

{Chapter Seven

THE PLANTS}



What should be planted on the bluff?

The conditions on a bare bluff face are too harsh for many plants to succeed. To be successful, a potential bluff plant should:

- Be able to withstand this harsh environment (wind and harsh storms, steep slope with low nutrient content).
- Have a good root system to hold the soil and help prevent erosion. The best mix will include a combination of plants with a fibrous root system and plants with a tap root system.
- Be easy or quick to grow.
- Be able to withstand being reburied periodically. This quality is one that can be observed in most of the successful bluff vegetation. Plants on the bluff would die if they could not sprout back up through the sediments that wash down over them each year. Many trees cannot tolerate this, but a good bluff tree must.
- Recommended but optional: Be a native plant from a local source.

Table 3 contains a list of native bluff plants that have been chosen because they fit most or all of the criteria above. All have been successfully grown on the bluff. Following the table, there is a brief description of each plant, highlighting its strengths as a bluff plant. This is far from being an all-inclusive list.

For information about methods for taking cuttings and germinating seeds, please see Appendix C. For a list of plants that are considered invasive and are not recommended, please see Appendix B.

Establishing Plants on the Bluff

While the plants in this chapter can be propagated by the landowner, many can also be purchased from local nurseries and native plant growers. When purchasing plants from local growers, be aware that some growers import their plant materials from other states, and some of these plants may not be well-adapted to the local environment. The Web site for the “Pennsylvania Native Plant Society” at http://www.pawildflower.org/04_links/links2.htm gives a list of Pennsylvania nurseries. Alternatively, an on-line search for ‘native plant nurseries of Pennsylvania’ may be helpful.

Planting seeds directly on the bare bluff sediments is rarely successful, and is not recommended. This is because the sediments are so low in nutrients and organic matter and the surface is so hard and crusted that seedlings rarely survive. Also, the weather conditions can be very harsh. More success can be expected when planting well-rooted plants or using live stakes. Live stakes are simply hardwood cuttings that are inserted directly into the soil. See Appendix C. Methods of planting live stakes or branches on the bluff include wattling, brush layering, brush matting, and simple live staking. An excellent review of these methods, with illustrations, can be found in “The Shoreline Stabilization Handbook for Lake Champlain and Other Inland Lakes.” See Appendix A, Websites and Manuals, for information on how to access this manual online or to request a hard copy.

Establishing vegetation on the tableland is much easier than planting on the bluff face because topsoil is present and the land is not steeply sloping. Trees and shrubs are often removed from the tableland to provide a better view of the lake. However, tableland vegetation plays a very important role in decreasing groundwater runoff and in holding the soil. Instead of removing trees, consider keeping them and allowing them to “frame the view.”



Springfield Township.

