



Cape Cod Cranberry Growers' Association

GROWER ADVISORY

Federal Clean Water Act

Cranberry Production Practices and the Federal Clean Water Act

Section 404 of the Federal Clean Water Act regulates activities that involve the discharge of dredged or fill material into wetlands and other waters. Proposed work that requires a Section 404 permit, which is issued by the United States Army Corps of Engineers, also triggers the need for a Section 401 Water Quality Certificate from the state.

This grower advisory discusses cranberry bog management practices that are either **unregulated** (and therefore not covered by the Clean Water Act) or **exempt** from the need to obtain a permit under Section 404 of the Clean Water Act.

- **Unregulated activities** are those which do not involve filling (discharges of dredged or fill material) in wetlands and other waters – primarily activities occurring on upland.
- **Exempt activities** pertain to ongoing, established cranberry operations and do involve some filling in wetlands or other waters but do not require a permit as long as they meet certain requirements.

A permit will be required for an otherwise exempt activity if the activity would convert wetlands or other waters to a new use (e.g., change in wetland type or actual use) where the flow or circulation of the waters would be impaired or their reach reduced.

To be certain about whether a particular activity is exempt or requires a Clean Water Act Section 404 permit, always check with the Army Corps of Engineers before proceeding with any work. For Massachusetts regulations regarding work in wetlands, please see the cranberry grower advisory “Agriculture Regulations of the Wetlands Protection Act.”

Note: **In all cases** the agricultural activity must be conducted in a manner that **prevents erosion and siltation of nearby water bodies and wetlands**.

UNREGULATED ACTIVITIES

Brush Cutting and Tree Clearing

Removal of brush and trees around the perimeter of the bog is necessary for the following reasons: (1) Removal of brush and saplings promotes air movement which helps reduce frost risk. Air movement on the bog also cuts down on fungus growth. (2) Removal of surrounding vegetation that serves as a host for certain insects decreases infestations on the bog and thus reduces insecticide usage. (3) Removal of adjacent woody vegetation helps cut down on herbicide usage by preventing their seeds from blowing onto the bog. (4) A healthy cranberry plant requires abundant sunlight. Close trees prevent this.

Although the area to be kept clear depends upon the slope, the type of vegetation present, and direction of the sun, this area is generally at least 50 feet. (In wetlands, pulling of stumps and roots or mounding, piling, or windrowing of cut trees, shrubs, or other vegetation is prohibited without first obtaining a Corps permit.)

UNREGULATED ACTIVITIES (continued)

Burning

Growers cut brush adjacent to the bogs to improve sunlight and air circulation for their bogs. An efficient method of disposing of the light brush is to burn it on site. Agricultural burning is done primarily during the winter months under damp or snowy conditions to minimize danger to surrounding woodlands.

Bypass Canal Construction in Uplands

Bypass canals are normally used as a temporary diversion when a moving stream bisects a bog area. The canal diverts the stream to the perimeter of the bog area and out of the target area of pesticide applications.

Clearing Land in Preparation for Sand Pits

Periodic sanding of cranberry vines is a most important part of cranberry cultivation. To accomplish this, cranberry growers must either purchase sand or use natural sand deposits on their property. Because the sand deposits are usually located in the hills surrounding the bogs, the trees and brush must be cleared and the topsoil removed for the grower to access the sand.

Fertilizer and Pesticide Application

Fertilizers are applied to cranberry beds to replace nutrients necessary for growth. Fertilization of the bogs begins in early spring and continues until fall. Time and rate of application varies with each individual cranberry bog as growers strive to maximize plant uptake. Fertilizers can be applied aerially with the use of helicopters or on the ground through irrigation systems, rotary spreaders, or motorized vehicles.

Application of pesticides and fungicides are a necessary component of cranberry agriculture to prevent damage to the cranberry plant by various insects and fungi. During the growing season, each grower scouts the cranberry beds for insects and disease. If the insect population reaches a predetermined economic threshold, then the grower decides which chemical is necessary to eliminate the problem. Chemicals are applied to the cranberry bog using chemigation systems, helicopters, and portable spray units.

