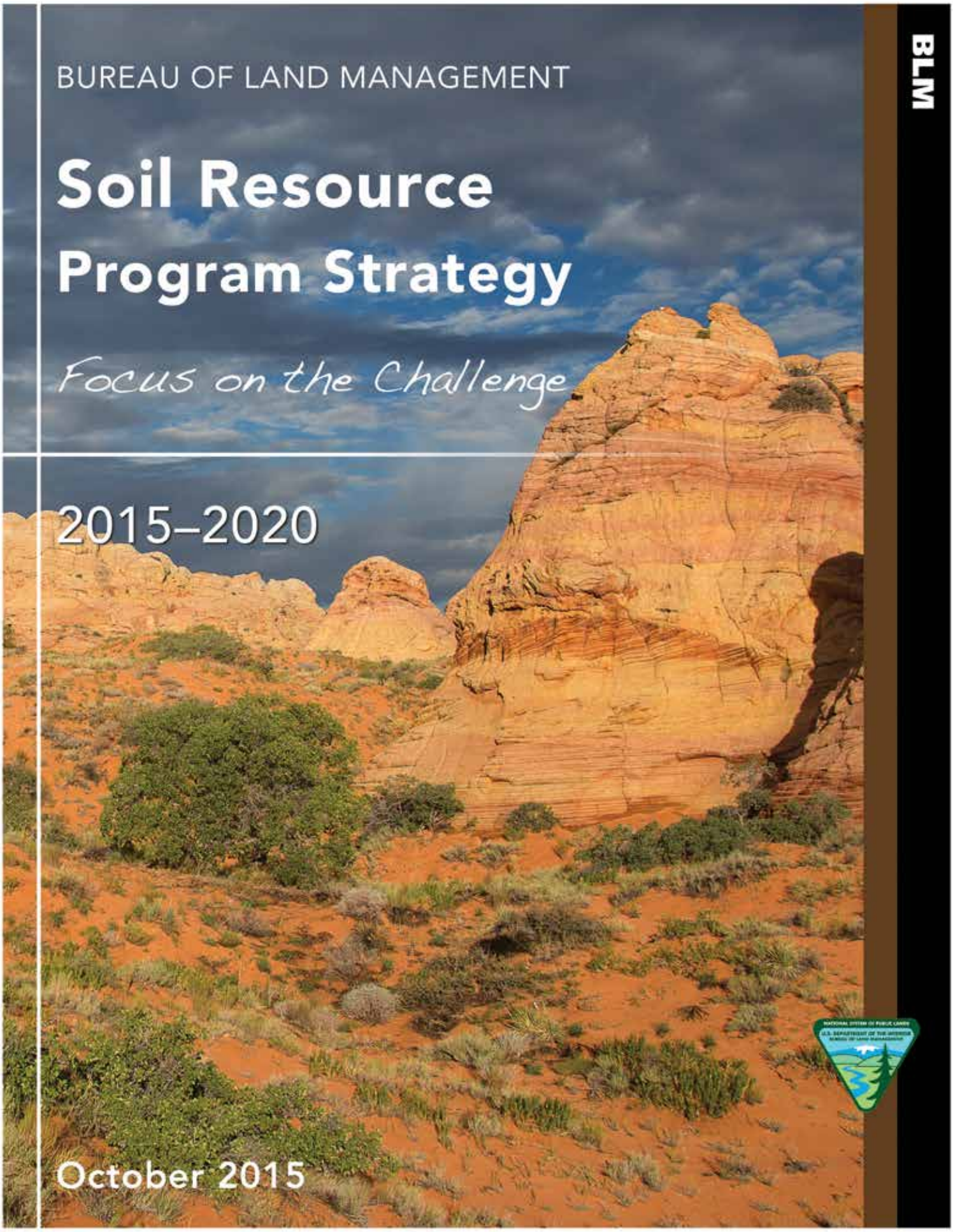
BUREAU OF LAND MANAGEMENT

Soil Resource Program Strategy

Focus on the Challenge

2015–2020



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BUREAU OF LAND MANAGEMENT

Soil Resource Program Strategy: Focus on the Challenge 2015-2020

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SOIL, WATER, and AIR PROGRAM

Mission Statement

We maintain and improve foundational processes to ensure resilience of our watersheds and other landscapes and to promote ecosystem integrity by protecting, maintaining, and improving the quality of soil, water, and air resources on public lands in partnership with communities and stakeholders.

Vision Statement

The Soil, Water, and Air Program seeks to improve the quality and effectiveness of decisions made by the Bureau of Land Management by:

(1) Integrating natural resource conservation and sustainable use principles in soil, water, and air activities and functions.

(2) Providing effective engagement with other programs, partners, and stakeholders.

(3) Striving to make soil, water, and air resources knowledge and expertise accessible throughout the BLM.

Principles

Guiding principles for Soil, Water, and Air Program personnel when evaluating assessments and making decisions include:

(1) Using integrated and holistic systems approaches, including the BLM landscape approach.
(2) Collecting and analyzing information at multiple scales.
(3) Keeping a strong basis in science.
(4) Expanding partnerships.
(5) Ensuring transparency and open communication at all levels.
(6) Choosing purposeful outcomes and measurable effects.
(7) Fostering the continued evaluation and improvement of all aspects of the program.

