

Title 15

DEPARTMENT OF AGRICULTURE

Subtitle 20 SOIL AND WATER CONSERVATION

Chapter 08 Content and Criteria for a Nutrient Management Plan Developed for an Agricultural Operation

Authority: Agriculture Article, §§8-801—8-806,
Annotated Code of Maryland

.01 Scope.

A. This chapter describes the:

- (1) Content requirements for a nutrient management plan;
- (2) Requirements for plan recommendations by a certified nutrient management consultant or certified farm operator; and
- (3) Requirements for the implementation of a nutrient management plan by a person who manages an agricultural operation.

B. A nutrient management plan prepared for an agricultural operation indicates how primary nutrients are to be managed annually on farm fields for plant and crop production and for the protection of water quality. Plans contain recommendations to the agricultural operator based on expected crop yield or plant production goals, existing nutrient levels in the soil, organic residuals, optimum timing and placement of nutrients, environmental protection, and normal agricultural practices, such as liming, tillage, and crop rotation. The Department certifies and licenses qualified individuals to prepare plans under COMAR 15.20.04 and requires agricultural operations to implement the plans under COMAR 15.20.07.

C. This chapter addresses nutrient management plans and recommendations for agricultural operations, including container or out-of-ground agricultural operations.

.02 Incorporation by Reference.

The performance and technical standards provided in this subtitle are found in the Department of Agriculture's Maryland Nutrient Management Manual (November 1999), Supplement No. 1 (September 2000), Supplement No. 2 (November 2001), and Supplement No. 3 (September 2004), which are incorporated by reference in COMAR 15.20.07.02.

.03 Definitions.

A. In this chapter, the following terms have the meanings indicated.

B. Terms Defined.

- (1) "Account identification number" means the unique identifier used by the Maryland Department of Assessments and Taxation to identify a unit of land.
- (2) "Agricultural operation" means a business or activity that:
 - (a) Tills, crops, keeps, pastures, or produces an agricultural product, including livestock, poultry, plants, trees, sod, food, feed, or fiber by in-ground, out-of-ground, container, or other culture; and
 - (b) Has a gross annual income of \$2,500 or more, or has eight or more animal units.
- (3) "Animal unit" means the unit of measure equivalent to 1,000 pounds of live animal weight.
- (4) "Best management practice" means a conservation or pollution control practice that

manages soil, nutrient losses, or other potential pollutant sources to:

- (a) Minimize nutrient runoff or pollution of water resources; or
- (b) Improve agricultural production and management.

(5) “Bioavailable” means a nutrient supply that is either currently, or likely to be, available to a plant or crop.

(6) “Biosolids” means any thickened liquid, suspended or settled solid, or dried residue extracted from sewage at a sewage treatment plant, including domestic sewage, that:

- (a) Contains recognized plant nutrients or liquid byproducts, that meet federal and State regulations for beneficial use by land application or other methods; and
- (b) Is regulated as sewage sludge, pursuant to the Environment Article, §9-201 et seq., Annotated Code of Maryland.

(7) “Certified farm operator” means an individual certified by the Department under this subtitle to prepare a nutrient management plan solely for agricultural land that the individual owns or operates, or where individual has a legal interest.

(8) “Certified nutrient management consultant” or “consultant” means an individual certified by the Department under this subtitle to prepare a nutrient management plan.

(9) Chemical fertilizer.

(a) “Chemical fertilizer” means a manufactured or blended nutrient source, usually in granular or liquid form, containing a guaranteed analysis of primary nutrients.

(b) “Chemical fertilizer” does not include a product blended from all natural organic fertilizer sources.

(10) “Controlled release fertilizer” means a type of fertilizer that releases nutrients over time and which may be categorized as follows:

- (a) Natural organics;
- (b) Organic, synthetic isobutylidene diurea and urea-formaldehyde;
- (c) Sulfur-coated synthetic organic or inorganic fertilizers; and
- (d) Inorganic, resin-coated fertilizers.

