Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

MULTI-STORY CROPPING

CODE 379

(ac)

DEFINITION

Existing or planted stands of trees or shrubs that are managed as an overstory with an understory of woody and/or non-woody plants that are grown for a variety of products.

PURPOSE

This practice is used to accomplish one or more of the following purposes–

- Improve crop diversity by growing mixed but compatible crops having different heights on the same area
- Improve soil quality by increasing utilization and cycling of nutrients and maintaining or increasing soil organic matter
- Increase net carbon storage in plant biomass and soil

CONDITIONS WHERE PRACTICE APPLIES

On all lands to establish woody species in existing systems resulting in both diversified forest or cropping system composition and establishment of a new canopy position or layer. The practice does not apply on land that is grazed.

CRITERIA

General Criteria Applicable to All Purposes

Combinations of overstory and understory woody and/or non-woody plant species shall be compatible and complementary.

Plants shall be selected based on their adaptation to the climatic region and soil properties and capabilities. Use tree, shrub and vine species that are native or introduced non- native species.

A precondition for establishing trees, shrubs and vines under this Standard is appropriately prepared sites. Should any type or amount of site preparation be required, only Tree/Shrub Site Preparation (490) shall be planned and applied prior to planting. Conservation practices: Forest Stand Improvement (666), Brush Management (314) and/or Herbaceous Weed Control (315) shall not be planned or applied in conjunction with, or in sequence with Tree/Shrub Site Preparation (490) for the purposes of preparing a site for tree/shrub planting.

The planting and care of selected tree and shrub species will comply with all General Criteria detailed in the Tree/Shrub Establishment (612) Standard.

Canopy covers will be balanced/managed to optimize health and growth of plants in each story or level as determined by client objectives for each story of vegetation.

Plants selected for purposes of protection, growth and production will, at a minimum, maintain soil organic matter content.

Moisture conservation or supplemental watering shall be provided for plant establishment and growth where natural precipitation is too low for one or more of the selected species.

Select pest-resistant plant varieties.

Select species that enhance habitat for beneficial insects including pollinators.

Avoid selecting tree or shrub species, which provide habitat to pests of the accompanying crop or forage.

The overstory canopy density will be determined by the following tree or shrub management objectives:

- Light requirements and growth period of the managed crops dispersed in the understory.
- Erosion control needs.
- Machinery widths and turning areas.

For areas with frequent or periodic high to severe winds, leave denser canopies towards the windward side(s).

To reduce surface water runoff and erosion on erosion-prone sites, ground-level vegetation will be of sufficient coverage and oriented on or near the contour. Use mulch as needed to cover bare areas. Any bedding for any story of vegetation will be placed on the contour.

Heights and widths of trees or shrubs will be controlled so they will not interfere with structures and above or below ground utilities.

Additional Criteria to Improve Soil Quality by Increasing Utilization and Cycling of Nutrients and Maintaining or Increasing Soil Organic Matter

Plants selected for purposes of protection, growth and production will improve soil organic matter content.

Select deep-rooted species for the overstory.

Include nitrogen fixing species in the overstory and/or understory.

Retain thinning and pruning material on-site.

Additional Criteria to Increase Net Carbon Storage in Plant Biomass and Soil

For optimal carbon storage, select plant species that are adapted to the site to assure strong health and vigor and plant the full stocking rate for the site.

Manage the appropriate density for the site that will maximize above and below ground biomass production.

Minimize soil disturbance during establishment of the site.

Minimize soil disturbance during cultivation of the understory crop(s).

CONSIDERATIONS

Select crop, forage, tree and/or shrub varieties based on their tolerance to agriculture chemicals that will be used at the site.

Species diversity including use of native species should be considered to avoid loss of function due to species-specific pests or to enhance pollinator and wildlife needs.

High value trees or shrubs should be selected to maximize economic returns.

Consider selecting plants that are culturally important.

For areas with frequent or periodic high to severe winds, consider the use of Windbreak/Shelterbelt Establishment-380 on the windward side(s) of multi-story cropped areas.

Anticipate possible off-site effects and modify the practice design accordingly.

Coppice ability of selected species of trees and shrubs should be considered when they are to be pruned periodically.

PLANS AND SPECIFICATIONS

Plans and Specifications for applying this practice shall be prepared for each site and recorded using the Pacific Islands Area Multi- Story Cropping (379) Jobsheet.

OPERATION AND MAINTENANCE

The trees, shrubs, crops, and/or forages will be inspected periodically and protected from adverse impacts including insects, diseases or competing vegetation. Refer to the standards for Integrated Pest Management (595) if pesticides will be employed and Herbaceous Weed Control (315) for weeds. Newly planted trees or shrubs will also be protected from fire and damage from livestock or wildlife.

All other specified maintenance measures and techniques to ensure establishment of trees/shrubs/vines will continue throughout the lifespan of this practice. This includes replacement of dead and dying trees or shrubs, pruning of dead or damaged branches for safety reasons, periodic pruning of selected branches for control of product quality, and control of undesirable competing vegetation.

Any removals of tree or shrub products, use of agricultural chemicals, and maintenance operations shall be consistent with the intended purpose of the practice. Avoid damaging the site and soil and comply with applicable federal, state and local regulations pertaining to on-site and off-site effects.

REFERENCES

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