

What is the Montana Mesonet? v220215



The Montana Mesonet is a partner-driven system of networked climate observation stations. The closely spaced stations monitor weather, soil moisture, and (optionally) vegetation response. Near real-time data are transmitted by cellular signals for viewing on-line through the [Montana Climate Office](#) (MCO). The purpose of the MT Mesonet is to support adaptive management of farms, rangeland, water resources, and natural ecosystems; with the aim of building resilient and sustainable agricultural, economic, and ecological systems.

Each MT Mesonet station is configured with a surface weather package, a soil moisture array, and a solar-powered data logger/transmitter unit. Atmospheric data support calculation of evapotranspiration and other meteorological derivatives useful for management decisions. The soil probe array monitors water availability essential for plant growth. Volumetric water content measures soil response to precipitation and vegetation, soil temperature monitors subsurface response to surface temperature trends, and electrical conductivity is sensitive to agricultural inputs and changes to biogeochemical processes.

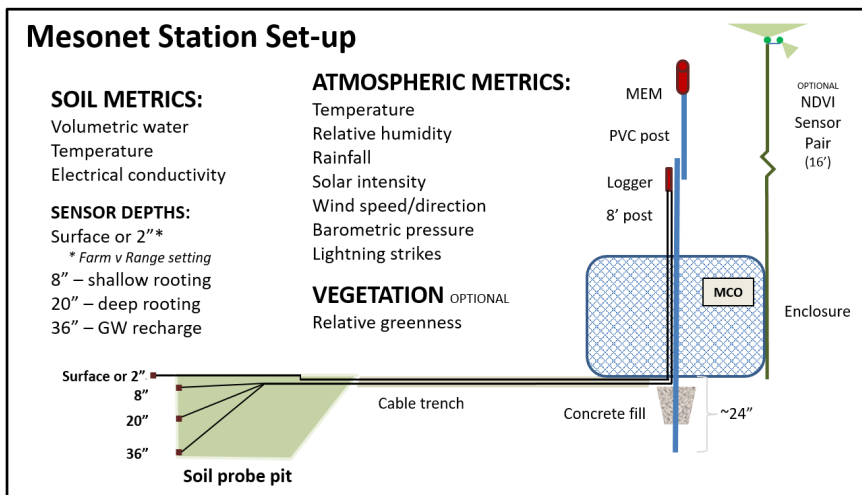


Figure 1: Standard Mesonet Station Set-up using METER equipment with soil and atmospheric metrics recorded.

