NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

CRITICAL AREA PLANTING

(acre)
CODE 342

DEFINITION

Planting vegetation, such as trees, vines, grasses, and/or legumes on highly erodible or critically eroding areas.

Stabilization of sediment producing areas with herbaceous and/or woody vegetation.

PURPOSE

- **to stabilize the soil**
- **reduce runoff and sedimentation damages to downstream areas**
- **improve wildlife habitat**
- **improve visual resources**

* ***to improve vegetative ground cover density***
* ***reduce accelerated soil erosion and maintain or improve sustainability of the resource***
* ***improve landscape appearance***
* ***produce wildlife food and cover***

CONDITIONS WHERE PRACTICE APPLIES

This practice may be applied on all natural and man-made landscapes where water erosion is causing, or has the potential to cause, on-site soil stability and off-site runoff and sedimentation problems. The practice may also be applied on critical areas in order to improve aesthetics and/or wildlife habitat.

CRITERIA

General Criteria Applicable To All Purposes Named Above

The location, layout, and vegetative cover density will accomplish the intended purpose and function. Planning will be designed to insure that soil erosion is reduced to, or maintained at, acceptable levels.

Dominant vegetation will consist of herbaceous and/or woody species adapted to the site and intended purpose. Listed in Appendix 1.

Necessary site preparation and planting shall be done at a time and manner to insure survival and growth of selected species. Site preparation shall be sufficient for establishment and growth of selected species as described in Appendix 1.

Livestock shall be controlled or excluded as necessary to allow for establishment and maintenance of the desired vegetative cover.
Determine pesticide needs and apply in accordance with the NRCS Pest Management Standard (595).

Additional Criteria To Insure Stabilization of the Soil and Reduction of Runoff and Sedimentation Damages to Downstream Areas

Determine need for water control and sediment retention structures by referring to applicable NRCS Standards in Section IV of the West Virginia Technical Guide, or the West Virginia Sediment and Erosion Control Manual for Developing Areas.

Determine soil nutrient levels and pH by soil test and develop fertilizer and lime recommendations according to guidelines presented in the soil test report. If soil tests can not be obtained, use recommendation in Appendix 1. Follow-up with a soil test to meet Operation and Management requirements.

Determine timing of establishment of vegetation according to information presented in Appendix 1.

Determine need for mulch and mulch anchoring in accordance with the NRCS Standard for Mulching (484) and WV Agronomy Field Letter Number 9 (Table 4).

Additional Criteria for Improvement of Wildlife Habitat and Visual Resources

Select native species that have multiple values such as those suited for timber, biomass, nuts, fruit, browse, nesting, aesthetics and tolerance to locally used herbicides. Use Technical Guide References (FOTG Section 1-A; Biology) to select desirable species.

Avoid tree and shrub species which may be alternate hosts to pests. Use a mixture of species to avoid loss of function due to species-specific pests.

The location, layout and density of the critical area planting should complement natural features.

CONSIDERATIONS

The severity of water erosion and its influence on down stream sedimentation should be assessed to determine appropriate stabilization measures.

On sites with good access for regular fertilization, consider splitting nitrogen applications to improve nitrogen use efficiency. When splitting nitrogen applications, apply no more than 60 percent of the total amount in one application for cool season species and no more than 50 percent of the total in one application for warm season species.

On remote sites with poor access for regular fertilization, consider applying all nitrogen as slow release compounds such as: ureaformaldehyde, sulfur-coated urea, composted manures, or poultry by-products, et cetera.

Coordinate land disturbance to allow for critical area planting during optimum seeding dates.

Consider substituting orchardgrass for fescue in seeding mixtures when adjacent land uses or objectives may be adversely affected by fescue or other invasive species.

When conducting streambank treatment consider using techniques outlined in Appendix A-NEH, Part 653, Stream Corridor Restoration: Principals, Processes and Practices.

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Specifications shall be recorded using approved job sheets, narrative statements in the conservation plan, or other acceptable documentation. Requirements for operation and maintenance of the practice shall be incorporated into site specifications.

