Appendix A. List of Invasive Plant Species in New Jersey
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
(Note: See New Jersey Invasive Species Strike Team website for more information - www.njisst.org)

Species Name and Family			CJISST Information					
Scientific Name	Common Name	Family Name	CJISST Target	CJISST Search Grouping	Current Distribution Code	CJISST Category	Threat Code	ED/RR Action Code
Acer ginnala Maxim.	Amur maple	Aceraceae	Yes	1	Stage 0	Emerging	Moderate	1
Acer palmatum Thunb.	Japanese maple	Aceraceae	Yes	1	Stage 0	Emerging	Moderate	1
Acer pseudoplatanus L.	sycamore maple	Aceraceae	Yes	1	Stage 0	Emerging	High	1
Actinidia arguta (Siebold & Zucc.) Planch. ex Miq.	hardy kiwi	Actinidiaceae	Yes	2	Stage 0	Emerging	Mild	1
Alnus glutinosa (L.) Gaertn.	European alder	Betulaceae	Yes	4	Stage 0	Emerging	High	1
Artemisia stelleriana Bess.	oldwoman	Asteraceae	Yes	3	Stage 0	Emerging	Moderate	1
Buddleja davidii Franch.	orange eye butterflybush	Buddlejaceae	Yes	3	Stage 0	Emerging	Moderate	1
Dioscorea oppositifolia L.	Chinese yam	Dioscoreaceae	Yes	2	Stage 0	Emerging	Moderate	1
Elaeagnus angustifolia L.	Russian olive	Elaeagnaceae	Yes	3	Stage 0	Emerging	High	1
Eleutherococcus sieboldianus (Makino) Koidz.	fiveleaf aralia	Araliaceae	Yes	1	Stage 0	Emerging	High	1
Heracleum mantegazzianum Sommier & Levier	giant hogweed	Apiaceae	Yes	3	Stage 0	Emerging	Moderate	1
Ligustrum ovalifolium Hassk.	California privet	Oleaceae	Yes	1	Stage 0	Emerging	High	1
Lonicera caprifolium	Italian honeysuckle	Caprifoliaceae	Yes	1	Stage 0	Emerging	Moderate	1
Lonicera fragrantissima	fragrant honeysuckle	Caprifoliaceae	Yes	1	Stage 0	Emerging	Moderate	1
Ludwigia peploides (HBK.) Raven var. glabrescens (Kuntze) Shinners	floating primrose-willow	Onagraceae	Yes	5	Stage 0	Emerging	High	1
Marsilea quadrifolia L.	European waterclover	Marsileaceae	Yes	5	Stage 0	Emerging	High	1
Myriophyllum aquaticum (Vell.) Verdc.	Parrot feather	Haloragaceae	Yes	5	Stage 0	Emerging	High	1
Phellodendron japonicum Maxim.	Japanese corktree	Rutaceae	Yes	3	Stage 0	Emerging	Moderate	1
Pueraria montana (Lour.) Merr. var. lobata (Willd.) Maesen & S. Almeida	kudzu	Fabaceae	Yes	2	Stage 0	Emerging	High	1
Rubus discolor Weihe & Nees	Himalayan blackberry	Rosaceae	Yes	3	Stage 0	Emerging	Moderate	1
Ulmus parvifolia Jacq.	Chinese elm	Ulmaceae	Yes	1	Stage 0	Emerging	High	1
Ulmus procera	English elm	Ulmaceae	Yes	1	Stage 0	Emerging	High	1
Viburnum lantana L.	wayfaring tree	Caprifoliaceae	Yes	1	Stage 0	Emerging	High	1
Viburnum plicatum Thunb.	Japanese snowball viburnum	Caprifoliaceae	Yes	1	Stage 0	Emerging	High	1
Viburnum setigerum Hance	tea viburnum	Caprifoliaceae	Yes	1	Stage 0	Emerging	High	1
Conium maculatum L.	poison hemlock	Apiaceae	Yes	4	Stage 1	Emerging	Moderate	1
Dipsacus laciniatus L.	cutleaf teasel	Dipsacaceae	Yes	4	Stage 1	Emerging	Moderate	1
Euonymus europaea L.	European spindletree	Celastraceae	Yes	1	Stage 1	Emerging	Moderate	1
Euonymus fortunei (Turcz.) Hand.-Maz.	winter creeper	Celastraceae	Yes	1	Stage 1	Emerging	Moderate	1
Hedera helix L.	English ivy	Araliaceae	Yes	2	Stage 1	Emerging	Moderate	1
Pachysandra terminalis Siebold & Zucc.	Japanese pachysandra	Buxaceae	Yes	1	Stage 1	Emerging	Mild	1
Parthenocissus tricuspidata (Sieb. & Zucc.) Planch.	Boston ivy	Vitaceae	Yes	2	Stage 1	Emerging	High	1
Perilla frutescens (L.) Britt. var. frutescens	beefsteakplant	Lamiaceae	Yes	4	Stage 1	Emerging	Mild	1
Phalaris canariensis L.	annual canarygrass	Poaceae	Yes	4	Stage 1	Emerging	High	1
Polygonum orientale L.	kiss me over the garden gate	Polygonaceae	Yes	2	Stage 1	Emerging	Moderate	1
Polygonum sachalinense F. Schmidt ex Maxim.	giant knotweed	Polygonaceae	Yes	4	Stage 1	Emerging	High	1
Ribes rubrum L.	garden red current	Grossulariaceae	Yes	1	Stage 1	Emerging	Moderate	1
Robinia hispida L. var. hispida	bristly locust	Fabaceae	Yes	3	Stage 1	Emerging	Moderate	1
Rosa canina L.	dog rose	Rosaceae	Yes	3	Stage 1	Emerging	Moderate	1
Ulmus pumila L.	Siberian elm	Ulmaceae	Yes	1	Stage 1	Emerging	High	1
Akebia quinata (Houtt.) Dcne.	chocolate vine	Lardizabalaceae	Yes	2	Stage 2	Emerging	High	1
Amorpha fruticosa L.	desert false indigo	Fabaceae	Yes	3	Stage 2	Emerging	High	1
Ampelopsis brevipedunculata (Maxim.) Trautv.	Amur peppervine	Vitaceae	Yes	2	Stage 2	Emerging	High	1
Anthriscus sylvestris (L.) Hoffmann	wild chervil	Apiaceae	Yes	3	Stage 2	Emerging	Moderate	1

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Scientific Name	Common Name	Family Name	CJISST Target	CJISST Search Grouping	Current Distribution Code	CJISST Category	Threat Code	ED/RR Action Code
Berberis vulgaris L.	common barberry	Berberidaceae	Yes	1	Stage 2	Emerging	Moderate	1
Cynanchum louiseae Kartesz & Gandhi	black swallowwort	Asclepiadaceae	Yes	2	Stage 2	Emerging	High	1
Eragrostis curvula (Schrad.) Nees	weeping lovegrass	Poaceae	Yes	3	Stage 2	Emerging	High	1
Frangula alnus P. Mill.	glossy buckthorn	Rhamnaceae	Yes	4	Stage 2	Emerging	High	1
Humulus lupulus L. var. lupulus	common hop	Cannabaceae	Yes	2	Stage 2	Emerging	Moderate	1
Iris pseudacorus L.	paleyellow iris	Iridaceae	Yes	4	Stage 2	Emerging	High	1
Lonicera tatarica L.	Tatarian honeysuckle	Caprifoliaceae	Yes	1	Stage 2	Emerging	Moderate	1
Malus toringo (Siebold) Siebold ex de Vriese	Japanese crabapple	Rosaceae	Yes	1	Stage 2	Emerging	High	1
Miscanthus sinensis Anderss.	Chinese silvergrass	Poaceae	Yes	3	Stage 2	Emerging	High	1
Photinia villosa (Thunb.) DC.	Oriental photinia	Rosaceae	Yes	1	Stage 2	Emerging	High	1
Pyrus calleryana Dcne.	Callery pear	Rosaceae	Yes	3	Stage 2	Emerging	High	1
Rhamnus cathartica L.	common buckthorn	Rhamnaceae	Yes	1	Stage 2	Emerging	High	1
Rhodotypos scandens (Thunb.) Makino	jetbead	Rosaceae	Yes	1	Stage 2	Emerging	High	1
Rosa rugosa Thunb.	rugosa rose	Rosaceae	Yes	3	Stage 2	Emerging	High	1
Rubus laciniatus Willd.	cutleaf blackberry	Rosaceae	Yes	3	Stage 2	Emerging	Moderate	1
Trapa natans L.	water chestnut	Trapaceae	Yes	5	Stage 2	Emerging	High	1
Viburnum sieboldii Miq.	Siebold's arrowwood	Caprifoliaceae	Yes	1	Stage 2	Emerging	High	1
Wisteria floribunda (Willd.) DC.	Japanese wisteria	Fabaceae	Yes	2	Stage 2	Emerging	High	1
Aralia elata (Miq.) Seem.	Japanese angelica tree	Araliaceae	Yes	3	Stage 3	Emerging	High	2
Cardamine impatiens L.	narrowleaf bittercress	Brassicaceae	Yes	1	Stage 3	Emerging	High	2
Clematis terniflora DC.	Japanese clematis	Ranunculaceae	Yes	2	Stage 3	Emerging	High	2
Humulus japonicus Sieb. & Zucc.	Japanese hop	Cannabaceae	Yes	2	Stage 3	Emerging	High	2
Lespedeza cuneata (Dum.-Cours.) G. Don	sericea lespedeza	Fabaceae	Yes	3	Stage 3	Emerging	High	2
Lysimachia nummularia L.	creeping jenny	Primulaceae	Yes	4	Stage 3	Emerging	Mild	2
Polygonum perfoliatum L.	Asiatic tearthumb	Polygonaceae	Yes	2	Stage 3	Emerging	High	2
Rorippa nasturtium-aquaticum (L.) Hayek	white watercress	Brassicaceae	Yes	5	Stage 3	Emerging	High	2
Viburnum dilatatum Thunb.	linden arrowwood	Caprifoliaceae	Yes	1	Stage 3	Emerging	High	2
Acer platanoides L.	Norway maple	Aceraceae	No	N/A	Widespread	Invasive	High	3
Acorus calamus L.	calamus	Acoraceae	No	N/A	Widespread	Invasive	High	3
Ailanthus altissima (P. Mill.) Swingle	tree of heaven	Simaroubaceae	No	N/A	Widespread	Invasive	High	3
Alliaria petiolata (Bieb.) Cavara & Grande	garlic mustard	Brassicaceae	No	N/A	Widespread	Invasive	High	3
Artemisia vulgaris L. var. vulgaris	common wormwood	Asteraceae	No	N/A	Widespread	Invasive	Moderate	3
Arthraxon hispidus (Thunb.) Makino	small carpgrass	Poaceae	No	N/A	Widespread	Invasive	Moderate	3
Berberis thunbergii DC.	Japanese barberry	Berberidaceae	No	N/A	Widespread	Invasive	High	3
Carex kobomugi Ohwi	Japanese sedge	Cyperaceae	No	N/A	Widespread	Invasive	High	3
Celastrus orbiculata Thunb.	Oriental bittersweet	Celastraceae	No	N/A	Widespread	Invasive	High	3
Centaurea biebersteinii DC.	spotted knapweed	Asteraceae	No	N/A	Widespread	Invasive	Moderate	3
Cirsium arvense (L.) Scop.	Canada thistle	Asteraceae	No	N/A	Widespread	Invasive	Moderate	3
Dipsacus fullonum L.	Fuller's teasel	Dipsacaceae	No	N/A	Widespread	Invasive	Moderate	3
Elaeagnus umbellata Thunb. var. parvifolia (Royle) Schneid.	autumn olive	Elaeagnaceae	No	N/A	Widespread	Invasive	High	3
Euonymus alata (Thunb.) Sieb.	burningbush	Celastraceae	No	N/A	Widespread	Invasive	High	3
Ligustrum obtusifolium Sieb. & Zucc.	border privet	Oleaceae	No	N/A	Widespread	Invasive	High	3
Ligustrum vulgare L.	European privet	Oleaceae	No	N/A	Widespread	Invasive	High	3
Lonicera japonica Thunb.	Japanese honeysuckle	Caprifoliaceae	No	N/A	Widespread	Invasive	High	3

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Lonicera maackii (Rupr.) Herder	Amur honeysuckle	Caprifoliaceae	No	N/A	Widespread	Invasive	High	3
Lonicera morrowii Gray	Morrow's honeysuckle	Caprifoliaceae	No	N/A	Widespread	Invasive	High	3
Lythrum salicaria L.	purple loosestrife	Lythraceae	No	N/A	Widespread	Invasive	High	3
Microstegium vimineum (Trin.) A. Camus	Japanese stiltgrass	Poaceae	No	N/A	Widespread	Invasive	High	3
Myriophyllum spicatum L.	Eurasian watermilfoil	Haloragaceae	No	N/A	Widespread	Invasive	High	3
Phalaris arundinacea L.	reed canarygrass	Poaceae	No	N/A	Widespread	Invasive	High	3
Phragmites australis (Cav.) Trin. ex Steud.	common reed	Poaceae	No	N/A	Widespread	Invasive	High	3
Polygonum cuspidatum Sieb. & Zucc.	Japanese knotweed	Polygonaceae	No	N/A	Widespread	Invasive	High	3
Potamogeton crispus L.	curly pondweed	Potamogetonaceae	No	N/A	Widespread	Invasive	High	3
Ranunculus ficaria L. var. bulbifera Marsden-Jones	fig buttercup	Ranunculaceae	No	N/A	Widespread	Invasive	High	3
Robinia pseudoacacia L.	black locust	Fabaceae	No	N/A	Widespread	Invasive	Moderate	3
Rosa multiflora Thunb. ex Murr.	multiflora rose	Rosaceae	No	N/A	Widespread	Invasive	High	3
Rubus phoenicolasius Maxim.	wine raspberry	Rosaceae	No	N/A	Widespread	Invasive	High	3

NJISST Target
Includes only emerging invasive species (widespread species are excluded)

NJISST Search Grouping
1 = Forest Invasives, 2 = Invasive Vines, 3 = Open Upland Habitat Invasives, 4 = Open Wetland Habitat Invasives, 5 = Open Water Invasives

Current Distribution Code
Stage 0 = Absent or very rare, Stage 1 = Rare (may be locally common), Stage 2 = Uncommon (may be regionally common or abundant), Stage 3 = Common (may be regionally abundant), Widespread = Very common

Threat Code
Values include Mild, Moderate, or High threat to natural plant communities

ED/RR Action Code
1 = Eradication of ALL detected occurrences (Applies to Stage 0, Stage 1, and Stage 2 species that are considered to pose a threat to natural plant communities),
2 = Eradication of newly emerging occurrences only (Applies to Stage 3 species that are considered to pose a threat to natural plant communities)
3 = Species should be considered for site-based early detection/rapid response (Applies to already widespread invasive species)

Appendix B. List of Invasive Animal Species in New Jersey
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Scientific Name	Common Name	Taxa	Origin	National Distribution Status[1]	National Invasive Species Status[2]	Risk of Introduction to New Jersey[3]	New Jersey Distribution Status[4]	New Jersey Threat Status[5]	New Jersey Invasive Status[6]	Notes
Aedes albopictus	Asian tiger mosquito	insect	Asia	established	Invasive	Already Present	Widespread	Moderate	Invasive	First discovered in 1985 (Texas), First NJ record in Monmounth County (1995); unknown ecological impacts; may transmit human diseases.
Aporrectodea limicola	earthworm (Lumbricidae)	invertebrate	Europe	established	Invasive	Already Present	Widespread	High	Invasive	May dramatically alter forest soils leading to soil erosion and changes in nutrient availability; often associated with infestations of invasive plant species.
Carpodacus mexicanus	house finch	bird	North America	established	N/A	Already Present	Widespread	Moderate	Invasive	Primarily associated with human habitations and agricultural fields; populations are large and may compete with native birds for food and nesting sites; introduced to the eastern U.S. in 1940's.
Corbicula fulminea	Asiatic clam	mussel	Asia	established	Invasive	Already Present	Widespread	Moderate	Invasive	Widespread outside of Pine Barrens; species may produce 'biofouling' of intake pipes in the U.S.; ecological impacts unknown; tolerant of human-caused impacts (silting, nutrient loads, etc.).
Dendrobaena octaedra	earthworm (Lumbricidae)	invertebrate	Europe	established	Invasive	Already Present	Widespread	High	Invasive	May dramatically alter forest soils leading to soil erosion and changes in nutrient availability; often associated with infestations of invasive plant species.
Eisenia rosea	earthworm (Lumbricidae)	invertebrate	Europe	established	Invasive	Already Present	Widespread	High	Invasive	May dramatically alter forest soils leading to soil erosion and changes in nutrient availability; often associated with infestations of invasive plant species.
Felis domesticus	feral cats	mammal	Africa (but with significant selection for domestication)	established	Invasive	Already Present	Widespread	High	Invasive	Primarily associated with human habitations; estimated to result in the death of nearly 240 million birds per year in the U.S.
Lumbricus rubellus	earthworm (Lumbricidae)	invertebrate	Europe	established	Invasive	Already Present	Widespread	High	Invasive	May dramatically alter forest soils leading to soil erosion and changes in nutrient availability; often associated with infestations of invasive plant species.
Lumbricus terrestris	earthworm (Lumbricidae)	invertebrate	Europe	established	Invasive	Already Present	Widespread	High	Invasive	May dramatically alter forest soils leading to soil erosion and changes in nutrient availability; often associated with infestations of invasive plant species.
Molothrus ater	brown-headed cowbird	bird	North America	established	N/A	Already Present	Widespread	High	Invasive	Primarily associated with small forest patches, edges, grasslands, and agricultural operations; parasitize nests of native birds and kill nestlings; range expanded toward New Jersey with forest clearing for agriculture.
Orconectes rusticus	rusty crayfish	crustacean	North America	established	N/A	Already Present	Widespread	Moderate	Invasive	Can reduce native crayfish and alter fish species composition.

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Passer domesticus	house sparrow	bird	Europe	established	Invasive	Already Present	Widespread	Moderate	Invasive	Primarily associated with human habitations and agricultural fields; may consume wheat, corn, and buds of fruit trees; may harass or displace native birds (e.g., eastern bluebird, tree swallows).
Pseudemys scripta elegans	red-eared slider	reptile	North America	established	N/A	Already Present	Widespread	Moderate	Invasive	May directly compete with native painted turtle.
Sturnus vulgaris	European starling	bird	Europe	established	Invasive	Already Present	Widespread	Moderate	Invasive	Primarily associated with human habitations and agricultural operations; may harass or displace native birds (especially other cavity nesting species - e.g., woodpeckers, eastern bluebird).
Cygnus olor	mute swan	bird	Eurasia	established	Invasive	Already Present	Emerging Stage 1	High	Emerging / Potential	Population growth rate very high in New Jersey, localized damage observed (e.g., Great Swamp National Wildlife Reguge); often associated with ponds in developed parks; may harass or displace native birds; occassionally aggressive toward humans especially while nesting.
Dreissena bugensis	quagga mussel	mussel	Eurasia	established	Invasive	High	Emerging Stage 0	High	Emerging / Potential	Found in one location in eastern Pennsylvania; Not found in New Jersey, but introduction is possible.
Dreissena polymorpha	zebra mussel	mussel	Eurasia	established	Invasive	High	Emerging Stage 0	High	Emerging / Potential	Causes signifcant damage where present.
Myocastor coypus	nutria	mammal	South America	established	Invasive	Already Present	Emerging Stage 0	High	Emerging / Potential	Limited distribution and abundance.
Sus scrofa	feral hog	mammal	Escaped livestock	established	Invasive	Already Present	Emerging Stage 1	High	Emerging / Potential	Large population (> 100 individuals) known from the White Oak Branch Wildlife Management Area and neighboring state-owned golf course in Gloucester County (several other observations of feral hogs have been reported in Ocean and Sussex Counties). Species is subject to a current eradication program. Species may carry pseudo-rabies that can infect domestic pigs. Feral hogs are known to produce significant impacts on natural systems in other parts of the country.
Alectoris graeca	chukar	bird	Asia	established	Non-Invasive	Already Present	Emerging Stage 0	Mild	Non - Invasive	Introduced game species, common on game farms but cannot sustain populations without continued human stocking programs.
Columba livia	rock dove	bird	Europe	established	Invasive	Already Present	Widespread	Mild	Non - Invasive	Primarily associated with human habitations and agricultural operations; may be considered a risk to human health; foul structures.
Lepus californicus	black-tailed jackrabbit	mammal	North America	established	N/A	Already Present	Emerging Stage 0	Mild	Non - Invasive	Introduced game species.
Lepus capensis	European hare	mammal	Europe	established	Non-Invasive	Already Present	Emerging Stage 0	Mild	Non - Invasive	Introduced game species.
Lepus townsendii	white-tailed jackrabbit	mammal	North America	established	N/A	Already Present	Emerging Stage 0	Mild	Non - Invasive	Introduced game species.

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Mus musculus	house mouse	mammal	Eurasia	established	Non-Invasive	Already Present	Widespread	Mild	Non - Invasive	Primarily associated with human habitations, may be considered an agricultural problem and risk to human health; may compete with native small mammals.
Myiopsitta monachus	monk parakeet	bird	South America	established	Invasive	Already Present	Emerging Stage 1	Mild	Non - Invasive	Currently known from a few isolated, but persistant breeding populations associated with urban areas. Current property damage to utility poles, but species is an agricultural pest in its native range.
Phasianus colchicus	ring-necked pheasant	bird	Asia	established	Non-Invasive	Already Present	Emerging Stage 2	Mild	Non - Invasive	Introduced game species with marginal ability to maintain populations without continued stocking.
Rattus norvegicus	brown rat	mammal	Europe	established	Non-Invasive	Already Present	Widespread	Mild	Non - Invasive	Primarily associated with human habitations, may be considered an agricultural problem and risk to human health.
Rattus rattus	black rat	mammal	Asia	established	Non-Invasive	Already Present	Widespread	Mild	Non - Invasive	Primarily associated with human habitations, may be considered an agricultural problem and risk to human health.
Trionyx spiniferus	Eastern spiny softshell	reptile	North America	established	N/A	Already Present	Emerging Stage 1	Mild	Non - Invasive	Maurice River system only
Ambloplites rupestris	rock bass	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, competition for food with similar species.
Ameiurus melas	black bullhead	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish communities through predation.
Amia calva	bowfin	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish communities through predation.
Astronotus ocellatus	oscar	freshwater fish	South America	established	Uknown	Already Present	Unknown	Unknown	Unknown	Introduced from aquarium releases, may compete with other sunfish for food and nesting locations.
Bithynia tentaculata	mud bithynia	snail	Europe	established	Uknown	Already Present	Unknown	Unknown	Unknown	Records for Sussex County.
Carassius auratus	goldfish	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced ornamental species, may alter aquatic vegetation and substrate.
Cipangopaludina chinensis malleata	Chinese mystery snail	snail	Asia	established	Uknown	Unknown	Unknown	Unknown	Unknown	
Craspedacusta sowerbyi	freshwater jellyfish	hydrozoan	Asia	established	Uknown	Unknown	Unknown	Unknown	Unknown	Widespread distribution.
Ctenopharyngodon idella	grass carp	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter aquatic vegetation and substrate
Cyprinus carpio	common carp	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter aquatic vegetation and substrate.
Esox lucius	Northern pike	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish community composition through predation, may elimate smaller native fish species.
Esox lucius x masquinongy	tiger muskellunge	freshwater fish	Artificial hybrid	established	Game Species	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish community composition through predation, may elimate smaller native fish species.
Esox masquinongy	muskellunge	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish community composition through predation, may elimate smaller native fish species.

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Gambusia affinis	mosquitofish	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced for mosquito control, may impact fish species through egg predation and composition of invertebrate communities -- may not be effective at controlling mosquitos.
Ictalurus furcatus	blue catfish	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may hybridize with other catfish, may alter fish species composition through predation.
Ictalurus punctatus	channel catfish	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may hybridize with other catfish, may alter fish species composition through predation.
Lepomis cyanellus	green sunfish	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game and bait species, may alter fish communities through competition and predation.
Lepomis gulosus	warmouth	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game and bait species, may alter fish communities through competition and predation, may hybridize with other sunfish.
Lepomis macrochirus	bluegill	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game and bait species, may alter fish communities through competition and predation.
Leuciscus idus	ide	freshwater fish	Europe	established	Game Species	Already Present	Unknown	Unknown	Unknown	Introduced game species, may behavior similarly to goldfish and carp.
Micropterus dolomieu	smallmouth bass	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish community composition through predation, may elimate smaller native fish species.
Micropterus salmoides	largemouth bass	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish community composition through predation, may elimate smaller native fish species.
Misgurnus anguillicaudatus	Oriental weatherfish	freshwater fish	Asia	established	Invasive	Already Present	Unknown	Unknown	Unknown	Introduced aquarium species.
Oncorhynchus mykiss	rainbow trout	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish community composition through predation, may elimate smaller native fish species.
Orconectes virilis	virile crayfish	crustacean	North America	established	N/A	Unknown	Unknown	Unknown	Unknown	Create damage to levees.
Pectinatella magnifica	freshwater bryozoan	bryozoan	North America	established	N/A	Unknown	Unknown	Unknown	Unknown	Can create a toxin poisonous to fish.
Physella acuta	European physa	snail	Europe	established	Uknown	Unknown	Unknown	Unknown	Unknown	
Pimephales notatus	bluntnose minnow	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced bait species.
Pimephales promelas	fathead minnow	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced bait species.
Pisidium amnicum	greater European pea clam	mussel	Europe	established	Uknown	Unknown	Unknown	Unknown	Unknown	Can grow at great densities in native range.
Pomoxis alularis	white crappie	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish communities through competition and predation.
Pomoxis nigromaculatus	black crappie	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish communities through competition and predation.
Pylodictis olivaris	flathead catfish	freshwater fish	North America	established	N/A	High	Emerging Stage 0	Unknown	Unknown	Introduced game species, may alter fish communities through competition and predation.
Radix auricularia	big-ear radix	snail	Europe	established	Uknown	Already Present	Unknown	Unknown	Unknown	
Salmo trutta	brown trout	freshwater fish	Europe	established	Game Species	Already Present	Widespread	Unknown	Unknown	Introduced game species, may impact native brook trout through competition or predation.

Appendix B. List of Invasive Animal Species in New Jersey
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Scientific Name	Common Name	Taxa	Origin	National Distribution Status[1]	National Invasive Species Status[2]	Risk of Introduction to New Jersey[3]	New Jersey Distribution Status[4]	New Jersey Threat Status[5]	New Jersey Invasive Status[6]	Notes
Salvelinus namaycush	lake trout	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish communities through competition and predation.
Sander vitreus	walleye	freshwater fish	North America	established	N/A	Already Present	Widespread	Unknown	Unknown	Introduced game species, may alter fish communities through competition and predation.

Notes

1 - National Distribution Status: coarse estimate based upon sources including Ehrlich et al. 1988, GISP 2007, NJDEP 2007, Steves et al. 2007, USGS-NAS 2007

2 - National Invasive Species Status: This is not an official status - Values include 'Invasive', 'Non-Invasive', 'Unknown' or 'N/A' for species native to some portion of the United States.

3 - Risk of Introduction to New Jersey: very coarse estimate of risk of establishing in NJ; values include 'Already Present', 'High', 'Moderate', 'Mild', 'Unknown'

4 - New Jersey Distribution Status: very coarse estimate of current infestation status; values include - Stage 0 (absent or very rare), Stage 1 (Rare or Locally Common), Stage 2 (Uncommon, but may be regionally commmon or abundant), Stage 3 (Common, but may be regionally abundant), Widespread

5 - New Jersey Threat Code: very coarse estimate of current or potential damage; values include - 'High', 'Moderate', 'Mild', 'Unknown'

6 - New Jersey Invasive Status: values include 'Invasive', 'Emerging / Potential', 'Non-Invasive', and 'Unknown'

Appendix C. Invasive Pest and Pathogen Species in New Jersey
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Scientific Name	Common Name	Type	National Distribution Status[1]	National Invasive Species Status[2]	Risk of Introduction to New Jersey[3]	New Jersey Distribution Status[4]	New Jersey Threat Status[5]	New Jersey Invasive Status[6]	Species at Risk	Comments
Adelges tsugae	hemlock woolly adelgid	insect	established	Invasive	Already Present	Widespread	High	Invasive	Eastern hemlock (*Tsuga canadensis*), Carolina hemlock (*Tsuga caroliniana*)	Biocontrol agent of limited efficacy, half of NJ hemlocks killed and nearly all wounded.
Cryphonectria parasitica	chestnut blight (bark disease)	pathogen	established	Invasive	Already Present	Widespread	High	Invasive	American chestnut (*Castanea dentata*), Allegheny chinkapin (*Castanea pumila*)	Chestnuts have been reduced to short-lived sprouts. There are efforts to produce plants with resistance for future reintroduction.
Discula destructiva	dogwood anthracnose disease	pathogen	established	Invasive	Already Present	Widespread	Moderate	Invasive	Flowering dogwood (*Cornus florida*)	Resistance found in non-native ornamental (*Cornus kousa*), but is rare or absent in the native *C. florida;* acid deposition increases susceptibility, more prevalent in southeast U.S.
Lymatria dispar	European gypsy moth	insect	established	Invasive	Already Present	Widespread	Moderate	Invasive	Primarily Oak species (*Quercus* spp.)	periodic severe defoliations occur, perennial low level infestations. Last serious defoliations occurred over 20 years ago. Species is currently controlled by a native pathogen and aerial application of Bt.
Nectria coccinea var. *faginata*	beech bark disease	pathogen / insect	established	Invasive	Already Present	Widespread	Moderate	Invasive	American beech (*Fagus grandifolia*)	Found throughout the state, but damage is not currently severe. *Nectria coccinea* var. *faginata* (pathogen) with *Cryptococcus fagisuga* (insect)
Ophiostoma ulmi	Dutch elm disease	pathogen / insect	established	Invasive	Already Present	Widespread	Moderate	Invasive	American elm (*Ulmus americana*)	Mostly street trees infected, but also impacts forests, slippery elm (*Ulmus rubra*) has some reistance. *Ophiostoma ulmi* (pathogen) vectored by native elm bark beetle (*Hylurgopinus rufipes*) and the European bark beetle (*Scolytus multistriatus*).
Sirococcus clavigignentii-juglandacearum	butternut canker	pathogen	established	Invasive	Already Present	Widespread	Moderate	Invasive	Butternut (*Juglans cinerea*)	Butternut relatively uncommon in NJ.
Anoplophora glabripennis	Asian longhorned beetle	insect	recently introduced	Invasive	Already Present	Emerging Stage 1	High	Emerging / Potential	maples (*Acer* spp.), poplars (*Populus* spp.), birches (*Betula* spp.), elms (*Ulmus* spp.)	USDA risk map shows New Jersey as largely non-susceptible, but beetles show preference for sugar maple (these forest types in NJ include globally rare limestone forest communities); Eradication programs in urban areas - New York City, Jersey City, Carteret, Woodbridge, and Rahway are ongoing.
Pyrrhalta viburni	Viburnum leaf beetle	insect	established	Invasive	Already Present	Emerging Stage 1	High	Emerging / Potential	Various species of native *Viburnum*	Viburnum are substantial components of forests and shrublands and provide high-quality fruit utilized by birds. Species has spread throughout NY state over the last 10 years. Cranberry viburnum and arrowwood viburnum may be the most susceptible species.
Cronartium ribicola	white pine blister rust	pathogen	established	Invasive	Already Present	Emerging Stage 2	Moderate	Emerging / Potential	Five needle pines (e.g., white pine - *Pinus strobus*)	NJDA considers species to be dangerous plant disease and is a nuisance. NJDA restricts importation and movement of infected white pine trees and currants (Ribes sp. and Grossularia sp.). Relatively small pockets of naturally occurring white pine in New Jersey, but could have large impacts to nursery industry.
Tomicus piniperda	common pine shoot beetle	insect	recently introduced	Invasive	Already Present	Emerging Stage 2	Moderate	Emerging / Potential	Scotch pine (Pinus sylvestris) and other Pines (*Pinus* spp.)	Discovered in North America in 1992 (Ohio) and now known from 12 states; May cause damage to Christmas tree farms; may cause severe decline in the health of the trees; APHIS-PPQ limits its spread beyond the infested area through quarantine, an active regulatory program and control of infestation impacts.

Appendix C. Invasive Pest and Pathogen Species in New Jersey
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Scientific Name	Common Name	Type	National Distribution Status[1]	National Invasive Species Status[2]	Risk of Introduction to New Jersey[3]	New Jersey Distribution Status[4]	New Jersey Threat Status[5]	New Jersey Invasive Status[6]	Species at Risk	Comments
Xylella fastidiosa	bacterial leaf scorch	pathogen	established, Native to southeast U.S.	Invasive	Already Present	Emerging Stage 2	Moderate	Emerging / Potential	Red oak group (*Quercus* spp.)	Currently, BLS is associated with street trees and other ornamental plantings (40% of tested trees were infested across the state), but spread into more natural settings appears to be occurring (J. Arsenault, personal communication).
Agrilus planipennis	emerald ash borer	insect	recently introduced	Invasive	High	Emerging Stage 0	High	Emerging / Potential	ashes (*Fraxinus* spp.), potentially elm (*Ulmus* spp.) and Juglandaceae (walnut and hickory families)	USDA risk map shows New Jersey as "moderate risk"; species found in Michigan, Ohio and Ontario; transported to Maryland and Virginia
Aradus cinnamomeus	pine flat bug	insect	potential threat	Invasive	High	Emerging Stage 0	High	Emerging / Potential	Broad host range - hardwoods and conifers	Serious pest in its native range, entry potential high
Lymantria dispar	Asian gypsy moth	insect	potential threat	Invasive	High	Emerging Stage 0	High	Emerging / Potential	Broad host range - 500 species in native range	Repeatedly found at ports; Worse than European variety because females can disperse great distances.
Lymantria monacha	Eurasian nun moth	insect	potential threat	Invasive	High	Emerging Stage 0	High	Emerging / Potential	Broad host range - hardwoods and conifers	Serious pest in its native range, entry potential high.
Phytophthora cinnamomi	Phytophthora root rot	pathogen	established	Invasive	High	Emerging Stage 0	High	Emerging / Potential	American chestnut (*Castanea dentata*), Allegheny chinkapin (*Castanea pumila*)	Potential threat to oaks, which are attacked by this pathogen in Europe.
Scolytus intricatus	European oak bark beetle	insect	potential threat	Invasive	High	Emerging Stage 0	High	Emerging / Potential	Oaks (*Quercus* spp.), chestnuts (*Castanea* spp.), beech (*Fagus* spp.), birch (*Betula* spp.), poplars (*Populus* spp.), willows (*Salix* spp.), elms (*Ulmus* spp.)	Serious pest in its native range, entry potential high. Carries pathogenic fungi. Insect would probably have its greatest impact on eastern hardwood dominated forests.
Phytophthora ramorum	sudden oak death syndrome	pathogen	recently introduced	Invasive	High	Emerging Stage 0	Moderate	Emerging / Potential	red oak group (*Quercus* spp.), mountain laurel (*Kalmia angustifolia*), great bay (*Rhododendron maximum*)	Found in nursery stock in Long Island and Cape May; risk maps show New Jersey as "moderate risk", however, there is a margin of error in the risk designation for our area and this pest has huge destructive potential. 2.1 million plants from contaminated nurseries were shipped to 21 states since 2003. 1.5 million of the potentially infected plants were not recovered (infected stock installed as landscape plantings). Searches were conducted near affected nurseries and disease did not establish in wild.
Sirex noctilio	Sirex woodwasp	insect / pathogen	recently introduced	Invasive	High	Emerging Stage 0	Moderate	Emerging / Potential	Pines (*Pinus* spp.)	Discovered in New York in 2004. Primarily a threat to pine plantations. *Sirex noctilio* (insect) with *Amylostereum areolatium* (pathogen)
Ophiostoma novo-ulmi	Dutch elm disease 2	pathogen	recently introduced	Unknown	Mild	Emerging Stage 0	High	Emerging / Potential	Elm (*Ulmus* spp.)	Unknown origin - native?, more damaging than *O. ulmi.*
Tetropium fuscum	brown longhorned spruce beetle	insect	recently introduced	Invasive	Mild	Emerging Stage 0	Moderate	Emerging / Potential	Red spruce (*Picea rubens*), white spruce (*Picea glauca*), potentially pines (*Pinus* spp.), fir (*Abies* spp.), larch (*Larix* spp.)	Found in Nova Scotia, primarily a risk to conifer forests.
Xylosandrus crassiusculus	ambrosia beetle	insect	recently introduced	Invasive	Mild	Emerging Stage 0	Moderate	Emerging / Potential	Fruit trees and nursery stock, so far	Found in South Carolina.
Xylosandrus mutilatus	ambrosia beetle	insect	recently introduced	Invasive	Moderate	Emerging Stage 0	Moderate	Emerging / Potential	Broad host range - hardwood trees and shrubs	Found in Mississippi.

