

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

ROAD/TRAIL/LANDING CLOSURE AND TREATMENT

(Ft.)

CODE 654

DEFINITION

The closure, decommissioning, or abandonment of roads, trails, and/or landings and associated treatment to achieve conservation objectives.

PURPOSE

To minimize various resource concerns associated with existing roads, trails, and/or landings by closing them and treating to a level where one or more the following objectives are achieved:

- Controlling erosion (road, sheet and rill, gully, wind), chemical residues and off-site movement, sediment deposition and damage, accentuated storm runoff, and particulate matter generation;
- Restoring land to a productive state by reestablishing adapted plants and habitat (wildlife food, cover, and shelter), reconnecting wildlife habitat and migration corridors including streams and riparian areas, and controlling noxious and invasive species;
- Reestablishing drainage patterns that existed prior to construction of the road, trail, or landing to restore the form and integrity of associated hill slopes, channels and floodplains and their related hydrologic and geomorphic processes;
- Minimizing human impacts to the closure area to meet safety, aesthetic, sensitive area protection, or wildlife habitat requirements.

CONDITIONS WHERE PRACTICE APPLIES

On roads, trails, and landings designated for closure including cut-and-fill slopes, sidecast areas and associated drainage structures.

This practice should not be used to mitigate, replace or be used in lieu of the best management practices that are required for logging operations. Logging operations are required to implement best management practices for activities, including timber harvesting, with respect to water quality and Section 319 of the Federal Clean Water Act Amendment of 1987. Refer to the current version of *Kentucky Forest Practice Guidelines for Water Quality Management*.

This practice shall be implemented in a team approach consisting at a minimum of an engineer and a certified forester and/or biologist. Coordination with a soil scientist and the Kentucky Division of Forestry (KDF) should be consulted prior to implementation.

This practice shall be utilized where there can be clear demonstration of soil erosion (i.e. gully erosion) and/or point source impacts to water quality such as direct sedimentation into surface waters.

CRITERIA

All designs and specifications shall be in accordance with the current version of *Kentucky Forest Practice Guidelines for Water Quality Management*. This document is also available in Section IV of the eFOTG under Tools.

Roads, trails, and landings will be designated into one of three levels of treatment:

- 1) Closure and treatment to a level that facilitates future use for management activities.
- 2) Closure, treatment, and reconnection to applicable drainage networks (usually

involves culvert removal which limits potential for future use).

- 3) Closure, removal and reshaping to natural contours, treatment and stabilization, and natural landscape and drainage restoration.

Determine the appropriate level of treatment based on the associated severity of environmental effects of existing roads, trails, and landings; future access requirements; and short-term disturbance effects during closure and treatment activities.

Treatment shall result in physical conditions and a configuration that achieve the stated purpose and objective(s). Approved technology tools will be used to support design and specifications development such as prediction models for erosion, hydrology and hydraulics, soil mechanics and slope stability, and wildlife/habitat interactions.

Closure and treatment activities and final conditions and configuration will minimize adverse onsite and off-site effects such as water and wind erosion including particulate matter/dust generation, concentrated flows to unprotected areas, destabilization of slopes and mass wasting, riparian area or wetland degradation, stream channel and streambank damage, barriers to aquatic organism and wildlife movement or migration, hydrologic modification, or other water resource damage. Any seep or spring that is on or associated with the area to be treated shall not be buried under fill nor have its drainage concentrated through unarmored fill areas. Seeps and springs shall be reconnected to appropriate drainage networks.

Equipment types will be sufficient to implement treatments to the designated level. Treatment and construction techniques will be scheduled to minimize soil erosion, displacement, compaction, aesthetics degradation, safety concerns, barriers to wildlife movement, or unacceptable damage to adjacent areas.

All levels of treatment will utilize measures applicable to that level such as but not limited to:

- Permanent or temporary traffic barriers and caution signage.
- Excavation and reshaping of roads, trails, landings, and drainage ways to natural conditions including culvert removal and reconnection of the site areas to appropriate drainage networks.
- Ripping to improve infiltration and vegetation root growth. Refer to criteria outlined in Tree/Shrub Establishment (490).
- Topsoil stockpiling and respreading and, in some cases, importing.
- Rolling grades to disperse runoff of selected road and trail segments to be closed.
- Control of nuisance, noxious or invasive species. Refer to criteria outlined in Herbaceous Weed Control (315) or Brush Management (314).
- Reestablishing adapted vegetation including mulch and soil amendments as necessary to enhance establishment.

