

NATURAL RESOURCES CONSERVATION SERVICE
MONTANA CONSERVATION PRACTICE SPECIFICATION/JOB SHEET

CRITICAL AREA PLANTING (ACRE)

CODE 342



PLANS AND SPECIFICATIONS

A site inventory shall be conducted to identify any physical, chemical or biological conditions that could affect the successful establishment of vegetation, and to plan the needed site preparations and protective measures.

Plans and specifications are to be prepared for each treatment area and include planting area preparation, methods and rates of planting, species (mixtures) to be planted, seed depth of planting, time of planting, fertilizer requirements, irrigation requirements, establishment requirements, site protection requirements and long-term management requirements.

Form MT342-JS1, Seeding/Planting Plan - Job Sheet, will assist practice planning and documenting application for herbaceous seedings.

Form MT342-JS2, Seeding/Planting Plan - As-Built, will assist with certification for herbaceous seedings.

Form MT612-JS1, Tree/Shrub Establishment Code 612 or MT391-JS 1, Riparian Forest Buffer Code 391 will assist practice planning and documenting application for woody plantings.

Under severe circumstances, structural (engineering) practices may be required in association with this practice to ensure long-term site stability.

Conservation Management System

As part of a conservation management system, use Critical Area Planting concurrently with other practices such as Filter Strips (Code 393), Diversion (Code 362), Streambank and Shoreline Protection (Code 580), Access Control (Code 472), Fence (Code 382), Prescribed Grazing (Code 528), Forage Harvest Management (Code 511), Nutrient Management (Code 590) and other practices needed on a site-specific basis to address natural resource concerns and the producer's objectives.

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SITE PREPARATION

Site Investigation: Identify any physical, chemical, or biological conditions that could limit the successful establishment of vegetation and list the limitations in the conservation plan assistance notes followed by recommended remediation. **Use a soil test to quantify limiting soil properties and to use as a basis for soil amendments to ameliorate or eliminate conditions that inhibit plant establishment and growth.** Limiting factors include soil texture, soil fertility, soil chemistry, soil compaction, average annual precipitation, topography, and site stability. **Attach an aerial photograph or map, topographic map, soil map, and soil test results of the site.**

Soil Amendments: Apply soil amendments to address soil deficiencies identified in the site investigation including lime, fertilizer, compost or other organic matter. Nitrogen fertilizer is not normally recommended. However, if a soil analysis shows a severe deficit, a light rate, less than 20 pounds per acre may be applied prior to seeding. Base fertilizer recommendations on Montana State University Extension Service Publication #EB 161, Fertilizer Guidelines for Montana.

Seedbed Preparation: Prepare a clean, firm, weed-free seedbed for all herbaceous and woody species to be planted following guidance in Plant Materials Technical Note MT-58, Seedbed Preparation and Seeding.

Considerations for Site Preparation. Planning and installation of other conservation practices such as Diversion (Code 362), Obstruction Removal (Code 500), Subsurface Drain (Code 606), or Underground Outlet (Code 620) may be necessary to prepare the area or ensure vegetative establishment.

Species Selection. Select herbaceous and/or woody species suited to current site conditions and intended uses and common to the site or location. Use certified seed or plant stock when available. **Attach a photocopy of all seed labels and/or nursery stock certification.**

- Do not select species on the Federal, State, County or Tribal noxious weed lists.
- Consider climate conditions of average annual rainfall and seasonal rainfall patterns, length of growing season, temperature extremes, Major Land Resource Area (MLRA), Ecological Site Descriptions, and USDA Plant Hardiness Zones.
- Consider soil conditions of soil texture and depth, pH, toxic elements, salinity, water table, flooding or ponding, and topographic conditions of slope and aspect.
- Consider plant compatibility among species in a mixture in rate of establishment, phenology, palatability, and growth habit.
- Use rhizomatous, sod-forming species to stabilize the soil and consider species to improve wildlife and pollinator habitat where appropriate.
- For critical areas on forested sites, refer to the practice specification Forest Trails and Landings (Code 655) for site adaptation zones.

Considerations for Species Selection. Use native species when appropriate for the site and the management objectives. Consider species or mixes with multiple conservation values. In a larger, grass-dominated planting, consider incorporating a small percentage of wildflower species and flowering shrubs, where appropriate, with tough root systems and good soil-holding properties, to benefit pollinators and other wildlife.

