

**Assessment of State Rare Plant Populations at Cove Point Wetland and List of Plant
Species Observed in Swamp Forest
(Year 2012)**

Submitted by Brent W. Steury, 28 January 2013

Cove Point wetland is located in Calvert County, Maryland, northeast of Cove Point Road, on the Dominion Liquefied Natural Gas (LNG) property. It is separated from the Chesapeake Bay by a single low dune and a rip-rap breakwater constructed in 2010. The 2012 rare plant survey at Cove Point wetland was expanded to include the entire marsh and associated swamp forest at Cove Point. In 2011 the herbaceous flora of the marsh was surveyed and a list of species was compiled. This 2012 report includes a list of all plant species observed in the swamp forests around Cove Point Marsh and an assessment of the rare Maryland state listed plant species found in Cove Point Wetland. Prior to 2011, this report only included assessments of rare plant populations found along the marsh / beach dune ecotone and in nearby swamp forests because of the yearly possibility of treating with herbicide the invasive *Phragmites australis* population within this area and thus pinpointing rare plant populations to be avoided was necessary. 2012 surveys were conducted on 4 and 12 May, 14 June, 3 and 20 September, and 5 October.

By adding the list of marsh species documented in 2011 and the list of swamp species found in 2012, a comparison can be made with the wetland flora documented at Cove Point 16 years ago (Steury, 1996). In 2007, a breach of the barrier dune at Cove Point converted the marsh from a freshwater system to a brackish water system, killing many of the freshwater marsh species found there. Steury (1996) documented 178 wetland plants found associated with inundated (hydric) to saturated (wet-mesic) soils at Cove Point wetland. The 1996 report also included a list of species found on the barrier beach and dune at Cove Point wetland and in ecotone habitats around the wetland. The 1996 report listed each species only with the habitat “in which it was observed to be most common.” Thus, in 1996, if a species was observed in Cove Point wetland but was predominately found on the barrier dune, it would have been tallied with the barrier dune flora and not counted among the 178 species predominately found in the wetland at Cove Point.

The 2011 survey reported 51 herbaceous plant species from Cove Point Marsh and an additional seven woody species that were components of the “marsh” flora. In 2012, one species, *Utricularia vulgaris*, was found in the marsh that was not observed in 2011. The 2012 survey of Cove Point swamp (Table II) documented 80 additional species not found in the marsh in 2011, plus 27 species that were found in the marsh in 2011. This total of 59 species found in Cove Point Marsh in 2011 and 2012 and 80 additional species found in the surrounding swamps in 2012 renders a total of 139 wetland species found at Cove Point. This is 39 species less than the 178 species found in 1996. The 1996 total would have undoubtedly been higher if all species observed in Cove Point wetland would have been listed with the wetland flora instead of with the habitat in which they predominately occurred. For example, a few plants of *Smilax bona-nox* were found in Cove Point swamp in 2012, but in 1996 this species was listed with the barrier dune flora and not counted as a component of the wetland because then, as now, the species is abundant on the barrier dune. Thirty-two of the species (marked with a double asterisk) listed in

Table II were not listed for Cove Point Wetland in 1996. Of these 32, 23 were listed for Cove Point barrier dune or ecotone habitats. The other nine species are first records for these habitats at Cove Point. Two of these nine, *Iris pseudacorus* and *Rubus phoenicolasius* are potentially invasive and should be eradicated. Assuming the 23 species previously reported as predominately associated with the barrier dune or ecotone were also present (but to a much lesser degree) in Cove Point wetland in 1996, an even greater total of 62 fewer species found in Cove Point wetland in 2012 than in 1996, would be rendered. Much of this loss of species richness is likely due to the breach of the barrier dune and the associated flow of brackish bay water into the freshwater marsh between 2007 and 2010.

