

Environmental Assessment Registration

Name of Undertaking: Mega Healthy Cranberry Farm

PROPONENT:

(i) Mega Healthy Cranberry farm

(ii) 13 Crewes Rd, Glovertown, NL A0G-2L0

(iii) Nancy Sweetapple, 13 Crewes Rd, Glovertown, NL, A0G-2L0 (709) 533-2492 home

(iv) Mr. Tony Mulrooney, 13 Crewes Rd, Glovertown, NL, A0G-2L0 (709) 533-2492 home (709) 424-1061 cell

THE UNDERTAKING:

(i) Nature of the Undertaking: Mega Healthy Cranberry Farm is presently seeking an Agriculture Crown Land Lease to develop and operate a cranberry farm in the Glovertown area.

(ii) Purpose / Rationale / Need for the Undertaking: We feel Newfoundland and Labrador is offering a significant opportunity for the development of a first class cranberry farm. The Glovertown area has a climate very suitable for cranberry production. This farm would contribute to the cranberry industry and help increase the overall yield of the berry which would be beneficial for future secondary processing on the island.

DESCRIPTION OF THE UNDERTAKING:

(i) Geographical Location: The proposed site, 200 acres(80.9 hectares), is located off of the TCH, east of the Terra Nova River. A 1:50,000 scale location map and 1:24,000 scale map of the site is attached to

this registration.

(ii) Physical Features: The bog was previously dredged and farmed. The ground vegetation consists of sphagnum moss, caribou moss, grasses and kalmia. There are no flashets or rock outcrops within the area proposed for development. The site is located between Terra Nova river and a water run off from the hills on the east of the fields. The area of this proposed site is approximately 200 acres(80.9 hectares). (We hope to develop the largest Cranberry farm in Newfoundland over the years)

No construction of a access road will be needed for this site. Minor work to repair the road that is currently on the farm.

(iii) Construction: The construction of the site will be subject to a detailed engineering design by an appropriate engineering consultant. The site will be a on going construction site for the development of the largest Cranberry farm in Newfoundland. The goal is to begin production on 6 acres(2.4 hectares) within a two year period. Once operators are more familiar with construction of the beds, we feel more beds and land will be developed in a shorter time frame. The actual size of the fields will be determined by engineering advice.

The Construction will consist of:

- Heavy equipment will be used to conduct preliminary ditching in the proposed berm locations and discharge areas; fields are developed by removing top layer of vegetation and peat to be used to form berms around the fields;
- Cranberry bed development, consisting of removing a layer of peat to level the bed, with spoil peat used for the berm construction measuring two metres (6.5') high and five metres (16') wide;
- Sand source for this farm will be dug up and removed from the back portion of the farm. Soil samples and mineral resource maps indicate a excellent sand supply which will be needed for farm operations within the lease vicinity. This sand will be dug up during the digging out and construction of the sediment and irrigation ponds and used for the Cranberry beds (This resource is a huge benifit to eliminate cost of transporting soil as well as a excellent environmental benifit by reducing Co2 in the atmosphere.)
- Ditching between the bed and berm;
- Construction of irrigation pond for water storage and construction of sediment pond for holding discharge water

- Installation of water control structures (sheet metal sluices);

Water Use

Cranberry vines need approximately an inch of water a week to grow. Water will be used to protect cranberries from frost and hot weather in summer. As a general rule, each acre of cranberries will use seven to ten feet of water to meet all production, harvesting and flooding needs. There are two main ways the farm will bring water onto the bogs – through sprinkler systems and through flooding. 10 acre feet of water per acre per year.

Sprinkler Systems

Sprinkler irrigation will be used to supplement soil moisture, protect the buds from spring frosts and the berries from fall frosts and it will cool the plants during intense summer heat. The sprinkler system will have two vital operations on the cranberry bogs - Irrigation and Frost Protection.

Irrigation

Cranberries can require 0.20-0.25 inches (.05-.06 cm) of water per acre per day during the hottest, driest and windiest weather. The standard recommendation is for vines to receive an inch of water per week from either rain, capillary action from groundwater, irrigation or some combination of these. Best Management Practices recommend irrigating in the early morning, so as not to extend the time the plants are naturally wet. This practice also minimizes loss from evaporation, run-off and drift, which can amount to 30 percent of water that comes out of the nozzle.

