

**Resource Planning for Cranberry Bogs within Drinking Water  
Supply Areas**

**Project #**

**99-14SWT**

**Grantee Name**

**Cape Cod Cranberry Growers' Association**

**Project Dates**

**(Start, April 15, 2000/Finish, June 30, 2002)**

**PREPARED BY:**

**CAPE COD CRANBERRY GROWERS' ASSOCIATION**

**Jeffrey LaFleur, Executive Director**

**PREPARED FOR:**

**MASSACHUSETTS DEPARTMENT OF ENVIRONMENT PROTECTION**

**BUREAU OF RESOURCE PROTECTION**

**AND**

**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**REGION 1**



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**MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS**  
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Michael Rotondi, Director

**DIVISION OF WATERSHED MANAGEMENT**  
Glenn Haas, Director

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# FINAL REPORT

Department of Environmental Protection

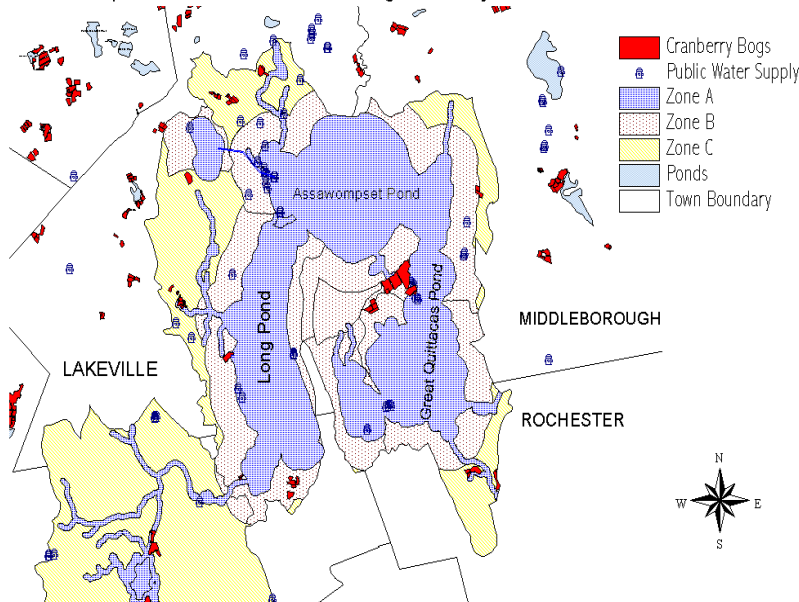
Source Water Protection Grant

Project Number 99-14SWT

Resource Planning for Cranberry Bogs within Drinking Water Supply Areas

**TASK 1** Utilizing the Cape Cod Cranberry Growers' Association GIS data base of cranberry bogs in conjunction with the MassGIS Zone II, IWPA, Zone B and C data base of January 2000 a query of cranberry bogs within these areas was completed. Out of the 5,198 individual shapes identified as cranberry bogs, 923 bogs were identified to fall within the defined constraints. Unfortunately, of the 923 bogs identified to fall within the defined constraints, 155 bogs did not have any grower information associated with them, representing 263 acres. This task identified some flaws within the internal CCCGA system beyond the scope of this project, which included lack of identifier information on many bog owners in Southeastern Massachusetts. A proposal was developed to correct this problem through the USDA, Natural Resource Conservation Service. The USDA will be completing the identification of all agricultural lands in New England by identifying the parcels by using USDA identification procedures, utilizing farm number and tract number.

Cranberry Bogs within Zone's B and C of the Assawompset, Quittucas and Long Pond system



**TASK 2** Providing Direct Technical assistance in to cranberry growers located in Zone II's Zones, B and C and IWPA's. Focus was in the towns of Middleboro, Lakeville, Rochester and Mattapoisett.

There are roughly 2,900 acres of producing cranberry bogs in Middleboro, Lakeville, Rochester and Mattapoisett.

