

The Monitor

CASTNET

Clean Air Status and Trends Network

Fall 2008

The Newsletter for Air Quality Station Operators



National Park Service (NPS)
Gaseous Pollutant Monitoring Program
(GPMP)



Environmental Protection Agency (EPA)
Clean Air Status and Trends Network
(CASTNET) program

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NETWORK NEWS

NCore (National Core) network

The U.S. EPA promulgated air monitoring rule requirements October 17th, 2006 (40 CFR Parts 53 and 58), to urban area and National Ambient Air Quality Standards (NAAQS)-related ambient air monitoring networks which will lead to the creation of new sites and a reconfiguration and enhancement of existing networks. These revisions were part of a comprehensive review of ambient air monitoring requirements for all criteria pollutants. A major component

of the revised rule requirements is the creation of NCore, a multi-pollutant network that integrates several advanced measurement systems for particles, pollutant gases, and meteorology. The EPA is coordinating with federal, state, local, and Tribal partners, who will operate the NCore sites.

NCore network *continued on page 5...*

Update on installation of CR3000 data loggers at EPA-sponsored sites

As discussed in the previous issue of *The Monitor* (Spring 2008), installation of the new Campbell Scientific Inc. (Campbell) Model CR3000 Micrologger® data loggers began during January 2008 at the EPA-sponsored CASTNET sites. As of the end of August 2008, 16 sites had been upgraded with a CR3000. With all 59 of the EPA-sponsored sites slated to receive a new Campbell CR3000, a MACTEC installation team will be visiting your site soon.

The CR3000 has increased capabilities that allow MACTEC to poll and download data more frequently. The data logger can also be programmed to perform additional functions. The installation team is generally at the site for a day and a half. After the CR3000 is installed, the technician will verify that everything is working properly and polling correctly. The MACTEC field technician will arrange a time to meet with the site operator(s) for a training session prior to leaving the site. Obtaining data from the CR3000 in order to complete the weekly Site Status Report Form (SSRF) requires different procedures than were used with the previous data loggers. Information that describes the new standard operating procedures (SOP) for the weekly Tuesday site visit will be left at the site for future reference. If you have any questions, don't hesitate to call MACTEC's field operations group at 1-888-224-5663, ext. 6629 or 6621.

NETWORK NEWS *continued on page 2...*

NETWORK NEWS continued from page 1....

Voyageurs NP changes to satellite communications for data collection

The National Park Service air quality station at Voyageurs National Park, MN, changed its data collection communications system this summer from cellular telephone service to satellite service. Although satellite communications is not new to air quality monitoring stations, Voyageurs is the first NPS CASTNET air quality site to operate with such a satellite communications system.

As no land-line telephone exists, the Voyageurs station has used cellular telephone communications to transfer data from the on-site data logger to the ARS Information Management Center (IMC) since 1998. As analog cell communication is being rapidly discontinued throughout the country, alternative communications options were investigated. Converting to digital cellular service was not a feasible alternative due to equipment incompatibility and limited cellular service in the area.

Satellite communications have proven to be a viable alternative in other NPS remote monitoring locations. A StarBand satellite communication system was procured and installed at the Voyageurs station in June, and the station has been transmitting data routinely, on schedule, through an Internet connection to the IMC since then. No additional maintenance is required by the site operator for these systems.



The Voyageurs National Park air quality monitoring station in extreme northern Minnesota, received a new satellite communications system in June 2008.

Rocky Mountain NP to monitor high-altitude ozone

A CASTNET station operates at 9,000 feet on the southern edge of Rocky Mountain National Park, CO. Park resource personnel, however, have been concerned about ozone values at higher elevations and have requested that the National Park Service Air Resource Division (NPS ARD) monitor ozone in the remote, alpine tundra area of the park during Summer 2008. The NPS ARD responded by authorizing the deployment of a portable ozone monitoring station (POMS) at 11,500 feet. The station was installed in July 2008 by ARS, NPS ARD, and park personnel, was serviced bi-weekly by park personnel, and was removed in early September.