Frost Protection

Water will be applied to prevent damage to buds and berries when they are sensitive to temperatures below freezing. There are two times of the year when we will be worried about frost – in the spring and in the fall. It is necessary to apply at least 0.10 inch (0.25cm) of water per acre per hour to provide basic frost protection. This will protect the plants to about 24 degrees F (minus -4 celsius) under calm conditions.

Flooding

The other practice the farm will use with water management on the bog is flooding. Flooding as a management tool will be used to protect the plants from the cold, drying winds of winter, to harvest and remove fallen leaves and to control pests.

Winter Flood

Newfoundland weather can be unpredictable and harsh. Cranberry vines may be injured or killed by severe winter weather. This injury, winterkill, will be prevented by protecting the vines with a winter flood. The winter flood will be applied at the best time frame depending on the forecast and remains on the bog as long as winterkill conditions are present or forecasted.

Late Water

Another flooding technique that maybe used is known as late water. Late water floods have been used since the 1940's and have been used to protect the bog from spring frost and to provide some pest control. In modern cranberry production, holding late water refers to the practice of withdrawing the

winter flood then re-flooding the bog on a latter date for one month.

Harvest Flood

The harvest flood will be used to cultivate the berries from the farm. Flood harvesting will occur after the berries are well colored and the flood waters have lost their summer heat. The bogs are flooded with up to one foot (12 inches) of water. In order to conserve the farm water, harvest is managed so the water is reused to harvest as many sections of bog as possible before the water is released from the system. Flood water is recycled in the cranberry bog system, passed from bed to bed. Further details below.

Water supply will be drawn from the irrigation pond which will be dug out from the existing peat bog on the upper back portion of the farm in the confines of the property boundaries. The irrigation pond will rely on the natural water table that exists and is plentiful on the property. The size and depth of the irrigation pond will depend on the development of the cranberry fields with reference to the number of beds and will increase as the cranberry fields increase. Water will be drawn from the irrigation pond by means of gravity flow with a sluice. Cranberry beds will be developed at a lower elevation than the irrigation pond. The engineering firm will design a network to adequately and safely flow the water from the irrigation pond to flood the Cranberry fields. HDPE and a diesel pump will be a back up system to irrigate the cranberry beds. Presently there are no plans or intentions on drawing water from any streams or water sources.

Irrigation operations usually allow waste water to free flow through the site. During harvest, one cranberry bed is flooded at a time with subsequent beds being flooded using the previously used flood water and topped up if necessary. Water draw down is significant during the winter season as all fields are flooded to protect from frost damage. With all the water usage operations there is a need to discharge excess water. Excess water is discharged through a series of ditching around each of the cranberry beds and control structures at entry and exit locations for each bed. Hence, the amount of discharge is managed. The flood water is then drained to the next field through a controlled drainage system for similar harvesting or drained into the sediment pond to be used later as required.

Silt fences will be used to mitigate sediment discharge during the construction phase.

Settlement or tail water pond will be constructed and used at the low end of the peat bog to allow for gravity flow. The tail water recovery pond will be outfitted with a spill way structure to allow for the release of the water in a less damaging way.

- Installation of drainage tile in the bed;
- Placement and leveling of approximately 20 cm of sand on the constructed cranberry beds.

****The layout of the entire cranberry farm operations and structures depends entirely on the topographical survey in relation to bog depth, elevation etc, which has not yet been conducted. ****

Sustainable Agriculture will be obtained by conducting appropriate agricultural operational procedures and meeting appropriate environmental standards.

Machinery diesel fuel and lubricants are potential sources of pollutants during the construction period. All Machinery and heavy equipment will be refueled and lubricated on mineral soil - off the construction site. Regulations will be used for the disposal of refuse and human waste. Buffers will be maintained between the development and water courses during (and after) the construction. The water courses are shown on the attached map. The buffers will be a minimum of 30 metres wide.

The phased development of this project will be completed over a five year period as follows:

Year 1 - Soil Samples, and all required surveys, soil depth and permits

Year 2 - 3 acre development or depending on engineering plans. Man made pond, water control structures.