Treatments to restore natural topography and surface hydrology will result in stable slopes and be compatible with existing land uses in the vicinity.

Minimize indirect adverse impacts or effects of the practice on species with declining populations, particularly aquatic species in streams or wetlands downslope of project area.

Sites containing hazardous material shall be cleaned prior to the establishment of this practice following all local, state, and federal regulatory requirements. Appropriate actions to clean sites suspected of containing hazardous wastes shall be based on soil tests.

To control emissions of particulate matter to the air during closure and treatment operations, utilize a dust palliative or other method of dust control on bare and disturbed surfaces.

Design, construction criteria, and specifications of other practices used in combination with this practice shall be integrated and compatible to conduct closure and treatment activities and achieve specified final conditions and configuration. Criteria for design of components not addressed in NRCS practice standards shall be consistent with professional engineering practices.

Other engineering/ecological facilitating practices may include but are not limited to:

- (342) Critical Area
- (410) Grade Stabilization Structure
- (472) Access Control
- (484) Mulching
- (490) Tree/Shrub Site Preparation
- (560) Access Road
- (578) Stream Crossing
- (587) Structure for Water Control
- (612) Tree/Shrub Establishment

Additional Criteria to Establish Vegetation

Vegetative establishment can also be used to improve wildlife habitat and enhance natural beauty. Vegetative establishment is needed on sediment-producing, erodible, or severely eroded areas, such as logging roads, skid trails, and log landings.

Herbaceous Vegetation

Vegetative establishment of herbaceous cover is used to stabilize the soil and reduce damage to down-stream areas from sediment and runoff from silviculturally disturbed areas.

Where appropriate, re-vegetation should be accomplished using both temporary cover crop species and permanent species mixes.

Herbaceous vegetation shall be established according to rates, timing, and species shown in the *Kentucky Forest Practice Guidelines for Water Quality Management - BMP #2* Vegetative Establishment on Silviculturally Disturbed Areas. Refer to Tables 2-3 through 2-6, including Appendix 1 – Determining the Amount of Seed Needed on Roads and Trails. *These tables are also included in this document.*

NOTE: Where wildlife is the primary consideration mixtures containing Kentucky 31 fescue shall not be utilized.

Mulching for herbaceous vegetation shall be in accordance with the conservation practice (480) Mulching.

Woody Vegetation

Woody vegetation shall be established only on areas and sites that are, or have been, adequately stabilized. Species utilized shall be native or indigenous to Kentucky. Refer to the Tree and Shrub Establishment Guide in the eFOTG, Section IV, Tools.

When wildlife is a primary consideration select trees and shrubs that produce food or cover for targeted species.

Establishment of woody vegetation shall be performed according to Kentucky conservation practice standards (490) Tree/Shrub Site Preparation and (612) Tree/Shrub Establishment.

CONSIDERATIONS

Carefully consider access control for this practice due to the propensity to utilize sites for recreational purposes (i.e. four-wheeler access).

For roads, trails, or landings deemed unsuitable as candidates for closure and treatment, consider upgrading specifications and operation-maintenance provisions of the existing practices Access Road-560 and/or Forest Trails and Landings-655 to achieve conservation objectives. In these cases, install complementary practices and measures concurrently while upgrading road, trails, and/or landings.

Compacted areas will need bulk density tests at various depths to assure treatment specifications are adequate to reestablish hydrologic function and vegetation.

Use native species when establishing vegetation, especially those having multiple values, e.g., biomass, nuts, fruit, browse, nesting, and aesthetics. Avoid use of

introduced or exotic species that could become nuisances.

In areas where steepness of slope and severity of cut and fill operation preclude returning sidecast to create a rooting medium, assess the road base for ripping and usage as a rooting medium. If not suitable as a rooting medium, suitable haul-in topsoil/fill material may be needed. Assure that such material is free of weeds seeds and/or contaminants.