Common Name	Scientific Name	Ideal pH	Soil Type	Moisture/Drought Factors	Sun/Shade Tolerance
Shrubs					
Silky Dogwood	<i>Cornus amomum</i>	6.1-8.5	Various, very tolerant	Wet to moist	Full sun
Red-osier Dogwood*	<i>Cornus sericea</i>	6.1-8.5	Various, very tolerant	Wet to moist	Full sun to partial shade
Staghorn Sumac*	<i>Rhus typhina</i>	5.5-7.5	Various, very tolerant	Well-drained soil, tolerates salt	Full sun to partial shade
Purple-flowering Raspberry	<i>Rubus odoratus</i>	6.0-8.0	Various	Moist to dry, well-drained	Partial to full shade
Sandbar Willow	<i>Salix exigua</i>	5.5-8.0	Deep, moist loams	Prefers moist areas	Full sun to partial shade
Heartleaf Willow (Diamond Willow) and Pussywillow	<i>Salix eriocephala and S. discolor</i>	4.0-7.0	All except very rocky, coarse soils	Moist to very moist	Full sun to partial shade
Common Elderberry	<i>Sambucus canadensis</i>	5.0-8.0	Various	Prefers moist, tolerates dry	Full sun to partial shade
Northern Arrowwood*	<i>Viburnum recognitum</i>	4.0-7.0	Various	Prefers moist, well-drained areas, tolerates salt	Full sun to full shade
Trees					
Red Maple	<i>Acer rubrum L</i>	4.0-7.4	Various, very tolerant	Prefers moist areas, flood tolerant	Full sun, some shade tolerance
Sugar Maple*	<i>Acer saccharum</i>	5.5-7.3	Well-drained, various	Moist to dry (locally adapted)	Full shade to full sun
Speckled Alder	<i>Alnus incana, ssp. rugosa</i>	4.8-7.7	Various	Wet to moist	Full sun to light shade
Gray Birch	<i>Betula populifolia</i>	3.5-6.0	Tolerates poor, sandy, rocky, or heavy soils	Moist to dry	Full sun
Red Ash, White Ash	<i>Fraxinus pensilvanica and F. Americana</i>	5.0-7.5	Various	Moist to periodic drying (use red ash in wetter sites)	Full sun to partial shade
Witch Hazel*	<i>Hamamelis virginiana</i>	4.5-6.2	Various	Moist (avoid very dry areas)	Full sun to full shade (shade tolerant)
Black Walnut	<i>Juglans nigra</i>	6.0-8.0	Prefers deep loam	Moist, well-drained (tolerates some dryness)	Full sun to partial shade
Hophornbeam	<i>Ostrya virginiana</i>	5.0-7.5	Various rocky or sandy soil	Moist to somewhat dry, well-drained	Full sun to partial shade-understory
White Pine	<i>Pinus strobus</i>	4.0-6.5	Various (locally adapted)	Moist (tolerates dry and bogs)	Full sun to partial shade

	Seed Dormancy	Propagation by Cuttings				Form	Origin	Root type	Usage Area
		Soft Wood	Hard Wood	Semi Hard Wood	Root Cuttings				
Shrubs									
	Dormant	•	•			Woody deciduous	Native	Deep, extensive root system, excellent stabilizer	Table, ravine, face, toe
	Dormant/Double Dormant	•	•	•		Woody deciduous	Native	Deep, extensive root system, very good stabilizer	Table, ravine, face, toe
	Double Dormant				•	Woody deciduous	Native	Fibrous, shallow, spreading, suckering roots, good stabilizer	Table, ravine, face, toe
	Dormant		•	•		Woody deciduous	Native	Fibrous	Table, ravine (face or toe if partially shaded)
	No Dormancy	•	•	•		Woody deciduous	Native	Fibrous, spreading, suckering roots, excellent stabilizer	Table, ravine, face, toe
	No Dormancy	•	•	•		Woody deciduous	Native	Fibrous, spreading, suckering roots, excellent stabilizer	Table, ravine, face, toe
	Double Dormant	•	•			Woody deciduous	Native	Suckering roots, very good stabilizer	Table, ravine, face, toe
	Double Dormant	•	•			Woody deciduous	Native	Suckering root, good stabilizer	Table, ravine, face, toe
Trees									
	No Dormancy	•				Woody deciduous	Native	Shallow roots, very good stabilizer	Table, face, toe, mid successional
	Dormant	very difficult				Woody deciduous	Native	Tap root, extensive lateral root branches	Table, ravine, face
	Dormant		difficult			Woody deciduous	Native	Roots form nodules w/ N-fixing bacteria good stabilizer, good colonizer from suckers	Table, ravine, face
	Dormant			•		Woody deciduous	Native	Suckering root system, often shallow	Table, toe (not best on steep slope), early-successional
	Dormant					Woody deciduous	Native	Extensive root system	Table, ravine, face
	Double Dormant	difficult	difficult			Woody deciduous	Native	Usually shallow-rooted	Table, ravine
	Dormant		very difficult			Woody deciduous	Native	Tap root (hard to transplant), release a compound which inhibits the growth of some other plants	Table, ravine
	Dormant					Woody deciduous	Native	Variable, deep or shallow, depending on the soil	Table, ravine
	Dormant					Woody evergreen	Native	Wide-spreading, deep root system, tap root not dominant	Table, ravine

