

Part 520 – National Range and Pasture Manual

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Subpart A - General

520.0 Purpose

The purpose of this manual is to provide guidance to NRCS planners when assisting clients with developing grazing management plans on grazing lands, including pastureland, rangeland, grazed forestland, hayland, and grazed cropland.

520.1 References

A. Authorities

(1) Authority for Establishment of the Soil Conservation Service

The Soil Conservation Act, passed by Congress and signed into law in 1935 by President Franklin D. Roosevelt, declared “the wastage of soil on farm, grazing, and forest lands...is a menace to national welfare,” and directed the Secretary of Agriculture to establish the Soil Conservation Service (which in 1994 became the Natural Resources Conservation Service), as a permanent agency to extend conservation assistance and technology to landowners.

(2) Authority for NRCS to Provide Conservation Assistance on Private Lands

(i) The authority to assist in applying sound conservation on private lands is provided through the authorities charged to the Secretary of Agriculture and delegated to the Under Secretary for Farm Production and Conservation (as defined in 7 CFR Sect. 2.16), who in turn, has provided that authority to the NRCS Chief through 7 CFR Section 2.43.

(ii) The Conservation Technical Assistance Program (CTAP) is the foundation of the Nation’s Federal conservation efforts on private lands, which is implemented in

cooperation with the agency’s partners. The program is delivered to decision makers, Tribes, units of governments, and nongovernmental organizations in all 50 States, the District of Columbia, Puerto Rico, U.S. Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, the Republic of Palau, and the Marshall Islands.

- (iii) NRCS, through the CTAP, provides conservation technical assistance to individuals, communities, and units of government to improve the long-term sustainability of the natural resource base on cropland, forestland, grazing lands, coastal lands, and developed or developing lands. Conservation technical assistance on Federal lands involving a significant amount of NRCS resources can be provided only through formal agreements (Title 440, Conservation Programs Manual, Part 525, Subpart A, Section 525.1E).

(3) Authority for NRCS to Provide Grazing Lands Conservation Assistance

The specific authority to provide grazing lands conservation assistance is found in 7 CFR Section 2.16a3(xiii)(I), Conservation of private grazing lands authorized by section 1240M of the Food Security Act (16 U.S.C. 3839bb). That specific code states:

§3899bb. Conservation of private grazing land

(a) Purpose

It is the purpose of this section to authorize the Secretary to provide a coordinated technical, educational, and related assistance program to conserve and enhance private grazing land resources and provide related benefits to all citizens of the United States by—

- (1) establishing a coordinated and cooperative Federal, State, and local grazing conservation program for management of private grazing land;
- (2) strengthening technical, educational, and related assistance programs that provide assistance to owners and managers of private grazing land;
- (3) conserving and improving wildlife habitat on private grazing land;
- (4) conserving and improving fish habitat and aquatic systems through grazing land conservation treatment;
- (5) protecting and improving water quality;
- (6) improving the dependability and consistency of water supplies;
- (7) identifying and managing weed, noxious weed, and brush encroachment problems on private grazing land; and
- (8) integrating conservation planning and management decisions by owners and managers of private grazing land, on a voluntary basis.

(b) Definitions

In this section:

(1) Department

The term “Department” means the Department of Agriculture.

(2) Private grazing land

The term “private grazing land” means private, State-owned, tribally owned, and any other non-federally owned rangeland, pastureland, grazed forest land, and hay land.

(3) Secretary

The term “Secretary” means the Secretary of Agriculture.

(c) Private grazing land conservation assistance

(1) Assistance to grazing landowners and others

Subject to the availability of appropriations for this section, the Secretary shall establish a voluntary program to provide technical, educational, and related assistance to owners and managers of private grazing land and public agencies, through local conservation districts, to enable the landowners,

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managers, and public agencies to voluntarily carry out activities that are consistent with this section, including—

- (A) maintaining and improving private grazing land and the multiple values and uses that depend on private grazing land;
- (B) implementing grazing land management technologies;
- (C) managing resources on private grazing land, including—
 - (i) planning, managing, and treating private grazing land resources;
 - (ii) ensuring the long-term sustainability of private grazing land resources;
 - (iii) harvesting, processing, and marketing private grazing land resources; and
 - (iv) identifying and managing weed, noxious weed, and brush encroachment problems;
- (D) protecting and improving the quality and quantity of water yields from private grazing land;
- (E) maintaining and improving wildlife and fish habitat on private grazing land;
- (F) enhancing recreational opportunities on private grazing land;
- (G) maintaining and improving the aesthetic character of private grazing land;
- (H) identifying the opportunities and encouraging the diversification of private grazing land enterprises; and
- (I) encouraging the use of sustainable grazing systems, such as year-round, rotational, or managed grazing.

