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The Montana Natural Resources Conservation Service Soil Health Strategy

*Healthy, functioning soil as the foundation
for all working lands in Montana*





The Montana Natural Resources Conservation Service Soil Health Strategy

A plan to meet current and future challenges in agriculture

Our mission: healthy, functioning soil as the foundation for all working lands in Montana.

While the U.S. agricultural industry has made significant strides in improving farming practices to decrease soil erosion and improve water quality, we still face numerous challenges in the 21st century. Herbicide resistant weeds, large fluctuations of input costs, overuse of inputs and the resulting environmental degradation, continued erosion, and new diseases and insects all threaten producers' livelihoods. The Soil Conservation Service, created during the Dust Bowl era, concentrated on ways to decrease soil erosion. Today, we recognize we have to consider more than getting to "T," tolerable soil loss levels, for successful conservation. The average annual erosion on Montana cropland was 11.4 tons per acre in 1987. Twenty years later, in 2007, the average annual erosion rate was 6.4 tons per acre. This is progress. It is keeping rivers and air cleaner, but it is treating a symptom rather than the problem of unhealthy soil.

We must change our minds about soil health and how it functions. Many of our problems, regardless of land use, are actually symptoms of the main problem, dysfunctional soil. A healthy functional soil does not erode, keeps pests in check, supplies plants and animals with what they need when they need it, and provides for long-term sustainable systems. A soil health approach to conservation planning can better address the opportunities we have to improve resource conditions.

A simple definition of soil health is "the capacity of a soil to function."

Soil is a living factory of macroscopic and microscopic organisms that need food to eat and places to live. Without these organisms, soil does not function efficiently. These organisms control soil's ability to supply water and nutrients to plants, and they ultimately determine how successful ranching, forestry, and farming operations will be. A healthy soil contains a multi-

tude of individual organisms, including bacteria, protozoa, nematodes, fungi, molds, and yeasts and can be decomposers, pathogens, parasites, predators or grazers. Beetles, mites, and small animals feed on the tinier creatures to cycle nutrients.

The challenges are to harvest sunlight through photosynthesis, allow microorganisms to break down carbon from plant residues, and cycle nutrients so they are available to growing plants in order to manage farms, ranches, and forests sustainably for food and fiber in the future. Managing for soil health and improved soil function is mostly a matter of maintaining a suitable habitat for the myriad of creatures that comprise the soil food web. That means disturbing the soil as little as possible, growing as many different species of plants as practical, keeping living roots in the soil as often as possible, keeping the soil covered all the time with plants and plant residues, and managing livestock to benefit the soil. Managing for soil health has implications regardless of land use; range, crop, pasture, hay and forest lands can all benefit.



Soil health must become part of the NRCS culture.

Because soil is the foundation of conservation planning, we should consider soil health first. By focusing on soil health we can provide the best return on our nation's conservation investment and on the farmer or rancher's bottom line.

Montana NRCS has made excellent progress in promoting soil health in the past few years. We believe our work has resulted in conservation on the ground that is regenerating soil across the state. Some examples include:

- We have sponsored field days and workshops that have promoted soil health to over 6000 producers, along with numerous federal, state, local and conservation district personnel.
- Outside speakers, brought in by MT NRCS, have challenged producer thinking and the status quo, leading many to change how they see soil and thus change how they farm and ranch. This "bottom up" movement has also pushed research institutions such as ARS and MSU to invest resources into soil health research, e.g. evaluating the use of cover crop mixes in cropping systems.
- Many Conservation Districts have made field trips to innovative soil health producers operations (e.g. Burleigh County, ND), and have returned to aggressively promote soil health in their counties. A number of districts now rent no-till single disk drills, others offer their own cover crop mix cost share programs, and others directly sponsor their own field days and workshops.

