



Chesapeake Bay Program

Chesapeake Bay Area Nutrient Management Programs: An Overview

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Acknowledgements

This brief overview of the nutrient management programs in the Chesapeake Bay watershed is prepared by the Nutrient Management Workgroup of the Nutrient Subcommittee. It reflects the unified efforts of Bay jurisdictions toward a common technical criteria for development of nutrient management plans for agricultural and urban land. Other charges of the workgroup include the development of a model training and certification program to encourage the privatization of providing technical services and nutrient

recommendations for crop production as well as the urban landscape.

The Chesapeake Bay Program Nutrient Subcommittee recognizes the Workgroup's efforts in exchanging technical information and experiences, coordinating nutrient management program strategies and activities in the Bay region, and preparing this report. We extend our gratitude to each of them.

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Introduction

Agriculture has been identified as a major contributor of nutrients to the Chesapeake Bay in the 1987 Chesapeake Bay Agreement. Under this agreement, the states of Maryland, Pennsylvania, and Virginia and the District of Columbia committed to reduce nutrient loads to the Chesapeake Bay by 40 percent by the year 2000. These jurisdictions have made the implementation of agricultural nonpoint source (NPS) pollution control programs a priority. Nutrient management has been recognized as an efficient and cost effective practice to reduce NPS pollution in the 1992 Baywide Nutrient Reduction Reevaluation and the 1995 "Cost Analysis for Nonpoint Source Control Strategies in the Chesapeake Basin".

Nutrient management is a pollution prevention practice that manages the rate, timing, and method of application of nutrients and minimizes their potential losses through runoff or leaching to groundwater. Nitrogen, phosphorus and potassium are three essential plant nutrients used in significant amounts in intensive agricultural operations. These nutrients are important for satisfactory crop production but, if not managed properly, can easily move from farmland to ground and surface waters.

Nutrient management received new emphasis in the mid-1980's as an important management practice to supplement ongoing soil conservation and water quality plans and animal waste best management practices. Although the Nutrient Management Program is administered by different agencies in each

state, the programs are well established and coordinated at the local level, based on individual state needs and available technical support. Nutrient Management Workgroup members and their technical support staff have been meeting regularly since July, 1991. In 1992, the Nonpoint Source Subcommittee, which is now the Nutrient Subcommittee, asked the Nutrient Management Workgroup to cooperatively develop standards for nutrient management plans and a model certification program to be adapted for each jurisdiction. These meetings provided a great opportunity for technical exchange, the sharing of experiences and enhancement of the program in the Bay region. Under the auspices of the Nutrient Subcommittee, the Workgroup has continued to address other important topics as summarized in the following pages.

Plan Definition and Criteria

The definition of a nutrient management plan, plan criteria and the minimum standards required for a certified plan were developed and agreed upon by participating states. The basic standards include a written site-specific plan indicating how major plant nutrients (nitrogen, phosphorus and potassium) are to be managed for both expected crop production and water quality protection.

Nutrient management plans provide nutrient recommendations based on realistic expected crop yield, existing nutrient levels in the soil, appropriate timing and placement of nutrients and other normal farming practices related to efficient nutrient utilization, with particular emphasis on environmentally sensitive areas.

Elements of a nutrient management plan include:

- Plan identification and information to identify the farm location on a map, watershed code, acreage of each field, operator's name and address, and planner's identification
 - Crop history, soil test results, and credit for residual nitrogen from previous crops
 - Site specific nutrient recommendations based on standard plan criteria
 - Narratives on updating plans as necessary and detailed instructions on any special environmental recommendations, and the proper management and utilization of excess manure, if applicable.
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Baywide Model Training and Certification Program

The model Bay area nutrient management training and certification program was developed to serve as a guide to each of the Chesapeake Bay Agreement signatory states in formulating individual certification programs. The purpose of the program is to certify the competence of the nutrient management planners/consultants in writing environmentally- sensitive crop nutrient recommendations. Basic training and continuing education courses were designed to provide greater details about nutrient management concepts and their practical applications. Certified individuals are updated on the latest relevant research findings and technologies and kept abreast of program policies and strategies.

All nutrient management plans required by state or federal regulations or incentive programs should be prepared or approved by a certified professional. All certified plans must adhere to nutrient management plan criteria and should be consistent with those specified in the "Minimum Requirements of a Nutrient Management Plan" document as approved by the Chesapeake Bay Program Implementation Committee.

Individuals Targeted for Certification

Certification is recommended for all individuals from the private sector or government agencies who provide recommendations to farmers or others on the use and management of crop nutrients including commercial fertilizers, animal manure, and other organic sources. Other professionals who provide technical assistance, including farmers who are interested in developing state-approved nutrient management plans, are encouraged to participate in the certification program.