B. Mission

The mission of NRCS is to improve the health of the Nation’s natural resources while sustaining and enhancing the productivity of American agriculture. NRCS achieves this by providing voluntary assistance through strong partnerships with private landowners, managers, and communities to conserve, protect, restore, and enhance the lands and waters upon which people and the environment depend. NRCS has specific responsibility to assist owners and operators of grazing lands in planning and applying conservation programs on the privately controlled land in their operating units (Amendment No. 4, Title 9, Administrative Regulations, May 17, 1954; and Comptroller General’s Opinion B-115665 of October 1, 1953, 33CG:133) (Title 190, National Range and Pasture Handbook (190-NRPH)).

C. Objectives

Grazing Conservation Assistance Objectives

- The objectives of conservation planning on grazing lands are to assist clients to
- Understand the basic ecological principles associated with managing their land—the soil, water, air, plants, and animals.
 - Realize they are part of the complex ecosystem and that their management decisions influence the ecological changes that occur.
 - Realize their responsibilities and importance for protecting the environment and maintaining future options for the use of the resource.
 - Develop a plan that meets the needs of the soil, water, air, plant, and animal resources and their management objectives.

520.2 Definitions

A. State Grazing Conservationist.—Refers to the State-level employee determined by the State conservationist to be the lead for the technical grazing discipline in their State. This may include employees under the following series: 0454, 0471, 0457, 0401; with the following titles: rangeland management specialist, State grazing specialist, State grassland specialist, State pastureland specialist, and State agronomist (see APPENDIX 2 of this manual for qualification requirements).

B. Grazing Conservationist.—Refers to grazing lands specialist, grazing specialist, grassland conservationist, grassland forage specialist, agronomist, pastureland specialist, pasture specialist, pastureland management specialist, rangeland ecologist, rangeland specialist, range conservationist, and rangeland management specialist.

520.3 Acronyms

These are common acronyms and initialisms used in this manual.

- (1) DIPH.—Determining indicators of pastureland health
- (2) ES.—Ecological sites
- (3) ESD.—Ecological site description
- (4) ESJAA.—Ecological sciences job approval authority
- (5) FOTG.—Field Office Technical Guide
- (6) GMP.—Grazing management plan
- (7) IIRH.—Interpreting Indicators of Rangeland Health
- (8) MIM.—Multiple Indicator Monitoring
- (9) NASIS.—National Soil Information System
- (10) NHCP.—National Handbook of Conservation Practices
- (11) NISMP.—National Invasive Species Management Plan
- (12) NESH.—National Ecological Site Handbook
- (13) NRPH.—National Range and Pasture Handbook
- (14) NTSC.—National technology support center
- (15) PCS.—Pasture condition score
- (16) PFC.—Proper Functioning Condition for riparian wetland areas
- (17) RHA.—Rangeland health assessment
- (18) RHEM.—Rangeland Hydrology Erosion Model
- (19) SVAP.—Stream Visual Assessment Protocol
- (20) SWAPA.—Soil, water, animals, plants, air

520.4 National Forms

These national forms are used to inventory, assess, and monitor grazing lands, and to design conservation practices on grazing lands. They are in the 190-NRPH.

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- (1) Browse Resource Evaluation Worksheet
- (2) Determining Indicators of Pastureland Health Evaluation
- (3) Grazing Lands Inventory Summary Worksheet
- (4) Line – Point Intercept Worksheet
- (5) Livestock, Forage, and Feed Worksheet
- (6) Multiple Indicator Monitoring Worksheets
- (7) Pasture Condition Score Sheet
- (8) Prescribed Grazing Schedule Worksheet
- (9) Proper Functioning Condition Worksheet
- (10) Proper Grazing Use Worksheet – NRCS Range 414
- (11) Rangeland Health Evaluation Matrix
- (12) Record of Livestock Grazing
- (13) Similarity Index Worksheet
- (14) Step – Point Intercept Worksheet
- (15) Trend Determination Worksheet

520.5 Policy

This manual sets forth the policy for conservation planning on grazing lands.