Through a GIS query of cranberry bogs overlaid with MassGIS Zone II, IWPA, Zone B and C database of January 2000 we identified 23 growers totaling 372 acres of cranberry bog. We also uncovered 6 parcels that had no identification to correspond with them totaling less than 15 acres. We further cross-referenced this list with a list of known farm plans to determine how many of these growers had farm plans or

needed revised farm plans. A total of seventeen growers were identified as needing conservation farm plans, many of which have not had any technical assistance provided to them by USDA. The CCCGA contacted all of these growers to notify them of the plan to have farm plans conducted on their properties. The farm planning process is voluntary, so follow-up calls were made by Plymouth County Conservation District farm planners and on-site visits conducted.

In total, 16 farm plans were completed and/or revised for growers within these areas in the stated towns. This represents 1,113.77 acres of land with 357 acres of active cranberry bog.

### *The Farm Plan*

A farm plan is a **comprehensive, customized** document that completely outlines the use and best management of the natural resources on a property. A farm plan defines and explains the resources on a property in a simple easy to understand manner.

A farm plan is a key that provides access through the realm of regulatory guidelines and restrictions that farmers are scrutinized under everyday. A farm plan combines the management of all the resources on a property into one comprehensive, user friendly plan. The farm plan assists the land manager in making positive environmental and economic decisions for a property. The farm plan defines and explains both the current and planned uses of a property along with how they will be implemented to federal, state and local officials.

A team of USDA-NRCS certified planners and engineers develops a farm plan. Farm plans incorporate the current Best Management Practices. Every farm plan is customized to the individual needs of each property.

The Plymouth County Conservation District (PCCD) Farm Planning Program has developed or revised 16 USDA NRCS approved farm plans for cranberry growers in Middleboro, Lakeville, Rochester and Mattapoisett. The Farm Plan provides the landowner with aerial photography, maps of the farm fields and technical recommendations about needed conservation improvements.

Detailed soil maps of the property have been included with soil descriptions to aid in the application of soil amendments and fertilizers.

GIS mapping has been provided to the farmer detailing the farms location in the watershed and locations of surrounding Zone II's (Wellhead protection areas), Zone A, B, C (surface water protection areas), and ACEC (areas of critical environmental concern).

State (DFA) and federal (NRCS) cost share funding programs for agricultural improvements were thoroughly reviewed with the farmer, outlining what conservation practices are cost sharable, those that are not, and how to apply for assistance.

The DEP Water Management Act was reviewed in detail with the farmer.

State and Federal Wetland regulations were also reviewed (where applicable).

The farmer was supplied with a copy of the Farm Planning Resource Guide that includes

- The Massachusetts Agriculture and Water Quality Guide for cranberry production; Peter Bonome PCCD and Kathy Ruhf NESFI
- The Best Management Practices for Cranberry Production; University of Massachusetts
- A guide to Understanding Cranberry Soils; USDA NRCS
- Detailed explanation on the proper installation and placement of erosion and sediment control materials
- The Massachusetts wetlands protection act; Farming in Wetland resource area: A guide to Agriculture and the Massachusetts Wetland Protection Act; Massachusetts DEP
- General Recommendations for the Storage, Mixing and Loading of Pesticides; Massachusetts Department of Food and Agriculture, The Pesticide Bureau

### **Description of Federal Practices implemented or planned through the farm plan:**

#### 320 – IRRIGATION CANAL

Follow specifications provided by NRCS. Maintain canal integrity by removing accumulated weeds or other debris from flow area, mowing side slopes to eliminate wood growth, and maintaining vigorous vegetative growth on the side slopes. Lime according to a soil test or at a minimum of every 5 years using a rate of two tons per acre (100 pounds per 1,000 square feet). Where grasses predominate, fertilize according to soil test or broadcast biennially, 300 pounds of 10-10-10 or equivalent per acre (7 pounds per 1,000 square feet). Where legumes predominate, fertilize according to a soil test or broadcast every 3 years 300 pounds of 0-20-20 or equivalent per acre (8 pounds per 1,000 square feet).

#### 356 - DIKE

Dikes are embankments constructed of earth or other suitable materials to protect land against overflow or to regulate water. Dikes for cranberry bog water management include perimeter and interior dikes to temporarily impound water for harvesting, trash removal, pest control, and winter flooding or other management purposes including maintaining water quality from chemigation on bogs.