Soil Resource Program's Challenge

Improving the capacity of soils to provide a supporting matrix for vital ecosystem processes that sustain plants, animals, and human societies through BLM land management decisions.

Table of Contents

Executive Summary

The Bureau of Land Management (BLM) Soil, Water, and Air Program has established 5-year strategies for all three program elements to support BLM professionals in meeting conservation challenges posed by increasing societal demands for access to ecological resources on public lands. This strategy highlights the management challenges particular to soil resources, describes the diverse roles and responsibilities of federal agencies, and outlines a set of overarching goals specific to the BLM Soil Resource Program for implementation over the next 5 years.

The overarching goals in this strategy include: (1) Update Soil Resource Program policy guidance documents; (2) Assess all planning actions with respect to the chemical and physical properties of soils provided in soil surveys, and outline recommended design features and the planned actions to avoid based on soil map unit limitations; (3) Institute as standard practice the use of regional (e.g., ecoregion, Major Land Resource Area) landscape boundaries to assess cumulative and continuing effects on soil resources from all project actions proposed within the boundaries. (Follow BLM landscape approach guidance where applicable); (4) Improve the effectiveness of soil parameter measurements and analyses efforts; (5) Limit environmental contamination from unnecessary or undue transport of soils into waters or the atmosphere; (6) Improve relationships with other programs, agencies, and stakeholders; (7) Enhance the BLM's technical expertise relevant to understanding, assessing, and managing soil resources; and (8) Continue to coordinate Soil, Water, and Air Program activities with other BLM programs responsible for decisions on and management of use authorizations, other resource uses, and resource conservation and protection actions.

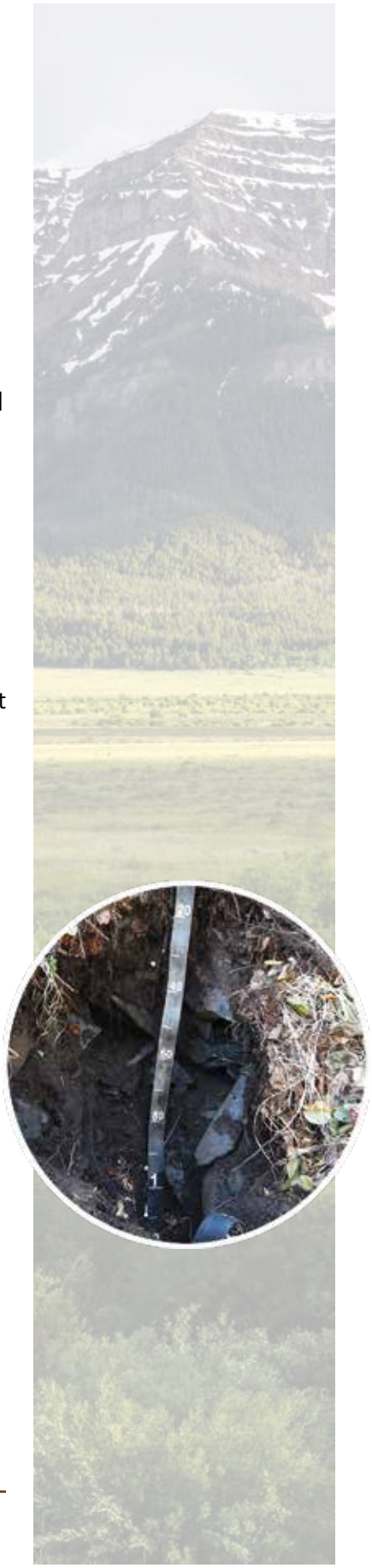
These strategic goals will enable the BLM to continue to protect soil resources while applying the Federal Land Policy and Management Act's multiple-use mandate for managing public lands. A critical aspect of this soils strategy is using a landscape approach based on ecoregional boundaries or the Natural Resources Conservation Service's Major Land Resource Areas, as applicable. By placing program emphasis on proactive measures to reduce erosion, improve management of permafrost soils to reduce human impact and deal with the effects of changing climate, improve regional salinity reduction assessments, design and implement monitoring plans, and improve data management, the Soil Resource Program will ensure a focus on elements critical to its success. Also, collaborative relationships with other agencies and stakeholders, plus strengthening the soil expertise within the BLM, are equally critical elements. This strategy offers opportunities for continual learning to inform BLM soil resource professionals, as well as to support other resource management efforts.

1. Introduction

Soils provide a foundation for all ecosystem services. They are comprised of a mixture of minerals, water, air, organic matter, and organisms. Soils are a renewable resource, but they are dependent on duration and level of degradation (e.g., topsoil erosion, nutrient depletion). Soils support and deliver many ecosystem services vital to human societies but, in the process, are subjected to erosion, organic matter decline, contamination, salinization, compaction, soil biodiversity loss, thermokarst, landslides, and flooding. Recent reports suggest there has been a significant increase of soil degradation around the world; there is evidence that it will continue if no action is taken to reverse the degradation.[1]

The BLM will review proposed land management actions to recommend ways rangeland and forestry practices, industrial activities, and other development and recreational activities can prevent soils capacity reduction. This, in turn, will help provide crucial ecological functions and supply ecosystem services vital to society. However, this does not prevent unauthorized use from degrading these same lands. In the United States, the Soil and Water Resources Conservation Act of 1977, as amended, provides the U.S. Department of Agriculture broad strategic assessment and planning authority for the conservation, protection, and enhancement of soil, water, and related natural resources. The BLM has no singular piece of legislation that provides for soil protection. However, soils are intricately linked to the Clean Water Act and Clean Air Act, and soil conservation is specifically cited in the National Environmental Policy Act (NEPA), Federal Land Policy and Management Act (FLPMA), Taylor Grazing Act of 1934, Bankhead-Jones Farm Tenant Act of 1937, and Farmland Protection Policy Act of 1981.