520.6 Procedure

When addressing resource concerns anticipated or caused by grazing animals, prescribed grazing is recommended as the primary practice scheduled in the conservation plan.

520.7 Responsibilities

- A. The National Rangeland Management Specialist will
 - (1) Ensure forms and assessments referenced in this manual are current.
 - (2) Respond to requests for consideration of changes to this manual.
 - (3) Discuss proposed changes with the National Grazing Lands Technology Acquisition and Development Team, NTSC rangeland management specialists and grazing specialists, and State grazing conservationists.
- B. The National Grazing Lands Technology Acquisition and Development Team and the NTSC rangeland management specialists and grazing specialists will
 - (1) Assist in grazing-related training and technology for all States to have the tools and knowledge needed to carry out the policy set forth in this manual.
 - (2) Ensure that potential changes to this manual are proposed to and discussed with the national rangeland management specialist.
- C. State Conservationists will

- (1) Assign one staff member as lead of the technical grazing discipline for their State (State grazing conservationist or other designee) and ensure that they are trained as a technical grazing specialist.
 - (2) Ensure that their State is following the requirements set out in this manual concerning grazing management plan development, planning prescribed grazing, and training for their employees who are charged with planning on grazing lands.
- D. State Grazing Conservationists will
- (1) Review, assess, and provide recommendations to the State resource conservationist or State delegated authority on the approval of grazing-related Ecological Sciences Job Approval Authority (ESJAA) for area- and field-level conservationists.
 - (2) Ensure that grazing land planners are receiving training and planning opportunities needed to develop technically sound grazing management plans.
 - (3) Conduct quality reviews of planning on grazing lands during yearly spot checks. Quality assurance reviews are conducted in each State as prescribed in Title 340, General Manual (GM), Part 400, “Strategic Planning and Accountability.”

520.8 Relationship to the National Range and Pasture Handbook

The 190-NRPH is a companion document to this manual. This manual describes the policy for technical assistance on grazing lands, whereas the 190-NRPH contains the technical information, methodologies, and procedures for conservation planners to carry out policy on grazing lands.

520.9 Modifications to 190-NRPM

- A. Changes to 190-NRPM
- (1) The national rangeland management specialist may undertake periodic review, in consultation with the National Grazing Lands Technology Acquisition and Development Team and the NTSC rangeland management specialists and grazing specialists, to make changes to policy and procedures outlined in this manual.
 - (2) Assessment tools and forms will change over time. These may be added or removed from this manual at the discretion of the national rangeland management specialist, in consultation with the National Grazing Lands Technology Acquisition and Development Team and the NTSC rangeland management specialists and grazing specialists, and State grazing conservationists.
 - (3) Proposed changes or amendments to this manual may be submitted to the national rangeland management specialist through the appropriate State conservationist.
 - (4) Proposals for change consideration will include
 - (i) Requestor’s name and contact information
 - (ii) Date of the request
 - (iii) Reference to those parts and page numbers that are affected
 - (iv) Proposed change
 - (v) Justification for the proposed change
 - (vi) A letter of concurrence from the appropriate State conservationist
- B. Supplements to 190-NRPM

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Supplements to this manual may be required by individual States to supply additional details to comply with regional, State, or local laws and regulations. Supplements are for State-specific policy or procedures directly related to the policy promulgated in this manual. They are not intended to circumscribe the policy or procedures that this manual sets forth. Supplements will be filed in NRCS eDirectives in the Manuals section, and copies of all supplements will be filed with the national rangeland management specialist.

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Subpart B – Policy on Key Practices and Issues

520.10 Prescribed Grazing Planner Certification and Training

A. Conservation planning on grazing lands involves unique planning skills and requires planners to work with complex ecological dynamics; large landscape scales; and multiple private, State, Federal, and Tribal land ownerships; and may include multiple (and often conflicting) resource concerns and objectives.

B. Conservation planners working on grazing lands are required to be certified conservation planners or technical specialist planners as outlined in Title 180, General Manual, Part 409, “Conservation Planning Policy.” In addition, it is recommended that all planners developing conservation plans on grazing lands receive the pasture and/or range certified planner supplemental training. This suite of courses will assist NRCS conservation planners, ecological site specialists, and technical specialists to provide quality assistance to grazing land managers through acquired skill and competency in the use of grazing land resource tools and aids.