The data collected by the instrument show ozone reached significant levels at this high-altitude location, and mimics the lower-elevation CASTNET station under some conditions.

The high-altitude Portable Ozone Monitoring Station (POMS) operated at 11,500 feet elevation in Rocky Mountain National Park, Colorado.



POMS were developed several years ago to respond to an NPS need for a low-power relocatable ozone and meteorological monitoring station. ARS assisted with the development and assembled 14 POMS since 2002. The stations are typically used in remote locations where utilities are not available, and consist of a 2B Technologies Model 202 ozone monitor and meteorological sensors. The 2B Technologies analyzer is a UV photometer instrument; however, it does not currently have EPA-Equivalency status. Data are transmitted hourly via satellite, so near-real time observations are available. These stations' data are made available on AIRNow and on the NPS Data Display Web page. In addition, some stations have a CASTNET-style filter pack sampling system to help characterize the nitrogen and sulfur compounds impacting the region. The stations are deployed from May through September in the same location for several years before they are relocated. They provide the NPS to collect high quality ozone and meteorological data with hourly resolution in a cost-effective manner.

STATION OPERATOR FOCUS

Air quality is an extension of interest for Chiricahua operator Tina Thompson

NPS CASTNET site operator Tina Thompson at Chiricahua National Monument, AZ, is a contract operator who has an interest in her environment and finds time to do more.

Tina has been the Air Quality Operator at Chiricahua since April 2006. "I've enjoyed learning about the equipment and I like the challenge of keeping everything running in good order," said Tina. The air quality site at Chiricahua is a large station outfitted with instrumentation for several federal air monitoring programs. Tina devotes about four hours every Tuesday to perform checks and routine maintenance of the instrumentation, and to collect and change filters.

Tina's interest in nature has always been with her. She pursued interests in forestry at Northern Arizona University and agriculture and animal husbandry at Cochise College. Nowadays, she spends two days every week working at Chiricahua's Visitor Center.

Being a lifelong resident of Arizona, the remainder of Tina's time revolves around her family and working on the family ranch. "Growing up here on the ranch has given me a deep respect and love for the land. I have always been interested

in the plants and animals that surround us and I have turned into a natural history nut that can't pass up a good field identification book," said Tina. She is the 5th generation to live and work on the ranch; her great-great grandfather homesteaded it in 1879 and Tina, her husband David, and son Cory still live at the original homestead site.

Tina's interest in nature is also seen in her gardening, canning vegetables, and photographing southern Arizona. She took a little time off from all these interests this summer when she celebrated her 20th wedding anniversary.

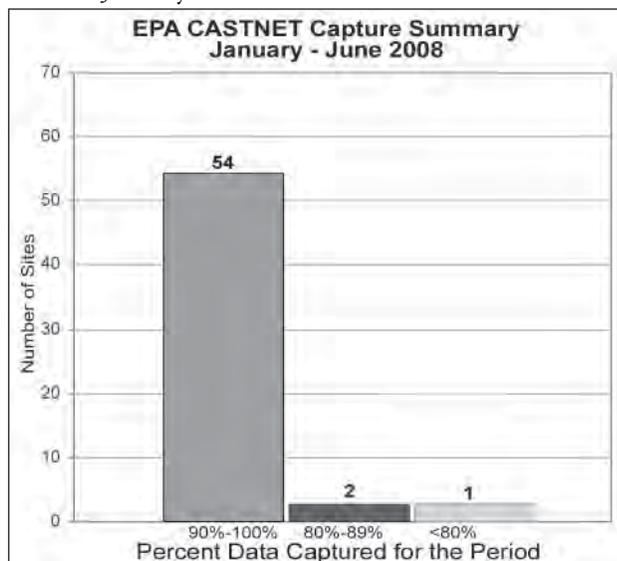


Air Quality Operator Tina Thompson performs mid-week checks when necessary to resolve any problems quickly.