Other legislation important to the requirement of maintaining soil sustainability includes the: Wild Free-Roaming Horses and Burros Act of 1971, Public Rangelands Improvement Act of 1978, Federal Noxious Weed Act of 1974, Watershed Restoration and Enhancement Agreements (Wyden Amendment), Fish and Wildlife Coordination Act of 1934, Water Resources Reform and Development Act of 2014, Surface Mining Control and Reclamation Act of 1977, Healthy Forests Restoration Act of 2003, Federal Lands Recreation Enhancement Act of 2005, and Alaska National Interest Lands Conservation Act of 1980.



[1] R. Michael Lehman et al., "Understanding and Enhancing Soil Biological Health: The Solution for Reversing Soil Degradation," Sustainability 7 (2015): 988-1027.

In addition to the legislation applicable to soils, the BLM is required to follow standards and guidelines consistent with the fundamentals of rangeland health (43 CFR 4180.1). Soils are intricately linked to the attainment of the fundamentals of rangeland health, which include: (1) watershed function (upland, riparian, and aquatic functioning in watersheds), (2) ecological processes (hydrologic cycle, energy flow, nutrient cycle), (3) water quality, and (4) habitat quality for threatened and endangered and other special status species.

This strategy establishes a framework for the BLM's role in protecting soils, in general, and for conserving those environmental, economic, social, and cultural functions specific to:

- Producing biomass (forestry)
- Storing and filtering nutrients, substances, and water
- Providing for the diversity of species and the complexity of their habitats
- Providing raw materials
- Sequestering carbon
- Serving as the archive of geological and archaeological heritage

The primary goal of this strategy is to build on the existing policy of the BLM's fundamentals of rangeland health and land health standards and to establish a common approach for the protection and sustainable use of soils. The approach focuses on working with other BLM programs on soil resource concerns by establishing policies promoting sustainable soil functions, reducing threats to soil resources, and restoring degraded soils to a suitable level of functionality.

2. Emphasis, Perspective, and Services

2.1 A Soils Emphasis

Soils and soil processes provide the structural landscape and functional ecosystem context for BLM land management decisions. Resilient soils across a landscape provide a number of beneficial (ecosystem) services, including buffering nutrient concentrations for long-term productivity, improving water and air quality, and regulating flood waters, while also supporting other resource uses on BLM-managed public lands. A considerable amount of BLM management decisions require reliable and readily accessible soils information, as well as interpretation expertise; ecological site descriptions greatly assist with assessment and interpretation expertise.

To help the BLM meet its multiple-use mission, BLM soil scientists are assigned to select geographic areas within BLM public lands; these soil scientists serve as subject matter experts and address soil resource support needs. The BLM depends on professionals in the physical sciences or on a network of partners to support the needs of state and field offices that do not have a soil scientist on staff.

BLM soil scientists provide the following support for soil resources:

- Consult and coordinate with partners regarding soil type, soil quality, and ecological site descriptions.
- Assess potential effects on soils (rangeland health assessments, soil surveys, etc.), such as the potential for erosion, surface dust, and soil compaction, for a wide variety of permitted activities on BLM lands.
- Review ecological effects analyses in NEPA documents to ensure proper and adequate assessment of soil changes driven by land use actions, climate change, fires, droughts, floods, and transitions to different plant communities.
- Develop site-specific procedures and reporting to implement BLM-wide policies.
- Address protests, appeals, and litigation regarding soil issues and effects from current or proposed activities.
- Work with outside partners and providers, including with the use of interagency agreements, on an array of management issues involving soils.

- Coordinate with other stakeholders and agencies that could be affected, such as the Agricultural Research Service, Environmental Protection Agency, National Park Service, Natural Resources Conservation Service, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, and state agencies and universities.
- Provide basic soils classes at the National Training Center, and provide online courses previously developed, with modules on soil quality and indicators and with the use of web-based soil surveys, ecological site descriptions, and regional case studies.
- Develop and distribute soils information via websites.

2.2 BLM Perspectives

The BLM's management of public lands contributed $114 billion to the national economy and supported 467,000 jobs nationwide in fiscal year 2014. Energy production is not the only way in which the BLM contributes to local communities and the economy. The combined economic effects of timber, grazing, and mineral production activities on BLM lands totaled more than $13.5 billion in fiscal year 2014. More than 61 million recreation-related visits occurred on BLM lands in 2014, contributing more than $5 billion to local economies.[2] The BLM must construct a system to measure and promote integrated and diversified resource-related skills in soil science to support activities that benefit society.