(11) “Cover crop” means a crop including, but not limited to, cereal grains, that is planted following the harvest of summer crops for the purpose of:

- (a) Seasonal protection of soil;
- (b) Assimilation of residual nitrogen left from a previous crop; and
- (c) Continued mineralization of nitrogen.

(12) “Crop or plant nutrient needs” means the primary nutrient requirements of a crop, usually determined as pounds of total nitrogen (N), available phosphate (P₂O₅), or soluble potash (K₂O), required for production of a crop yield unit, such as a bushel of corn.

(13) “Department” means the Maryland Department of Agriculture or its designee.

(14) “Environmental risk assessment for out-of-ground production” means a method used to evaluate risk from stormwater and runoff management and water application (irrigation) methods that is acceptable to the Department, as described in the Maryland Nutrient Management Manual, Section II-D.

(15) “Expected crop yield” means a realistic crop yield for the agricultural operation determined by yield records or soil productivity information.

(16) “Fertility index value (FIV)” means an index developed by the University of Maryland that is:

- (a) Used to describe the relative availability of nutrients to a plant or crop; and
- (b) Described in the Maryland Nutrient Management Manual, Section II-B.

(17) “Fertilizer” means a substance containing a recognized primary plant nutrient used for its plant nutrient content and designed for use in promoting plant growth.

(18) “Field identification number” means a number or unique identifier used by an

agricultural operator to distinguish or pinpoint the location of a field or management unit on a farm.

(19) “Liming” means the application of materials containing the carbonates, oxides, or hydroxides of calcium or magnesium in a condition, and in a quantity, adequate to manage soil acidity.

(20) “Management unit” means an area sharing common characteristics, including soil type, nutrient content, and plant type or crop produced, such that nutrients can be recommended and managed in a uniform and consistent manner.

(21) “Manure management” means operations and conditions specific to an agricultural operation that has animals, or uses animal manure or waste nutrients from animal production. The purpose of manure management in nutrient management planning is to improve efficiency and effectiveness of nutrient utilization and to minimize the potential for nutrient loss from the management of animals or their manure and associated waste nutrients. Guidelines for manure management are described in the Maryland Nutrient Management Manual, Section III-C.

(22) “Mineralization” means the process that converts unavailable organic forms of nutrient elements to an available inorganic state as a result of bacterial decomposition.

(23) “Natural organic fertilizer” means a fertilizer derived from plant or animal products, including animal manure, biosolids, green manure, compost, or plant materials, or other residuals used as a source of primary nutrients, which:

(a) Typically are not mixed with synthetic materials; or

(b) Are not changed in any physical or chemical manner from their initial state, except by means of cooking, chopping, composting, drying, grinding, shredding, or pelleting.

(24) “Nutrient application rate” means the quantity of primary nutrients, including total nitrogen (N), available phosphate (P_2O_5), or soluble potash (K_2O), recommended by a certified consultant to:

(a) Supply crop or plant nutrient needs; and

(b) Achieve realistic yield or plant production goals, as defined by this chapter.

(25) “Nutrient content” means the percentage of any primary nutrients as total nitrogen (N), available phosphate (P_2O_5), or soluble potash (K_2O) in any type or source of fertilizer.

(26) “Nutrient management plan” means a plan prepared by a certified nutrient management consultant or certified farm operator to manage the amount, placement, timing, and application of animal manure, fertilizer, biosolids, or other plant nutrients to minimize nutrient loss or runoff and to maintain the productivity of soil when growing agricultural products.

(27) “Operator” means a person who owns or manages an agricultural operation.

(28) “Out-of-ground or container production” means the production of plants whose roots are not actually growing in the soil column.

(29) “Person” means the State, any county, municipal corporation, or other political subdivision of the State, or any of their units, or an individual, receiver, trustee, guardian, executor, administrator, fiduciary, or representative of any kind, or any partnership, firm, association, public or private corporation, or any other entity, unless otherwise provided.

