

TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE STATE OF COLORADO NATURAL RESOURCES CONSERVATION SERVICE

Plant Materials Technical Note No. 79

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Methods to Increase Early Successional Plant Diversity

This guide applies to established conservation cover such as perennial grass and legume cover enrolled in the Conservation Reserve Program (CRP) or other similar perennial vegetative cover where wildlife may benefit from early successional plant diversity.

PURPOSE

The purpose of introducing early successional plant diversity in established conservation cover is to develop plant diversity, habitat structure and wildlife benefits while protecting soil and water resources.

Early Successional Plant Establishment will:

- Increase plant species and structural diversity.
- Provide habitat for species requiring early successional habitat for all or part of their life cycle; by managing plant succession to develop and maintain early successional habitat.
- Remove duff and control undesired woody vegetation which inhibits plant diversity and wildlife habitat.

All activities must be site specific. Use the appropriate wildlife habitat evaluation guide ([NRCS CO Biology Technical Note 8, FOTG Section I](#)) to enhance the specific wildlife species habitat for the site.

Once established, manage vegetative cover so grasses do not crowd out forbs and/or legumes over time. In the absence of disturbance, the composition of grassland communities will change over several years through normal plant succession processes. The vegetative structure changes as annual and biennial (early successional) plants are replaced by perennial (later successional) forbs, grasses, and shrubs.

Changes also occur structurally as bare ground declines litter accumulates and vegetation density increases. These changes may lead to a decrease in plant diversity and a decline in wildlife habitat. Managing plant communities is beneficial if not essential for wildlife habitat. Early successional plant establishment is designed to achieve the desired plant community in density, vertical and horizontal structure and plant species diversity, needed by the targeted wildlife species.

METHODS

Methods to establish early successional plant species in established cover must meet soil and water quality criteria. Existing vegetation generally must be weakened, to promote the establishment of early successional plants. Vegetative manipulation to maximize plant and animal diversity can be accomplished by disturbance practices that include: Interseeding, tillage, selected herbicides, prescribed burning, managed haying and prescribed grazing. These practices are effective ways to increase early successional plant species and structural diversity in a plant community.

Farmbill Programs

Certain farmbill programs support the development of early successional plant establishment and may have additional program requirements. For the Conservation Stewardship Program (CSP) see the appropriate [CSP Job Sheet and Colorado Supplement](#) located on the NRCS Colorado Homepage. For the Conservation Reserve Program (CRP) see the [Farm Service Agency 2-CRP Manual](#), Managing Approved Cover.

1. INTERSEEDING

Interseeding may be used to enhance existing conservation cover by providing an early successional plant component. The addition of wildflowers, grasses and shrubs will add diversity and structure to existing cover. Interseeding may be used in conjunction with other early successional plant establishment techniques.

Methods

Prepare a proper seedbed by ensuring a reduction in competition for seedlings from the established vegetation. *A reduction of competition does not mean elimination of all existing cover.* Seedbed may be prepared by tillage or herbicide application consistent with [CO NRCS Herbaceous Weed Control \(315\)](#) planning criteria. A minimum of 50% cover from the existing vegetation must remain after seedbed preparation is completed. Refer to [CO Agronomy Technical Note 82](#), Estimating Residue with Line Transect Method for measurement guidance. Refer to [CO Agronomy Technical Note 81](#), Residue Cover as Affected by Tillage, to estimate residue burial from field operations.

Rotate seeded areas in strips or blocks from 50' to 150' wide across the field. An area the width of the seeded block should be left between the strips or blocks. Repeat the process for two to three years until the entire field has been seeded.

For fields over 160 acres interseed one-third of the field each year starting in years four, five, and six from contract start date. For fields less than 160 acres, interseeding may be performed on half of the acreage over two years.

Options for Interseeding

- Interseed a minimum of 3 adapted grasses, forbs, or shrubs not currently found in the site inventory, as noted on the Conservation Cover Assessment form, [Plant Materials Tech Note 78](#). Refer to [Plant Materials Technical Note 59](#), Plant Suitability and Seeding Rates for Conservation Plantings in Colorado, for suitability and seed rate information, and to the CRP Seeding matrix, as applicable.
- To increase species diversity interseed different species than those in the original seed mix.
- If the hoop or point assessment data and WHEG verifies that the abundance of the original species seeded does not occur in a density to be effective for the desired wildlife habitat, these species may be reseeded (with concurrence of a wildlife biologist and the District Conservationist).