The BLM must continue to engage managers, partners, and stakeholders when obtaining and using soils information from an operational aspect. Soils experts within the BLM can assist in policy development, education, outreach, technical work on soil protection, and the integration of many diverse disciplines. New developments in understanding permafrost, deserts, biological soil crusts, soil salinity, landslides, and erosional processes are vital as the BLM assesses the effects of land use changes in concert with climate change. Improved internal and external education about the BLM Soil Resource Program is essential for furthering the contributions of soils experts in interdisciplinary teams formulating management plans and decisions.

Soils training and recruitment through universities and professional societies can enhance the BLM's soils science capacity. Also, training and recruitment increases the BLM's ability to provide cross-disciplinary and integrative interactions with the greater land use community, while encouraging critical thinking, landscape management, and

[2] Bureau of Land Management, "The BLM: A Sound Investment for America 2015" (Washington, DC: Bureau of Land Management, 2015).

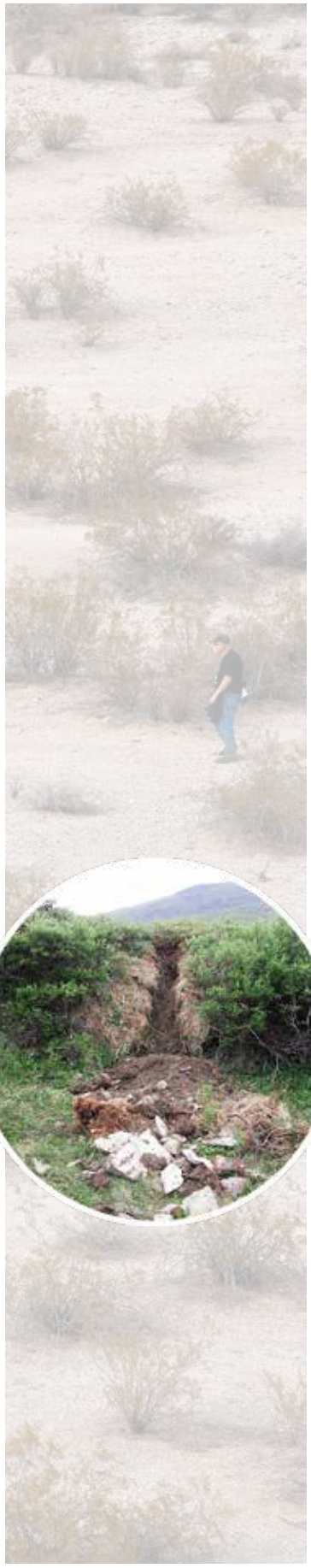
ecological integrity. The BLM Soil Resource Program can use soils science to form closer ties during restoration activities with programs such as mining, engineering, wildlife, invasive weed management, fire rehabilitation, socioeconomics, and forest, range, and recreation management.

2.3 Goods and Services from Soils

The Millennium Ecosystem Assessment (2001-2005) presented an analysis of possible consequences from a changing environment by appraising conditions and trends of the world's ecosystems and the services the ecosystems provide to society.[3] As noted in the reports, soils offer supporting services (e.g., nutrient cycling, soil formation, and primary production) and provisioning services (e.g., food, water, wood, fiber, and fuel). Soils support landscapes that provide cultural, educational, and recreational activities. Aesthetic and spiritual pursuits are equally vital to individual human health and social cohesion—both of which are included in the United Nations definition of basic human well-being and extends beyond a simple sufficiency of food, water, and shelter.

The management of ecological resources supporting the production of clean air, water, and food is essential; they are the basic ecological services on which society is wholly dependent. The Soil Resource Program recognizes that soils are a vital component of management and use in society. An intact social-ecological landscape offers other services as well, from the aesthetic value of wildlands to protecting communities and building environments (e.g., mitigating effects from large storm events by retaining and slowly releasing flood waters). Infrequent but expensive events, such as landslides and floods, have a noticeable effect on local and regional economies by the damage caused. The daily ability (or lack thereof) of soils to offer services has long and far-reaching economic consequences. It is much more economical and efficient to prevent water pollution naturally by protecting and restoring wetlands and rivers versus mechanically and chemically treating contaminated waters to reestablish them for human use standards.

Soils are also a primary component of our life support and recycling system. Soils host biogeochemical cycles and store the largest terrestrial stock of organic carbon. In addition, soils contain a vast majority of insect, microbial, and fungal species in a complex matrix and integrate earth system processes while providing for and supporting important ecosystem services.



[3] Rashid Hassan, Robert Scholes, and Neville Ash, eds., Ecosystems and Human Well-being: Current State and Trends, Volume 1 (Washington, DC: Island Press, 2005), *http://www.milleniumassessment.org/documents/document.766.aspx.pdf.*

Modern soils science follows an interdisciplinary approach that covers a broad spectrum of environmental, economic, and social considerations. Transdisciplinary groups working on land use plans or other resource management issues must understand soil capacity and limitation issues. Soils expertise is important to the team—assembling, interpreting, and presenting soils information to these groups, thereby improving the overall quality of environmental assessments, mine reclamation and site restoration plans, ecological evaluations (including BLM land health assessments), and engineering suitability evaluations. It is vital to understand the capacity and function of soils when conducting environmental hazards investigations, including hazardous waste sites; evaluating nutrient or chemical fate and transport processes; and developing suitable site remediation alternatives.