Year 3 - 3 acre development

Year 4 - 3 acre development

year 5 - 3 acre development

(iv) Operations:

Mega Healthy Cranberry Farm is truly committed in producing a high quality cranberry product and developing and operating a world class environmental operation. The use of green technologies such as solar and wind generation for powering future buildings will be considered.

The proposed cranberry site is located on a bog located between a river and a shallow water run off from the adjacent hills. There maybe a possibility of water fowl using the near by bodies of water, so we will be taking every precaution in observing the wildlife and water fowl and commencing operations to not disturb or impact the well being of wildlife. The farm will not interfere with waterfowl feeding, nesting patterns, or with the hunting. We will use techniques which have been effective in controlling wildlife if in the future the wildlife is to jepordize the crop yields and potentially damage the fields. Proper Departments will be contacted to help control such actions if need be. Noise makers,

stimuli techniques, such as balloons, Mylar scare tape and plastic flags have proven useful.

The cranberry harvest consists of field by field flooding with approximately 30-45cm of water. Fields are flooded individually to reduce large volumes of discharge. While flooded, a cranberry beater will dislodge the cranberries from the vines underwater allowing them to float to the surface, where they are gathered by a boom and loaded into containers via a conveyor system. Once the harvesting of a field is completed, flood water discharge will be diverted into another field for harvesting or through maintained ditches and routed to a sediment pond, which will contain any potential contaminants, and act as a supplementary water source if required.

Farm operational procedures will be consistent with appropriate environmental standards for sustainable agriculture. Cranberry farms can be maintained for over 100 years.

Common agricultural chemicals, used at minimal levels on cranberry operations within the Province, include the following registered products:

Herbicides: Devrinol, Callisto, Roundup

Insecticides: Sevin, Diazinon

Fungicides: Bravo, Furbon

Fertilizers: 17 17 17/50lbs/acre, 4600/10lbs/acre

Mega Healthy Cranberry Farm Pollinator Protection Plan (In respect to our Bees and pollinators)

The importance of monitoring, assessing and making sure the farm takes every precaution necessary for the well being and safety of pollinators is a major concern and this is why we have put in place a plan to monitor such concerns. Field manager Tony Mulrooney is a Natural Resource technician and has previously done research with pollinators on Blueberry fields and have worked hand in hand with Agriculture Canada in data collection and has assisted many entomologist under the direction of Dixon, Peggy, PhD.

The field manager for Mega Healthy Cranberry Farm will be monitoring and conducting research to make sure the pollinators are not harmed during site development and on farm operations.

Cranberry requires pollination (pollen transfer from male to female flower parts) to maximize yields. Bees will be the most important pollinators for our cranberry farm. A bee has special structures on its body to carry pollen and one bee may visit thousands of flowers, and in the process carry pollen from flower to flower. It is very important that we take every necessary step possible to conserve and

enhance a diverse assemblage of pollinators on our cranberry farm and always practice best management practices in relationship to farm development and operational practices. This will help to assure the berries get adequate pollination carried out by many different species. Many species of bees are associated with bloom on a Cranberry field. Field manager will be monitoring and identifying species in the surrounding areas as well as on berry fields. The honey bee is a species introduced nearly 400 years ago by European settlers. Mega Healthy Berry farm will be looking into developing our own Honey bee operation in the future. We will manage our hives, and use the pollinators on our Cranberry fields as well as Blueberry fields in the area.

Pollinator data Practices

Each bed will be given a number for data purposes. During the bloom each bed will be walked and data collected to assess pollinator numbers. Level of bee activity during bloom will possibly vary depending on bed location. Pollinating bees should be in the range of 1-2 individuals per minute on an average bed. Isolated beds surrounded by varied land uses may have a high and diverse assemblage of pollinators. Native bee counts (e.g. bumble bees) may be lowest on beds that are flooded by honey bees or on beds that are surrounded by extensive tracts of cranberry bogs or forest.