The following shall be required to document and certify satisfactory application of the practice:

- ***location on aerial or topographic map***
- ***landowners land use goals***
- ***water control and sediment retention structures location and design***
- ***required soil amendments***
- ***site and/or seedbed preparation***
- ***species, cultivar, rate of seeding and/or spacing of plants***
- ***method of establishment***
- ***dates of seeding and/or planting***
- ***type and rate of mulch and mulch anchoring***
- ***pest control measures, eg. insect, disease, browsing animals, et cetera***
- ***operation and maintenance requirements***

OPERATION AND MAINTENANCE

The following actions shall be carried out to insure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance):

The critical area planting will be inspected at least twice in the establishment year and at least once each of the next two years. Protected and restored as needed, to maintain the intended purpose from adverse impacts such as vehicular and pedestrian traffic, pest infestations, pesticide use on adjacent lands, livestock damage and fire.

Replacement of vegetation will be continued until the critical area is, or will progress to, a fully functional condition.

For providing habitat and corridors for wildlife, manage the critical area to favor food, shelter and nesting cover that would satisfy the habitat requirements of the indicator for target wildlife. Refer to Wildlife Habitat Management standard (645) in Section IV of the West Virginia Technical Guide.

For purposes of reducing excess pollutants in surface runoff and shallow groundwater, or providing habitat and corridors for wildlife, manage the dominant canopy to maintain the maximum vigor of overstory and understory species.

Additional operation and maintenance requirements shall be developed on a site-specific basis to assure performance of the practice as intended.

REFERENCES

1. Agronomy Guide - Current Edition; The Pennsylvanie State University, College of Agriculture, Extension Service, University Park, Pennsylvania. (http://AgGuide.agronomy.psu.edu)

2. A Guide for Revegetating Bituminous Strip Mine Spoils in Pennsylvania, 1965, Revised 1971; Research Committee On Coal Mine Spoil Revegetation in Pennsylvania.

3. Conservation Plants for the Northeast, 1977, Revised 1991; David G. Lorenz, W. Curtis Sharp, and Joseph D. Ruffner; Soil Conservation Service, U. S. Department of Agriculture

4. Tree - Herbaceous Study on Mine Spoil, 1977 - 1979, Field Evaluation Plantings: Big Flats Plant Materials Center, USDA, Soil Conservation Service, Big Flats, New York (unpublished).

5. Erosion and Control Surface Mining in the Eastern United States, #1 Planning, #2 Design, 1976; ERP Technology Transfer Seminar Publication

6. Plant Performance on Surface Coal Mine Spoil in the Eastern United States, 1978; Joseph D. Ruffner

7. West Virginia Field Letter Agronomy No. 9, 1999; Natural Resources Conservation Service, Morgantown, West Virginia

8. West Virginia Erosion and Sediment Control Handbook for Developing Areas, 1993; Soil Conservation Service, Morgantown, West Virginia

9. Vegetating with Native Grasses in Northeastern North America, 1998, USDA-Natural Resources Conservation Service and Ducks Unlimited Canada.

10. Stream Corridor Restoration: Principals, Processes and Practices National Engineering Handbook (NEH) Part 653. Federal Interagency Stream Restoration Working Group 1998.

APPENDIX 1
NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE

CRITICAL AREA PLANTING

(acre)
CODE 342

SITE PREPARATION

GENERAL

Install water control measures as needed (permanent and temporary.

Perform all cultural (tillage, et cetera) operations at right angles to the dominant slope.

Apply all soil amendments , eg. lime and fertilizer, immediately prior to preparation of the seedbed.

Where site conditions permit, prepare the seedbed by loosening the soil to a depth of four to six inches with suitable tillage equipment. Seedbed preparation may not be required on newly disturbed areas. If needed, firm the seedbed with a cultipacker or other suitable implement prior to broadcasting seed and/or plants to insure good seed and/or plant to soil contact and to prevent seeds and/or plants from being deeply buried.

Where site conditions will not permit normal seedbed preparation, loosen the soil surface by tracking and/or back blading with a bulldozer or other suitable earthmoving equipment, if available.