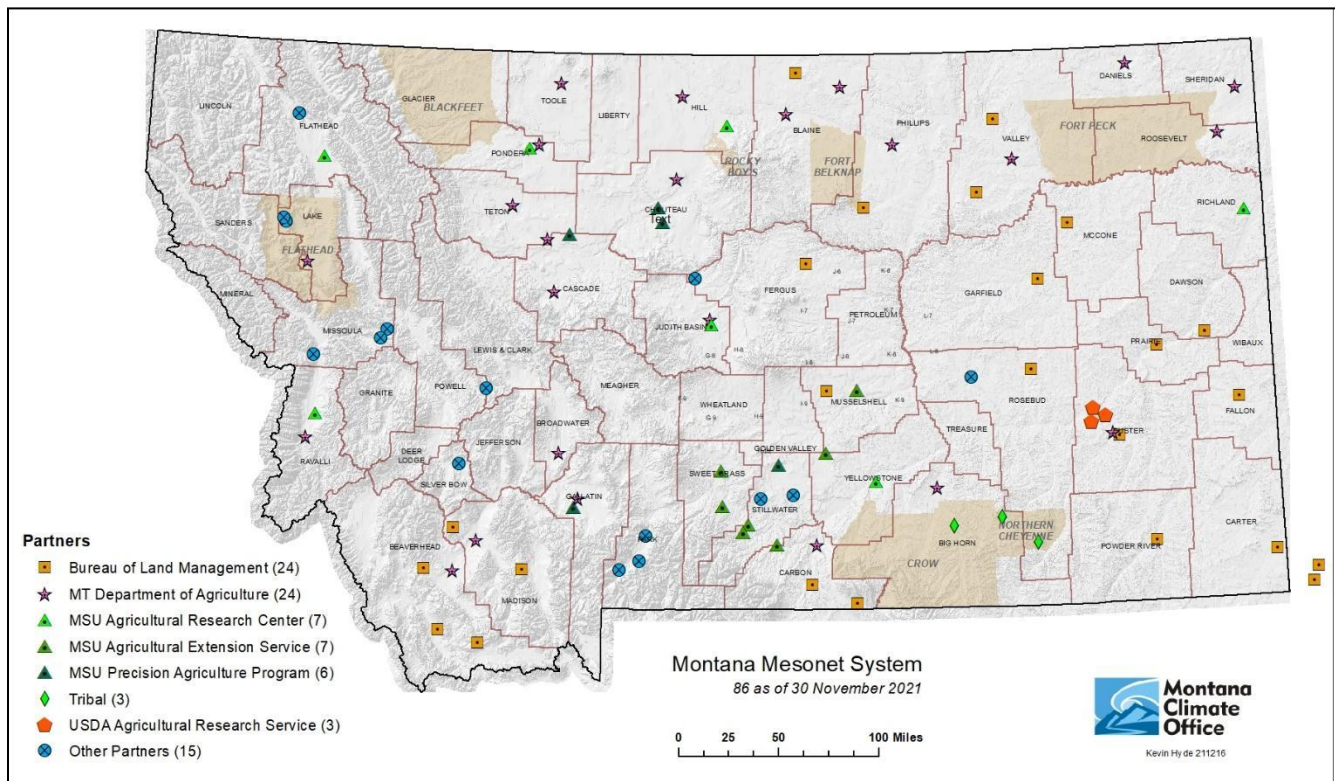
The vertical soil sensor profile monitors trends with depth and potential recharge. Soil data support decisions about crop timing, stocking levels, available water, irrigation efficiency, and drought potential. The *optional* NDVI sensor pair monitors relative vegetation greenness, a commonly used indicator of vegetation productivity, where local NDVI provides means for future calibration of broad-scale satellite images of vegetation response, water stress, and drought indicators.



Figure 2: Completed station in sagebrush rangeland west of Dillon, MT with optional NDVI sensor pair measuring vegetation greenness. NDVI can be used to track vegetation health and forage production.



Figure 3: Soil pit in silty loam near Roundup, MT. The probes record changes in plant available water, temperature, and soil water quality.



The Montana Mesonet is part of the National Mesonet system. Our goal is to build out a system of strategically placed stations representing the range of environments, land uses, and jurisdictions across Montana. Build-out of the MT Mesonet began in 2016. Currently 86 stations are active. Additional stations are funded with installation pending.

The Montana Climate Office is the home base for the developing the MT Mesonet. We actively seek partnerships to invest in building a sustainable climate information and decision support system for Montana.

Vision Statement: The Montana Mesonet Project aims to build out and sustain a high-density network of climate observation stations to provide near real-time data, data derivatives, decision-support tools, and user training to support the economy, environment, and culture of Montana.

1. Build and sustain **Climate Observation Network**
2. Develop **Decision Support Services**
3. Build and implement **User Education Programs**
4. **Support Public Sector** service needs
5. Design and implement a **Subscription Business Model**
6. Develop and sustain applied **Climate Research Program**

Active Partnerships (Direct or in-kind support)

- Private Ranches and Farms
- Bureau of Land Management
- Montana Institute on Ecosystems
- Stillwater County
- Sweetgrass County
- MT Department of Agriculture
- MSU MT Agricultural Experiment Station
- The Blackfoot Challenge
- Crow Agency
- Northern Cheyenne Tribe
- MT Dept. of Natural Resources and Conservation
- NOAA: National Mesonet Program
- National Forest Service
- Governor's Drought & Water Supply Committee
- MT Bureau of Mines and Geology
- NOAA: National Integrated Drought Information System
- USDA Agricultural Research Service

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