Herbicides are applied to the bog in the spring as pre-emergent broadcast applications to control weed seeds and as a post-emergent wipe during the summer to control weeds above the vine level.

Flooding and Flood Release

Cranberry growers flood their acreage for three primary reasons. These are: 1) Water harvest in September – November. Water harvesting requires a flood over the bog to assist collection of the fruit and includes a trash flow (use of the flood to float out dead leaves and berries which are skimmed from the water to reduce these sources of rot inoculum). 2) Protection from winter injury during December - March. 3) Enhancement of fruit quality by holding a flood until May – June (called “late water”).

In addition to the above, a small number of growers without irrigation use flooding for frost protection. Flooding can also be used as a cultural practice to reduce insect damage--in some cases it is the only known control.

When flooding the bogs, growers take advantage of portable pumps and/or stationary lift pumps.

UNREGULATED ACTIVITIES (continued)

Gate and Fence Construction in Uplands

Gates are normally built to control access to a bog to minimize vandalism and thefts. Construction and maintenance of these gates is ongoing throughout the year.

General Maintenance of Pumps and Equipment

The irrigation pump is the grower's lifeline between success and failure. This pump must provide water to protect the vines and berries during spring and fall frost times and during the summer heat. Many of the grower's agricultural chemicals and fertilizers are applied by the sprinkler system, powered by either an internal combustion or electric motor. These motors must be able to start on a moment's notice and run without fail for 10-12 hours. Proper maintenance of these units is essential. Growers test and maintain these units on a regular basis.

Equipment is absolutely essential to proper upkeep of a bog. Equipment is used for almost every phase of production, including but not limited to: harvesting, sanding, and ditch cleaning. This equipment is constructed and maintained in buildings adjacent to bogs.

Harvesting

Cranberry harvest takes place once a year from mid-September through early November. Two methods of harvest may be employed: one is the "dry method" which involves using machines that rake the berries off the vines into boxes or bags. Berries are removed from the bog by either bog vehicles or helicopters. The other method, the "wet method," involves flooding the bog with up to a foot of water and using a reel to free the berries from the vines. Berries are corralled and removed from the bog by pump or conveyors. Eighty-five percent or more of the crop is normally wet harvested.

Maintenance and Construction of Buildings in Uplands

Structures to house and protect equipment used for harvest, sanding, and other production related operations are built in uplands near bogs to provide easy and efficient access on and off the bog. General maintenance of the structures includes painting, replacement of damaged wood or foundation, roofing and siding, etc.

Maintenance of Pump Houses

Pump houses are built to protect irrigation and pumping equipment from weather and possible vandalism. The pump house is built next to the water source for efficient access. General upkeep includes painting, reroofing, putting up new siding, and replacing decayed timbers.

Mowing

Grasses on upland areas adjacent to cranberry beds are mowed periodically during the growing season to prevent seeding on the bog and minimize the risk of fire. Underbrush is also cut and removed at different times throughout the year.

UNREGULATED ACTIVITIES (continued)

Pollination

Cranberries are normally in bloom from mid-June to mid-July. To aid in the pollination process, beehives are brought to the bogs during this period. One hive of bees is generally necessary to pollinate one acre of bog. These bees may be brought to the bog on trucks during evening or night hours since that is the time when all bees are in the hive. Once the cranberries are pollinated, bees may be removed and taken to pollinate other crops. Generally, bees are present on cranberry bogs for approximately one month in early summer. Many growers own and rent hives which are kept on the property year-round.

Pruning Vines

Pruning vines removes the woody portion of the cranberry plant. This woody portion produces few uprights which produce berries. Pruning out the undesirable parts enables the plant to put more strength into the producing areas (uprights), thus increasing production. Pruning also eliminates the heavy vine growth that promotes the development of rot in the berries. Pruning takes place during picking for dry harvested bogs and in the spring for wet harvested bogs.

Regulating Water Flow

Many growers utilize water from lakes and ponds and control the dams and flumes which allow water to be released. Most growers hold deeded water rights. Fluctuations in water levels may occur during flooding and flood release associated with harvesting, winter protection, and late water.