(30) “Phosphorus site index” means a procedure developed by the University of Maryland, approved by the Department, and described in the Maryland Nutrient Management Manual, Section II-C, that uses characteristics of soils, landforms, and management practices to identify potential risk of phosphorus losses from soils to waters.

(31) “Plant production goal” means a statement of the estimated length of time that plants will be grown, and appropriate measure of expected plant size, such as height or diameter.

(32) “Primary nutrients” means a plant food that is essential for normal plant growth, and includes total nitrogen (N), available phosphate (P_2O_5), or soluble potash (K_2O).

(33) “Residual nutrients” means the level of nitrogen, phosphorus, and potassium available in the soil from previous nutrient sources or unharvested plants or plant parts, or the

baseline nutrient levels in the soil.

(34) “Soil leaching potential” means the potential for a given soil to be subject to nitrate and soluble chemical leaching below the root zone.

(35) “Soil pH level” means the relative acidity or alkalinity of a soil and refers to the hydrogen ion concentration in the soil solution.

(36) “Substrate” means organic or inorganic material, often bark, peat, and sand, used as media components in a container to support the plant and contain the root system.

(37) “Volatilization” means a process in which nitrogen losses to the atmosphere occur as ammonia.

(38) “Watershed code” means the code used by the State to identify a hydrologic unit area.

(39) Waters.

(a) “Waters” means surface water or ground water, including:

(i) That part of the Atlantic Ocean within the boundaries of the State;

(ii) The Chesapeake Bay and its tributaries; and

(iii) All ponds, streams, natural wetlands, and drainage ditches or public drainage systems.

(b) “Waters” do not include irrigation and treatment ditches installed to hold, transform, treat, or transfer water or wastewater, if a separation is maintained between the ditches and waters, as defined in §B(38)(a) of this regulation at all times.

.04 Nutrient Management—Required Plan Content.

A. A certified nutrient management consultant or certified farm operator shall prepare, and an operator shall have and implement, a nutrient management plan that conforms to the requirements in §§ B—G of this regulation.

B. Plan Identification. A plan shall contain:

(1) The operator name and address;

(2) The account identification number or numbers for all tax maps and parcels contained in the plan;

(3) A county and watershed code of all land under a nutrient management plan;

(4) The date the plan was prepared or updated;

(5) The period of time the plan covers;

(6) The name, certification, and license number of the certified nutrient management consultant responsible for the plan development; and

(7) The name and certification number of the certified farm operator responsible for the plan development.

C. Map or Aerial Photograph.

(1) A plan shall contain one or more maps, such as soil survey maps or aerial photographs that identify:

(a) The location and boundaries of the agricultural operation;

(b) The individual field boundaries or management units;

(c) A field or management unit number or identifier; and

(d) Acreage of each field or management unit.

(2) The map or aerial photograph of the features described in §C(1) of this regulation shall be clearly recognizable. An agricultural operation sketch or soil survey map may be used when a map or aerial photograph is not available, if the features described in §C(1) of this regulation are clearly recognizable.

D. Plan Elements. A plan shall contain the following, when applicable:

(1) All nutrient recommendations for the period the plan is effective, including crop

rotations or recommendations for alternative cropping plans, if applicable, within specific field or management unit information, described under §E of this regulation;

(2) The type and average number of animals annually raised, maintained, or housed on the agricultural operation;

(3) The quantities of animal manure or waste produced and available from animal housing or waste storage structures during the period the plan covers;

(4) The total animal manure used as crop nutrients, including manure from on-farm and off-farm sources, and its nutrient analysis;

(5) The quantity of animal manure or waste and location of alternative use, including land application off-site, processing, composting, or other uses of unused animal manure or waste;

(6) The source and type of information used to determine expected crop yield or plant production goal;

(7) Any recommendation to change management, install additional best management practices, or implement alternative technologies to reduce risk potential for nutrient movement;

(8) Any recommendation to ensure efficient application of fertilizers; and

(9) Any determination of the limiting nutrient as required under Regulation .04. of this chapter, including use of a risk analysis tool indicating the potential for nutrients to move into surface water or ground water, based on current conditions.