3. Status of Soils Science in the BLM

Soils science is evolving into a more diverse and transdisciplinary field, with a focus on integration of emerging societal challenges, such as adapting to a changing climate. Soils science positions in the BLM are commonly staffed by others in the physical sciences, most often natural resource specialists with a less general knowledge of soils. Other staff may have detailed site-specific knowledge of soils limitations regarding specific activities such as planning, decision support, and NEPA, as well as range, forest, mineral, and energy management resource issues.

Under this strategy, coordination and collaboration between BLM soils specialists, program managers, and field generalists should continually improve since many policy issues have specific ties to soils science. This includes, but is not limited to, healthy landscapes reporting, vegetation and wildlife management, hazardous materials and abandoned mine lands investigations, water/air quality monitoring, energy program support, and environmental education activities.

The BLM's work begins and ends in the field and local program offices.

The BLM must reassess staffing needs and seize the opportunity to assemble staff trained to confront and find viable solutions to diverse and divisive issues. The proper assessment depends on the type of activities, plans, litigation, and expanding resource constraints in the areas of clean water, air regulations, and threatened and endangered species management. In the past, a soils expert was an integral part of the BLM's range, forestry, soil, water, and air programs. In recent years, budget and program changes have decreased or eliminated these essential connections.

This soils strategy brings attention to the skills needed for BLM soils science positions (GS 470) and seeks to improve internal and external partner cooperation in response to management needs. The time has come for the BLM to broaden its soil science education within the BLM and ensure that ecological systems thinking is incorporated when addressing the many and varied issues in using goods and services provided by supporting social-ecological landscapes.

4. Collaboration in Managing Soil Resources

Federal, state, tribal, and local agencies take different roles and responsibilities in managing soil resources. Soil types and ecological systems can cross geographic and political boundaries and are important to numerous government entities and interest groups. Therefore, the BLM must collaborate with all levels of government, stakeholders in the private and nonprofit sectors, and members of the public to protect and use soil resources on public lands.

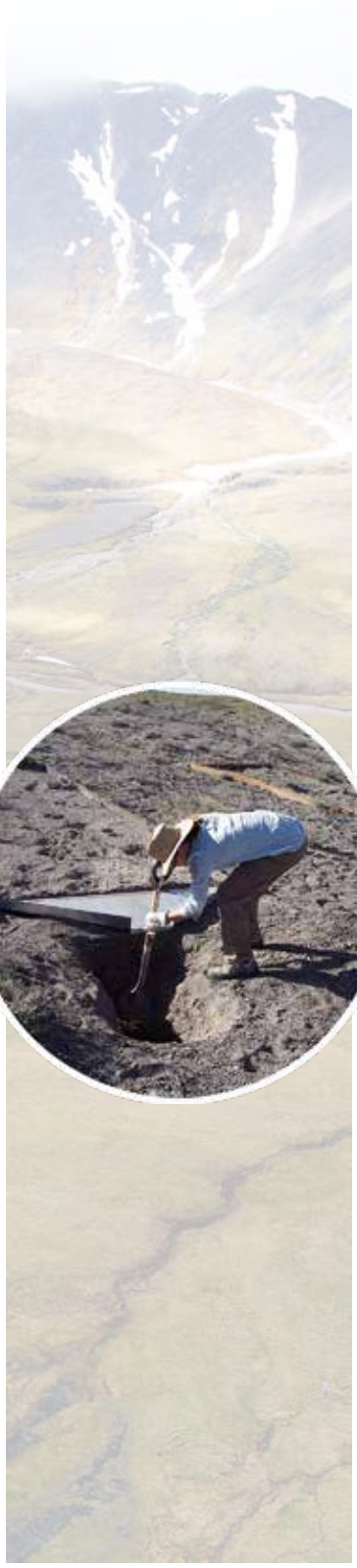
The Soil Resource Program will continue to coordinate its activities with other BLM programs responsible for decision and management of use authorizations, resource uses, and resource conservation and protection. The program will focus on collaboration with other federal agencies on common issues and cooperation with federal and state agencies responsible for compliance, monitoring, and enforcement of water and air quality regulations and long-term soil productivity and sustainability.

4.1 Bureau of Land Management

The BLM manages the public lands under the principles of "multiple use" and "sustained yield" as described in FLPMA, which directs the BLM to manage the public lands in a manner that will protect the quality of soil values, among others. One way in which the BLM manages soil resources is by establishing goals and objectives in land use plans.

The BLM maintains partnerships and coordinates efforts with other federal agencies that have responsibilities, such as:

- Managing federal lands, natural resources, and tribal trust resources.
- Permitting and oversight of surface mining, oil and gas development, and other actions.
- Overseeing federal environmental legislation.
- Researching earth and agricultural sciences research.
- Assisting private agricultural producers.
- Managing and conserving resources for multiple use and sustained yield on public lands used for the following:
  - Renewable and conventional energy and mineral development
  - Forestry management and timber and biomass production
  - Wild horse and burro management
  - Domestic livestock grazing
  - Recreation and resource protection
  - Fish and wildlife habitat management



4.2 Federal Partners

U.S. Environmental Protection Agency (EPA): The EPA is the lead federal agency for the protection of human health and the environment, using tools such as the Clean Water Act and the Clean Air Act and performing risk assessments at contaminated sites. The BLM complies with federal environmental laws in its management of lands and resources just as any other entity and thus communicates with and occasionally partners with EPA offices and officials.