Appendix C. Invasive Pest and Pathogen Species in New Jersey
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Scientific Name	Common Name	Type	National Distribution Status[1]	National Invasive Species Status[2]	Risk of Introduction to New Jersey[3]	New Jersey Distribution Status[4]	New Jersey Threat Status[5]	New Jersey Invasive Status[6]	Species at Risk	Comments
Anoplophora chinensis	citrus longhorned beetle	insect	eradicated	Unknown	Mild	Emerging Stage 0	Mild	Non - Invasive	maple (*Acer* spp.), oak (*Quercus* spp.), willow (*Salix* spp.), poplar (*Populus* spp.), apple (*Malus* spp.)	Hopefully eradicated…
Coleophora laricella	larch casebearer	insect	established	Unknown	Mild	Emerging Stage 0	Mild	Non - Invasive	American larch (*Larix laricina*)	Larch found in small, but globally rare communities in NJ (spread rate would be low?); introduced parasitoids released
Dryocosmus kuriphilus	chestnut gall wasp	pathogen	established	Unknown	Mild	Emerging Stage 0	Mild	Non - Invasive	American chestnut (*Castanea dentata*)	Found in Georgia, chinkapins are resistant
Ips typographus	European spruce beetle	insect	potential threat	Unknown	Mild	Emerging Stage 0	Mild	Non - Invasive	Spruce (*Picea* spp.)	Repeatedly found at ports, entry potential high. Carries extremely pathogenic fungi; spruce uncommon in NJ, but found in rare plant communities and could impact nursery industry
Lachnellula willkommii	European larch canker	pathogen	established	Unknown	Mild	Emerging Stage 0	Mild	Non - Invasive	American larch (*Larix laricina*)	Reported infections to our north, larch found in small, but globally rare communities in NJ (spread rate would be low?).
Orthotomicus erosus	Mediterranean pine engraver beetle	insect	potential threat	Unknown	Mild	Emerging Stage 0	Mild	Non - Invasive	Pine (*Pinus* spp.), douglas-fir (*Pseudotsuga menziesii*), spruce (*Picea* spp.), fir (*Abies* spp.)	Repeatedly found at ports, entry potential high.
Scolytus schevyrewi	banded elm bark beetle	insect	recently introduced	Unknown	Moderate	Emerging Stage 0	Mild	Non - Invasive	Elm (*Ulmus* spp.), Cherries (*Prunus* spp.)	Currently found from California to Michigan.
Hylurgus ligniperda	red-haired pine bark beetle	insect	recently introduced	Unknown	Unknown	Emerging Stage 0	Mild	Non - Invasive	Conifers	Found in Christmas tree plantation in Rochester, NY (and two other sites in the county)

Notes

1 - National Distribution Status: The majority of information in this table is derived Campbell 2007 or NJDA 2007.

2 - National Invasive Species Status: Values include 'Invasive', 'Non-Invasive', 'Unknown'

3 - Risk of Introduction to New Jersey: very coarse estimate of risk of establishing in NJ; values include 'Already Present', 'High', 'Moderate', 'Mild', 'Unknown'

4 - New Jersey Distribution Status: very coarse estimate of current infestation status; values include - Stage 0 (absent or very rare), Stage 1 (Rare or Locally Common), Stage 2 (Uncommon, but may be regionally commmon or abundant), Stage 3 (Common, but may be regionally abundant), Widespread

5 - New Jersey Threat Code: very coarse estimate of current or potential damage; values include - 'High', 'Moderate', 'Mild', 'Unknown'

6 - New Jersey Invasive Status: values include 'Invasive', 'Emerging / Potential', 'Non-Invasive', and 'Unknown'

Appendix D. Overview of Invasive Species Control Methods
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Method Type(s)	Method Name	Method Code	Typical Herbicide Concentrations	Target Type(s)	Basic Technique	Pros	Cons	Notes
Biological Control	biological control	BC	N/A	few selected species	Release of approved biological control agents that attack only target species	Method can provide effective control and is cost effective	Only mile-a-minute and purple loosestrife have an available biological control agent	A biological control agent for garlic mustard is under development and may be ready for release in the near future.
Chemical Control	basal bark	BB	20 - 25%	woody species	Application of herbicide within a 6-12 inch band around entire stem approximately 12 inches above base of plant	Method provides effective control and is cost effective	Some suggested oil diluents are not environmentally friendly, but mineral, vegetable or citrus oils with triclopyr can be effective (Rathfon 2006)	Herbicide application is performed using a backpack sprayer. Method used for woody stems ≤ 6" in diameter. This method should be considered an important control technique.
Chemical Control	foliar spray	FS	1-3%	Any plant less than 4 feet tall	Application of herbicide using a backpack sprayer to wet all leaves	Method provides effective control and is cost effective	Method has potential to injure non-target species and cannot be used on taller plants due to increased risk to applicator and non-target species (i.e., spraying upward increases risk of drift); Method can be sensitive to weather conditions (e.g., heat may dry spray before effective absorption)	Foliar applications generally include use of a backpack sprayer (Recommend use of Thinvert system[1]). Some foliar application methods include wipe-on applications (e.g., "bloody glove"), but these methods are not recommended because they are extremely time consuming and increase likelihood of exposure to the applicator. The use of boom applications is not recommended, but may be useful in the establishment of native warm season grasses where all existing vegetation must be removed prior to seeding.
Chemical Control	pre-emergent spray	PS	1-3%	herbaceous species	Application of herbicide to prevent seed germination	Method can provide effective control	Requires a broad application in areas known or suspected to contain invasive species; Timing of application can vary between years for targeted species; Supresses germination of all species	This method may be most beneficial for Japanese stiltgrass infestations on trails.
Chemical & Mechanical Control	hack-and-squirt	HS	20 - 25%	woody species	Make downward cuts with a hand axe (one cut per inch of diamter) and apply herbicide to cuts	Method provides effective control and is cost effective; Volunteers can assist with stem cutting	Stem cutting may be difficult for thick-barked plants	Herbicide applied with squirt bottle or paint brush. Herbicide should be applied immediately after cutting.

Appendix D. Overview of Invasive Species Control Methods
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Method Type(s)	Method Name	Method Code	Typical Herbicide Concentrations	Target Type(s)	Basic Technique	Pros	Cons	Notes
Chemical & Mechanical Control	stem injection	SI	20 - 25%	woody species	E-Z-Ject Lance loaded with herbicide pellets	Method provides effective control	Equipment is difficult to operate under field conditions; Injection for thick-barked trees requires signifcant force; Equipment is expensive	A modified approach using a drill and manual insertion of herbicide may be more practical. This method is generally not practical.
Chemical & Mechanical Control	cut stump	CS	20 - 25%	woody species	Cutting stems just above ground level followed by targeted application of herbicide to cut stems	Method provides effective control; Volunteers can assist with stem cutting	Mechanical removal of stems is very time consuming	Cutting is performed by loppers, handsaws or chainsaws depending upon size of stems. Herbicide applied with a squirt bottle, paint brush or backpack sprayer. Herbicide should be applied immediately after cutting.
Cultural Control	prescribed fire	PF	N/A	many species	Should follow a site-specific Prescribed Burning Plan that is part of a comprehensive Grassland Management Plan	Method provides effective control and is cost effective	Requires highly trained personnel; Insurance requirements may restrict application to an outside contractor; Requires public outreach to neighbors and public officials	Prescribed fire is most effective for grasslands with dense stands of native warm season grasses that provide ample fuel to eliminate woody seedlings; Prescribed fire may be utilized to remove dense thatch before application of herbicides (e.g., common reed, reed canary grass) in wetland habitats. The effectiveness of presribed fire to control invasive species in forest habitats is currently uncertain.
Cultural Control	prescribed grazing	PG	N/A	many species	Rotational system using multiple livestock species; Should follow a site-specific Presribed Grazing Plan that is part of a comprehensive Grassland Management Plan	Method may be effective; Method can be assisted by volunteers	Method requires significant expertise in selection of livestock species, density of animals per unit area and timing of grazing; Method requires installation of fencing; Method may spread some invasive species through feces; Trampling of vegetation may encourage invasive species	Implementation will require consultation with experts in the use of livestock for the purpose of eliminating invasive species; Method may be considered for shrub control in forest settings if native species are currently absent

Appendix D. Overview of Invasive Species Control Methods
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Method Type(s)	Method Name	Method Code	Typical Herbicide Concentrations	Target Type(s)	Basic Technique	Pros	Cons	Notes
Cultural Control	soil tilling	ST	N/A	herbaceous species and woody seedlings	Turning of soil using typical farm equipment	Method may provide effective control and is cost effective	Method destroys native species along with invasive species; Method may increase invasive species through extensive soil disturbance	This is an extreme method with limited use in natural areas. Successive tilling events may be used to exhaust weed seed bank prior to re-planting meadows.
Cultural Control	mulching	MU	N/A	herbaceous species	Application of a thick layer (3-4 inches) of organic materials	Method is effective for herbaceous species within cultivated garden beds or roadsides; Method can be assisted by volunteers	Method is not practical in natural areas where vehicle access is limited	Only effective on species with small seeds or weakly growing plants that cannot germinate/grow through the mulch. Japanese stiltgrass and garlic mustard are sensitive to heavy mulching.
Cultural Control	solarization	SO	N/A	herbaceous species	Application of plastic sheeting over infested areas	Method may be effective in some situations; Method can be assisted by volunteers	Method may alter soil chemistry and biology more significantly than herbicides	Plastic sheeting increases soil temperature to kill seeds and plants. This method is generally not practical in natural areas.
Mechanical Control (may be combined with Chemical Control)	girdling	GI	N/A	woody species	Cutting and removing a ≥ 3 inch band of bark from a trunk	Method can provide effective control; Method can be assisted by volunteers	Method may be ineffective on species with re-sprouting ability; Method is time consuming and difficult for thick-barked species; Method cannot be utilized where the risk of standing dead trees is unacceptable	Method may be combined with chemical control (i.e., apply herbicide to girdled area); Do not attempt on species such as black locust, tree-of-heaven or Japanese angelica tree, which will vigorously re-sprout multiple stems in response to girdling (hack-and-squirt may be effective on these species).
Mechanical Control	mowing	MO	N/A	many species	Cutting tops of plants using a mower, brush cutter or weed whacker	Method may be used as a pre-treatment for herbicide application to cut stumps or foliar applications to re-sprouts using a backpack sprayer	Method is ineffective for most species because of re-sprouting ability	Japanese stiltgrass can sustain itself as a "lawn" by producing seeds on plants that are two inches or smaller.

Appendix D. Overview of Invasive Species Control Methods
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Method Type(s)	Method Name	Method Code	Typical Herbicide Concentrations	Target Type(s)	Basic Technique	Pros	Cons	Notes
Mechanical Control	pulling	PU	N/A	small woody plants and herbaceous species	Removal of entire plant by hand or use of specialized tools such as a "Weed Wrench"	Method can provide effective control; Method can be performed by volunteers	Method is extremely time consuming and ineffective when root system cannot be completely removed; Method creates soil disturbance that stimulates germination of invasive species such as garlic mustard and Japanese stiltgrass	This method should only be considered on a limited basis.
Mechanical Control	hot foam spray	HF	N/A	herbaceous species	Rental of Waipuna Hot Foam System	No herbicides are required	System rental cost is $700/month with a two-year lease commitment and there are other related equipment costs; system can only be used within 200 feet of a vehicle that carries the specialized hot foam generator, many herbaceous plants require multiple treatments	This is an innovative system, but has significant financial and practical limitations.

[1]Thinvert system involves use of specialized spray nozzles combined with a thin invert emulsion spray fluid (instead of using water to mix with herbicides). The primary advantage is less herbicide drift to non-target plants and an overall lower volume of spray required to treat a given area. Although the system is more expensive than typical spray systems, it is ultimately cost effective because of labor-savings generated through reduction of re-filling of sprayers and reduction of herbicide use by minimizing drift.

Appendix E. Summary of Herbicide Characteristics
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
Sources: Tu et al. 2001, CDMS 2007

							Wildlife Risk Category		Human Risk	
Herbicide Common Name[1]	**Recommended Use Grouping[2]**	**Examples of Trade Names**	**Target Species**	**Half-life in Soil (days)**	**Half-life in Water (days)**	**Estimated Cost per Gallon**	**Birds and Mammals**	**Aquatic Species**	**Signal Word[3]**	**Notes**
2,4-D[1]	Infrequent	Navigate, 2,4-D L.V.4 Ester, 2,4-D Amine 4, Aqua-kleen, Barrage	herbaceous broadleaf plants	10	hours to months	$40 (Weed Ho)	Moderately toxic	Not reported, but may bioaccumulate	Caution or Danger	Inconclusive evidence implicates 2,4-D as a potential endocrine disrupter; Eye and skin irritant
Clopyralid	Infrequent	Reclaim, Curtail, Transline, Stinger, Lontrel	herbaceous broadleaf plants	40	8-40	$ 410 (Transline)	Practically non-toxic	Low toxicity	Caution or Danger	May cause serious eye damage
Fluazifop-p-Butyl	Limited	Fusilade DX, Fusion, Ornamec, Horizon 2000	grasses	15	stable	$300 (Fusilade)	Slight toxicity to practically non-toxic	High toxicity	Caution	Eye and nasal irritant - toxic if inhaled
Fosamine	Limited	Krenite S	woody plants, some herbaceous broadleaf plants	8	stable	$60 (Krenite)	Very slight toxicity	Low toxicity	Caution	Eye and skin irritant
Glyphosate[1]	Typical	Round-Up, Rodeo, Accord, Glypro, Glyphomax, Touchdown	any plant	47	12 days to 10 weeks	$40 (Accord); $80 (Rodeo)	Low toxicity	Moderate toxicity[4]	Caution	Eye and skin irritant
Hexazinone	Infrequent	Velpar L	herbaceous broadleaf plants, some grasses & some woody plants	90	3 days to 9 months	$95 (Velpar)	Low toxicity	Slight toxicity	Danger	May cause serious eye damage
Imazapic	Infrequent	Plateau, Cadre	some grasses, some herbaceous broadleaf plants	120-140	< 8 hours	$350 (Plateau)	Low toxicity	Moderate toxicity	Caution	Eye and skin irritant

Appendix E. Summary of Herbicide Characteristics
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
Sources: Tu et al. 2001, CDMS 2007

							Wildlife Risk Category		Human Risk	
Herbicide Common Name[1]	**Recommended Use Grouping[2]**	**Examples of Trade Names**	**Target Species**	**Half-life in Soil (days)**	**Half-life in Water (days)**	**Estimated Cost per Gallon**	**Birds and Mammals**	**Aquatic Species**	**Signal Word[3]**	**Notes**
Imazapyr[1]	Limited	Arsenal, Chopper, Stalker, Habitat	any plant	24-141	2 days	$410 (Arsenal)	Low toxicity	Low toxicity	Caution	Eye and skin irritant
Picloram	Typical	Tordon K, Tordon 22K, Grazon PC	herbaceous broadleaf plants, woody plants	90	2-3 days	$120 (Tordon)	Slight toxicity to practically non-toxic	Slight to moderate toxicity	Caution	Eye and skin irritant
Sethoxydim	Limited	Poast, Torpedo, Ultima, Vantage, Conclude	grasses	5	hours in sunlight	$230 (Poast)	Slight toxicity	Slight toxicity	Warning	Eye and skin irritant
Triclopyr	Typical	Garlon 3A, Garlon 4, Remedy, Pathfinder II, Crossbow	herbaceous broadleaf plants, woody plants	30	4 days	$130 (Garlon)	Slight toxicity	Slight toxicity	Caution or Danger	Garlon 3A can cause severe eye damage and is labeled "Danger"; Most other formulations are labeled "Caution"

[1] Denotes that some formulations of this herbicide are registered for aquatic applications.
[2] Groupings were based upon risks to humans or wildlife, relative cost compared to other similarly effective products and frequency of use by natural area managers.
[3] Signal Words include "Danger" (highly toxic or highly corrosive), "Warning" (moderately toxic) and "Caution" (slightly toxic or relatively non-toxic). Please note that signal words are assigned to specific formulations and may vary within particular herbicide common names (CDMS 2007).
[4] Glyphosate is essentially non-toxic when using aquatic formulations (e.g., Rodeo with a surfactant registered for aquatic applications).

Appendix F. Invasive Plant Species Phenology[1]
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

flowering period
period of flowering and fruiting
fruiting period

Scientific Name	Common Name	January	February	March	April	May	June	July	August	September	October	November	December
Acer platanoides	Norway Maple												
Ailanthus altissima	Tree-of-Heaven												
Albizia julibrissin	Mimosa												
Alliaria petiolata	Garlic Mustard												
Aralia elata	Japanese Angelica Tree												
Artemisia vulgaris	Common Mugwort												
Arthraxon hispidus	Asian Carpgrass												
Berberis thunbergii	Japanese Barberry												
Celastrus orbiculata	Asiatic Bittersweet												
Centaurea stoebe	Spotted Knapweed												
Cirsium arvense	Canada Thistle												
Coronilla varia	Crown Vetch												
Dioscorea oppositifoloia	Chinese Yam												
Eleagnus umbellata	Autumn Olive												
Euonymus alata	Winged Burning Bush												
Euonymus fortunei	Wintercreeper												
Hedera helix	English Ivy												
Ligustrum sp.	Privet species												
Lonicera sp. (BUSH)	Bush Honeysuckle species												
Lonicera japonica	Japanese Honeysuckle												
Lythrum salicaria	Purple Loosestrife												
Microstegium vimineum	Japanese Stiltgrass												
Miscanthus sinensis	Chinese Silver Grass												
Pachysandra terminalis	Japanse Pachysandra												
Phalaris arundinacea	Reed Canary Grass												
Phragmites australis	Common Reed												
Pyrus calleryana	Callery Pear												
Robinia pseudoacacia	Black Locust												
Rosa multiflora	Multiflora Rose												
Rubus phoenicolasius	Wineberry												
Vinca minor	Lesser Periwinkle												
Wisteria floribunda	Japanese Wisteria												

[1]Phenology information collected from Hough (1983), MOBOT (2007),PFAF (2007) or Brand (2007) and is intended to guide timing of control efforts.

Wickecheoke Creek Preserve Survey

Community Use, Concerns, Suggestions and Support

Sieglinde Mueller

Montclair State University
ENVR 531-81: Independent Study: Environmental Studies
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Appendices

Abstract:

The Wickecheoke Creek Preserve, owned and managed by the New Jersey Conservation Foundation, stretches across four municipalities in Hunterdon County, New Jersey – Delaware Township, Kingwood Township, Raritan Township, and Stockton Borough. The Preserve encompasses riparian and agricultural lands, forests, meadows, and scenic vistas and is open to the public during daylight hours for passive recreational uses. The purpose of the Wickecheoke Creek Preserve survey was to determine how the local community perceives the Preserve, and to determine their use patterns, stewardship concerns and suggestions, familiarity with NJCF.

The web-based survey was advertised via postcard, flyer, Facebook, Twitter and on NJCFs homepage. The advertisements also informed participants could also take the survey via telephone or traditional mail. Fifty-nine people participated in the survey.

Although the concerns and suggestions provided by the participants were fairly varied, the survey indicated that the community is in strong support of the Preserve's existence but, as a whole, are less likely to volunteer or donate money to support the Wickecheoke Creek Preserve or the New Jersey Conservation Foundation. Recommendations to alleviate this disparity in support include an outreach campaign and educational programming at the Preserve.

Introduction:

Every year, New Jersey loses another 16,000 acres of land to development. At the current rate of development, the state is expected to reach build-out in approximately 45 years (Hasse, 2008). This incredibly rapid development across the state only makes the preservation of the remaining open space and agricultural lands more vital.

The Wickecheoke Creek Preserve, stretching across four municipalities in Hunterdon County, – Delaware Township, Kingwood Township, Raritan Township and Stockton Borough – is a prime example of preserved land in our rapidly developing state (Appendix I). The Preserve includes fields in active agricultural production, early and late successional fields, forests, and riparian lands. The entire Preserve is open to the general public during daylight hours for passive recreation activities such as hiking, dog walking, fishing, and nature study and has an extensive trail system (Appendix II). Bow hunting during New Jersey deer hunting season is permitted with prior written permission only.

The majority of the parcels that comprise the Wickecheoke Creek Preserve are owned by the New Jersey Conservation Foundation (NJCF). A handful of parcels are owned in partnership with the State of New Jersey or local municipalities but are entirely managed by NJCF. The New Jersey Conservation Foundation is a private, non-profit organization dedicated to preserving land and natural resources throughout New Jersey for the benefit of all (New Jersey Conservation Foundation (a), 2009). NJCF uses land acquisition and management, positive land-use policy promotion, strong organizational support of other local conservation groups, as well as outreach and educational programs to achieve its mission. After 50 years of conservation work, NJCF has preserved over 120,000 acres in New Jersey, many of which have become state, federal or county parkland (New Jersey Conservation Foundation (b), 2009).

The purpose of the survey is to determine the opinions of local property owners regarding the Wickecheoke Creek Preserve. The main goals of the survey are to determine (a) how often people use the Preserve and for what purposes, (b) what they like and dislike about the Preserve, (c) what types of improvements and programs they would like to see, and (d) whether or not they support the New Jersey

Conservation Foundation. The information gathered will provide valuable insight into NJCF's land management and outreach activities in one of their most active regions and help determine how NJCF can increase its impact in the area.

Literature Review:

Research has shown that questions on a survey have a greater impact on the results than any other aspect of the survey (Alreck & Settle, 1985). Participants can be easily affected by the tone, language, and framing of each question on the survey. To help avoid participant confusion and try to maintain unbiased responses, researchers recommend that each question should be brief and clear (Alreck & Settle, 1985). More specifically, the questions should use simple language, be brief (no more than 20 words), avoid double negatives, and implicit negatives- words like 'ban', 'restrain', 'control', etc.- that have negative connotations (Converse & Presser, 1989). Both opened and closed questions can easily conform with these guidelines and be used effectively in surveys. Closed questions (ie: where were you born?) are phrased to provide facts and to be quick and easy to answer. Likert responses are an effective tool that allows for participants to elaborate slightly and still answer quickly closed questions because they require the respondent to answer with their level of agreement of disagreement. Likert responses consist of a scale with five possible answers, i.e.:

I believe in the Bill of Rights.

Strongly agree – Agree – Undecided – Disagree – Strongly disagree

Religion should be incorporated into public school curricula.

Strongly encourage– Encourage – No opinion – Discourage – Strongly discourage

Open questions, on the other hand, are phrased to provide the respondent with time to reflect and to give an opportunity to explain their feelings and opinions; ie: what made you move to this town? Using an open question as a follow-up to a closed question can easily provide further insight into the

position of the respondant (Converse & Presser, 1989). Unfolding questions are particularly effective for telephone surveys where there are no visuals to aid the respondent. An example of an unfolding question is:

> "Now thinking of your health and general physical condition, would you say you are satisfied, dissatisfied, or somewhere in the middle?
> (IF SATISFIED) How satisfied are you with your health and physical condition- completely satisfied, mostly, or somewhat?
> (IF IN THE MIDDLE) If you had to choose, would you say you are close to being satisfied, or dissatisfied or are you really right in the middle?
> (IF DISSATISFIED) How dissatisfied are you with you physical condition—completely dissatisfied, mostly, or somewhat?"
>
> (Groves, 1990)

Other recommendations for phrasing survey questions include refraining from asking hypothetical questions because they can only yield hypothetical answers, as well as refraining from general questions as they can be broadly interpreted by different readers. Questions should be kept as specific as possible. It has also been shown that questions that only ask if a participant agrees or disagrees often suffer from "acquiescence response set", the tendency to agree regardless of the question, so forced choice questions, like those with Likert responses, often produce stronger results.

Another useful aspect of surveys is incorporating contingent valuation questions which are used to estimate economic values for all types of ecosystem and environmental services. Contingent valuation method is most commonly used for non-use values that are not related to the actual use of a good or service and asks how much people would pay for the use of that service or good. It is known as the "contingent" valuation method because it asks what a person's willingness-to-pay is, contingent on a hypothetical scenario (King & Mazzotta). Survey professionals and economists have realized that the responses gathered from contingent valuation methods are often inconsistent with economic theory. The inconsistencies are thought to be due to respondents failing to have a preference for the good and merely arbitrarily selecting a hypothetical "price" without considering their actual budget constraints (Diamond & Hausman, 1994). Also, different surveys can result in widely differed willingness-to-pay amounts for the same service with no indication as to which one is realistic. If the contingent valuation method

provided willingness-to-pay amounts that reflected true preferences and donations, then wealthy people and environmentalists would have more generous willingness-to-pay results, which is not reflected in real life (Diamond & Hausman, 1994).

The greatest weakness of the contingent valuation method is that it is based on what people say they would pay – not what they actually do pay (King & Mazzotta). Even with its numerous limitations, contingent valuation method is often the only viable option, especially when the public good in question, like open space, is not directly related to a market good with an associated value (MacKenzie, 1993).

Once the questions of a survey have been written, the survey must be distributed to the sample population. Common survey distribution methods include traditional mail, e-mail, face-to-face interviews, and telephone interviews. Telephone surveys were the dominant mode of survey collection in the 1990s in the United States. They were, and still are, cheaper and easier to administer than face-to-face interview because the cost and effort of dialing another phone number is significantly less than driving to another house. Some simple steps can be taken when administering a telephone survey to ensure the highest response rate possible. It has been found that callers get a higher response rate if they speak quickly, loudly, and with a standard American accent. Researchers often try to make people feel obligated to respond, known as the reciprocation influence, by sending letters in advance or offering incentives. The greatest limitation to telephone surveys is the quick non-response. Within the first minute, most people hang up the phone, making it very hard to persuade someone to take the survey and require many phone calls before reaching a reasonable response rate (Groves, 1990).

Using email to distribute surveys is a common choice for researchers because it is an inexpensive, fast, and effective method to distribute and collect information. Also, email surveys allows for simple pre-notification and follow-up and often the data is automatically entered into a software program that makes analysis very easy (Shannon, et.al., 2002). Another advantageous aspect of email surveys are the speed and magnitude. Researchers can administer a survey to large numbers of people instantly and receive their responses quickly. Email surveys also permit people time to think about their answers before writing them down and provide a level of anonymity that allows participants to respond more

candidly than in a face-to-face interview (Thach, 1995). Email distribution is limited to people with access to the internet and active email accounts. Email surveys are further limited by because many participants may have concerns about the confidentiality and privacy of their responses. In addition, it can be very difficult to ensure the credibility of a sample with an email survey (Shannon, et. al., 2002). Also, email addresses are not listed publically like phone numbers or physical addresses which can make it almost impossible to distribute a survey via email for some projects. Email and web-based surveys have an advantage over traditional mail surveys because the response rates are faster and the costs are significantly less (Cobanoglu, et. al., 2001).

Research has shown that the methodologies used for designing and implementing an internet survey and a traditional mail survey are comparable. Also, internet surveys can be used to augment mail surveys or even used in place of mail surveys (DSS Research, Inc. 2000). A study conducted by researchers at the University of Virginia determined that traditional mail surveys have a higher response rates than web-based surveys in general due to the population types and follow-up reminders available to traditional mail surveys. College-aged respondents are more likely to respond to web surveys while other population groups, like school teachers and general consumers, are more likely to respond to a mail survey (Shih & Fan, 2008). Mix-mode surveys, combining a mixture of traditional mail, fax, and email, are also acceptable survey distribution methods and tend to yield a higher response rate (Cobanoglu, et. al., 2001).

While NJCF organized the public access points, parking areas, trail system and management plan of the Apshawa Preserve in Passaic County, a traditional mail survey was administered to local residents. The goal of the survey was to understand Preserve visitation patterns, recreational activities, public concerns, valuation, and access points, as well as to collect basic personal information about the survey participants (Rothman, 2005). A 3-page mail survey, with a postage-paid return envelope, was sent to all 59 residential properties which abut the Preserve. The neighboring commercial and undeveloped properties were excluded from the mailing. The survey was designed to be user friendly and easy to complete. The response rate was 26% although the level-of-completion of the survey varied significantly.

The results of the survey indicate that the most common usages for the Apshawa Preserve were hiking and dog walking, and respondents were most interested in developing additional hiking, outdoor education, and fishing opportunities on the property. The most common management concerns were litter, broken glass, and trespassing (Rothman, 2005). Rothman postulates that the survey response rate would have been higher had a map showing the location of the property been included in the mailing (2005).

The Schiff Natural Lands Trust in Mendham, NJ conducted a similar survey regarding use of the Schiff Nature Preserve. The purpose of the survey was to do a program assessment for the Schiff Nature Center and use the data to assist Schiff in the design of future recreational and educational programs. Residents of Morris County, Somerset County, and the greater Highlands region were invited to take the survey (Schiff Natural Lands Trust (b), 2010). The web-based survey was advertised in the Schiff Nature Preserve newsletter, *Field Notes*, on their webpage, on the Facebook page, and may have been advertised via other methods as well (Schiff Natural Lands Trust (a), 2010.).

Methods:

The Wickecheoke Creek Preserve Survey was as a mixed-mode survey. The responses were collected mainly through SurveyMonkey, a web-based survey tool, although advertisements were sent via traditional mail and follow up interviews were conducted via telephone.

The survey consisted of seventeen questions divided into four sections – welcome, use, concerns and suggestions, and miscellaneous (Appendix III). The questions were carefully worded to avoid confusion and bias, be brief, and to collect pertinent information. The welcome section asked how participants learned about the survey, their general opinion of the Preserve, and how often they visit. If participants replied that they never visit the Preserve, they automatically skipped the use section, that has questions regarding the access and reasons for visiting the Preserve, and went directly to the concerns and suggestions section. The concerns and suggestions section polled participants about their concerns about public access and the abundant white-tailed deer population, their interest in educational programs and

volunteer opportunities, and infrastructure improvements. The miscellaneous section asked a variety of questions including willingness to contribute financially, familiarity with NJCF, other natural areas they might visit, and invited the participant to provide their name and phone number if they were interested in participating in the expanded telephone survey. Shortly after the survey was released and four people had already responded, a question was added to the miscellaneous section asking if participants were members of NJCF, bringing the survey to a total of eighteen questions.

The mailing list for the advertisement was compiled using geographic information systems (GIS) and tax records. ArcMap, a GIS mapping program, was used to map all the parcels that make up the Wickecheoke Creek Preserve. The program was used to identify all tax parcels within one mile of the Preserve – a total of 1,982 parcels. The list from GIS was then cross-referenced with the 2009 Hunterdon County tax records to acquire the name and address of the owner of the parcels. The 181 parcels that are owned by a business (L.L.C., Inc., etc), estate, or family trust were removed from the mailing list, as well as the 54 parcels with out-of-state owners. Duplicate addresses, meaning more than one parcel within a mile of the Preserve are owned by the same person, were only included on the mailing list once. After the removing all these instances; 1,356 address remained in the mailing list.

A postcard advertising the survey was mailed to the 1,356 addresses on the mailing list(Appendix IV). The front side of the postcard announced that "We need your feedback!". The backside briefly explained the purpose of the survey and invited people to complete the survey by visiting a website. The postcard also listed my office telephone number and stated that I could be contacted with any questions, or if the person wanted to take the survey by mail or telephone. "All survey responses are confidential" was also stated on the postcard.

The postcard directed participants to a section of NJCF's website dedicated to the survey (Appendix V). The website reiterated the information listed on the postcard, provided a link to NJCF's Wickecheoke Creek Preserve page that contains information regarding the location, trails, and recreational opportunities available at the Preserve, and provided the link to the survey. Participants that chose to take the survey where then redirected to SurveyMonkey.com.

The postcard was mailed on April 8, 2010 and reached mailboxes shortly thereafter. Nine postcards were returned to sender by the Post Office for a variety of reasons including not deliverable as addressed-unable to forward, no such number, unclaimed, moved-left no address, and no mail receptacle.

Flyers (Appendix VI) advertising the survey were posted in local cafes, delis, and other small businesses in Stockton, NJ and Sergeantsville, NJ on April 14, 2010. The flyers were posted on community bulletin boards in Cravings and Stockton Food Store, left with the cashier at Phillips Fine Wine with the understanding she would post it on the counter, and added to a community flyer bucket outside the Stockton Farmer's Market. In Sergeantsville, NJ, the flyer was added to the community bulletin board at Bobbi's Place and the Sergeantsville General Store. During the same week, the flyer was also posted in the NJCF's Wickecheoke Creek Preserve kiosk along Lower Creek Road and the kiosk at the Huey property on Joe Ent Road. A small icon/link advertising the survey was also added to NJCF's homepage. On May 27, 2010 the Wickecheoke Creek Preserve survey was advertised on NJCF's Facebook page and Twitter feed.

Five hardcopies of the survey were mailed to people that telephoned and requested them. One gentleman requested three hardcopies of the survey for him, his wife, and his son. Another gentleman requested a hardcopy of the survey and expressed confusion regarding the locations of the Preserve so a trail map was included as well. The third caller was merely curious about NJCF's plans for the Preserve. After it was explained that NJCF had no concrete plans at this time, he provided his mailing and a copy was mailed to him as well. Each mailing included a printout of the SurveyMonkey survey, a hand written note on NJCF notepaper thanking them for their interest and help, and my business card. Only one completed copy of the survey was mailed back.

Two participants took the survey over the phone. One set of responses was recorded on a hard copy of the survey. The second telephone survey participant's responses were entered into the SurveyMonkey survey by an NJCF staff member. For the process of data analysis, this instance is considered a SurveyMonkey response rather than a telephone response.

The first survey response was received on April 10, 2010 and the results from SurveyMonkey were downloaded on June 21, 2010**.** The responses that were completed by mail or telephone before that date were manually added to the downloaded data.

Results:

A total of fifty-nine people participated in the survey. Fifty-seven people took the survey through SurveyMonkey, one person returned a completed hardcopy, and one person completed the survey over the telephone. The same Internet Protocol (I.P.) address responded to the internet survey twice. Both sets of responses were included in the data because it is likely that two members of the same household responded.

The welcome section of the survey included three questions with the intent of identifying how people learned about the survey, their overall opinion of the Preserve and how often they visit. The responses to the welcome section are shown in Figures 1-3.

The use section contained two questions regarding peoples access and reasons for visiting the Preserve. Eleven participants failed to answer both questions in the use section. Nine of these instances were because the respondent indicated they never visit the Preserve and automatically bypassed the use section. One participant indicated that s/he never visits the Preserve although answered the use section regardless because s/he completed the survey via traditional mail. The responses for this section are shown in Figure 4 and 5.

The third portion of the survey was the concerns and suggestions section. Eight participants skipped the question regarding their biggest concern and seven participants skipped the remainder of the questions in the section. The responses for this section are shown in Figures 6-10.

The final section of the survey was the miscellaneous section (Figures 11-16; Table 1). Ten participants skipped the questions regarding monetary contributions, distance to the Preserve, familiarity with NJCF, and their visitation of other natural areas. Eleven participants skipped the question regarding the Preserve's effect on the community. Sixteen participants failed to indicate their NJCF membership

status and forty-four participants did not provide additional comments. Five respondents were willing to participate in the expanded telephone survey. I was only able to speak with three of the people interested in participating in the telephone survey.

I spoke with the first participant in the telephone survey on April 12, 2010 for approximately 15 minutes. He lives adjacent to the Turnquist property, at the northern end of the Preserve, and is very familiar with NJCF and our staff that works in the region. He expressed that his largest concerns were the lack of trail maintenance, litter along the road frontage, and that the property boundaries and trails are so poorly posted that he finds lost hikers wandering around. His main suggestions were that NJCF remove fallen and dead trees from the property, mow the meadow trails wider, and use motorized vehicles for management. He also said that he uses his motorized vehicle on the property while picking up roadside litter in the area. He explained that, to him, the positive aspects of NJCF's involvement in the property are the hunting program and that teenagers didn't seem to be partying on the property. He also noted that overall, he thought the Wickecheoke Creek Preserve was a positive thing for the community because the properties "can't ever be built on" but that he "[didn't] want it become a park".

I spoke with the second telephone survey participant on April 20, 2010 for approximately 10 minutes. The gentleman lives across the street from the Preserve and bicycles on the roads often with his family. He said that he moved toward the area sixteen years ago for his children's benefit, although the Wickecheoke Creek Preserve did not particularly affect that decision. His largest concerns were that the roadside parking can be dangerous and that parked cars reduce visibility. He expressed that most visitors to the Preserve were courteous, although sometimes visitors create a safety hazard by standing in the middle of the road taking photographs. He explained that litter is an occasional problem but that most visitors were respectful. He said he and his family participate in clean-up days (not NJCF sponsored) in the area and that littered beer bottles and spray-paint cans are shameful, but not a habitual problem. He also expressed concern about the flashy water level in the creek and asked if it was normal and stated that he would like the see the numerous downed trees in the creek removed. He said he was not concerned

about the deer population although he makes sure his children are tested regularly for Lyme Disease, a deer tick borne illness.