Common Name	Scientific Name	Ideal pH	Soil Type	Moisture/Drought Factors	Sun/Shade Tolerance
Eastern Cottonwood	<i>Populus deltoides</i>	4.5-8.0	Various	Moist (tolerates drought and salt)	Full sun to partial shade
Quaking Aspen	<i>Populus tremuloides</i>	6.0-8.0	Various	Moist to dry	Full sun
Black Cherry	<i>Prunus serotina</i>	5.5-7.5	Prefers deep loam, tolerates heavy soil and sandy soil	Moist (tolerates dry)	Full sun to partial shade
Black Locust*	<i>Robinia pseudoacacia</i>	4.8-7.5	Various, rich or poor, except swampy	Drought and salt tolerant	Full sun
Basswood	<i>Tilia americana L</i>	6.0-7.5	Prefers deep loam, tolerates heavy or sandy soil	Moist (tolerates dryness)	Full sun to partial shade
Herbaceous Plants					
Goldenrod	<i>Solidago sp.</i>	4.0-8.0	Various	Variable	Full sun to partial shade
Aster	<i>Aster sp.</i>	5.5-7.2	Various	Moist to dry	Full sun
Boneset*	<i>Eupatorium perfoliatum</i>	5.6-7.8	Various	Prefers very moist but tolerates some drying	Full sun to partial shade
Virginia Creeper*	<i>Parthenocissus quinquefolia</i>	5.0-7.5	Various	Moist (tolerates drought)	Full sun to full shade
Bentgrass	<i>Agrostis perennans</i>	5.5-7.5	Various	Dry (some moisture but not wet)	Full sun to partial shade
Indian Grass	<i>Sorghastrum nutans</i>	5.0-7.8	Various	Moist (tolerates drought)	Full sun
Switchgrass*	<i>Panicum virgatum</i>	4.5-8.0	Various	Moist to dry	Full sun
Wild Rye (Bottle-brush Grass)	<i>Elymus riparius</i>	4.5-7.2	Various	Wet to moist	Sun to partial shade
Virginia Wild Rye	<i>Elymus virginicus</i>	5.0-7.4	Various	Wet to moist	Full sun to full shade
Bottle-brush Grass	<i>Elymus hystrix</i>	5.0-7.5	Various	Intermediate moisture	Partial shade to full shade
Coltsfoot	<i>Tussilago farfara</i>	6.6-8.5	Various	Moist to dry	Full sun to partial shade
Yarrow	<i>Achillea millefolium</i>	5.6-7.5	Various	Moist (tolerates dry)	Full sun to partial shade

Seed Dormancy	Propagation by Cuttings				Form	Origin	Root type	Usage Area
	Soft Wood	Hard Wood	Semi Hard Wood	Root Cuttings				
No Dormancy- plant immediately	•	•		•	Woody deciduous	Native	Will root from stems when buried, suckers	Face, toe, early to mid successional
No Dormancy				•	Woody deciduous	Native	Extensive root system to 2-3 feet, sinker roots to 5 feet or more, will sucker	Face, toe, early successional
Dormant	difficult				Woody deciduous	Native	Tap root, with shallow spreading roots, some sinker roots to 4 feet (roots will stay above poorly drained layer)	Table, ravine, face, toe
Double Dormant				•	Woody deciduous	Native	Extensive root system, roots form nodules w/ N-fixing bacteria, suckers	Face, toe, early successional (see note below ¹)
Double Dormant - difficult			•		Woody deciduous	Native	Mostly lateral roots, can form adventitious roots from stem if buried	Table, late successional