Species still listed as rare by the State of Maryland that have regularly been found during the last 15 years within the ecotone and swamp forest at Cove Point include *Carex hyalinolepis* (S2S3), *Scutellaria galericulata* (S1), and *Zizaniopsis miliacea* (S1). Additionally, during surveys on September 24, 2008 and June 9, 2009, two additional State listed species *Oldenlandia uniflora* (S3) and *Sesuvium maritimum* (S1), were found in Cove Point Marsh, after a breach of the barrier dune at Cove Point in 2007 converted the marsh from a freshwater system to a brackish water system. This breach was sealed in 2010 by the construction of a rip-rap breakwater off shore and replenishing the dune with imported sand. Beginning in 2011, the marsh was rapidly reverting to a freshwater system, however, as documented here, as many as 62 species found in the marsh may have been lost due to the brackish water intrusion. This includes seven species of State listed plants *Bidens discoidea* (S3), *Eleocharis flavescens* (S1), *Eleocharis tortilis* (S3), *Fuirena pumila* (S2S3), *Lemna trisulca* (S1), *Potamogeton foliosus* (S1), and *Rhynchospora glomerata* (S3). Although *Rhynchospora glomerata* and *Eleocharis tortilis* are still known from low lying areas just outside Cove Point Marsh and off Dominion LNG property, they are now absent from the marsh. *Potamogeton foliosus* had not been observed in the marsh for many years, even prior to the brackish water intrusion, probably due to increasing sedimentation and drought at the site where it occurred. Additionally, *Oldenlandia uniflora* has not been relocated since the year it was discovered and *Sesuvium maritimum*, a brackish water species that was thriving in the marsh after the breach of the barrier dune, now has a much reduced population since the construction of the breakwater. Other brackish water species that were colonizing Cove Point Marsh after the dune breach such as *Salicornia europaea* and *Spartina alterniflora* are now absent in the marsh, and *Aster subulatus*, abundant after the breach, is now very rare. *Spartina alterniflora* has been planted on the bay side of the dune as part of the dune restoration, and it is thriving there. However, just two years after being planted, patches of invasive *Phragmites australis* have become established within the *Spartina alterniflora* planted areas, and threaten to quickly take over this newly established brackish marsh as it has the freshwater marsh and swamp at Cove Point. Areas of swamp surveyed in 2012 contained noticeably larger areas of *Phragmites australis* than were present in 1996.

The 2012 inventory of plants in Cove Point wetland, now largely reverted to a freshwater system, relocated populations of seven species of State listed plants, *Ammannia latifolia* (S2), *Carex hyalinolepis* (S2S3), *Fraxinus profunda* (S2S3), *Limnobium spongia* (S1), *Scutellaria galericulata* (S1), *Sesuvium maritimum* (S1), and *Zizaniopsis miliacea* (S1). One small population of *Polygonum densiflorum* (S1?), which was observed in 2011, was not relocated in 2012. Two non-native Mute Swans were evident in the marsh in 2012 and could easily account for the loss of this species. The population of *Fraxinus profunda*, which once

provided shade for a number of other vascular plant species along the southeastern edge of Cove Point Marsh, was decimated by the brackish water intrusion and now survives as just a few, unhealthy, individuals.

The following State rare plants were located during the 2012 survey. Their population assessments are as follows:

Ammannia latifolia:

This species has rapidly, and abundantly, returned to Cove Point Marsh. It disappeared from the marsh with the brackish water intrusion, but was rediscovered in 2011 along the western shore of the marsh, adjacent to the upland area, on loosely consolidated, developing peat mats in two populations containing approximately 117 plants. In 2012 (20 September), thousands of plants were observed along the entire shoreline of the marsh except along the southeastern edge. All plants were in flower and fruit on 20 September. See attached map and GPS coordinates in Table I for location of this population. Areas containing the densest populations occurred between points 11 & 12 on the attached map where an estimated 10,000 plants were observed. At point 13, 1,000 plants occurred, and at point 15, 1,300 plants were present. There was a total of 2689 m of shoreline where *Ammannia latifolia* was present (Table I).

Carex hyalinolepis:

The size of the three populations at Cove Point was measured with GPS on 14 June, 2012. The sandy dune that separates the marsh from the Chesapeake Bay is moving toward the marsh and is now on top of the *Carex hyalinolepis* population (#1 in Table I) which in 2007 was observed along the marsh / dune ecotone and historically was found in Cove Point Marsh. Most of the *Carex hyalinolepis* population now occurs on the dune between the Chesapeake Bay and Cove Point Marsh. GPS measurements in 2011 show a length of 16.8 m and a width of 8.0 m for this population. GPS measurements on 14 June 2012 showed a length of 17.6 m and a width of 7.8 m. The maximum number of fruiting stems observed within a square meter of the population was 2.0. The estimated average number of fruiting stems per square meter was 0.4. The population (#3 in Table I) of *Carex hyalinolepis* at the end of Webster Drive on the southeastern end of the marsh discovered in 2009 measured 108.9 m x 8.7 m using GPS in 2012. The maximum number of fruiting stems observed within a square meter of the population was 15.0. The estimated average number of fruiting stems per square meter was 1.5. In 2012, a previously undiscovered, third population of *Carex hyalinolepis* (#2 in Table I) was found in the northeastern corner of the wetland. This population measured 26.5 m x 15.4 m. The maximum number of fruiting stems observed within a square meter of the population was 7.0. The estimated average number of fruiting stems per square meter was 1.0. See attached map and GPS coordinates in Table I for locations of center points of these populations.