Data will be collected on the diversity of native bees on each bed and other types of bees. On sunny days we will be looking for the (yellow blobs of pollen on the legs and abdomen of the pollinators). This will include several species of bumble bees (*Bombus*), which all have hairy bodies with various black and yellow patterns. All bumble bee species are social, meaning that there is a queen and workers that live together in a colony and share the labor of its maintenance. We feel the native Bumble bees will be the most important native pollinators for our cranberry plants. They are several times more efficient at pollinating cranberry flowers than honey bees and may start to forage very early in the morning and continue towards dusk. Depending on species, bumble bees nest at varied sites, usually cavities, for example, in abandoned rodent burrows, or in slash piles, stone walls, vegetative debris, or matted grass. With this in mind, we will do everything possible to not disturb surrounding areas that could be possible nesting sites and will help provide ideal nesting sites for the bees. A mated bumble bee queen will overwinter and emerges in early spring. These large (ca. ¾ inch long) robust females can often be seen flying low to ground in search of next sites where rears a first worker brood. This new brood of workers (ca. ½ inch or smaller) takes care of the nest and collects food for other developing immatures in the nest. After the colony is established and grown, new queens and males are produced, some as early as June and through late summer.

It has been observed that most common species of native bees even though being considerably smaller than honey bees, are highly efficient pollinators that forage under poor weather conditions. Newfoundland has been known to have poor weather conditions so the hardy native bumble bee of

Newfoundland is a very important insect for pollination. Pollinators may be social or solitary, but most are solitary. In a solitary species, a female constructs and provisions a nest by herself; she typically produces 20-30 offspring. Most solitary bees are active for only a few weeks and have only one generation per year.

Monitoring of species

The different species may be difficult to tell apart.

Mining bees (Family Andrenidae) are common in cranberry habitats and are ground-nesting bees. They carry pollen on the sides of the abdomen and on their hind legs. They create tunnels in the ground with entry holes that are $\frac{1}{4}$ " or smaller; the entry holes may have mounds of excavated sandy soil around them and be easily confused with anthills. The burrows are located in areas of well-drained, exposed soil. The different species range from small to medium-sized. Some of the larger and more common *Andrena* species are about the size of honey bees, and although they have furry thoraxes (central part of the body), the backside of the abdomen is shiny black and much less fuzzy than a honey bee. Others are considerably smaller and may be black, striped, or metallic green.

Sweat bees (Family Halictidae) are also a common group of small native bees found on bogs. Most species nest in the ground and most are solitary. Large numbers may create nests close together. They are very diverse, are often small, and can be black, brown, striped, or metallic-colored. They carry pollen on their hind legs.

Leafcutter bees (Family Megachilidae) are also found and are medium-sized native bees. Pollen is carried on the underside of the abdomen.

Making sure a native bee habitat surrounds a bed

Mega Healthy Cranberry farm will be observing and introducing plant species surrounding the beds. To enhance populations of wild pollinators, the cranberry agroecosystem should provide pollen and nectar in spring and summer, nest-site areas, and protection from insecticides. The entire landscape, not only the cranberry beds, but all of the surrounding will be assessed and new species of plants such as willows, cherry trees etc will be planted. Bees move extensively through these areas, so that resources may be somewhat distant from the cranberry bed: larger species like bumble bees may travel $\frac{1}{2}$ - 1 mile, while smaller bees such as the mining and sweat bees may move only $\frac{1}{4}$ mile or less while foraging. Pollen and nectar-rich wild flowering plants in the open edges around cranberry beds and in the habitat surrounding the bog will be important in maintaining abundant bee populations. The farm land currently has a large abundance of vegetation for a healthy habitat for pollinators. We will observe plants where bees are foraging, for example, clover, and different flowering plants throughout the season. Plants that are common pre-cranberry-bloom are bunchberry (*Cornus canadensis*), cherry (*Prunus*), blueberry, dangleberry, dangleberry, *Viburnum*, maple, birch, willow, and alder. After bloom,

dewberry, aster, goldenrod, fireweed, sweet pepperbush (*Clethra alnifolia*), meadowsweet (*Spirea*), and buttonbush (*Cephalanthus occidentalis*) produce flowers that are visited by foraging bees. Habitat that might be favorable should be noted, for example, edges of ponds and streams, hedgerows, fence areas, road edges, standing dead trees, or bare areas. Bumble bees often nest in at the interface of a grassy area and woods, particularly in grassy thickets. Nesting areas for the many of the solitary bee species are well-drained or sloping ground sites that are free of plants or have patchy areas of bare ground. Others nest in dead/dying trees or rotting logs, particularly in abandoned beetle tunnels.