I spoke with the third telephone survey participant on June 3, 2010 for approximately 15 minutes. The property she owns is bordered by the Wickecheoke Creek Preserve on three sides and she visits often. She explained that she has lived there for about 5 years and that she can "count on her fingers" how many people she has seen using the Preserve adjacent to her property. Apparently, even some of the other neighbors have never walked the adjacent trails. The only problems she has experienced at the Preserve are children leaving trash/debris (forts, etc) and trash accumulation after flood waters recede. She also stated that although the trails are marked well, there is basically no maintenance. She explained that she brings her clippers on the trail sometimes to try to help a little bit. As committee work is not her forte, she expressed interest in assisting as a stewardship volunteer. She would like to see more trails and public access at the Preserve, although did point out that NJCF does a good job of establishing trails on newly acquired parcels. As the conversation came to an end, she stated that the Wickecheoke Creek Preserve is a great resource for everyone and the "NJCF is doing a good job of acquiring little pieces along the way".

Discussion and Analysis:

Visitation Patterns, Infrastructure Improvements, and Concerns:

Casual observation indicates that the Wickecheoke Creek Preserve is well visited by neighbors and community members. According to the survey results, 39% of respondents visit the Preserve weekly and an additional 33.9% visit every few months. This shows that the Preserve has a visitor base that returns to the property repeatedly for the most common activities of hiking or walking (85.2%) and photography and wildlife viewing (43.7%). As hiking and walking is the most popular activity, it seems sensible that the most requested improvement at the Preserve is improved trail maintenance (42.3%). The second most requested improvement was additional trails (36.5%). All three participants in the expanded telephone survey mentioned their concerns regarding trail maintenance, including clearer trail blazing,

wider mowed trails, and the removal of fallen trees and limbs. Write-in responses from a variety of questions on the online survey included comment like "clear marking were trails meet roads…", "better trail maintenance needed", "more trails = good thing", "trails not properly maintained near my residence…", and "more marked trails. Wider trails". Although improved trail maintenance was a common concern and creation of additional trails was a common request, only 25% of the respondents expressed that they would be willing to volunteer to assist with trail creation and maintenance.

The majority (61.7%) of the visitors access the Preserve by walking from their residence and 34% park at roadside pull-offs and access the property at a posted trailhead. In addition, three survey participants indicated that they accessed the property via bicycle. Even though approximately 13.4% of survey participants requested more off-road parking as a preferred improvement, access concerns were not expressed very often.

The biggest concern for locals at the Wickecheoke Creek Preserve was littering and dumping (70.6%). The second largest concern was increased vehicular traffic near their home with 21.6%. Two participants indicated in the write-in responses regarding volunteering that they would be willing to volunteer for clean-up days and one indicated willingness to help with event and community outreach. The concerns expressed through write-in responses included invasive plant management, damage to the ecosystem by large numbers of people, and a few specific concerns regarding specific properties that are not owned by NJCF.

Many participants were interested in some sort of education program at the Wickecheoke Creek Preserve. Forty-two percent expressed interested in guided hikes and talks, 36.5% are interested in ecological studies, and 26.9% are interested in photography and art programs. Approximately 40% expressed no interest in educational programming at all. Hosting consistent programs at the Wickecheoke Creek Preserve would help introduce NJCF to the community and could garner more volunteers and financial support.

In addition, the white-tailed deer population in New Jersey has ballooned out of control. Their constant grazing is harming our native forest because the deer avoid the exotic plant species, which can be

invasive, and the native vegetation is not able to recover between nibbles (The Nature Conservancy, 2004). When asked about the deer population's effect on the forest and meadows in the area, 61.5% stated that they were very or slightly concerned, whereas 27.4% stated they were slightly or very indifferent. In the write-in responses from a variety of questions, five deer related concerns were expressed ranging from invasive plant management, an interest in indigenous plants, a suggestion to "[get] rid of some of the deer", and a suggestion for management techniques to minimize the tick concern.

Membership and Support:

The Wickecheoke Creek Preserve clearly has strong local support because 91.5% of respondents believe the Wickecheoke Creek Preserve is beneficial to the local community. As the participants explained; "It is the cornerstone of our local habitat. It is what makes living here so worthwhile", "Land preservation enables future generations to enjoy the beauty of our country" and "[the Preserve] provides scenic beauty that is good for the soul and protects the waterway".

When asked whether the Wickecheoke Creek Preserve has a positive effect on their enjoyment of their housing and community, 50% reported a very positive effect, 31.3% reported a somewhat positive effect and 14.6% believe the Preserve has no effect. Merely 4.2% of respondents believe the Wickecheoke Creek Preserve has a somewhat or very negative effect on their housing and community. This indicates that, even though the local residents may have complaints, the vast majority is at least minimally supportive of the Preserve. The challenge arises in trying to determine whether this support is merely theoretical or whether it manifests itself in volunteers and financial support as well.

When asked if they would be willing to contribute financially to ensure the Preserve receives adequate stewardship and maintenance, 44.9% stated that they would not be willing to contribute at this time. Approximately 4% stated they would be willing to donated $10 or less, 22.4% would be willing to donate $11-$50, an additional 22.4% would be willing to donate $51-$100, and 8.2% would be willing to give more than $100.

A Protector membership to NJCF costs $45.00 and a student membership costs only $25.00. As area around the Wickecheoke Creek Preserve is mostly single family residences, it is most likely that the members in the area are NJCF Protectors. Approximately 67% of the survey participants have never been members of NJCF, whereas 9.3% have been members in the past and 23.2% are currently members. When considering the contingent valuation (the amount a person would be willing to contribute), 30.6% of the survey participants indicated that they would be willing to contribute $51.00 or more to the Preserve. In other words, 23.2% of people are willing to pay $45.00 or more for a membership to NJCF and 30.6% of people are willing to donate more than $51.00 to the Preserve. These statistics show that 7.4% of the survey respondents are willing to donate at least the cost of membership, although they are not members.

Only 22.4% of survey respondents indicated that they were very familiar with the New Jersey Conservation Foundation and 46.9% indicated that they were somewhat familiar with NJCF (remember, only 23.2% are currently NJCF members).

Conclusion:

The New Jersey Conservation Foundation seems to have strong support from the communities surrounding the Wickecheoke Creek Preserve. Although community members support the existence of the Preserve, they are reluctant to help NJCF tangibly through volunteerism or financial donations. A great example of this disproportion of support is the large disparity between people requesting more trails and improved trail maintenance and volunteers interested in Preserve stewardship.

An effective way to address the disproportion of support would be to sponsor an annual Wickecheoke Creek Preserve Clean-Up Day. This event would help alleviate the communities concerns about littering and dumping and also help introduce people to different areas of the Preserve. NJCF could use the event as a "meet and greet" with interested community members and potentially build a consistent, reliable group of volunteers. Eventually, if an appropriate group of volunteers has been formed, an "Adopt-A-Preserve" or an "Adopt-a-Trail" program could be created where volunteers are

responsible for a specific stewardship tasks or areas of the property and do not need constant staff oversight. Hopefully, those who are not able to donate time, but are still inspired by NJCF, will be interested in donating financially.

Also, although requests for more off-road parking were numerous, there were relatively few complaints about the parking situation. Residents are less likely to consider the difficulties when creating additional parking areas, such as sight-lines, a flat, dry area, any necessary municipal or county permits, locating an area where the natural resources would not be harmed, and identifying an appropriate spot on a property that is not restricted from development. All in all, the New Jersey Conservation Foundation is providing the most reasonable parking possible for the Wickecheoke Creek Preserve.

To capture the interest of new community members, and maintain the current volunteers, NJCF should improve its outreach campaign through advertising, education programming, and volunteer opportunities. An effective advertising campaign for the Wickecheoke Creek Preserve does not need to be extremely complicated. NJCF currently posts announcements and newsletters in the kiosk on Lower Creek Road and to the newly constructed kiosk at the Huey property. In addition to the general NJCF news, an effort should be made to include Wickecheoke-specific updates such as new improvements at the Preserve (ie: signage, trails, new property, etc). These displays should colorful, brief, and be regularly updated. Visitors to the Preserve will see the changing kiosk displays and remain informed of all the NJCF is doing on the property. A direct-mail campaign could be implemented for the surrounding properties and will help reach people who do not visit the Preserve. If the community is truly informed about how much time and effort managing the Preserve requires, individuals may be more likely to step forward as volunteers.

Also, regular educational programs should be offered at the Wickecheoke Creek Preserve. Currently, there are two large NJCF sponsored events in the area annually – the Donald Jones Memorial Hike and the Barn Dance. The Donald Jones hike is a free-event that features a series of hikes with refreshments served at the Prallsville Mill afterward and the Barn Dance is a fundraising event and includes an auction of donated items. A handful of programs should be developed that have education as

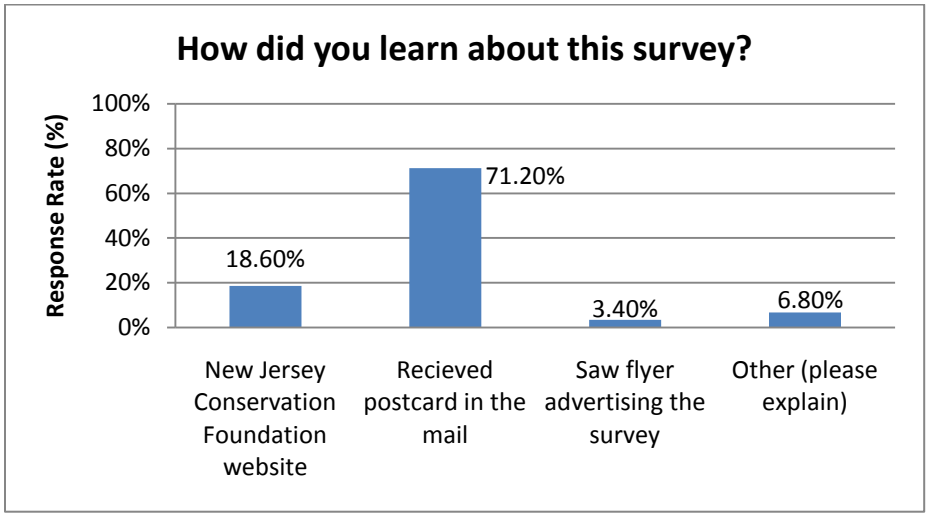
the major goal. Guided hikes with a focus on a specific topic (ie: native plants, bird watching, child friendly, etc.) could be incorporated into the Donald Jones Hike, a clean-up day, or offered as stand-alone events. Similar events would provide an excellent opportunity to increase awareness about the destruction nature of the abundant white-tailed deer population in New Jersey. Educational programming would help draw more people to NJCF's events which will lead to more supporters, more members and more support.

An effective outreach campaign and inspiring programming would also help the New Jersey Conservation Foundation address the people that have not renewed their membership (10%), and also gain memberships from the 7.4% of people who indicated they would donate more than the cost of a membership and are not current members.

These steps may seem straightforward and relatively simple but as a non-profit in today's difficult economy staff-time and funding are even more precious than before. An outreach campaign and education programming takes considerable time and money to implement. A reasonable ticket price, or suggested donation, could be charged for the educational programs although it is unlikely that it will directly offset the cost of running the program. The campaign and programming can be done at varying degrees of intensity which will also help conserve available funds.

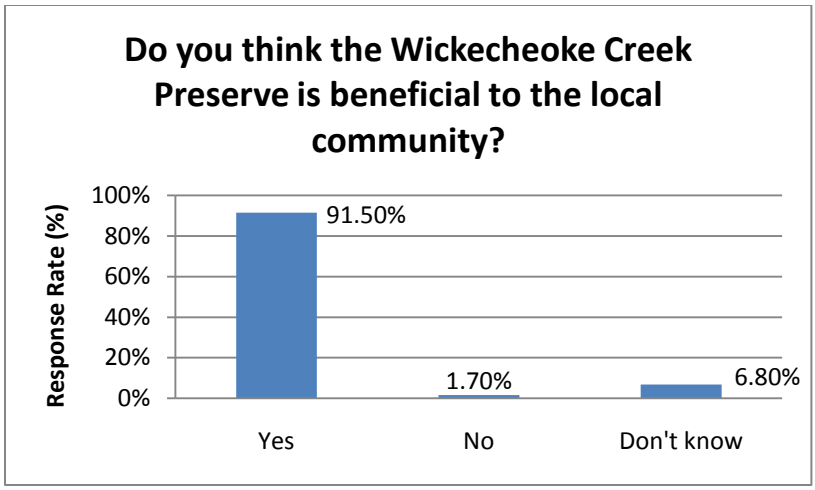
Hopefully, with enough outreach, the community will become tangible, as well as theoretical, supporters of the Wickecheoke Creek Preserve and the New Jersey Conservation Foundation.

Tables and Figures



"Other (please explain)" Responses
email from friend
sent via email by a friend
frfiend sent it to me
neighbor via email

Figure 1: "How did you learn about this survey?" Responses



"Please explain" Responses
One of the most beautiful streams in the state!
local people don't go there. all vehicles parked in the area are from Pa.
great trails for enjoying nature: scenic vistas from roadways
We can walk in nature.
It is the cornerstone of our local habitat. It is what makes living here so worthwhile.
It is a beautiful part of nature that we need for our future.
We can't save too much undeveloped land. Among other things, it maintains the character of the area. Plus, as more and more people move out here, more and more people are discovering the existing trails. More trails = good thing.
Protecting local land and wildlife from threats of development. Provides recreational areas. Preserves historical landmarks.
Controls building on the creek.
Provides scenic beauty that is good for the soul and protects the waterway
It's a beautiful natural resource to hike in and explore.
open space is very important in nj, especially having it available to the public
Protecting the natural resource of the creek is beneficial to the local community for its environmental health & its aesthetic beauty. It gives the community an understanding of how natural water moves through the area and creates a vehicle to appreciate the outdoors via the creekside trails
Trails not properly maintained near my residence; people get lost between Allen corner road and oak grove road.
Land preservation enables future generations to enjoy in the beauty of our country
It is a beautiful area to hike, bike and picnic in. Thank you for keeping it so pristine.

Figure 2: "Do you think the Wickecheoke Creek Preserve is beneficial to the local community?" Responses

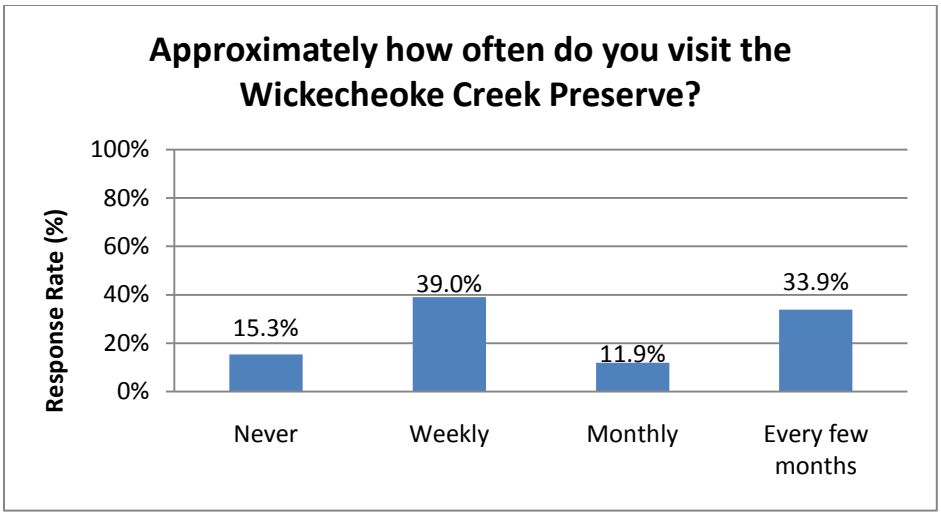
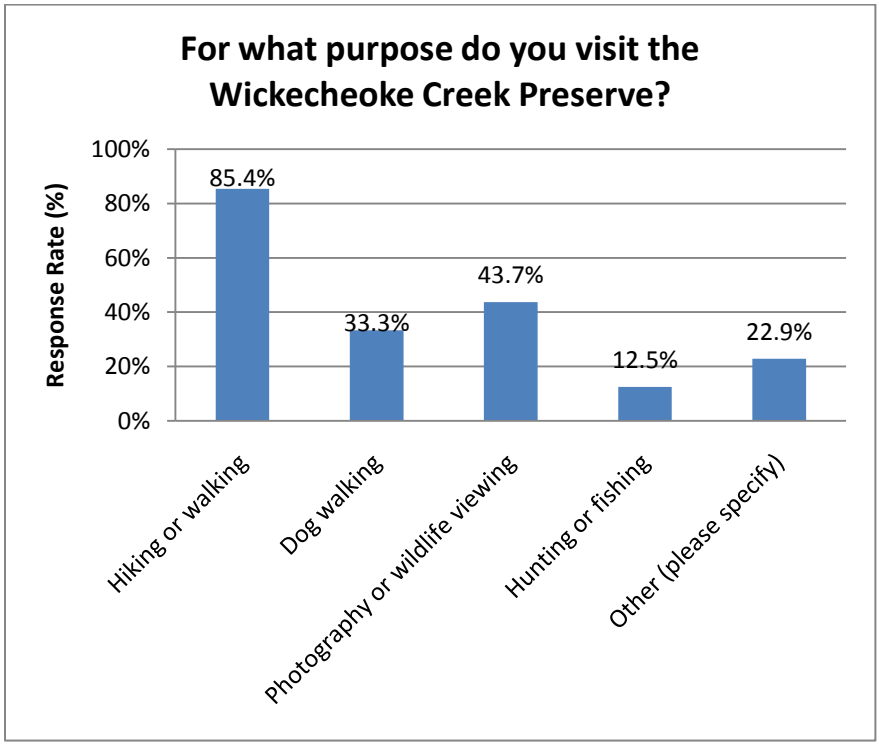
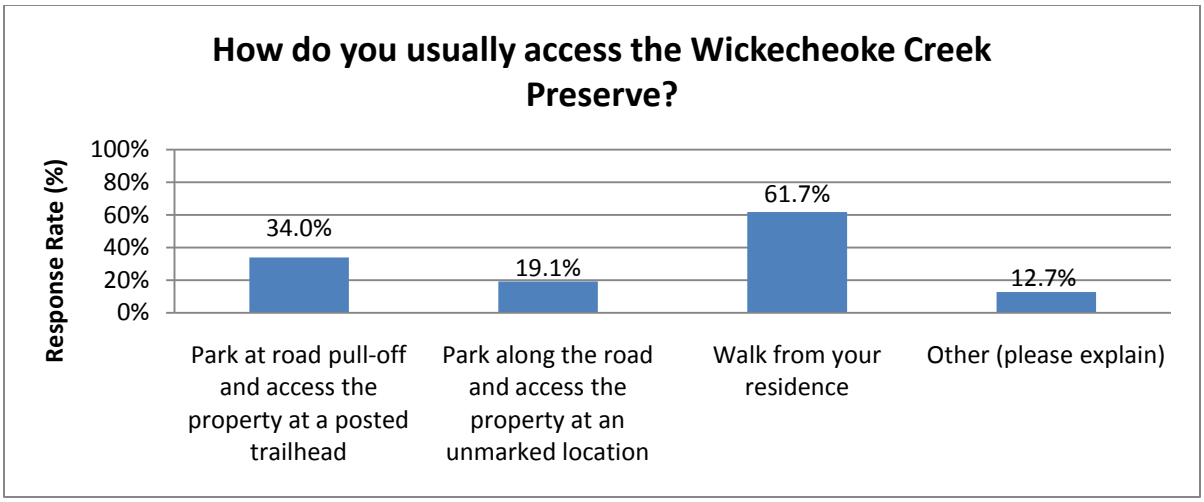


Figure 3: "Approximately how often do you visit the Wickecheoke Creek Preserve?" Responses



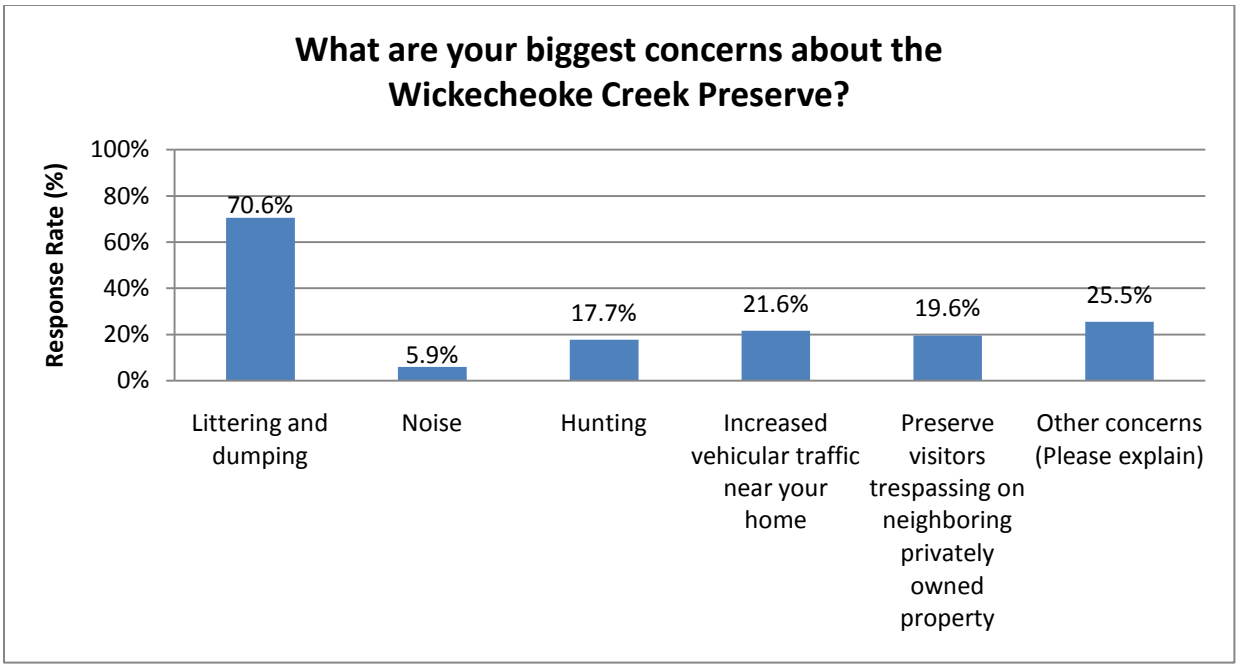
"Other (please specify)" Responses
Biking
ride my bike through it, on Lower Creek Rd.
I live there
horseback riding
just for the peacefulness of the beauty
Birding
wildflower viewing
Nature - I enjoy plants and birds: nature in general
painting
picnics with the kids
staying active

Figure 4: "For what purpose do you visit the Wickecheoke Creek Preserve?" Responses



Other
Ride my bike through the lower creek road area. Occasionally I drive to one of the upper areas and park at trailhead.
same as above
on horseback
Access southern from workplace
bicycle from home
Bike

Figure 5: "How do you usually access the Wickecheoke Creek Preserve?" Responses



"Other concerns (Please explain)" Responses
No immediate concerns...
I haven't been there since the fall but had no issues then.
More people should be enjoying it...and supporting it!
Possibility of a water evacuation business at a nearby farm
Invasive plant management
Destruction of preserved land and structures.
The Damn at 52 Hammer Road. Has the NJDEP proceeded to have it removed? All the residents are concerned about the low water level.
Bug that's eating the Hemlocks -you have been doing a test on our property, never received an update & unsightly ribbon/tags are still hanging on the trees! If test is done, they should be removed
Damage to the ecosystem by large numbers of people
Threats to wildlife habitiats
Better trail maintenance needed
parking
don't really have any concerns

Figure 6: "What are your biggest concerns about the Wickecheoke Creek Preserve?" Responses

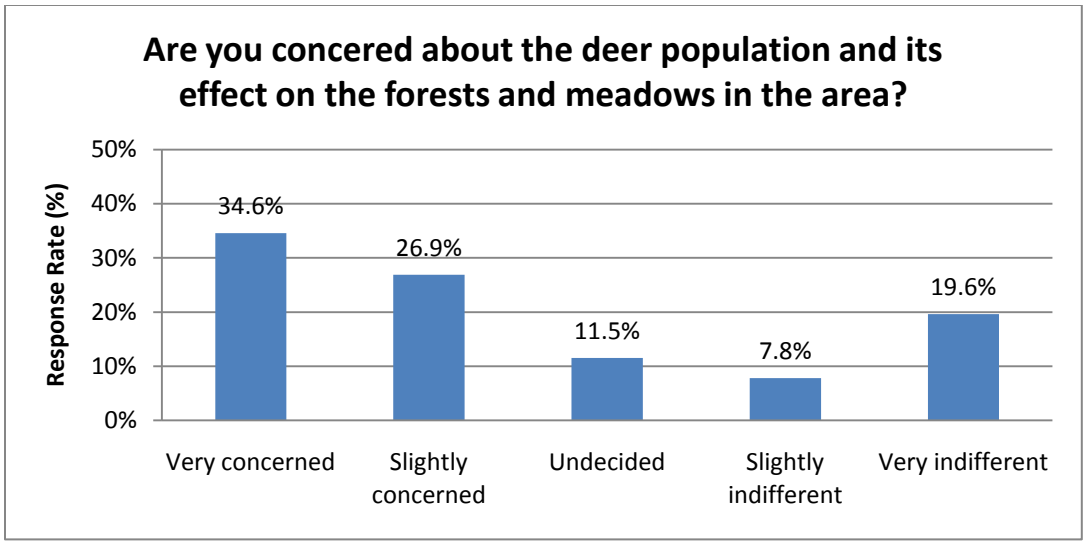
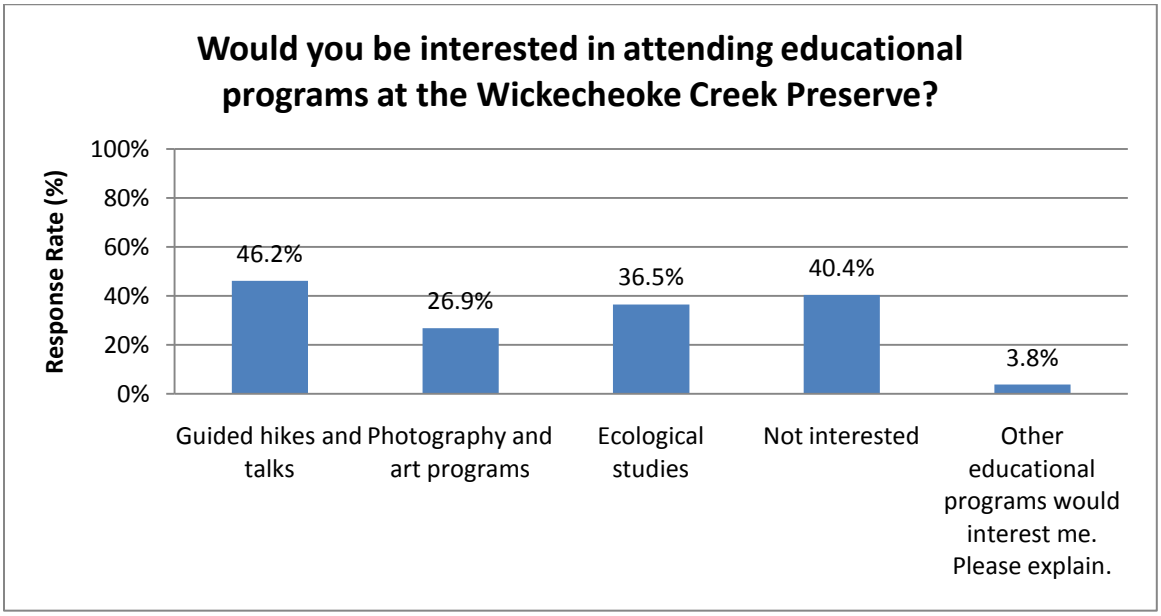
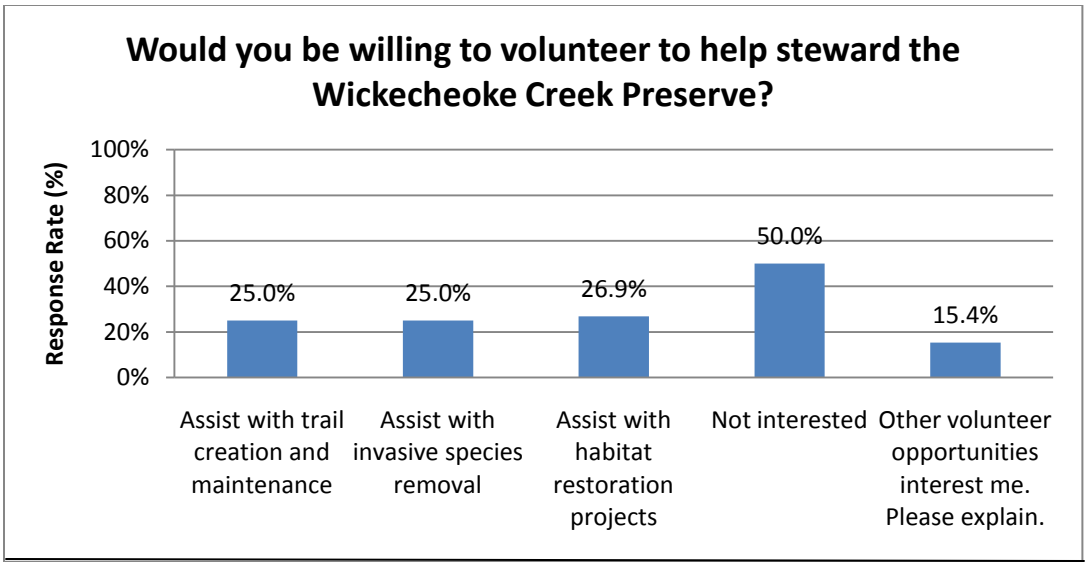


Figure 7: "How concerned are you about the deer population and its effect on the forests and meadows in the area?" Responses



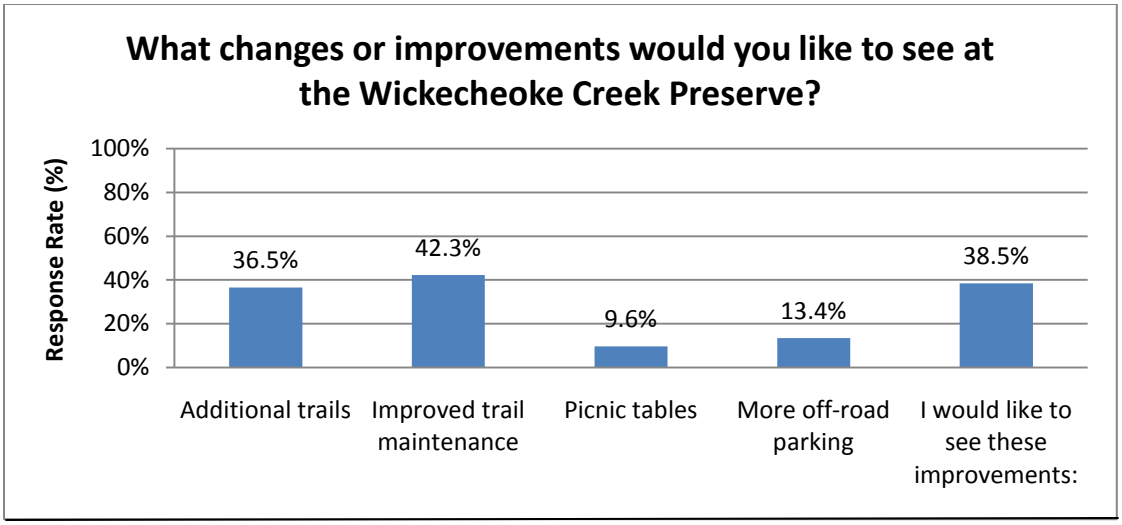
"Other educational programs would interest me. Please explain." Responses
nature - particularly what is indigenous to this area
very interested - anything informative

Figure 8: "Would you be interested in attending educational programs at the Wickecheoke Creek Preserve?" Responses



"Other volunteer opportunities interest me. Please explain." Responses
HELP WITH EVENTS AND COMUNITY OUTREACH
We regularly try to help with the litter cleanup today.
Not sure
Communication of available programs to outside groups
Not interesred at this time.
clean-up
OPen to helping out but cannot do so on a regular basis
generally
too busy on my own land

Figure 9: Would you be willing to volunteer to help steward the Wickecheoke Creek Preserve?" Responses



I would like to see these improvements:
Seems good to me...
not qualified to make suggestions
return the hunting rights to the local people that had them before you took over.
more information
coordinate with local horse associations to create and maintain more trails
It's fine.
Better signage to indicate where parking is permitted. We live adjacent to the Preserve and find that many people park, picnic, play with their dogs, and walk on our property to fish or wade in the Creek.
more land
Better advertising for volunteers, perhaps though the schools
Get rid of some of the deer
Clear markings where trails meet roads. Some are fine. Other trails I think only exist on maps. Also, improve trail markings. With the low traffic and little or no trail maintenance, there is no obvious trail in some areas, nor visible blazes.
mowing of grassy areas more often, to minimize tick problem
a few scattered picnic tables--not large groups of tables a little more parking, not big lots
The removal of all the downed trees.
acquisition of adjoining lands
Invasive species removal, habitat restoration
no improvements necessary
the trash along Sam Levine is horrible
made available to horseback riding
don't know

Figure 10: "What changes or improvements would you like to see at the Wickecheoke Creek Preserve?" Responses

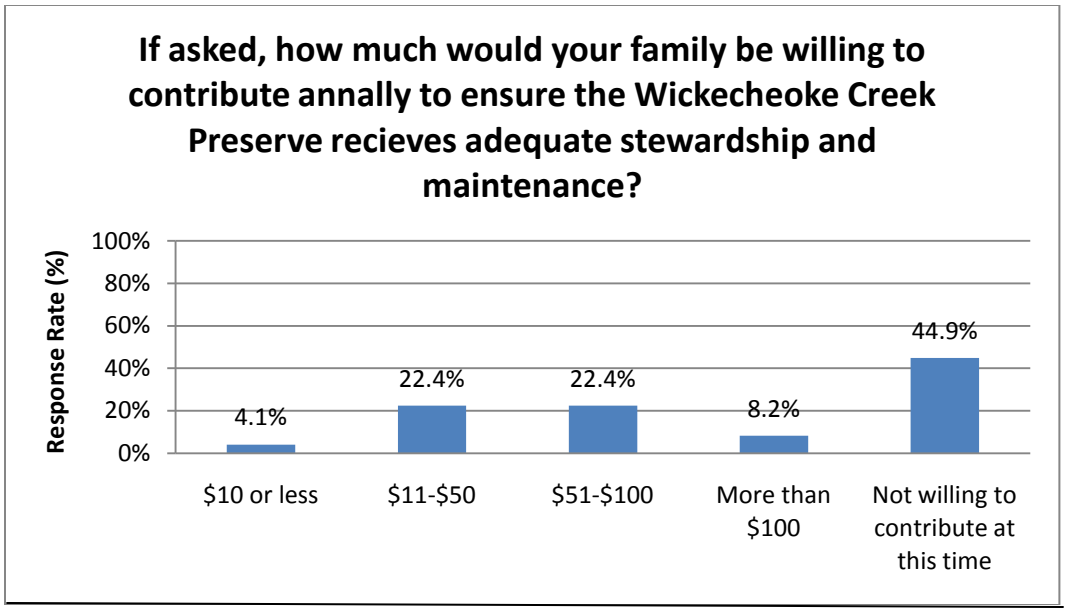


Figure 11: "If asked, how much would your family be willing to donate to ensure the Wickecheoke Creek Preserve receives adequate stewardship and maintenance?" Responses

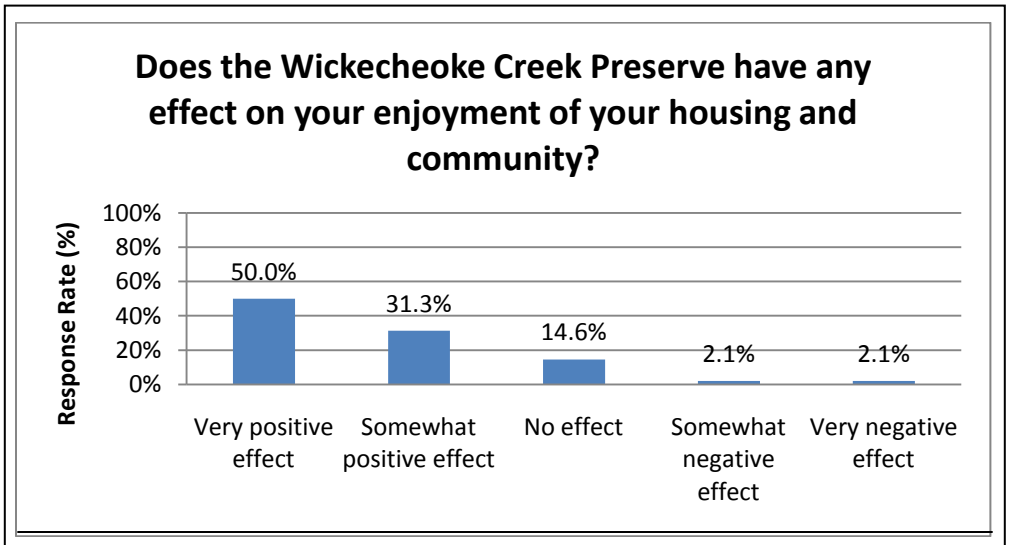


Figure 12: "Does the Wickecheoke Creek Preserve have any effect on your Enjoyment of your housing and community?" Responses

