Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

TREE/SHRUB ESTABLISHMENT

CODE 612

(ac)

DEFINITION

Establishing woody plants by planting seedlings or cuttings, by direct seeding, and/or through natural regeneration.

PURPOSE

Establish woody plants to—

- Maintain or improve desirable plant diversity, productivity, and health by establishing woody plants
- Create or improve habitat for desired wildlife species compatible with ecological characteristics of the site
- Control erosion
- Improve water quality. Reduce excess nutrients and other pollutants in runoff and groundwater.
- Sequester and store carbon
- Restore or maintain native plant communities
- Develop renewable energy systems
- Conserve energy
- Provide for beneficial organisms and pollinators

CONDITIONS WHERE PRACTICE APPLIES

Tree/shrub establishment can be applied on any site capable of growing woody plants.

CRITERIA

General Criteria Applicable to All Purposes

Select one or more species that are suited to soil and site conditions, and appropriate for the planned purpose(s).

Determine desired stocking levels for trees and/or shrubs based on ecological characteristics of the site and species, and landowner objectives. Plant, seed, and/or naturally regenerate at densities/rates that reflect anticipated seedling mortality, to achieve desired stocking levels in the established stand.

Use NRCS Conservation Practice Standard (CPS) Tree/Shrub Site Preparation (Code 490) to prepare sites for planting, seeding, or natural regeneration, if conditions are not suitable for establishing the desired plants.

When utilizing natural regeneration to establish trees and/or shrubs, ensure that a source of seed and/or vegetative propagules is or will be present, or that advanced reproduction exists, sufficient to achieve objectives. Where natural regeneration relies on seed sources, apply any needed stand treatments and/or

site preparation at appropriate times to facilitate germination and establishment of seeds from desired species. Modify forest stand conditions as needed, using CPS Forest Stand Improvement (Code 666), to create favorable stand structure for initiating natural regeneration. Use NRCS CPSs Prescribed Burning (Code 338), Brush Management (Code 314), and/or Herbaceous Weed Control (Code 315), as needed, to obtain the desired species composition, density, and arrangement of trees/shrubs in naturally regenerated areas. Implement coppice regeneration (originating from root shoots or stump sprouts) based on suitability of tree species, age, diameter, and site conditions. Determine the correct timing for coppice regeneration based on species characteristics.

Use tree/shrub planting to accomplish or supplement forest stand regeneration in locations where natural regeneration of desired species is not possible, or will not meet objectives.

Select only viable, high-quality, and adapted plant materials. Select planting stock that conforms to established seed transfer protocols within the State, and complies with minimum standards accepted by the American National Standards Institute (ANSI). Do not plant any species on the Federal or State invasive species or noxious weed lists.

Choose appropriate planting dates and handling methods to increase rates of survival. Select planting techniques and timing appropriate for soil and site conditions.

Alter species selection and/or timing of planting/seeding to minimize potential effects of residual chemical carryover, as needed.

Evaluate the site to determine if mulching, supplemental water or other cultural treatments (e.g., tree protection devices, shade cards, brush mats, etc.) are needed to assure adequate survival and establishment. Minimize the need for supplemental water and/or nutrients by choosing site-adapted plant materials, planting methods, and planting seasons. Where supplemental moisture is needed to achieve tree/shrub establishment use NRCS CPS Irrigation System, Microirrigation (Code 441).

Protect tree and shrub plantings, seeded areas, and naturally regenerated areas, from unacceptable adverse impacts of pests, wildlife, livestock, and/or fire. Protect from pests, as necessary, by applying integrated pest management techniques for pest prevention, avoidance, monitoring, and suppression.

Removal of products (e.g., trees, biomass, medicinal herbs, nuts, fruits, etc.) is allowed, provided that conservation purpose(s) are not compromised by the loss of vegetation or by harvesting disturbance.

Tree and shrub plantings will be designed so that they do not impact the safe operation of gas and electric line transmission corridors.

Additional Criteria for Maintaining or Improving Desirable Plant Diversity, Productivity, and Health

Conifer forest reforestation in high or extreme fire hazard severity areas should contain criteria for wildfire hazard reduction. Use facilitating NRCS Conservation Practice Standards (CPS) and other reforestation techniques to achieve hazard reduction objectives. This may include CPSs: Tree/Shrub Site Preparation (Code 490) or Woody Residue (Code 384) to dispose of excess slash not needed for biological purposes; or Fuel Break (Code 383), Firebreak (Code 394) installed along the perimeter of planting areas and Tree/Shrub Pruning (Code 660) at the appropriate future time. Other reforestation techniques may include reduced planting densities, brush suppression, or multiple seedling group planting arrangements to replicate forest structures often found in fire-adapted forests.