SOIL AMENDMENTS

Soil amendments may include agricultural grade ground limestone and/or other pH enhancing materials, commercial fertilizers and organic materials such as animal manures.

Apply all soil amendments by any approved method that will give uniform distribution of the material being applied.

Application of all soil amendments will be based upon recommendations from a qualified soil testing laboratory, unless a laboratory report ABSOLUTELY cannot be obtained prior to establishment of the practice. The following may be used as general guidelines for application of soil amendments if a soil testing laboratory report ABSOLUTELY cannot be obtained prior to establishment of the practice.

- ***apply all pH enhancing materials at a rate which is equivalent to 3 tons of agricultural grade ground limestone per acre (150 pounds/ 1000 square feet)***

- ***apply all soil fertility amendments according to the following general guidelines for the type of cover to be established:***

for temporary cover, apply 40 pounds each of N, P_2O_5, and K_2O per acre (1 pound of each per 1,000 square feet).

for permanent cover with a prepared seedbed, apply 100 pounds each of N, P_2O_5, and K_2O per acre (2.5 pounds of each per 1,000 square feet).

for permanent cover with no seedbed preparation, apply 40 pounds of N and 80 pounds each of P_2O_5, and K_2O per acre (1 pound of N and 2 pounds each of P_2O_5, and K_2O per 1,000 square feet).

COVER SELECTION

TEMPORARY COVER

Selection of type of temporary cover to be used will be based upon period of soil exposure.

Mulching will be used alone where the period of soil exposure will be more than 14 days but less than 60 days. Mulching will also be used on all sediment producing areas where establishment of temporary vegetation is not feasible or where seeding cannot be immediately completed because of weather conditions.

Annual grass and/or small grain will be used on all sediment producing areas where the period of soil exposure will be more than 60 days but less than 365 days. Species and seed mixtures recommended for Temporary Seeding are found in Table 1.

PERMANENT HERBACEOUS COVER

Permanent herbaceous cover will be recommended where no further soil disturbance is anticipated or needed to adequately stabilize the site.

Selection of type of permanent herbaceous cover will be based upon the land use planned for the site. All permanent herbaceous cover seeding recommendations will include a nurse crop. Species and seed mixtures recommended for Permanent Herbaceous Cover are found in Table 2.

PERMANENT WOODY OR SHRUBBY COVER.

Select species according to the site conditions and planned use.

Trees and shrubs adaptable to plantings for water erosion control are found in Table 3. When tree planting is mainly for wood products, refer to the Tree Planting Standard and Specifications (612).

Trees and shrubs adaptable to plantings for water erosion control on recreation, suburban, and urban areas are found in the West Virginia Erosion and Sediment Control Handbook for Developing Areas.

ESTABLISHMENT OF VEGETATION

HERBACEOUS COVER

Smooth and firm seedbed with a cultipacker, bulldozer or similar

tracked earthmoving equipment prior to seeding, if possible.

Apply seeds of one of the species or mixtures (Table 2) and a nurse crop listed in Table 1. Apply seeds uniformly by drilling, broadcasting, hydroseeding, or other suitable method. Cover grass and legume seeds with $^{1}/_{4}$ inch of soil when broadcasted or drilled.

Firm seedbed after applying seed with a cultipacker, bulldozer, or similar tracked earthmoving equipment, if possible.

Apply mulch according to standard for Mulching (484). For construction contracts, use WV Agronomy Field Letter 9. Annual grain such as barley, oats, or rye can be grown on some sites and a permanent seeding made in the standing stubble in lieu of mulching.

"Frost seeding" technique may be used on selected late winter days.

WOODY PLANTINGS

Woody species should be planted in combination with herbaceous species. Herbaceous species may be solid-seeded with woody species, interplanted or strip seeded with woody species planted between strips. When strip seeding, leave a 24 inch wide strip for woody species between strips of herbaceous plants. Strips should be on the contour. Plant trees at the rate of 1,200 per acre (6 by 6 foot spacing).

Plant shrubs at the rate of 4,800 per acre (3 by 3 foot spacing). Shrub or tree spacing may be varied to meet wildlife or aesthatic needs.