C. Planners working on grazing lands are encouraged to participate in grazing training activities, field days, and workshops provided in their State. Training from these activities can assist with justification for increasing prescribed grazing job approval authority (JAA) and fulfill continuing education requirements.

520.11 Conservation Practice Standard (CPS) Prescribed Grazing (Code 528)

A. NRCS CPS Prescribed Grazing (Code 528) should be planned on lands that are part of a grazing system. Develop a grazing management plan to address resource concerns and objectives identified through the planning process.

B. Grazing Management Plan Criteria:

- (1) A grazing management plan is a part of an overall conservation plan that specifically addresses the resource concerns on grazed land.
- (2) A complete grazing management plan will
 - (i) Comply with all Federal, Tribal, State, regional, and local laws, permits, and requirements (clients are responsible for obtaining all permits and clearances as required by law and regulation).
 - (ii) Meet the CPS Prescribed Grazing (Code 528) requirements.
 - (iii) Include facilitating practices necessary to support CPS Prescribed Grazing (Code 528).
 - (iv) Meet NRCS planning criteria for the resource concerns identified.
 - (v) Achieve the client’s objectives.

C. Grazing Management Plan Development. Prescribed grazing will address specific resource management concerns and objectives identified through the planning process and shall include the development of a written prescribed grazing management plan (GMP) for those fields that are grazed. Other practices that may be planned to achieve desired results may include, but are not limited to, fencing, use exclusion, watering facilities, range planting, nutrient management, pasture and hay planting, brush management, herbaceous weed

treatment, and prescribed fire. The following information is required in the grazing management plan:

(1) Goals and Objectives

The goals and objectives of the grazing management plan include the client's goals for their operation, their livestock, and their land and resources. In addition, include a statement describing the goal to address identified resource concerns related to soil water, air, plants, and animals.

(2) Resource Inventory

- (i) Inventory of the current condition of the natural resources present on the planning area. The inventory includes existing conservation practices and infrastructure, such as facilities, fences, or water lines.
- (ii) The resource inventory shall identify:
 - Existing resource conditions and concerns, which may include
 - Waterbodies or other sensitive areas
 - Noxious and invasive species locations and extent
 - Notes of animal trails or concentration areas with excessive erosion and runoff
 - Areas of cultural significance
 - Special wildlife habitat or areas of concern
 - Description of herds
 - Kinds and classes of animals
 - Average weights
 - Type of enterprise (cow, calf, stocker, dairy, etc.)
 - Ecological sites
 - Opportunities to enhance resource conditions
 - Existing conservation practices in the current operation, such as watering facilities, well, pipeline, planting, and heavy use areas

(3) Forage Inventory in Each Management Unit:

The forage inventory should provide information on the species, current condition, productivity, and goals for each management unit.

- (i) Required information includes forage
 - Species
 - Quantity
 - Quality
 - Use visual assessment to prescreen and follow up with lab-based tests for the Forage Balance Sheet if diseases or pests are present or if palatability is an issue.
- (ii) Additional recommended items:
 - History of the site
 - Utilization patterns
 - Current stocking rates
 - Targeted stocking rates (initial stocking rate for the new plan)
- (iii) Livestock Forage and Feed Balance Sheet
 - Ensures forage produced or available meets forage demand of livestock and/or wildlife.
- (iv) Other Required Criteria

Grazing Schedule

- Identifies periods of grazing and/or browsing, deferment, rest, and other treatment activities for each management unit, accommodating the flexibility needed for adaptive management decisions as supported by the contingency plan and monitoring plan, to meet goals and objectives.
- Consider referencing observed conditions instead of calendar dates to schedule or initiate paddock moves or to contingency plan (drought, too-wet, or flooded conditions).