U.S. Geological Survey (USGS): The USGS conducts scientific research regarding ecosystems, climate and land use change, mineral assessments, environmental health, and water resources to inform effective decisionmaking and planning. The agency evaluates data to increase understanding of natural hazards such as earthquakes, volcanoes, and landslides. The agency also conducts research on oil, gas, and alternative energy potential, production, consumption, and environmental effects, while providing access to natural science information to support decisions about how to respond to natural risks and manage natural resources. The USGS also leads the effort on climate change science research for the Department of the Interior.

U.S. Forest Service (USFS): The USFS is often a partner with the BLM because of the close proximity of many national forests and grasslands to BLM-administered lands. For example, the BLM and Natural Resources Conservation Service partner with the USFS to implement interagency policy for developing ecological site descriptions.

National Park Service (NPS): The NPS also manages many tracts of land adjacent to land the BLM considers for permitting: for example, a coal-bed methane well. The BLM will often solicit concerns from another agency if the potential effects appear to be significant for the management objectives of that agency. Stipulations for the well development may include provisions that are deemed critical to protect adjacent resources.

U.S. Army Corps of Engineers (USACE): The USACE is the lead federal agency for permitting work in navigable waters and wetlands of the United States; therefore, it is important for the BLM and those seeking permits to conduct relevant activities on BLM land to work in coordination with the USACE. Relevant activities that may require coordination with the USACE include any work in navigable waters and wetlands, such as placing dredge or filled material into navigable waters

(e.g., road fills or riprap bank protection).

Bureau of Reclamation (BOR): The BOR is a partner with the BLM in its role as the lead agency in the Colorado River Basin Salinity Control Program, in which the BLM reduces salt loading to the Colorado River by plugging saline wells and performing nonpoint source sediment and salinity control efforts. The BOR is also often a partner in management of dispersed outdoor recreation at major federal reservoirs.

Bureau of Indian Affairs (BIA): The BIA and numerous tribal councils are assisted by the BLM in several ways, including the BLM's technical support to the Department of the Interior's tribal trust management responsibilities (e.g., in the assessment, leasing, and development of energy resources).

U.S. Fish and Wildlife Service (USFWS): The USFWS is the lead federal agency for compliance with the Endangered Species Act. The USFWS frequently assists the BLM in providing biological consultations on planning and NEPA documents. They also assist the BLM in the development and review of habitat conservation plans and may partner on mutually beneficial vegetative or watershed management projects where USFWS refuge lands lie adjacent to BLM-administered lands.

Office of Surface Mining Reclamation and Enforcement (OSMRE): The OSMRE is the lead agency in preparing environmental impact statements in compliance with NEPA for certain coal mine expansions. The BLM is often a cooperating agency in the development of the environmental impact statement. The OSMRE also protects the environment during coal mining through federal programs, grants to states and tribes, and oversight activities. The agency also ensures the land is reclaimed afterwards and mitigates the effects of past mining by pursuing reclamation of abandoned coal mine lands.

Natural Resources Conservation Service (NRCS): The NRCS delivers a wide variety of program services, technical assistance, and federal cost sharing to private landowners on western landscapes in which the BLM is sometimes a manager of lands above or below the targeted private lands. The NRCS also leads the partnership of the National Cooperative Soil Survey. The BLM has a longstanding relationship with the NRCS, including the determination and delineation of ecological site descriptions, implementing soils standards and procedures, and addressing the interactions of soil

characteristics and properties tied to management needs and issues.

Agricultural Research Service (ARS): The ARS is a major research arm of the U.S. Department of Agriculture and has research capabilities in the areas of livestock grazing systems, rangeland hydrology and water quality, and soil science, including soil erosion and water movement through soils. The BLM has partnered with the ARS in many studies and continues to cooperate with them on topics of mutual interest.

National Cooperative Soil Survey (NCSS): The NCSS is a partnership of federal, regional, state, and local agencies and private entities and institutions that works to describe, classify, map, interpret, and promote the use of soil information.

BLM Manual Section 7100, "Soil Resource Management," directs the BLM to participate in the NCSS and adopt NCSS standards for collecting and interpreting soils and ecological site description data.

4.3 Tribes

Indian tribes exercise inherent sovereign powers over their members and territory. The BLM works with tribes on a government-to-government basis to address any water-related matters affecting specific Indian tribes using BLM lands or tribes affected by activities on these lands.

5. Goals

The mission of the BLM is to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations. The BLM manages lands in every type of ecosystem, from arid to tundra, while balancing multiple uses of the lands against an ever-changing set of societal demands for ecological goods and services. In addition, the BLM must learn to manage or mitigate effects from a changing climate, including drought, floods, invasive species, and wildland fire fuels density. As urban populations grow, the demand for open space recreation and resource extraction activities on public and private lands is anticipated to increase. As a result, BLM managers and decisionmakers will be further challenged in sustaining the delivery of clean water, clean air, and productive soils valued by users of the system of public lands.