DATA COLLECTION SUMMARY

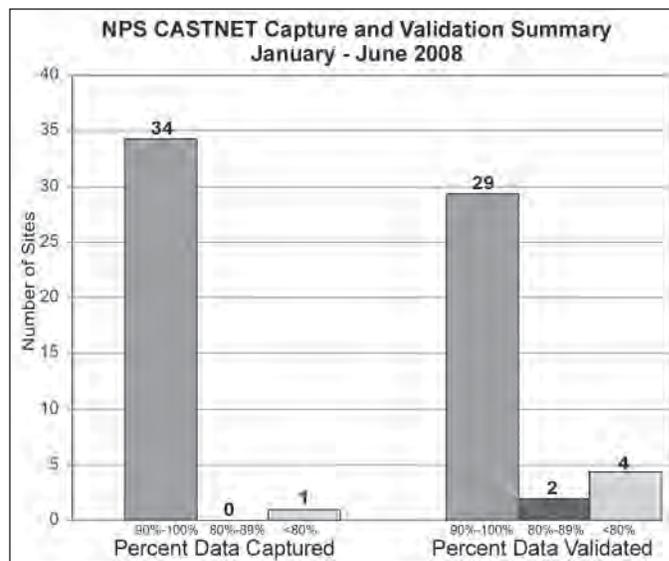
EPA site data capture summary

Ozone data capture for the EPA CASTNET sites for January through June 2008 is summarized in the graph below. The network achieved an average 98% collection for the period. Data validation statistics for the period will not be available until mid-January 2009.



NPS data capture and validation summary

Ozone data capture for the NPS CASTNET and GPMP sites for January through June 2008 achieved an average of 96% collection as illustrated in the graph below. Data validation for the same sites and period are also shown. The network achieved an average 92% final validation for the period.



FEATURE ARTICLE

Siting criteria and the NADP Site Survey Program (by M. Kolian, EPA)



"I wonder what's in those buckets....."

Any deposition site chosen for sampling and measurements should be representative of the area of interest. The size of this area represented is determined by the variability of the air, precipitation quantity and quality, and the desired spatial resolution in the concentration and deposition fields. When emissions influencing the air quality in an area are located outside that area, selection of the monitoring site involves consideration of the impact of the immediate surroundings and by emissions within 20km. These local emissions should not be allowed to result in unrepresentative measured air concentrations or precipitation chemistry at the site. In addition, local meteorological conditions, such as prevailing wind directions, and localized siting characteristics (e.g., equipment configuration or farming operations) should be considered.

The National Atmospheric Deposition Program (NADP) monitoring networks (e.g., NTN, MDN, and AIRMoN) includes a range of quality assurance/quality control activities. One of those activities is the site systems and performance surveys (referred to as site surveys). Site surveys are conducted by an independent field survey team approximately once every three years. The site survey program is sponsored by the US EPA's Office of Atmospheric Programs through a contract with Environmental, Engineering & Measurement Services, Inc. (EEMS). In addition to NADP site surveys, EEMS performs independent site audits for the CASTNET measurement stations.

Maintaining NADP siting criteria rules and guidelines are critical to ensure network sites are comparable and regionally representative. The photo above is from a survey EEMS conducted this past year at an NTN site, a site that is collocated with a CASTNET site. While the photo is

amusing, it does illustrate one of many challenges associated with operating a monitoring network. Mobile siting criteria problems that may affect the sample can be difficult to control.

During a field survey the survey team will verify the calibration and proper operation of the field instruments (e.g., precipitation gauge and precipitation collector),

document site information and siting criteria, sketch and photograph the site, observe sample handling procedures, and answer any questions. Primary site operators are required to attend the site survey which is scheduled at least one month in advance. Site supervisors and backup operators are also welcome and encouraged to attend. Any changes that may have occurred at the site since the last survey are good to share with the survey team.

The most common problems observed during NADP site surveys include violations of siting criteria within 5m of the collector and/or rain gauge. Examples include:

- Vegetation greater than 2 feet tall within 5m of the collector or rain gauge, objects > 1m within 5m of the collector or rain gauge;
- Misorientation of the collector and the precipitation sensor;
- Unacceptable height difference between the tops of the collector and rain gauge;
- Objects that project onto the collector or rain gauge (e.g., trees, building structures) that are within 30m of the collection equipment which could influence sample collection.

