NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

NUTRIENT MANAGEMENT

(Acre)
CODE 590

DEFINITION

Managing the amount, form, placement, and timing of applications of plant nutrients.

PURPOSES

To supply plant nutrients for optimum forage and crop yields, minimize entry of nutrients to surface and groundwater, and to maintain or improve chemical and biological condition of the soil.

CONDITIONS WHERE PRACTICE APPLIES

On lands where plant nutrients are applied. Sources of nutrients shall be considered using appropriate soil, water, and plant resource management features to protect water quality.

On lands within a ground water quality concern area, or within a surface water quality concern area, where plant nutrients are applied.

CRITERIA

Ground Water Quality Concern Area

If nitrogen fertilizer is not being applied, consider this practice not needed on this field (or CTU).

Find the Leaching Index rating for each soil mapping component in the field or conservation treatment unit (CTU). Refer to the Leaching Index for Soluble Nutrients data in Section II of the Field Office Technical Guide (FOTG).

Where all the soil mapping components are rated "NOMINAL", consider this practice not needed on this field (or CTU).

For those fields (or CTUs) that have one or more soil mapping components rated "INTERMEDIATE" or "HIGH", determine which nitrogen fertilizers including animal wastes and legume cover and green manure crops are being used, the amounts, and the application schedules.

Develop a crop nitrogen use budget for each crop in the proposed cropping sequence. Describe the kinds and amounts of nitrogen fertilizers planned to meet the crop fertility needs and the placement and timing of fertilizer for each crop. Describe the frequency of soil tests and/or plant tissue testing.

Evaluate nutrient overloading if animal wastes are applied to include time of year, presence of shallow water tables, proximity to water, and location of tile drain systems.

Compare the planned application rates to the amounts used by each crop. Where the amount of nitrogen being used is considered excessive for the yield goal after consultation with UC Cooperative Extension, specify that the application rate shall be reduced.

Realistic yield goals should be based upon soil type, available moisture, historical yield data, climatic conditions, and fertilizer costs versus returns.

Identify alternatives including substitution of other nitrogen fertilizers - ammonium forms, reducing the rates, and changing one of the crops. Consider split applications and changing the time interval between an application and the next irrigation or expected rainfall event. Make applications during the last part of the sprinkler or trickle irrigation cycle to minimize leaching.

Specify management practices such as winter cover crops that can be used to take up excess plant nutrients to prevent their movement out of the root zone during the non-growing season. Proper irrigation water management can reduce deep percolation of nutrients.

Surface Water Quality Concern Area

If nitrogen or phosphorus fertilizer is not being applied, consider this practice not needed on this field (or CTU).

If nitrogen or phosphorus fertilizer is being applied but the predicted sheet and rill erosion rate does not exceed the soil loss tolerance for the critical soil map unit for

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

planning, consider this practice not needed on this field (or CTU). If field is irrigated but the predicted furrow irrigation erosion rate does not exceed the soil loss tolerance for the critical soil map unit for planning, consider this practice not needed on this field (or CTU).

Find the Soil Surface Loss Potential rating for each soil mapping component in the field or conservation treatment unit (CTU). Refer to the Soil Ratings For Determining Water Pollution Risk For Pesticides list in Section II of the Field Office Technical Guide (FOTG).

Where all the soil mapping components are rated "NOMINAL", consider this practice not needed on this field (or CTU).

For those fields (or CTUs) that have one or more soil mapping components rated "INTERMEDIATE" or "HIGH", determine if nitrogen or phosphorus fertilizers are being used, the amounts, and the application schedules.

Develop a crop nitrogen and phosphorus use budget for each crop in the proposed cropping sequence. Describe the kinds and amounts of fertilizers planned to meet the crop fertility needs and the placement and timing of fertilizer for each crop. Describe the frequency of soil tests and/or plant tissue testing.

Compare the planned application rates to the amounts used by each crop. Where the amount of nitrogen or phosphorus being used is considered excessive for the yield goal after consultation with UC Cooperative Extension, specify that the application rate shall be reduced.

Realistic yield goals should be based upon soil type, available moisture, historical yield data, climatic conditions, and fertilizer costs versus returns.

Identify alternatives for the placement and timing of fertilizer for each crop, including deeper placement, banding, reduced rates, as well as changing one crop or cultural practices to reduce the predicted soil loss due to rainfall or irrigation to an acceptable level.

Maintenance of good soil tilth and control of compaction and plowpans will make plant nutrient absorption more efficient reducing need for applied fertilizer to compensate for restricted root development.

Plan erosion control practices to minimize soil loss and runoff that can carry dissolved and attached nutrients to surface waters. Proper tailwater management can reduce nutrient laden irrigation water.