When objectives include production and harvesting of wood products, used dense planting intensities, competition control practices, and future pre-commercial and commercial thinning practices.

Additional Criteria for Reducing Nutrients and Pollutants

When plantings are used to remove excess nutrients from runoff or groundwater, select species that have fast-growth characteristics, extensive root systems, and a high-nutrient uptake capacity. Trees and shrubs

used to reduce pollutants must be tolerant of the types of pollutants contained in effluent or soils at the site.

Additional Criteria for Restoring or Maintaining Native Plant Communities

Species selected for planting, or those favored in natural regeneration, will be native to the site and will create a successional state that progresses toward the identified target plant community.

Additional Criteria for Developing Renewable Energy Systems

Select plants that can provide adequate types and amounts of plant biomass to supply identified bioenergy needs.

Manage the intensity and frequency of energy biomass removals to prevent long-term negative impacts to the site.

Harvest biomass for energy in a manner that will not compromise other intended purpose(s) and functions of the site.

Additional Criteria to Conserve Energy

Increase energy efficiency by planting trees to provide shade for buildings.

Select plants with a potential height growth that will be taller than the structure or facility being protected. Use proper plant densities to optimize the shade produced.

Design tree and shrub plantings to avoid damage to structures, and to allow adequate space for maintenance access to walls and windows. Plant at a distance that is greater than mature crown spread, and select species that develop deep root systems.

To protect structures from heat loss due to wind, use NRCS CPS Windbreak Establishment (Code 380).

Additional Criteria for Habitat for Beneficial Organisms

Plant trees and shrubs that provide habitat and food sources for beneficial organisms, such as pollinators, predatory and parasitic insects, spiders, insectivorous birds and bats, raptors, and terrestrial rodent predators. Select plant species that meet dietary, nesting, and cover requirements for the intended beneficial organisms during the critical period for control of target pests and, if possible, for the entire year.

Protect beneficial organisms from harmful pesticides.

CONSIDERATIONS

Consider utilizing plant materials that have been selected and tested in the Plant Materials Program or in similar tree/shrub improvement programs. Plant materials should meet a minimum standard such as the American Nursery and Landscape Association, Forest Service, or state approved nursery.

Consider using diverse tree and shrub species combinations which best meet the needs of desired wildlife and pollinator species.

When silvicultural objectives includes retaining mature trees or groups of dense brush and smaller trees in areas planned for reforestation, consider avoiding planting in locations within the drip-line of mature trees or within the groups of dense brush.

When selecting plant materials, consider whether the species, variety, or cultivar possesses aggressive traits, and whether it poses a potential threat to the existing or desired plant community.

Consider the potential impacts of extreme weather events (e.g., drought, flooding, wind, late spring frosts) when selecting plant species and sites for planting.

When using trees and shrubs for carbon sequestration and storage, consider using modeling tools to predict carbon sequestration rates and amounts of stored carbon.

Tree/shrub arrangement and spacing should allow for and anticipate the need for future access lanes for purposes of stand management and fire control.

When under planting, trees and shrubs should be planted sufficiently in advance of overstory removal to ensure full establishment where feasible.

Consider establishing species with growth rates and at densities that make them competitive with weeds and undesirable plants.

Consider using species that provide subsistence and cultural values, (e.g., as used by Tribes).

Consider designing plantings to enhance visual quality in farmsteads, recreation areas, and along public rights-of-way, by applying foliage color, season and color of flowering, mature plant height, edge-feathering, and other landscaping techniques.

Considerations for successful establishment

The location for each planted seedling should take advantage of every moisture conserving and heat-protecting factor available such as: shade provided from stumps, logs, surface rocks, clods, hummocks, etc.

Harsher sites (warmer, drier) may require additional actions to ensure adequate survival such as installation of shade cards and/or mulch.

When irrigation is planned, have the systems in place prior to planting. To increase survival, irrigate after planting to aid in packing the soil around the seed or roots and assure enough water to begin growth.

Rooting hormones and fertilizers have not significantly improved success compared to the cost of the materials.

Potential mortality, weed competition, and pest populations may require additional seedlings initially or replanting later.