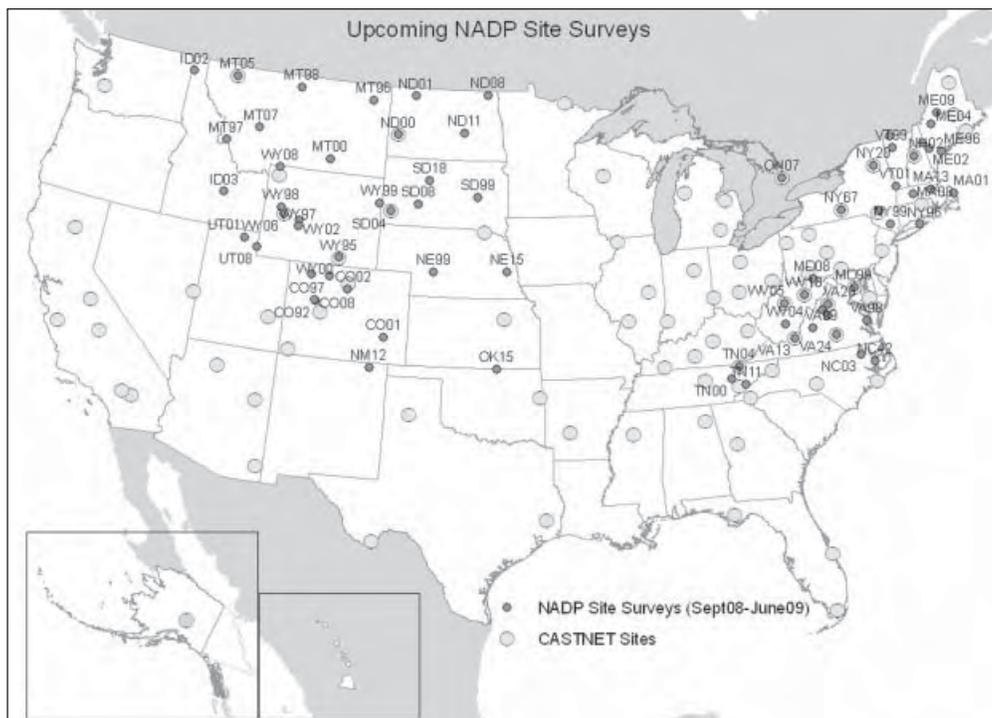
While these violations seem relatively minor they can translate into problems with sample integrity/contamination, collection efficiency, and other possible sample biases. Overall siting criteria, rain gauge and collector condition, and site operator proficiency are the areas that may most impact data quality. While performing routine operations at the site, it is good to keep these items in mind. This helps ensure that the quality of the sample will not be impacted by external factors, and that the sample is as representative for the site as possible.

If you have any questions or concerns regarding the operation of the site or siting criteria, please contact the appropriate site liaison. The contact information for each of the NADP networks is listed below as well as a map of sites (Figure 1) that are targeted for a site survey (through June 2009).

- NTN 800-952-7353
ntn@sws.uiuc.edu
- MDN 877-622-6960
hal@frontiergeosciences.com
- AIRMoN 800-952-7353
airmon@sws.uiuc.edu

Remember, the success of the networks starts with you!

Figure 1. NADP sites targeted for a site survey (through June 2009).



NCore network *continued from page 1...*

The NCore objective is to locate multi-pollutant sites in broadly representative urban (~50 sites) and rural or regional (~20 sites) locations throughout the country to help characterize urban- and regional-scale patterns of air pollution.

The EPA anticipates each state to have at least one NCore site, with more populous states and areas with non-attainment issues having multiple sites. The EPA will collaborate on site selection with its partners. In many cases, monitoring agencies will likely upgrade existing State and Local Monitoring Stations (SLAMS) locations, and where possible, agencies are encouraged to collocate NCore sites with Photochemical Assessment Monitoring Stations (PAMS) sites already measuring ozone precursors, National Air Toxics Trends Stations (NATTS) sites measuring air toxics, or Clean Air Status and Trends Network (CASTNET) sites measuring ozone and other parameters to provide information for the regional and rural required network sites. By combining these monitoring programs at a single location, stakeholders can maximize the multi-pollutant information available.

