

Buffer Zone Restoration Plan for

For a property located at

19 King George Drive
Boxford, MA 01930

Prepared for:

Michael Cronin
19 King George Drive
Boxford, MA

Prepared by:

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129 Route 125
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July 9, 2019
(Revised July 19, 2019)

OVERVIEW:

The Boxford Conservation Commission issued an Enforcement Order (EO) to Mr. Cronin on May 30, 2019 for grading, filling and removal of vegetation within the 100-foot buffer to Bordering Vegetated Wetland (BVW). According to Mr. Cronin this included three Red Maple (*Acer rubrum*) trees and two White Pines (*Pinus strobus*). One of the White Pines had a hollow trunk and clearly posed a threat to the dwelling. The house was built in the mid 1980's and the lawn area and landscaping has been mostly maintained as it was created then. Some neglected areas had developed stands of Japanese knotweed (*Polygonum cuspidatum*) most of which was also removed by Mr. Cronin's contractor. On June 3, 2019 I was retained by Mr. Cronin to help with restoring a portion of the buffer area that was illegally disturbed (EO #5). On June 6, 2019 I attended the Conservation Commission meeting with Mr. Cronin where we discussed the extent of the violation and essential elements of the restoration effort (EO #1). I explained that I would be preparing a draft restoration plan based on our discussion. Mr. Povenmire was not present at the meeting.

Mr. Cronin also had consulted with the Boxford DPW Superintendant and the Building Inspector previous to our attending the meeting on June 6th (EO #2). Erosion control in the form of straw wattles and silt fence was installed on June 8 and 9 (EO #3) and the disturbed area in the buffer zone was seeded with grass seed (EO #4).

On June 16, 2019 I stopped by the Conservation Commission office to discuss the draft restoration plan that I had sent via email as well as the soil stabilization efforts with Mr. Povenmire. We then visited the property. Mr. Povenmire observed the erosion control that was in place and made some suggestions for improvement. He also noted that the grass seed had significantly germinated in the effected buffer zone. He was very helpful in defining the no-disturb zone that would need to be established and suggested that we should triple the number of shrubs that I had put in the draft restoration plan. I recall Mr. Povenmire saying that we "were probably 50% there" with regard to the Enforcement Order requirements. I discussed these action items with Mr. Cronin who then went out and purchased eleven (11) High Bush Blueberry shrubs and planted them in the proposed no-disturb zone. He also made improvements to the erosion controls.

I was not able to accompany Mr. Cronin at the Conservation Commission meeting on June 20th.. Subsequent to that meeting a revised Enforcement Order was issued. The revisions are as follows:

5) No later than July 11, 2019, submit a mitigation plan prepared by a competent professional for the re-vegetation of the 25' no-disturb wetland buffer area, including herbaceous, shrub, understory and canopy species, and with permanent markers for the buffer zone boundary. The mitigation plan shall include a two year monitoring plan for planted vegetation and a monitoring plan for erosion control.

6) No later than July 11, have a mitigation site plan prepared by a professional surveyor or engineer meeting the plan requirements set forth at Town Code CH. 375-5 (see attached), including wetland boundaries as flagged by a competent wetland scientist and the stamp and signature of a professional surveyor or engineer. The site plan shall show the placement of all proposed plantings and erosion control. 7) The homeowner shall attend the Commission meeting scheduled for July 11, 2019.

I have flagged the boundaries of the wetland resources on the property for inclusion on this plan. I have also measured the area as defined by Mr. Povenmire. This area has been refined as a result of the survey plan prepared by Mr. Bowden. The area to be restored as a no-disturb zone is 1,049 square feet in size. The Plan accompanies this revised restoration plan. We understand that the "Permanent Markers" for the no-disturb zone are to be 4"x4"x4" Cedar posts with medallions attached.

Proposed restoration:

There are already several trees in the proposed no-disturb zone that will provide appropriate shade for the herbaceous plantings that are proposed. The trees will be located on the survey plan prepared by Mr. Bowden. In addition to the eleven (11) Highbush blueberry shrubs already planted we will be planting four (5) Spicebush (*Lindera benzoin*) this species is already present in the adjoining buffer zone and are shade tolerant. The resulting density will be one shrub every 8-feet on center. This is the shrub density recommended by MassDEP guidance for wetland restoration areas. We are also proposing the establish colonies of the following herbaceous plants: Wild geraniums (*Geranium maculatum*), Bloodroot (*Sanguinaria canadensis*), Bee-Balm (*Monarda didyma*), Enchanters nightshade (*Circaea quadrisculata*) and Hay Scented fern (*Dennstaedtia punctilobula*). A combination of bare-root and seeds will be utilized to establish these herbaceous plant colonies.