Prescribed burning may be required for natural regeneration of serotinous cone species and for site preparation for other species

All sites and all plant species may be subject to unacceptable damages due to browsing, grazing, vandalism or other human impacts. Protection may be required to hold damages to an acceptable level. Estimate the occurrence of animal populations which have the potential to cause damage. Sightings of gopher mounds, animal trails, beaver activity, frequency of scat, and evidence of browsing on native plants will yield data that can help determine the need for plant protection. In urban areas use of signs and/or barriers may be required to reduce damage to an acceptable level

Seedling Selection:

Use published seed zone maps. Use materials from the same seed zone in which the planting is to be done.

Tree stock can generally be 1-0, if it is over 8” and vigorous. However, the harsher the site the more important for 2-0, 2-1, 1-2 stock.

On sites infected with root rots or blue stain, reforest the infected area (and 100 feet beyond visibly affected trees or stumps) with species that are immune or resistant and adapted to the site. Clearly mark areas to aid planting crews.

White pine blister rust: When white pines are planted no more than 80% the white pine will more likely be blister rust resistant.

Considerations for Organic Systems During Vegetation Establishment

Natural mulches, such as wood products or hay, can be used to support tree/shrub establishment by controlling competing vegetation, as a viable alternative to using herbicides. Certified weed-free mulches are preferred. NRCS Use CPS Mulching (Code 484).

Pests may be managed through augmentation or introduction of predators or parasites and development of habitat for natural enemies of pests; non-synthetic controls such as lures, traps, and repellents may be used.

Invasive plant species may be controlled through mulching with fully biodegradable materials; mowing; livestock grazing with protection for plantings; hand weeding and mechanical cultivation; pre-irrigation; flame, heat, or electrical means. Use NRCS CPS Prescribed Burning (Code 338), as needed.

Considerations for Reducing Energy Use

When trees are planted to reduce summer energy use in buildings, consider prioritizing their placement on the west side of the building, where the greatest daily solar heat gain occurs. The second priority is the east side. Trees or shrubs planted within 30 to 50 feet of a building generally provide effective shade to windows and walls, depending on tree height potential.

Deciduous tree or shrub species planted adjacent to the south side of buildings in cool climates can provide shade in the summer yet allow sun to reach the building in winter.

Considerations for Cultural Resources and Endangered Species

This practice is likely to occur in areas where Cultural Resources or Endangered Species habitat may be found. Follow NRCS Planning Policy to address these concerns.

PLANS AND SPECIFICATIONS

Prepare plans and specifications that describe requirements for applying the practice to achieve its intended purpose, and obtain any required permits. Use approved specifications, implementation requirements, or other acceptable documentation.

At a minimum, plans and specifications will include the following:

- Objective(s) for establishment.
- Sketches, drawings, and detail drawings.
- Map showing the location of plantings and/or natural regeneration areas.
- Soils map, and description of soils and Ecological Sites (if available).
- Establishment method by species or vegetation type.
- Number of trees/shrubs per acre to be planted, by species.
- Timing of planting and/or natural regeneration relative to considerations for seasonal factors, plant physiology, disease, insects, and wildlife impacts.
- Tree spacing, cultural practices, and variations in methods and species between inter-planting, under-planting, and planting in open areas.
- Mitigation measures, if needed, to reduce wildfire hazard or the potential for disease and insect pests.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance plan for the site. As a minimum carry out the actions listed below to ensure 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).

- Control access by vehicles and/or equipment during or after tree/shrub establishment to protect new plants and minimize erosion, compaction and other site impacts.
- Provide supplemental water as needed.
- Burn or mow the area periodically, if needed to maintain the health of the plant community. Do not conduct maintenance practices and activities during the primary reproductive period of wildlife. Exceptions can be considered to maintain the health of the vegetative community if such exceptions do not conflict with agency requirements.
- Inspect the site one year after planting, seeding, and/or natural regeneration to determine whether there is an 80% survival rate for tree and shrubs, and that plants are healthy with signs of good growth, and trees and shrubs meet practice and client objectives. Replant or provide supplemental planting when survival is not adequate.
- Inspect the trees and shrubs periodically, and protect them from adverse impacts of insects, diseases, competing vegetation, fire, livestock, wildlife, non-functioning tree shelters and/or weed barriers, etc.
- If needed, control competing vegetation until the desired trees/shrubs are established. Control plant species on the Federal or State invasive species and noxious weed lists. Refer to standard Integrated Pest Management (595).
- If needed, apply nutrients to maintain vigor of desirable trees/shrubs.
- After trees and/or shrubs are established, refer to the standards Forest Stand Improvement (666) and Tree/Shrub Pruning (660) for subsequent management.

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