#### 430 - IRRIGATION WATER CONVEYANCE, PIPELINE (PLASTIC MAINLINE)

Irrigation water conveyance pertains to that part of the irrigation system that carries water to the irrigation sprinkler system (mainline). Water conveyance is through underground thermoplastic pipelines ranging from 1/2" to 18" in diameter which are closed to the atmosphere and subject to internal pressures of 80 lb./sq." or greater. The intent of this practice is to prevent loss of water quality, damage to the landscape and to make possible proper management of irrigation water by reducing water conveyance losses.

#### 442 - SPRINKLER IRRIGATION SYSTEM

A sprinkler irrigation system (laterals and heads) is a planned water delivery method, using sprinkler heads under pressure. The system should uniformly distribute water to maintain adequate soil moisture for optimum plant growth without causing excess water loss or reduced water capacity.

Sprinkler systems for cranberry bogs are also used for protection of crops from frost damage, for the application of fertilizers and pesticides and for plant temperature control during periods of intense heat.

#### *447 ? IRRIGATION SYSTEM, TAILWATER RECOVERY POND*

A tailwater recovery pond is a facility used to collect, store, and transport irrigation tailwater for reuse in farm irrigation / flood distribution system. Tailwater recovery systems for cranberry bog water management are used to conserve water supplies by collecting surface runoff for reuse on the bogs and protecting water quality by storing chemigated water onsite.

#### *449 - IRRIGATION WATER MANAGEMENT*

Irrigation water management is a method of determining and controlling the rate, amount and timing of irrigation water in an efficient manner.

The purpose of this practice is to effectively use available irrigation water supply in managing and controlling the moisture environment of crops to promote crop response, to minimize soil erosion and loss of plant nutrients, to control undesirable water loss and to protect water quality. The irrigator will have the knowledge and capability to manage and apply water in such a manner that these objectives can be reasonably attained. The knowledge should include:

1. How to determine when irrigation water should be applied, based on the rate of water used by crops and on the stages of plant growth and weather.
2. How to measure or estimate the amount of water required for irrigation and leaching needs.
3. The normal time needed for the soil to absorb the required amount of water and how to detect changes in intake rate.
4. How to adjust stream size, application rate, or irrigation time to compensate for changes in such factors as intake rate or the amount of water to be applied.
5. How to evaluate the uniformity of water application.

#### *587 - WATER CONTROL STRUCTURE*

Flumes are water control structures (WCS) usually constructed of steel, aluminum or concrete which are installed in a dike that conveys water, controls the direction of flow or maintains a desirable water surface elevation.

The primary purpose of a WCS is to control the stage, discharge, distribution, delivery, or direction of flow of water in open channels or water use areas. They are also used for water quality control, holding back sediment and impounding chemical laden water until it has sufficiently degraded (for its specified detention time) for discharge from the bog system.

#### *436/ 378 ? IRRIGATION STORAGE RESERVOIR/ POND*

This practice applies to reservoirs and ponds that store irrigation and flood water for cranberry farming. Reservoirs and ponds capture and store surface and ground water for use throughout the growing and management season. Regular cleaning and maintenance is required to provide an adequate water supply. Structural features such as dikes and flumes must be maintained to ensure function, stability and the water holding capacity of reservoirs and ponds.

### *680 - NUTRIENT MANAGEMENT*

Nutrient management is the management of the amount, form, placement and timing of applications of plant nutrients fertilizers.

The purpose of this practice is to supply plant nutrients for optimum crop yield, minimize leaching of nutrients to surface and groundwater and to maintain or improve the chemical and biological condition of the soil.

The operator will employ a nutrient management process with the goal of optimizing crop yield while having the least negative impact on surface/groundwater supplies. As native perennial plants well adapted to acid soils in a wetland environment, cranberries need less fertilizer than many annual crops. Nevertheless, the operator will adhere to the following standards:

#### Monitoring/Observation

Decisions regarding timing, rate and formulation of fertilizer application will be based on age and history of beds, soil and subsoil conditions, cropping records, weather factors and cultural practices. Close observation of individual beds and a thorough knowledge of them, not mere calendar dates, will be the deciding factors in application.

