Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

ORGANIC MANAGEMENT

CODE 823

(ac)

DEFINITION

Managing and improving natural resources on land in and adjacent to organic production using methods which integrate cultural, biological and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity.

PURPOSE

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

- Improve soil health
- Reduce soil erosion
- Reduce emissions of greenhouse gases (GHG)
- Reduce transport of pesticides and nutrients transported to surface water, groundwater and air
- Improve moisture management
- Improve plant productivity and health
- Reduce plant pest pressure
- Enhance habitat for wildlife, pollinators, and other beneficial invertebrates
- Improve livestock feed and forage imbalance
- Improve or maintain quantity and/or quality of forage for grazing, browsing and productivity

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where organic management methods are used.

CRITERIA

General Criteria Applicable to All Purposes

Comply with all applicable federal, state, and local laws and regulations and adhere to the USDA's National Organic Program (NOP) Standards.

Producers must coordinate all activities/inputs with NOP approved Organic Certifiers. All inputs and other materials must follow the National List of Allowed and Prohibited Substances.

Protect organic production areas from unintended introduction of prohibited substances through defined boundaries, buffer zones or diversions.

Establish or maintain at least one perennial conservation buffer planting to address specific concerns and follow the appropriate NRCS Conservation Practice Standard (CPS) such as Conservation Cover (Code

327), Hedgerow Planting (Code 422), etc. to protect production areas, enhance biodiversity, and/or provide habitat for wildlife and beneficials.

Within annual production fields, implement a diverse crop rotation to maintain or improve soil organic matter (SOM) content, increase biodiversity, and control erosion to tolerable levels.

Analyze soils following Michigan State University (MSU) recommendations at least once every three years. Soil test analysis will include organic matter, pH, Cation Exchange Capacity (CEC), phosphorus, potassium, calcium and magnesium, as a minimum.

Use land grant university (LGU) nutrient recommendations to manage soil fertility and crop nutrients through crop rotations, cover crops and the application of nutrient sources, including manure, compost and other organic by products. Nutrient applications must follow NRCS CPS Nutrient Management (Code 590) and any State level nutrient management requirements. Apply organic soil amendments at rates that do not overload phosphorus (P) or other nutrients.

Use certified organic seed for all crops including cover crops, unless organic seed is not commercially available, then use untreated, non-genetically modified organism (GMO), conventionally produced seed.

Pests are managed through an integrated strategy of prevention, avoidance, monitoring and suppression (PAMS). Pest management must follow NRCS CPS Pest Management Conservation System (Code 595). Utilize NOP-allowed pest control materials only when other tactics have not provided needed control.

Burn crop residues only to suppress the spread of disease or to stimulate seed germination.

Ash obtained from the burning of a plant or animal material may be applied only when the material burned has not been treated or combined with a prohibited substance or the ash is not included on the National List of Allowed and Prohibited Substances for use in organic crop production.

When livestock are a part of the operation, manage stocking rates and grazing periods to adjust the intensity, frequency, timing, duration, and distribution of grazing and/or browsing to meet the planned objectives for the plant communities, and the associated resources, including the grazing and/or browsing animals.

Manage animals and manure to prevent contamination of crops, soil, and water resources by nutrients and pathogens. Minimize concentrated livestock areas, trailing, and trampling to reduce soil compaction, excess runoff and erosion.

Manage pastures to provide ruminant livestock with sufficient forage to comprise at least 30% of dry matter intake during the grazing season.

Additional Criteria to Improve or Maintain Quantity and/or Quality of Forage For Grazing, Browsing and Productivity

Manage pastures to provide ruminant livestock with sufficient forage to comprise at least 30% of dry matter intake during the grazing season, while protecting water resources and minimizing soil erosion.

Build and maintain an overall Pasture Condition Score (PCS) of 40 or higher. Follow a pasture and grazing management plan that meets the criteria of NRCS CPS Prescribed Grazing (Code 528). Use optimum stocking rates and sufficient rest periods to build soil health and minimize soil erosion and compaction. Protect surface water and groundwater from transported nutrients, pathogens, and other contaminants.

Provide supplemental feed and/or minerals as needed to balance with forage consumption to meet the desired nutritional level for the kind and class of grazing and/or browsing livestock.