Avoid species that may harbor pests. Consider diverse species mixes to avoid the loss of site stabilizing function from single-species plantings affected by species-specific pest outbreaks.

Calculate seeding rates on a Pure Live Seed (PLS) basis and two times (2X) the seeding rates for a full stand listed in Montana Plant Materials Technical Note MT-46, Seeding Rates and Recommended Cultivars. Broadcast seeding requires four times (4X) the rates for a full stand listed in Montana

Plant Materials Technical Note MT-46 unless the site is harrowed and packed and then the 2X rate can be used. Hydro-seeding requires the 4X rate.

Inoculate legume seed with the Rhizobia nitrogen-fixing bacteria for the species being used before planting. Store Rhizobia in a cool dry environment and use only Rhizobia stored properly. Do not use inoculants after the expiration date indicated on the container.

Calculate woody plant densities and spacing from the following table:

PLANT TYPES	HEIGHT (FEET)	PLANT-TO-PLANT SPACING (FEET)	NUMBER OF PLANTS PER ACRE
Shrubs	<10	3–6	4,840–1,210
Shrubs/Trees	10–25	6–10	1,210–436
Trees	>25	10–15	436–194

Establishment of Vegetation. Plant using the best-suited methods for site and soil conditions.

Drill seed where practical. Calibrate drills on site to the planned seeding rate and set for the correct planting depth according to Montana Plant Materials Technical Note MT-30, Drill Calibration. Use rice hulls or other diluents in the seed mix with fluffy or multiple-sized seed to facilitate flow and distribution. Refer to Montana Plant Materials Technical Note MT-52, Mixing Seed with Rice Hulls. Where slopes are greater than 5%, drill seed on the contour.

Where drill seeding is not practical, broadcast seed on a freshly roughened surface to accommodate seed catchment. After broadcasting, incorporate seed into the soil by hand raking, or dragging harrows, chains, or other suitable equipment over the surface and pack to improve seed to soil contact by rolling. Mulch to cover the seed where practical. Use rice hulls or other diluents in the seed mix with fluffy or multiple-sized seed to facilitate flow and distribution. Refer to Montana Plant Materials Technical Note MT-52, Mixing Seed with Rice Hulls.

A helicopter or fixed-wing aircraft is an efficient and economical method when reseeding large areas after wildfires. Calibrate your swath width based on the species mix selected. Typically, the swath width from a bucket seeder on a helicopter is 40 to 60 feet and about 40 to 50 feet for fixed-wing aircraft.

SEEDING METHOD AND SEED PLACEMENT

Time seeding to best ensure establishment of selected species and to provide protective cover as soon as possible to minimize soil erosion. Complete spring plantings before May 15. Seed between May 15 and August 1 only when there is a minimum of two feet of moist soil, and moist soil is within two inches of the surface. Dormant fall planting after October 15 or when the soil temperature at two-inch depth remains below 40° F for 10 or more days.

MULCHING

Mulch plantings as necessary to ensure establishment or to prevent erosion. Refer to the standard and specification for Mulching (Code 484) for further technical information. Mulching is recommended on slopes steeper than 2:1. Prepare slopes to a roughened state by hand, excavator, dozer or other equipment to leave a loosened surface with divots and mini-basins for broadcast seed catchment.

Straw is the preferred mulch. Wheat straw deteriorates less rapidly and contributes less volunteer plants than barley straw. Use certified noxious weed-free straw. Apply uniformly no deeper than two inches and anchor with rollers or crimpers. Tackifiers, woven netting and other covers, can be used to anchor mulch where slopes are too steep to use equipment. Apply 10 pounds actual nitrogen per ton of straw to balance the carbon:nitrogen ratio and avoid a nitrogen deficiency during organic mineralization.

Woven, fabric and artificial mulches can also be used.

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When hydro-mulching, a split hydro-mulch – hydro-seeding procedure is recommended on appropriate sites. Apply seed and fertilizer first to optimize seed to soil contact, and then hydro-mulch over the site.

SODDING

When using sod, the surface will be smoothed so air pockets will not form beneath the sod. Sod strips will be tamped tightly together in place. Sod will be staked down as needed to protect from movement on steep slopes. Cut sod will be kept moist. The maximum period between cutting and laying will not exceed 96 hours.