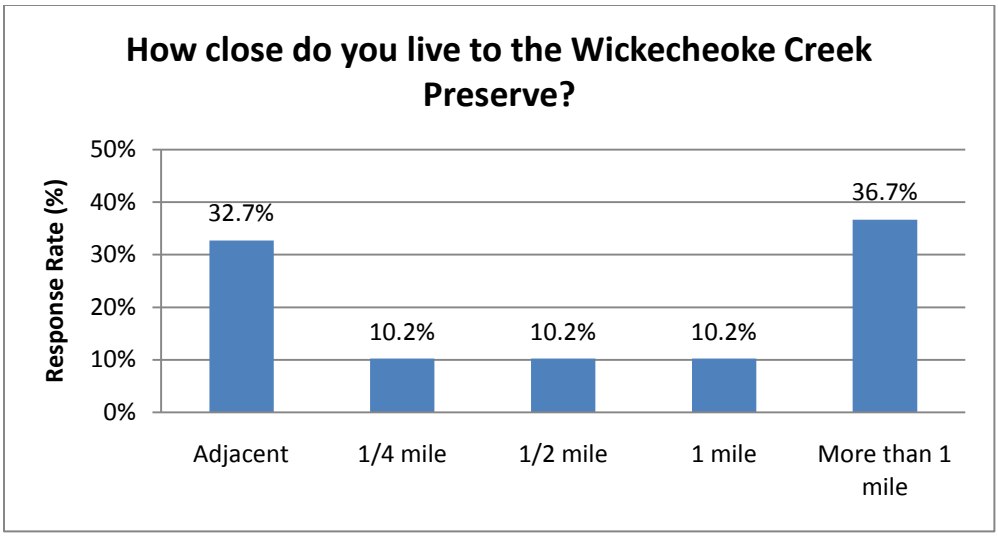


Figure 13: "How close do live to the Wickecheoke Creek Preserve?" Responses

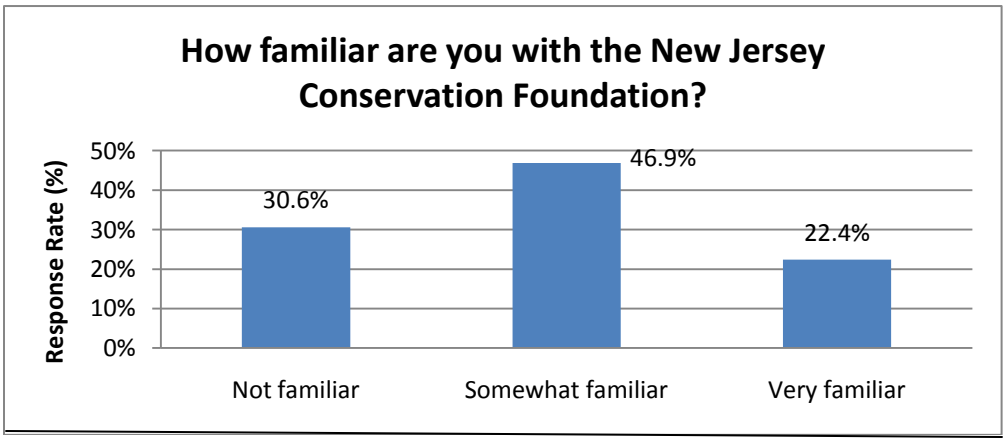
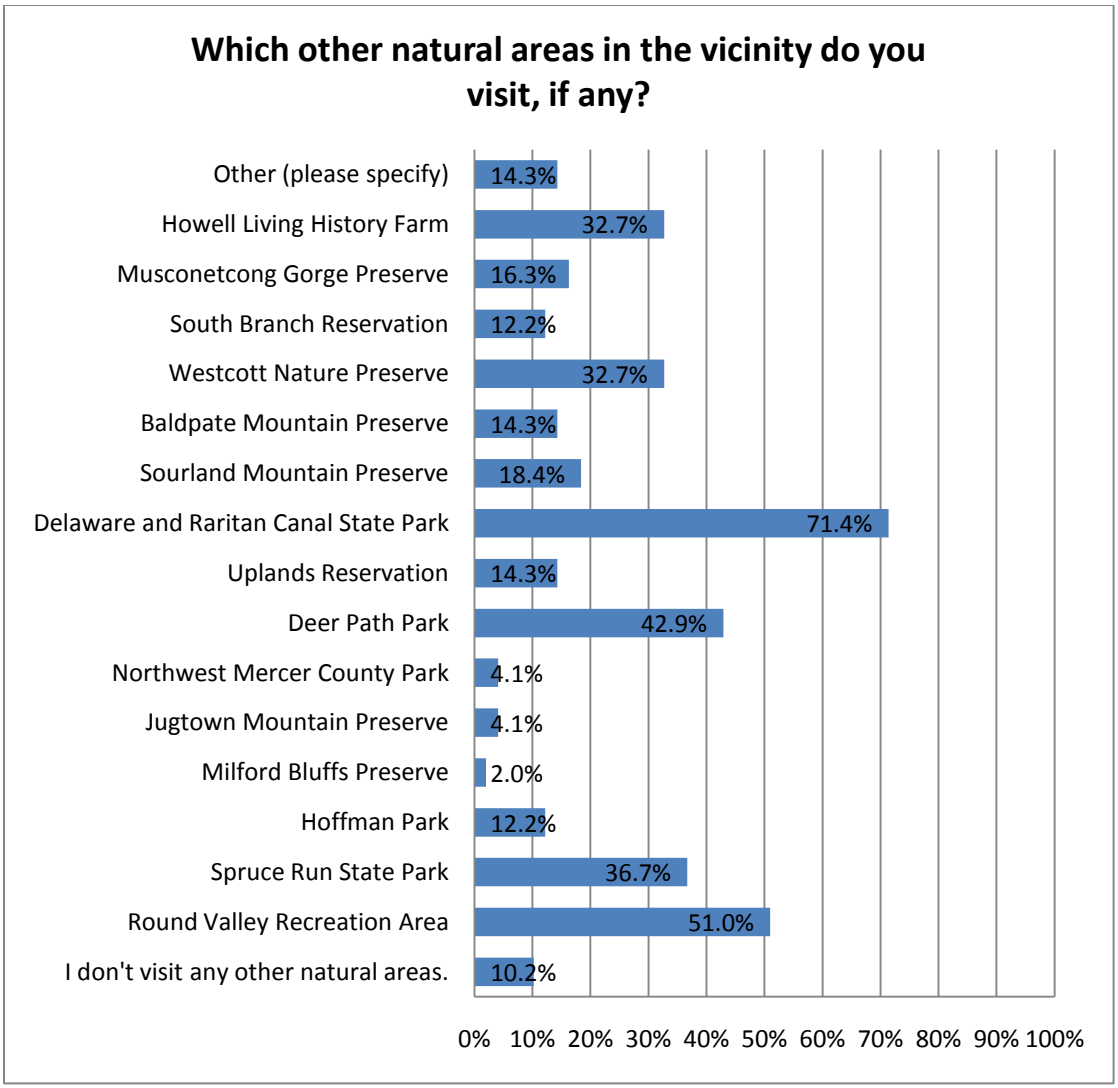


Figure 14: "How familiar are you with the New Jersey Conservation Foundation?" Responses



"Other (please specify)" Responses
wickecheoke preserve. Harmes property. HLTA holdings.
Wahington Crossing Park PA and NJ
Hunterdon Arboretum, Clover Hill Park, Columbia Trail, Landsdown Trail
combo trail-strimples mill rd to raven rock - Del. Twp. Morales trails - Mine Brook park- Flemington
I hike with Hunterdon Hikers on weekends

Figure 15: "Which other natural areas in the vicinity do you visit, if any?" Responses

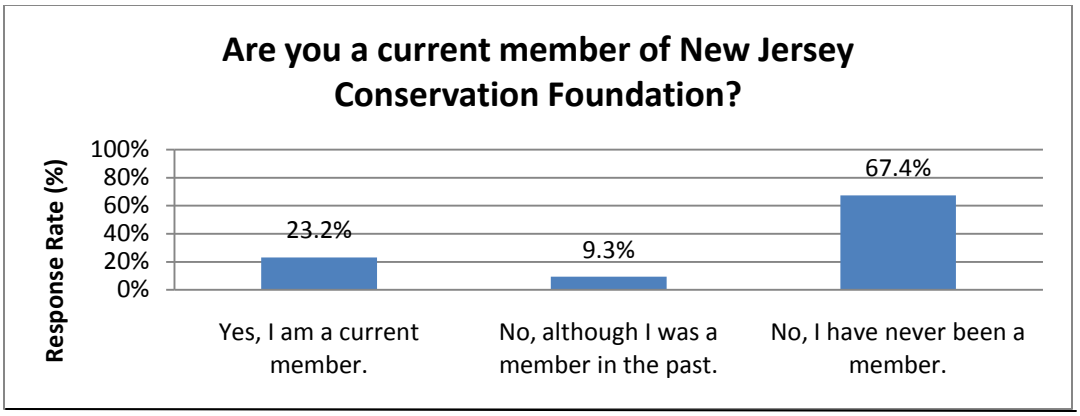


Figure 16: "Are you a current member of New Jersey Conservation Foundation?" Responses

Table 1: "If you have any additional comments or suggestions about the Wickecheoke Creek Preserve, please provide them in the box below:" Responses

If you have any additional comments or suggestions about the Wickecheoke Creek Preserve, please provide them in the box below:
The entire area is great for recreational biking. There are probably 100 miles of great roads in the area between Lambertville, Frenchtown, and Flemington. These people might be good prospects for donors to the preserve...
You are spending our money (taxes) on buying this land that cannot be developed anyway. This is a waste. There is virtually no use of this land by the people of Delaware Twp. (the ones who paid for it) You have put the hunting rights into the hands of an orginization that is not local. (how much did they pay you??) This brings people that do not know the area in, and forced the local ones out.
Again, we are a community of horse owners and I would like to see more horse friendly trails and programs.
I am not sure we're still members.
Thanks for all your hard work. You improve the quality of life for all of us who live in this region, as well as the whole state.
Would like to see fewer dogs and encourage people to not throw rocks and stones into the Creek.
Many times the area is overrun by various bicycling clubs causing both traffic problems on the local adjacent roads and safety issues for the people simply enjoying the creek. Perhaps areas specifically for bicyclers could be developed?
Keep doing what you do. Organization is making great strides in land preservation.
We would like an update on the bug survey that has been done on our property for the last 5 years. Would like ribbons removed from trees if test is complete. Property - Hurley - 35 Pine Hill Road, Sergeantsville, NJ. Thanks!
great place- do not develope for other uses
Please keep it as undeveloped as possible.
I'd be willing to help manage your trails for you
stock the ponds with bass or trout and allow fishing.
instructional activities - more community
I am interested in preserving the natural environment

Table 2: Telephone Survey Responses

If you would like to participate in an expanded telephone survey regarding the Wickecheoke Creek Preserve, please provide your first name, telephone number and a convenient time of day to call in the box below:
Confidential
Confidential
Confidential
Confidential
Confidential

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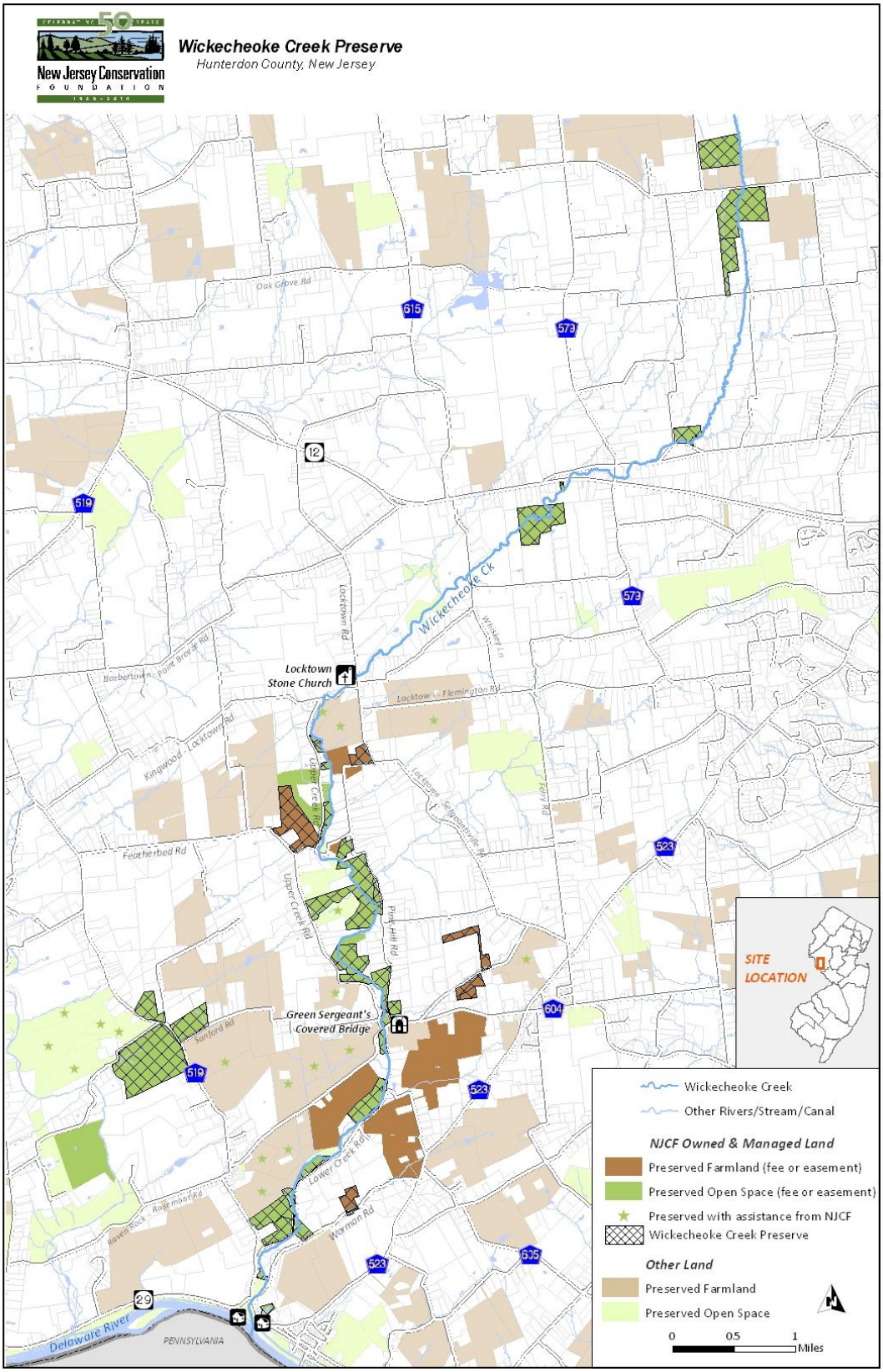
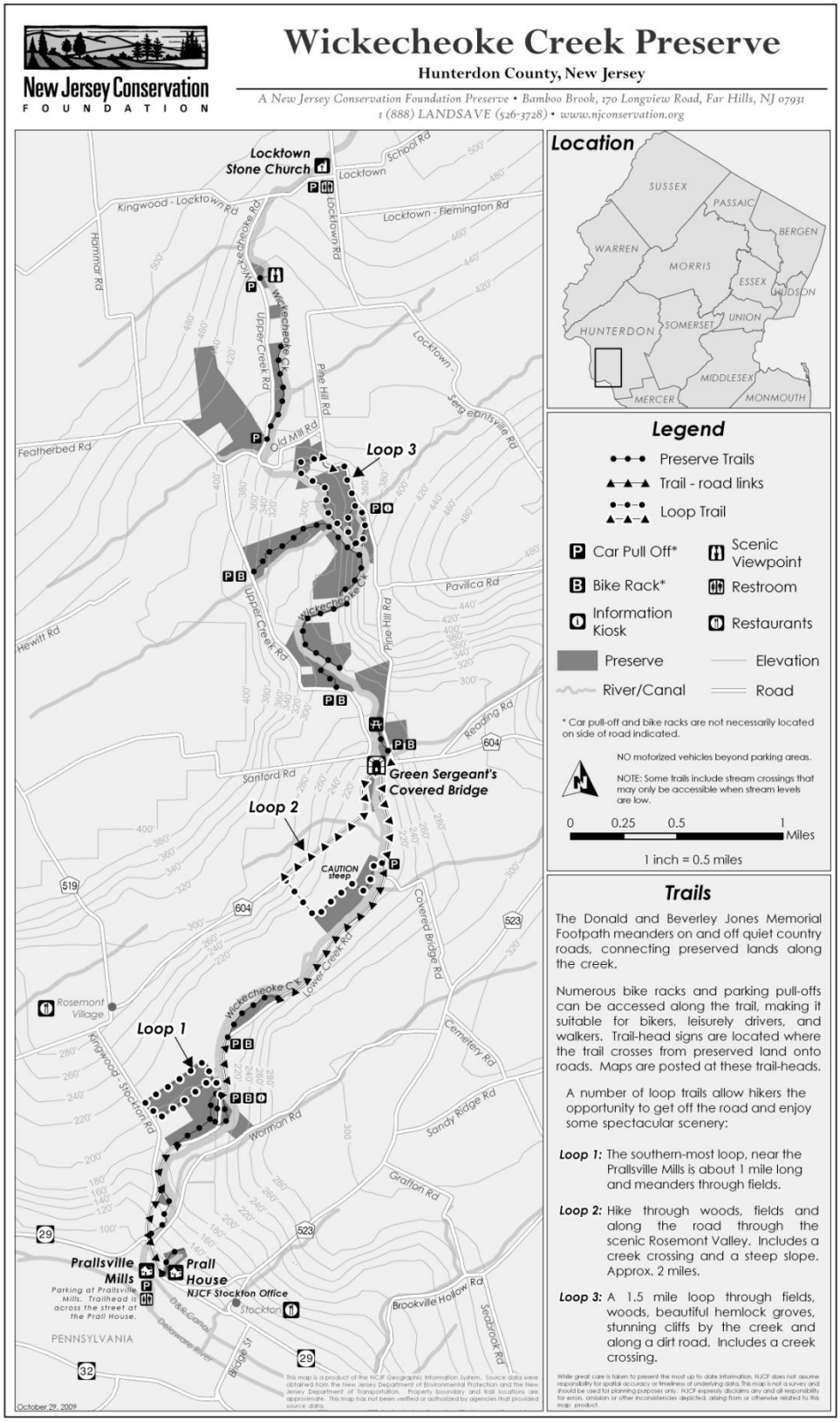
Appendices

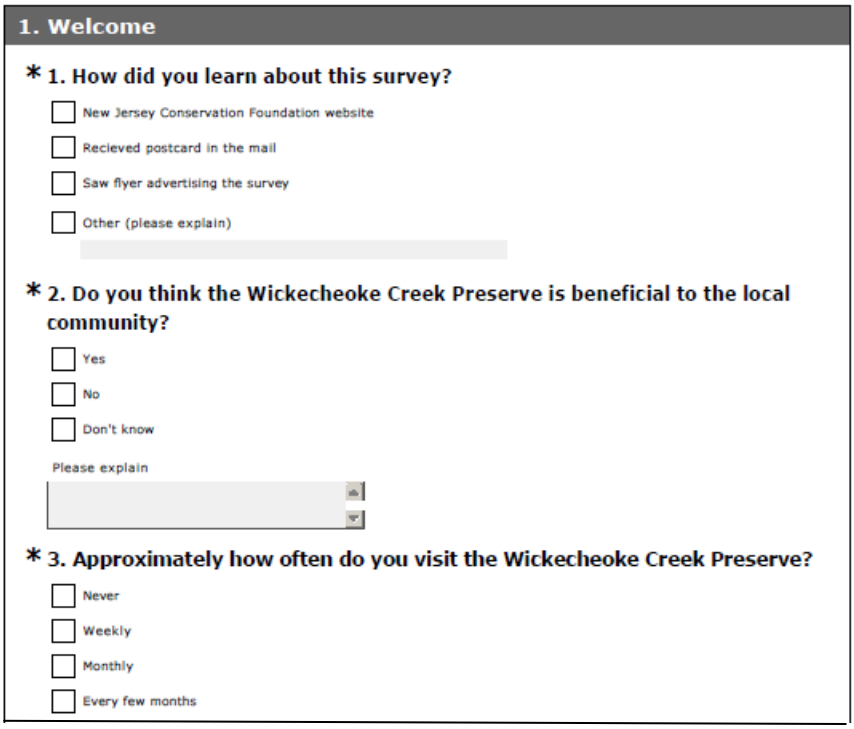
Appendix I – Wickecheoke Creek Preserve Map



Appendix II- Wickecheoke Creek Preserve Trail Map



Appendix II – Wickecheoke Creek Preserve Survey



1. Welcome

* **1. How did you learn about this survey?**

- [ ] New Jersey Conservation Foundation website
- [ ] Recieved postcard in the mail
- [ ] Saw flyer advertising the survey
- [ ] Other (please explain)

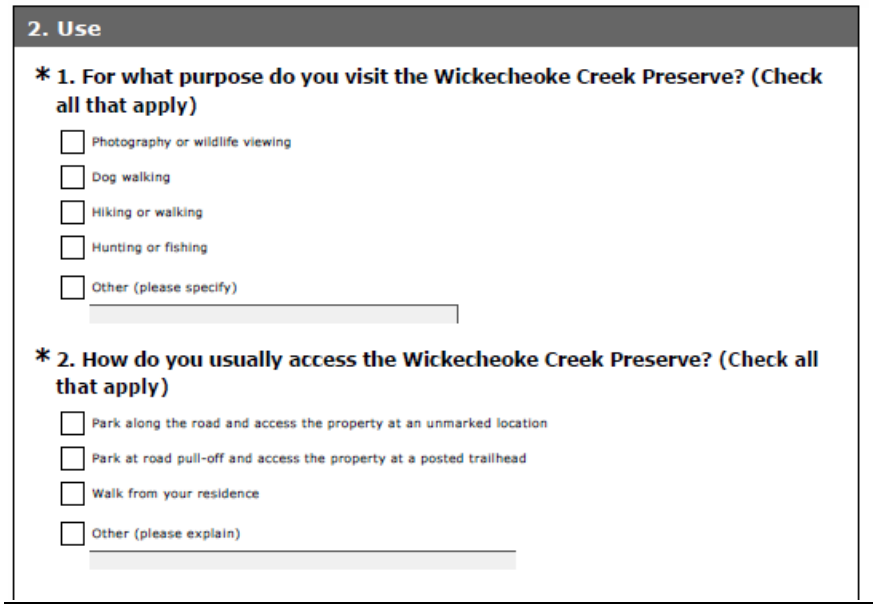
* **2. Do you think the Wickecheoke Creek Preserve is beneficial to the local community?**

- [ ] Yes
- [ ] No
- [ ] Don't know

Please explain

* **3. Approximately how often do you visit the Wickecheoke Creek Preserve?**

- [ ] Never
- [ ] Weekly
- [ ] Monthly
- [ ] Every few months



2. Use

* **1. For what purpose do you visit the Wickecheoke Creek Preserve? (Check all that apply)**

- [ ] Photography or wildlife viewing
- [ ] Dog walking
- [ ] Hiking or walking
- [ ] Hunting or fishing
- [ ] Other (please specify)

* **2. How do you usually access the Wickecheoke Creek Preserve? (Check all that apply)**

- [ ] Park along the road and access the property at an unmarked location
- [ ] Park at road pull-off and access the property at a posted trailhead
- [ ] Walk from your residence
- [ ] Other (please explain)

3. Concerns and Suggestions

*** 1. What are your biggest concerns about the Wickecheoke Creek Preserve? (Check all that apply)**

- [ ] Littering and dumping
- [ ] Noise
- [ ] Hunting
- [ ] Increased vehicular traffic near your home
- [ ] Preserve visitors trespassing on neighboring privately owned property
- [ ] Other concerns (Please explain) _____

*** 2. Are you concerned about the deer population and its effect on the forests and meadows in the area?**

- [ ] Very concerned
- [ ] Slightly concerned
- [ ] Undecided
- [ ] Slightly indifferent
- [ ] Very indifferent

*** 3. Would you be interested in attending educational programs at the Wickecheoke Creek Preserve? (Check all that apply)**

- [ ] Guided hikes and talks
- [ ] Photography and art programs
- [ ] Ecological studies
- [ ] Not interested
- [ ] Other educational programs would interest me. Please explain. _____

*** 4. Would you be willing to volunteer to help steward the Wickecheoke Creek Preserve? (Check all that apply)**

- [ ] Assist with trail creation and maintenance
- [ ] Assist with invasive species removal
- [ ] Assist with habitat restoration projects
- [ ] Not interested
- [ ] Other volunteer opportunities interest me. Please explain. _____

*** 5. What changes or improvements would you like to see at the Wickecheoke Creek Preserve? (Check all that apply)**

- [ ] More off-road parking
- [ ] Improved trail maintenance
- [ ] Additional trails
- [ ] Picnic tables
- [ ] I would like to see these improvements: _____

4. Miscellaneous

*** 1. If asked, how much would your family be willing to contribute annually to ensure the Wickecheoke Creek Preserve recieves adequate stewardship and maintenance?**

- ☐ $10 or less
- ☐ $11-$50
- ☐ $51-$100
- ☐ More than $100
- ☐ Not willing to contribute at this time

*** 2. Does the Wickecheoke Creek Preserve have any effect on your enjoyment of your housing and community?**

- ☐ Very positive effect
- ☐ Somewhat positive effect
- ☐ No effect
- ☐ Somewhat negative effect
- ☐ Very negative effect

*** 3. How close do you live to the Wickecheoke Creek Preserve?**

- ☐ Adjacent
- ☐ 1/4 mile
- ☐ 1/2 mile
- ☐ 1 mile
- ☐ More than 1 mile

*** 4. How familiar are you with the New Jersey Conservation Foundation?**

- ☐ Not familiar
- ☐ Somewhat familiar
- ☐ Very familiar

8. If you would like to participate in an expanded telephone survey regarding the Wickecheoke Creek Preserve, please provide your first name, telephone number and a convenient time of day to call in the box below:

*** 5. Which other natural areas in the vicinity do you visit, if any? (Check all that apply)**

- [ ] I don't visit any other natural areas.
- [ ] Round Valley Recreation Area
- [ ] Spruce Run State Park
- [ ] Hoffman Park
- [ ] Milford Bluffs Preserve
- [ ] Jugtown Mountain Preserve
- [ ] Northwest Mercer County Park
- [ ] Deer Path Park
- [ ] Uplands Reservation
- [ ] Delaware and Raritan Canal State Park
- [ ] Sourland Mountain Preserve
- [ ] Baldpate Mountain Preserve
- [ ] Westcott Nature Preserve
- [ ] South Branch Reservation
- [ ] Musconetcong Gorge Preserve
- [ ] Howell Living History Farm
- [ ] Other (please specify)

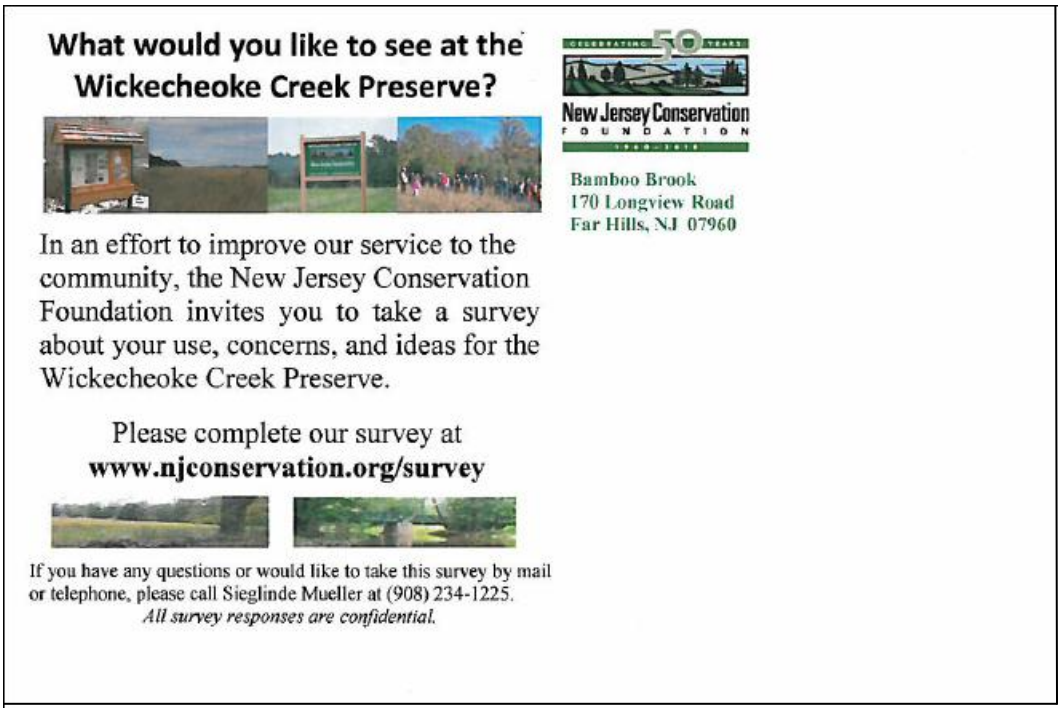
6. Are you a current member of New Jersey Conservation Foundation?

- [ ] Yes, I am a current member.
- [ ] No, although I was a member in the past.
- [ ] No, I have never been a member.

7. If you have any additional comments or suggestions about the Wickecheoke Creek Preserve, please provide them in the box below:

Appendix IV – Survey Announcement Postcard

(front)

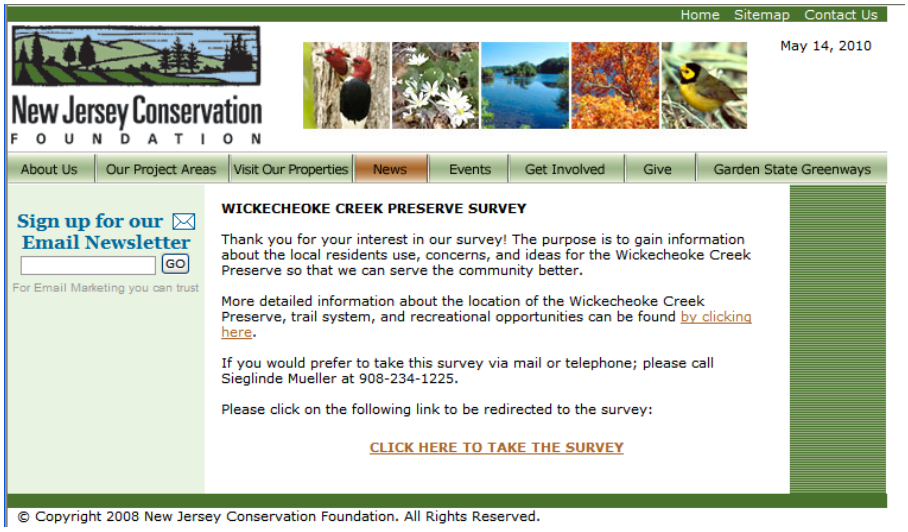


(back)

Appendix V – New Jersey Conservation Foundation Website Survey Information

New Jersey Conservation Foundation Homepage – Wickecheoke Creek Preserve Survey Advertisement

New Jersey Conservation Foundation Website – Wickecheoke Creek Preserve Survey Page



Appendix VI – Survey Announcement Flyer

CELEBRATING 50 YEARS
New Jersey Conservation FOUNDATION
1960-2010

We need your feedback!

What would you like to see at the Wickecheoke Creek Preserve?

In an effort to improve our service to the community, the New Jersey Conservation Foundation invites you to take a survey about your use, concerns, and ideas for the Wickecheoke Creek Preserve.

Please complete our survey at
www.njconservation.org/survey

If you have any questions or would like to take this survey by mail or telephone, please call Sieglinde Mueller at (908) 234-1225.

All survey responses are confidential.

Appendix VII – NJCF Facebook and Twitter Advertisements

New Jersey Conservation Foundation Facebook Profile – Survey Advertisement

New Jersey Conservation Foundation Twitter Account – Survey Advertisement

Appendix IIX – Wickecheoke Creek Preserve Survey Data

Welcome Section

1. How did you learn about this survey?		
Answer Options	**Response Percent**	**Response Count**
New Jersey Conservation Foundation website	18.6%	11
Recieved postcard in the mail	71.2%	42
Saw flyer advertising the survey	3.4%	2
Other (please explain)	6.8%	4
answered question		**59**
skipped question		**0**

2. Do you think the Wickecheoke Creek Preserve is beneficial to the local community?		
Answer Options	**Response Percent**	**Response Count**
Yes	91.5%	54
No	1.7%	1
Don't know	6.8%	4
Please explain		16
answered question		**59**
skipped question		**0**

3. Approximately how often do you visit the Wickecheoke Creek Preserve?		
Answer Options	**Response Percent**	**Response Count**
Never	15.3%	9
Weekly	39.0%	23
Monthly	11.9%	7
Every few months	33.9%	20
answered question		**59**
skipped question		**0**

Use Section

1. For what purpose do you visit the Wickecheoke Creek Preserve? (Check all that apply)		
Answer Options	**Response Percent**	**Response Count**
Hiking or walking	85.4%	41
Dog walking	33.3%	16
Photography or wildlife viewing	43.7%	21
Hunting or fishing	12.5%	5
Other (please specify)	22.9%	11
answered question		**48**
skipped question		**11**

2. How do you usually access the Wickecheoke Creek Preserve? (Check all that apply)		
Answer Options	**Response Percent**	**Response Count**
Park at road pull-off and access the property at a posted trailhead	34.0%	16
Park along the road and access the property at an unmarked location	19.1%	9
Walk from your residence	61.7%	29
Other (please explain)	12.7%	6
answered question		**47**
skipped question		**12**

Concerns and Suggestions Section-

1. What are your biggest concerns about the Wickecheoke Creek Preserve? (Check all that apply)		
Answer Options	**Response Percent**	**Response Count**
Littering and dumping	70.6%	36
Noise	5.9%	3
Hunting	17.7%	9
Increased vehicular traffic near your home	21.6%	11
Preserve visitors trespassing on neighboring privately owned property	19.6%	10
Other concerns (Please explain)	25.5%	13
answered question		**51**
skipped question		**8**

2. Are you concerned about the deer population and its effect on the forests and meadows in the area?

Answer Options	Response Percent	Response Count
Very concerned	34.6%	18
Slightly concerned	26.9%	14
Undecided	11.5%	6
Slightly indifferent	7.8%	4
Very indifferent	19.6%	10
answered question		52
skipped question		7

3. Would you be interested in attending educational programs at the Wickecheoke Creek Preserve? (Check all that apply)

Answer Options	Response Percent	Response Count
Guided hikes and talks	46.2%	24
Photography and art programs	26.9%	14
Ecological studies	36.5%	19
Not interested	40.4%	21
Other educational programs would interest me. Please explain.	3.8%	2
answered question		52
skipped question		7

4. you be willing to volunteer to help steward the Wickecheoke Creek Preserve? (Check all that apply)

Answer Options	Response Percent	Response Count
Assist with trail creation and maintenance	25.0%	13
Assist with invasive species removal	25.0%	13
Assist with habitat restoration projects	26.9%	14
Not interested	50.0%	26
Other volunteer opportunities interest me. Please explain.	15.4%	8
answered question		52
skipped question		7

5. What changes or improvements would you like to see at the Wickecheoke Creek Preserve? (Check all that apply)

Answer Options	Response Percent	Response Count
Additional trails	36.5%	19
Improved trail maintenance	42.3%	22
Picnic tables	9.6%	5
More off-road parking	13.4%	7
I would like to see these improvements:	38.5%	20
answered question		52
skipped question		7

Miscellaneaous Section-

1. If asked, how much would your family be willing to contribute annually to ensure the Wickecheoke Creek Preserve recieves adequate stewardship and maintenance?