Training and Knowledge Areas for the Certification Examination

State-approved training sessions are organized prior to certification examinations. The core knowledge area components for training and certification include:

- General Nutrient Management
- Crop Production Economics
- Natural Resources and Environmental Stewardship
- Basic Soil Science
- Nutrient Testing, Analysis and Assessment
- Basic Soil Fertility
- Management of Commercial Fertilizers
- Management and Utilization of Manure
- Management and Utilization of Sewage Sludge
- Incentives and Regulations (specific to individual state)

Training Manual

A regional training manual for use in the nutrient management certification program is being developed by the academic staff of universities in the Bay region. The manual was reviewed by jurisdiction program managers and comments were provided to the manual's authors and editors. The manual is intended to be a regional nutrient management textbook covering the above-mentioned competency areas. It may have national application, as well. The last chapter of the manual covering state-specific nutrient recommendations, procedures and regulations will be developed by jurisdictions.

Exam Process and Analysis

The first step in the certification process requires qualified individuals to pass a certification examination. Over 800 questions compiled in a core question bank cover the required knowledge areas.

Questions were compiled and refined by professionals from government agencies and universities in the Bay region.

To ensure exam consistency within all the jurisdictions, the Workgroup retained the contractual services of testing professionals to develop a standard exam process and analysis. The consultant reviewed, edited, and developed a systematic rating of questions, and trained the staff administering the exam process in each jurisdiction.

Certification Reciprocity

The Chesapeake Executive Council's Directive No. 94-2 calls for development of a reciprocal certification program for nutrient management professionals in Maryland, Pennsylvania and Virginia. The Workgroup has begun reviewing common elements of the certification programs. The main components of a reciprocity agreement include the adoption of a core nutrient management certification exam using a regional question bank and a standard exam process and analysis. State-specific requirements and recommendations will be identified and addressed. Some of these specific requirements primarily defined in the states' regulations include: eligibility for certification, continuing education requirements, and licensing. Other technical deviations may include mineralization rates and some specific crop nutrient recommendations.

Reciprocal agreements relating to nutrient management certification are included in the current agenda of the Workgroup, and may be finalized by early 1996. However, the agreement will become effective within 12 months of adoption of the certification by the states.

Data Base Systems for Tracking and Evaluation

In response to Executive Council directives and the Nutrient Subcommittee charge for development of a comprehensive and accurate BMP tracking and reporting system, the Workgroup is reviewing and evaluating the current tracking systems and evaluation methodologies. Existing tracking procedures in each jurisdiction are being evaluated with respect to current and anticipated needs.

In addition to the state-specific reporting and evaluation needs, tracking systems should be capable of providing information required for planning and evaluation of the Tributary Strategies and the Chesapeake Bay Program Watershed Model. In the early stage of the program, jurisdictions developed distinctive data base systems for agricultural nutrient management. Urban nutrient management initiatives are in the early stages of planning and development and present different approaches and issues to be tracked and evaluated. The Workgroup plans to complete the review and evaluation process of the tracking systems and provide the Subcommittee with a summary report and recommendations by late 1996.

Progress Update

Progress in the development of agricultural nutrient management plans is tracked and evaluated by the

number of plans and crop acreage covered. Nutrient reductions resulting from the implementation of plans are estimated by planners as reductions in application rates per acre. Savings in operating costs are based on reduced application rates and by efficient utilization of existing on-farm organic nutrient sources. In addition to the states' nutrient reduction strategy plans, Tributary Strategy Teams have developed nutrient management planning goals for each tributary.

There has been a sharp increase in nutrient management planned acreage since the 1989 basin-wide progressive approach. With an annual increase of about 200,000 acres per year, as of 1994, over one million acres of agricultural land were covered under nutrient management plans by agency staffs in Pennsylvania, Maryland and Virginia. Implementation of nutrient management training and certification programs, and joint efforts of government agencies and private industry consultants will triple the annual program outreach.

Average nitrogen application reductions reported by jurisdictions ranged from 30 to 40 pounds per acre. Similar figures were reported for lower phosphorus application rates. An important step in the early stages of the program was the Baywide modification of nitrogen recommendations for corn crop. Prior to the establishment of the nutrient management program, the nitrogen recommendations for corn ranged from 120 to 130 pounds per acre for a 100 bushels of expected yield goal. Soil fertility specialists in the Bay region revised their nitrogen recommendations to levels approaching 1.0 pound of nitrogen (N) per bushel of corn grain. Also, nitrogen availability rates for organic nutrient sources were substantially modified based on a review coordinated by the Workgroup.

Refinement of the nutrient management plan criteria is an ongoing process of the program. Principle parameters have been addressed. Parameters being considered for further refinement include: the basis for crop yield estimates, modification of organic nutrients mineralization rates, promotion of the soil nitrate test (PSNT) prior to application of the sidedress nitrogen for corn, and the use of soil vulnerability ranking for soluble nutrient leaching.