#### Record Keeping

The operator will maintain, in a format appropriate to the operation, records of dates and times of applications, rates and formulations used, split doses, and weather conditions. Application dates, locations and results of soil and tissue tests will also be recorded. Detailed records kept over a period of years will contribute to the decision-making process.

#### Training/Education

Informed decisions on fertilizer use also require continuing education as new research becomes available. In order to remain current, the operator will attend available workshops and educational sessions.

#### Application

In determining actual application and procedures, the operator will follow the Nutrient Management Guidelines set forth in the "Cranberry Chart Book: Management Guide for Massachusetts" to the extent practical.

### OPERATION, SAFETY AND MAINTENANCE

Calibrate equipment where applicable to ensure recommended fertilizer rates are applied. Protect fertilizers, in appropriate storage facilities, from weather and accidental leakage or spillage. When disposing of any nutrients, proper care should be taken to comply with all applicable local, state and federal laws.

### *685 - PEST MANAGEMENT*

Pest Management is a conservation practice that manages agricultural pest infestations (including weeds, insects and diseases) to reduce adverse effects on plant growth, crop production and environmental resources. The practice establishes the elements of an Integrated Pest Management (IPM) approach. This approach requires an understanding of the dynamic nature of pest management and includes combinations of appropriate biological, chemical and cultural control techniques. The purpose of this strategy is to promote favorable crop results while minimizing environmental impacts. The goal is to use a multi-disciplinary approach to controlling the most economically threatening pests, while optimizing favorable crop yields. IPM programs utilize various techniques to monitor weather, pest life cycles and crop development; it also integrates cultural, biological and chemical control strategies to maintain pests below economically damaging levels. Potential control strategies will be based on

established economic thresholds and will employ techniques that minimize environmental impacts. Adherence to the following standards have been established and will be followed.

#### Monitoring/Observation

Appropriate monitoring techniques, such as weekly sweep sets, weed mapping and close observation will be used in order to determine pest infestation levels; techniques will be based on the recommendation of the "Cranberry Chart Book: Management Guide for Massachusetts," University of Massachusetts publication.

#### Selection of Management Techniques

Pest Management methods will be selected on the basis of degree of control, cost and environmental risk. Timing will be based on economic thresholds (when established) as well as the operator's experience and site-specific conditions. Implementation of methods will follow the guidelines recommended in the "Cranberry Chart Book".

#### Education/Training

Operators will possess a valid pesticide applicator certification and will attend the appropriate continuing education workshops to keep informed of research developments, or will contract with a licensed custom applicator that does.

#### OPERATION, SAFETY AND MAINTENANCE

Calibrate equipment where applicable to ensure recommended pesticide rates are applied. Protect pesticides from weather and when disposing of any pesticides, proper care should be taken to comply with all applicable local, state and federal laws.

#### *342 - CRITICAL AREA PLANTING*

Critical Area Planting is establishing vegetation such as trees, shrubs, vines, grasses or legumes on highly erodible or critically eroding areas.

The purpose of the practice is to stabilize the soil, reduce erosion, runoff, and sediment damages to downstream areas and improve water quality.

#### *386 ? FIELD BORDER*

A strip of perennial grass, trees or shrubs established at or around the edge of a field to provide a perimeter buffering effect for improved water quality and to provide wildlife food and cover.

#### *391 ? RIPARIAN FOREST BUFFER*

A riparian forest buffer is an area of trees and/ or shrubs located adjacent to a body of water. The vegetation will create shade to lower water temperatures and improve habitat for aquatic animals. Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife. Act as a buffer to filter out sediment, organic material and other pollutants that may adversely impact water body.

#### *466 - LAND SMOOTHING*

Land smoothing is the practice of removing irregularities on the land surface by the use of special construction equipment. In cranberry bogs, land smoothing is practiced to construct a more level bed to reduce the amount of water used during flooding operations. Squaring off bogs is a form of land smoothing to straighten crooked edges and odd shaped pieces. Straightening of edges make harvesting and mowing more efficient and facilitates better irrigation coverage.