The following are detailed descriptions of these species:

Bee Balm

Monarda fistulosa

Description:

This herbaceous perennial plant is 2-3' tall, branching occasionally. The central stem is 4-angled and slightly hairy. The opposite leaves are up to 5" long and 2" across. They are ovate or ovate-cordate, sparingly hairy, and serrated along the margins. The upper surface of each leaf is usually dark green; sometimes the surface of the upper leaves is tinted purple or red. At the base of each leaf, there is a slender petiole up to 1" long that is more or less hairy. The central stem and major side stems each terminate in a single head of flowers. Each flowerhead spans 3-4" across and has several leaf-like bracts underneath. These bracts are often tinted red or purple. The lower bracts are ovate or lanceolate, while the upper bracts are shorter and more linear in shape. Each flowerhead has a ring of several flowers in bloom at the same time. Each flower is about 1½" long, consisting of a 2-lipped red corolla and a tubular calyx. The upper lip of the corolla is semi-erect and tubular in shape, while the narrow lower lip arches downward. The outer surface of the upper lip is often finely pubescent, but it is not conspicuously hairy. The tubular calyx is light green to reddish green and has several veins along its length; there are 5 teeth along its outer rim. Two stamens and a style are strongly exerted from the upper lip of the corolla. The slender style is cleft at its tip. The blooming period occurs during the summer and lasts about 1-2 months. There is no floral scent, although the foliage is aromatic. The flowers are replaced by ovoid nutlets. The root system produces abundant rhizomes. This plant often forms clonal colonies..



Habitat:

The preference is partial sun, moist to mesic conditions, and fertile loamy soil. The foliage is often discolored by powdery mildew, although there are disease-resistant cultivars. During hot dry weather, there is a tendency for the lower leaves to fall off the stems. Bee Balm is an easy plant to grow, but keeping it in good condition throughout the summer is rather difficult.

Wildlife Value:

The nectar of the flowers attracts hummingbirds, Swallowtail butterflies, and probably bumblebees. The caterpillars of various moths feed on *Monarda spp.*, including *Agriopodes teratophora* (The Gray Marvel), *Sphinx eremitus* (Hermit Sphinx), and *Pyrausta orphisalis* (Pyralid Moth sp.). The aromatic foliage of Bee Balm is disagreeable to mammalian herbivores and it is rarely eaten.

Bloodroot

Sanguinaria canadensis

Description:

Bloodroot grows from 20 to 50 cm (8 to 20 in) tall. It has one large basal leaf, up to 25 cm (10 in) across, with five to seven lobes. The leaves and flowers sprout from a reddish rhizome with bright orange sap that grows at or slightly below the soil surface. The color of the sap is the reason for the genus name *Sanguinaria*, from Latin *sanguinari* "bloody". The rhizomes grow longer each year, and branch to form colonies. Plants start to bloom before the foliage unfolds in early spring. After blooming the leaves unfurl to their full size and go summer dormant in mid to late summer, later than some other spring ephemerals.



The flowers bloom from March to May depending on the region and weather. They have 8–12 delicate white petals, many yellow stamens, and two sepals below the petals, which fall off after the flowers open. Each flower stem is clasped by a leaf as it emerges from the ground. The flowers open when they are in sunlight. They are pollinated by small bees and flies. Seeds develop in green pods 4 to 6 cm (1 ½ to 2 ¼ in) long, and ripen before the foliage goes dormant. The seeds are round and black to orange-red when ripe, and have white elaiosomes, which are eaten by ants.

Habitat:

Bloodroot is native to eastern North America from Nova Scotia, Canada southward to Florida. *Sanguinaria canadensis* plants are found growing in moist to dry woods and thickets, often on floodplains and near shores or streams on slopes. They grow less frequently in clearings and meadows or on dunes, and are rarely found in disturbed sites. Deer will feed on the plants in early spring.

Wildlife Value:

Bloodroot is one of many plants whose seeds are spread by ants. The seeds have a fleshy organ called an elaiosome that attracts ants. The ants take the seeds to their nest, where they eat the elaiosomes, and put the seeds in their nest debris, where they are protected until they germinate. The flowers produce pollen, but no nectar. Various bees and flies visit the flowers looking in vain for nectar. Some bees come to collect pollen, including mining bees (*Andrena*), which are the most effective pollinators.

The bitter and toxic leaves and rhizomes are not often eaten by mammalian herbivores.

Enchanters Nightshade

Circaea lutetiana

Description:

Circaea lutetiana is a perennial herbaceous plant with opposite, simple leaves, on slender, green stems. The flowers are white, borne in summer. It grows 20 cm to 60 cm, rarely up to 75 centimeters high.