Road sites are typically nutrient poor. Consider soil amendments or organic matter, as appropriate, to accelerate the rate of re-vegetation.

Consider performing a soils investigation to document pH and chemical properties such as fertility, and physical properties such as compaction and slip potential.

PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared for the specific site conditions in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. These items shall describe the location; the designated level of treatment; the kind, amount and quality of materials and acceptable equipment to be used; and the sequence, timing and details of closure-treatment activities.

At a minimum information shall include:

- Name
- Purpose
- Location map
- Existing site description (or photos)
- **Planned Treatment Level**
 - Treatment description
 - Sequencing, timing and details of closure activities.
 - Plan view of site with existing and planned features, including dimensions, distances, slope, drainage structures, erosion control measures, etc.
- Identification of access control, if needed.
- Any supplemental practices required
- Operation and maintenance plan

Specifications shall include at a minimum:

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- Width/length (height) of cut slope, road/trail surface, fill slope, total length, average width, acreage, additional treatment requirements, plant materials (species, seed, lime, fertilizer, mulch, dates) site preparation, planting method
- Computations for surface water controls, water bars, drainage structures and outlets, as needed.
- Materials and quantities needed. Identify borrow material and/or spoil area, as needed.
- Identification of needed erosion and sediment control measures

OPERATION AND MAINTENANCE

Operation and maintenance shall include periodic monitoring and weather event-based patrolling of completed sites to determine adverse environmental effects and the condition of vegetation established on disturbed areas. Dying or dead vegetation shall be replaced as necessary. Control of nuisance, noxious, or invasive species will be continued.

Initial monitoring and patrolling shall be conducted during water and/or wind erosive period(s) as needed until the site is determined to be stable. Stabilizing measures and additional treatment will be applied when and where necessary.

REFERENCES

- Borlander, P. and A. Yamada. 1999. Dust palliative selection and application guide. Project Report 9977-1207-SDTDC San Dimas Technology Development Center, USDA, Forest Service, San Dimas, CA. Available at <http://www.wsdot.wa.gov/TA/T2Center/DustGuide.pdf>.
- Merrill, B.R. and E. Casaday. 2001. Field techniques for forest and range road removal. California State Parks, Sacramento, CA. Available at: <http://www.parks.ca.gov/pages/23071/files/field%20techniques%20for%20road%20removal%20part%202.pdf>.
- Moll, J. 1996. A guide for road closure and obliteration in the Forest Service. San Dimas Technology and Development Center, USDA Forest Service, San Dimas,

- CA.
- Switalski, T.A., et al. Benefits and impacts of road removal. The Ecological Society of America, Front. Ecol. Environ. 2004. 2(1): 21–28. Available at http://www.fs.fed.us/rm/pubs_other/rmrs_2004_switalski_t001.pdf.
 - Kentucky Forest Practice Guidelines for Water Quality Management - Jeffrey W. Stringer, Ph.D., Department of Forestry, University of Kentucky, Lexington, KY 40546-0073 and Cary Perkins, Kentucky Division of Forestry, 627 Comanche Trail, Frankfort, KY 40601

Table 2-2—Temporary Cover Crop Species

Species	Seeding Rates (lbs/ac/pls ¹)	Recommended Seeding Dates
winter wheat ²	35	Oct. 15 - March 1
grain rye	35	Oct. 15 - March 1
spring oats	35	Oct. 15 - March 1
foxtail millet	12	May 1 - July 15
Japanese millet	15	May 1 - July 1
pearl millet	10	May 1 - July 1
annual ryegrass	5	Aug. 1 - Oct. 15
browntop millet	15	May 1 - July 1
cereal rye (Aroostook)	25	Sept. 15 - Oct. 15

NOTE: Species in **bold** are primary recommendations. PLS is utilized for NWSG plantings only.