E. Field or Management Unit Specific Information. A plan shall contain data for each field or area where nutrients will be applied and shall include:

(1) The date the recommendations are prepared or updated;

(2) An account identification number;

(3) The watershed location code;

(4) The field or management unit number or identifier and acreage;

(5) A soil analysis;

(6) The expected crop or plant and expected crop yield or plant production goal for the period covered by the plan;

(7) Any crop rotation or recommendation for alternative cropping plans, if applicable, to:

(a) Provide the operator greater flexibility and

(b) Minimize the need for a plan update;

(8) The primary nutrient requirements based on expected crop yield or plant production goals;

(9) Any available nutrients in the soil from the previous crop and mineralization and bioavailability assumptions for organic nutrient sources;

(10) The nutrients to be applied from all fertilizer sources to meet the crop or plant nutrient requirements;

(11) Any recommendation for:

(a) The liming of the soil,

(b) The application time for nutrients, including split applications, and the use of diagnostics to determine crop nutrient requirements,

(c) Any nutrient application method,

(d) The need to calibrate application equipment,

(e) The incorporation of natural organic fertilizers, and

(f) Any management strategy to achieve soil fertility within an optimal range; and

(12) Current or recommended tillage method.

F. Summary of Nutrient Recommendations. A plan shall contain a summary section that lists the following information for each farm field or management unit:

(1) The field or management unit identifier or number;

(2) The field or management unit acreage;

- (3) The expected crop or plant;
- (4) The expected crop yield or plant production goals for the period covered by the plan;
- (5) Any recommended nutrient rates;
- (6) The amount and type of nutrients, including chemical fertilizer or natural organic fertilizer, per acre or management unit;
- (7) The nutrient application method and, if application method requires incorporation of the nutrient, timing for incorporation; and
- (8) Any liming recommendations, if needed.

G. Plan Maintenance. A plan shall contain information to maintain and update a nutrient management plan. General comments about plan maintenance may be summarized, and shall include:

- (1) The length of time the plan is effective;
- (2) The circumstances or changes in the farm operation that would require the plan to be modified or updated, including a change:
 - (a) To the planned crop or cropping rotation, or introduction of a new crop not currently addressed in the existing nutrient management plan, unless the new crop or plant will have fertility management similar to that originally planned;
 - (b) Of nutrient source or soil test results that indicate a change in nutrient recommendations;
 - (c) In acreage managed of 10 percent or greater, or 30 acres, whichever is less; or
 - (d) In animal units of 10 percent or greater if resultant manure production will require significant management adjustments; and
- (3) Any information on soil fertility and management strategies for achieving soil fertility within an optimal range.

.05 Nutrient Management—Required Plan Recommendations.

A. A certified nutrient management consultant or certified farm operator shall address all of the elements and use the criteria described in §§B—I of this regulation to determine recommendations in a nutrient management plan. A consultant's or certified farm operator's recommendations shall be consistent with the Department technical standards and criteria as provided in the Maryland Nutrient Management Manual, Sections I, II and III.

B. Nutrient rates.

- (1) Nutrient rates of the primary nutrients shall be calculated for plant growth requirements of the crop.
- (2) Plant growth requirements shall be based on one of the following:
 - (a) University of Maryland Plant or Crop Nutrient Recommendations, as provided in the Maryland nutrient Management Manual, Section I-B; or
 - (b) Alternative standards, as provided in scientifically validated data for the development of a nutrient management plan acceptable to the Department.
- (3) A consultant or certified farm operator may recommend the use of lime, secondary nutrients, or micronutrients needed for optimal plant growth.
- (4) A consultant or certified farm operator may recommend nutrient rates that deviate from University of Maryland Plant or Crop Nutrient Recommendations and alternative standards provided in the Maryland Nutrient Management Manual, Section I-B, for application on farm test plots with prior approval from the Department.
- (5) A consultant or certified farm operator may recommend nutrient rates based on a single variety tissue sample when used in conjunction with a soil sample.

