THE
POLLY HILL
ARBORETUM

February 24th, 2011

Bea Phear
Box 1029
West Tisbury, MA 02575

Dear Bea,

Enclosed, please find our Edey Foundation grant report from the grant received, May 11th, 2010. The Mill Pond represents one of over 20 freshwater ponds surveyed on the Vineyard over the last two years by PHA research associate, Melissa Cullina.

As the Arboretum moves into its second decade we continue to build the capacity to contribute to the scientific assessment of our flora in a professional and comprehensive manner. This past year we were able to obtain a herbarium dryer and two additional storage cabinets to support our efforts. We are also now involved with field botany training for conservation land managers to increase their ability to identify, catalog, and document plant diversity on the sites they oversee on Martha's Vineyard.

Thank you for supporting this study. It now provides a historical reference of the plant diversity found at the Mill Pond, and the others ponds surveyed that are part of the Mill Brook watershed.

Sincerely,

Tim Boland

Tim Boland
Executive Director
The Poly Hill Arboretum

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Botanical Survey of Mill Pond and upstream ponds of the Mill Brook Watershed.
West Tisbury, Massachusetts

March 1st, 2011

Edey Foundation Grant Report

THE POLLY HILL ARBORETUM

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Summary
The Mill Pond and three of the ponds which feed into it were inventoried for aquatic vascular plant species. The shoreline of the Mill Pond itself was also surveyed for all vascular plant species. No invasive aquatic species were found in Mill Pond or in Priester, Crocker, or Fisher Ponds, although the ponds were found to be densely vegetated with aquatic vegetation in all shallow areas. Several "Invasive" species, including reed canary grass (*Phalaris arundinacea*), purple loosestrife (*Lythrum salicaria*), oriental bittersweet (*Celastrus orbiculatus*), and black locust (*Robinia pseudoacacia*) were found along part of the shore of the Mill Pond, along with one "Likely Invasive" species, true forget-me-not (*Myosotis scorpioides).* Several other non-native species, including the aggressive gray willow (*Salix cinerea*), were also documented. All four of the ponds exhibited a great deal of algae in late season, likely because of the heavy use of the ponds and their surrounding shores by waterfowl.

Methods
The vegetation within and around the Mill Pond was surveyed on the dates of 8 September 2009, 11 June 2010, and 21 July 2010. Botanical surveys were conducted by Polly Hill Arboretum staff and associates Tim Boland, Melissa Dow Cullina, Justin Free, and Tom Clark. Plant specimens were collected by kayak and on foot for many of the plant taxa in and around the ponds. Specimens, created by pressing, drying, and mounting onto paper, will be deposited and curated within the herbarium of the Polly Hill Arboretum. A complete species list was compiled.

The ponds upstream of Mill Pond (Priester Pond, Crocker Pond, and Fisher Pond) were also surveyed by kayak for the presence of invasive aquatic plant species. A complete species list was taken and specimens from the ponds were also collected. Crocker Pond was surveyed on 17 August 2010, Fisher Pond on 18 August 2010, and Priester Pond on 19 August 2010.

Results
A complete list of species found in Mill Pond is presented in Appendix 1. Six plant species considered problematic by the Massachusetts Invasive Plants Working Group (MIPAG; see Somers et al, 2006)) were found on the shores of Mill Pond. A small stand of reed canary grass (*Phalaris arundinacea*), classified by MIPAG as "Invasive" located on the southwestern shore of Mill Pond. Additionally, "Invasive" Oriental bittersweet (*Celatrus orbiculatus*), purple loosestrife (*Lythrum salicaria*), and black locust were found in thickets along the eastern shoreline. A small patch of true forget-me-not (*Myosotis scorpioides*), classified as "Likely Invasive" by MIPAG, was located in the shade of shubs on the western shore of the pond. A single patch of yellow flag Iris (*Iris pseudacorus*) was found along the southwest embankment of the pond. The non-native gray willow (*Salix cinerea*), found abundantly around the pond, has not been determined to be an invasive species by MIPAG, however can be aggressive. No aquatic invasive species were observed within the Mill Pond. Several species new to the County and island (Sorrie and Somers, 1999, Keith and Spongberg 2008) were documented at the time the surveys were conducted, including watercress (*Nasturtium microphyllum*; introduced), greater duckweed (*Spirodela polyrrhiza*; native), and forked coontail (*Ceratophyllum echinatum*; native).

Discussion & Recommendations

The ponds of the upper and lower Mill Brook watershed appear to be quite eutrophic based on the very dense growth of aquatic macrophytes and algae. The abundance of feathers floating in all of the ponds, plus tremendous amounts of fowl feces on the shores of Fisher Pond, and to a lesser degree, Crocker Pond, indicate that the source of the eutrophic conditions are likely a large, possibly overwintering, population of geese. In order to discourage geese, we recommend that shrub borders be allowed to grow up around all areas of the shores of the ponds in this watershed.