Answer Options	Response Percent	Response Count
$10 or less	4.1%	2
$11-$50	22.4%	11
$51-$100	22.4%	11
More than $100	8.2%	4
Not willing to contribute at this time	44.9%	22
answered question		49
skipped question		10

2. Does the Wickecheoke Creek Preserve have any effect on your enjoyment of your housing and community?

Answer Options	Response Percent	Response Count
Very positive effect	50.0%	24
Somewhat positive effect	31.3%	15
No effect	14.6%	7
Somewhat negative effect	2.1%	1
Very negative effect	2.1%	1
answered question		48
skipped question		11

3. How close do you live to the Wickecheoke Creek Preserve?		
Answer Options	**Response Percent**	**Response Count**
Adjacent	32.7%	16
1/4 mile	10.2%	5
1/2 mile	10.2%	5
1 mile	10.2%	5
More than 1 mile	36.7%	18
answered question		49
skipped question		10

4. How familiar are you with the New Jersey Conservation Foundation?		
Answer Options	**Response Percent**	**Response Count**
Not familiar	30.6%	15
Somewhat familiar	46.9%	23
Very familiar	22.4%	11
answered question		49
skipped question		10

5. Which other natural areas in the vicinity do you visit, if any? (Check all that apply)

Answer Options	Response Percent	Response Count
I don't visit any other natural areas.	10.2%	5
Round Valley Recreation Area	51.0%	25
Spruce Run State Park	36.7%	18
Hoffman Park	12.2%	6
Milford Bluffs Preserve	2.0%	1
Jugtown Mountain Preserve	4.1%	2
Northwest Mercer County Park	4.1%	2
Deer Path Park	42.9%	21
Uplands Reservation	14.3%	7
Delaware and Raritan Canal State Park	71.4%	35
Sourland Mountain Preserve	18.4%	9
Baldpate Mountain Preserve	14.3%	7
Westcott Nature Preserve	32.7%	16
South Branch Reservation	12.2%	6
Musconetcong Gorge Preserve	16.3%	8
Howell Living History Farm	32.7%	16
Other (please specify)	14.3%	7
answered question		49
skipped question		10

6. Are you a current member of New Jersey Conservation Foundation?

Answer Options	Response Percent	Response Count
Yes, I am a current member.	23.2%	10
No, although I was a member in the past.	9.3%	4
No, I have never been a member.	67.4%	29
answered question		43
skipped question		16

7. If you have any additional comments or suggestions about the Wickecheoke Creek Preserve, please provide them in the box below:

Answer Options	Response Count
	15
answered question	15
skipped question	44

8. If you would like to participate in an expanded telephone survey regarding the Wickecheoke Creek Preserve, please provide your first name, telephone number and a convenient time of day to call in the box below:	
Answer Options	Response Count
	5
answered question	5
skipped question	54

Appendix H. Ecological Communities of the Gettysburg Piedmont (Section 221Da)
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Class	Formation Name	Alliance Name	Association Name	Page #	Identifier	Global Rank	State Rank	Hydrologic modifier
Forest	Lowland or submontane cold-deciduous forest	ACER SACCHARUM-FRAXINUS AMERICANA-TILIA AMERICANA FOREST ALLIANCE	Acer saccharum-Fraxinus americana-Tilia americana-Magnolia acuminata / Actaea racemosa	26	CEGL006237	G?	S?	None
Forest	Lowland or submontane cold-deciduous forest	CARYA (GLABRA, OVATA)-FRAXINUS AMERICANA-QUERCUS (ALBA, RUBRA) FOREST ALLIANCE	Carya (glabra, ovata)-Fraxinus americana-Quercus spp. Central Appalachian Forest	30	CEGL006236	G?	S?	None
Forest	Lowland or submontane cold-deciduous forest	CARYA (GLABRA, OVATA)-FRAXINUS AMERICANA-QUERCUS (ALBA, RUBRA) FOREST ALLIANCE	Quercus rubra-Carya (glabra, ovata) / Ostrya virginiana / Carex pensylvanica Forest	30	CEGL006301	G?	S2S3?	None
Forest	Lowland or submontane cold-deciduous forest	QUERCUS ALBA-(QUERCUS RUBRA, CARYA SPP.) FOREST ALLIANCE	Quercus (alba, rubra, velutina) / Cornus florida / Viburnum acerifolium Forest	35	CEGL006336	G?	S4S5	None
Forest	Lowland or submontane cold-deciduous forest	FAGUS GRANDIFOLIA-QUERCUS RUBRA-QUERCUS ALBA FOREST ALLIANCE	Fagus grandifolia-Quercus alba-Quercus rubra-Liriodendron tulipifera Forest	33	CEGL006377	G?	S2?	None
Forest	Lowland or submontane cold-deciduous forest	QUERCUS PRINUS-(QUERCUS COCCINEA, QUERCUS VELUTINA) FOREST ALLIANCE	Quercus prinus-Quercus (rubra, velutina) / Gaylussacia baccata Forest	44	CEGL006282	G3G5	S3S4	None
Forest	Lowland or submontane cold-deciduous forest	QUERCUS PRINUS-QUERCUS RUBRA FOREST ALLIANCE	Quercus prinus-Quercus rubra-Carya (glabra, alba) / Gaylussacia baccata Forest	48	CEGL006057	G5?	S?	None
Forest	Lowland or submontane cold-deciduous forest	QUERCUS RUBRA-(ACER SACCHARUM) FOREST ALLIANCE	Quercus rubra-Acer saccharum-Liriodendron tulipifera Forest	50	CEGL006125	G?	S3S4	None
Forest	Lowland or submontane cold-deciduous forest	QUERCUS RUBRA-(ACER SACCHARUM) FOREST ALLIANCE	Quercus rubra-Acer saccharum-Fagus grandifolia / Viburnum acerifolium Forest	50	CEGL006173	G?	S?	None
Forest	Temporarily flooded cold-deciduous forest	ACER SACCHARUM-CARYA CORDIFORMIS TEMPORARILY FLOODED FOREST ALLIANCE	Acer saccahrum-Fraxinus spp.-Tilia americana / Matteuccia struthiopteria-Ageratina altissima Forest	55	CEGL006114	G?	S2S3	Flooded (Temporary)
Forest	Seasonally flooded cold-deciduous forest	ACER RUBRUM-FRAXINUS PENNSYLVANICA SEASONALLY FLOODED FOREST ALLIANCE	Acer rubrum-Fraxinus (pennsylvanica, americana) / Lindera benzoin / Symplocarpus foetidus Forest	57	CEGL006406	G4G5	S3S5	Flooded (Seasonally)
Forest	Saturated cold-deciduos forest	ACER RUBRUM-NYSSA SYLVATICA SATURATED FOREST ALLIANCE	Acer rubrum-Nyssa sylvatica / Rhododendron viscosum-Clethra alnifolia Forest	61	CEGL006156	G?	S4S5	Saturated
Forest	Saturated cold-deciduos forest	FRAXINUS NIGRA-ACER RUBRUM SATURATED FOREST ALLIANCE	Fraxinus nigra-Acer rubrum-(Larix laricina) / Rhamnus alnifolia Forest	63	CEGL006009	G?	S1S3	Saturated
Forest	Mixed needle-leaved evergreen--cold-deciduos forest	PINUS STROBUS-QUERCUS (ALBA, RUBRA, VELUTINA) FOREST ALLIANCE	Pinus strobus-Quercus (rubra, velutina)-Fagus grandifolia Forest	66	CEGL006293	G5?	S?	None
Forest	Mixed needle-leaved evergreen--cold-deciduos forest	TSUGA CANADENSIS-BETULA ALLEGHANIENSIS FOREST ALLIANCE	Tsuga canadensis-Betula alleghaniensis Lower New England / Northern Piedmont Forest	70	CEGL006109	G4?	S3	None
Shrubland	Saturated cold-deciduous shrubland	VACCINIUM CORYMBOSUM SATURATED SHRUBLAND ALLIANCE	Vaccinium corymbosum / Sphagnum spp. Shrubland	107	CEGL006190	G3G5	S1S3	Saturated
Herbaceous	Seasonally flooded temperate or subpolar grassland	CALAMAGROSTIS CANADENSIS SEASONALLY FLOODED HERBACEOUS ALLIANCE	Calamagrostis canadensis-Phalaris arundinacea Herbaceous Vegetation	127	CEGL005174	G4G5	S?	Flooded (Seasonally)
Herbaceous	Seasonally flooded temperate or subpolar grassland	CAREX STRICTA SEASONALLY FLOODED HERBACEOUS ALLIANCE	Carex stricta Seasonally Flooded Herbaceous Vegetation [Placeholder]	130	CEGL004121	G?	S3S4	Flooded (Seasonally)
Herbaceous	Semipermanently flooded temperate or subpolar grassland	SCHOENOPLECTUS ACUTUS-(SCHOENOPLECTUS TABERNAEMONTANI) SEMIPERMANENTLY FLOODED HERBACEOUS ALLIANCE	Schoenoplectus (tabermaemontani, acutus) Eastern Herbaceous Vegetation	141	CEGL006275	G?	S2S4	Flooded (Semipermanently)
Herbaceous	Semipermanently flooded temperate or subpolar grassland	TYPHA (ANGUSTIFOLIA, LATIFOLIA)-(SCHOENOPLECTUS SPP.) SEMIPERMANENTLY FLOODED HERBACEOUS ALLIANCE	Typha (angustifolia, latifolia)-(Schoenoplectus spp.) Eastern Herbaceous Vegetation	155	CEGL006153	G5	S5	Flooded (Semipermanently)
Herbaceous	Tidal temperate or subpolar grassland	TYPHA (ANGUSTIFOLIA, DOMINGENSIS) TIDAL HERBACEOUS ALLIANCE	Typha angustifolia-Hibiscus moscheutos Herbaceous Vegetation	156	CEGL004201	G?	S4	Flooded (Tidal)
Herbaceous	Semipermanently flooded temperate forb vegetation	PONTEDERIA CORDATA-PELTANDRA VIRGINICA SEMIPERMANENTLY FLOODED HERBACEOUS ALLIANCE	Peltandra virginica-Saururus cernuus-Carex crinita / Climacium americanum Herbaceous Vegetation	167	CEGL007696	G2?	S?	Flooded (Semipermanently)
Herbaceous	Tidal temperate perennial forb vegetation	AMARANTHUS CANNABINUS TIDAL HERBACEOUS ALLIANCE	Amaranthus cannabinus Tidal Herbaceous Vegetation	168	CEGL006080	G3G5	S2S3	Flooded (Tidal)
Herbaceous	Tidal temperate perennial forb vegetation	PELTANDRA VIRGINICA-PONTEDERIA CORDATA TIDAL HERBACEOUS VEGETATION ALLIANCE	Mixed Forbs High Marsh Tidal Herbaceous Vegetation [Placeholder]	170	CEGL006325	G?	S3	Flooded (Tidal)
Herbaceous	Permanently flooded temperate or subpolar hydromorphic rooted vegetation	NYMPHAEA ODORATA-NUPHAR SPP. PERMANENTLY FLOODED TEMPERATE HERBACEOUS VEGETATION ALLIANCE	Nuphar lutea ssp. Advena-Nymphaea odorata Herbaceous Vegetation	173	CEGL002386	G4G5	S4	Flooded (Permanently)
Herbaceous	Permanently flooded temperate or subpolar hydromorphic rooted vegetation	VALLISNERIA AMERICANA PERMANENTLY FLOODED TEMPERATE HERBACEOUS ALLIANCE	Vallisneria americana-Potamogeton perfoliatus Herbaceous Vegetation	176	CEGL006196	G5	S4	Flooded (Permanently)

Appendix I. Mapped Forest Patch Summary and Recommendations
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Section Name	Area ID	GIS FID	Acres	Forest Block Size[1]	1890 Forest?	1930 Forest?	Forest Type Approximation (Breden et al 2001)	Lead Forest Type	Native Species Composition	Invasive Species Composition	Qualtiy Rank Factors	Relative Quality Rank	Special Stewardship Recommendations[2,3]
Huey	100	0	7.5	< 10	25-50%	No	2: Variant	2	Canopy: Red Oak, Shagbark Hickory, Mockernut Hickory. Sub-Canopy: Black Cherry, Hop Hornbeam. Shrubs (moderate): Common Blackberry (dominant as low shrub layer), Maple-leaved Viburnum (trace), Spicebush (trace). Herbs: Horsebalm (trace)	Low amounts of Multiflora Rose. High amounts of Japanese Stiltgrass (dense in western portion).	Low Woody Invasives Cover	Low	
Huey	101	1	1.2	< 10	No	No	8: Variant	8	Canopy: Red Maple, Green Ash	Severely infested streamside/wetland forest. Multiflora Rose, Japanese Stiltgrass, Reed Canary Grass as primary cover.		Low	
Huey	102	2	1.1	< 10	No	No	2: Variant	2	Canopy: White Oak, Shagbark Hickory, Red Oak. Shrubs: Blackhaw. Herbs virutally absent.	Small amounts of Multiflora Rose and Japanese Stiltgrass.	Low Woody Invasives Cover	Low	
Huey	103	3	1.2	< 10	> 75%	No	8: Variant (Pin Oak)	8	Canopy: Pin Oak, Green Ash, Mockernut Hickory, Red Maple, American Elm. Sub-Canopy: Ironwood. Shrubs: Blackhaw, Spicebush.	High amounts of Japanese Stiltgrass. Low amounts of Multiflora Rose.	Moderate Priority Old Forest; Low Woody Invasives Cover.	Moderate	
Huey	104	4	1.5	< 10	25 - 50%	No	8: Variant (Pin Oak)	8	Canopy: Red Maple, Green Ash, Pin Oak. Sub-Canopy: None. Shrubs: Blackhaw	High amounts of Japanese Stilgrass. Low to Moderate amounts of Multiflora Rose. Low amounts of Autumn Olive.		Low	
Huey	105	5	1.7	< 10	50-75%	No	No formal type designation. Edge/Successional	0	Canopy: Black Cherry, Walnut, White Ash, Red Maple, Pin Oak, Sweet Birch. Shrubs: Common Blackberry, Spicebush, Vines: Frost Grape, Fox Grape	High to Moderate amounts of Autumn Olive, Multiflora Rose.	Moderate Priority Old Forest.	Low	
Huey	106	6	0.4	< 10	50-75%	No	5-8: Variant	5	Canopy: Shagbark Hickory, Mockernut Hickory, Green Ash, Pin Oak, White Oak. Shrubs and Herbs virtually absent.	Low amounts of Japanese Stiltgrass.	Moderate Priority Old Forest; Low Woody Invasives Cover.	Moderate	
Huey	107	7	1.6	< 10	> 75%	No	8: Variant (Pin Oak)	8	Canopy: Pin Oak, Green Ash, Red Maple. Shrubs (sparse): Arrowwwood.	Moderate to High amounts of Japanese Stiltgrass. Low amounts of Multiflora Rose.	Moderate Priority Old Forest; Low Woody Invasives Cover.	Moderate	
Turnquist	108	8	7.0	10-25	No	No	8: Variant (Pin Oak)	8	Canopy (open): Red Maple, Green Ash, Pin Oak, Black Cherry. Sub-Canopy: Black Cherry. Shrubs: Spicebush, Arrowwood. Herbs: Jumpseed, White Grass.	High amounts of Multiflora Rose. Low to Moderate amounts of Japanese Stiltgrass.		Low	
Turnquist	109	9	0.9	10-25	No	No	No formal type designation. Edge/Successional	0	Not recorded.	High to Moderate amounts of Multiflora Rose. Moderate amounts of Autumn Olive.		Low	
Turnquist	110	10	4.3	< 10	No	No	8: Variant	8	Canopy: Red Maple (young). Shrubs: Spicebush (low). Herbs: Bluejoint Grass (high)	Moderate to High amounts of Multiflora Rose. Moderate to Low amounts of Japanese Stiltgrass and Autumn Olive.		Low	
Turnquist	111	11	18.6	10-25	< 25%	No	8: Variant (Pin Oak)	8	Canopy (open): Red Maple, Green Ash, Pin Oak, American Elm. Shrubs (variable from sparse to 50% cover): Spicebush, Blackhaw, Winterberry.	High amounts of Multiflora Rose. Low to Moderate amounts of Japanese Stiltgrass, Wineberry, Japanese Honeysuckle.		Low	
Turnquist	112	12	2.1	< 10	No	No	8: Variant (Pin Oak)	8	Canopy: Red Maple (young), Green Ash, Pin Oak, American Elm. Shrubs: virtually absent. Herbs: Bluejoint Grass.	Low amounts of Japanese Stiltgrass, Japanese Honeysuckle, Multiflora Rose.	Low Woody Invasives Cover	Low	

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Turnquist	113	13	0.5	10-25	No	No	8: Variant (Pin Oak)	8	Canopy: Red Maple, Pin Oak, Green Ash, American Elm. Shrubs: Winterberry, Blackhaw, Spicebush, Arrowwood. Herbs: Bluejoint Grass	Low to Moderate amounts of Japanese Stiltgrass, Multiflora Rose, Japanese Barberry.	Low Woody Invasives Cover	Low	
Turnquist	114	14	4.3	10-25	No	No	5-8: Variant	5	Canopy: Red Oak, Mockernut Hickory, Shagbark Hickory, Red Maple, American Beech. Sub-Canopy: Ironwood, Hop Hornbeam. Shrubs (low): Arrowwood. Herbs: Bluejoint Grass	Low to Moderate amounts of Japanese Stiltgrass, Multiflora Rose, Japanese Barberry.	Low Woody Invasives Cover	Low	
Turnquist	115	15	1.1	10-25	No	No	8: Variant (Pin Oak)	8	Canopy: Red Maple, Pin Oak, American Elm. Shrubs (moderate): Arrowwood, Spicebush, Maple-leaved Viburnum. Herbs: Bluejoint Grass	Low to Moderate amounts of Japanese Stiltgrass and Multiflora Rose.	Low Woody Invasives Cover	Low	
Turnquist	116	16	7.6	10-25	No	No	8: Variant (Pin Oak)	8	Canopy: Red Maple, Pin Oak. Shrubs (moderate): Highbush Blueberry, Spicebush, Blackhaw.	High amounts of Japanese Stiltgrass, Low amounts of Multiflora Rose.	Low Woody Invasives Cover	Low	
Turnquist	117	17	10.6	10-25	No	No	8: Variant (Pin Oak)	8	Canopy: Red Maple, Pin Oak. Shrubs (low): Spicebush, Common Blackberry.	High amounts of Japanese Stiltgrass, Low amounts of Multiflora Rose.	Low Woody Invasives Cover	Low	
Turnquist	118	18	25.5	10-25	No	No	8: Variant (Pin Oak)	8	Canopy: Red Maple, Pin Oak. Shrubs (low): Spicebush.	Moderate to High amounts of Japanese Stiltgrass and Multiflora Rose. Several patches with very high amounts of Multiflora Rose and low/moderate amounts of Autumn Olive.		Low	
Turnquist	119	19	4.2	< 10	No	No	8: Variant (Pin Oak)	8	Canopy: Red Maple, Pin Oak. Shrubs (high): Arrowwood.	Low to Moderate amounts of Multiflora Rose.	Low Woody Invasives Cover	Low	
Levine	120	20	5.7	10-25	No	No	8: Variant (Pin Oak)	8	Canopy: Red Maple, Pin Oak, Black Tupelo, Green Ash. Shrubs (low): Spicebush, Arrowwood. Herbs: White Snakeroot	Moderate to High amounts of Multiflora Rose. Low/Moderate amounts of Bush Honeysuckle, Japanese Stiltgrass. Open canopy areas with high amounts of Reed Canary Grass.		Low	
Levine	121	21	1.3	10-25	No	No	No formal type designation. Edge/Successional	0	Canopy variable: Red Maple, Pin Oak, Green/White Ash, Walnut.	West and south edges with low amounts of Multiflora Rose and Bush Honeysucke. Northern edge with high amounts of Autumn Olive.		Low	
Fishkin	122	22	0.5	100-250	25 - 50%	No	8: Variant	8	Canopy: Green Ash, Red Maple, Bitternut Hickory, Tulip Poplar. Shrubs (high): Spicebush	Low amounts of Japanese Stiltgrass and Multiflora Rose.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	
Fishkin	123	23	0.9	> 1000	50 - 75%	No	8: Variant (Pin Oak)	8	Canopy (open): Red Maple, Red Cedar, Pin Oak. Shrubs/Herbs virtually absent.	High amounts of Japanese Stiltgrass and Multiflora Rose.	High Priority: Contiguous Forest	Moderate	
Fishkin	124	24	1.3	> 1000	> 75%	100%	2: Variant	2	Canopy: Red Oak, Shagbark Hickory, American Beech, Sweet Birch. Sub-Canopy: Ironwood, Hop Hornbeam. Shrubs (moderate): Spicebush, Witchhazel	Low amounts of Multiflora Rose and Wineberry.	High Priority: Contiguous Forest; High Priority Old Forest; Low Woody Invasives Cover.	High	

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Fishkin	125	25	3.0	> 1000	100%	100%	7: Variant	7	Canopy: Sugar Maple, American Basswood. Shrubs and Herbs virtually absent.	Moderate to High amounts of Japanese Stiltgrass and Multiflora Rose.	High Priority: Contiguous Forest; High Priority Old Forest	Moderate	
Fishkin	126	26	3.6	> 1000	100%	100%	7: Variant	7	Canopy: Sugar Maple, American Basswood. Shrubs and Herbs virtually absent.	Low amounts of Japanese Stiltgrass and Multiflora Rose.	High Priority: Contiguous Forest; High Priority Old Forest; Low Woody Invasives Cover.	High	
Fishkin	127	27	1.0	> 1000	100%	100%	2-4: Variant	2	Canopy: Red Oak, Shagbark Hickory, American Beech, Sweet Birch, Red Maple. Sub-Canopy: Ironwood, Hop Hornbeam. Shrubs (low): Spicebush, Witchhazel	High amounts of Multiflora Rose. Low amounts of Japanese Stiltgrass.	High Priority: Contiguous Forest; High Priority Old Forest	Moderate	
Fishkin	128	28	8.2	100-250	50-75%	100%	4: Variant	4	Canopy: American Beech. Shrubs virtually absent. Herbs (low): Christmas Fern, Partridgeberry, White Wood Aster.	No invasive species.	High Priority: Contiguous Forest; High Priority Old Forest; Low Woody Invasives Cover.	High	
Fishkin	129	29	0.6	100-250	No	100%	2-4: Variant	2	Canopy: Red Oak, Shagbark Hickory, American Beech, Sweet Birch, Red Maple. Sub-Canopy: Ironwood, Hop Hornbeam. Shrubs (low): Spicebush.	Moderage/High amounts of Japanese Stiltgrass.	High Priority: Contiguous Forest; Moderate/High Old Forest; Low Woody Invasives Cover.	High	
Fishkin	130	30	6.9	> 1000	N/A	> 75%	1: Variant (Shagbark)	1	Canopy: Sugar Maple, Shagbark Hickory. Shrubs virtually absent. Herbs (low): White Snakeroot	Low amounts of Garlic Mustard, Multiflora Rose, Japanese Stiltgrass.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Fishkin	131	31	7.0	> 1000	N/A	100%	7: Variant	7	Canopy: Sugar Maple, Shagbark Hickory, American Beech, Red Maple. Sub-Canopy: Ironwood, Hop Hornbeam. Shrubs (low/moderate): Highbush Blueberry, Spicebush. Herbs: Bluejoint Grass	Moderate amounts of Japanese Stiltgrass.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover	High	
Fishkin	132	32	4.3	> 1000	N/A	100%	2: Variant	2	Canopy: Red Oak, Shagbark Hickory, American Beech, Sweet Birch, Red Maple. Sub-Canopy: Ironwood, Hop Hornbeam. Shrubs (low): Spicebush, Witchhazel	High amounts of Multiflora Rose. Low amounts of Japanese Stiltgrass.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest	Moderate	

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Section Name	Area ID	GIS FID	Acres	Forest Block Size[1]	1890 Forest?	1930 Forest?	Forest Type Approximation (Breden et al 2001)	Lead Forest Type	Native Species Composition	Invasive Species Composition	Qualtiy Rank Factors	Relative Quality Rank	Special Stewardship Recommendations[2,3]
Fishkin	133	33	3.0	100-250	> 75%	100%	4: Variant	4	Canopy: American Beech. Shrubs virtually absent. Herbs (low): Christmas Fern, Partridgeberry, White Wood Aster.	No invasive species.	High Priority: Contiguous Forest; High Priority Old Forest; Low Woody Invasives Cover	High	
Fishkin	134	34	0.3	100-250	25 - 50%	100%	4: Variant	4	Native species virtually absent (Streamside).	High amounts of Multiflora Rose. Low amounts of Common Mugwort.	High Priority: Contiguous Forest	Moderate	
Fishkin	135	35	7.7	100-250	50-75%	100%	2-4: Variant	2	Canopy: Red Oak, Shagbark Hickory, American Beech, Sweet Birch, Red Maple. Sub-Canopy: Ironwood, Hop Hornbeam. Shrubs (low): Spicebush.	Low to High amounts of Japanese Stiltgrass. Low amounts of Japanese Barberry	High Priority: Contiguous Forest; High Priority Old Forest; Low Woody Invasives Cover.	High	
Fishkin	136	36	1.3	100-250	100%	100%	2-4: Variant	2	Canopy: Red Oak, Shagbark Hickory, American Beech, Sweet Birch, Red Maple. Sub-Canopy: Ironwood, Hop Hornbeam. Shrubs (low): Spicebush.	Moderate to High amounts of Multiflora Rose and Japanese Stiltgrass. Low amounts of Privet.	High Priority: Contiguous Forest; High Priority Old Forest	Moderate	
Fishkin	137	37	10.6	> 1000	N/A	100%	2-4: Variant	2	Canopy: Red Oak, Shagbark Hickory, American Beech, Sweet Birch, Red Maple. Sub-Canopy: Ironwood, Hop Hornbeam. Shrubs (low): Spicebush.	Moderate to high amounts of Japanese Stiltgrass. Low amounts of Multiflora Rose and Japanese Barberry.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover	High	
VanHouten-Lang	138	38	4.8	> 1000	N/A	100%	7-5: Variant	7	Canopy: Sugar Maple, Red Oak, Basswood, American Elm, American Beech, Shagbark Hickory. Sub-Canopy: Bladdernut. Shrubs: Spicebush, Witch-hazel.	Moderate to Hgh amounts of Japanese Stilgrass and Multiflora Rose. Low amounts of Autumn Olive and Japanese Honeysuckle.	Moderate/High Priority Old Forest.	Low	
Mornan	139	39	3.1	> 1000	N/A	0%	No formal type designation. Edge/Successional.	0	Canopy: Sugar Maple, Black Walnut, White Ash, Red Cedar. Shrubs: Spicebush.	High amounts of Japanese Stiltgrass and Multiflora Rose. Moderate to low amounts of Japanese Honeysuckle and Wineberry.		Low	
Hodanish-Anderson	140	40	10.4	> 1000	N/A	25 - 50%	7-2: Variant	7	Canopy: Sugar Maple, Red Oak, Shagbark Hickory. Sub-Canopy: Hop Hornbeam. Shrubs: Spicebush (density variable).	Variable: High amounts of Multiflora Rose in center of area where Spicebush is also most dense. Moderate to low amounts of Japanese Stilgrass, Japanese Honeysuckle, Japanese Barberry, Autumn Olive.		Low	
Jungblut	141	41	3.1	> 1000	N/A	> 75%	7-2: Variant	7	Canopy: Sugar Maple (>90%), Red Oak. Shrubs (sparse): Spicebush. Herbs (sparse): White Wood Aster, Christmas Fern, White Snakeroot	Low amounts of Japanese Honeysuckle, Garlic Mustard, Multiflora Rose, Autumn Olive, Japanese Barberry, Japanese Stiltgrass. High amounts of Japanese Stilgrass at intersection of Featherbed and Upper Creek Roads.	Modeate/High Priority Old Forest; Low Woody Invasives Cover.	Moderate	
Jungblut	142	42	0.2	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	Moderate to High amounts of Multiflora Rose, Autumn Olive.		Low	

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Section Name	Area ID	GIS FID	Acres	Forest Block Size[1]	1890 Forest?	1930 Forest?	Forest Type Approximation (Breden et al 2001)	Lead Forest Type	Native Species Composition	Invasive Species Composition	Qualtiy Rank Factors	Relative Quality Rank	Special Stewardship Recommendations[2,3]
Jungblut	143	43	0.2	> 1000	N/A	25 - 50%	No formal type designation. Edge/Successional.	0	Thin band of Sugar Maple along roadside.	Low amounts of Japanese Barberry, Japanese Honeysuckle, Autumn Olive.	Low Woody Invasives Cover	Low	
Jungblut	144	44	1.0	> 1000	N/A	0%	1: Variant (Shagbark)	1	Canopy: Sugar Maple (>90%), Shagbark Hickory. Shrubs and Herbs virtually absent.	Moderate to High amounts of Multiflora Rose along edges. Low amounts of Japanese Stiltgrass, Japanese Honeysuckle, Japanese Barberry, Garlic Mustard.		Low	
Jungblut	145	45	0.1	> 1000	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts (dense thicket) of Multiflora Rose and Japanese Honeysuckle.		Low	
Jungblut	146	46	1.0	> 1000	N/A	0%	1: Variant (Shagbark)	1	Canopy (open): Sugar Maple (>90%), Shagbark Hickory. Shrubs and Herbs virtually absent.	High amounts of Japanese Stilgrass. Low amounts of Japanese Barberry, Autumn Olive, Japanese Honeysuckle.	Low Woody Invasives Cover	Low	
Jungblut	147	47	1.6	> 1000	N/A	0%	1: Variant (Shagbark)	1	Canopy: Sugar Maple (>90%), Shagbark Hickory, Red Oak. Shrubs and Herbs virutally absent.	Small amounts of Japanese Honeysuckle, Multiflora Rose, Autumn Olive, Japanese Barberry, Japanese Stiltgrass. Moderate amounts of Multiflora Rose along edges.	Low Woody Invasives Cover	Low	
Jungblut	148	48	0.2	> 1000	N/A	0%	1: Variant (Shagbark)	1	Canopy: Sugar Maple (>90%), Shagbark Hickory, Red Oak. Shrubs and Herbs virutally absent. NOTE: Tree cutting has reduced canopy cover to < 10%.	Low to moderate amounts of Autumn Olive, Japanese Honeysuckle, Japanese Stiltgrass and Multiflora Rose.		Low	
Jungblut	149	49	0.9	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose or Autumn Olive. Low amounts of Japanese Honeysuckle.		Low	
Jungblut	150	50	0.8	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Autumn Olive. Low to moderate amounts of Multiflora Rose, Japanese Honeysuckle.		Low	
Jungblut	151	51	0.3	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	Moderate to High amounts of Autumn Olive. Low to moderate amounts of Multiflora Rose, Japanese Honeysuckle.		Low	
Jungblut	152	52	0.2	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	Moderate to High amounts of Multiflora Rose. Low amounts of Autumn Olive, Japanese Honeysuckle.		Low	
Jungblut	153	53	20.6	> 1000	N/A	> 75%	1-5: Variant	1	Canopy: Sugar Maple, Red Oak, American Beech, Mockernut Hickory, Shagbark Hickory, White Oak. Shrubs: Spicebush (badly browsed). Herbs (sparse): White Snakeroot	High amounts of Japanese Stilgrass. Low amounts of Multiflora Rose, Japanese Barberry, Japanese Honeysuckle. Canopy gaps with denser infestations of Japanese Stilgrass, Japanese Barberry (See Invasive Species Areas 189 & 190).	High Priority: Contiguous Forest; Modeate/High Priority Old Forest; Low Woody Invasives Cover.	High	Priority candidate for deer exclosure fencing.
Cooper	154	54	1.1	> 1000	N/A	0%	8-7: Variant	8	Canopy (open): Sugar Maple, Green Ash, Red Maple. Shrubs (sparse): Spicebush. Herbs: White Snakeroot	High amounts of Multiflora Rose, Japanese Stiltgrass. Low amounts of Japanese Honeysuckle, Bush Honeysuckle, Wineberry, Norway Maple.		Low	Remove Norway Maple - Emerging population.

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Cline-Helmer	155	55	1.4	> 1000	N/A	0%	No formal type designation. Edge/Successional.	0	Canopy (open): Black Walnut, White Ash. Sub-Canopy: Staghorn Sumac. Vines: Grape infestation. Note: Native grapes bringing down trees and reversing succession.	Moderate to High amounts of Multiflora Rose. Low amounts of Autumn Olive.		Low	
Cline-Helmer	156	56	2.2	> 1000	N/A	50 - 75%	5-3: Variant	5	Canopy: Red Oak, White Oak, Red Maple, American Beech, Sugar Maple. Shrubs (>75% cover): Black Cherry, Spicebush, Maple-leaved Viburnum (browsed). Very unusual shrub layer dominated by Black Cherry.	Low amounts of Japanese Stiltgrass, Japanese Honeysuckle, Japanese Barberry, Multiflora Rose, Wineberry.	Modeate/High Priority Old Forest; Low Woody Invasives Cover.	Moderate	
Cline-Helmer	157	57	0.4	> 1000	N/A	0%	No formal type designation. Edge/Successional.	0	Canopy (open): Black Walnut, Black Cherry, White Ash. Vines: Grape. Note: Native grapes bringing down trees and reversing succession.	High amounts of Multiflora Rose. Low to Moderate amounts of Japanese Honeysuckle.		Low	
Cline	158	58	5.6	> 1000	N/A	0%	8: Variant (Pin Oak)	8	Canopy: Red Maple, Green Ash, Black Cherry. Shrubs: Blackhaw. Vines: Grape species. Herbs: White Snakeroot.	High amounts of Multiflora Rose, Japanese Honeysuckle. Low amounts of Garlic Mustard, Japanese Stiltgrass, Bush Honeysuckle.		Low	
Cline	159	59	1.5	> 1000	N/A	0%	8: Variant (Pin Oak)	8	Canopy: Pin Oak, Black Tupelo, Red Maple, Black Cherry, Shagbark Hickory, Red Cedar. Shrubs: Witch-hazel.	High amounts of Multiflora Rose. Low amounts of Garlic Mustard, Japanese Honeysuckle, Japanese Stiltgrass.		Low	
Cline	160	60	2.3	> 1000	N/A	0%	1: Variant (Shagbark)	1	Canopy: Sugar Maple, Shagbark Hickory. Shrubs and Herbs virtually absent.	High amounts of Multiflora Rose, Japanese Honeysuckle. Low amounts of Wineberry.		Low	
Cline	161	61	7.9	> 1000	N/A	0%	5-2: Variant	5	Canopy: Sugar Maple, White Ash, Pignut Hickory, Mockernut Hickory, Red Maple, White Oak. Shrubs: Spicebush, Blackhaw. Herbs: White Snakeroot.	High amounts of Multiflora Rose, Japanese Honeysuckle. Moderate amounts of Japanese Stiltgrass. Low amounts of Privet, Wineberry, Japanese Barberry, Garlic Mustard. Note: Japanese Honeysuckle tearing down trees. Huge gaps opening in forest.		Low	
Thompson	162	62	0.8	250-1000	N/A	0%	8: Variant (Pin Oak)	8	Canopy: Red Maple, Silver Maple, Green Ash. Shrubs: Spicebush, Blackhaw. Herbs: White Snakeroot.	High amounts of Multiflora Rose. Low amounts of Japanese Honeysuckle, Japanese Stiltgrass, Bush Honeysuckle.		Low	
Thompson	163	63	0.9	250-1000	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	Moderate to High amounts of Multiflora Rose, Autumn Olive, Japanese Honeysuckle. High amounts of Reed Canary Grass in southern portion. Low amounts of		Low	
Thompson	164	64	3.0	250-1000	N/A	25 - 50%	8: Variant (Pin Oak)	8	Canopy (open): Red Maple, Green Ash, Pin Oak, Shagbark Hickory, Mockernut Hickory. Sub-Canopy: Ironwood, Black Cherry. Shrubs: Common Blackberry, Blackhaw.	High amounts of Multiflora Rose. Low amounts of Japanese Stiltgrass, Japanese Honeysuckle, Bush Honeysuckle, Wineberry.		Low	
Thompson II	165	65	1.1	250-1000	N/A	0%	No formal type designation. Edge/Successional.	0	Canopy (open): White Ash, Sugar Maple. Shrubs: Blackhaw.	High amounts of Multiflora Rose, Low amounts of Japanese Honeysuckle, Wineberry, Bush Honeysuckle, Autumn Olive.		Low	