Areas covered with sod will be irrigated until sod has become well established. Certain species may require permanent irrigation to maintain adequate cover. Dryland sites that receive less than 18 inches of precipitation will not be sodded unless irrigated. Dryland sites that receive greater than 18 inches of precipitation will be sodded early spring to May 1. Irrigated sites can be sodded from early spring to September.

The following species are adapted for sod purposes:

INTRODUCED SPECIES	NATIVE SPECIES
Creeping Foxtail	Western Wheatgrass
Intermediate Wheatgrass	Prairie Sandreed
Pubescent Wheatgrass	Slender Wheatgrass
Kentucky Bluegrass	Streambank Wheatgrass
Smooth Bromegrass	Thickspike Wheatgrass

IRRIGATION

When plantings are to be irrigated, use non-erosive methods to maintain adequate moisture in at least the upper six inches of soil during the first four weeks and then in the upper 12 inches until the end of the growing season. Excessive irrigation may hinder the establishment of native seedlings. For further technical information, refer to the FOTG, Section IV, Standards and Specifications for Irrigation Water Management (Code 449).

COVER CROPS

Nurse crops will not be used.

Where quick protection is required to reduce wind or water erosion a cover crop may be seeded one season prior to the desired vegetation. Cover crops and their seeding rates are in the box below:

CROP	SEEDING LBS/ACRE	SEEDS PER FOOT ²
Spring Wheat	20	6.7
Barley	15	4.5
Oats	20	6.5
Slender wheatgrass	3	9.6

Temporary cover crops can be used for up to two years where cover is needed. If construction is delayed on a site that has been disturbed, or will be redistributed in the near future, temporary cover crops can be used to protect the site against erosion, weed invasion, or stabilize the site for eventual permanent vegetation establishment. In the latter situation, the cover crop must be clipped or chemically terminated prior to seed set to control volunteer competition to new seedlings. Refer to the FOTG, Section IV, Practice Standards and Specifications for Cover Crop (Code 340).

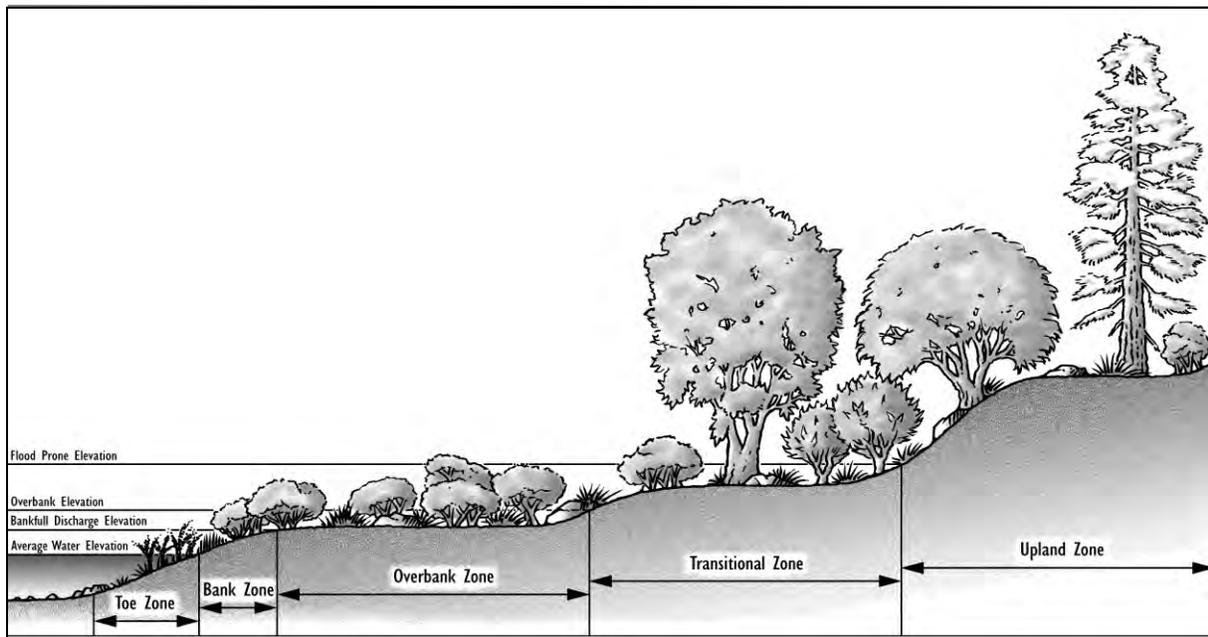
Additional Criteria to Stabilize Stream and Channel Banks and Shorelines

Figure 1. Location of hydrologic zones along a channel or shoreline.