Herbaceous Plants

No Dormancy	Basal stem cuttings or stem tip cuttings in spring				Perennial	Native	Fibrous roots, most with vigorously spreading rhizomes	Table, ravine, bluff face
Dormant- slight	Basal stem cuttings in spring				Perennial	Native	Fibrous roots, often from a course root stock, and many species form rhizomes	Table, ravine, bluff face
Dormant	Basal stem cuttings or crown division in spring				Perennial	Native	Fibrous root system, spread by rhizomes, forming large colonies	Table, ravine, bluff face
Dormant	•			•	Woody vine	Native	Root system can be extensive, with adventitious roots forming along the stem, vigorous growth	Table, ravine, face, toe
No Dormancy					Perennial	Native	Fibrous root system	Face, toe, as a part of a mix
May require cold stratification					Perennial	Native	Forms short rhizomes, may penetrate deeply into the soil	Face, toe, grows well on steep slopes, helps prevent wind erosion, readily colonizes disturbed areas
Dormant					Perennial	Native	Spreads by rhizomes, and will form a sod	Face, toe, often used for erosion control
No Dormancy					Perennial	Native	Fibrous root system, without rhizomes	Face, toe, often used for erosion control
No Dormancy					Perennial	Native	Fibrous root system, will form vegetative offsets, and slowly form a sod	Face, toe, often used for erosion control
No Dormancy (2 weeks of cold is helpful)					Perennial	Native	Fibrous root system (spreads mainly by seed)	Face, toe, often used for erosion control
No Dormancy				•	Perennial	Eurasia	Spreads by rhizomes, root system is deep and extensive, fleshy	Face, toe
No Dormancy				divide root ball	Perennial	Europe	Fibrous root system forming root ball	Face, toe

*According to some sources, deer are not fond of these plants. They can be thought of as deer-resistant, but not deer-proof.

¹Note- Some researchers recommend that black locust not be planted near sandy lake bluffs that support sand barrens or oak savannas, because black locust quickly spreads into these areas.



Red-osier Dogwood

Silky Dogwood, *Cornus amomum* and Red-osier Dogwood, *Cornus sericea*

These dogwood shrubs are recommended as bluff plants because they can grow on a wide variety of soils and form excellent root systems for stabilization. They can withstand being partially buried by bluff sediments and will simply grow more roots from their buried stems.

They are both easy to propagate. A very simple way to establish these shrubs on the bluff is to take cuttings after they become dormant (November through March) and simply stick those cuttings directly into the bluff. They also can be stuck into the garden. By June, the rooted cuttings can be moved either into a pot. As soon as a vigorous root system develops (July or August), they can be planted on the bluff. Both these shrubs can also be purchased from local commercial nurseries.

The seeds from these shrubs exhibit dormancy. (See Appendix C for methods for taking a cutting and for starting dormant seeds.)



Staghorn Sumac

Staghorn Sumac, *Rhus typhina*

Staghorn sumac is often one of the first woody plants to grow on a bare bluff in this area. It is a good reclamation plant because of its dense, shallow root system which spreads by root suckers. It is very tolerant of poor soils. It is rarely used as a specimen plant in the landscape, but for naturalizing, it will form large attractive clumps that turn a vivid red in the autumn.

Sumac can easily be propagated by digging up some of the small root suckers in spring before they get their leaves. The seeds have a double dormancy, and after a three month cold-moist period, they must be rubbed well between sandpaper to scarify them before they will germinate.



Purple-flowering Raspberry

Purple-flowering Raspberry, *Rubus odoratus*

This showy flowering plant grows naturally along the bluff and in the ravines of the area in any location that provides some shade. Its growth pattern is similar to a raspberry; and, like them, it can spread by tip layering. Tip layering is the characteristic that allows the shoots to form roots wherever they touch the ground. A new plant then forms at this point. The new plants can be dug up and moved to a new location. Pin down the tips to increase the number of new plants. The hundreds of seeds are also easy to collect and to grow if given a cold-moist period.



Common Elderberry

Common Elderberry,

Sambucus canadensis

Elderberry bushes have a suckering root system that can help to stabilize the soil. They also provide edible fruit that many birds also enjoy.

Elderberry can be propagated by the home gardener without special equipment. Softwood cuttings taken in July will root if a rooting hormone is used (preferably 0.3 – 0.8 % IBA) and the cuttings are misted daily or kept in a very humid enclosure. The seeds are difficult to germinate, and have a double dormancy. An easy way to overcome this is to plant the seeds in a protected garden plot as soon as the fruit ripens and allow them to break dormancy the natural way. This may take two or more years.



Sandbar Willow

**Sandbar Willow, *Salix exigua*,
Heartleaf Willow, *Salix eriocephala*, and
Pussywillow, *Salix discolor***

All three of these small bushy willows have extensive root systems which help to hold soil in place. They grow quickly and can tolerate being buried. They are valuable bluff plants. Pussywillow has the added characteristic of being very showy in the early spring when it blooms.