At this point in time, no aquatic invasive exotic species were observed within this watershed. Several invasive species have been documented around the shores of Mill Pond, however, they are not dominant community members at this time. Ideally, invasive species should be managed before populations further spread or become more dominant around the shoreline. If removed, subsequent vigilance would be needed to ensure that these species did not become re-established from nearby populations. One additional aspect of the study is the potential spread of common buckthorn, *Rhamnus cathartica.* This hyper-aggressive shrub was found along Scotchman's Lane, and a few have spread to Old County Road. Their proximity to the Mill Brook is troublesome, and will lead to further infestations. Additionally, purple loosestrife in Parsonage Pond, Town Cove, and a wet swale within 150 feet of Mill Pond should be addressed as soon as possible. (see map 1)

Finally, we recommend that common management goals be established for this watershed by the various abutting landowners. The Massachusetts Lakes and Ponds Program of the Department of Conservation and Recreation and the state division of Ecological Restoration would be excellent organizations to consult with for setting realistic goals for a healthy watershed system. Notable with the attached list of plants is the absence of a great diversity of species. This is likely the effect of a compromised water system. This baseline botanical inventory can form the basis for further studies. Dried, labeled and pressed herbarium specimens of plants collected at the Mill Pond are now located at the Polly Hill Arboretum (PHA) herbarium. This collection now forms a historical archive for these four ponds inventoried over the last year. We would like to thank the Edey Foundation for supporting our efforts.

Literature Cited

Somers, P., R. Kramer, K. Lombard, and B. Brumback . 2006. *A Guide to Invasive Plants in Massachusetts*. Massachusetts Division of Fisheries and Wildlife, Westborough, Massaschusetts.

Sorrie, B.A. and P. Somers. 1999. *The Vascular Plants of Massachusetts: A County Checklist.* Massachusetts Division of Fisheries and Wildlife, Westborough, Massaschusetts.

Keith, A. R. and S. A. Spongberg. 2008. *Island Life: A Catalog of the Biodiversity on and Around Martha's Vineyard*. Marine Biological Laboratories, Woods Hole, Massachusetts.

Appendix 1. Vascular Plant Species in and around Mill Pond

Scientific Name	CommonName	Family	Conservation/ Invasive Status
Acer rubrum	Red Maple	Sapindaceae	
Acer pseudoplatanus	Sycamore Maple	Sapindaceae	
Achillea millefolium ssp. millefolium	Yarrow	Asteraceae	
Agrostis perennans	Upland Bentgrass	Poaceae	
Ambrosia artemisiifolia	Ragweed	Asteraceae	
Amelanchier canadensis	Thicket Shadbush	Rosaceae	
Anthoxanthum odoratum	Sweet Vernalgrass	Poaceae	
Apios americana	Groundnut	Fabaceae	
Arisaema triphyllum ssp. triphyllum	Woodland Jack-in-the-pulpit	Araceae	
Asclepias incarnata ssp. pulchra	Downy Swamp-milkweed	Apocynaceae	
Bidens connata	Swamp Beggar-ticks	Asteraceae	
Calamagrostis canadensis var. canadensis	Canada Bluejoint or Reedgrass	Poaceae	
Calystegia sepium ssp. americana	Wild Morning-glory	Convolvulaceae	
Carex comosa	Bristly Sedge	Cyperaceae	
Carex scoparia var. scoparia	Broom Sedge	Cyperaceae	
Carex stricta	Tussock-sedge	Cyperaceae	
Celastrus orbiculatus	Oriental Bittersweet	Celastraceae	Invasive
Ceratophyllum echinatum	Forked Coontail	Ceratophyllaceae	
Cicuta bulbifera	Bulblet Water-hemlock	Apiaceae	
Clethra alnifolia	Sweet Pepper-bush	Clethraceae	
Cyperus strigosus	Straw-colored Flatsedge	Cyperaceae	
Daucus carota	Queen Anne's Lace	Apiaceae	
Decodon verticillatus	Water-willow	Lythraceae	
Dichanthelium clandestinum	Deer-tongue	Poaceae	
Eleocharis obtusa var. obtusa	Soft-stemmed Spike-rush	Cyperaceae	
Eleocharis palustris	Creeping Spike-rush	Cyperaceae	
Eragrostis pectinacea var. pectinacea	Tufted Lovegrass	Poaceae	
Eupatorium perfoliatum	Boneset	Asteraceae	
Euthamia graminifolia	Grass-leaf Flat-topped Goldenrod, Common Flat-topp	Asteraceae	
Eutrochium dubium	Atlantic Joe-Pye-weed	Asteraceae	
Galium trifidum ssp. trifidum	Tricleft Bedstraw, Northern Three-lobed Bedstraw	Rubiaceae	
Glyceria obtusa	Coastal Mannagrass	Poaceae	
Holcus lanatus	Velvet-grass	Poaceae	
Hypericum mutilum	Dwarf St. John's-wort	Hypericaceae	