Definitions and descriptions of hydrologic zones used for channels and shorelines:

Bankfull Discharge Elevation - In natural streams, it is the elevation at which water fills the channel without overflowing onto the flood plain.

Bank Zone - The area above the Toe Zone located between the average water level and the bankfull discharge elevation. Vegetation may be herbaceous or woody, and is characterized by flexible stems and rhizomatous root systems.

Overbank Zone - The area located above the bankfull discharge elevation continuing upslope to an elevation equal to two thirds of the flood prone depth. Vegetation is generally small to medium shrub species.

Toe Zone - The portion of the bank that is between the average water level and the bottom of the channel, at the toe of the bank. Vegetation is generally herbaceous emergent aquatic species, tolerant of long periods of inundation.

Transitional Zone - The area located between the overbank zone, and the flood prone width elevation. Vegetation is usually larger shrub and tree species.

Upland Zone – The area above the Transitional Zone; this area is seldom if ever saturated.

Note: some channels or shorelines have fewer than four hydrologic zones because of differences in soils, topography, entrenchment and/or moisture regime.

Bank and Channel Slopes. Salvage and stockpile topsoil before modifying slopes. Shape channel side slopes to stabilize and allow establishment and maintenance of desired vegetation. Stabilize slopes steeper than 2:1 with a combination of vegetation and structural measures. Spread salvaged topsoil over areas as needed to meet planting and landscaping needs.

Species Selection. Select plant materials adapted to the hydrologic zone of the site Figure 1 above that are adapted to the region. Also, select plant materials that when mature are compatible with the plant community in the area and protect the channel banks but do not restrict channel capacity. For guidance on species selection for our region, refer to Plant Materials Technical Note MT-37, Users Guide to Description, Propagation, and Establishment of Wetland Species and Grasses for Riparian Areas in the Intermountain West, Forestry Technical Note MT-26, Establishment of Bareroot and Containerized Stock in Riparian

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Areas, and Plant Materials Technical Note MT-36, Users' Guide to Description, Propagation, and Establishment of Native Shrubs and Trees for Riparian Areas in the Intermountain West.

Establishment of Vegetation. The planting rates, spacing, methods and dates of planting for herbaceous species for our region are described in Plant Materials Technical Note MT-37, Users Guide to Description, Propagation, and Establishment of Wetland Species and Grasses for Riparian Areas in the Intermountain West and Forestry Technical Note MT-26, Establishment of Bareroot and Containerized Stock in Riparian Areas. Also, consult Plant Materials Technical Note MT-51, Temporary Handling and Storage of Container, Bareroot, and Cutting Stock.

If desirable vegetation exists on the site, identify, mark, and protect it during practice installation where practical.

If the existing vegetation on a site will compete with species to be established vegetatively (e.g., bareroot, containerized, ball-and-burlap, potted), it will be controlled in a manner that ensures the successful establishment of the planted species. All noxious weeds shall be controlled prior to planting following specification for Herbaceous Weed Control (Code 315) and only using herbicides approved for application in riparian areas and without soil residual activity that may affect planned vegetation.

Site Protection and Access Control. Exclude grazing animals from planted areas for a minimum of two growing seasons. Permanently exclude grazing on high hazard sites such as cut banks, areas of seepage or other potentially unstable areas. Design exclusion fencing according to specification for Fence (Code 382). Protect woody plantings from wildlife damage by fencing or protective tubes (see Montana Plant Materials Technical Note MT-45, Proper Installation, Maintenance, and Removal of Rigid Seedling Protector Tubes). All areas to be grazed will have a grazing plan according to the specifications for Prescribed Grazing (Code 528).

Additional Criteria to Rehabilitate and Re-vegetate Degraded Sites that cannot be Stabilized through Normal Farming Practices

If gullies or deep rills are present, fill and level as necessary to allow equipment operation and ensure proper site and seedbed preparation. Rip soil compacted by equipment operation to break up compaction layers before seedbed preparation.