Base the dietary needs of livestock on the National Academies of Science, Engineering, and Medicine's Nutrient Requirements of Animals series or similar scientific sources.

Design and install livestock feeding, handling, and watering facilities to minimize stress, the spread of disease, parasites, contact with harmful organisms, and toxic plants.

Additional Criteria to Reduce Erosion and Improve Soil Health

Cropland management must result in a soil erosion rate of Tolerable (T) rates or less, minimized soil compaction, a positive Soil Conditioning Index (SCI) of 0.1 or higher (or equivalent positive trend shown by a soil health assessment).

The SCI, or other NRCS approved, science-based soil health assessments may be used in lieu of SCI. The SCI value for each field must be 0.1 or higher indicating that SOM is maintained or improving for the crop rotation and management. Adjust crop rotation, cover crops, tillage practices, organic inputs, and other management factors, as needed, to build or maintain SOM.

Enhance SOM quality and quantity, habitat for beneficial soil organisms, and soil aggregate stability:

- Follow a crop rotation and use cover crops to maintain year-round soil coverage, biomass production, living roots and plant diversity.
- Limit fallow periods in the rotation to less than 25 percent of the available growing season (e.g. when temperatures or soil moisture are not adequate to sustain plant growth.)
- Minimize soil disturbances by tillage, livestock, concentrated nutrients, and crop protection materials.

Reduce the number and intensity of tillage and cultivation operations and manage timing and sequence of crops and field operations to minimize physical disruption to soil structure and soil life. Cropland management for the rotation must achieve a Soil Tillage Intensity Rating (STIR) of 80 or less. In annual cropping systems where crop production and weed management creates a high STIR, include a perennial sod phase for at least 2 years to lower mean annual STIR to 80 or less.

Crops in rotation must include at least three crops representing three different plant families or three of the four main crop types (warm season grass, cool season grass, warm season broadleaf, cool season broadleaf). In rotations dominated by vegetables or other low-residue production crops, integrate sufficient higher-residue production crops (e.g., specialty grains), high-biomass cover crops, and perennial sod crops to meet the above criteria for soil erosion and soil health.

Include at least one cover crop meeting the criteria of NRCS CPS Cover Crop (Code 340) in the rotation. Grow cover crops long enough to achieve canopy closure and at least 1 ton (dry) above ground biomass per acre. Terminate cover crops with no or minimal tillage whenever practical, by roller crimping, mowing, winterkill, or strip tillage.

Maintain floors and alleys in orchards, vineyards, berries, and other perennial horticultural crops in year-round living plant cover; or in dormant vegetation, residues, or organic mulch during the dry season in rainfall-limited regions.

Limit the use of concentrated organic nitrogen (N) sources such as poultry litter, manure slurry, feather meal, and blood meal to provide not more than 50% of total crop N requirement. Provide the balance of N through legume N fixation, slow-release sources and SOM mineralization. When high soil phosphorus (P) limits the use of manure and compost, increase use of legumes for N.

Additional Criteria to Reduce Plant Pest Pressure and Prevent Transport of Pesticides to Surface and Groundwater

Provide nectar, pollen, and habitat for natural enemies of crop pests by planting and maintaining diversified mixes of flowering plants meeting the criteria of NRCS CPS Conservation Cover (Code 327) or other appropriate NRCS CPS.

Use NOP-allowed pest control products judiciously and only when monitoring indicates they are needed, to minimize environmental risks and development of pest resistance. Utilize the Windows Pesticide Screening Tool (WIN-PST) to estimate risks to water and non-target organisms, and to consider the lowest-impact materials that meet pest management goals. Follow pesticide label instructions to optimize efficacy and minimize environmental and human health risks. Avoid application or drift of pesticides onto beneficial habitat and make applications when pollinators and other non-target organisms are least active.

Implement pesticide mitigation techniques as needed, as described in NRCS directive Agronomy Technical Note (TN) 190, AGR 5, "Pest Management in the Conservation Planning Process," and Agronomy TN 190, AGR 9, "Preventing or Mitigating Potential Negative Impacts of Pesticides on Pollinators Using Integrated Pest Management and Other Conservation Practices."