Follow Riparian Forest Buffer (391) standard when treating areas adjacent to and up-gradient from water bodies to stabilize the riparian zone.

OPERATION AND MAINTENANCE

GENERAL

Using the following criteria as guidelines, prepare an operation and management plan for inclusion in the conservation plan for this practice.

Conduct periodic inspections of the practice to ensure that the practice continues to function as planned.

All restorative measures required will be completed in accordance with the conservation plan for the practice, unless additional conservation measures are determined to be neccessary to ensure the integrity of the practice. Any additional measures will be planned and installed in accordance with the criteria of the appropriate standard and specification for the measures that may be required.

HERBACEOUS COVER

For forage, manage and maintain according to the standard and specifications for 528A or 511.

For all other uses, except woody cover, apply soil amendments as required to maintain ground cover density at the desired level (usually 90% ground cover density or greater). Application of soil amendments will be based upon soil testing laboratoy recommendations. As a minimum, test the soil at least once

every five years or more often if indicated by periodic inspections of the practice.

To maintain desired open areas, control brush and weeds by mechanical and/or chemical means according to the standard and specifications for Brush Management (314)[1/].

WOODY COVER

Protect plantings from trampling, grazing, and fire.

Trees may be thinned to meet landowner's goals.

Control brush and weeds by mechanical and/or chemical means according to the standard and specification for Brush Management (314)[1/].

[1/] Persons using chemical means of brush and weed control should be cautioned as follows: if herbicides are handled or applied improperly, or if unused portions are not disposed of safely, they may injure humans, domestic animals, desirable plants, fish, and other wildlife, and may contaminate nearby crops and other vegetation. Follow the directions and observe all the precautions on the container label.

TABLE 1.
TEMPORARY SEEDING RECOMMENDATIONS

SPECIES/MIXTURE	*SEEDING RATE LBS./ACRE*	*OPTIMUM SEEDING DATES*	*SOIL - SITE ADAPTATION DEPTH/DRAINAGE*	*pH RANGE*
ANNUAL RYEGRASS	*40*	*3/1 - 6/15 8/15 - 9/15*	*SHALLOW – DEEP WELL - POORLY*	*5.5 - 7.5*
FIELD BROMEGRASS	*40*	*3/1 - 6/15 8/15 - 9/15*	*SHALLOW - DEEP; WELL - MOD. WELL*	*6.0 - 7.0*
SPRING OATS	*96*	*3/1 - 6/15*	*SHALLOW - DEEP; WELL - POORLY*	*5.5 - 7.0*
SUDANGRASS	*40*	*5/15 - 8/15*	*SHALLOW - DEEP; WELL - POORLY*	*5.5 - 7.5*
WINTER RYE	*168*	*8/15 - 10/15*	*SHALLOW - DEEP; WELL - POORLY*	*5.5 - 7.5*
WINTER WHEAT	*180*	*8/15 - 11/15*	*SHALLOW - DEEP; WELL - MOD. WELL*	*5.5 - 7.0*
JAPANESE MILLET	*30*	*6/15 - 8/15*	*SHALLOW - DEEP; WELL*	*4.5 - 7.0*
REDTOP	*5*	*3/1 - 6/15*	*SHALLOW - DEEP; WELL*	*4.0 - 7.5*
ANNUAL RYEGRASS AND SPRING OATS	*26 64*	*3/1 - 6/15*	*SHALLOW - DEEP; WELL – POORLY*	*5.5 - 7.5*

TABLE 2.