The Soil Resource Program's goals focus on maintaining or improving the integrity of the soil ecosystem consistent with the four fundamentals of rangeland health. Through continued development of internal and external partnerships, this strategy will continue to enhance the BLM's understanding and management of all soil resources.

Goal 1: Update Soil Resource Program policy guidance documents.

In support of this goal, the Soil Resource Program will:

- Complete the BLM soils handbook.
- Produce directives, when appropriate, to identify training opportunities or new technologies and processes.
- Use BLM Manual 1734, "Rangeland Interagency Ecological Site Manual," and BLM Handbook H-1734-1, "Interagency Ecological Site Handbook for Rangelands," to guide development of ecological site description manuals for wetlands, riparian areas, and forest lands.
- Work with cooperators on development of the ecological site description implementation plan.

Goal 2: Assess all planning actions with respect to the chemical and physical properties of soils provided in soil surveys, and outline recommended design features and the planned actions to avoid based on soil map unit limitations.

In support of this goal, the Soil Resource Program will:

- Where current soil information is lacking, use broader land unit

information such as that found in ecological site descriptions or a statewide database (e.g., STATSGO or Web Soil Survey).

- Follow and participate in the interagency ecological site description memorandum of understanding and implementation plan.

Goal 3: Institute as standard practice the use of regional (e.g., ecoregion, Major Land Resource Area) landscape boundaries to assess cumulative and continuing effects on soil resources from all project actions proposed within the boundaries. (Follow BLM landscape approach guidance where applicable.)

In support of this goal, the Soil Resource Program will:

- Support development and implementation of the BLM's landscape approach by completing the soil, water, and air landscape assessment handbook.
- Include anticipated effects of climate change in broad-scale assessments, incorporate rapid ecoregional assessment information where available, and integrate ecosystem services valuation into all planning and management decisions.
- Encourage the use of collaborative watershed or ecoregion workgroups and transdisciplinary science teams to fully assess problems and develop iterative solutions.

Goal 4: Improve the effectiveness of soil parameter measurements and analyses efforts.

In support of this goal, the Soil Resource Program will:

- Incorporate soil quality principles and thresholds into resource management plans.
- Improve the use of soils data, and link the data to plants and roots, transitions in soil formation, and soil vulnerabilities.
- Select parameters as part of a soils monitoring program to enable the BLM to follow trends in and project the potential occurrence of short-term and long-term soil degradation processes, including:
  - Erosion by water or wind.
  - Organic matter loss, such as a steady downward trend in the organic material fraction of the soil or decline in soil biomass.
  - Compaction, such as an increase in bulk density or a decrease in soil porosity.
  - Salinization, such as through the accumulation of soluble salts.
  - Gross changes to soil structure, as a result of vegetative cover loss, unusual mixing of soil and water, or vehicular activities on vulnerable soils.

Goal 5: Limit environmental contamination from unnecessary or undue transport of soils into waters or the atmosphere.

In support of this goal, the Soil Resource Program will:

- Modify proposed actions to protect surface soil organic matter and subsurface aggregate stability to reduce erosion and soil compaction by wind and water.
- Provide a system to track and report undesired effects, results of mitigation actions, and soil stabilization successes.

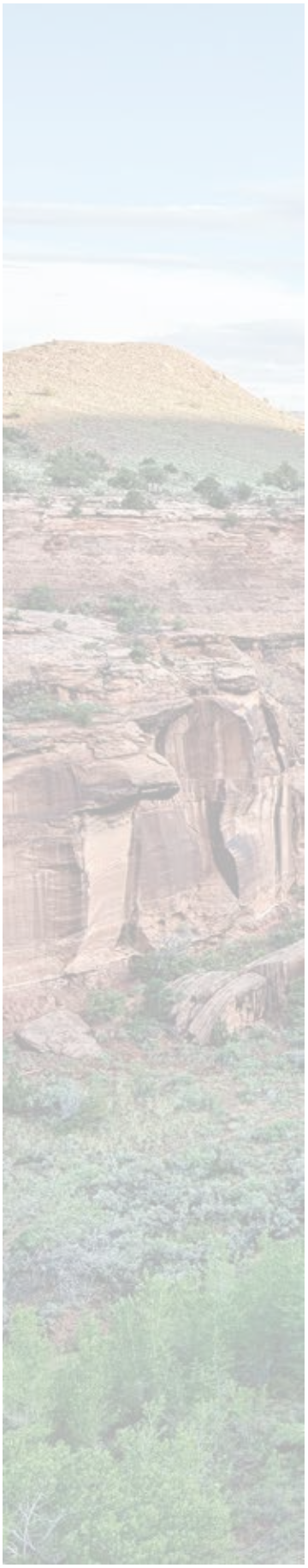
Goal 6: Improve relationships with other programs, agencies, and stakeholders.