Additional Criteria to Enhance Habitat for Wildlife, Pollinators and other Beneficial Invertebrates

Establish and maintain habitat plantings on a minimum 5% of the total acreage of the organic operation.

Select a diversity of primarily native plant species that provide food, shelter, nesting sites, and other habitat needs for desired wildlife, pollinators, and other beneficial organisms.

Plant material specifications shall include only high quality and adapted species.

Site preparation, planting dates, and planting methods shall optimize vegetation survival and growth.

Protect habitat plantings from unintended application, drift, or runoff from pesticide applications.

Equipment movement and other disturbance to habitat shall be restricted during critical periods such as nesting, brood rearing, fawning or calving seasons. States may establish exceptions when certain disturbance causing activities are necessary to maintain the health of the plant community and control noxious weeds.

CONSIDERATIONS

Reliance on tillage and cultivation to manage weeds and cover crops without herbicides can accelerate oxidation of SOM and compromise soil health.

Integration of grazing livestock on cover crops or crop residues can improve soil health by increasing microbial activity, adding nutrients from manure, and other termination strategies.

Organic nutrient sources require biological processes to release N and tend to be rich in P relative to N.

Organic amendments feed soil organisms and abstinence from soluble fertilizers and synthetic crop protection chemicals protects soil life and functional biodiversity.

Managing pests, weeds, and diseases through a combination of strategic and diversified crop rotations, use of disease-resistant and weed competitive crop varieties, best organic soil health practices, and low impact physical and biological controls can reduce the need for pesticide applications or cultivation for weeds. Specific microbial biopesticides and bio-fungicides that attack the target pest or pathogen generally have lower environmental and resource impacts than NOP-allowed botanical or mineral pesticides and fungicides.

Maximize the percentage of the year livestock spend on pasture and range (within the climate constraints of the locale of the operation), and the percentage of dry matter intake derived from grazing to reduce livestock feed costs, lessen the volume of animal waste that must be stored and managed, and mitigate associated environmental risks including water quality impairment and GHG emissions.

Maximize the amount of dry matter livestock obtain their diet by grazing pastures. Supplement pasture shortfalls with mechanically harvested and processed feeds. When developing livestock rations, consider testing pasture forages for nutrient content and accounted for in the feed ration and balance of nutrients.

Consider testing all feeds, including grazed pasture, to develop livestock rations to meet the livestock's nutrient requirements and avoid excess nutrients being fed. Forage tests will meet the LGU acceptance and certification process.

Use to facilitate transition to organic production or to enhance conservation benefits of a certified or exempt organic operation.

For fields or production areas where topography and inherent soil properties (erodibility) make it impractical to maintain positive SCI or reduce soil erosion rates to Tolerable rates or below during annual crop production, consider converting the area to perennial production (orchard, vineyard, pasture, silvopasture, agroforestry) or conservation plantings.

Apply compost, organic mulches, biochar, or other carbon-based soil amendments to organic cropland soils to enhance the soil health benefits of living vegetation.

Provide livestock with organically produced feed and forage, clean drinking water, organic bedding (as applicable), and year-round access to outdoors, sun, shade, shelter, fresh air, and exercise areas.

Use this practice in conjunction with the following NRCS CPS to create an organic system management plan:

- Access Control (Code 472)
- Composting Facility (Code 317)
- Diversion (Code 362)
- Feed Management (Code 592)
- Field Border (Code 386)
- Filter Strip (Code 393)
- Forage Harvest Management (Code 511)
- Forest Stand Improvement (Code 666)
- Heavy Use Area Protection (Code 561)
- High Tunnel System (Code 325)
- Irrigation Water Management (Code 449)
- Mulching (Code 484)
- Upland Wildlife Habitat Management (Code 645)
- Vegetated Treatment Area (Code 635)
- Windbreak/Shelterbelt Establishment and Renovation (Code 380)
- Wildlife Planting (Code 420)

PLANS AND SPECIFICATIONS

Develop plans and specifications for each field, production area, or treatment unit within the operation according to the Criteria and Operation and Maintenance requirements of this standard. Maintain records to meet NOP Organic System Plan requirements connected to natural resource management.