The parameters required at each NCore site are listed in Table 1. In addition, integrated nitric acid and ammonia sampling will be investigated for inclusion at NCore sites; however, the methods, sampling frequency, and implementation details for these gases remain under consideration at this time. Although these parameters include the criteria pollutants except Pb and NO₂, the parameters are not chosen for compliance purposes. Instead, they represent a robust set of indicators that

support multiple objectives including accountability, health assessments, and emissions strategy development.

Table 1. Required NCore Parameter List

Measurements	Comments
PM _{2.5} FRM mass	Typically 24-hr average every 3 rd day
Continuous PM _{2.5} mass	1-hr reporting interval for all continuous species
PM _{2.5} speciation	Organic and elemental carbon, major ions, and trace metals (24-hr average every 3 rd day)
PM _{10-2.5} mass	Supporting research related to potential future PM _{10-2.5} standard
PM _{10-2.5} speciation	Analytes to likely include elemental analysis and possibly major ions. Operations would be integrated/collocated with PM _{2.5} speciation
Ozone (O ₃)	Continuing use of continuous FEM analyzers
Carbon monoxide (CO)	Using high sensitivity analyzers
Sulfur dioxide (SO ₂)	Using high sensitivity analyzers
Nitrogen oxide (NO)	Using high sensitivity analyzers
Total reactive nitrogen (NO _x)	Using high sensitivity analyzers
Surface meteorology	Wind speed and direction, temperature, relative humidity

A plan for the implementation of the required NCore multi-pollutant monitoring stations, including site selection, is due by July 1, 2009. States, locals, and Tribes must implement the required NCore multi-pollutant stations by January 1, 2011. For additional information on design attributes, data objectives, and proposed locations of the NCore network visit: <http://www.epa.gov/ttn/amt/c/ncore/index.html>.

SHOP TALK

Time for a contractor visit



Twice each year, every monitoring station receives a thorough maintenance and instrument calibration from an ARS or MACTEC field specialist. This is your opportunity, as a station operator, to participate in the visit, ask questions, and get problems resolved that have been bugging you.

So how does the contractor visit work? We can divide it into three parts: 1) pre-visit preparation, 2) the actual visit by the field specialist, and 3) post-visit items to follow-up. Let's see what is involved at each step of the way.

Pre-visit preparation

The CASTNET program technical representative (NPS or EPA) will coordinate with the project manager of their respective contractor project manager (ARS or MACTEC) to confirm the scheduling of these visits. A general outline is prepared at the beginning of each contract year, and refinement of the schedule occurs each month. After the schedule has been set, all appropriate personnel are notified about the pending visit. The project manager will discuss specific site maintenance or other requirements needed to be performed during the visit with the assigned field specialist.

The field specialist will contact you, the station operator, to discuss any special arrangements that need to be made for the visit. You should receive a site visit notification letter within two weeks prior to each visit. Please notify any backup or relief operators about the visit as well, and please try to arrange your work schedule so you will be available to assist during the visit.

Visit procedures and tasks

The field specialist will perform the maintenance and calibration of your shelter and instrumentation, and will train you on new procedures as well as provide refresher training on routine, weekly tasks you perform. Now's the time to ask questions. Is there anything special that needs to be looked at? Are you fuzzy about "why" or "how" to do something? Do you have adequate consumable supplies such as gloves or desiccant? The field specialist will also verify and update your station's inventory and quality assurance documentation (operator procedure manuals). The specialists will also update the site's equipment inventory and take new documentation photographs of your station and its surroundings. These twice-annual visits generally take one or possibly two days' time.

Your responsibility as a station operator is to plan for any special arrangements, such as contacting the local utility

company or other contractor that may be required for the visit. Generally this is needed when new sites are installed, or a new shelter will be relocated at the site that may require a trench to be dug for the utility lines prior to the field specialist arriving on site.

