

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

CONSERVATION CROP ROTATION

(Acre)

CODE 328

DEFINITION

Growing crops in a recurring sequence on the same field.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion.
- Reduce soil erosion from wind.
- Maintain or improve soil organic matter content.
- Manage the balance of plant nutrients.
- Manage plant pests (weeds, insects, and diseases).
- Provide food for domestic livestock.
- Provide food and cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land where crops are grown, except:

This standard does not apply to pastureland, hayland, or other land uses where crops are grown occasionally only to facilitate renovation or re-establishment of perennial vegetation. It does not apply to land devoted to orchards, vineyards, or nurseries.

CRITERIA

General Criteria Applicable To All Purposes.

Note: Specific program guidance may be more restrictive on a number of these criteria. Refer to program manual for specific program requirements.

Crops shall be grown in a planned, recurring sequence as outlined in Plans and Specifications.

Crops shall be adapted to the climatic region, the soil resource, and the goals of the producer. Adapted crops and varieties listed in appropriate Iowa State University publications or other approved sources, shall be selected.

A conservation crop rotation may include crops planted for cover or nutrient enhancement.

Crops shall be selected that produce sufficient quantities of biomass at the appropriate time to reduce erosion by water or wind to within acceptable soil loss levels (T) or any other planned soil loss objective. In those instances where crops selected do not produce sufficient biomass to meet this criteria, a cover crop (see Cover Crop Standard (340)) or other appropriate practices shall be used. The amount of biomass needed shall be determined using current approved erosion prediction technology. Soil loss estimates shall account for the effects of other practices in the conservation management system.

Additional Criteria To Maintain Or Improve Soil Organic Matter Content.

Crops shall be selected that produce the amount of plant biomass needed to maintain or improve soil organic matter content as determined using the current approved Soil Conditioning Index (SCI) procedure.

If partial removal of residue by means such as baling or grazing occurs, enough residue shall be maintained to achieve the desired soil organic matter content goal.

Cover and green manure crops planted specifically for soil improvement may be grazed, as long as grazing is managed to retain adequate biomass.

Additional Criteria To Manage the Balance of Plant Nutrients. Crop selection and sequence shall be determined using an approved nutrient balance procedure. See Nutrient Management Standard ([590](#)).

When crop rotations are designed to add nitrogen to the system, nitrogen-fixing crops shall be grown immediately prior to planting or interplanted with nitrogen-depleting crops.

To reduce excess nutrients, crops or cover crops having rooting depths and nutrient requirements that utilize the excess nutrients shall be grown.

Additional Criteria To Manage Plant Pests (Weeds, Insects, Diseases).

Crops shall be alternated to break the pest cycle and/or allow for the use of a variety of control methods. Affected crops and alternate host crops shall be removed from the rotation for the period of time needed to break the life cycle of the targeted pest. Crops selected in the rotation can also be affected by herbicide carryover.

Resistant varieties shall be selected where there is a history of a pest problem. For

approved varieties see ISU Extension Publication PM-1649 "[Soybean Disease-Resistance Varieties for Iowa](#)", ISU Extension Publication PM-1096 "Controlling Corn Diseases in Conservation Tillage."

Additional Criteria To Provide Food For Domestic Livestock.

Crops shall be selected to balance the feed supply with livestock numbers. The needed amount of selected crops shall be determined using an approved forage-livestock balance procedure. See Iowa Technical Notice #5 "Managing Pasture and Hayland for Year-Around Forage Supplies" and supporting "Pasture Planning Computer Spreadsheet."

Additional Criteria To Provide Food And Cover For Wildlife.

Crop selection to provide either food or cover for the targeted wildlife species will be grown, managed, or left unharvested as per the needs of the these species as determined by appropriate habitat evaluation models. A selection of various habitat models for wildlife species may be obtained from the State Biologist.

CONSIDERATIONS

When used in combination with Stripcropping Contour ([585](#)), the crop sequence should be consistent with the stripcropping design.

When used in combination with Residue Management practices ([329A](#), [329B](#), [329C](#)), selection of high residue producing crops and varieties, use of cover crops and adjustment of plant population and row spacing can enhance production of the kind, amount, and distribution of residue needed.