Protect the seeding from livestock grazing for two successive growing seasons, or until the District Conservationist determines the stand is established.

Use the recommended seeding dates listed below for interseeding mixtures of cool and warm season species, and plan the application within a [Grass Seeding Planned and Applied Worksheet, CO-ECS-05](#).

Recommended Seeding Dates for Interseeding Mixtures of Cool and Warm Season Species

MLRA	Dormant- Spring	Summer
D34A & B, D35, and D36	October 15 to April 30 th *	June 15 th to August 15 th
E47, E48A & B	October 15 th to April 30 th *	June 15 th to July 15 th
E49	October 15 th to May 15 th *	August
E51	November 1 st to March 30 th *	June 15 th to July 15 th
G67A & B, H70A, H72, H77A, G69	November 1 st to April 30 th *	August 15 th to September 15 th (Irrigated Only)

*For dormant season planting soil temperatures below 45 degrees Fahrenheit for a minimum of five consecutive days. Winter scarification requires a minimum of 45 days with soil temperatures of 45 degrees Fahrenheit or less.

2. GROUND DISTURBANCE BY TILLAGE

Ground disturbance may be achieved by shallow disking, chiseling with straight points, or spring tooth harrowing of established stands three years and older to increase the amount of open ground and encourage a diverse plant community of annual and perennial plants. Ground disturbance by tillage may be used in conjunction with other early successional plant establishment techniques.

Methods and Timing

For fields over 160 acres or fields that are highly erodible ($EI \geq 8$), ground disturbance will be performed on one-third of the field per year for three years. For fields less than 160 acres or fields that are not highly erodible ($EI < 8$), ground disturbance may be performed on half of the acreage per year over two years:

- November 1st to March 14th unless soil erosion by wind or water is a concern, then
- January 1st to March 14th
- July 16th to November 1st with Biologist and DC concurrence

Ground disturbance activities from July 16th to November 1st may be approved with concurrence of a wildlife biologist and the District Conservationist. Tillage depths should not exceed 2-3 inches and be performed perpendicular to the prevailing winds.

Ground disturbance operations must maintain a minimum of 50% cover. Refer to [CO Agronomy Technical Note 81](#), Residue Cover as Affected by Tillage, to estimate residue burial from field operations. Refer to [CO Agronomy Technical Note 82](#), Estimating Residue with Line Transect Method, to estimate surface residue cover after treatment. Treated fields will not remain exposed during the dormant season for more than three continuous months.



The dormant season is the time frame generally from November 1st to March 14th. The onset is usually defined by the first hard freeze in the fall followed by soil temperatures consistently below 45 degrees and ends with the last hard freeze in the spring followed by warming soil temperatures.

Additional Considerations

Perform ground disturbance across the slope or on the contour with slopes greater than 9 percent. Rotate the tillage passes in strips or blocks from 50' to 150' wide across the field. An area the width of the disked block should be left between the strips or blocks. Repeat the process for two to three years until the entire field has been disked.

Site conditions and equipment utilized may vary to achieve desired habitat conditions. The disked area should provide no more than 50% bare ground leaving at least 50% ground cover of residue to prevent soil erosion. Follow NRCS [Early Successional Habitat Management Standard \(647\)](#) planning criteria.

Activity	Requirement	Scheduling/ Interval
Shallow disking Straight-point chisel, Spring tooth harrow	Depth should not exceed 2-3 inches 50% soil surface cover must be maintained. Ground disturbance will not be conducted in areas: <ul style="list-style-type: none"> - Not capable of maintaining 50% ground cover - With a high risk of noxious weed colonization. - With high risk to wind/water erosion. 	July 16 th to March 14 th January 1 st to March 14 th

Ground disturbance may be performed as a component of seedbed preparation for interseeding or as a stand-alone practice.