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The plan documentation will include:

- Purpose(s)
- Activities planned to meet the criteria for each purpose
- Aerial site photograph(s) or site map(s), with locations of the following identified:

    - field boundaries
    - buffer zones
    - designated sensitive areas
    - setbacks
- Soil survey map and soil properties of each map unit for all managed areas.
- Initial benchmark and planned rotation data including, as applicable:
    - soil test or plant tissue test reports
    - irrigation water analysis for pathogens and nutrient content
    - nutrient analysis or estimates for all inputs (i.e., compost, manure, organic by-products, etc.)
    - water and wind erosion estimates, including SCI and STIR
    - crop rotation
    - In-Field Soil Health Assessment (IFSHA)
    - Pasture Condition Scoresheet (PCS)
- As applicable, all component plans (e.g., nutrient, pest, prescribed grazing, etc.)
- Organic Input list
- Sanitation measures to remove disease vectors, weeds, seeds and habitat for pests
- Any mitigation activities needed for anticipated impacts of to water, soil, or other natural resources
- Guidance for implementation, monitoring, operation and maintenance, and recordkeeping

OPERATION AND MAINTENANCE

For transitioning operations, the plan should extend, and be adjusted as needed, through the time to meet the required period of prohibited substance application, typically three years but can be less with proper documentation.

Review or revise plans annually to determine if adjustments or modifications are needed.

Implement the plan continuously through the duration of this practice.

Monitor, evaluate, and document outcomes in relation to conservation purposes on a regular schedule.

Monitor fields receiving animal manures and biosolids for the accumulation of heavy metals, nutrients and contaminants in accordance with Michigan Generally Accepted Agricultural and Management Practices (GAAMPS), LGU guidance and State law. Other contaminants that are rapidly emerging as a concern in the application of biosolids are per- and poly-fluorinated alkyl substances (PFAS). The Environmental Protection Agency has created a roadmap of strategic action to address the environmental and health implications posed by PFAS, which will provide guidance to a currently evolving situation.

Annually inspect and repair structural and vegetative components of this practice.

REFERENCES

National Organic Standards:

https://www.ecfr.gov/current/title-7/subtitle-B/chapter-I/subchapter-M/part-205?toc=1

Websites with additional information:

Extension eOrganic at https://eorganic.info/

NCAT/ATTRA website at https://attra.ncat.org/ has information on crops, pest control, etc.

Organic Materials Review Institute at https://www.omri.org has lists of allowed products.

Organic Farming Research Foundation at https://ofrf.org/resesarch/reports/. Series of Guidebooks on Soil Health and Organic Farming.

NRCS Organic Farming Handbook, updated 2022 (in process)

NRCS Organic Crosswalk, updated 2022 (in process)

NRCS Organic Resources web page

EPA PFAS Explained

Summaries of OFRF Soil Health Guidebooks written for NRCS (in press)

NRCS Guidebook on Organic Tillage and Cultivation Practices (yet to be drafted – part of OFRF/NRCS project)

Bowles, T. M., A. D. Hollander, K. Steenwerth, and L. E. Jackson. 2015. Tightly Coupled Plant-Soil Nitrogen Cycling: Comparison of Organic Farms across an Agricultural Landscape. PLOS ONE http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0131888.

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Kloot, Robin. 2018. Using adaptive nutrient management to answer “how much fertilizer do you actually need?” NRCS webinar May 8, 2018. Science and Technology Training Library

Bowles, T.M., Jackson, L.E., Loeher, M., Cavagnaro, T.R. Ecological intensification and arbuscular mycorrhizas: a meta-analysis of tillage and cover crop effects. Journal of Applied Ecology 54: 1785-1793.

National Academies of Sciences, Engineering, and Medicine. 2022. Animal Nutrition Series. Washington, DC: The National Academies Press. https://nap.nationalacademies.org/collection/63/nutrient-requirements-of-animals

Morrone, V. and Snapp, S. 2011. Building Soil for Organic and Sustainable Farms. https://www.canr.msu.edu/uploads/resources/pdfs/building_soil_(e3144).pdf Accessed Feb 2023.

Dhakal, M. Integrated Weed Management. https://rodaleinstitute.org/science/integrated-weed-management/ Accessed Feb 2023.