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Section Name	Area ID	GIS FID	Acres	Forest Block Size[1]	1890 Forest?	1930 Forest?	Forest Type Approximation (Breden et al 2001)	Lead Forest Type	Native Species Composition	Invasive Species Composition	Qualtiy Rank Factors	Relative Quality Rank	Special Stewardship Recommendations[2,3]
Thompson II	166	66	16.9	250-1000	N/A	> 75%	5-3: Variant	5	Canopy: White Ash, Red Oak, Sugar Maple, American Elm, Mockernut Hickory, American Beech. Sub-Canopy: Witch-hazel, Hop Hornbeam. Shrubs: Blackhaw. Herbs: White Snakeroot.	High amounts of Multiflora Rose, Low to Moderate amounts of Japanese Honeysuckle, Japanese Barberry, Japanese Stiltgrass, Garlic Mustard, Wineberry, Bush Honeysuckle.	Modeate/High Priority Old Forest.	Low	
Thompson II	167	67	9.3	250-1000	N/A	< 25%	8: Variant (Pin Oak)	8	Canopy (open): Red Maple, Green Ash, Shagbark Hickory, Black Walnut, American Elm, Red Oak, Sugar Maple. Shrubs: Blackhaw, Spicebush. Herbs (sparse): White Wood Aster	High amounts of Multiflora Rose. Low to Moderate amounts of Japanese Honeysuckle.		Low	
Thompson II	168	68	2.5	250-1000	N/A	0%	No formal type designation. Edge/Successional.	0	Canopy (open): Black Walnut, White Ash, Red Cedar.	High amounts of Japanese Stiltgrass. Low amounts of Multifloral Rose, Japanese Honeysuckle, Bush Honeysuckle, Wineberry, Garlic Mustard, Small Carpgrass.		Low	
Thompson II	169	69	0.8	250-1000	N/A	> 75%	No formal type designation. Edge/Successional.	0	Canopy (open): Black Walnut, White Ash, Red Cedar.	High amounts of Multiflora Rose, Japanese Honeysuckle. Low to Moderate amounts of Bush Honeysuckle.	Modeate/High Priority Old Forest.	Low	
Thompson II	170	70	0.6	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	Moderate amounts of Multiflora Rose. Low amounts of Garlic Mustard, Japanese Honeysuckle, Bush Honeysuckle, Autumn Olive, Japanese Stiltgrass.		Low	Remove hedgerow to establish larger field area for grassland birds. Joins Successional Areas 72, 73 & 74 = 39.2 acres.
Thompson II	171	71	0.6	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	Low amounts of Small Carpgrass, Bush Honeysuckle, Multiflora Rose.		Low	Remove hedgerow to establish larger field area for grassland birds. Joins Successional Areas 72, 73 & 74 = 39.2 acres.
Thompson II	172	72	0.9	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose. Low amounts of Bush Honeysuckle, Japanese Honeysuckle.		Low	
Thompson II	173	73	1.2	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	Variable: Moderate to Low amounts of Multiflora Rose. Low amounts of Small Carpgrass, Japanese Honeysuckle, Bush Honeysuckle.		Low	
Thompson II	174	74	0.4	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Small Carpgrass. Low to Moderate amounts of Multiflora Rose, Japanese Stiltgrass, Bush Honeysuckle.		Low	
Thompson II	175	75	1.4	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High to Moderate amounts of Multiflora Rose. Moderate to Low amounts of Japanese Honeysuckle, Autumn Olive, Bush Honeysuckle.		Low	
Thompson II	176	76	3.2	< 10	N/A	< 25%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Autumn Olive, Multiflora Rose, Bush Honeysuckle. Moderate amounts of Japanese Honeysuckle.		Low	

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Section Name	Area ID	GIS FID	Acres	Forest Block Size[1]	1890 Forest?	1930 Forest?	Forest Type Approximation (Breden et al 2001)	Lead Forest Type	Native Species Composition	Invasive Species Composition	Qualtiy Rank Factors	Relative Quality Rank	Special Stewardship Recommendations[2,3]
Thompson II	177	77	1.6	< 10	N/A	< 25%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose, Japanese Stiltgrass. Low to Moderate amounts of Garlic Mustard, Autumn Olive, Japanese Honeysuckle, Wineberry.		Low	
Thompson II	178	78	1.2	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	Low to Moderate amounts of Japanese Honeysuckle, Bush Honeysuckle, Multiflora Rose.		Low	
Thompson II	179	79	0.7	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose, Japanese Stiltgrass. Low to Moderate amounts of Autumn Olive, Japanese Honeysuckle, Bush Honeysuckle, Japanese Stiltgrass.		Low	
Thompson II	180	80	2.4	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose. Low to Moderate amounts of Autumn Olive, Small Carpgrass, Bush Honeysuckle, Japanese Stiltgrass.		Low	
Thompson II	181	81	0.6	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose. Moderate amounts of Japanese Honeysuckle, Bush Honeysuckle.		Low	
Thompson II	182	82	0.4	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose. Moderate amounts of Japanese Honeysuckle, Bush Honeysuckle.		Low	
Thompson II	183	83	0.9	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose. Low amounts of Bush Honeysuckle.		Low	Remove hedgerow to establish larger field area for grassland birds. Joins Successional Areas 72, 73 & 74 = 39.2 acres.
Prall House	184	84	0.8	> 1000	N/A	0%	5-9: Variant	5	Canopy: Sugar Maple, Red Oak, Eastern Hemlock. Shrubs: Spicebush. Herbs: Christmas Fern.	Low to Moderate amounts of Multiflora Rose, Winged Burning Bush, Japanese Barberry, Japanese Honeysuckle, Bush Honeysuckle, Wineberry, Japanese Stiltgrass, English Ivy, Lesser Periwinkle, Japanese Wisteria.		Low	
Prall House	185	85	0.03	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded. Edge of landscaping.	High amounts of Wineberry. Low to Moderate amounts of Bush Honeysuckle, English Ivy.		Low	
Prall House	186	86	0.2	> 1000	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded. Pond edge.	High amounts of Japanese Honeysuckle. Low amounts of Garlic Mustard, Bush Honeysuckle, Japanese Stiltgrass, Wineberry, Lesser Periwinkle, Japanese Wisteria.		Low	

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Prall House	187	87	0.4	> 1000	N/A	< 25%	No formal type designation. Edge/Successional.	0	Canopy: Sugar Maple, Red Oak. Transitional from landscaping.	High to Moderate amounts of Lesser Periwinkle. Low to Moderate amounts of Winged Burning Bush, Multiflora Rose, Japanese Honeysuckle, Garlic Mustard, Bush Honeysuckle, English Ivy.		Low	
Prall House	188	88	0.9	> 1000	N/A	> 75%	1-5: Variant	1	Canopy: Sugar Maple, American Beech. Sub-Canopy: Ironwood. Shrubs and herbs virtually absent.	Low amounts of Winged Burning Bush, Japanese Barberry, Japanese Stiltgrass.	Modeate/High Priority Old Forest; Low Woody Invasives Cover.	Moderate	
Prall House	189	89	0.9	> 1000	N/A	< 25%	2-5: Variant	2	Canopy (open): Red Oak, Mockernut Hickory, Sugar Maple.	High amounts of Japanese Barberry. Moderate amounts of Multiflora Rose, Japanese Stiltgrass. Low amounts of Privet, Wineberry, Garlic Mustard, Japanese Honeysuckle.		Low	
Thorpe	190	90	0.8	100-250	N/A	100%	7: Variant	7	Canopy: Sugar Maple, American Sycamore, Black Tupelo, Mockernut Hickory, American Beech, Tulip Poplar, American Basswood. Sub-Canopy: Ironwood. Shrubs: Spicebush. Herbs: Virginia Waterleaf.	High amounts of Japanese Stiltgrass. Low amounts of Multifloral Rose, Japanese Honeysuckle, Autumn Olive, Multiflora Rose, Wineberry, Common Mugwort.	Moderate/High Priority Old Forest; Low Woody Invasives Cover	Moderate	
Thorpe	191	91	0.4	100-250	N/A	100%	1: Variant (Shagbark)	1	Canopy: Sugar Maple, Shagbark Hickory. Shrubs virtually absent. Herbs (low): Virginia Waterleaf	Roadside: High amounts of Garlic Mustard. Moderate amounts of Wineberry.	Moderate/High Priority Old Forest.	Low	
Thorpe	192	92	0.6	100-250	N/A	100%	1: Variant (Shagbark)	1	Canopy: Sugar Maple, Shagbark Hickory. Shrubs virtually absent. Herbs (low): Virginia Waterleaf	Streamside: High amounts of Japanese Stiltgrass. Low to Moderate amounts of Multiflora Rose, Wineberry, Japanese Honeysuckle, Common Mugwort, Japanese Barberry.	Moderate/High Priority Old Forest.	Low	
Thorpe	193	93	0.3	100-250	N/A	100%	1: Variant (Shagbark)	1	Canopy: Sugar Maple, Shagbark Hickory. Shrubs virtually absent. Herbs (low): Virginia Waterleaf	Moderate amounts of Japanese Honeysuckle. Low to Moderate amounts of Multiflora Rose, Japanese Barberry, Garlic Mustard.	Moderate/High Priority Old Forest; Low Woody Invasives Cover	Moderate	
Thorpe	194	94	0.2	100-250	N/A	100%	1: Variant (Shagbark)	1	Canopy: Sugar Maple, Shagbark Hickory. Shrubs virtually absent. Herbs (low): Virginia Waterleaf	Near minor stream: High amounts of Japanese Honeysuckle and Garlic Mustard. Low amounts of Japanese Barberry.	Moderate/High Priority Old Forest.	Low	
Thorpe	195	95	0.7	100-250	N/A	100%	1: Variant (Shagbark)	1	Canopy: Sugar Maple, Shagbark Hickory. Shrubs virtually absent. Herbs (low): Virginia Waterleaf	Low amounts of Japanese Honeysuckle, Multiflora Rose, Winged Burning Bush.	Moderate/High Priority Old Forest; Low Woody Invasives Cover	Moderate	
Hackl	196	96	7.3	> 1000	N/A	> 75%	9-2: Variant	9	Canopy: Eastern Hemlock, American Beech, Sugar Maple, Tulip Poplar, Red Oak, White Oak. Shrubs virtually absent. Herbs: Partridgeberry, Striped Wintergreen, Pennsylvania Sedge.	Low amounts of Garlic Mustard, Japanese Barberry, Japanese Stiltgrass. Small canopy gaps with High amounts of Garlic Mustard and Low amounts of Japanese Barberry.	Modeate/High Priority Old Forest; Low Woody Invasives Cover.	Moderate	

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Hackl	197	97	0.1	100-250	N/A	0%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, Shagbark Hickory. Shrubs virtually absent. Herbs: Bottlebrush Grass, Zig-Zag Goldenrod, Virginia Waterleaf.	Streamside: High amounts of Multiflora Rose. Moderate amounts of Japanese Stiltgrass, Japanese Honeysuckle.		Low	
Hackl	198	98	0.9	100-250	N/A	> 75%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, Shagbark Hickory. Shrubs virtually absent. Herbs: Bottlebrush Grass, Zig-Zag Goldenrod, Virginia Waterleaf.	Streamside: High amounts of Japanese Honeysuckle. Moderate amounts of Japanese Stiltgrass. Low amounts of Multiflora Rose.	Modeate/High Priority Old Forest; Low Woody Invasives Cover.	Moderate	
Hackl	199	99	0.2	100-250	N/A	> 75%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, Shagbark Hickory. Shrubs virtually absent. Herbs: Bottlebrush Grass, Zig-Zag Goldenrod, Virginia Waterleaf.	Drainage ditch: High amounts of Japanese Stiltgrass.	Modeate/High Priority Old Forest; Low Woody Invasives Cover.	Moderate	
Hackl	200	100	0.2	100-250	N/A	< 25%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, Shagbark Hickory. Shrubs virtually absent. Herbs: Bottlebrush Grass, Zig-Zag Goldenrod, Virginia Waterleaf.	Roadside: Moderate amounts of Japanese Honeysuckle, Japanese Stiltgrass, Multiflora Rose. Low amounts of Bush Honeysuckle.	Low Woody Invasives Cover	Low	
Hackl	201	101	0.4	100-250	N/A	< 25%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, Shagbark Hickory. Shrubs virtually absent. Herbs: Bottlebrush Grass, Zig-Zag Goldenrod, Virginia Waterleaf.	Roadside: Low to Moderate amounts of Japaese Honeysuckle, Japanese Stiltgrass, Multiflora Rose.	Low Woody Invasives Cover	Low	
Hackl	202	102	0.9	100-250	N/A	100%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, Shagbark Hickory. Shrubs virtually absent. Herbs: Bottlebrush Grass, Zig-Zag Goldenrod, Virginia Waterleaf.	Low amounts of Japanese Honeysuckle, Multiflora Rose.	Moderate/High Priority Old Forest; Low Woody Invasives Cover	Moderate	
Cook	203	103	0.9	100-250	N/A	0%	No formal type designation. Edge/Successional.	0	Canopy: Sugar Maple. Shrubs and Herbs virutally absent.	High amounts of Garlic Mustard. Low to Moderate amounts of Multiflora Rose, Japanese Honeysuckle.		Low	
Jarbo	204	104	0.4	100-250	N/A	> 75%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Japanese Honeysuckle, Multiflora Rose. Low to Moderate amounts of Japanese Stiltgrass, Bush Honeysuckle.		Low	
Jarbo-Cook	205	105	9.4	100-250	N/A	< 25%	No formal type designation. Edge/Successional.	0	Canopy (open): Black Walnut, White Ash. Vines: Grape infestation.	High amounts of Multiflora Rose. Moderate amounts of Japanese Stiltgrass. Low amounts of Canada Thistle, Bush Honeysuckle, Japanese Honeysuckle, Autumn Olive, Garlic Mustard, Wineberry. Edges with High amounts of Multiflora Rose, Japanese Honeysuckle.		Low	
Jarbo	206	106	0.8	100-250	N/A	> 75%	7: Variant	7	Canopy: Sugar Maple, American Basswood. Shrubs and Herbs virtually absent. Herbs: Christmas Fern.	High amounts of Multiflora Rose, Japanese Honeysuckle. Low amounts of Garlic Mustard.	Modeate/High Priority Old Forest.	Low	
Hilton	207	107	1.1	100-250	N/A	100%	1: Variant	1	Canopy: Sugar Maple, American Basswood. Shrubs and Herbs virtually absent. Herbs: Christmas Fern.	Moderate to High amounts of Multiflora Rose, Garlic Mustard. Low to Moderate amounts of Japanese Stiltgrass, Japanese Honeysuckle.	Moderate/High Priority Old Forest.	Low	

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Section Name	Area ID	GIS FID	Acres	Forest Block Size[1]	1890 Forest?	1930 Forest?	Forest Type Approximation (Breden et al 2001)	Lead Forest Type	Native Species Composition	Invasive Species Composition	Qualtiy Rank Factors	Relative Quality Rank	Special Stewardship Recommendations[2,3]
Hilton	208	108	0.5	100-250	N/A	100%	1: Variant	1	Canopy: Sugar Maple, American Basswood. Shrubs and Herbs virtually absent. Herbs: Christmas Fern.	Low to Moderate amounts of Garlic Mustard, Japanese Barberry, Japanese Stiltgrass, Multiflora Rose, Lesser Periwinkle.	Moderate/High Priority Old Forest.	Low	
Hilton	209	109	0.3	100-250	N/A	100%	1: Variant	1	Canopy: Sugar Maple, American Basswood. Shrubs and Herbs virtually absent. Herbs: Christmas Fern.	High amounts of Japanese Honeysuckle, Multiflora Rose. Modeate amounts of Japanese Stiltgrass.	Moderate/High Priority Old Forest.	Low	
Hilton	210	110	0.8	100-250	N/A	100%	1: Variant	1	Canopy: Sugar Maple, American Basswood. Shrubs and Herbs virtually absent. Herbs: Christmas Fern.	Low amounts of Garlic Mustard, Multiflora Rose.	Moderate/High Priority Old Forest; Low Woody Invasives Cover	Moderate	
Hilton	211	111	0.9	100-250	N/A	100%	7: Variant	7	Canopy: Sugar Maple, Sycamore. Sub-canopy: Ironwood. Shrubs: Spicebush.	High amounts of Multiflora Rose, Japanese Honeysuckle. Low amounts of Bush Honeysuckle.	Moderate/High Priority Old Forest.	Low	
Hilton-Richards	212	112	2.3	> 1000	N/A	100%	7: Variant	7	Canopy: Sugar Maple, Sycamore. Sub-canopy: Ironwood. Shrubs: Spicebush.	Variable: High to Low amounts of Multiflora Rose, Japanese Honeysuckle. Low amounts of Japanese Stiltgrass, Winged Burning Bush, Autumn Olive, Japanese Barberry, Bush Honeysuckle, Wineberry.	Moderate/High Priority Old Forest.	Low	
Richards	213	113	1.2	> 1000	N/A	100%	7: Variant	7	Canopy: Sugar Maple, American Basswood, Red Oak. Shrubs: Spicebush. Herbs: Wreath Goldenrod, White Wood Aster, Blue Wood Aster.	High amounts of Japanese Stiltgrass, Moderate to Low amounts of Multiflora Rose, Garlic Mustard, Japanese Barberry, Japanese Honeysuckle.	Moderate/High Priority Old Forest.	Low	
Milano	214	114	1.5	> 1000	N/A	100%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock.	Low amounts of Japanese Honeysuckle, Multiflora Rose.	Moderate/High Priority Old Forest; Low Woody Invasives Cover	Moderate	
Milano	215	115	8.4	> 1000	N/A	50 - 75%	7-5: Variant	7	Canopy: Sugar Maple, Red Oak. Shrubs: Blackhaw, Spicebush. Herbs: Bluejoint Grass, Stinging Nettle, White Wood Aster.	Variable: Moderate to High Amounts of Japanese Stiltgrass, Japanese Honeysuckle, Multiflora Rose. Low amounts of Wineberry, Autumn Olive.	Moderate/High Priority Old Forest.	Low	
Snevily	216	116	0.8	> 1000	N/A	0%	7: Variant	7	Canopy: Sugar Maple, American Basswood, Red Oak. Sub-Canopy: Bladdernut. Herbs: Bottlebrush Grass.	High amounts of Multiflora Rose, Japanese Honeysuckle. Moderate to Low amounts of Japanese Stiltgrass, Bush Honeysuckle.		Low	
Ling	217	117	14.7	100-250	N/A	< 25%	No formal type designation. Edge/Successional.	0	Canopy (open): White Ash, Black Cherry, Mockernut Hickory. Shrubs: Blackhaw, Spicebush (dense in pockets).	High amounts of Multiflora Rose, Japanese Honeysuckle (smothering trees). Low to Moderate Amounts of Garlic Mustard, Japanese Stiltgrass, Bush Honeysuckle, Wineberry.		Low	
Ling	218	118	3.7	100-250	N/A	0%	No formal type designation. Edge/Successional.	0	Canopy: Sugar Maple, Tulip Poplar, American Sycamore, Red Cedar. Shrubs: Spicebush.	High amounts of Multiflora Rose. Low to Moderate amounts of Japanese Honeysuckle, Japanese Stiltgrass, Wineberry.		Low	

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Ling	219	119	4.9	100-250	N/A	50 - 75%	1-5: Variant	1	Canopy: Sugar Maple, Red Oak, American Beech, Shagbark Hickory, White Oak. Shrubs and Herbs virtually absent.	Low amounts of Garlic Mustard, Japanese Barberry, Multiflora Rose, Wineberry. (Mostly in areas with more oak in canopy).	Moderate/High Priority Old Forest; Low Woody Invasives Cover	Moderate	
Ling	220	120	7.3	100-250	N/A	0%	7: Variant	7	Canopy: Sugar Maple, American Sycamore, Shagbark Hickory, Green Ash. Shrubs (sparse): Blackhaw.	Moderate to High Amounts of Multiflora Rose, Japanese Honeysuckle, Japanese Stiltgrass. Low amounts of Autumn Olive, Japanese Barberry.		Low	
Cosman	221	121	1.5	100-250	N/A	0%	1: Variant	1	Canopy: Sugar Maple, American Basswood, Green Ash, Red Oak, Mockernut Hickory. Shrubs and Herbs virtually absent.	Low amounts of Garlic Mustard, Japanese Honeysuckle, Multiflora Rose.	Low Woody Invasives Cover	Low	
Cosman	222	122	0.9	100-250	N/A	0%	1: Variant	1	Canopy: Sugar Maple, American Basswood, Green Ash, Red Oak, Mockernut Hickory. Shrubs and Herbs virtually absent.	High amounts of Garlic Mustard. Low amounts of Multiflora Rose, Japanese Honeysuckle.	Low Woody Invasives Cover	Low	
Cosman	223	123	1.4	100-250	N/A	0%	1: Variant	1	Canopy: Sugar Maple, American Basswood, Green Ash, Red Oak, Mockernut Hickory. Shrubs and Herbs virtually absent.	High amounts of Multiflora Rose, Garlic Mustard.		Low	
Cosman	224	124	1.0	100-250	N/A	0%	1: Variant	1	Canopy: Sugar Maple, American Basswood, Green Ash, Red Oak, Mockernut Hickory. Shrubs and Herbs virtually absent.	Low amounts of Garlic Mustard, Japanese Honeysuckle, Multiflora Rose, Winged Burning Bush.	Low Woody Invasives Cover	Low	
Johnson	225	125	1.9	> 1000	N/A	0%	7: Variant	7	Canopy: Sugar Maple, American Basswood, Green Ash, Red Oak, Mockernut Hickory. Shrubs and Herbs virtually absent.	Variable: High to Low amounts of Multiflora Rose, Japanese Honeysuckle, Japanese Stiltgrass		Low	
Johnson	226	126	6.0	> 1000	N/A	> 75%	7: Variant	7	Canopy: Sugar Maple, American Basswood, Green Ash, American Beech, Red Oak, White Oak, Mockernut Hickory. Shrubs and Herbs virtually absent. Shrubs: Blackhaw. Herbs: Wreath Goldenrod, White Wood Aster, White Snakeroot.	Low amounts of Garlic Mustard, Japanese Honeysuckle, Multiflora Rose, Wineberry, Japanese Barberry.	High Priority: Contiguous Forest; Low Woody Invasives Cover.	Moderate	
Johnson	227	127	0.2	> 1000	N/A	100%	7: Variant	7	Canopy: Sugar Maple, American Basswood, Green Ash, American Beech, Red Oak, White Oak, Mockernut Hickory. Shrubs and Herbs virtually absent. Shrubs: Blackhaw. Herbs: Wreath Goldenrod, White Wood Aster, White Snakeroot.	High amounts of Multiflora Rose. Low amounts of Privet, Japanese Honeysuckle, Japanese Stiltgrass, Wineberry.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest.	Moderate	
Johnson	228	128	1.1	> 1000	N/A	100%	7: Variant	7	Canopy: Sugar Maple, American Basswood, Green Ash, American Beech, Red Oak, White Oak, Mockernut Hickory. Shrubs and Herbs virtually absent. Shrubs: Blackhaw. Herbs: Wreath Goldenrod, White Wood Aster, White Snakeroot.	No invasive species.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Johnson	229	129	1.3	> 1000	N/A	> 75%	1: Variant	1	Canopy: Sugar Maple, American Basswood, Green Ash, American Beech, Red Oak, White Oak, Mockernut Hickory. Thin Canopy with more ash. Shrubs and Herbs virtually absent. Shrubs: Blackhaw. Herbs: Wreath Goldenrod, White Wood Aster, White Snakeroot.	High amount of Multiflora Rose. Low amounts of Garlic Mustard, Japanese Honeysuckle, Bush Honeysuckle, Wineberry.	High Priority: Contiguous Forest; Modeate/High Priority Old Forest.	Moderate	

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Section Name	Area ID	GIS FID	Acres	Forest Block Size[1]	1890 Forest?	1930 Forest?	Forest Type Approximation (Breden et al 2001)	Lead Forest Type	Native Species Composition	Invasive Species Composition	Qualtiy Rank Factors	Relative Quality Rank	Special Stewardship Recommendations[2,3]
Johnson	230	130	0.9	> 1000	N/A	100%	9: Variant	9	Canopy: Eastern Hemlock, White Pine, Sugar Maple. Shrubs and Herbs virtually absent.	No invasive species.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Johnson	231	131	1.7	> 1000	N/A	100%	9-1: Variant	9	Canopy: Eastern Hemlock, Sugar Maple. Shrubs: Blackhaw.	Low amounts of Garlic Mustard, Japanese Honeysuckle, Wineberry. Invasive species in canopy gaps.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Johnson	232	132	4.4	> 1000	N/A	25 - 50%	9-1: Variant	9	Canopy: Eastern Hemlock, Sugar Maple. Shrubs and Herbs virtually absent.	No invasive species.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	
Johnson	233	133	0.4	> 1000	N/A	0%	9-1: Variant	9	Canopy: Eastern Hemlock, Sugar Maple. Shrubs and Herbs virtually absent. Area associated with exposed cliff faces and thinner canopy coverage.	Low amounts of Garlic Mustard, Japanese Honeysuckle, Japanese Stiltgrass.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	
Johnson	234	134	5.2	> 1000	N/A	> 75%	1: Variant	1	Canopy: Sugar Maple, Red Oak, Mockernut Hickory. Shrubs and herbs virtually absent.	Low amounts of Japanese Stiltgrass, Japanese Honeysuckle, Multiflora Rose.	High Priority: Contiguous Forest; Modeate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Johnson	235	135	3.1	> 1000	N/A	100%	5-1: Variant	5	Canopy: Sugar Maple, Red Oak, Mockernut Hickory, Tulip Poplar. Shrubs and herbs virtually absent.	High amounts of Japanese Stiltgrass. Moderate amounts of Japanese Honeysuckle, Garlic Mustard. Low amounts of Japanese Barberry, Multiflora Rose.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Macak	236	136	8.3	> 1000	N/A	100%	9: Variant	9	Canopy: Eastern Hemlock, Sugar Maple, White Oak. Shrubs and Herbs virtually absent.	No invasive species.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Macak	237	137	4.8	> 1000	N/A	100%	1-4: Variant	1	Canopy: Sugar Maple, American Beech, Tulip Poplar. Shrubs (sparse): Spicebush	Low amounts of Garlic Mustard, Japanese Barberry, Japanese Honeysuckle, Multiflora Rose.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	

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Section Name	Area ID	GIS FID	Acres	Forest Block Size[1]	1890 Forest?	1930 Forest?	Forest Type Approximation (Breden et al 2001)	Lead Forest Type	Native Species Composition	Invasive Species Composition	Qualtiy Rank Factors	Relative Quality Rank	Special Stewardship Recommendations[2,3]
Macak	238	138	0.8	> 1000	N/A	100%	1-9: Variant	1	Canopy: Sugar Maple, Red Oak, Eastern Hemlock.	Low amounts of Japanese Stiltgrass, Garlic Mustard.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Macak	239	139	2.6	> 1000	N/A	50 - 75%	1: Variant	1	Canopy: White Ash, Red Oak, Sugar Maple, White Oak, American Elm. Shrubs: Blackhaw, Spicebush (50-75% cover in northern portion). Herbs: White Snakeroot.	Low amounts of Garlic Mustard, Japanese Barberry, Japanese Honeysuckle, Wineberry.	High Priority: Contiguous Forest; Moderate/High Old Forest; Low Woody Invasives Cover.	High	
Macak	240	140	5.8	> 1000	N/A	25 - 50%	1: Variant	1	Canopy: White Ash, Red Oak, Sugar Maple, White Oak, American Elm. Shrubs: Blackhaw, Spicebush. Herbs: White Snakeroot.	High amounts of Japanese Stiltgrass. Low amounts of Japanese Barberry, Multiflora Rose, Japanese Honeysuckle, Wineberry.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	
Macak	241	141	1.2	> 1000	N/A	100%	7: Variant	7	Canopy (open): Sugar Maple.	High to Moderate amounts of Japanese Stiltgrass. Low amounts of Autumn Olive, Multiflora Rose, Common Mugwort.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Macak	242	142	1.6	> 1000	N/A	> 75%	1: Variant	1	Canopy: Sugar Maple, Red Oak, American Beech. Shrubs (sparse): Spicebush. Herbs (sparse): Christmas Fern.	Low amounts of Garlic Mustard, Japanese Barberry, Multiflora Rose.	High Priority: Contiguous Forest; Modeate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Macak	243	143	2.1	> 1000	N/A	100%	9-1: Variant	9	Canopy: Sugar Maple, Eastern Hemlock, Sweet Birch, American Beech. Shrubs (sparse): Blackhaw. Herbs (sparse): Marginal Woodfern	Low amounts of Garlic Mustard, Autumn Olive, Winged Burning Bush, Multiflora Rose, Wineberry.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Macak	244	144	0.8	> 1000	N/A	100%	9-1: Variant	9	Canopy (open): Sugar Maple, Eastern Hemlock, Sweet Birch, American Beech. Shrubs (sparse): Blackhaw. Herbs (sparse): Marginal Woodfern	High amounts of Japanese Stiltgrass. Low amounts of Japanese Barberry, Multiflora Rose, Wineberry.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Macek	245	145	0.6	> 1000	N/A	25 - 50%	1-5: Variant	1	Canopy: Sugar Maple, Red Oak, American Beech. Shrubs (sparse): Spicebush.	High amounts of Garlic Mustard. Low to Moderate amounts of Multiflora Rose, Japanese Barberry, Wineberry.	High Priority: Contiguous Forest	Low	

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Macek	246	146	3.2	> 1000	N/A	100%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, White Ash, Red Oak, American Beech. Shrubs (sparse): Spicebush. Herbs (sparse): Christmas Fern.	Low amounts of Garlic Mustard, Multiflora Rose, Wineberry.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Soine	247	147	1.6	> 1000	N/A	< 25%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, White Ash, Red Oak, American Beech. Shrubs (sparse): Spicebush. Herbs (sparse): Christmas Fern.	Low amounts of Garlic Mustard, Multiflora Rose, Wineberry.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	
Soine	248	148	0.7	> 1000	N/A	> 75%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, White Ash, Red Oak, American Beech. Shrubs (sparse): Spicebush. Herbs (sparse): Christmas Fern.	Low to Moderate amounts of Garlic Mustard, Japanese Barberry, Multiflora Rose, Wineberry. More invasives within steep-banked drainage area.	High Priority: Contiguous Forest; Modeate/High Priority Old Forest	Moderate	
Soine	249	149	0.3	> 1000	N/A	100%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, White Ash, Red Oak, American Beech. Shrubs (sparse): Spicebush. Herbs (sparse): Christmas Fern.	High amounts of Japanese Honeysuckle. Low amounts of Norway Maple, Garlic Mustard, Wineberry, Lesser Periwinkle.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover. Note: Worst spot in a relatively clean area.	High	
Soine	250	150	0.1	> 1000	N/A	100%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, White Ash, Red Oak, American Beech. Shrubs (sparse): Spicebush. Herbs (sparse): Christmas Fern.	High amounts of Lesser Periwinkle and Japanese Pachysandra.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Soine	251	151	4.0	> 1000	N/A	100%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, White Ash, Red Oak, American Beech. Shrubs (sparse): Spicebush. Herbs (sparse): Christmas Fern.	Low amounts of Garlic Mustard, Multiflora Rose, Wineberry.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Soine	252	152	4.7	> 1000	N/A	100%	1-9: Variant	1	Canopy: Sugar Maple, Eastern Hemlock, White Ash, Red Oak, American Beech. Shrubs (sparse): Spicebush. Herbs (sparse): Christmas Fern.	Moderate amounts of Garlic Mustard. Low amounts of Norway Maple, Japanese Honeysuckle, Japanese Barberry, Wineberry, Multiflora Rose.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	

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Mitchell	253	153	18.0	> 1000	N/A	> 75%	1-5: Variant	1	Canopy: Sugar Maple (dominant), American Beech, Red Oak, Tulip Poplar. Sub-Canopy: Ironwood. Shrubs and Herbs virtually absent.	Low amounts of Japanese Barberry.	High Priority: Contiguous Forest; Modeate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Mitchell	254	154	0.6	> 1000	N/A	100%	5-1: Variant	5	Canopy: Sugar Maple, American Beech, Red Oak, Tulip Poplar (dominant). Sub-Canopy: Ironwood. Shrubs and Herbs virtually absent.	High amounts of Japanese Barberry. Low amounts of Japanese Honeysuckle, Autumn Olive.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest. Note: Case in point for sugar maple inhospitable to any understory. Compare to ID 154.	Moderate	
Mitchell	255	155	4.1	> 1000	N/A	100%	9-1: Variant	9	Canopy: Eastern Hemlock (dominant), Sugar Maple, American Beech. Shrubs and Herbs virtually absent.	No invasive species.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Mitchell	256	156	6.1	> 1000	N/A	> 75%	1-9: Variant	1	Canopy: Sugar Maple (dominant), Red Oak, Eastern Hemlock, Tulip Poplar, White Ash. Shrubs and Herbs virutally absent. Herbs: Christmas Fern.	No invasive species.	High Priority: Contiguous Forest; Modeate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Mitchell	257	157	3.8	> 1000	N/A	100%	5-1: Variant	5	Canopy: Sugar Maple (co-dominant), Red Oak (co-dominant), American Beech, Shagbark Hickory, White Ash. Shrubs and Herbs virtually absent. Herbs: White Snakeroot.	High amounts of Japanese Stiltgrass. Moderate to High amounts of Autumn Olive. Moderate to Low amounts of Multiflora Rose, Garlic Mustard, Japanese Barberry. (Area lies lower and is wetter than FID 158).	High Priority: Contiguous Forest; Moderate/High Priority Old Forest.	Moderate	
Mitchell	258	158	3.2	> 1000	N/A	100%	1-5: Variant	1	Canopy: Sugar Maple (co-dominant), Red Oak (co-dominant), American Beech, Shagbark Hickory, White Ash. Shrubs and Herbs virtually absent. Herbs: White Snakeroot.	Low amounts of Japanese Stiltgrass, Garlic Mustard, Autumn Olive, Japanese Barberry. (Area listed higher and is drier than FID 157).	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Mitchell	259	159	1.2	> 1000	N/A	25 - 50%	2: Variant	2	Canopy: Red Oak, White Ash, Shagbark Hickory. Sub-Canopy: Hop Hornbeam. Shrubs: Spicebush (heavily browsed). Herbs: Bottlebrush Grass	High amounts of Japanese Stiltgrass. Low amounts of Japanese Honeysuckle, Winged Burning Bush.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	

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Mitchell	260	160	2.4	> 1000	N/A	0%	No formal type designation. Edge/Successional.	0	Canopy: Red Cedar. Shrubs: Blackhaw. Vines: Virginia Creeper. Herbs: Jack-in-the-Pulpit, Clearweed, White Snakeroot.	High amounts of Japanese Stiltgrass. Moderate amounts of Autumn Olive, Garlic Mustard. Low amounts of Multiflora Rose, Wineberry.	High Priority: Contiguous Forest	Low	Maintain cedar for owls?
Mitchell	261	161	0.5	> 1000	N/A	25 - 50%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose, Japanese Honeysuckle. Moderate amounts of Japanese Stiltgrass.	High Priority: Contiguous Forest	Low	
Mitchell	262	162	0.4	> 1000	N/A	0%	No formal type designation. Edge/Successional.	0	Canopy: Red Cedar.	High amounts of Japanese Stiltgrass. Low amounts of Autumn Olive.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	Maintain cedar for owls?
Mitchell	263	163	0.4	> 1000	N/A	< 25%	1: Variant (Shagbark)	1	Canopy: Sugar Maple, American Beech, Shagbark Hickory. Shrubs and Herbs virtually absent.	Low amounts of Japanese Barberry, Autumn Olive, Japanese Honeysuckle, Japanese Stiltgrass, Multiflora Rose.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	
Mitchell	264	164	3.1	> 1000	N/A	< 25%	2: Variant	2	Canopy: Red Oak, White Ash, Shagbark Hickory. Sub-Canopy: Hop Hornbeam. Shrubs: Blackhaw.	High amounts of Japanese Stiltgrass. Moderate amounts of Autumn Olive, Multiflora Rose. Low amounts of Privet, Japanese Honeysuckle, Japanese Barberry, Wineberry.	High Priority: Contiguous Forest	Low	
Bruce	265	165	1.3	> 1000	N/A	100%	5-7: Variant	5	Canopy: Red Oak, Sugar Maple, American Sycamore, Shagbark Hickory, Green Ash, Tulip Poplar, American Basswood. Herbs: White Snakeroot.	High amounts of Autumn Olive. Low to moderate amounts of Japanese Stiltgrass, Japanese Barberry.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest.	Moderate	
Bruce	266	166	2.9	> 1000	N/A	0%	5-7: Variant	5	Canopy: Red Oak, Sugar Maple, American Sycamore, Shagbark Hickory, Green Ash, Tulip Poplar, American Basswood. Herbs: White Snakeroot.	Moderate to Low amounts of Garlic Mustard, Japanese Stiltgrass, Multiflora Rose, Japanese Barberry.	High Priority: Contiguous Forest	Low	
Bruce	267	167	0.6	> 1000	N/A	0%	5-7: Variant	5	Canopy: Red Oak, Sugar Maple, American Sycamore, Shagbark Hickory, Green Ash, Tulip Poplar, American Basswood. Herbs: White Snakeroot.	High amounts of Japanese Stiltgrass. Low amounts of Japanese Barberry, Multiflora Rose, Autumn Olive.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	
Bruce-Mitchell	268	168	0.9	> 1000	N/A	0%	5-7: Variant	5	Canopy: Red Oak, Sugar Maple, American Sycamore, Shagbark Hickory, Green Ash, Tulip Poplar, American Basswood. Herbs: White Snakeroot.	High amounts of Japanese Stiltgrass, Multiflora Rose. Low amounts of Japanese Honeysuckle, Common Mugwort, Autumn Olive, Wineberry.	High Priority: Contiguous Forest	Low	
Bruce	269	169	1.3	> 1000	N/A	0%	5-7: Variant	5	Canopy: Red Oak, Sugar Maple, American Sycamore, Shagbark Hickory, Green Ash, Tulip Poplar, American Basswood. Herbs: White Snakeroot.	High amounts of Japanese Stiltgrass. Low amounts of Garlic Mustard.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	
Bruce	270	170	0.9	> 1000	N/A	0%	5-7: Variant	5	Canopy (open): Red Oak, Sugar Maple, American Sycamore, Shagbark Hickory, Green Ash, Tulip Poplar, American Basswood. Herbs: White Snakeroot.	High amounts of Japanese Stiltgrass. Low amounts to Moderate amounts of Multiflora Rose, Garlic Mustard.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	