3. PRESCRIBED BURNING

Prescribed burning is used to remove excess litter, which may reduce the quality of wildlife habitat. In areas of decadent vegetation, prescribed burns facilitate germination of seed bearing annuals, increase plant species diversity, control unwanted woody cover, and open up the stand for movement of small animals and birds. Prescribed burning may be used in conjunction with other early successional plant establishment techniques.



Methods and Timing

For optimum wildlife habitat, no more than one-third of a field should be burned at one time each year or half of a field each year for two years based on fields less than 160 acres in size. Prescribed burns may be conducted from November 1st to March 14th within the specified prescribed burn plan parameters. Prescribed burning is not allowed during the primary nesting season March 15th to July 15th. If soil erosion is a concern perform prescribed burns as close to March 14th as possible.

Prescribed burn plans for early successional habitat development must be reviewed by Colorado NRCS State Rangeland Management Specialist before implementation.

Additional Considerations

A prescribed burn plan may be provided by an approved TSP (NRCS Technical Service Provider) or state or federal agencies with prescribed burn expertise (Colorado Parks and Wildlife, Colorado State Forest Service, US Forest Service, Bureau of Land Management).

Prescribed burn areas must be protected from livestock for one growing season or until plant density is determined sufficient by a Range Conservationist, Biologist and the District Conservationist.

Follow the [NRCS Colorado Prescribed Burning \(338\)](#) and [Firebreak \(394\)](#) standards, specifications, job sheets/implementation requirements and job approval authority. Prescribed burning must be according to an approved prescribed burn plan written in accordance with state and county laws.

Activity	Requirement	Scheduling/ Interval
Prescribed Burn	Approved burn plan provided by TSP or state or federal entity reviewed by NRCS state rangeland management specialist If the site is vulnerable to wind and water erosion	November 1 st to March 14 th January 1 st to March 14 th

4. PRESCRIBED GRAZING

When implementing prescribed grazing with early successional habitat development as the focus vegetative diversity and wildlife habitat will increase. Prescribed grazing may be used in conjunction with other early successional plant establishment techniques.



Prescribed grazing may be used to remove excess plant litter and manipulate plant community composition in order to increase the quality of wildlife habitat, promote the germination of seed bearing annuals and plant diversity, height and density.

Implement grazing according to [NRCS Colorado Prescribed Grazing \(528\)](#) standards, specifications, job sheets/implementation requirements, planning guidance, and job approval authority.

Requirements

A prescribed grazing plan is a site specific conservation plan developed to address one or more resource concerns. Minimum requirements for a prescribed grazing plan include, Goals and Objectives, Resource Inventory, Forage Inventory, Forage Animal Balance, and Schedule.

A prescribed grazing plan to promote early successional plant establishment must use the appropriate wildlife habitat evaluation guide ([NRCS CO Biology Technical Note 8](#), FOTG Section I) and be designed to manipulate the existing vegetation to enhance the specific wildlife species habitat for the site.

The prescribed grazing plan must maintain vegetative cover, minimize soil erosion, protect water quality, and protect wildlife habitat quality.

The Rangeland Management Specialists, Wildlife Biologists, and the district conservationist will work together with the landowner to determine prescribed grazing parameters that will achieve early successional habitat goals and objectives that meet NRCS planning guidelines.

Additional Resources: [Colorado Grazing Land Planning](#) (FOTG Section III, Resource Planning Criteria)

5. MANAGED HAYING

When implementing haying with early successional habitat development as the focus, vegetative diversity and wildlife habitat will increase. Managed haying may be used in conjunction with other early successional plant establishment techniques.



Haying may be used to remove excess plant litter and manipulate plant community composition in order to increase the quality of wildlife habitat, promote the germination of seed bearing annuals and plant diversity, height and density.

Implement haying according to [NRCS Colorado Forage Harvest Management \(511\)](#) planning criteria. Cutting heights will be no less than 6 inches.

Requirements

Managed haying for early successional plant development may not occur during the primary nesting season, March 15th to July 15th.

The managed haying must maintain vegetative cover, minimize soil erosion, protect water quality, and protect wildlife habitat quality.