- We have assisted innovative producers in becoming "soil health champions" who can communicate the soil health message to other producers very effectively.
- We are active participants in the national Soil Health Nutrient Tool Project, working with producers to educate them on soil health.
- Many of our staff, through formal and informal training, have become technically competent in using tools to build soil health, resulting in the increased adoption of diverse no-till cropping systems, cover crop mixes, integration of crop and livestock components, and improved grazing systems.
- We have partnered with MACD to sponsor soil health workshops across the state, making outreach to producers more effective.



Rainfall simulators such as this one comparing no-till soil, conventional-till soil, CRP soil, overgrazed range soil and a healthy range soil are used for outreach and education.

Goal 1: Get More Conservation on the Ground Resulting in Improved Soil Health

1. Increase knowledge and adoption of soil health principles and practices by farmers, ranchers, forest landowners, and others.
 - a. Provide outreach and education regarding soil health principles for agricultural producers throughout Montana.
 - b. Promote at least one soil health event by each Field Office per year.
 - c. Support the Bridger Plant Materials Center as a Center of Sustainability in cooperation with the Montana-Wyoming PMC Board of Managers for long-term demonstrations of technologies that improve soil health.
 - d. Develop new training materials covering soil health and agro-ecosystem sustainability and work with the public affairs staff to keep the soil health web page current.
 - e. Assist in the development of cost list items and enhancements in order to improve adoption of soil health principles via EQIP and CSP.
2. Improve technical knowledge and consistency of analysis tools.
 - a. Collaborate with research partners to address NRCS needs related to soil health.
 - b. Facilitate awareness of research funding opportunities such as Conservation Innovation Grants and Sustainable Agriculture Research Education grants.

Goal 2: Increase Organizational Effectiveness and Efficiencies to Promote Soil Health

1. Form a Soil Health Advisory Committee to help implement and continuously improve Montana's Soil Health Strategy, develop and revise technical resources for soil health, cooperate with Programs on soil health for EQIP, CSP, etc. and advise the State Conservationist.

- a. Committee make-up: 2 members/area; 3 state office representatives.
- b. Committee should meet in person once per year with quarterly teleconferences.
- c. Committee will serve as lead in development of Soil Health education for Conservation Planning Course.
- d. Encourage each NRCS area to develop an active Area Soil Health Team to work and share information on localized issues of importance.
- e. Maintain coordination with the Soil Health Division concentrating on the four national goals of training, assessment, planning and implementation.

2. Montana NRCS leadership will encourage and support the training of all NRCS and conservation partner employees, so to promote and practice soil health principles as part of the planning process.

- a. Require training on soil health and agro-ecology principles as part



of conservation planning certification by integrating soil health principles and practical training in the Montana conservation planning course.

- b. Recommend NEDC course "Soil Health & Sustainability for Field Staff" for all new employees.
- c. Support "in the field", OJT soil health training as follow-up to conservation planning course.
- d. Support employees attending seminars, tours and workshops related to soil health.
- e. Encourage inter-area exchange of training resources and staff.



Field tours demonstrate the soil health benefits of conservation practices such as this cover crop "cocktail mix" of radishes, turnips, millet, peas, lentils and safflower and oats grown near Plevna, Montana.

Goal 3: Develop strong partnerships with the Montana Association of Conservation Districts and Montana Department of Natural Resource Conservation to ensure statewide efforts cross agency lines.

- a. Work with MACD to develop a soil health training (anywhere from 2 hours to a half-day) for conservation district employees and supervisors.
- b. Work with MACD to sponsor annual soil health workshops, with NRCS providing speakers and topics.
- c. Explore partnerships with DNRC and other agencies and organizations to promote soil health.
- d. Explore partnerships with agri-business and ag-lenders to promote soil health.

NRCS in Montana is fully engaged in this Soil Health Strategy. Farmers, ranchers, forestland owners, and our employees have seen the important difference healthy, functioning soil can make in supporting our other water, air, plant, animal, and energy resources. We are committed to making soil health a priority for the producers of Montana.



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