[Enviromental Indicator: Acres Under Nutrient Management \(bar graph\)](#)

Urban Nutrient Management

Urban nutrient management has become a prominent option in the implementation of nutrient reduction strategies. The managed application of nutrients (fertilizers) in the urban landscape for lawns, parks, sod farms, athletic grounds and public building grounds is an important component in meeting the goals of the Chesapeake Bay Program. It is essential that homeowners, industries providing services and supplies to homeowners, and managers of parks, recreational facilities and golf courses all understand their roles and responsibilities in managing nutrients for environmental protection.

Jurisdictions are formulating urban nutrient management delivery strategies to address nutrient reductions from non-agricultural fertilizer usage. Since the supply of materials and delivery of services are provided by the private sector, educational efforts are being targeted toward the private sector and

enhancing public awareness. States, based on their individual needs, are using a combination of the following activities in their urban nutrient management programs. These include:

- Conducting a survey and updating background information required for the development of urban nutrient management strategies;
- Preparing educational materials, fact sheets and brochures for various targeted groups such as homeowners, technicians and managers providing urban landscape services;
- Organizing training programs for the agencies and private sector technicians on proper management and utilization of fertilizers;
- Participating in existing events and workshops for public information and awareness;
- Working with ground managers of state and federal government buildings, recreational lands and parks in the proper and efficient use of fertilizers; and
- Generating water quality cooperation agreements with urban fertilizer retailers and lawn care firms.

In contrast with agriculture, urban nutrient management initiatives and strategies will impact a diverse group of audiences. Urban nutrient management provides technical assistance and guidance to fertilizer retailers (point of sale), homeowners, ground maintenance and lawn care services, sod producers, golf course and athletic ground managers, commercial production nurseries, and public parks and grounds staff. The success of the program relies on a unified approach, continued technical exchange between jurisdictions, and the leadership and support of the Nutrient Subcommittee.

Research Needs

As an ongoing process, the Workgroup will identify, prioritize and support research topics related to refinement of the plan criteria and enhancement of the program. Specific research projects recommended by the Workgroup and granted by the Nutrient Subcommittee include:

- Mineralization and Availability of Nitrogen in Organic Waste-Amended Mid-Atlantic Soils. Gregory K. Evanylo, Virginia Polytechnic Institute
- The Relationship between Soil Test Phosphorus Level and the Concentration of Dissolved and Potentially Transportable Phosphorus in Field Drainage Water. Frank J. Coale, University of Maryland

The mineralization work resulted in significant changes in manure availability factors used by states in nutrient management planning. We anticipate that the phosphorous research work will also provide additional criteria for evaluating alternative nutrient management practices. The Workgroup will continue to identify the research needs and integrate research findings into the nutrient management planning process.

Vision for the Future

During the short life of the program, basic problems associated with handling and utilization of nutrients were identified, and solutions and options studied. State-specific strategies were developed and program outreach expanded. A diverse group of individuals representing various government agencies, academic institutions and the private sector were included in the planning and implementation process of the program. The Nutrient Management Program was initiated and promoted by providing additional staff and technical support to government agencies at the state and local level. Program outreach is being expanded through training, certification, and privatization of nutrient management planning services.

Today, the infrastructure of the nutrient management program in the Bay region is established and the challenges have been examined. Refinement of plan criteria, research and study programs, tracking and evaluation are and will remain an integral part of the ongoing implementation process. Innovative approaches supported by the states' specific laws, regulations, and incentives ensure accomplishment of common goals.

States have made tremendous strides in improving and expanding their nutrient management programs. But more needs to be done to meet agricultural nonpoint source nutrient reduction goals. The continued application of fertilizers and manure in areas of intensive crop and livestock production have increased the nitrate concentrations in ground- water and led to subsequent build-up of soil phosphorus levels beyond crop nutrient uptake. The continual discharge of nitrate accumulated in deep levels of aquifers during past decades and losses of dissolved and particulate phosphorus are of increasing concern to agencies and the soil fertility experts in the Bay region. Expected results from current research on potential losses of bioavailable phosphorus may result in the modification of nutrient management guidelines and nutrient recommendations by agencies and nutrient management specialists.

State agencies and the Cooperative Extension Service need to continue educational efforts to enhance farmers' awareness of the importance of managing nutrients and implementing nutrient management plans. State agencies should continue providing incentives for implementation of other supplemental practices such as animal waste storage structures, cover crops and integration of nutrient management planning into other production and environmental management systems. Urban nutrient management elements, and their related activities, need to be specified, tracked and evaluated. Nutrient management, as a key element in nutrient load reductions, will remain on the agenda in the future.

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