PERMANENT HERBACEOUS COVER SEEDING RECOMMENDATIONS

SPECIES AND/OR MIXTURE	*SEEDING RATE LBS. PER ACRE*		*SOIL - SITE ADAPTATION*		
	PREPARED SEEDBED	*UNPREPARED SEEDBED*	*SOIL DEPTH & DRAINAGE*	*pH RANGE*	*SEEDING DATES*[1]
ORCHARDGRASS	*10*	*15*	*SHALLOW - DEEP;*	*5.5 - 7.5*	*3/1-6/15;*
LADINO CLOVER	*2*	*3*	*WELL - MOD. WELL*		*8/15-9/15*
REDTOP	*3*	*4.5*			
BIRDSFOOT TREFOIL	*10*	*15*	*SHALLOW - DEEP;*	*5.0 - 7.5*	*3/1-6/15;*
OR LADINO CLOVER	*3*	*4.5*	*WELL - MOD. WELL*		*8/15-9/15*
TALL FESCUE	*30*	*45*			
WEEPING LOVEGRASS	*1-2*	*1.5-3*			
OR REDTOP	*3*	*4.5*			
CROWNVETCH	*10-15*	*15-22.5*	*SHALLOW - DEEP;*	*5.0 - 7.5*	*3/1-6/15;*
TALL FESCUE	*30*	*45*	*WELL - MOD. WELL*		*8/15-9/15*
CROWNVETCH	*10-15*	*15 - 22.5*	*SHALLOW - DEEP;*	*5.0 - 7.5*	*3/1-6/15;*
PERENNIAL RYEGRASS	*20*	*30*	*WELL - MOD. WELL*		*8/15-9/15*
FLATPEA OR	*20*	*30*	*SHALLOW - DEEP;*	*4.0 - 8.0*	*3/1-6/15;*
PERENNIAL PEA	*20*	*30*	*WELL - MOD. WELL*		*8/15-9/15*
TALL FESCUE	*15*	*22.5*			
DEERTONGUE	*15*	*22.5*	*SHALLOW - DEEP;*	*4.0 - 7.0*	*3/1-6/15;*
BIRDSFOOT TREFOIL	*10*	*15*	*WELL - MOD. WELL*		*8/15-9/15*
WEEPING LOVEGRASS	*1-2*	*1.5-3*			
TALL FESCUE	*30*	*45*	*SHALLOW - DEEP;*	*4.5 - 7.5*	*3/1-6/15;*
SERECIA LESPEDEZA	*25*	*37.5*	*WELL - MOD. WELL*		*8/15-9/15*
LADINO CLOVER	*2*	*3*			
TALL FESCUE	*40*	*60*	*SHALLOW - DEEP;*	*5.0 - 7.5*	*3/1-6/15;*
LADINO CLOVER	*3*	*4.5*	*WELL - MOD. WELL*		*8/15-9/15*
REDTOP	*3*	*4.5*			
CROWNVETCH	*10*	*15*	*SHALLOW - DEEP;*	*5.0 - 7.5*	*3/1-6/15;*
TALL FESCUE	*20*	*30*	*WELL - MOD. WELL*		*8/15-9/15*
REDTOP	*3*	*4.5*			

[1] If permanent seeding is not feasible during these dates and the decision maker is willing to assume a high risk of failure and increased costs, use the recommended seeding and mulching rates in WV Agronomy Field Letter Number 9. (attached)

TABLE 2 (cont).