*608 - SURFACE DRAINAGE, MAIN OR LATERAL*

Surface drainage in cranberry bogs consists of open drainage ditches and/or stoned filled and tiled ditches constructed to dispose of surface water. The practice includes main, lateral and perimeter ditches. Main and lateral ditches may also be used to distribute water for flooding and for frost control, if necessary.

*645 - WILDLIFE HABITAT MANAGEMENT*

Wildlife habitat management is a conservation practice that enhances the natural resource base environmentally and esthetically. Habitat management practices consist of providing and enhancing food sources, cover, open space, wetland areas and edge. Wildlife habitat management practices enhance the local ecosystem providing enhanced natural weed and insect control.

*SAND STORAGE, REMOVAL, AND APPLICATION*

The mining and use of sand on cranberry farms is a necessary and common activity. Sand resources are vital to the health and production of the bog. Sanding is commonly conducted on ice in the winter but may occur in the spring by utilizing barge-sanding methods or spot treatments are often applied by hand. Periodic sanding reduces the need for herbicides, pesticides and fertilizers.

**FARMERS PARTICIPATING IN FARM PLANNING THROUGH TASK 2**

USDA Farm #: 138  
Tract #: 1030  
Town: Rochester  
Watershed: Buzzards Bay  
Acreage: 14.87 total acreage / 6.1 crop land

USDA Farm #: 1240  
Tract #: 527  
Town: Lakeville  
Watershed: Buzzards Bay  
Acreage: 24.0 total acreage / 11.9 crop land

USDA Farm #: 921  
Tract #: 1294  
Town: Rochester  
Watershed: Buzzards Bay  
Acreage: 43 total acreage / 12 crop land

USDA Farm #: 932  
Tract #: 1299  
Town: Lakeville  
Watershed: Taunton  
Acreage: 40.0 total acreage / 26.3 crop land

USDA Farm #: 1023  
Tract #: 1448  
Town: Rochester

Watershed: Buzzards Bay  
Acreage: 19.5 total acreage / 7.7 crop land

USDA Farm #: 1609  
Tract #: 1832  
Town: Lakeville  
Watershed: Buzzards Bay  
Acreage: 4.4 total acreage / 4.4 . crop land

USDA Farm #: 405  
Tract #: 229  
Town: Lakeville  
Watershed: Buzzards Bay  
Acreage: 45.0 total acreage / 8.0 crop land

USDA Farm #: 1707  
Tract #: 238  
Town: Rochester  
Watershed: Buzzards Bay  
Acreage: 108.0 total acreage / 38.5 crop land

USDA Farm #: 1707  
Tract #: 239  
Town: Rochester  
Watershed: Buzzards Bay  
Acreage: 246.0 total acreage / 64.8 crop land

USDA Farm #: 252  
Tract #: 247  
Town: Rochester  
Watershed: Taunton River  
Acreage: 15.0 total acreage / 5.0 crop land

USDA Farm #: 406  
Tract #: 271  
Town: Rochester  
Watershed: Buzzards Bay  
Acreage: 8.0 total acreage / 2.3 crop land

USDA Farm #: 1438  
Tract #: 301  
Town: Rochester  
Watershed: Buzzards Bay  
Acreage: 407.0 total acreage / 112.9 crop land

USDA Farm #: 1585  
Tract #: 310  
Town: Rochester  
Watershed: Buzzards Bay  
Acreage: 197.0 total acreage / 66.9 crop land

USDA Farm #: 1411

Tract #: 312  
Town: Rochester  
Watershed: Buzzards Bay  
Acreage: 10 total acreage / 6.5 crop land

USDA Farm #: 1583  
Tract #: 634  
Town: Lakeville  
Watershed: Taunton  
Acreage: 31.0 total acreage / 7.3 cropland

USDA Farm #: 712  
Tract #: 732  
Town: Rochester  
Watershed: Buzzards Bay  
Acreage: 8.5 total acreage / 4.2 crop land

**RECORD OF DECISION:**

Included with each a farm plan and attached in this report is the record of decision made by each farmer. The record of decision records the practices to be implemented on the farm and the size of the area that that practice will be implemented. The term "Planned" means that a practice has been planned to be implemented and the date it was planned. The term "Applied" means that particular practice has been applied (installed or completed) on that date.