It is extremely simple to propagate these willows. Cuttings can be taken at virtually any time of year. Stems with pencil- to thumb-thick wood can be rooted with no hormone in peat moss, vermiculite, perlite, potting soil, water, or just by sticking the cutting into the soil where it is to grow. Willows are very vigorous and they produce an abundance of their own rooting hormones.



Northern Arrowwood

Northern Arrowwood,

Viburnum recognitum

The viburnums are a very diverse and versatile group of plants that are used extensively in wildlife plantings as well as in landscaping. Northern arrowwood grows naturally on the bluff, and the related maple-leaved viburnum (*Viburnum acerifolium*) grows in the ravines and on the forested table land.

The seeds of these two species are easy to gather, but very difficult to germinate. If the seeds are planted without being allowed to dry out, they may come up in two or three years.

Hardwood or semi-hardwood cuttings may root moderately well for viburnums. See Appendix C for methods of taking hardwood and semi-hardwood cuttings.

Note: Recently in our area (2005-2006), an invasive beetle has defoliated many of the shrubs in the Viburnum genus, including the species above. Most of the severely defoliated shrubs are now weak or dying. Until the impact of this pest decreases, viburnums may no longer be good candidates for revegetation on the bluffs.



Sugar Maple

Red Maple, *Acer rubrum*, and Sugar Maple, *Acer saccharum*

Red and sugar maples form a tap root with an extensive lateral root system, which makes them good for stabilizing the soil. Their fall color is variable, but can be spectacular.

Sugar maples are simple to grow from seed. Many of the seeds will be empty and should be discarded. A fertile seed will be hard when squeezed. Seeds can be placed in moist peat moss or sand in a baggie and stored in a refrigerator for two to three months. When seeds begin to sprout, they can be planted in pots.

The disadvantage of growing sugar maples from seed is that they are slow-growing, so do not expect too much size in one year. The advantage to growing sugar maples from seed is that local seeds will grow into locally adapted plants, which is thought to be important with maples. When purchasing maples, it may therefore be valuable to ask about the seed source. Like many hardwood trees, maples are very difficult to start from cuttings.



Speckled Alder

Speckled Alder, *Alnus incana*, ssp. *rugosa*

The speckled alder is a well-adapted bluff plant because it is one of a small number of local trees that can fix nitrogen in its roots. Nitrogen is fixed by bacteria that live in nodules on the roots of the alder. The alders are thus supplied with an abundant amount of nitrogen and therefore grow even in infertile soils. Alders also have extensive root systems that sucker and form colonies. While listed as a facultative wetland plant, it grows in healthy colonies on the bluff.

Cuttings of alder are difficult to root unless a mist bed is used, but alder is easy to grow from seeds. They can be treated as described above for sugar maple and planted after three months of cold treatment. Several local nurseries also supply speckled alder.

Black Alder, *Alnus glutinosa*, is not a native to our area. It should be avoided.



Gray Birch

Gray Birch, *Betula populifolia*

Gray Birch is a small early-successional tree. The trunk is a chalky white color with dark triangular markings. It grows easily from seeds, following the cold moist treatment described above for sugar maple. Cuttings are difficult to root; semi-hardwood cuttings are the recommended method. Used as a bluff plant, gray birch will usually spread by self-seeding as well as root suckering.



White Ash

Red Ash, *Fraxinus pennsylvanica* and White Ash, *Fraxinus americana*

Ashes grow well on the bluff because they can send up sprouts from their stems even if they have been knocked over and partially buried by falling sediments.

Ashes can be grown from seeds after a cold, moist treatment. The seeds may not sprout until six to seven months of cold. Cuttings are not suggested as a method for propagating the ashes. Red ash is a facultative wetland plant, meaning it grows especially well in moist soils. Its cousin, the white ash, grows best in dryer, well-drained soils.



Witch Hazel

Witch Hazel, *Hamamelis virginiana*

This small tree, usually under 20 feet tall, has fragrant yellow, spider-like flowers late in the fall. It is available from nurseries, and this is the easiest way to obtain specimens. It is most often started from seeds, though they have a double dormancy and require a warm-moist period, then a cold-moist period. Seeds planted outside in the fall should germinate during their second spring.