Table 2-3—Mixtures for Slopes Less than 10 Percent

Species Mixture	Seeding Rates (lbs/ac/pls ¹)	Seeding Dates for Mixture ²	Special Considerations
a. orchard grass³	8	Feb. 1 - May 1	
red clover	6	Aug. 1 - Oct. 15	
b. orchard grass	8	Feb. 1 - May 1	
ladino clover	2	Aug. 1 - Oct. 15	
c. timothy	4	Feb. 1 - May 1	
ladino clover	2	Aug. 1 - Oct. 15	
d. orchard grass	10	Feb. 1 - May 1	No fall planting due to lespedesa
Kobe or Korean lespedesa	10		
e. switch grass	1	May 1 - June 30	For open canopy conditions only. A good seed bed is required. No fall planting due to lespedesa.
big bluestem	2		
indiangrass	2		
red clover	4		
Korean lespedesa	5		
f. little bluestem	3	May 1 - June 30	No fall planting due to lespedesa
side-oats gramma	3		
Korean lespedesa	5		

1 pls: pure live seed (see Appendix 1).

2 the seeding dates were developed for the mixture and not the individual species. For example, it is recommended that mixture "a" be seeded between February 1 and May 1 or between August 1 and October 15.

3 Mixes in **boldface type** are primary recommendations.

NOTE: Species in **bold** are primary recommendations. PLS is utilized for NWSG plantings only.

Table 2-4—Mixtures for Highly Erodible Areas (Areas Exceeding 10 Percent Slope)

Species Mixture	Seeding Rates (lbs/ac/pls) ¹	Seeding Dates ² for Mixture	Special Considerations
a. Kentucky 31 fescue	30	Feb. 1 - May 15 Aug. 1 - Oct. 15	High seedling and plant vigor on droughty, exposed sites. The endophyte-free fescue is more valuable for wildlife and is acceptable on lesser slopes.
flatpea ³	30		
b. Kentucky 31 fescue	30	Feb. 1 - May 15 Aug. 1 - Oct. 15	High seedling and plant vigor on droughty, exposed sites. The endophyte-free fescue is more valuable for wildlife and is acceptable on lesser slopes.
birdsfoot trefoil	10		
c. creeping red fescue	20	Feb. 1 - May 15 Aug. 1 - Oct. 15	For use in shaded areas.
white clover	2		
d. switch grass	8	May 1 - June 30	For open canopy conditions only. Switch grass is a native.
partridge pea	5		

1 pls: pure live seed (see Appendix 1).

2 the seeding dates were developed for the mixture and not the individual species. For example, it is recommended that mixture "a" be seeded between February 1 and May 1, or between August 1 and October 15.

3 Mixes in **boldface type** are primary recommendations.

NOTE: Species in **bold** are primary recommendations. PLS is utilized for NWSG plantings only.

Table 2-5—Mixtures for Wet or Poorly Drained Areas

Species Mixture	Seeding Rates (lbs/ac/pls) ¹	Seeding Dates ²	Special Considerations
a. redtop	7	Feb. 15 - June 30	
alsike clover or birdsfoot trefoil ³	6	Aug. 1 - Oct. 1	
b. switch grass	8	May 1 - June 30	For open canopy conditions only.
alsike clover or birdsfoot trefoil	6	Aug. 1 - Oct. 1	

1 pls: pure live seed (see Appendix 1).

2 the seeding dates were developed for the mixture and not the individual species. For example, it is recommended that mixture "a" be seeded between February 15 and June 30, or between August 1 and October 1.

3 Mixes in **bold face type** are primary recommendations.

NOTE: Species in **bold** are primary recommendations. PLS is utilized for NWSG plantings only.

Table 2-6—Mixtures for Establishing Native Species

Species Mixture	Seeding Rates (lbs/ac/pls) ¹	Seeding Dates ²	Special Considerations
a. switch grass	2.0	May 1 - June 30	For open canopy conditions only.
indiangrass	2.0		
big bluestem	1.5		
little bluestem	1.5		
partridge pea	5.0		

1 pls: pure live seed (see Appendix 1).

2 the seeding dates were developed for the mixture and not the individual species. For example, it is recommended that mixture "a" be seeded between February 1 and May 1, or between August 1 and October 15.

NOTE: Species in **bold** are primary recommendations. PLS is utilized for NWSG plantings only.