(4) Monitoring Plan

- (i) Developed with appropriate protocols and records that assess whether the grazing strategy is resulting in a movement toward meeting goals and objectives. Record keeping and short- and long-term monitoring may be needed to determine outcomes and support timely adaptive management decisions. Identify the key areas, key plants, or other monitoring or assessment indicators that the manager should evaluate in making grazing management decisions.
- (ii) Monitoring data that may be gathered include
 - herd name
 - herd composition (number of animals, kind, class)
 - stocking rate
 - dates animals are moved in and out of field
 - average forage height when animals are turned into field
 - average forage height when animals are removed from field
 - percent utilization
 - photo point documentation
 - plant cover, production, density, or frequency
 - plant species composition
 - grazing response index (GRI)
 - condition of previously identified sensitive areas
 - interpreting indicators of rangeland health
 - determining indicators of pastureland health
 - pasture condition score
 - similarity index
 - apparent trend
 - long-term trend
 - haying or harvest records (yield, dates)

(5) Contingency Plan

Plan that details existing and potential future problems (i.e., drought, fire, flood, insects) and serves as a guide for adaptive management decisions in grazing prescription to mitigate resource and economic effects identified through evaluation and monitoring

(6) Maps

- (i) Providing a visual overview of a farm or ranch and the grazing lands encompassed allows both the planner and the client to have a better understanding of the grazing management plan flow, locations of resources, resource concerns, and conservation practices that will result in solutions to ecological and economic concerns or problems. Create the maps at appropriate

scales for planning purposes. Oversized maps are commonly needed for large rangeland operations.

(ii) Required maps include

- Ecological site or vegetation community map
Include an ecological site map as part of the grazing plan, depicting ecological site and soil boundaries within the planned management units. Boundary lines may be refined to identify areas of distinct ecological sites within each management unit.
- Grazing plan map. Include the following:
 - Management unit boundaries, numbers, names, and acres for each unit
 - Planned and existing fences
 - Developed water sources or troughs
 - Pipelines
 - Streams and other water bodies
 - Special or sensitive areas
 - Infrastructure and improvements
 - Roads
 - Animal trails
 - Heavy use areas or animal containment areas
 - Key area locations for each management unit
 - Resource condition maps to be developed and included when applicable and appropriate.
 - Utilization pattern map
 - Apparent trend pattern map
 - Similarity index pattern map
 - Land ownership map
 - Areas where erosion is a concern

(7) Signatures

(i) Line and date for planner

Signature line and date for the planner who developed the GMP, and if that person is not qualified to sign for technical adequacy, another signature line and date will be added for a qualified grazing conservationist, indicating technical adequacy.

(ii) Line and date for the client

This indicates the client's agreement to the goals and objectives of the plan and shows their intent to carry it out. It does not bind them to carrying out the grazing management plan but indicates their intent.

D. GMP Resource Inventory and Assessment

Several different resource inventories can be done when planning on grazing lands, depending on the kind of grazing land being assessed.

(i) Pastureland

- Field assessments on pastureland have been and continue to be integral steps in conservation planning. In 2001, the USDA-NRCS Grazing Lands Technology Institute developed a Pasture Condition Score (PCS) sheet which was updated in 2020 for the purposes of
 - Providing a framework for planning and assessing management at a site.
 - Evaluating current productivity and stability, and soil and water resources on pastureland.

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- Assisting in identifying future conservation treatment needs required to maintain or improve pasture conditions.
 - Identifying resource concerns.
 - The PCS is included in 190-NRPH.
 - DIPH is a detailed assessment tool that identifies hydrologic function, soil and surface stability, and biotic integrity. It incorporates some of the key elements found in the “Interpreting Indicators of Rangeland Health” V5, in 190-NRPH.
 - PCS can be used as an assessment tool on pastureland to ascertain basic conditions. It can also be used with clients during conservation planning field assessments and as a monitoring tool after grazing plans are implemented. Use DIPH if the planner needs a more comprehensive pasture assessment of hydrologic function, soil and surface stability, and biotic integrity (DIPH protocols can be used to identify problem areas in more detail).
 - Other assessments: Apparent trend, Current utilization
- (ii) Rangeland
- When planning on rangeland, conduct interpreting indicators of RHA on each field in the grazing plan. If the preponderance of evidence summary indicates any category except “None to Slight” for Soil/Site Stability and/or Hydrologic Function, then RHEM will be used to further determine the extent and risks of potential erosion based on long-term average and for 2-, 5-, 10-, 25-, 50-, and 100-year rainfall events. If the planner identifies that the RHA “Biotic Integrity” may be affecting hydrologic function and/or soil and site stability, then RHEM can be used to evaluate the effects of plant foliar cover dynamics on hydrology and erosion.
 - Other Assessments:
 - Apparent trend
 - As used by the NRCS, apparent trend is the assessment of perceived direction of successional change occurring over time in a plant community and soils in relation to a reference state. The reference state needs to be identified (historic plant community, alternative community phase used as reference, or other desired plant community state).
 - Apparent trend uses seedling and young plant abundance, perceived changes in plant composition, plant litter, plant vigor, and condition of the soil surface (erosion) in determining if the site is static or appearing to move toward or away from the desired plant community.
 - Similarity index
 - As used by the NRCS, similarity index calculates the present composition (based on production) of the plant species on a site in comparison with the historic plant community (reference state) as described for the ecological site.
 - The similarity index is not used to evaluate overall rangeland condition because it does not directly consider trends of other key environmental variables such as erosion and hydrology. However, similarity index is a valuable indicator of the status of native plant diversity and composition.
 - ESDs and reference sheets should be utilized in gathering resource inventory and completing RHAs where developed.
- (iii) Riparian—Streams, seeps and springs