Witch hazel is familiar to many because an extract from the twigs is an old remedy and is often found in medicine cabinets. It is used externally as an ingredient in lotions, soaps, and creams. Compounds in the bark have been shown to have antioxidant, anti-inflammatory, and radiation-protective properties.



Black Walnut

Black Walnut, *Juglans nigra*

Black Walnut is a valuable lumber tree in our area. It also supplies nuts for wildlife and humans. It can be found growing naturally along some parts of the bluff and along the streams and ravines that flow into the lake.

A very easy way to grow walnut trees from seed is to remove the husks and plant the nuts in a garden plot in the fall. They should not be dried before planting. A screen on a wooden frame will keep the squirrels away from the seeds. In the spring, the walnut sprouts can be easily (gently) dug and potted up. Propagation of walnut by cuttings is said to be difficult and to be possible only in very young walnut trees.

Note: It is known that black walnut releases chemicals from the roots that inhibit the growth of other nearby plants. Some plants are affected, and others are not. Therefore, walnut might not be the best choice of a tree in areas where a diversity of plants is desired.



Hophornbeam

Hophornbeam, *Ostrya virginiana*

Hophornbeam is a tree that often can be found growing along the edge of the woods along the bluff. It can grow in sun or shade and can tolerate sandy soil. It is easy to gather the seeds for this tree, but difficult to germinate them. A long cold-moist period (eight to nine months) was required for germination in a study done by Mercyhurst College.

Cuttings are not suggested as a method for propagating hophornbeam. Since it is slow to germinate and to grow, it may be best to purchase this tree from a nursery.



White Pine

White Pine, *Pinus strobus*

White pine was once common on the tableland along Lake Erie. Most of those early stands have since been harvested for lumber. This tree is recommended for the land at the top of the bluff. Because it is an evergreen, it removes groundwater year round, although at a slower rate in the winter.

Seeds from white pine can be collected from August to September, when the cones just begin to open. The cones are usually formed at the tops of the trees, but the cones hold many of their seeds until after they fall and can be gathered easily then. The seeds need a two to three month cold-moist period.



Eastern Cottonwood

Eastern Cottonwood, *Populus deltoids*, and Bigtooth Aspen, *Populus grandidentata*, and Quaking Aspen, *Populus tremuloides*

These three local poplars are fast-growing, early-successional trees. Cottonwoods are especially adapted to growing along the lake. One of their qualities as a bluff plant is that the small trees can be partially buried by sand or sediments from above, survive, and root along their buried stems.

Cottonwood seeds are easy to collect when the "cotton" is released. They should be planted immediately and will germinate very well. Like many early season seeds, they exhibit no dormancy. Softwood or hardwood cuttings are another good way to propagate cottonwood.



Black Cherry

Black Cherry, *Prunus serotina*

Black cherry is a large common timber tree in Pennsylvania. Birds love the clusters of small cherries it produces, which are edible. Black cherry is often used as a reclamation plant because it is early-successional, and in areas with a sandy soil, its root system will become extensive. It is not difficult to propagate from seed if given a four month cold stratification. The seedlings should be grown for at least one year in pots before planting in the desired location, and may need protection from deer for their first few years.



Black Locust

Black Locust, *Robinia pseudoacacia*

Black locust can be found growing in many recently disturbed bluff areas. It has many attributes that are desirable in a bluff plant. It is early-successional and has a spreading root system that sends up new shoots as it spreads. It is a legume and, therefore, harbors bacteria in its roots to fix nitrogen. It also can survive being buried. However, some scientists consider the black locust a “native invasive species” in sandy areas.

Seeds require a cold period, but do not need cold-moist treatment. The key to germinating the seeds is to scarify them. Black locust can also be propagated by root cuttings. See Appendix C for seed scarification and root cutting techniques.