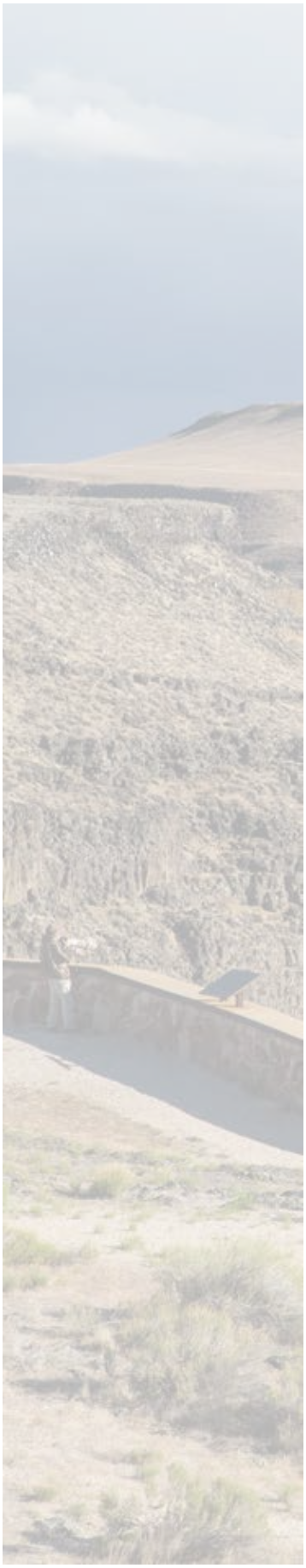
In support of this goal, the BLM Soil Resource Program will:

- Include monitoring requirements for soils in all appropriate planning documents.
- Use existing or develop new soil monitoring methods, and require monitoring results be made available to regional landscape management groups and agencies.
- Increase training of Web Soil Survey and other tools and databases.
- Ensure that all partners in the National Cooperative Soil Survey are involved with site visits and the use of new soil mapping technologies.
- Build a network of and communicate with BLM personnel who have the opportunity to and regularly do interact with relevant professional societies, including:
  - Soil Science Society of America *www.soils.org*
  - Society for Range Management *www.rangelands.org*
  - Soil and Water Conservation Society *www.swcs.org*
  - The Wildlife Society *www.wildlife.org*
  - American Fisheries Society *www.fisheries.org*
  - Ecological Society of America *www.esa.org*
  - American Geophysical Union *www.agu.org*
  - The Geological Society of America *www.geosociety.org*
  - American Water Resources Association *www.awra.org*
  - Weed Science Society of America *www.wssa.net*
  - Society of American Foresters *www.safnet.org*
  - Society of Outdoor Recreation Professionals *www.recpro.org*
  - American Society of Mining and Reclamation *www.asmr.us*
  - Air & Waste Management Association *www.awma.org/*
  - International Erosion Control Association *www.ieca.org*

Goal 7: Enhance the BLM's technical expertise relevant to understanding, assessing, and managing soil resources.

In support of this goal, the Soil Resource Program will:





- Improve the presence and effectiveness of the Soil Resource Program on BLM lands by integrating soils specialists into prominent and transdisciplinary roles in most resource management decisions.
- Encourage managers, decisionmakers, and other resource specialists to plan for and actively include soils specialists in all resource management decisions.
- Position soils experts to lead assessment efforts for specific programs or initiatives, particularly those relating to the maintenance of landscape condition or enhancement of restoration efforts.
- Train BLM natural resource personnel in positions outside the traditional soils scientist classification series in soils interpretation skills.
- Develop short courses with the National Training Center, universities, and other partners (e.g., online classes and webinars) in soil ecology, erosion prevention, landslide mitigation, soil carbon dynamics, soils remote sensing technologies, and soils classification and taxonomy.
- Train the BLM's current cadre of soils professionals in the theory and application of landscape and ecosystem approaches to soils conservation.
- Complete the National Training Center introductory soils class (in draft 2014).
- Develop additional soils training materials, such as the use of state-and-transition simulation models, ecological site descriptions, and field-based monitoring and assessment.

Goal 8: Continue to coordinate Soil, Water, and Air Program activities with other BLM programs responsible for decisions on and management of use authorizations, other resource uses, and resource conservation and protection actions.

In support of this goal, the Soil Resource Program will:

- Coordinate and enhance opportunities to include soil information and reporting in budget justifications, policy documents, and outreach materials across BLM programs. (Three performance measures are tied to the management of soil resources in the "U.S. Department of the Interior Strategic Plan for Fiscal Years 2014-2018.")[4]

[4] The three performance measures include (1) Percent of DOI acres that have achieved desired conditions where condition is known and as specified in management plans; (2) Percent of baseline acres infested with invasive plant species that are controlled; and (3) Percent of DOI riparian (stream/shoreline) miles that have achieved desired condition where condition is known and as specified in management plans.

6. Summary

The goals described in this 5-year strategy will enable the BLM Soil Resource Program to meet challenges posed by the increasing demand for resource development and recreational opportunities on public lands. This strategy will enable the BLM to continue to protect soils resources while carrying out FLPMA's multiple use and sustained yield mandate for managing public lands. New emphasis on improving the capacity of soils to provide a supporting matrix for vital ecosystem processes that sustain plants, animals, and human societies through BLM land management decisions will be important to the program's success. Collaborative relationships with other agencies and stakeholders, plus heightened soil resource expertise within the BLM, will be equally important. This strategy also offers opportunities for continual learning that can improve the BLM's soil resource knowledge and increase awareness of soil resource areas of concern.

The mention of company names, trade names, or commercial products does not constitute endorsement or recommendation for use by the Federal Government.