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- Stream Visual Assessment Protocol Version 2 (SVAP2)
- PFC–Proper Functioning Condition for lentic and lotic riparian areas

E. Ecological Sites

- (1) An ecological site (ES) is a conceptual classification of the landscape. It is a distinctive land unit based on a recurring landform with distinct soils (chemical, physical, and biologic attributes), kinds and amounts of vegetation, hydrology, geology, climatic characteristics, ecological resistance and resiliency, successional dynamics and pathways, natural disturbance regimes, geologic and evolutionary history including herbivore and other animal impacts, and response to particular management actions. These discrete characteristics separate one ES from another.
- (2) Use in Grazing Management Planning:
 - (i) ESs and ESDs are discussed in three USDA NRCS documents: Title 190, National Ecological Site Handbook (190-NESH); Title 190, Interagency Ecological Site Handbook for Rangelands; and 190-NRPH. Collectively, these handbooks serve as technical and procedural references that outline standards, guidelines, and definitions to support policies and indicated responsibilities for the development of ES concepts and ESDs.
 - (ii) Responsibilities for ES activities are shared among disciplines, including soil science, range science, forestry, agronomy, animal science, wildlife biology, hydrology, and ecology. Steps on how to use ecological site information in conservation planning are detailed in 190-NRPH, Subparts B and D.
- (3) Common uses of ESs and ESDs are
 - (i) Providing ecological site information to NRCS customers at a finite scale of land classification—the ecological site
 - (ii) Communication tool with customers and other users
 - (iii) Conservation planning
 - (iv) Watershed scale modeling
 - (v) Database for ES information
 - (vi) Provide baseline ecological information for RHEM and interpreting indicators of IIRH and DIPH
 - (vii) Plant community baseline data for scientific research and experimental studies
- (4) The use of ESs ensures that as an agency, we can communicate and provide information during conservation planning activities in a clear and consistent manner. The ES state and transition model is the most spatially and temporally relevant model for a conservation planner to use when identifying ecological status, defining resource concerns, gathering baseline information on production capabilities, and conducting resource inventories. Other pertinent options (range site descriptions, provisional ecological sites) should be used if ESDs are not available.

520.12 NRCS CPS Prescribed Burning (Code 338)

Policy for planning for and carrying out prescribed burning can be found in Title 190, General Manual (GM), Part 413, Subpart A, Section 413.0, “Purpose,” (190-GM-413-A-413.0) and includes training, certification, authority, planning, safety, and liability. Each State conservationist decides whether prescribed burning is planned and applied in their State.

520.13 Pest Management Addressing Noxious and Invasive Species

Policy on noxious and invasive species on grazing land can be found in 190-GM, Part 414, Subpart B, Section 414.10, “Guidance and Policy Requirements,” (190-GM-414-B-414.10) and includes the following guidance:

- (1) The roles of NRCS concerning invasive species include the following actions:
 - (i) Adhering to goals and purposes of the National Invasive Species Management Plan (NISMP).
 - (ii) Following and supporting all Tribal, State, and local laws regarding invasive species when giving technical and financial assistance and implementing conservation practices.
 - (iii) Considering environmental, social, cultural, and economic conditions when recommending management options for eradication or control of invasive species.
 - (iv) Encouraging the use of native species for a given location and conservation practice, in correlation with restoration or control goals; for example, ecological site descriptions or other agency-established land-use type classifications.
 - (v) Recognizing that many introduced species are not invasive, and that some of these, within specific settings, are among the best plants for conservation, forage production, and agronomic purposes.
 - (vi) Recommending and using noninvasive, nonnative species in order to meet both the agronomic and conservation objectives of our clientele when native species will not support the conservation needs.
 - (vii) Using NRCS programs, when appropriate, to help private landowners recognize, inventory, and control invasive species.
 - (viii) Working with NRCS experts and partners to better understand invasive species thresholds and potential social, economic, and environmental threats.
 - (ix) Preparing and maintaining management plans, technical notes, and guides reflecting the management of invasive species, and adding timely and pertinent information to the NRCS Plant Materials Program national website (<http://plant-materials.nrcs.usda.gov/>), the PLANTS database (<http://plants.usda.gov/>), and other appropriate databases.
 - (x) Recognizing that NRCS staff are likely to be among the first professionals to see or hear of existing or potential species invasions due to NRCS interface with private landowners. This would include maintaining client confidentiality when working with landowners to manage invasive species, while also conveying the need to prevent these invasive species from spreading.
- (2) NRCS encourages partnerships with other Federal, Tribal, State, and local governments and nongovernmental organizations to
 - (i) Share information and address invasive species issues impacting ecosystem health and quality of life.
 - (ii) Provide public education on invasive species identification and management.
 - (iii) Achieve local and regional goals for controlling invasive species.
 - (iv) Create Tribal, State, and regional lists of invasive terrestrial and aquatic plant and animal species and prioritize these species in such a way as to reflect the degree of threat to human, environmental, and economic health (190-GM-414-B-414.12, “Partnerships”).

APPENDIX 1 – Decision Support Tools

Apparent Trend.—A qualitative assessment to determine direction the present plant community from a reference state.

Body Condition Scoring (BCS).—A ranking of the relative fatness or body composition of livestock. For example, a nine-grade system is commonly used by ranchers and researchers on beef cattle, with a score of 1 indicating emaciation and 9 indicating obesity. Body condition scoring allows a manager to evaluate their nutritional program. By evaluating livestock condition at strategic times of the year, it is possible to coordinate use of the forage resource with nutritional needs of the herd or flock so that supplemental feed and hay needs are kept to a minimum. Check with land grant university, landowners, or animal nutritionists for the most recent or currently used BCS for your region and animal type.

Determining Indicators of Pastureland Health (DIPH).—A detailed and comprehensive assessment of pasture health. It incorporates some of the key elements that are found in Interpreting Indicators of Rangeland Health V5. Additionally, it includes a matrix of indicators that can be used to determine the preponderance of evidence for ecosystem attributes (biotic integrity, soil/site stability, and hydrologic function).

Ecosystem Dynamics Interpretive Tool (EDIT).—An information system framework for the development and sharing of ecological site descriptions, ecosystem state and transition models, and land management knowledge (<https://edit.jornada.nmsu.edu/>). An ecological site is a distinctive kind of land based on recurring soil, landform, hydrology, geology, and climate characteristics that differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its ability to respond similarly to management actions and natural disturbances (190-NESH-630-A-630.1.)

Interpreting Indicators of Rangeland Health Assessment (IIRH).—This assessment considers three main components of the ecology of the rangeland: biotic integrity, hydrology, and soil condition. Seventeen indicators are assessed and given a point value based on the protocol, and each one is tied to one or more of the three components. When scored, the assessment gives an indication of the rangeland's health and its functioning in these three areas.

Nutrient Balance Analyzer (NUTBAL).—This is a fecal analysis-based program that provides information on a herd's nutritional needs. NUTBAL provides livestock managers, wildlife managers, researchers, and others a way to monitor the nutrient quality of the animal's diet and determine if the current diet is sufficient to meet performance goals.

Pasture Condition Score (PCS).—Pasture condition scoring involves the visual evaluation of 10 indicators, which rate a pasture's productivity, condition, and the stability of its natural resources. The score sheet rates the 10 indicators with 5 descriptive conditions, ranging from lowest (1) to highest (5). This objectively ranks the extent of any problems and helps to determine the likely causes. Indicators receiving the lowest scores can be targeted for corrective action, as warranted.