C. Expected Crop Yield or Production Goal.

- (1) The calculation of expected crop yield shall be based upon one of the following:

- (a) An average of the 3 highest-yielding years for the crop out of the latest consecutive 5-year cropping sequence; or
- (b) If yield information exists for more than 5 years for a given field or management unit, crop yield calculations may be based on the average of 60 percent of the highest-yielding years for all consecutive years that crop yield information is available.

(2) If field or management unit-specific yield or plant production goal information is unavailable or unrepresentative for reasons including new seed varieties, irrigation or new technologies, a consultant or certified farm operator shall use one of the following:

- (a) Any soil productivity information;
- (b) The average yield based upon an average of the 3 highest-yielding years for the crop out of the latest consecutive 5-year cropping sequence from nearby fields or management units with similar soil type and management conditions; or
- (c) Any data acceptable to the Department.

(3) A consultant should document what was used as the basis for determining expected yield goal as part of his record keeping requirements.

D. Soil Analysis Results.

(1) Soil analysis results for each field or management unit shall be based on standard soil sampling and analysis methods acceptable to the Department.

(2) Soil Samples. Variations from the standard sampling process shall be documented by the consultant or certified farm operator and may include:

(a) Soil samples collected from larger fields or acreage with uniform characteristics, including soil types, moisture, or fertility management history. Crop rotations may be sampled as one management unit.

(b) Soil samples from fields, such as those common to strip cropping, may be combined if the soils, previous cropping history, and soil fertility management are similar.

(c) Any specialized production unit may warrant smaller sampling units.

(3) Soil analysis results for a plan are valid for 3 years, except if the following conditions exist and are documented by the consultant or certified farm operator:

- (a) A less frequent soil analysis is required to implement a management system based on new technologies;
- (b) The management system does not require any nutrient application; or
- (c) The management system requires nutrient application at a frequency less than once every 3 years.

(4) A recommendation for more than one planting season or crop may be made if anticipated soil fertility changes from the following are documented:

- (a) Previous and future crop rotations; and
- (b) Residual soil nutrients and nutrients used for previous crops.

E. Determination of Limiting Nutrient.

(1) A consultant or certified farm operator shall:

- (a) Use the criteria in this section to determine which nutrient is the limiting factor in the application of nutrients; and
- (b) Recommend subsequent nutrient management strategies consistent with this section.

(2) Soil fertility shall be used as an indicator of whether nutrient recommendations should be adjusted to address potential nutrient pollution problems.

(3) If the soil sample analysis results show a phosphorus fertility index value (FIV) of less than 150, nutrient recommendations may use nitrogen plant needs as the limiting factor.

(4) Phosphorus.

- (a) If the soil sample analysis results show a phosphorus fertility index value (FIV) of

150 or greater, a phosphorus site index or other phosphorus risk assessment method acceptable to the Department, as provided in the Maryland Nutrient Management Manual, Section II-B, shall be used to determine the potential risk of phosphorus loss due to site characteristics.

(b) If the risk for potential movement of phosphorus from the site is low according to the phosphorus site index, nutrient recommendations by the consultant or certified farm operator may use nitrogen plant needs as the limiting factor.

(c) If the risk for potential movement of phosphorus from the site is medium according to the phosphorus site index:

(i) Nutrient rates shall be based on nitrogen plant needs as the limiting factor no more than 1 out of every 3 years. Phosphorus rates the other 2 years shall be limited to the expected amount removed from the field by the crop or plant harvest, or the amount indicated by soil testing in accordance with the recommendations described in the Maryland Nutrient Management Manual, Section I-B, whichever is greater; or

(ii) Nutrient recommendations may use nitrogen plant needs as the limiting factor if BMPs are implemented by the operator and address site or management characteristics to reduce the risk of phosphorus loss to low.