Squaring Off Bogs in Uplands

Many bogs in southeastern Massachusetts were constructed in the early 1900's by hand labor. Modern equipment of today, including excavators and bulldozers, allow growers to straighten crooked edges and odd shaped pieces. Straightening edges makes tasks such as harvesting and mowing much more efficient and facilitates better irrigation coverage.

Trapping

Growers are compelled to control the muskrat and other burrowing animals on the cranberry bog. These animals tunnel into the beds, which causes the muck soils to collapse and renders the bed unusable. Muskrats are the number one cause of dike failure. Muskrats are trapped during a specific season regulated by the state Division of Fisheries and Wildlife.

EXEMPT ACTIVITIES

Note that a grower should always confirm an exemption with the Corps prior to starting work. Confirmation of the exemption can be done very quickly in the vast majority of situations.

Cleaning and Dredging Reservoirs and Water Storage Systems

Reservoirs and water storage systems lose holding capacity because of vegetation growth and siltation, reducing the availability of water for frost protection, irrigation, and harvest. These reservoirs and other storage systems must be cleaned and dredged from time to time to maintain water availability. Shallow water supplies need to be cleaned and deepened for a number of reasons, including but not limited to: insure movement of water to pumps or water control structures, control vegetation growth that clogs pump suction, and insure water availability in cold weather when ice forms. (Disposal of dredged material may not occur in wetlands or other waters without a permit.)

Construction of Pump Houses

Pump houses are built to protect irrigation and pumping equipment from weather and vandalism. The pump house is built next to the water source for efficient access. From time to time new pump facilities are constructed to improve water management practices.

Ditch Cleaning

Ditches facilitate flooding and draining of a bog and keep the water table close to the root zone during the growing season. These ditches must be kept free flowing. Ditch cleaning is necessary to keep water moving and to facilitate better drainage. It also helps to prevent certain weeds which grow in excessively wet conditions, thus reducing the amount of herbicide used. Excess flooding at blossom time will devastate a cranberry crop; thus, free running ditches are a necessity. (Disposal of dredged material may not occur in wetlands or other waters without as permit.)

Irrigation System Improvement

A must in the growing of cranberries is the use of underground low volume sprinkler systems. These systems are absolutely essential for applying water for frost protection and irrigation, as well as for applying pesticides and fertilizers.

Many systems that were buried in the bogs during the 60's and 70's are now being replaced or upgraded as new technology develops. The old systems were generally undersized and need to be replaced with larger pipes. The proper spacing and sizing of the modern systems provides uniform distribution of irrigation water usage which leads to a more conservative use of water. These modern systems are usually made of black 'poly' pipe plowed into the ground or trenched in by backhoes as in the case of main feed lines. For most of the year, only the sprinkler heads are seen but, following harvest, these heads are removed and put into place again in early spring.

Interior Dike Construction

Dikes within the bog may be constructed or removed in order to increase water conservation and overall efficiency. (Dike construction is limited to areas within the perimeter dike or the bog.)

EXEMPT ACTIVITIES (continued)

Pond Construction – New or Expansion

The construction of water holding facilities for irrigation and water management is commonly performed by growers. These types of projects may be exempt but are subject to certain conditions and best management practices that are sometimes complicated. Growers are strongly urged to always check with the Corps of Engineers before proceeding with any work.

Rebuilding Dikes and Flumes

Because most cranberry bog dikes were built by hand and are not wide or strong enough to accommodate large vehicles, it becomes necessary to repair and widen them. In addition, animals continuously bore holes in dikes causing structural damage. A combination of wind actions when the bogs are flooded and heavy rains deteriorate the dikes, making graveling and resloping necessary. Properly maintained dikes provide storm water protection. (Any modification to the size or scope of the dike should be in conformance with Natural Resources Conservation Service design specifications.)