Proper Functioning Condition (PFC).—Qualitative tool for assessing the condition of riparian areas. The tool is used to describe both the assessment process and a defined on-the-ground condition of a riparian wetland area.

Rangeland Hydrology Erosion Model (RHEM).—An approved process-based rangeland hydrology and erosion model that estimates runoff and erosion rates on rangelands. RHEM also provides risk assessments for design storm dynamics (2-, 5-, 10-, 25-, 50-, and 100-year storm events) (Nearing et. al. 2011).

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Remote Sensing.—Satellite imagery and other special imagery continues to become more sophisticated and will improve its usefulness in providing the planner and producer more information when assessing the condition of grazing lands.

Similarity Index.—This assessment tool can be used on rangeland and forestlands where established ESD's include plant species composition. Similarity index is a quantitative mathematical calculation of similarity between the present plant community on a given site and a reference community (usually historic plant community but can be any reference community).

Stream Visual Assessment Protocol (SVAP).— A rapid, visual, qualitative assessment involving 15 physical elements that are rated to help assess the condition of the stream and identify resource problems. It is intended for use in the field with the landowner.

Database Information Systems:

Ecosystem Dynamics Interpretive Tool (EDIT)

<https://edit.jornada.nmsu.edu/>

National Soil Information System (NASIS)

https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/?cid=nrcs142p2_053552

PLANTS.Gov website

<https://plants.usda.gov/java/>

Web Soil Survey

<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

APPENDIX 2 – Qualification Standards

Rangeland Management Series (0454)

Basic Requirements, as identified below in either (1) or (2):

- (1) Degree.—Range management or a related discipline that included at least 42 semester hours in a combination of the plant, animal, and soil sciences, and natural resources management, as follows:
 - (i) Range Management.—At least 18 semester hours of course work in range management, including courses in such areas as basic principles of range management, range plants, range ecology, range inventories and studies, range improvements, and ranch or rangeland planning.
 - (ii) Directly Related Plant, Animal, and Soil Sciences.—At least 15 semester hours of directly related courses in the plant, animal, and soil sciences, including at least one course in each of these three scientific areas, (i.e., plant, animal, and soil sciences). Courses in such areas as plant taxonomy, plant physiology, plant ecology, animal nutrition, livestock production, and soil morphology or soil classification are acceptable.
 - (iii) Related Resource Management Studies.—At least nine semester hours of course work in related resource management subjects, including courses in such areas as wildlife management, watershed management, natural resource or agricultural economics, forestry, agronomy, forages, and outdoor recreation management.
- (2) Combination of Education and Experience.—At least 42 semester hours of course work in the combination of plant, animal, and soil sciences and natural resources management (in section 1, above) plus appropriate experience or additional education.

Soil Conservation Series (0457)

Basic Requirements, as identified below in either (1) or (2):

- (1) Degree.— Soil conservation or related agricultural or natural resource discipline such as agronomy, soil science, forestry, agricultural education, or agricultural engineering. The study must have included 30 semester hours in a natural resource or agricultural field, including at least 12 semester hours in a combination of soils and crops or plant science. Of the 12 semester hours, a minimum of 3 semester hours must have been in soils and 3 semester hours in crops or plant science.
- (2) Combination of Education and Experience.—At least 30 semester hours in one or more of the disciplines as shown in A above, including at least 12 semester hours in a combination of soils and crops or plant science, plus appropriate experience or additional education. Of the 12 semester hours, a minimum of 3 semester hours must have been in soils and 3 semester hours in crops or plant science.

Agronomy Series (0471)

Basic Requirements, as identified below in either (1) or (2):

- (1) Degree.—Agronomy or related discipline of science that included at least 30 semester hours of course work in the basic plant sciences, including at least 15

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semester hours in agronomic subjects, such as those dealing with plant breeding, crop production, and soil and crop management.

- (2) Combination of Education and Experience.—At least 30 semester hours in the basic plant sciences, including a minimum of 15 semester hours in agronomic subjects, as shown in A above, plus appropriate experience or additional education.

General Natural Resources Management and Biological Sciences Series (0401)

Basic Requirements, as identified below in either (1) or (2):

- (1) Degree.—Biological sciences, agriculture, natural resource management, chemistry, or related disciplines appropriate to the position.
- (2) Combination of Education and Experience.—Courses equivalent to a major, as shown above, plus appropriate experience or additional education.