Since the construction of the breakwater, the area of dune containing the *Carex hyalinolepis* population #1 is quickly eroding (probably because it is at the southern end of the constructed breakwater) and Eastern red-cedar and Tree-of-heaven that had been growing on this area of dune since 1996, are now up-rooted.

It is unknown whether the *Carex hyalinolepis* population on the dune will be able to survive in the much drier conditions since it is a species generally found in marshes. The population #3 at the end of Webster Drive and #2 in the northeastern corner of the wetland seem secure. Most of the plant species currently associated with the *Carex hyalinolepis* population #1 are species typically found in dry upland sites such as *Rubus*, *Lonicera japonica*, *Toxicodendron radicans*, and *Vitis labrusca*. Some stems of *Phragmites australis* that were also found within the *Carex hyalinolepis* population are probably plants that were in the marsh in 2007, but are now covered by the dune.

Fraxinus profunda:

As recently as 2005, this species formed a large contiguous population along the southeastern shore of Cove Point. Under the once shady canopy of these trees also existed a number of other State listed species such as *Bidens discoidea*, *Lemna trisulca*, *Limnobiium spongia*, and *Polygonum densiflorum*. The breaches of the dune in 2006 and 2007 and the associated brackish water influx decimated this population of trees. Now only a few scattered individuals survive, and they are all in poor health.

Limnobiium spongia:

A small population of this species was found along the southern edge of the marsh on 26 May, 2011. It had not been observed since it was first found near this same site in 1996. At that time 1000 plants were reported from five sites. In 2011, two patches of not more than five plants each were observed. By 14 June 2012 the population had expanded and measured 37.9 m x 3.0 m. All plants were vegetative. See attached map and GPS coordinates in Table I for location of this population.

Scutellaria galericulata:

On 10 June, 2011, nine plants of this species were observed over 3.0 m x 2.0 m along the boardwalk at Cove Point Marsh. No plants were observed in flower or fruit. On 2 September 2011, no plants were observed in this same area, despite routinely being found in September on numerous previous surveys. The large mats of peat that were deposited on the eastern end of the population during hurricane Isabelle in 2005 have changed the microtopography and probably the hydrology of this site to the species detriment. In 1996, 300 stems were observed in the population. On 14 June 2012, this population measured 1.0 m x 1.0 m using GPS. A total of six plants were found, none were in flower or fruit. A second population consisting of three stems was found at Cove Point on 26 May, 2011, at the northern most edge of the marsh. In August, 2011, tropical storm Irene deposited about 0.5 m of sand on this population and it was not found on any subsequent site visits that year. Attempts to relocate this population in 2012 also proved unproductive. See attached map and GPS coordinates in Table I for location of the existing population.

Sesuvium maritimum:

During the 2009 survey, a large population (estimated to occupy nearly an acre of the marsh) of *Sesuvium maritimum* a State endangered (S1) species was found for the first time at Cove Point. *Sesuvium maritimum* is a brackish water species. The construction of the breakwater and subsequent conversion of the marsh back to a freshwater system has nearly extirpated this species from the marsh. On 22 July 2011, only 8 plants were found, near where the main breach occurred. On 20 September 2012, *Sesuvium maritimum* was still persisting along the marsh dune ecotone near the Chesapeake Bay. The population measured 34.0 m x 2.0 m using GPS. Most plants were in flower and fruit. This species is clinging to areas of the marsh with some salinity. It is unlikely that these plants will persist if there is a full transition back to an entirely freshwater marsh. See attached map and GPS coordinates in Table I for the location of this population.

Zizaniopsis miliacea:

On 10 June 2011 this population measured 57.1 m x 11.3 m with GPS. On 14 June 2012 it measured 54.0 m x 10.2 m using GPS. The maximum number of fruiting stems per square meter was nine. The estimated average number of fruiting stems per square meter was 0.4. See attached map and GPS coordinates in Table I for the location of this population.

Phragmites australis was thick on the north and east sides of the *Zizaniopsis miliacea* population and is commingled with it. Treating the *Phragmites australis* by hand with herbicide is highly recommended in this area as it has been for that last few years.