(d) If the risk for potential movement of phosphorus from the site is high according to the phosphorus site index:

(i) Phosphorus rates shall be limited to the expected amount removed from the field by the crop or plant harvest, the amount indicated by soil testing, in accordance with the recommendations described in the Maryland Nutrient Management Manual, Section I-B; or

(ii) If BMPs are implemented by the operator, and address site or management characteristics to reduce the risk of phosphorus loss to medium, nutrient rates may be based on nitrogen plant needs as the limiting factor not more than 1 out of every 3 years. Phosphorus rates the other 2 years shall be limited to the expected amount removed from the field by the crop or plant harvest, or the amount indicated by soil testing or in accordance with recommendations described in the Maryland Nutrient Management Manual, Section I-B, whichever is greater.

(e) If the risk for potential movement of phosphorus from the site is very high according to the phosphorus site index:

(i) No additional phosphorus may be applied; or

(ii) If BMPs are implemented by the operator, and address site or management characteristics to reduce the risk of phosphorus loss to high, recommended rates of application of phosphorus shall be limited to the expected amount removed from the field by the crop or plant harvest, or the amount indicated by soil testing in accordance with recommendations described in the Maryland Nutrient Management Manual, Section I-B.

(5) Before the deadlines set forth in COMAR 15.20.07.03 for the development of a phosphorus-based plan, a certified nutrient management consultant or certified farm operator may use:

(a) The requirements of §E(1)—(3) of this regulation as a planning tool to determine if future management changes are indicated by the P index, and if development of a phased-in approach to a phosphorus-based plan should be recommended; or

(b) Section §E(1)—(3) of this regulation as a guide to determine nutrient management recommendations.

F. Natural Organic Fertilizer.

(1) An agricultural operator who uses natural organic fertilizer shall determine its nutrient value as specified in this section.

(2) Test results for natural organic fertilizer shall be determined by an operator, consultant, or certified farm operator using standard sampling and analysis methods acceptable to the Department.

(3) The consultant or operator shall conduct animal manure or waste analysis as close to application time as possible, or a consistent baseline for nutrient content may be established and used from analysis results taken at least twice a year until a uniform value is confirmed, and then for every second year thereafter to verify its consistency. If significant changes occur, including feed, management, animals, or storage, a new analysis for nutrient content shall be determined by the consultant or operator for the new manure.

(4) Biosolids analysis shall be conducted according to COMAR 26.04.06.09A(13)(d) as close to nutrient application time as possible, but at least once a year. If changes occur in a sewage treatment facility, or routine biosolids analysis reveals a significant change in available nutrient content during the permit period, nutrient application rates shall be adjusted accordingly by the consultant, certified farm operator, or the operator.

(5) Analysis of any other natural organic fertilizer or organic materials shall be conducted by the operator as close to nutrient application time as possible, but at least once a year.

(6) Calculations for nutrient content from natural organic fertilizer shall consider mineralization rates and plant availability rates for different forms and sources of organic nutrients. Mineralization of organic nitrogen from the 2 previous years of natural organic fertilizer applications shall be accounted for in the plan.

G. Application Method for Nutrients. A consultant or certified farm operator shall consider the following when making recommendations on nutrient application methods in a plan:

(1) Nutrient application shall be made to minimize nitrogen and phosphorus losses to waters and nitrogen volatilization losses to the atmosphere;

(2) Techniques to achieve accurate and uniform application of nutrients shall be recommended by the consultant or certified farm operator and shall be used by the operator;

(3) Split application of nitrogen on soils identified as having a high leaching potential;

(4) Measures to minimize or control nutrient movement to sensitive areas, including natural or existing wetlands, sinkholes, and steep slopes; and

(5) Recommendations shall ensure efficient application of fertilizers and may include crop rotation, agronomic practices, tillage, and cover crop management.

H. Timing of Nutrient Application. Timing for nutrient applications, as recommended by a consultant or certified farm operator and conducted by an operator, shall:

(1) Be as close to plant nutrient uptake periods as possible;

(2) Maximize plant utilization efficiency and minimize the potential for nutrient movement; and

(3) Be consistent with guidelines contained in the Maryland Nutrient Management Manual, Section I-D.