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Section Name	Area ID	GIS FID	Acres	Forest Block Size[1]	1890 Forest?	1930 Forest?	Forest Type Approximation (Breden et al 2001)	Lead Forest Type	Native Species Composition	Invasive Species Composition	Qualtiy Rank Factors	Relative Quality Rank	Special Stewardship Recommendations[2,3]
Bruce	271	171	0.8	> 1000	N/A	25 - 50%	8: Variant	8	Canopy: Tulip Poplar, Green Ash, American Sycamore, Red Maple.	High amounts of Japanese Stiltgrass. Low amounts of Garlic Mustard, Autumn Olive, Multiflora Rose.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	
Mitchell	272	172	1.0	> 1000	N/A	0%	5-7: Variant	5	Canopy: Red Oak, Sugar Maple, American Sycamore, Shagbark Hickory, Green Ash, Tulip Poplar, American Basswood. Herbs: White Snakeroot.	Moderate to High amounts of Japanese Stiltgrass. Low to Moderate amounts of Japanese Honeysuckle. Low amounts of Japanese Barberry.	High Priority: Contiguous Forest; Low Woody Invasives Cover	Moderate	
Mitchell	273	173	0.5	> 1000	N/A	< 25%	5-7: Variant	5	Canopy: Red Oak, Sugar Maple, American Sycamore, Shagbark Hickory, Green Ash, Tulip Poplar, American Basswood. Herbs: White Snakeroot.	Moderate amounts of Autumn Olive, Japanese Honeysuckle.	High Priority: Contiguous Forest	Low	
Mitchell	274	174	0.4	> 1000	N/A	> 75%	5-7: Variant	5	Canopy (open): Red Oak, Sugar Maple, American Sycamore, Shagbark Hickory, Green Ash, Tulip Poplar, American Basswood. Herbs: White Snakeroot.	High amounts of Japanese Stiltgrass. Low amounts of Japanese Honeysuckle.	High Priority: Contiguous Forest; Modeate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Mitchell	275	175	0.3	> 1000	N/A	100%	5-7: Variant	5	Canopy: Red Oak, Sugar Maple, American Sycamore, Shagbark Hickory, Green Ash, Tulip Poplar, American Basswood. Herbs: White Snakeroot, Wild Ginger (small patch).	Low amounts of Japanese Stiltgrass, Multiflora Rose, Autumn Olive.	High Priority: Contiguous Forest; Moderate/High Priority Old Forest; Low Woody Invasives Cover.	High	
Bruce	276	176	0.3	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	Variable: Low to High amounts of Multiflora Rose, Autumn Olive.		Low	
Bruce	277	177	0.4	< 10	N/A	0%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose, Autumn Olive.		Low	
Bruce	278	178	0.4	< 10	N/A	< 25%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose, Autumn Olive.		Low	
Bruce	279	179	0.3	> 1000	N/A	> 75%	No formal type designation. Edge/Successional.	0	Not recorded.	High amounts of Multiflora Rose, Autumn Olive.		Low	
Bruce	280	180	4.6	> 1000	N/A	> 75%	7: Variant	7	Canopy: Sugar Maple, American Sycamore, American Elm, American Basswood, Green Ash.	High amounts of Japanese Stiltgrass. Moderate to High amounts of Multiflora Rose. Moderate amounts of Japanese Honeysuckle. Low to Moderate amounts of Autumn Olive, Wineberry, Privet, Garlic Mustard.	Moderate/High Priority Old Forest.	Low	
Bruce	281	181	1.5	> 1000	N/A	> 75%	7-8: Variant	7	Canopy: Sugar Maple, Shagbark Hickory, White Oak, Pignut Hickory, Green Ash, Red Maple.	High amounts of Japanese Stiltgrass, Multiflora Rose. Low amounts of Japanese Honeysuckle, Garlic Mustard. (Relatively wet area).	Moderate/High Priority Old Forest.	Low	
Bruce	282	182	1.0	> 1000	N/A	100%	5-1: Variant	5	Canopy (open): Sugar Maple, Green Ash, Red Oak.	High amounts of Japanese Stiltgrass. Low amounts of Japanese Barberry, Multiflora Rose, Japanese Honeysuckle, Garlic Mustard.	High Priority: Contiguous Forest; Low Woody Invasives Cover.	Moderate	

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Section Name	Area ID	GIS FID	Acres	Forest Block Size[1]	1890 Forest?	1930 Forest?	Forest Type Approximation (Breden et al 2001)	Lead Forest Type	Native Species Composition	Invasive Species Composition	Qualtiy Rank Factors	Relative Quality Rank	Special Stewardship Recommendations[2,3]
Bruce	283	183	0.7	> 1000	N/A	< 25%	8: Variant (Pin Oak)	8	Canopy: Pin Oak, Shagbark Hickory, Red Maple. Sub-Canopy: Ironwood. Shrubs: Blackhaw.	Low amounts of Japanese Honeysuckle, Multiflora Rose. (Young dense forest).	Low Woody Invasives Cover	Low	
Stone	284	184	2.7	> 1000	N/A	100%	7-5: Variant	7	Canopy: Sugar Maple (dominant), Red Oak, Tulip Poplar, American Basswood, American Beech. Sub-Canopy: Ironwood. Shrubs and Herbs virutally absent.	Low amounts of Japanese Barberry, Winged Burning Bush, Garlic Mustard, Autumn Olive.	Moderate/High Priority Old Forest; Low Woody Invasives Cover	Moderate	
Stone	285	185	6.7	> 1000	N/A	< 25%	5: Variant	5	Canopy: Red Oak (dominant), White Ash, Sugar Maple, Tulip Poplar, Shagbark Hickory. Shrubs: Spicebush, Blackhaw.	High amounts of Multiflora Rose, Japanese Honeysuckle, Japanese Stiltgrass. Moderate amounts of Japanese Barberry. Low amounts of Garlic Mustard, Wineberry.		Low	
Totals			515.5										

[1] Forest Block Size: Represents Landscape Project Patch Sizes -- Note: Landscape Project Version 3.0 appears to have much stricter habitat patch contiguity rules and therefore much smaller patch sizes than Landscape 2.1. Huey, Turnquist, and Levine Sections are within Landscape 3.0, while all other Sections are within Landscape Version 2.1.

[2] The primary stewardship recommendations for all forest areas is site- and community-level deer management programs to foster ecological control of invasive species and allow natural recovery of forest health.

[3] All areas should be subject to an Early Detection / Rapid Response program.

Appendix J. Mapped Early Successional Patch Summary and Recommendations
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Section Name	Area ID	GIS FID	Acres	Current Programs	Current Agriculture	Current Habitat Type	Habitat Goal	Native Species Composition*	Invasive Species Management Concerns	Stewardship Recommendation
Bruce	1	24	4.0	WHIP	None	Meadow	Forest	Moderate Quality (fenced): Woody species virtually absent (Red Cedar seedlings present). Herbs include: Goldenrods, Dogbane, Small-flowered Agrimony, Common Milkweed, Rushes & Sedges.	Field contains low/moderate amounts of Autumn Olive and Multiflora Rose (poor condition). Common hay grasses present. Edges contain large amounts of Autumn Olive and Multiflora Rose.	Area surrounded by deer excosure, fencing repaired in 2010.
Bruce	2	25	3.0	WHIP	None	Meadow	Forest	Low Quality: Woody species virtually absent. Herbs relatively sparse and include: Goldenrods, Fleabane, Beardtongue, Virginia Mountain Mint.	Field dominated by common hay grasses. Field contains nascent population of Multiflora Rose (poor condition). Edges variable, but contain large amounts of Autumn Olive and Multiflora Rose.	Two neighboring fields contain deer exclosures.
Bruce	3	26	4.4	None	None	Shrubland	Forest	High Quality (fenced): Tree cover > 25% including 10+ foot tall White Pine, Sweet Gum, Pin Oak, but few native woody seedlings. Herbs include: Goldenrods, Dogbane, Small-flowered Agrimony, Deer Tongue Grass, Rushes & Sedges.	Field contains nascent populations of Autumn Olive and Multiflora Rose (poor condition). Edges contain large amounts of Autumn Olive and Multiflora Rose.	Bi-annual treatment of Autumn Olive to maintain quality of shrubland habitat and allow establishment of native trees.
Bruce	4	27	1.8	None	None	Shrubland	Forest	Low Quality: Successional community with minimal native plant cover.	Contains numerous invasive species including a large amount of Multiflora Rose. Area along road is a small shrubland containing large amounts of Multiflora Rose.	No stewardship activity recommended (low priority).
Bruce	5	89	0.4	None	None	Meadow	Meadow	Low Quality: Native plant community limited.	High amounts of Japanese Stiltgrass. Low amounts of Common Mugwort, Autumn Olive, Wineberry.	streamside meadow

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Section Name	Area ID	GIS FID	Acres	Current Programs	Current Agriculture	Current Habitat Type	Habitat Goal	Native Species Composition*	Invasive Species Management Concerns	Stewardship Recommendation
Bruce	6	90	0.7	None	None	Meadow	Meadow	Low Quality: Native plant community limited.	High amounts of Autumn Olive. Moderate amounts of Japanese Stiltgrass. Low amounts of Japanese Barberry.	streamside meadow
Bruce	7	91	0.3	None	None	Shrubland	Forest	Low Quality: Native plant community limited.	High amounts of Autumn Olive. Moderate amounts of Multiflora Rose, Japanese Honeysuckle.	
Cline	8	56	2.9	SADC - LIP	Yes	Hay	Meadow	Low Quality: Small amount of sycamore seedlings. Herbs include: goldenrods, fleabane, asters, broom grass (ca. 50% cover).	Field with common hay grasses (> 50% cover) with small amounts of Queen Anne's Lace. Field contains nascent populations of Multiflora Rose (poor condition), Autumn Olive and Common Mugwort. Edges variable, but contain large amounts of Multiflora Rose.	Must be available for agriculture in perpetuity - Currently leased to Skip Updyke. Convert to winter mowing only upon expiration of LIP grant. Field intersects stream buffer area.

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Cline	9	57	2.9	SADC - LIP	Yes	Hay	Meadow	Low Quality: Herbs include: Goldenrods, Fleabane, Asters, Broom Grass.	Field with common hay grasses (> 50% cover) with small amounts of Queen Anne's Lace. Field contains nascent populations of Multiflora Rose (poor condition), Autumn Olive and Common Mugwort. Edges variable, but contain large amounts of Multiflora Rose.	Must be available for agriculture in perpetuity - Currently leased to Skip Updyke. Convert to winter mowing only upon expiration of LIP grant. Field intersects stream buffer area.
Cline	10	58	2.9	SADC - LIP	Yes	Hay	Meadow	Low Quality: Herbs include: Goldenrods (> 25% cover), Black Eyed Susan.	Field dominated by common hay grasses with small amounts of Queen Anne's Lace. Field contains nascent populations of Multiflora Rose (poor condition), Autumn Olive and Common Mugwort. Edges variable, but contain large amounts of Autumn Olive and Multiflora Rose.	Must be available for agriculture in perpetuity - Currently leased to Skip Updyke. Convert to winter mowing only upon expiration of LIP grant. Field intersects stream buffer area.
Cline	11	59	0.3	None	Yes	Hay	Hay	Low Quality: Native plant community minimal.	Field dominated with common hay grasses. Field contains nascent population of Multiflora Rose (poor condition). Forest to north and east are heavily infested with a varitety of invasive species.	Managed with continuation of field on neighboring property by Skip Updike.
Cline	12	69	0.4	None	None	Meadow	Meadow	Low Quality: Native plant community minimal.	Modeate amounts of Japanese Stiltgrass. Low amounts of Autumn Olive.	Grass under open tree canopy.

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Section Name	Area ID	GIS FID	Acres	Current Programs	Current Agriculture	Current Habitat Type	Habitat Goal	Native Species Composition*	Invasive Species Management Concerns	Stewardship Recommendation
Cook	13	1	10.9	None	None	Meadow	Forest	Low Quality: Woody plants include dense patches of Common Blackberry, Creeping Dewberry and Black Raspberry. Herbs include: Goldenrods, Common Milkweed, Venus Looking Glass.	Field contains numerous invaisve species at low to moderate infestation levels. Species include Common Mugwort, Canada Thistle, Autumn Olive, Multiflora Rose (poor condition) and Japanese Stiltgrass. Edges are variable but contain high amounts of Multiflora Rose and Common Mugwort. A patch of Black Locust occurs in the northern terminus.	Convert to forest cover to improve stream buffering. Consider suggestion by Leslie Sauer regarding usage of area as 'naturalized water retention basin'.
Cook	14	77	0.2	None	None	Shrubland	Forest	Low Quality: Native plant community limited.	High amounts of Multiflora Rose, Japanese Stiltgrass. Low amounts of Garlic Mustard, Japanese Honeysuckle, Common Mugwort.	
Cook	15	78	0.4	None	None	Meadow	Forest	Low Quality: Native plant community limited.	High amounts of Phragmites. Moderate amounts of Multiflora Rose.	
Cook	16	79	0.8	None	None	Shrubland	Forest	Low Quality: Native plant community limited.	High amounts of Multiflora Rose. Low amounts of Autumn Olive, Canada Thistle.	
Cosman	17	85	0.2	None	None	Meadow	Meadow	Low Quality: Native plant community limited.	High amounts of Japanese Stiltgrass. Low to Moderate amounts of Garlic Mustard, Multiflora Rose.	Road pull off

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Section Name	Area ID	GIS FID	Acres	Current Programs	Current Agriculture	Current Habitat Type	Habitat Goal	Native Species Composition*	Invasive Species Management Concerns	Stewardship Recommendation
Finkle	18	28	4.9	SADC - LIP	Yes	Hay	Meadow	Low Quality: Herbs include: Goldenrods, Black Eyed Susan.	Field dominated by common hay grasses with small amounts of Queen Anne's Lace. Field contains nascent population of Multiflora Rose (poor condition). Edges variable, but contain moderate amounts of Autumn Olive and Multiflora Rose.	Must be available for agriculture in perpetuity - Currently leased to Skip Updyke. Convert to winter mowing only upon expiration of LIP grant. Field intersects stream buffer area.
Hackl	19	73	0.2	None	None	Meadow	Meadow	Low Quality: Native plant community limited.	High amounts of Japanese Stiltgrass. Low amounts of Multiflora Rose and Common Mugwort.	streamside meadow
Hackl	20	74	0.2	None	None	Meadow	Meadow	Low Quality: Native plant community limited.	Moderate amounts of Japanese Stiltgrass.	streamside meadow

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Hackl	21	75	0.3	None	None	Meadow	Meadow	Low Quality: Native plant community limited.	High amounts of Japanese Honeysuckle. Moderate amounts of Japanese Stiltgrass.	streamside meadow
Hackl	22	76	0.5	None	None	Meadow	Meadow	Low Quality: Native plant community limited.	High amounts of Common Mugwort. Low amounts of Japanese Stiltgrass, Black Locust.	streamside meadow
Hilton	23	81	0.3	None	None	Meadow	Meadow	Low Quality: Native plant community limited.	High amounts of Japanese Stiltgrass. Moderate amounts of Reed Canary Grass, Multiflora Rose, Japanese Honeysuckle. Low amounts of Wineberry, Common Mugwort.	streamside meadow
Hilton	24	82	0.6	None	None	Shrubland	Shrubland	Low Quality: Native plant community limited. Loose Sugar Maple canopy.	High to Moderate amounts of Multiflora Rose, Japanese Honeysuckle, Japanese Stiltgrass.	streamside meadow

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Hilton	25	83	0.7	None	None	Shrubland	Shrubland	Low Quality: Native plant community limited.	High amounts of Garlic Mustard, Japnese Stilgrass. Dense band of Multiflora Rose, Japanese Honeysuckle. Low amounts of Common Mugwort.	streamside meadow
Hilton-Richards	26	84	0.8	None	None	Meadow	Meadow	Low Quality: Native plant community limited.	High amounts of Common Mugwort, Japanese Stiltgrass.	streamside meadow
Huey	27	47	2.1	None	None	Meadow	Forest	Moderate Quality: Shrubs < 5%, Herbs include: Goldenrods, Virginia Mountain Mint, Dogbane.	Field contains low amounts of numerous invasive species including Autumn Olive.	Allow natural succession to increase stream buffer. Bi-annual treatment of Autumn Olive to maintain quality of shrubland habitat and allow establishment of native trees.
Huey	28	48	3.9	None	None	Meadow	Meadow	Moderate Quality: Shrubs < 5%, Herbs include: Goldenrods, Asters, Dogbane, New York Ironweed, Small-flowered Agrimony, Rushes & Sedges.	Field contains moderate amount of Autumn Olive, Multiflora Rose (poor condition). Edges contain high amounts of Autumn Olive and Multiflora Rose.	Allow natural succession to increase stream buffer. Bi-annual treatment of Autumn Olive to maintain quality of shrubland habitat and allow establishment of native trees.
Huey	29	49	2.6	None	None	Shrubland	Shrubland	High Quality: Trees > 5%, cover and includes: American Elm, Sycamore, Pin Oak, Red Maple. Shrubs > 50% cover and includes: Gray Dogwood, Silky Dogwood, Red-osier Dogwood, Red Chokeberry. Herbs > 50% cover and includes: Goldenrods, Virginia Mountain Mint, Small-flowered Agrimony, Blue Vervain, Asters, New York Ironweed, Rushes and Sedges.	Field contains nascent populations of Autumn Olive, Multiflora Rose (poor condition), Purple Loosestrife and Phragmites. Edges with moderate/high amounts of Autumn Olive and Multiflora Rose.	Forestry mowing as necessary when funding available (ca. every 3 years); Alternatively: Bi-annual hand removal of larger individuals of Autumn Olive and all tree species using chainsaw and/or basal bark herbicide applications.

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Section Name	Area ID	GIS FID	Acres	Current Programs	Current Agriculture	Current Habitat Type	Habitat Goal	Native Species Composition*	Invasive Species Management Concerns	Stewardship Recommendation
Huey	30	51	4.1	None	None	Shrubland	Shrubland	High Quality: Similar composition to #1 above, but woody vegetation taller (Red Maple and Green Ash more predominant). Shrubs also include Blackhaw. Herbs are less diverse (mostly Goldenrods).	Field contains nascent infestations of Autumn Olive, Multiflora Rose (poor condition), and Purple Loosestrife. Edges with low/moderate amounts of Multiflora Rose.	Forestry mowing as necessary when funding available (ca. every 3 years); Alternatively: Bi-annual hand removal of larger individuals of Autumn Olive and all tree species using chainsaw and/or basal bark herbicide applications.
Huey	31	52	5.7	None	None	Shrubland	Shrubland	Moderate Quality: Similar composition to #1 above, but woody vegetation much taller and becoming dominated by Red Maple. Shrubs also include Arrowwood and Hardhack. Herbs are less diverse herbs (mostly Goldenrods, but also includes Monkeyflower).	Field contains significant amount of Autumn Olive. Edges with low amounts of Multiflora Rose.	Forestry mowing as necessary when funding available (ca. every 3 years); Alternatively: Bi-annual hand removal of larger individuals of Autumn Olive and all tree species using chainsaw and/or basal bark herbicide applications.
Huey	32	53	2.3	None	None	Shrubland	Forest	High Quality: Trees/shrubs > 75%. Many trees > 20 feet tall including Pin Oak, American Elm, Red Maple. Shrubs include Gray dogwood, Arrowwood.	Field contains low/moderate amounts of Multiflora Rose (poor condition).	No stewardship activity required.
Huey	33	54	1.3	None	None	Lawn	Lawn	Low Quality: Native plant community minimal.	N/A	Periodic mowing during growing season to maintain acceptable grass heights.

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Huey	34	55	2.0	None	None	Lawn	Meadow	Low Quality: Native plant community minimal.	Field contains Reed Canary Grass patches that may dominate with reduction in mowing. Edges with limited invasive species.	Reduce mowing regime to bi-annual dormant season mowing (Between Nov. 15 and Mar. 15). Consider restoration that includes elimnation of existing vegetation and re-seeding with native grasses and wildflowers to demonstrate alternative cover for private landowners with large amounts of lawn.
Huey	35	63	3.0	None	None	Shrubland	Forest	Moderate Quality: Woody plants include Pin Oak, Red Maple, American Elm, Gray Dogwood, Silky Dogwood, Blackhaw, Common Elderberry, Arrowwood. Herbs include: Goldenrods.	High amounts of Multiflora Rose. Low amounts of Autumn Olive, Small Carpgrass, Japanese Stiltgrss, Reed Canary Grass.	Bi-annual treatment of Autumn Olive to maintain quality of shrubland habitat and allow establishment of native trees.
Huey	36	64	0.3	None	None	Shrubland	Forest	Low Quality: Woody plants include Gray Dogwood, Arrowwood. Forest canopy gap.	High amounts of Multiflora Rose. Moderate amoutns of Japanese Stiltgrass.	
Huey	37	65	0.2	None	None	Meadow	Meadow	Low Quality: Native plant community minimal. Highly disturbed pond outflow area may be too wet for woody plant establishment.	Moderate amounts of Japanese Stiltgrass, Reed Canary Grass.	
Huey	38	66	0.1	None	None	Shrubland	Forest	Low Quality: Woody plants include Gray Dogwood, Arrowwood. Forest canopy gap.	High amounts of Multiflora Rose. Moderate amoutns of Japanese Stiltgrass.	
Huey	39	67	1.2	None	None	Meadow / Pond	Meadow / Pond	Low Quality: Native plant community minimal.	High amounts of Japanese Stiltgrass. Moderate amounts of Reed Canary Grass.	

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Huey	40	68	5.7	None	None	Meadow / Pond	Meadow / Pond	Low Quality: Native plant community minimal. Area contains rectangular ponds.	N/A	N/A
Jarboe	41	80	0.2	None	None	Shrubland	Forest	Low Quality: Native plant community limited.	High amounts of Black Locust.	Control Black Locust as soon as possible.
Jarboe	42	0	28.1	LIP	Yes	Meadow	Meadow	Low Quality: Native plant community minimal. Patches of Broom Grass and Indian Grass. Small amounts of Goldenrods, Dogbane, Fleabane.	Field dominated by common hay grasses. Common hay field weeds include Black Medick, Common Mullein. Field contains nascent populations of Autumn Olive and Canada Thistle.	LIP requires mowing every 2 years (at minimum). Program end date? Bi-annual mowing of entire field. Bi-annual treatment of Autumn Olive. Consider use of ecological burning as an alternative or supplement to mowing.
Johnson	43	20	4.8	None	None	Hay	Forest	Low Quality: Native plant community minimal. Recently mowed very low to ground and species identification not possible.	Field dominated by common hay grasses. Field contains nascent population of Multiflora Rose (poor condition). Edges variable, but contain moderate amounts of Multiflora Rose.	Located uphill from Pine Hill Road - forest cover would reduce erosion potential. Adjacent to severely infested (roses) area to the south. Who leases this property? Consider deep chisel plowing to remove compaction - maintain as meadow until plowing can be funded through grants.

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Johnson	44	86	2.2	None	None	Shrubland	Forest	Low Quality: Native plant community limited.	High amounts of Multiflora Rose, Japanese Honeysuckle. Low amounts of Wineberry, Wintercreeper Euonymus.	
Jungblut	45	29	1.0	SADC	Yes	Hay	Meadow	Low Quality: Woody plants minimal, include: Common Blackberry. Herbs include: Indian Grass, Goldenrods, Asters, Broom Grass.	Field contains large infestation of Autumn Olive. Common hay grasses present.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.
Jungblut	46	30	2.1	SADC	Yes	Hay	Meadow	Low Quality: Woody plants minimal, include: Common Blackberry. Herbs include: Indian Grass, Goldenrods, Asters, Broom Grass.	Field contains large infestation of Autumn Olive. Common hay grasses present.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.
Jungblut	47	31	2.5	SADC	Yes	Hay	Meadow	Low Quality: Woody plants minimal, include: Creeping Dewberry. Herbs include: Goldenrods, Indian Grass, Broom Grass, Deer Tongue Grass.	Field contains a low/moderate infestaion of Autumn Olive. Common hay grasses present.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.
Jungblut	48	32	2.8	SADC	Yes	Hay	Meadow	Low Quality: Woody plants minimal, include: Creeping Dewberry. Herbs include: Goldenrods, Indian Grass, Broom Grass, Deer Tongue Grass.	Field contains nascent populations of Autumn Olive and Multiflora Rose (poor condition). Common hay grasses present.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.

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Jungblut	49	33	1.2	SADC	Yes	Hay	Meadow	Low Quality: Herbs include: Goldenrods, Indian Grass.	Field contains nascent populations of Autumn Olive and Multiflora Rose (poor condition). Common hay grasses present.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.
Jungblut	50	34	1.3	SADC	Yes	Hay	Meadow	Low Quality: Herbs include: Goldenrods, Indian Grass.	Field contains a moderate infestation of Autumn Olive. Common hay grasses present.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.
Jungblut	51	35	5.3	SADC	Yes	Hay	Meadow	Low Quality: Herbs include: Goldenrods, Asters, Indian Grass, Virginia Mountain Mint, Rushes & Sedges.	Field contains a nascent population of Multiflora Rose (poor condition). Common hay grasses abundant.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.
Jungblut	52	36	2.7	SADC	Yes	Hay	Meadow	Low Quality: Herbs include: Goldenrods, Asters, Indian Grass, Virginia Mountain Mint, Rushes & Sedges.	Field contains nascent populations of Autumn Olive and Multiflora Rose (poor condition). Hay grasses common.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.
Jungblut	53	37	5.0	SADC	Yes	Hay	Meadow	Low Quality: Herbs include: Goldenrods, Asters, Indian Grass, Virginia Mountain Mint, Rushes & Sedges.	Field contains nascent populations of Autumn Olive and Multiflora Rose (poor condition). Common hay grasses abundant.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.
Jungblut	54	38	1.3	SADC	Yes	Hay	Meadow	Low Quality: Herbs include: Goldenrods, Asters, Indian Grass, Virginia Mountain Mint, Deer Tongue Grass, Rushes & Sedges.	Field contains nascent populations of Autumn Olive and Multiflora Rose (poor condition). Common hay grasses abundant.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.

Appendix J. Mapped Early Successional Patch Summary and Recommendations
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Section Name	Area ID	GIS FID	Acres	Current Programs	Current Agriculture	Current Habitat Type	Habitat Goal	Native Species Composition*	Invasive Species Management Concerns	Stewardship Recommendation
Jungblut	55	39	2.0	SADC	Yes	Hay	Meadow	Low Quality: Herbs include: Goldenrods, Asters, Indian Grass, Virginia Mountain Mint, Rushes & Sedges.	Field contains a nascent population of Autumn Olive. Common hay grasses abundant.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.
Jungblut	56	40	3.2	SADC	Yes	Hay	Meadow	Low Quality: Herbs include: Goldenrods, Asters, Indian Grass, Virginia Mountain Mint, Rushes & Sedges.	Field contains a nascent population of Multiflora Rose (poor condition). Common hay grasses abundant.	Must be available for agriculture in perpetuity; intersects stream buffer area. Consider: Enrollment in Farm Bill Program and/or agreement with local farmer to establish mowing regime.
Levine	57	41	2.0	None	None	Meadow	Forest	Moderate Quality: Woody cover minimal, includes: Hardhack, native shrub/tree seedlings. Herbs include: Goldenrods, New York Ironweed, Small-flowered Agrimony, Dogbane, Virginia Mountain Mint, Few Rushes & Sedges.	Field contains small amounts of Multiflora Rose (poor condition) and Reed Canary Grass. Large amounts of Small Carpgrass are present, but do not seem to hinder presence of native species. Edges contain low amounts of Multiflora Rose and Bush Honeysuckle.	Allow natural succession to increase stream buffer. Bi-annual treatment of Autumn Olive to maintain quality of shrubland habitat and allow establishment of native trees. Consider additional efforts to maintain shrubland if resources permit.
Levine	58	42	7.7	None	None	Meadow	Forest	Moderate Quality: Woody cover minimal, includes: Hardhack, Pin Oak, Pussy Willow, Silky Willow, Creeping Dewberry, Silky Dogwood. Herbs include: Goldenrods, Swamp Milkweed, Dogbane, Virginia Mountain Mint, New England Aster, Small-flowered Agrimonty, New York Ironweed, Few Rushes & Sedges.	Field contains nascent populations of Autumn Olive, Multiflora Rose (poor condition) and Purple Loosestrife. Edges variable but contain moderate/high amounts of Autumn Olive and Multiflora Rose.	Allow natural succession to increase stream buffer. Bi-annual treatment of Autumn Olive to maintain quality of shrubland habitat and allow establishment of native trees. Consider additional efforts to maintain shrubland if resources permit.

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Wickecheoke Creek Preserve Management Plan
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Section Name	Area ID	GIS FID	Acres	Current Programs	Current Agriculture	Current Habitat Type	Habitat Goal	Native Species Composition*	Invasive Species Management Concerns	Stewardship Recommendation
Milano	59	2	0.7	None	None	Meadow	Meadow	Low Quality: Native plant community minimal.	Area dominated by Common Mugwort and Japanese Stiltgrass.	Natural streamside meadow. Stewardhip efforts not practical due to flashiness of stream system.
Mitchell	60	21	12.5	WHIP	None	Meadow	Meadow	Low Quality: Herbs include: Beardtongue, Dogbane, Black Eyed Susan, Goldenrods, Virginia Mountain Mint	Field dominated by common hay grasses and associated weeds including Black Medick, Queen Anne's Lace, Vetch species, Oxeye Daisy. Field contains nascent populations of Autumn Olive, Multiflora Rose (poor condition) and Canada Thistle. Edges variable but contain large amounts of Autumn Olive with some Multiflora Rose.	Bi-annual mowing of entire field. Bi-annual treatment of Autumn Olive. Consider use of ecological burning as an alternative or supplement to mowing. WHIP program until ?2016?, D&R holds easement/property agreement on preserve portion. Jackie Strigl neighbor.
Mitchell	61	22	2.6	WHIP	None	Meadow	Forest	Low Quality: Herbs include: Dogbane, Goldenrods.	Field dominated by Reed Canary Grass with some Autumn Olive, Multiflora Rose (poor condition) and Japanse Stiltgrass.	Allow natural succession to increase stream buffer following expiration of WHIP agreement. Bi-annual treatment of Autumn Olive to maintain quality of shrubland habitat and allow establishment of native trees. D&R holds easement/property agreement on preserve portion. Jackie Strigl neighbor.

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Wickecheoke Creek Preserve Management Plan
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Section Name	Area ID	GIS FID	Acres	Current Programs	Current Agriculture	Current Habitat Type	Habitat Goal	Native Species Composition*	Invasive Species Management Concerns	Stewardship Recommendation
Mitchell	62	23	2.6	WHIP	None	Meadow	Forest	Low Quality: Herbs include: Beardtongue, Dogbane, Black Eyed Susan, Goldenrods, Virginia Mountain Mint.	Field dominated by common hay grasses and associated weeds including Black Medick, Queen Anne's Lace, Vetch species, Oxeye Daisy. Field contains nascent populations of Autumn Olive, Multiflora Rose and Canada Thistle. Edges variable but contain large amounts of Autumn Olive with some Multiflora Rose.	Allow natural succession to increase stream buffer following expiration of WHIP agreement. Bi-annual treatment of Autumn Olive to maintain quality of shrubland habitat and allow establishment of native trees. D&R holds easement/property agreement on preserve portion. Jackie Strigl neighbor.
Mitchell	63	62	0.9	WHIP	None	Meadow	Forest	Moderate Quality: Trees and shrubs planted within fence. Species include: Gray Dogwood, Oaks, Blackhaw. Herbs include: Beardtongue, Dogbane, Black Eyed Susan, Goldenrods, Virginia Mountain Mint.	Field dominated by common hay grasses and associated weeds including Black Medick, Queen Anne's Lace, Vetch species, Oxeye Daisy. Field contains nascent populations of Autumn Olive, Multiflora Rose (poor condition) and Canada Thistle. Edges variable but contain large amounts of Autumn Olive with some Multiflora Rose.	Allow natural succession to increase stream buffer following expiration of WHIP agreement. Bi-annual treatment of Autumn Olive to maintain quality of shrubland habitat and allow establishment of native trees. D&R holds easement/property agreement on preserve portion. Jackie Strigl neighbor.

Barred Owl, *Strix varia*

Status: ***State:*** Threatened ***Federal:*** Not listed

Identification

© Blaine Rothauser

On still spring evenings, the hooting and eerie caterwauling of barred owls resonate throughout the remote, swampy woodlands of New Jersey. The resounding song of the barred owl, often represented as "who cooks for you, who cooks for you allllll," is often accompanied by loud "hoo-ah" calls and yowling reminiscent of monkeys. Barred owls may vocalize throughout the year, but are most expressive during courtship, from late February to early April. These owls often call at night but may also vocalize during the day.

The barred owl is a large fluffy-looking owl with brown barring on the upper breast and brown streaking on the lower breast and belly. The upperparts are brown with buffy-white barring. The tail is patterned with alternating bands of brown and buff-gray. The throat is white and the round head lacks ear tufts. The facial disk is grayish-white with a brown outline. The large facial disk funnels sounds towards the owl's proportionally gigantic ears, providing it with extraordinary hearing for detecting minute noises, such as the rustling of mice in the dark. Unlike all other eastern owls excluding the barn owl, the eyes of the barred owl are dark brown. The hooked bill is buff yellow. The feet and toes are feathered and the talons are dark brownish-black. Sexes are similar in plumage and, although there is much overlap, females may be larger than males. Juveniles resemble adults.

Barred owls fly with slow, moth-like wing beats that are interspersed with glides. In flight, the head appears large and the wings are broad and rounded. Soft feathers and serrated edges on the outer wing feathers minimize noise, enabling these and all other owls to fly silently--an advantage that enables them to surprise their prey.

The barred owl can be distinguished from most other New Jersey owls by its plumage, large size, distinctive vocalizations, and habitat selection. The great horned owl (Bubo virginianus), a common breeding species in the state, is also a large owl but has rich brown plumage and yellow eyes. The ear tufts of great horned owls may not be noticeable in flight, making them appear round-headed like a barred owl. The call of the great horned owl is a melancholy "hoo-hoo-hoo." Great horned owls, which often reside in forested uplands or near human habitation, are less restrictive in their habitat choice than barred owls. The barn owl (Tyto alba), the only other New Jersey owl with dark eyes, is white below and golden brown above. In addition, the barn owl, which resides in

open fields and grasslands, has a narrow body, long unfeathered legs, and a heart-shaped facial disk.

Habitat

Traditionally known as the "swamp owl," the barred owl is a denizen of remote, contiguous, old-growth wetland forests. These owls require mature wet woods that contain large trees with cavities suitable for nesting. Barred owl habitats typically have an open understory through which the owls can fly and hunt. The lack of large nesting cavities is often the primary limiting factor for barred owls. Consequently, these owls may nest immediately outside of a wetland or in sub-climax wetland forests if adequate nest sites are unavailable within a mature wetland forest. Barred owls are typically found in remote wilderness areas that may also contain other rare species such as the red-shouldered hawk (Buteo lineatus) or the Cooper's hawk (Accipiter cooperii). Barred owls typically shun human activity by avoiding residential, agricultural, industrial, or commercial areas. In northern New Jersey, barred owls favored sites that were at least 500 meters (1640 ft.) from human habitation and had little or no forest clearings or trails (Bosakowski 1987).

In southern New Jersey, barred owls inhabit both deciduous wetland forests and Atlantic white cedar (Chamaecyparis thyoides) swamps associated with stream corridors. Often such lowland forests are buffered by surrounding pine or pine/oak uplands that may protect the owls from human disturbance and provide additional foraging habitat. Mixed hardwood swamps are often dominated by red maple (Acer rubrum) and black gum (Nyssa sylvatica) and may include highbush blueberry (Vaccinium corymbosum), swamp magnolia (Magnolia virginiana), or greenbrier (Smilax spp.) in the shrub layer. Although barred owls utilize white cedars for roosting, they infrequently provide cavities that are large enough for nesting owls.

In northern New Jersey, barred owls inhabit hemlock ravines and mixed deciduous wetland or riparian forests. Oak hardwood forests containing white oak (Quercus alba), red maple, black birch (Betula lenta), black willow (Salix nigra), hickory (Carya spp.), white ash (Fraxinus americana), basswood (Tilia americana), tulip poplar (Liriodendron tulipifera), black cherry (Prunus serotina), and black gum may be occupied. Barred owls may also inhabit northern hardwood forests that contain sugar maple (A. saccharum), birch (Betula spp.), and beech (Fagus grandifolia). Dense stands of hemlock (Tsuga canadensis), white pine (Pinus strobus), Norway spruce (Picea abies), or other conifers provide cover for roosting owls and protection from harsh weather. Barred owls prefer flat, lowland terrain and avoid rocky slopes and hillsides.