Protecting the Good Habitat

Once we have observed and have determined that good bee habitat exists, we will take measures to protect it. We will leave dead trees standing or piles of tree trunks in place. Allow areas of grasses along edges to create matted areas. Do not disturb patchy bare areas where there are nesting holes. Avoid mowing blooming plants, for example, clover or dandelions that are in grassy areas around the bog or stands of fall goldenrod that are distant enough to limit risk of invading the cranberry bed. Or, consider leaving strips of flowers or even mowing later in the season to allow bee-plants to flower.

Enhancing flowering plants

Where ever the floral resources are poor in the area of the bog (before and after cranberry bloom), we will provide other areas of flowering plants. Blocks of flowers will be seeded. The plantings will be seeded and planted close to nesting habitats. We will choose a large variety of species that bloom from very early in the spring to late fall. The continuous sequence of flower sources around the bog is probably one of the most important ways to support bumble bee populations since they are active all season and are unable to store food reserves for more that a few days. A diverse selection allows for bees with different preferences to be supported. Species selection will be taken into account to make sure the bloom do not bloom concurrently with cranberry and draw pollinators away from the bog.

Creating Bee Zones

Strips of land around the cranberry bed will be protected by a double row of evergreens (windbreak) or by a hill or hummock could support good bee habitat. Most of the native bees nest in the ground by burrowing tunnels down to chambers. Thus, clearing vegetation (e.g., a 9'x9' area on a sunny slope or on flat bare ground) may provide nesting sites. Clearing of sites should occur only in the (early) spring (vegetation would provide insulation for overwintering bees).

Pesticide use

We will take every precaution necessary to protect bees and pollinators from the use of pesticides. Most insecticides are deadly to bees or may have sublethal effects. The insecticides used in cranberry vary enormously in toxicity to bees, ranging from highly toxic to less toxic. When bloom is on the bed we will use best practices to choose the less toxic herbicides to control the weeds and the insecticides with the least toxicity to bees. We will use best management practices to spray after dark or the best time when pollinators are less active; risk is reduced once the spray dries. Wind speed will be monitored to make sure spray drift does not contaminate flowering weeds adjacent to the bed.

Mega Healthy Berry farm will be taking all necessary precautions and will be going above and beyond to ensure a healthy environment is kept for the well being of all species and surrounding habitats.

We especially recognize the important role of native pollinators and the potential risks involved in endangering the well being of pollinators. Small changes in the habitat may conserve a bees number and diversity. Farming and producing healthy food for our worlds population is a very important responsibility society and farmers have. It is just as important that we do so by safe environmental farm practices.

(v) Occupations:

1. General Manager Full time.
2. Field manager/Grower/Pesticide Applicator Full time.
3. Labourers Part time.
4. Equipment operator Full time.
5. Electrician.(Contractor) Part time.
6. Mechanic. (Contractor) Part time.

* Will include other positions as required

(vi) Project Related Documents:

Crown Land Application Number: 150754 in progress

Approval of the Undertaking:

Following is a list of main permits, licenses and approvals required for this project.

Approval/Certification/License/Permit Authority

Environmental Registration (Municipal Affairs and Environment)

Environmental Assessment Approval (Municipal Affairs and Environment)

Land Title (Fisheries and Lands Resources)

Water Use management (Municipal Affairs and Environment) (Water Resource Management)

Fuel Storage & Handling (Service NL)

Road Access Approval (Service NL)

Pesticides (applicator/Operator) (Municipal Affairs and Environment)

Permit to Alter a Body of Water (Municipal Affairs and Environment)

Workers Health and Safety Compensation (Service NL) Workplace Health Safety and Compensation Commission

Schedule:

The earliest construction start date is Sept 2017, latest being May 2018.

Funding:

No application for funding at this time.

Date

Nancy Sweetapple (Owner)