The leaves are rounded or slightly notched at the base, they narrow gradually to the pointed tip and are not strongly toothed, but have sinuate edges. The leaf stalks are equally hairy all round.

The flower has 2 notched petals, 2 stamens and a 2-lobed stigma. The open flowers are well spaced along the stalk and there are no bracts at base of individual flower stalks. The fruit consists of 2 equal cells, and usually sets seed. The flower stalks become angled downwards before fruiting. The fruit is a small bur 3.5-5mm which aids the plant's dispersal via zoochory.

In winter the aerial parts die off leaving an underground rhizome. *Circaea alpina* will hybridize with *Circaea lutetiana* producing sterile offspring that persists in vegetative colonies.

Habitat:

Enchanter's Nightshade is usually found in a woodland setting where it receives dappled sunlight or medium shade. Moisture conditions can range from moist to medium dry. Soils are usually richer. Numerous plants can occur in a given area of a garden as the plant spreads by creeping rhizomatous rootstocks in addition to the seeds. The root system also has a short taproot.

Wildlife Value:

The nectar and pollen of the flowers attract small bees, including Halictid bees (*Lasioglossum spp.*) and little carpenter bees (*Ceratina spp.*); they are also visited by Syrphid flies and bee flies (Bombyliidae). The caterpillars of a moth, *Mompha terminella* (Enchanter's Cosmet), are blotch leaf-miners. Birds and mammals help to distribute the seeds, as the small bur-like fruits can cling to feathers and fur; these fruits can cling to the clothing of humans as well. Deer occasionally browse on the foliage of Enchanter's Nightshade.



Hay Scented Fern

Dennstaedtia punctilobula

Description:

This perennial fern is 1-3' tall, forming loose clusters of deciduous leaves that are erect to ascending. The slender petioles are 4-10" long and yellowish green, tan, or brown; sometimes they are softly pubescent or sparsely scaly. The compound leaves are light green or yellowish green, mostly bipinnate-pinnatifid, and about one-third as wide as long. In outline, the compound leaves are lanceolate to lanceolate-ovate; each compound leaf has 15-30 pairs of leaflets along its rachis (central stalk), terminating in a slender pinnatifid tip. The lowermost leaflets are only slightly shorter than the middle leaflets. Individual leaflets are linear-lanceolate to narrowly lanceolate in outline; they are mostly pinnate-pinnatifid with 10-20 pairs of subleaflets, becoming slender and pinnatifid toward their tips.



Habitat:

Hay-scented Ferns are relatively flexible in terms of site requirements. They do best in well-drained, acidic soil and full sun, but can also grow in partial shade and wetter soils. In terms of habitat, they are found in forest edges and canopy openings, along the sides of trails and roads, on hillsides, stream banks, and rocky slopes, and in meadows and old fields. Hay-scented Ferns are quick to colonize logged-over sites, sometimes inhibiting forest regeneration by crowding out tree seedlings.

Wildlife Value:

The Hay-scented Fern's ecological value to wildlife appears to be quite low. Like most ferns, the Hay-scented Fern does not represent a major food source, although a few insects reportedly feed on the its spore-bearing structures. Despite the abundance of these ferns, White-tailed Deer apparently do not relish them, in part because the foliage is covered with tiny hairs the exude a sticky substance. This allows Hay-scented Ferns to form dense colonies in the forest understory, in some cases shading out tree seedlings. Large colonies of Hay-scented Ferns may provide protective cover for some species.

High Bush Blueberry

Vaccinium corybosum

Description:

This blueberry species is a 6-12 ft. high and wide, deciduous shrub with numerous upright stems and twiggy branches forming a rounded, compact outline. Reddish-green spring leaves turn blue-green in summer and red, yellow, orange and purple in fall. White or pink, bell-shaped flowers in drooping clusters are followed by edible, blue fruit. A multi-stemmed shrub with green, or often red, twigs and terminal clusters of small, urn-shaped white flowers.



Habitat:

Highbush blueberry occupies numerous habitats but seldom occurs as community dominant. Two habitats where it occurs as a dominant or codominant are open swamps or bogs and high-elevation balds.

In the Appalachian Oak and Northern Hardwood Regions highbush-blueberry-dominated thickets are common on peatlands with strong water-level fluctuations and weakly minerotrophic water. Thickets may also occur on a quaking mat. Codominants include swamp azalea (*Rhododendron viscosum*), downy blueberry (*V. atrococcum*), mountain holly (*Nemopanthus mucronata*), black huckleberry (*Gaylussacia baccata*), cinnamon fern (*Osmunda cinnamomea*), casandra (*Chamaedaphne calyculata*), black chokeberry (*Aronia melanocarpa*), and sheep laurel (*Kalmia angustifolia*).