Scientific Name	CommonName	Family	Conservation/ Invasive Status
Impatiens capensis	Orange Jewelweed	Balsaminaceae	
Iris pseudacorus	Yellow Flag Iris	Iridaceae	Invasive
Juncus brevicaudatus	Short-tailed Rush	Juncaceae	
Juncus pylaei	Soft Rush	Juncaceae	
Juncus tenuis	Path-rush, Yard-rush	Juncaceae	
Lemna minuta	Minute Duckweed	Aracaee	
Lonicera morrowii	Morrow Honeysuckle	Caprifoliaceae	Invasive
Lyonia ligustrina var. ligustrina	Maleberry	Ericaceae	
Lysimachia terrestris	Swamp-candles	Myrsinaceae	
Lythrum salicaria	Purple Loosestrife	Lythraceae	Invasive
Maianthemum canadense	Canada Mayflower	Ruscaceae	
Myosotis scorpioides	True Forget-me-not	Boraginaceae	Likely Invasive
Myrica gale	Sweet Gale	Myricaceae	
Nasturtium microphyllum	Watercress	Brassicaceae	
Nyssa sylvatica	Black Gum	Cornaceae	
Oenothera biennis	Common Evening-primrose	Onagraceae	
Onoclea sensibilis	Sensitive Fern	Onocleaceae	
Osmundastrum cinnamomea	Cinnamon-fern	Osmundaceae	
Oxalis stricta	Common Yellow Wood-sorrel	Oxalidaceae	
Parthenocissus quinquefolia	Virginia Creeper	Vitaceae	
Persicaria arifolia	Halberd-leaf Tearthumb	Polygonaceae	
Phalaris arundinacea	Reed Canary-grass	Poaceae	Invasive
Phleum pratense	Timothy	Poaceae	
Potamogeton berchtoldii	Slender Tiny Pondweed	Potamogetonaceae	
Potamogeton epihydrus	Ribbon-leaf Pondweed	Potamogetonaceae	
Prunus serotina var. serotina	Black Cherry	Rosaceae	
Quercus velutina	Black Oak	Fagaceae	
Rhododendron viscosum	Swamp-azalea	Ericaceae	
Rhus copallinum var. latifolia	Winged Sumac	Anacardiaceae	
Robinia pseudoacacia	Black Locust	Fabaceae	Invasive
Rubus allegheniensis	Common Blackberry	Rosaceae	
Rubus flagellaris	Northern Dewberry	Rosaceae	
Rubus hispidus	Bristly Dewberry	Rosaceae	
Rubus idaeus ssp. idaeus	European Raspberry, Garden-raspberry	Rosaceae	
Rumex crispus ssp. crispus	Curly Dock	Polygonaceae	

Scientific Name	CommonName	Family	Conservation/ Invasive Status
Salix cinerea ssp. cinerea	Gray Willow	Salicaceae	
Salix cinerea ssp. oleifolia	Gray Willow	Salicaceae	
Saponaria officinalis	Soapwort	Caryophyllaceae	
Schoenoplectus pungens var. pungens	Common Threesquare	Cyperaceae	
Smilax rotundifolia	Common Greenbrier	Smilacaceae	
Solanum dulcamara	Bittersweet Nightshade	Solanaceae	
Solidago rugosa var. rugosa	Rough-stemmed Goldenrod, Wrinkle-leaved Goldenrod	Asteraceae	
Sparganium americanum	Common Bur-reed	Typhaceae	
Spartina pectinata	Prairie Cord-grass	Poaceae	
Spiraea tomentosa	Steeple-bush	Rosaceae	
Spirodela polyrrhiza	Greater Duckweed	Araceae	
Swida sericea	Red Osier Dogwood	Cornaceae	
Toxicodendron radicans ssp. radicans	Poison-ivy	Anacardiaceae	
Triadenum virginicum	Marsh St. John's-wort	Hypericaceae	
Typha latifolia	Common Cat-tail	Typhaceae	
Vaccinium corymbosum	Highbush-blueberry	Ericaceae	
Viburnum dentatum var. lucidum	Northern Arrow-wood	Adoxaceae	

Bold – Indicates Non-native species

Budget Granted	$2,000.00	
Botanical Fieldwork -	**Collecting, pressing, identification, determination, correspondence**	
32 hours 35/fr.	$1,320.00	
Report Write-up		
6 hours	$210.00	
Mounting and Labeling Herbarium Vouchers		
8 hours	$280.00	
	$1,810.00	Total Grant Used

Map 1.

☆ Indicates buckthorn presence on Scotchman's Lane and Old County Road. ■ Indicates purple loosestrife on Parsonage Pond, Edgartown - West Tisbury road swale, Mill Pond and at Town Cove.

Additional ponds surveyed as part of the Mill Brook- Tisbury Great Pond watershed:
Fisher, Crocker, and Priesters Ponds.

March 1st, 2011