Please make every effort to be available for the visit, as they are only made twice each year! By meeting the field specialist you will also develop a rapport, helping you to match a person to a voice when you telephone your support center with a problem. The field specialists are here to ensure your monitoring efforts run as smoothly as possible.

Post-visit wrap-up

After returning home, the field specialist will compile a written trip report and finalize calibration forms which will summarize the trip. The report will include conditions of the monitoring site found upon arrival, problems noted, corrective actions taken, training performed, equipment inventory lists, calibration documents, and problems requiring further attention. If you are an NPS site, you will be able to view the report on your DataView system within a few weeks following the visit. The field specialist will also follow-up on repairs or other actions required, and ensure these actions are performed expeditiously.



ARS field specialist John Faust performs a semiannual site maintenance and calibration visit at Yosemite National Park. Station Operator Katy Warner is on-hand to assist and looks on.

Monitoring Site Assistance:

NPS CASTNET sites: contact Air Resource Specialists
telephone: 1-800/344-5423 (Mountain Time)

EPA CASTNET sites: contact MACTEC
telephone: 1-888/224-5663 ext. 6629 and/or 6621
(Eastern Time)

OPERATOR'S TOOLBOX

Preparing for winter



As temperatures fall and snow begins to fly, your air quality shelter may need some special attention, and ensuring it is environmentally sound may save you a lot of trouble later on. Now is a good time to check and repair a number of maintenance items.

Shelter leaks

Check your shelter for various types of leaks, both water and air. EKTO shelters are generally pretty water-tight, but as they age, caulking, door, and air conditioner seals can shrink and become brittle, allowing rain and snow melt to leak in and cause significant damage if left unchecked.

Pay particular attention to cable and plumbing entrances where water could enter and recaulk as necessary. Recent water stains on the inside can indicate new leaks. The exterior seam at the bottom of the shelter wall is often overlooked. As rain hits the shelter wall, water flows over this seam and any void will cause a wet floor on the inside.

Check all shelter inlets both inside and outside (Figure 1) to see if there is evidence of rodent activity or space where rodents or insects could enter the shelter. Your shelter can become a very cozy home for animals and insects during any season.

Heating function

Ensure your shelter's heater is functioning properly. For most shelters, it should switch automatically from air conditioning to heat when appropriate. Proper station temperature is critical to the proper functioning of your gas analyzers, and station temperature is also a parameter collected by the data logger. It should be maintained at a temperature between 68°F and 86°F (20°C and 30°C) and you should feel comfortable while performing your instrument checks while inside your shelter. A simple test adjustment of the thermostat should call for baseboard heat. No heat (or no cool) equals no data when shelter temperatures fall below 20°C or rise above 30°C.

Outside the shelter

Outside the shelter, inspect wiring and cables for weathering cracks or other areas of concern. Make sure tower junction boxes and other enclosures are sealed. Winter winds may strain tower guy wires and sensor cabling. Check to see if guy wires are taut and signal cables are adequately tie-wrapped to the tower.

Just like at home, your shelter may need a snow shovel to gain access to it in the winter months. Keeping the doorway



Figure 1. Check all building inlets for holes where rodents may gain access into your shelter and where heat loss may occur.

clear of built-up snowfall will make your weekly servicing visits easier. You may also need to shovel a path to your precipitation sensor. In addition, placing a mat inside your shelter to wipe your feet may be a good idea.

Where are the sensors?

It is a good idea to mark the location of your low-level sensors (Figure 2) such as your wetness sensor and your precipitation sensor if you're in an area that receives heavy snowfall during winter months. Marking these locations will ensure you know where they are and may alleviate any damage by walking or driving on them.

Contact your monitoring support contractor if maintenance or repairs are beyond your capabilities. A little attention now could save a lot of effort and possible data loss later.