Wildlife Value:

These plants are very important to wildlife: their berries are relished by songbirds, game birds, bear, and small mammals; the twigs and foliage are eaten by deer and rabbits. Because of their food value and spectacular red fall foliage, these shrubs are excellent for naturalized landscaping.

Spicebush

Calycanthus occidentalis

Description:

Spicebush is a deciduous shrub growing to 6–12 feet (1.8–3.7 m) tall. It has a colonial nature and often reproduces by root sprouting, forming clumps or thickets. The leaves are alternately arranged on the stem, simple, 6–15 cm (2–6 in) long and 2–6 cm (1–2 in) broad, oval or broadest beyond the middle of the leaf. They have a smooth edge with no teeth and are dark green above and paler below. The leaves, along with the stems are very aromatic when crushed with a spicy, citrusy smell, hence the common names and the specific epithet benzoin. In the fall the leaves turn a very bright and showy yellow color.



The yellow flowers grow in showy clusters which appear in early spring, before the leaves begin to grow. The flowers have 6 sepals and a very sweet odor. The ripe fruit is a red, elipsoidal, berrylike drupe, rich in lipids, about 1 cm ($\frac{1}{2}$ in) long and is eaten by several bird species. It has a "turpentine-like" taste and aromatic scent, and contains a large seed. Spicebush is dioecious (plants are either male or female), so that both sexes are needed in a garden if one wants drupes with viable seeds.

Like other dioecious plants, the female plants have a greater cost of reproduction compared to the male plants. In the wild, the population tends to have more males than females possibly due to the heavier reproductive costs on females.

The stem of *L. benzoin* has a slightly rough, but flat, bark which is covered in small, circular lenticels which give it a rough texture.

Habitat:

Within its native range it is a relatively common plant where it grows in the understory in moist, rich woods, especially those with exposed limestone.

Wildlife Value:

Over 20 species of birds, as well as deer, rabbits, raccoons, and opossums have been recorded as browsing the leaves or eating the fruits. The fruits are a special favorite of wood thrushes. The spicebush swallowtail, *Papilio troilus* (L.), lays its eggs on spicebush and other plants in the Laurel Family – sassafras, redbay, and camphortree.

Wild Geranium

Geranium maculatum

Description:

It is a perennial herbaceous plant growing to 60 cm (2 ft) tall, producing upright, usually unbranched stems and flowers in spring to early summer. The leaves are palmately lobed with five or seven deeply cut lobes, 10–12.5 cm (4–5 in) broad, with a petiole up to 30 cm (12 in) long arising from the rootstock. They are deeply parted into three or five divisions, each of which is again cleft and toothed.

The flowers are 2.5–4 cm (1.0–1.6 in) in diameter, with five rose-purple, pale or violet-purple (rarely white) petals and ten stamens. In the Northern Hemisphere, they appear from April to June (precise dates depend on the latitude). They are grouped in loose corymbs or umbels of two to five at the top of the flower stems.



The fruit capsule, which springs open when ripe, consists of five cells each containing one seed joined to a long beak-like column 2–3 cm (0.8–1.2 in) long (resembling a crane's bill) produced from the center of the old flower.

The rhizome is long, and 5 to 10 cm (2 to 4 in) thick, with numerous branches. It is covered with scars, showing the remains of stems of previous years' growth. When dry it has a somewhat purplish color internally.

Habitat:

It grows in dry to moist woods and is normally abundant when found.

Wildlife Value:

Over 20 species of birds, as well as deer, rabbits, raccoons, and opossums have been recorded as browsing the leaves or eating the fruits. The fruits are a special favorite of wood thrushes. The spicebush swallowtail, *Papilio troilus* (L.), lays its eggs on spicebush and other plants in the Laurel Family – sassafras, redbay, and camphortree.

We will concentrate our planting efforts in areas where the grass that was planted is less abundant.

Invasive species - Invasive species found elsewhere on the property or common to neighboring properties such as Japanese knotweed (*Polygonum cuspidatum*), Garlic mustard (*Alliaria petiolata*), Multiflora rose (*Rosa multiflora*), Burning bush (*Euonymus alatus*) or Tartarian honeysuckle (*Lonicera tatarica*) if found will be removed by appropriate means.

Monitoring - Monitoring for plant survival will be conducted spring and fall for two years following planting. Any areas that have not been successfully colonized by native herbaceous species will be re-planted. Any shrubs that may die will also be re-planted in-kind. A monitoring report will be submitted to the Conservation Commission at the end of each of two full growing seasons.

Monitoring for erosion will be conducted by Mr. Cronin with photographs sent to the Conservation Commission office at intervals to be determined by the Commission.