Basswood

Basswood, American Linden, *Tilia americana*

Basswoods are tall, stately trees that grow naturally on the tableland of the Lake Erie bluff. They have extensive root systems that are thought to pull nutrients from deep in the soil, but have no distinct taproot. Cuttings can be taken in late June, but they are difficult to root. Their seeds are very difficult to germinate due to a double dormancy, with the biggest obstacle being the very hard seed coat. Seeds may take three years to germinate in nature. This is another tree that may be best to purchase from a nursery.



Goldenrod

Goldenrod, *Solidago sp.*

Goldenrod is a perennial plant that forms a very extensive root system. It is a tough native plant and several different species are native to the bluff. They are one of the first colonizers of newly disturbed bluff and grow well even in the poor sediments there.

Local species include *Solidago canadensis* and *S. Altissima*, but any species found along the bluff could be propagated and used.

Goldenrod can be propagated from seeds or from basal stem cuttings. Seeds require more care and time than cuttings. Start the seeds in the spring in a cold frame. No cold stratification is required. Lightly cover them and do not allow the soil to dry out. Place individual seedlings in pots and let them grow through their first winter. Plant them out into their permanent positions the next spring or early summer. Each plant may spread to form a large clump. Basal stem cuttings root very well for goldenrod. Take them when growth from the crowns begins in the spring. See Appendix C for details on this method.



Aster

Aster, *Aster sp.*

Another perennial plant that is hardy enough to grow well on the bluff is the aster. Several species grow locally.

Seeds can be collected from late July to October, depending on the species. Seeds can be stored moist or dry, but if stored dry, they should be pre-chilled for at least two weeks. Locally collected seeds will need this chilling, while some purchased seeds may not. When the seedlings are large enough to handle, place them into individual pots and allow them to grow roots to fill their pots before planting them out in the summer.

Basal cuttings are a quicker method of propagation and should be taken in late spring, as described for goldenrod.



Bonaset

Boneset, *Eupatorium perfoliatum*

Boneset is a perennial and is a very flexible plant with respect to the type of soil it will grow in, but it grows best in areas that do not dry out too severely.

To start this plant from seed, gather the seeds in the late autumn when they are mature. Dry them, and then give them a one to three month cold-moist stratification before planting. The plants will flower in the autumn of their first year.

Boneset can also be propagated by division. The crowns can be divided in spring, or basal stem cuttings can be taken in spring as described for goldenrod.



Virginia Creeper

Virginia Creeper,

Parthenocissus quinquefolia

Virginia creeper is a perennial vine that becomes woody and so does not really fit in the category of herbaceous plants. It is a beautiful native, prized for its bright red fall color. It can be propagated via cuttings, taken in the early summer and treated with rooting hormone. It can also be propagated from seeds. Seeds should be given a cold-moist period for six weeks at 5°C before planting. Germination is variable.



Indian Grass

Bent Grass, *Agrostis perennans*;

Indian Grass, *Sorghastrum nutans*;

Switch Grass, *Panicum virgatum*;

Bottle-brush Grass, *Elymus riparius*, *E. virginicus*, *E. hystrix*

Perennial grasses have fibrous root systems that can help hold the soil in place, especially when used in combination with deeper-rooted plants. Many grasses also have spreading rhizomes that help them to form large colonies. All of the grasses listed here can be grown from seed. When trying to establish grasses on the bluff, the recommended procedure is to plant the seeds in small pots and allow them to become well-established (though not root-bound) before transplanting them to the bluff. In good soil, grass can simply be directly seeded, but direct seeding on the bluff sediments is rarely successful.



Coltsfoot

Non-native Plants:

Coltsfoot, *Tussilago farfara* and

Yarrow, *Achillea millefolium*

While these plants are not native to Erie County, they have grown in this area for a long time. They are included here because they can commonly be found growing along the bluff, and, in fact, flourish there. If the goal is to get plants established on the bluff to begin the successional process, then these plants should be considered, and, in fact, will probably begin growing there without needing to be planted.

Of these two plants, only coltsfoot might be considered invasive, but only in disturbed areas. Coltsfoot has a remarkable root system. The large, fleshy rhizomes (underground stems) can be found deep in the bluff. These rhizomes help coltsfoot to survive on the bluff by storing nutrients, and also help to stabilize the bluff sediments.