I. Manure Management. When an agricultural operation either produces animals or integrates animal manure use with crop production, a consultant or certified farm operator shall:

(1) Take into account the current manure management measures being used to store, stockpile, and handle animal manure and waste nutrients associated with animal production in order to make appropriate recommendations for application rates, timing, and methods;

(2) Evaluate existing conditions and procedures and advise the operator when manure management changes, such as improved stockpiling or storage facilities, would minimize the potential for nutrient loss or runoff or improve nutrient use efficiency and proper timing of manure utilization; and

(3) Take into account animal manure or waste nutrients associated with animal production and all other sources of nutrients when making recommendations.

.06 Nutrient Management for Container or Out-of-Ground Agricultural Production — Additional Required Plan Content.

A. A certified nutrient management consultant or certified farm operator shall prepare, and an operator of container or out-of-ground agricultural production shall conform to the requirements of §§B—H of this regulation, in addition to applicable requirements described in this chapter, when developing and implementing a nutrient management plan.

B. Plan Elements. A plan shall contain a summary of planned plant production applicable to the site, including:

(1) A listing of plants to be grown by name, species, and variety and cultivar or both; however, if more than 20 different kinds of plants are grown, general plant categories may be used, such as herbaceous, deciduous shrub, coniferous evergreen, broadleaf evergreen, or trees;

(2) The estimated greatest number of plants, units, or containers that will be in production at any one time during a calendar year and the month this will occur;

(3) The estimated percentages of plants, units, or containers in the following container size categories:

(a) Less than 1 gallon (less than 2,492 cubic centimeters container volume),

(b) From 1 to 3 gallons (2,492 to 12,164 cubic centimeters);

(c) Greater than 3 gallons and less than 15 gallons (more than 12,164 , but less than 45,376 cubic centimeters); or

(d) 15 gallons or greater (45,376 cubic centimeters or more);

(4) An inventory, which may include projected changes during the life of the plan, taken by the operator for any purpose within 12 months of completion of the plan shall meet the requirements of § B(1), (2), and (3) of this regulation, if the inventory is representative of planned production during the period covered by a nutrient management plan;

(5) Total growing area under the plan, which may include projected changes in growing area planned to take place during the life of the plan.

C. Summary of Nutrient Recommendations. A plan shall contain summary information on the total amount of primary nutrients recommended for each calendar year covered by the plan, including:

(1) The estimated total amounts of nitrogen, phosphorus, and potash;

(2) A listing of all sources of nutrients;

(3) The estimated amounts of each source of nutrients to be applied for each quarter of the year; and

(4) A listing or description of the application method or methods for each nutrient.

D. Assessment of Environmental Risk. A nutrient management plan shall contain an assessment of the risk of nutrient losses to surface water, using the Environmental Risk Assessment for out-of-ground production provided in the Maryland Nutrient Management Manual, Section II-D.

E. General Management Recommendations. A plan shall contain general recommendations to ensure efficient application of nutrients, including:

(1) The calibration of equipment;

(2) The timing and application methods for water and nutrients;

(3) Management options to maximize the efficient use of water;

(4) Any operator management options to reduce nutrient losses; and

(5) Any other best management practices that may be applicable as provided in the Maryland Nutrient Management Manual, Section II-E.

F. Specific Management Recommendations. A consultant or certified farm operator shall recommend growing area or section-specific management techniques to improve water use efficiency and minimize nutrient losses, including the following:

(1) Grouping plants to improve water and nutrient usage;

(2) Monitoring water and nutrient needs of plants;

(3) Increasing the percentage of water and nutrients entering the plant root zone;

- (4) Reducing the amount of leachate or runoff; and
- (5) Reducing or containing the flow of water from growing areas.