Table I

Species	Latitude	Longitude	max length (m)	max width (m)	polygon area (m2)
Scutellaria galericulata	38.39172	-76.4003	1.0	1.0	1.0
Zizaniopsis miliacea	38.39214	-76.4009	54.0	10.2	588.3
Limnobiium spongia	38.38227	-76.3921	37.9	3.0	97.1
Sesuvium maritimum	38.38974	-76.3970	34.0	2.0	68.0
Carex hyalinolepsis 1	38.38782	-76.3900	17.6	7.8	137.1
Carex hyalinolepsis 2	38.38684	-76.3872	26.5	15.4	412.5
Carex hyalinolepsis 3	38.38279	-76.3915	108.9	8.7	959.7
Ammannia latifolia 11	38.38373	-76.3946	n/a	n/a	n/a
Ammannia latifolia 12	38.38456	-76.3945	n/a	n/a	n/a
Ammannia latifolia 13	38.38515	-76.3929	n/a	n/a	n/a
Ammannia latifolia 15	38.38644	-76.3922	n/a	n/a	n/a
A. latifolia total population	n/a	n/a	2689.0	n/a	n/a

Table I: Species names of six state rare plants found in Cove Point Marsh; latitude and longitude of the center point of each population; maximum length, maximum width, and total area of GPS polygon for each population (For *Ammannia latifolia* data is given for points with significant numbers of plants. See report for numbers of plants at each point).

Swamp Plants of Cove Point Marsh (2012)

Species marked with an asterisk (*) were also found in the marsh in 2011. Species marked with a double asterisk (**) were not reported for Cove Point wetland by Steury (1996). Species marked with an exclamation mark (!) were not reported from the wetland, barrier dune or ecotone areas

at Cove Point wetland. Species marked by an "X" in the nativity column indicate a non-native species.

Table II

Family	Genus	Species	Common Name	Nativity
Aceraceae	*Acer	rubrum	red maple	
Anacardiaceae	*Toxicodendron	radicans	common poison-ivy	
Annonaceae	**Asimina	triloba	pawpaw	
Apiaceae	Cicuta	maculata	water-hemlock	
Apiaceae	*Hydrocotyle	verticillata	whorled pennywort	
Apiaceae	*Ptilimnium	capillaceum	atlantic mock bishopsweed	
Araceae	** ! Arisaema	triphyllum	jack-in-the-pulpit	
Araceae	*Peltandra	virginica	arrow arum	
Araceae	Symplocarpus	foetidus	skunk cabbage	
Asclepiadaceae	*Asclepias	incarnata	swamp milkweed	
Aspleniaceae	Athyrium	filix-femina	lady fern	
Aspleniaceae	**Thelypteris	noveboracensis	new york fern	
Aspleniaceae	Thelypteris	palustris	marsh fern	
Asteraceae	Aster	lanceolatus	eastern lined aster	
Asteraceae	*Baccharis	halimifolia	groundsel tree	
Asteraceae	Erechtites	hieracifolia	fireweed	
Asteraceae	** ! Eupatorium	serotinum	late-flowering thoroughwort	
Asteraceae	Mikania	scandens	climbing hempweed	
Asteraceae	**Solidago	sempervirens	seaside goldenrod	
Aquifoliaceae	Ilex	opaca	american holly	
Aquifoliaceae	Ilex	verticillata	winterberry	
Betulaceae	Alnus	serrulata	smooth alder	
Blechnaceae	Woodwardia	areolata	netted chainfern	
Brassicaceae	**Barbarea	vulgaris	common winter cress	X
Bignoniaceae	**Campsis	radicans	trumpet creeper	
Caprifoliaceae	**Lonicera	japonica	japanese honeysuckle	X
Caryophyllaceae	Stellaria	media	common chickweed	X
Celastraceae	**Euonymus	americanus	strawberry bush	
Chenopodiaceae	*Endolepis	dioica	orache	
Clethraceae	Clethra	alnifolia	pepper bush	
Clusiaceae	*Triadenum	walteri	walter's st. john's-wort	
Commelinaceae	**Commelina	virginica	virginia day-flower	
Convolvulaceae	*Calystegia	sepium	hedge bind-weed	
Cornacea	Cornus	amomum	knob-styled dogwood	
Cornacea	Nyssa	sylvatica	black tupelo	
Cupressaceae	**Juniperus	virginiana	red cedar	
Cyperaceae	*Carex	alata	winged sedge	
Cyperaceae	Carex	atlantica	atlantic sedge	
Cyperaceae	Carex	comosa	bearded sedge	
Cyperaceae	Carex	crinita	tasseled sedge	
Cyperaceae	Carex	debilis	weak sedge	
Cyperaceae	*Carex	hyalinolepis	shoreline sedge	
Cyperaceae	Carex	intumescens	swelled sedge	
Cyperaceae	*Carex	lurida	yellow-green sedge	