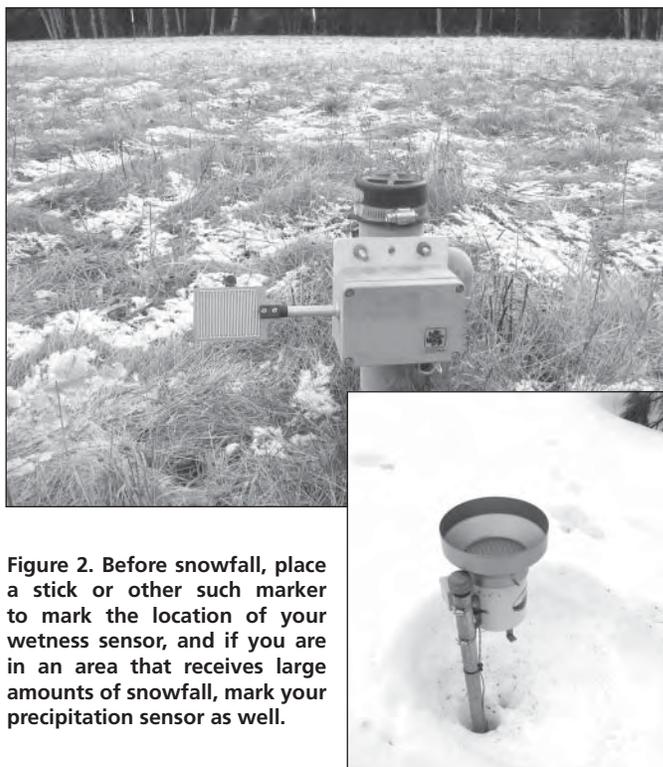


Figure 2. Before snowfall, place a stick or other such marker to mark the location of your wetness sensor, and if you are in an area that receives large amounts of snowfall, mark your precipitation sensor as well.

Air Resource Specialists, Inc.
1901 Sharp Point Drive, Suite E
Fort Collins, CO 80525

TO:

First Class Mail



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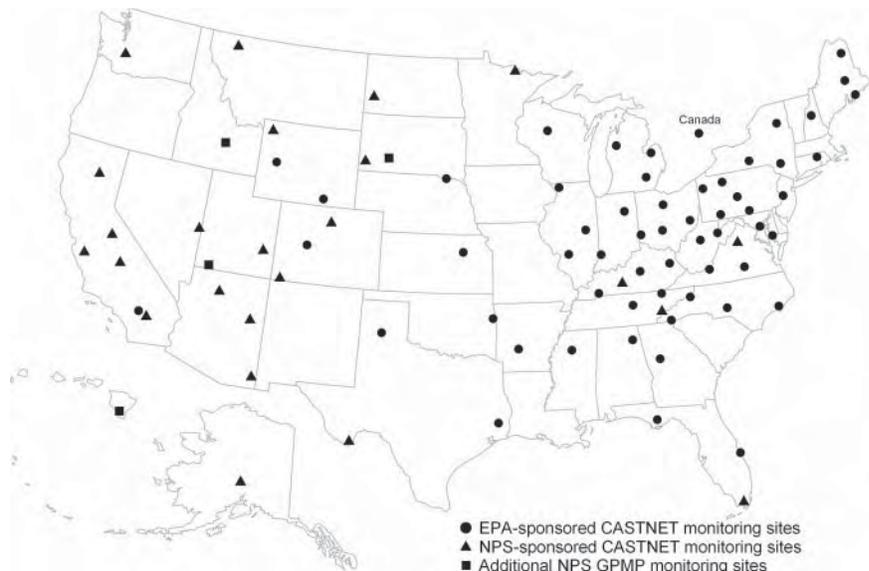
1901 Sharp Point Drive, Suite E
Fort Collins, CO 80525
Telephone: 970/484-7941
Toll Free: 1-800/344-5423
Fax: 970/484-3423
E-mail: info@air-resource.com

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Newsletter production consultant:
John D. Ray - Program Manager, NPS ARD
Telephone: 303/969-2820

Editor: Gloria S. Mercer
Air Resource Specialists, Inc.
Telephone: 970/484-7941

CASTNET Monitoring Program Locations



EPA Clean Air Status and Trends Network
(<http://www.epa.gov/castnet>)

NPS Gaseous Pollutant Monitoring Program Network
(<http://www.nature.nps.gov/air/monitoring/index.cfm>)