SPECIES AND/OR MIXTURE	SEEDING RATE LBS. PER ACRE PREPARED SEEDBED	UNPREPARED SEEDBED	SOIL - SITE ADAPTATION SOIL DEPTH & DRAINAGE	pH RANGE	SEEDING RATES[1]
TALL FESCUE BIRDSFOOT TREFOIL REDTOP	40 10 3	60 15 4.5	SHALLOW - DEEP; WELL - MOD. WELL	5.0 - 7.5	3/1-6/15; 8/15-9/15
SERECIA LESPEDEZA TALL FESCUE REDTOP	25 30 3	37.5 45 4.5	SHALLOW - DEEP; WELL - MOD. WELL	4.5 - 7.5	3/1-6/15; 8/15-9/15
TALL FESCUE REED CANARYGRASS REDTOP LADINO CLOVER	30 20 3 2	45 30 4.5 3.5	SHALLOW - DEEP; WELL - POORLY	4.5 - 7.5	3/1-6/15; 8/15-9/15
KENTUCKY BLUEGRASS REDTOP WHITE CLOVER OR BIRDSFOOT TREFOIL	20 3 2 10	30 4.5 3 15	SHALLOW - DEEP; WELL - MOD. WELL	5.5 - 7.5	3/1-6/15; 8/15-8/15
REED CANARYGRASS WEEPING LOVEGRASS	25 1	37.5 1.5	MOD. DEEP - DEEP; WELL - POORLY	4.5 - 7.5	3/1-6/15; 8/15-9/15
TALL FESCUE OR REED CANARYGRASS BIRDSFOOT TREFOIL	10 10 10	15 15 15	SHALLOW - DEEP; WELL - POORLY	5.5 - 7.5	3/1-6/15; 8/15-9/15
TIMOTHY ALFALFA	5 12	7.5 18	SHALLOW - DEEP; WELL - MOD. WELL	6.5 - 8.0	3/1-6/15; 8/15-9/15
TIMOTHY BIRDSFOOT TREFOIL	5 8	7.5 12	SHALLOW - DEEP; WELL - POORLY	5.5 - 7.5	3/1-6/15; 8/15-9/15
TALL FESCUE, CREEPING RED OR HARD FESCUE REDTOP	30 3	45 4.5	SHALLOW - DEEP; WELL - MOD. WELL	5.0 - 7.5	3/1-6/15; 8/15-9/15
REED CANARYGRASS BIRDSFOOT TREFOIL REDTOP	20 10 3	30 20 4.5	SHALLOW - DEEP; WELL - POORLY	5.5 - 7.5	3/1-6/15; 8/15-9/15

TABLE 2 (cont).

[1] If permanent seeding is not feasible during these dates and the decision maker is willing to assume a high risk of failure and increased costs, use the recommended seeding and mulching rates in WV Agronomy Field Letter Number 9. (attached)

SPECIES AND/OR MIXTURE	SEEDING RATE LBS. PER ACRE PREPARED SEEDBED	UNPREPARED SEEDBED	SOIL - SITE ADAPTATION SOIL DEPTH & DRAINAGE	pH RANGE	SEEDING DATES[1]
TALL FESCUE	50	75	SHALLOW -DEEP; WELL - POORLY	4.5 - 7.5	3/1-6/15; 8/15-9/15
SWITCHGRASS	10	15	SHALLOW - DEEP; WELL - MOD. WELL	5.0 - 7.5	3/1-4/15
SWITCHGRASS BIRDSFOOT TREFOIL	10 6	15 9	SHALLOW - DEEP; WELL - MOD. WELL	5.0 - 7.5	3/1-4/15
SWITCHGRASS SERECIA LESPEDEZA	10 20	15 30	SHALLOW - DEEP; WELL - MOD. WELL	5.0 - 7.5	3/1-4/15
SWITCHGRASS BIG BLUESTEM INDIANGRASS EASTERN GAMAGRASS LITTLE BLUESTEM COSTAL PANICGRASS	2 3 1 2 2 1	3 4 2 3 3 2	SHALLOW – DEEP; WELL – MOD. WELL	5.0 – 7.5	3/1-4/15
BIG BLUESTEM INDIANGRASS LITTLE BLUESTEM SIDEOATS GRAMA SWITCHGRASS	1 1 2 1 1	2 2 3 2 2	SHALLOW – DEEP; WELL – MOD. WELL	5.0 – 7.5	3/1-4/15

TABLE 3.

[1] If permanent seeding is not feasible during these dates and the decision maker is willing to assume a high risk of failure and increased costs, use the recommended seeding and mulching rates in WV Agronomy Field Letter Number 9. (attached)

TREES AND SHRUBS RECOMMENDED FOR PLANTING ON CRITICAL AREAS[1]