Cyperaceae	Carex	stipata	crowded sedge	
Cyperaceae	**Carex	swanii	swan's sedge	
Cyperaceae	** ! Scirpus	polyphyllus	many-leaved bull rush	
Dennstaedtiaceae	**Pteridium	aquilinum	bracken fern	
Ebenaceae	**Diospyros	virginiana	persimmon	
Ericaceae	Vaccinium	corymbosum	highbush blueberry	
Fabaceae	** ! Amphicarpa	bracteata	hog peanut	
Fabaceae	**Amorpha	fruitcosa	indigo bush	
Fabaceae	**Robinia	pseudoacacia	black locust	
Fagaceae	**Fagus	grandifolia	american beech	
Fagaceae	Quercus	phellos	willow oak	
Hamamelidaceae	Liquidambar	styraciflua	sweet gum	
Iridaceae	** ! Iris	pseudacorus	yellow iris	X
Iridaceae	*Iris	versicolor	northern blue flag	
Iridaceae	Sisyrinchium	angustifolium	blue-eyed grass	
Juncaceae	Juncus	acuminatus	sharp fruited rush	
Juncaceae	Juncus	effusus	soft rush	
Lamiaceae	Lycopus	virginicus	virginia water-horehound	
Lemnaceae	Lemna	perpusilla	small duckweed	
Lemnaceae	*Spirodela	polyrhiza	great duckweed	
Lythraceae	*Decodon	verticillatus	swamp loosestrife	
Magnoliaceae	Magnolia	virginiana	sweet bay magnolia	
Malvaceae	*Hibiscus	moscheutos	rose mallow	
Menispermaceae	**Menispermum	canadense	canada moonseed	
Myricaceae	*Myrica	pensylvanica	northern bayberry	
Oleaceae	** ! Fraxinus	americana	white ash	
Oleaceae	Fraxinus	pennsylvanica	red ash	
Oleaceae	*Fraxinus	profunda	pumpkin ash	
Onocleaceae	Onoclea	sensibilis	sensitive fern	
Ophioglossaceae	Ophioglossum	vulgatum	adder's tongue fern	
Orchidaceae	Spiranthes	vernalis	spring ladies' tresses	
Osmundaceae	Osmunda	regalis	royal fern	
Pinaceae	*Pinus	taeda	lobolly pine	
Poaceae	Cinna	arundinaceae	common woodreed	
Poaceae	** ! Festuca	subverticillata	a fescue	
Poaceae	Glyceria	striata	fowl mannagrass	
Poaceae	*Leersia	oryzoides	rice cutgrass	
Poaceae	Leersia	virginica	white grass	
Poaceae	** ! Panicum	boscii	bosc's panic grass	
Poaceae	**Panicum	dichotomum	bushy panic grass	
Poaceae	*Phragmites	australis	common reed	X
Poaceae	Zizaniopsis	miliacea	southern wild rice	
Polygonaceae	Polygonum	hydropiperoides	false water pepper	
Polygonaceae	*Rumex	verticillatus	water-dock	
Ranunculaceae	**Clematis	terniflora	yam-leaved clematis	X
Rosaceae	Rosa	palustris	swamp rose	
Rosaceae	Rubus	pensilvanicus	pennsylvania blackberry	
Rosaceae	** ! Rubus	phoenicolasius	wineberry	X
Rubiaceae	*Cephalanthus	occidentalis	buttonbush	
Rubiaceae	**Galium	aparine	cleavers bedstraw	

Rubiaceae	*Galium	tinctorium	marsh bedstraw
Rubiaceae	**Mitchella	repens	partridge-berry
Salicaceae	Salix	nigra	black willow
Saururaceae	*Saururus	cernuus	lizards tail
Scrophulariaceae	Gratiola	virginiana	round leaved hedge hyssop
Smilacaceae	**Smilax	bona-nox	bullbrier
Smilacaceae	Smilax	rotundifolia	round leaved greenbrier
Smilacaceae	Smilax	walteri	red-fruit greenbrier
Typhaceae	Typha	latifolia	common cat-tail
Urticaceae	*Boehmeria	cylindrica	false nettle
Valerianaceae	**Valerianella	radiata	beaked corn-salad
Vitaceae	**Parthenocissus	quinquefolia	virginia creeper
Vitaceae	**Vitis	labrusca	fox grape

Marsh plants observed in 2012 that were not reported in 2011.

Lentibulariaceae	Utricularia	vulgaris	common bladderwort
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Literature Cited

Steury, B.W. 1996. Floristics survey for vascular plants of Cove Point, Calvert County, Maryland. Unpublished report submitted to Cove Point Natural Heritage Trust.