Water control flumes were mostly made of wood or concrete in the past. Time and weather have taken their toll to the point where replacement with new metal ones is often necessary. Older flumes were generally small and often must be enlarged to improve water management efficiency. Faulty, badly leaking flumes result in lost water, making flume replacement a water conservation practice.

Road Maintenance

Bog road maintenance is a year-round activity consisting of grading and filling in pot holes, correcting washouts, mowing back brush along roadsides, and pruning tree branches. **(The work is exempt provided that maintenance is done according to Corps BMP's on Page 7.)**

Sanding

Every few years, one half to one inch of sand is applied to cranberry bogs as an essential part of good bog management. Sanding can be applied directly to the vines in the spring or fall, but the most cost-effective time is when sand can be applied on the ice of a winter flooded bog. Most growers use specialized sanders, usually that they have built themselves, or helicopters. Sanding is a cultural practice that stimulates new vine growth, suppresses insects, improves drainage of surface water, and helps to hasten the breakdown of the trash layer making nutrients more available.

Stripping and Replanting of Active Bogs

Many active (currently harvested or managed) cranberry bogs in southeastern Massachusetts were built in the early 1900's. At that time technology and machinery did not allow for the advanced design, precision construction, and leveling available with today's equipment.

A bog is stripped and replanted for the following reasons: 1) The bog is out-of-grade, requiring excessive quantities of water to flood. 2) The vine variety is low yielding and prone to rot. 3) Weeds such as briars, poison ivy, or bushes have overtaken the vines on poorly maintained bogs.

Upgrading Drainage System within a Bog

Changes in drainage within the bog are sometimes necessary to cut down on disease in the cranberry bogs. Maintaining existing ditches and building new lateral ditches helps to improve drainage. Adding crushed stones or installing drainage tiles may be used for better drainage after filling in ditches.

Corps of Engineers

BEST MANAGEMENT PRACTICES (BMP's)

1. Permanent roads (for farming of forestry activities), temporary access roads (for mining, forestry, or farm purposes) and skid trails (for logging) in waters of the United States shall be held to the minimum feasible number, width, and total length consistent with the purpose of specific farming, silvicultural or mining operations, and local topographic and climatic conditions.
2. All roads, temporary or permanent, shall be located sufficiently far from streams or other water bodies (except for portions of such roads which must cross water bodies) to minimize discharges of dredged or fill material into waters of the United States.
3. The road shall be bridged, culverted, or otherwise designed to prevent the restriction of expected flood flows.
4. The fill shall be properly stabilized and maintained following construction to prevent erosion.
5. Discharges of dredged or fill material into waters of the United States to construct a road fill shall be made in a manner that minimizes the encroachment of trucks, tractors, bulldozers, or other heavy equipment within waters of the United States (including adjacent wetlands) that lie outside the lateral boundaries of the fill itself.
6. In designing, constructing, and maintaining roads, vegetative disturbance in the waters of the United States shall be kept to a minimum.
7. The design, construction, and maintenance of the road crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body.
8. Borrow material shall be taken from upland sources whenever feasible.
9. The discharge shall not take, or jeopardize the continued existence of, a threatened or endangered species as defined under the Endangered Species Act, or adversely modify or destroy the critical habitat of such species.
10. Discharges into breeding and nesting areas for migratory waterfowl, spawning areas, and wetlands shall be avoided if practical alternatives exist.
11. The discharge shall not be located in the proximity of a public water supply intake.
12. The discharge shall not occur in areas of concentrated shellfish production.
13. The discharge shall not occur in a component of the National Wild and Scenic River System.
14. The discharge of material shall consist of suitable material free from toxic pollutants in toxic amounts.
15. All temporary fills shall be removed in their entirety and the area restored to its original elevation.

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The information in this guide is provided by the Cape Cod Cranberry Growers' Association as a service to its members. The information represents our interpretation of the state requirements and by no means is intended to act as a substitute for reading and following the specific regulatory requirements.

The Clean Water Act may be viewed in its entirety by consulting the
Federal Water Pollution Control Act
33 U.S.C. 1251 et seq.

Note: An activity that is exempt from the Clean Water Act may be subject to regulation under other state or federal laws.

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