Species	*Lower Limit pH Tolerance*	*Tolerance to Competition and Shade*[2]	*Elevation*
Conifers			
Shortleaf pine	*4.0 - 4.5*	*intolerant*	*below 2500 ft.*
Austrian pine	*4.0*	*intermediate*	
Red pine	*4.0 - 4.5*	*intermediate*	*above 2000 ft.*
Pitch pine	*4.0*	*intolerant*	
White pine	*4.5*	*tolerant*	
Scotch pine	*4.0*	*intolerant*	
Virginia pine	*4.0*	*intolerant*	*below 2500 ft.*
Japanese larch	*4.0*	*intermediate*	
Hardwoods			
European (black) alder	*3.5*	*intolerant*	*below 2500 ft.*
Sweet birch	*4.5*	*tolerant*	
River birch	*4.0*	*intermediate*	*below 2500 ft.*
Eastern cottonwood	*4.5*	*intolerant*	
Tulip or yellow poplar	*4.5*	*intolerant*	*below 3000 ft.*
Sycamore	*5.5*	*intolerant*	*below 2500 ft.*
Sawtooth oak	*5.0*	*intolerant*	
Red oak	*5.0*	*intermediate*	
Black locust	*4.0*	*intolerant*	*below 3000 ft.*
Hybrid poplar	*4.5*	*intolerant*	
Bigtooth aspen	*4.5*	*intolerant*	
Chinese chestnut	*5.0*	*intermediate*	

[1] For streambank or riparian zones use Riparian Forest Buffer (391) standard Table 1.

[2] Shade tolerance of species is defined as follows:
Tolerant – can withstand completely shaded conditions.
Intermediate – partial shade is tolerated; plant requires some sunlight.
Intolerant – plant requires full sunlight.

TABLE 3 (cont).

TREES AND SHRUBS RECOMMENDED FOR PLANTING ON CRITICAL AREAS[1]

Species	*Lower Limit pH Tolerance*	*Tolerance to Competition and Shade*	*Elevation*
Shrubs			
Indigobush	*4.0*	*intermediate*	
Silky cornel	*4.5*	*tolerant*	
Gray dogwood	*5.0*	*intermediate*	
Flowering dogwood	*5.0*	*tolerant*	
Bicolor lespedeza	*4.5 - 5.0*	*intolerant*	
Shrub lespedeza 'Amquail'	*4.5 - 5.0*	*intolerant*	
Amur privet	*4.5 - 5.0*	*tolerant*	
Crabapple	*4.5 - 5.0*	*intolerant*	
Fragrant sumac	*4.5*	*tolerant*	
Shining sumac	*4.0*	*intermediate*	
Smooth sumac	*4.5*	*intermediate*	
Coralberry	*5.0*	*tolerant*	
Arrowwood viburnum	*4.5*	*tolerant*	
Cranberrybush	*4.5*	*intermediate*	

[1] For streambank or riparian zones use Riparian Forest Buffer (391) standard Table 1.
[2] Shade tolerance of species is defined as follows:
Tolerant – can withstand completely shaded conditions.
Intermediate – partial shade is tolerated; plant requires some sunlight.
Intolerant – plant requires full sunlight.

TABLE 4.

AGRONOMY NO. 9 (Mod)
FIELD LETTER
WEST VIRGINIA
ISSUE DATE May 1999

West Virginia Instructions for Use of Seeding, Sprigging and Mulching for Critical Area Planting (342)

a. ***Seeding rates will be specified to provide for a 50% increase when seeding is performed during the periods of April 15 – August 1 and October 1 – March 1.***

b. ***The following table will be incorporated to provide additional requirements for mulching, depending on the time of year when seeding and mulching is performed.***

Time Period and Mulching Requirements for Revegetation of Construction Sites

Time Period	*Suitability*	*Mulch Material*	*Rate/Acre*
March 1 – April 15 *August 1 – October 1*	*Best seeding periods*	*Small grain straw [1] or hay[2]*	*2 tons straw* *or* *3 tons hay*
April 15 – August 1	*High Risk - moisture stress likely*	*Small grain straw*	*2½ tons*
October 1 – Dec. 1	*High Risk - Freeze damage to Young seedlings*	*Small grain straw*	*2½ tons*
Dec. 1 – March 1	*Good seeding period. Dormant seeding*	*Small grain straw*	*2½ tons*

[1] Small grain straw shall consist of wheat, oat, or rye straw.
[2] Hay shall consist of grass or grass-legume plants utilized for livestock forage.