G. Program for Monitoring Runoff. A nutrient management plan shall include recommendations to monitor runoff, as required in Regulation .07C of this chapter, including recommendations on methods, frequency, and locations of monitoring.

H. Plan Maintenance. A plan shall contain information to maintain and update the plan. General comments about plan maintenance may be summarized, but shall include:

- (1) The length of time the plan is effective, not to exceed 3 years.
- (2) Identification of changes in the agricultural operation that would require the original plan to be modified or updated, including:
 - (a) A change in area managed of 20 percent or greater, or 5 acres, whichever is less,or
 - (b) A substantial change in a production plan or method.

.07 Nutrient Management—Required Plan Recommendations for Container or Out-of-Ground Production.

A. Nutrient Recommendations. A certified nutrient management consultant or certified farm operator shall evaluate production cycles and methods and make nutrient recommendations based on at least one of the following:

- (1) The label recommendations on fertilizer products for the plants being grown or similar plants;
- (2) The recommendations of the University of Maryland Cooperative Extension for the specific plants being grown or for similar plants;
- (3) The recommendation from other state universities for the specific plants being grown or for similar plants;
- (4) The data from research done by accredited universities on the specific plants being grown or similar plants;
- (5) The general nutrition guidelines for similar plants; or
- (6) Any generally accepted growing practices for plants under comparable growing conditions.

B. Management Recommendations.

(1) A consultant or certified farm operator shall use the Environmental Risk Assessment for out-of-ground production, as provided in the Maryland Nutrient Management Manual, Section II-D, to identify the potential risk to the environment of nutrient movement from out-of-ground growing areas.

(2) For growing areas where there is zero or low risk of nutrient movement from the site, recommendations shall be made to maintain this zero or low level of risk.

(3) For growing areas where there is medium risk of nutrient movement:

(a) Management recommendations shall be made to minimize the risk of nutrients moving to, or reaching, surface waters; and

(b) The consultant or certified farm operator shall recommend that the operator or other person responsible for irrigation and nutrient management attend Department-approved training on best management practices for out-of-ground production to minimize nutrient losses.

(4) For growing areas where there is high risk of nutrient movement:

(a) Management recommendations shall be made for individual growing areas, as well as for the operation as a whole, to reduce the risk of nutrients moving to, or reaching, surface waters;

(b) The consultant or certified farm operator shall recommend that the operator or

other person responsible for irrigation and nutrient management attend Department-approved training on best management practices for out-of-ground production that teaches how to minimize nutrient losses; and

(c) Only controlled release fertilizer shall be recommended for use until management changes reduce the risk of nutrient loss to medium.

(5) In recommending field or management unit practices to reduce or minimize nutrient losses, a consultant or certified farm operator shall consider the following:

(a) The appropriate nutrient application methods; and

(b) Nutrient application timing; and

(c) Any plant nutrient needs.

(6) Timing of nutrient application shall be as close to plant nutrient uptake as possible, except in the case of controlled release fertilizer, which may be applied at any time.

C. Recommendations for Monitoring Runoff. Unless an operation is assessed as zero-risk for nutrient loss from the site, as provided in the Maryland Nutrient Management Manual, Section II-D, the nutrient management consultant shall recommend a monitoring program, including the following:

(1) The periods for monitoring when plant nutrients can reasonably be expected to be available;

(2) The locations immediately next to growing areas or areas where runoff or overflow from collection basins enters surface water, municipal stormwater, or drainage inlets; and

(3) The frequency of sampling for nutrients:

(a) Where the risk of nutrient movement from any growing area is low, monitoring shall include samples for testing a minimum of two different times during each growing season or cycle from each location; and

(b) Where the risk of impacting surface water is medium or high, monitoring recommendations shall be conducted monthly when nutrients are being applied.

D. Methods of Sampling and Testing. Samples may be analyzed by the operator or consultant on-site using calibrated electrical conductivity (EC) or nutrient meters. To evaluate the accuracy of on-site test results, at least two samples per year shall be split, with one part being sent to an independent laboratory for analysis.