Based on a soil test and other appropriate site evaluations, add soil amendments as necessary to ameliorate or eliminate physical or chemical conditions that inhibit plant establishment.

Additional Criteria for Areas Burned by Wildfire

Sites burned by severe wildfire have vegetation and the duff layer removed leaving the sites susceptible to erosion and noxious weed invasion. A description of fire severity is at:

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mt/programs/planning/ewpp/?cid=nrcs144p2_056249

Reseeding after wildfire should be limited to severely burned sites with high fire intensity. In general, these are steep-timbered north and east slopes that contained a dense forest canopy and natural vegetation recovery is about five to ten years post fire.

Seed wildfire affected sites the immediate fall or winter post fire. Aerial broadcasting seed on snow has successfully established native grass stands.

Wildfires prepare a favorable seedbed requiring no further seedbed preparation. Soil nitrogen is typically elevated after wildfire and no fertilizer additions are recommended.

Calculate seeding rates 2.25 to 2.5 times the drilled rates listed in Montana Plant Materials Technical MT-46, Seeding Rates and Recommended Cultivars (50 to 60 seeds per square foot).

For large areas burned by wildfire, aerial broadcast seeding using helicopter or fixed-wing aircraft is efficient and economical. Consult with the aircraft operator for seeding calibration and where possible, verify on site

by counting seeds within a one square foot frame. Typically, the swath width of a helicopter bucket seeder is 40 to 60 feet and 40 to 50 feet for fixed-wing aircraft.

Aerial seeding following wildfires must be done prior to March 1 following the year of disturbance.

For examples of seeding after fire, read Forestry Technical Note MT-35, Results of Reseeding a Fire Impacted area in western Montana, and Forestry Technical Note MT-28, Results of Reseeding a Fire Impacted Watershed in South Central Montana.

Defer livestock grazing for two seasons post seeding using practice Access Control (Code 472).

Additional Criteria for Urban and Conservation Construction Sites and Mined Lands

Site Preparation. Remove the topsoil layer and stockpile separately from subsoil layers. To preserve soil flora and fauna important to vegetation establishment and growth, stockpile topsoil for the minimum time required to complete construction no longer than two years. Remove or dispose of toxic materials in an approved manner if they are present on the site. Do not redistribute toxic material on the site. Rip soils compacted by equipment operation and redistribute the topsoil evenly on the site. Prepare the seedbed according to Plant Materials Technical Note MT-58, Seedbed preparation and Seeding.

OPERATION AND MAINTENANCE

Manage the use of the area for as long as necessary to ensure stability.

Protect plantings from pests (e.g., weeds, insects, diseases, livestock or wildlife) as necessary to ensure planted vegetation long-term survival. Scout for plant and insect pests using the schedule for forage in Table 2 in the specification for Integrated Pest Management (Code 595). Mow before weed seeds develop and to a six to eight inch height to manage weeds during the establishment year, where practical. Refer to Montana Invasive Species Technical Notes on species of Montana's Noxious Weeds for guidance on their control, and consult local County Extension Agents and Weed Coordinators for specific herbicide and pesticide recommendations.

Repair fences as needed to exclude livestock and wildlife.

In woody plantings, inspect woven weed fabric, protective tubes and netting each spring and repair or re-stake as needed to prevent girdling or other damage (see Montana Plant Materials Technical Note MT-45, Proper Installation, Maintenance, and Removal of Rigid Seedling Protector Tubes). Remove protective tubes when the growing points exceed the height of browsing animals on the site (from two to six years).

Inspect, reseed or replant, and fertilize as needed to ensure the practice functions as intended throughout its expected life. Observe the progress and success at regular intervals until the practice has met the criteria for successful establishment and implementation. Evaluate woody plantings in the spring or summer and re-plant if less than 75% of the planted trees and shrubs survive after "leaf out" of the second year. Evaluate the establishment of herbaceous seedings using the guidance in Conservation Planning Technical Note MT-5, Evaluating Seeding Success for Forage and Biomass Planting (Code 512) and Range Planting (Code 550).

Use of the critical area should be avoided during periods of establishment. Use thereafter should be minimal and based on physiological condition of vegetation and erodibility of the site. The site may require permanent protection from both domestic livestock and wildlife. Refer to FOTG, Section IV, Practice Standards and Specifications for Fence (Code 382).