CONSIDERATIONS

1. Evaluate water quality standards and designated use limitations that exist locally or statewide in managing nutrients to protect the quality of water resources.

2. Evaluate sources and forms of nutrients available for plant growth and production and how they affect the nutrient budget for the proposed crop and target yield.

3. Consider effects of the seasonal water budget on nutrient balance and on potential loss from the plant environment to surface or ground water. These effects will be the basis for developing the nutrient management plan for the practice application.

4. Consider the use of legume cover crops or green manure crops, where feasible, to provide a nitrogen source for the next crop. Be sure to consider these effects in the nutrient budget.

5. Consider the effects of soil erosion control practices used to reduce soil loss, runoff, and transport and leaching of dissolved and attached nutrients should be considered.

6. Consider adjustments to rate, timing, placement, method of application, and nutrient form to conform to seasonal variation in plant uptake needs, reduce soil fixation, and avoid excessive soil-water solution nutrient concentrations that could leach out of the root zone when capacity is exceeded.

7. Consider induced deficiencies of nutrients due to excessive levels of other nutrients, and the effect of soil pH on the availability of both soil and applied sources of plant nutrients and the optimum pH range of the crop to be grown.

8. Consider the importance of soil tilth and organic content on plant nutrient absorption and root development.

9. Consider cover crops following crop harvest, where appropriate, to take up residual nutrients.

10. Evaluate use of practices such as crop rotations, selection of crop varieties, waste utilization, etc.,

that enhance efficiency of nutrient uptake and improve soil and soil water conditions.

11. Consider waste storage and treatment needs to meet application timing as well as land area requirements for proper waste utilization.

12. Evaluate the effects of water table management or controlled drainage on availability and movement of nutrients.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as, freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware that during critical periods, such as spawning, eggs in gravel's, and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

This practice is considered to have no effect on the amount of water.

Water Quality

This practice principally reduces the availability of nutrients that could pollute surface or ground water by limiting the amount applied to the soil to that needed to produce an optimum crop yield.

Major reductions are expected in the amount of nitrate Nitrogen that reaches ground water and a corresponding reduction in the contamination of private wells and domestic wells. Contamination of wells will be avoided in many areas.

Streams and lakes and other surface water bodies will receive less Phosphorus resulting in a decreased rate of eutrophication.

PLANS AND SPECIFICATIONS

Plans and specifications shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose including the following:

1. Nutrient rates applied to agricultural land shall be based on soil test results, where applicable. Frequency of soil tests and/or plant tissue tests shall be specified.

2. Establish realistic yield goals based on soil map unit, available moisture, historical yield data, climatic conditions, and level of management to minimize potential nutrient loading of surface water and ground water.

3. Develop a nutrient management plan for the crops to be grown. Account for the residual amount of nutrients in the soil and crop residue, add estimated nutrients from anticipated organic waste applications, and then determine the amount of chemical fertilizer needed to meet the nutrient needs of the proposed crop and target yield. Specify the crop, crop rotation, and kind, source, and amount of plant nutrients that will be used to meet the crop fertility needs.

4. If non-farm organic waste is to be used, it shall be analyzed for content and applied as prescribed by Federal, state, or local regulations. Appropriate

documentation of amounts applied should be maintained.

5. Livestock waste shall be analyzed prior to land application to establish nutrient credits and application rates.

6. Credit for nitrogen contributions from legume crops in rotation shall be consistent with current land grant university recommendations.

7. Develop a water budget that will describe the seasonal distribution of water resources under the appropriate soil-crop-management system.

8. Use the "Leaching Index for Soluble Nutrients" procedure or other detailed guidelines from land grant universities to evaluate groundwater pollution potential in conjunction with the water budget for the location.

9. All specifications will be consistent with state and local regulations.

10. Include wording that the person will perform all the necessary operations, safety and maintenance needed.

OPERATION AND MAINTENANCE

The owner or operator will be responsible for operating all equipment safely and maintaining this practice. Maintenance includes the following:

1. Calibrate manure and fertilizer application equipment to ensure applied rates are within 10 percent of the specified rates.

2. Minimize exposure to animal and organic wastes, manure gases, and chemical fertilizers. Wear protective clothing, respirator, gloves, and footwear when appropriate.

3. Protect commercial fertilizer and agricultural waste storage facilities from weather and accidental leakage or spillage that will result in undesirable effects on soil, water, and plants. Dispose of fertilizer containers in an approved manner, according to local and state regulations.

4. When cleaning equipment after nutrient application, remove and save fertilizers or wastes in an appropriate manner. If system is flushed, use rinse water in the following batch of nutrient mixture, where possible, or dispose of it according to state and local regulations, always avoiding high runoff areas, ponds, lakes, streams, and other water bodies. Extreme care must be exercised to avoid contaminating wells.