Where maintaining or improving soil organic matter content is an objective, the effects of this practice can be enhanced by managing crop residues, tillage practices,

utilizing animal wastes, or applying mulches to supplement the biomass produced by crops in the rotation.

Where excess plant nutrients or soil contaminants are a concern, utilizing deep rooted crops or cover crops in the rotation can help recover or remove the nutrient or contaminant from the soil profile.

Where precipitation is limited, seasonal or erratic moisture can be conserved for crop use by maintaining crop residues on the soil surface to increase infiltration and to reduce runoff and evaporation. Where winter precipitation occurs as snow, additional moisture can be obtained for crop use by trapping snow with standing residue, windbreaks, or other barriers.

Crop damage by wind erosion can be reduced with this practice by selecting crops that are tolerant to abrasion from wind blown soil or tolerant to high wind velocity. If crops sensitive to wind erosion damage are grown, the potential for plant damage can be reduced by crop residue management, field windbreaks, herbaceous wind barriers, intercropping, or other methods of wind erosion control.

Herbicide carryover or persistence is affected by high pH, organic matter, soil type, wetness, herbicide type, and crop sensitivity. Where pesticides are used, consider application methods and the crop rotation to avoid negative impacts on the following crop due to residual herbicides in the soil or adverse affects on aquatic wildlife or habitat through runoff.

Crop rotations longer than three years are recommended to prevent disease buildup, insect damage, and yield loss for most crops.

Soil compaction can be reduced by adjusting crop rotations to include deep rooted crops that are able to extend to and penetrate the compacted soil layers, as

well as avoiding crops that require field operations when the soils are wet.

Leaving several rows unharvested around the edges of the field will provide protection and/or food for overwintering wildlife and as a windbreak/snow trap along the windward side of roads.

Crop plantings may be developed to benefit particular communities, species or life stages of wildlife. Food plots or crops for wildlife could be provided as part of a habitat restoration project and as an initial food and cover source for wildlife until food and cover producing vegetation becomes established.

Crop residues may be a valuable food source for wintering wildlife where winter browse is sparse.

Careful consideration should be given to pesticide use if applied to crops raised for wildlife. Crop selection will substitute low pesticide use crops (oats, alfalfa, etc.) for high pesticide use crops (corn, soybeans).

This practice has the potential to have either a positive or negative affect on National Register listed or eligible (significant) cultural resources (archeological, historic or traditional cultural properties). Care should be taken, especially during site preparation and maintenance, to avoid adverse effects to these resources. Follow NRCS Iowa state policy for considering cultural resources during planning and maintenance.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard.

Specifications shall be recorded using approved specification sheets, job sheets,

and narrative statements in the conservation plan, or other acceptable documentation.

The following components shall be included for recording this specification:

- aerial photo or map with fields identified
- sequence of crops to be grown
- length of time each crop will be grown
- total length of rotation
- Soil Conditioning Index

OPERATION AND MAINTENANCE

Rotations shall provide for acceptable substitute crops in case of crop failure or shift in planting intentions for weather related or economic reasons. Acceptable substitutes are crops having similar properties that meet the criteria for all the resource concerns identified for the field or treatment unit.

REFERENCES

These publications are available at County Extension Offices; Extension Distribution Center, Printing Building, Iowa State University, Ames, IA 50011; and several are available on the ISU Publications Home page at <http://www.extension.iastate.edu/Pages/pubs/>.

- ISU PM-1649 "[Soybean Disease-Resistance Varieties for Iowa](#)", Oct 1999.
- ISU PM-1096 "[Controlling Corn Diseases in Conservation Tillage](#)", Apr 1983.

The following publications are available at the local NRCS field offices or the Iowa NRCS Home page at: <http://www.ia.nrcs.usda.gov>.

- Field Office Technical Guide Standards
 - [Nutrient Management \(590\)](#)
 - [Stripcropping Contour \(585\)](#)
 - Residue Management ([329A](#), [329B](#), [329C](#))
 - [Cover Crop \(340\)](#)
 - Iowa Technical Notice #5 "Managing Pasture and Hayland for Year-Around Forage Supplies"