As a resident species, barred owls establish territories with fairly stable boundaries that are continuously maintained throughout the year. In eastern North America, home range sizes of 86 to 370 hectares (213 to 914 acres) have been documented for barred owls (Johnsgard 1988).

Status and Conservation

The barred owl was traditionally a common resident within the deep wooded swamps of New Jersey. Historically, these owls were shot as trophies or because of alleged poultry predation. Collectors also looted young owls and eggs. Despite human

persecution, the barred owl persisted virtually unscathed until the early 1940s when the cutting of old growth forests and the filling of wetlands greatly reduced habitat throughout the state. Rampant habitat loss and associated barred owl population declines continued for the next several decades. Consequently, these owls were lost from many historic breeding locales.

Due to population declines and habitat loss, the barred owl was listed as a threatened species in New Jersey in 1979. The New Jersey Natural Heritage Program considers the barred owl to be "demonstrably secure globally," yet "rare in New Jersey" (Office of Natural Lands Management 1992). Currently, barred owl populations appear to be declining due to development and fragmentation of large tracts of private forested lands. The barred owl population has been estimated at 37 pairs in South Jersey and 75 pairs in North Jersey (Sutton and Sutton 1985, Bosakowski 1988). But recent surveys in South Jersey indicate as much as a 30 percent decline there.

Bobolink, *Dolichonyx oryzivorus*

Status: ***State:*** Threatened ***Federal:*** Not listed

Identification

Photo by S. Maslowski, courtesy US FWS

Amid a sea of agriculture, the bubbly "bobo-o-link!" song of the bobolink echoes from within an overgrown weedy field. On a fall day at Cape May, a chorus of "plink" notes is heard overhead as a flock of bobolinks passes above a fallow grassland. These are the song and call of the bobolink, a sparrow-sized member of the blackbird family.

Bobolinks exhibit sexual dimorphism (gender differences) in plumage during the breeding season. The nuptial male is black overall with a creamy nape and hindneck, a white rump, and white scapulars (feathers at the base of the wing). The plumage of the female, which camouflages her during nesting, is relatively drab. The female is buffy with dark brown streaking on the back, sides, and rump and has dark stripes on the head. In non-breeding plumage, adult males resemble females. Immature bobolinks also resemble adult females but are more yellow and lack streaking on the sides of the body. All ages and sexes have a short, finch-like bill and pointed tail feathers.

Habitat

Bobolinks inhabit low-intensity agricultural habitats, such as hayfields and pastures, during the breeding season. In addition, lush fallow fields and meadows of grasses, forbs, and wildflowers are occupied. Bobolink nests are often placed in areas of greatest vegetative height and density. Although small numbers of bobolinks may nest in grasslands of 2 to 4 hectares (5-10 acres), larger sized fields support higher densities of nesting pairs (Jones and Vickery 1997a).

Similar habitats are occupied by bobolinks throughout their annual cycle. During migration, bobolinks inhabit fallow and agricultural fields, as well as coastal and freshwater marshes. On their South American wintering grounds, they occur in grasslands, marshes, rice fields, and farm fields.

Status and Conservation

Historic clearing of forests in the eastern United States during the 1700s and 1800s enabled numerous grassland species to expand their ranges, inhabiting the growing agricultural landscape. As a result, the bobolink became a common breeding species in the hayfields and pastures of New Jersey. However, by the early 1900s, bobolink

population declines were noted in the Northeast. The slaughter of migrant bobolinks in rice fields of the southern United States, market hunting, and modernized farming techniques likely caused this decline. During the 1960s and 1970s, changing agricultural practices, the conversion of fallow fields to forests, and the development of agricultural lands further shrunk bobolink populations in New Jersey.

Modern farming techniques, including frequent rotation of hayfields, early mowing of hay, decreased vegetative diversity, and the change from warm-season to cool-season grasses, have rendered agricultural fields less favorable for nesting bobolinks. In addition, alfalfa (Medicago sativa) fields, which offer poor nesting habitat for bobolinks, have replaced many timothy (Phleum spp.) and clover (Fabaceae) fields. The area of land cultivated as hay fields in the northeastern United States declined from 12.6 to 7.1 million hectares (31.1 to 17.5 million acres) from 1940 to 1986 (Martin and Gavin 1995). During the same period, the percentage of sites where alfalfa replaced hay increased from 20% to 60% (Bollinger and Gavin 1992). Habitat loss is largely responsible for the decline of bobolink populations in the United States and New Jersey detected by the Breeding Bird Survey from 1966 to 1999 (Sauer et al. 2000).

Due to population declines and habitat loss, the bobolink was listed as a threatened species in New Jersey in 1979. The New Jersey Natural Heritage Program considers the bobolink to be “demonstrably secure globally,” yet “imperiled in New Jersey because of rarity” (Office of Natural Lands Management 1992).

Cooper's hawk, *Accipiter cooperii*

Status: ***State:*** Endangered ***Federal:*** Not listed

Identification

On a cool fall day at Cape May Point, observers scan the skies as streams of accipiters zip past at tree-level. Darting through the cedars in pursuit of a yellow-rumped warbler is a Cooper's hawk, one of the three species of North American accipiters-woodland hawks that prey chiefly on birds. The Cooper's hawk, as well as its accipiter cousins, the sharp-shinned hawk (Accipiter striatus) and the northern goshawk (A. gentilis), are forest-nesting raptors that are able to quickly maneuver through dense cover while chasing prey.

© B.K. Wheeler/ VIREO

About the size of a crow, the Cooper's hawk has short, rounded wings and a long, narrow tail. When soaring, the head extends beyond the wrist, making it appear large-headed. In flight, the silhouette of a Cooper's hawk appears cross-shaped, whereas the similarly plumaged sharp-shinned hawk looks small-headed and T-shaped. Sharp-shinned hawks usually exhibit a shorter, more squared-off tail. In addition, the wing beats of the Cooper's hawk are stiffer and more powerful than the fluttery wing beats of the sharp-shinned hawk.

The adult Cooper's hawk has a dark cap, blue-gray back, and rusty, barred underparts. The juvenile's back is brown with rufous (reddish brown) feather edges and sparse white spotting, and the underparts are light colored with brown vertical streaking on the breast. In all ages, the tail is usually rounded and has a white edge along the tip. Juveniles molt into adult plumage during their second year. Eye color changes from yellow-green in immature birds to dark orange or red in adults. Females are significantly larger than males. The call of the Cooper's hawk, which is often given during the breeding season, is a loud and nasal "cak-cak-cak."

Habitat

During the breeding season, Cooper's hawks inhabit deciduous, coniferous, and mixed riparian or wetland forests. In southern New Jersey, breeding habitats include large, remote red maple (Acer rubrum) or black gum (Nyssa sylvatica) swamps and, on occasion, Atlantic white cedar (Chamaecyparis thyoides) swamps. Within these sites, high-bush blueberry (Vaccinium corymbosum) and greenbrier (Smilax rotundifolia) typically dominate the shrub layer. Adjacent upland pine or mixed pine/oak forests

provide an additional habitat buffer for nesting Cooper's hawks. In northern New Jersey, Cooper's hawks inhabit mixed riparian woodlands, eastern hemlock (Tsuga canadensis) / white pine (Pinus strobus) forests, and conifer plantations. Dominant tree species within such habitats may include red maple, sugar maple (Acer saccharum), eastern hemlock, white pine, black birch (Betula lenta), white oak (Quercus alba), scotch pine (Pinus sylvestris), and Norway spruce (Picea abies).

Cooper's hawk nest sites are often located within sub-climax forests that provide a closed canopy, moderate to heavy shrub cover, and trees more than 30 years old. Territories often contain forest edges and small openings along streams or roads, which may be used for hunting. In northern New Jersey, Cooper's hawk territories contained over 70% forested habitat within 0.3 km (0.2 miles) of nest sites and were, on average, 0.5 km (0.3 miles) away from the nearest house (Bosakowski et al. 1993). Home ranges of breeding Cooper's hawks in the United States may comprise 105 to 1,800 hectares (260 to 4,450 acres) (Johnsgard 1990, Rosenfield and Bielefeldt 1993).

During the 1970s, when the Cooper's hawk was first listed as an endangered species in New Jersey (1974), breeding was documented only within large, contiguous forests. As the Cooper's hawk population increased, pairs have nested in smaller woodlots containing mature trees and fragmented woods within agricultural, suburban, or urban landscapes. This may be attributed to both a larger breeding population and increased fragmentation of forested habitats. Cooper's hawks may exhibit limited tolerance for human disturbance and habitat fragmentation.

Cooper's hawks, which occur year-round in New Jersey, use many of the same habitats in winter as during the breeding season. However, because of limited prey availability during the winter months, habitat use during this season is less restrictive than during the breeding season. Consequently, Cooper's hawks forage within a variety of forest types as well as woodland edges. Wintering hawks may also frequent residential areas where they hunt songbirds and doves at bird feeders. Cedar forests, conifer groves, and other dense woods that provide protection from harsh weather are favored for roosting.

Status and Conservation

Until the mid-1930s, many raptor species, including the Cooper's hawk, were shot in large numbers during migration and on their breeding grounds because of suspected poultry and game bird predation. Regardless, the Cooper's hawk remained a fairly common breeding species in New Jersey's forests until the 1950s when habitat loss caused population declines. In addition, the pesticide DDT impaired reproduction and contributed to population declines observed from the 1950s to 1970s. Due to the reduction in the state's breeding population and the loss of habitat, the Cooper's hawk was listed as an endangered species in New Jersey in 1974. The New Jersey Natural Heritage Program considers the Cooper's hawk to be "apparently secure globally," yet "rare in the State (breeding)" (Office of Natural Lands Management 1998). Concern for this species is evident in nearby states, such as New Hampshire, Rhode Island, and Connecticut, where it is listed as threatened, and Massachusetts and New York, where it is considered a species of Special Concern. The National Audubon Society also included the Cooper's hawk on its Blue List of Imperiled Species from 1971 to 1982 and in 1986, the final year of the list.

Following the nationwide ban of DDT in 1972 and the reforestation of fallow lands throughout the state, Cooper's hawk populations began to recover. Cooper's hawks experienced increases in New Jersey Christmas Bird Counts from 1959 to 1988 and Breeding Bird Surveys from 1980 to 1999 (Sauer et al. 1996, Sauer et al. 2001). Other recent surveys have also shown a substantial increase in the breeding population of Cooper's hawks in New Jersey. As a result, the status of the Cooper's hawk was reclassified from endangered to threatened in New Jersey in 1999. The loss of large, contiguous forests remains a threat to this species and warrants the continued protection of Cooper's hawk nesting habitats.

Long-tailed Salamander, *Eurycea longicauda longicauda*

Status: ***State:*** Threatened ***Federal:*** Not listed

Identification

© Blaine Rothauser

Well deserving of its name, the long-tailed salamander's tail accounts for nearly two-thirds of its total length. In addition to tail size, these salamanders can be recognized by their coloration and pattern. The slender, bright yellow body is unmarked below and speckled above with black spots that form a herringbone pattern on the tail. Although typically yellow, individuals may range from orange to reddish-orange and, in older specimens, brown. Speed, agility, and the ability to regenerate their tails enable long-tailed salamanders to evade potential predators. Adults measure 10 to 16 cm (4.0 to 6.25 in.) in length (Conant and Collins 1991).

Habitat

Long-tailed salamanders inhabit clean, calcareous (limestone) spring-fed seepages, spring kettleholes, swampy floodplains, artesian wells, and ponds associated with springs. They may also reside in abandoned mines or caves that are permeated by calcareous ground water.

Aquatic habitats occupied by long-tailed salamanders often occur within upland deciduous forests that may also contain calcareous fens, limestone outcrops, or caves. Forest types typically include mature, closed canopy maple/mixed deciduous, mixed hardwood, or hemlock/mixed deciduous woodlands. Overstory vegetation may include silver maple (Acer saccharinum), red maple (A. rubrum), yellow birch (Betula alleghaniensis), white oak (Quercus alba), sugar maple (A. saccharum), black walnut (Juglans nigra), sycamore (Platanus occidentalis), American elm (Ulmus americana), tulip poplar (Liriodendron tulipifera), gray birch (B. populifolia), basswood (Tilia americana), slippery elm (Ulmus rubra), red cedar (Juniperus virginiana), eastern cottonwood (Populus deltoides), willow (Salix spp.), or eastern hemlock (Tsuga canadensis). In addition, alder (Alnus spp.), sumac (Rhus spp.), poison ivy (Toxicodendron radicans), spicebush (Lindera benzoin), sassafras (Sassafras albidum), wild grape (Vitis spp.), rhododendron (Rhododendron spp.), or maple-leaved viburnum (Viburnum acerifolium) may comprise the shrub layer.

Herbaceous species that make up the ground cover include jewelweed (Impatiens capensis), smartweed (Polygonum spp.), skunk cabbage (Symplocarpus foetidus), Solomon's seal (Polygonatum biflorum), violets (Viola spp.), pickerelweed (Pontederia cordata), sedge (Carex spp.), cattail (Typha spp.), may apple (Podophyllum peltatum),

columbine (Aquilegia canadensis), bloodroot (Sanguinaria canadensis), cardinal flower (Lobelia cardinalis), and bulrush (Scirpus spp.), as well as numerous grasses and ferns. . Stony loam, gravelly sandy loam, silt loam, stony silt loam, and muck gravelly loam soil types may be found at long-tailed salamander sites. On the ground, rotting logs, stones, moss, and leaf litter provide cover for the salamanders.

Status and Conservation

Due to habitat loss and pollution of larval ponds, the long-tailed salamander was listed as a threatened species in New Jersey in 1979. The New Jersey Natural Heritage Program considers this species to be "demonstrably secure globally," yet "imperiled in New Jersey because of rarity" (Office of Natural Lands Management 1992).

From the 1960s to the 1980s, biologists have conducted studies to determine the distribution, habitat use, life history, and breeding ecology of the long-tailed salamander in New Jersey. Currently, surveys are conducted to monitor known sites and locate additional populations, enabling biologists to document changes in the range of this species throughout the state. The Freshwater Wetlands Protection Act and environmental reviews of proposed development afford protection to long-tailed salamander habitats in New Jersey.

Red-shouldered Hawk, *Buteo lineatus*

Status: ***State:*** Endangered (breeding population), Threatened (nonbreeding population)
Federal: Migratory Nongame Bird of Management Concern

Identification

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The red-shouldered hawk is a crow-sized buteo, or soaring hawk. The adults are strikingly plumed, with rufous (brownish red) shoulder patches and a rufous barred breast. Rufous lesser and median upperwing coverts form the "red shoulders" evident on this species. The flight feathers of adults are barred black and white and show a white crescent-shaped window across the primaries, which is visible in flight. The underparts, which are rufous with white barring, often exhibit thin, dark streaks on the chest. The head and back are dark brown. The black tail is bisected by several narrow white bands. Although females average slightly larger than males, plumage is similar for both sexes. The call of the red-shouldered hawk is a series of nasal drawn-out "aahhh" cries.

Juvenile red-shouldered hawks can be distinguished from adults by their overall browner, less brilliant plumage. The shoulder patches of juveniles are paler rufous and the crescents across the primaries are tawny. The underparts are whitish with variable amounts of brown streaking. The tail is brown with several thin pale bands. Adult plumage appears in the second year.

The red-shouldered hawk is a long-tailed buteo with squared-off wings and a protruding head. Characterized by quick choppy wingbeats interspersed with short glides, the flight style of this hawk is similar to that of an accipiter. When soaring, most buteos hold their wings straight out, whereas the red-shouldered hawk bows its wings forward.

Habitat

Mature wet woods such as hardwood swamps and riparian forests typify red-shouldered hawk breeding habitat. Nesting territories, which occur in deciduous, coniferous, or mixed woodlands, are typically located within remote and extensive old growth forests containing standing water. Consequently, breeding barred owls (Strix varia) and Cooper's hawks (Accipiter cooperii) are often found in habitats containing red-shouldered hawks.

Red-shouldered hawks select large deciduous and, to a lesser extent, coniferous trees for nesting. Nests have been documented in oak (Quercus spp.), pine (Pinus spp.), maple (Acer spp.), ash (Fraxinus spp.), beech (Fagus grandifolia), birch (Betula spp.),

basswood (Tilia americana), chestnut (Castanea dentata), hemlock (Tsuga canadensis), elm (Ulmus spp.), cherry (Prunus spp.), hickory (Carya spp.), and tulip poplar (Liriodendron tulipifera). Forest characteristics include a closed canopy of tall trees, an open subcanopy, and variable amounts of understory cover.

Red-shouldered hawks inhabit wetland forest types unique to the different physiographic regions throughout northern and southern New Jersey. In north Jersey, they occupy riparian forests, wooded wetlands, beaver meadows, and mesic (slightly moist) lowland forests. Within the Pequannock Watershed, red-shouldered hawks are found in stream bottomlands and coniferous or mixed forests containing eastern hemlock or white pine (Pinus strobus). Nests are predominately located in wilderness areas where there are abundant wetlands, small forest openings, and limited areas of large open water such as lakes. In the Pequannock Watershed, red-shouldered hawks avoid areas of human inhabitation, steep uplands, dry slopes, open water, areas with limited conifers, and areas with too many or too few forest openings. Although red-shouldered hawks require extensive tracts of forested habitat for nesting, territories may also contain edges where the birds forage.

The majority of red-shouldered hawk nests in southern New Jersey are contained within vast contiguous freshwater wetlands. Hardwood or mixed hardwood/cedar swamps containing red maple (Acer rubrum), black gum (Nyssa sylvatica), sassafrass (Sassafras albidum), sweetbay magnolia (Magnolia virginiana), and Atlantic white cedar (Chamaecyparis thyoides) are occupied by red-shouldered hawks. Often, such large forested tracts are surrounded by oak/pine forests or agricultural fields. Although red-shouldered hawks nest in large contiguous tracts of wet old growth forests in Cumberland County, they occupy younger wet woods, often on private property safeguarded from high levels of human activity, in Cape May County.

An-area sensitive species, the red-shouldered hawk typically nests away from residences, roads, and development. In the Pequannock Watershed, red-shouldered hawk nests were located an average of 1,013 m and a standard deviation of plus or minus 614 m (3,324 ± 2,014 ft.) from the nearest building; and an average of 812 m and a standard deviation of plus or minus 634 m (2,664 ± 2,080 ft) from the nearest road (Bosakowski et al. 1991). Red-shouldered hawks avoid small fragmented woodlots and forests that do not contain trees large enough for nesting.

Red-shouldered hawks require large contiguous wooded tracts of 100 to 250 hectares (250 to 620 acres) (Johnsgard 1990). Eastern populations occupy breeding home ranges of 109 to 339 hectares (270 to 838 acres) (Crocoll 1994). In the Pequannock Watershed, red-shouldered hawk breeding densities were estimated at one nest per 450 hectares (1,112 acres) with an average distance of 1.2 to 1.6 km (0.75 to 1.0 mi.) between nests in areas containing the highest breeding concentrations (Bosakowski et al. 1991). Home range sizes of males exceed those of females, during both the breeding and nonbreeding seasons. Individuals of either sex may expand their home ranges while rearing young or throughout the winter months.

During the nonbreeding season, red-shouldered hawks are less restrictive in their habitat use. They inhabit the traditional wetland forests occupied during the breeding season as well as uplands, fragmented woods, smaller forests, open areas, and edges.

Status and Conservation

The red-shouldered hawk was once considered a common resident of wet lowland forests in New Jersey. Only a century ago, bounties were placed on birds of prey, which were accused of poultry and game predation. This unfortunate practice, coupled with egg collecting and the placement of wild red-shouldered hawks in captivity, may have caused initial population declines. The clearing of forests and filling of wetlands exacerbated red-shouldered hawk declines, which were noted as early as the mid-1920s. Reduced numbers of red-shouldered hawks wintering in New Jersey were documented from the early 1950s to the 1970s, as development increased and forest contiguity and patch size decreased. As a result, the red-shouldered hawk, with an estimated 100 breeding pairs in the state, was listed as a threatened species in New Jersey in 1979. In 1982, the U.S. Fish and Wildlife Service listed the red-shouldered hawk as a Migratory Nongame Bird of Management Concern due to population declines and restricted habitat requirements. In addition, the red-shouldered hawk was included on the National Audubon Society's Blue List of Imperiled Species from 1972 to 1986, the final year of the list.

During the 1980s, habitat loss continued to pose an increasing threat, causing red-shouldered hawk populations to decline ever further. By the late 1980s and early 1990s, the state's breeding population was estimated at only 36 pairs, nearly one-third the population size at the time of original listing. As a result, the breeding population of the red-shouldered hawk was reclassified as endangered in 1991. The nonbreeding population remained listed as threatened. The New Jersey Natural Heritage Program considers the red-shouldered hawk to be "demonstrably secure globally," yet "imperiled in New Jersey because of rarity" (Office of Natural Lands Management 1992). Habitat loss and declines of red-shouldered hawks in the Northeast have resulted in the listing of this species as threatened in New York and of special concern in Connecticut.

Savannah Sparrow, *Passerculus sandwichensis*

Status: ***State:*** Threatened ***Federal:*** Not listed

Identification

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The savannah sparrow is a small drab sparrow that is brown above and white below with brown streaking on the breast and sides. The back, nape, and crown are also patterned with variable amounts of dark brown streaking. There is a beige wing bar and the tail is short, brown, and notched. The head is brown with an obscure white crown stripe, a dark brown malar (mustache) stripe, yellow lores (between the eyes and the bill) and eyeline, and a white throat. The legs and feet are pink and the bill is a light pinkish-horn color. The sexes are similar in plumage. Juveniles resemble adults, but are buffer colored with more streaking.

The savannah sparrow closely resembles the song sparrow (Melospiza melodia). However, the song sparrow lacks yellow lores, has a longer, rounded tail, and its streaking forms a distinctive spot on the upper breast. The Ipswich sparrow (P. sandwichensis princeps), a race of savannah sparrow that breeds on Sable Island, Nova Scotia and winters along the Atlantic Coast, is larger and paler than the typical eastern race of savannah sparrow (P. sandwichensis savanna).

The song of the savannah sparrow consists of two to three chips followed by two buzzy trills. The insect-like melody is represented as, tsit tsit tsit, tseee tsaay. The call is a mild tsip.

Habitat

Indigenous to open habitats, the savannah sparrow nests in hay and alfalfa fields, fallow fields, grasslands, upland meadows, airports, pastures, and vegetated landfills. The species also formerly nested within salt marsh edges and coastal grasslands in New Jersey. Suitable tracks must provide a mix of short and tall grasses, a thick litter layer, dense ground vegetation, and scattered shrubs, saplings, or forbs. Because savannah sparrows are relatively tolerant of vegetative succession, they may occupy fields of varied ages, including those containing early woody growth. During the nonbreeding season, savannah sparrows inhabit coastal dunes, drier portions of salt marshes, roadside edges, agricultural and fallow fields, pastures, airports, vegetated landfills, and golf courses.

Status and Conservation

At the southern edge of its breeding range, the savannah sparrow has been a traditionally local and uncommon breeding species in the Garden State. Historically, the clearing of forests for farmland and the filling of coastal marshes provided habitat for breeding savannah sparrows. As agriculture began to decline in the Northeast, farms were developed or left idle, slowly growing into forests. In areas where farming continued, agricultural practices shifted, resulting in large monocultures and earlier and more frequent mowing of hayfields. Wetlands protection regulations prohibited the filling of coastal marshes, resulting in an inland shift in the distribution of savannah sparrows.

With the decline in traditional agriculture, breeding populations of savannah sparrows also began to fall. From 1966 to 1999, the number of savannah sparrows detected on Breeding Bird Survey routes declined in the Northeast and throughout the United States (Sauer et al. 2000). Likewise, Christmas Bird Counts revealed a significant decrease in wintering savannah sparrows from 1959 to 1988 (Sauer et al. 1996). Due to population declines and habitat loss, the savannah sparrow was listed as a threatened species in New Jersey in 1979. The New Jersey Natural Heritage Program considers this species to be “demonstrably secure globally,” yet “imperiled in New Jersey because of rarity” (Office of Natural Lands Management 1992).

From 1981 to 1982, the breeding population of savannah sparrows in New Jersey was estimated at 45 to 50 pairs (Wander 1981, 1982). In the late 1990s, the New Jersey Breeding Bird Atlas confirmed nesting savannah sparrows in 21 blocks and located probable pairs in an additional 29 blocks (Walsh et al. 1999).

Vesper Sparrow, *Pooecetes gramineus*

Status: ***State:*** Endangered ***Federal:*** Not listed

Identification

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The "bay-winged bunting," as it was formerly known, was given the name "vesper sparrow" because it frequently sings during the early evening hours and well into the night. The rich, musical song of the vesper sparrow, which is reminiscent of the song sparrow's (Melospiza melodia) melody, consists of a pair of repeated notes, represented as, "here-here where-where," followed by a series of descending trills. The first two notes are long, slurred, low-pitched whistles while the latter two notes are higher-pitched. The call of the vesper sparrow is a short "hsip."

The vesper sparrow is a stocky, short-tailed, grayish-brown sparrow with a streaked breast. The upperparts are pale gray-brown and marked with black streaking. The breast is grayish white and streaked with black. A brown cheek patch, which reaches behind the eye, is adjacent to a white sub-mustachial stripe that extends down from the bill. A thin, dark malar stripe (mustache) also extends from the bill, separating the white sub-mustachial stripe from the white throat. There is a white eye-ring that stands out against the brown cheek. Rich brown lesser coverts appear as chestnut shoulder patches on adults. However, the brilliance of these patches is variable and, depending on the view of the bird, may be difficult to see. The wings are marked with a pair of narrow, white wing bars. The tail, which is a key diagnostic indicator in flight, is notched and black with white outer tail feathers, similar to that of a junco (Junco hyemalis). The bill is conical-shaped with a dark upper mandible (jaw) and a flesh-colored lower mandible. Likewise, the legs are flesh colored. The iris is reddish brown to dark brown. Although males are slightly larger, the sexes are otherwise similar. Juveniles resemble adults but are buffer overall, have broader wing bars, and lack the chestnut shoulder patches.

Habitat

Inhabitants of open areas, vesper sparrows reside in cultivated fields, grasslands, fallow fields, and pastures. Agricultural fields containing crops of corn, soybean, alfalfa (Medicago sativa), hay, timothy (Phleum spp.), wheat (Agropyron spp.), or strawberry may be occupied. Farmed areas that are adjacent to fallow fields or contain uncultivated strips along fence-rows are favored. These fallow areas provide nesting habitat, cover, foraging sites, and singing perches. On active farmlands, human disturbance and crop

harvesting can threaten nesting sparrows. Fallow fields and grasslands provide a safer haven for nests.

Vesper sparrow habitats are typically sparsely vegetated with patches of bare ground, low vegetation (1 to 8 in.), and scattered shrubs or saplings. Habitats are typically dry and well drained. Nests are placed within clumps of herbaceous cover that afford protection from predators. Elevated perches, such as fence posts, shrubs, or weeds, provide singing posts from which males can advertise their territories and attract mates. Territory size may range from 0.5 to 3.2 hectares (1.2 to 7.9 acres). Similar habitats are used throughout the year.

Status and Conservation

The vesper sparrow was formerly a common, widespread breeding species within agricultural fields and pastures in the Garden State. Turnbull (1869), Stone (1894a, 1894b), Griscom (1923), Hausman (1935), and Cruickshank (1942) considered it to be a common to abundant summer bird in open cultivated areas of northern New Jersey and the Pine Barrens. However, even at this time, these authors noted its rarity in areas with suburban development. By the 1950s and 1960s, the vesper sparrow, which was by then considered an uncommon breeding species, had undergone population declines resulting from increased development of rural farmlands. Further declines in the Northeast were noted during the mid-1970s and early 1980s. The number of vesper sparrows detected on New Jersey Christmas Bird Counts plummeted from an average of 44 per year in 1971-1973 to four per year in 1983-1985. Likewise, numerous breeding populations documented in the state in the early 1980s were absent by the mid-1990s. The Breeding Bird Survey has shown a significant annual decline in the number of vesper sparrows detected on surveys in the New Jersey from 1966 to 1999 (Sauer et al. 2000).

Due to its dependence on habitats created by farming, the vesper sparrow has suffered significant population declines resulting from the ebb of agriculture in New Jersey. Consequently, the vesper sparrow was listed as a threatened species in New Jersey in 1979. As the breeding population continued to decline and nesting habitat dwindled, the status of the vesper sparrow was reclassified as endangered in 1984. Currently, it is a rare and local breeding species in the state. The New Jersey Natural Heritage Program considers the vesper sparrow to be “demonstrably secure globally.” yet “imperiled in New Jersey because of rarity” (Office of Natural Lands Management 1992). The National Audubon Society included the vesper sparrow on its Blue List of Imperiled Species from 1978 to 1980 and listed it as a local problem species in 1982 due to declines in the eastern population. Throughout much of the Northeast, the vesper sparrow has declined and, as a result, has been listed as endangered in Connecticut and Rhode Island, threatened in Massachusetts, and of special concern in New York.

Wood Turtle, *Clemmys insculpta*

Status: ***State:*** Threatened ***Federal:*** Not listed

Identification

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As the taxonomic name insculpta indicates, the wood turtle is distinguished by the sculpted or grooved appearance of its carapace, or upper shell. Each season a new annulus, or ridge, is formed, giving each scute (a scale-like horny layer) a distinctive pyramid-shaped appearance. As the turtle ages, natural wear smoothes the surface of the shell. While the scutes of the carapace are brown, the plastron, or underneath shell, consists of yellow scutes with brown or black blotches on each outer edge. The legs and throat are reddish-orange. The male wood turtle has a concave plastron while that of the female is flat or convex. The male also has a thicker tail than the female. Adult wood turtles measure 14 to 20 cm (5.5 to 8.0 in.) in length (Conant and Collins 1991).

Habitat

Unlike other turtle species that favor either land or water, the wood turtle resides in both aquatic and terrestrial environments. Aquatic habitats are required for mating, feeding, and hibernation, while terrestrial habitats are used for egg laying and foraging. Freshwater streams, brooks, creeks, or rivers that are relatively remote provide the habitat needed by these turtles. Consequently, wood turtles are often found within streams containing native brook trout (Salvelinus fontinalis). These tributaries are characteristically clean, free of litter and pollutants, and occur within undisturbed uplands such as fields, meadows, or forests. Open fields and thickets of alder (Alnus spp.), greenbrier (Smilax spp.), or multiflora rose (Rosa multiflora) are favored basking habitats. Lowland, mid-successional forests dominated by oaks (Quercus spp.), black birch (Betula lenta), and red maple (Acer rubrum) may also be used. Wood turtles may also be found on abandoned railroad beds or agricultural fields and pastures. Nevertheless, wood turtle habitats typically contain few roads and are often over one-half of a mile away from developed or populated areas (Zappalorti et al. 1984). Individuals from relict or declining populations are also sighted in areas of formally good habitat that have been fragmented by roads and development.

Status and Conservation

Historically, the wood turtle was a fairly common species within suitable habitat in New Jersey. By the 1970s, however, declines were noted as wood turtles were absent from many historic sites due to habitat loss and stream degradation. Consequently, the wood turtle was listed as a threatened species in New Jersey in 1979. The New Jersey Natural Heritage Program considers the wood turtle to be "demonstrably secure globally," yet "rare in New Jersey" (Office of Natural Lands Management 1992).

Since the late 1970s, biologists have monitored and surveyed wood turtle sites in New Jersey, providing valuable data regarding the life history, reproduction, and habitat use of these turtles in the state. There is, however, a continuing need to examine the productivity and juvenile survival of wood turtles, which may be threatened by disturbance or predation.

In 1995, the wood turtle was proposed for inclusion on the federal endangered species list. Despite declines in several northeastern states, populations were considered stable enough throughout the species' entire range to deny listing. However, the wood turtle was considered by the U.S. Fish and Wildlife Service as a species that, "although not necessarily now threatened with extinction may become so unless trade in them is strictly controlled" (U.S. Fish and Wildlife Service 1995). As a result, international trade of these turtles is strictly monitored and regulated through the CITES Act (Convention on International Trade in Endangered Species of Wild Flora and Fauna Act). The New Jersey Endangered Species Act prohibits the collection or possession of wood turtles.

Appendix L. Plants of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

		BHWP List #															
Present	BBG	611	746	756	981	2111	5511	5516	5521	5526	Genus	Specific epithet	Common Name PA/NJ	NJ list	NJ CC	NJ rank	Wetland Status	Comments
1					1						Acalypha	virginica	Three-seeded mercury	N	5		FACU-	Dry or moist soil of fields, wooded slopes, stream banks and waste ground.
1	1										Acer	negundo	Box-elder	N	2		FAC+	Low, moist areas, stream banks, and floodplains.
1	1										Acer	nigrum	Black maple	N	*		FACU	Rich woods, ravines and river banks.
1	1										Acer	pensylvanicum	Moosewood/ striped maple	N	7		FACU	Cool, moist, rocky woods.
1	1										Acer	platanoides	Norway maple	I	0		UPL	Cultivated and frequently escaped to disturbed woods, roadsides and edges.
1	1										Acer	pseudoplatanus	Sycamore maple	I	0		N	Occasionally spreading from cultivation to railroad banks, waste ground and urban woods.
6	1	1	1			1	1		1		Acer	rubrum var. rubrum	Red maple	N	3		FAC	Dry to moist woods, swamps and bogs. NJ: throughout.
1	1										Acer	saccharinum	Silver maple	N	5		FACW	Moist woods, stream banks and alluvium.North Jersey
8	1	1	1			1	1	1	1	1	Acer	saccharum var. saccharum	Sugar maple	N	5		FACU	Moist woods, wooded slopes, ravines and alluvial areas.
1	1										Acer	spicatum	Mountain maple	N	8		FACU-	Moist, rocky woods. North Jersey colder ravines
1						1					Achillea	millefolium	Common yarrow	I	0		FACU	Fields, roadsides and waste ground.
2		1	1								Actaea	alba	White Baneberry/ Doll's Eyes	N	5			
1			1								Adiantum	pedatum	Northern maidenhair	N	7		FAC-	Moist, shaded, humus-rich woods, in subacidic to neutral soils.
1	1										Aesculus	hippocastanum	Horse-chestnut	I	0		N	Cultivated, occasionally escaped to railroad banks or persisting in abandoned gardens.
2			1			1					Agrimonia	gryposepala	Agrimony/ Tall Hairy Agrimony	N	4		FACU	Woods, fields and floodplains.
1				1							Agrostis	gigantea	Redtop	I	0		FACW-	Cultivated and frequently established in moist soil of fields, roadsides and waste ground.
1	1										Ailanthus	altissima	Tree-of-heaven	I	0		FACU-	Disturbed woods, roadsides, fencerows, vacant lots and railroad banks.
1	1										Akebia	quinata	Akebia five-leaf	I	0		N	Disturbed woods, naturalized from cultivated sources.
1	1										Albizia	julibrissin	Mimosa	I	0		N	Cultivated and occasionally escaped to roadsides and woods edges.
4		1			1			1	1		Alisma	subcordatum	Broad-leaved water-plantain	N	3		OBL	Marshes, stream and pond margins and muddy shores.NJ: tidal flats, ditches.
7		1	1			1	1	1	1	1	Alliaria	petiolata	Garlic-mustard	I	0		FACU-	Disturbed woods, floodplains and waste ground.
1							1				Allium	canadense	Wild onion	N	5		FACU	Low woods, stream banks and thickets.
4			1			1	1		1		Allium	vineale	Field garlic	I	0		FACU-	Disturbed woods, fields and lawns.
1	1										Alnus	incana	Speckled alder	N	6			
2	1						1				Alnus	serrulata	Smooth alder	N	4		OBL	Low, wet woods and swamps.
2				1		1					Ambrosia	artemisiifolia	Common ragweed	N	0		FACU	Fields, meadows, cultivated areas, roadsides and waste ground.
2		1				1					Ambrosia	trifida	Giant ragweed	N	2		FAC	Fields, meadows, roadsides and floodplains.
2	1				1						Amelanchier	arborea	Shadbush/ Downy Juneberry	N	7		FAC-	Rocky bluffs and upper slopes.NJ: North Jersey
2	1	1									Amelanchier	canadensis	Shadbush/ Oblongleaf	N	8		FAC	Woods and peaty thickets.NJ: Brackish coastal swamps.
1	1										Amorpha	fruticosa	False-indigo	N	6		FACW	Alluvial soils along streams and rivers and other low, moist areas.NJ: Delaware traprock watershed.
7		1	1			1	1	1	1	1	Amphicarpaea	bracteata	Hog peanut	N	4		FAC	Moist woods and alluvium.
2				1		1					Andropogon	virginicus	Broom-sedge	N	2		FACU	Old fields, hillsides and waste ground, in dry, sterile soil.
2						1			1		Anthoxanthum	odoratum	Sweet vernalgrass	I	0		FACU	Open fields, meadows and roadsides.
1									1		Apios	americana	Ground-nut	N	5		FACW	Low, rich, moist ground and thickets.NJ: Floodplains.
1						1					Apocynum	cannabinum var. cannabinum	Indian-hemp	N	2		FACU	Woods, old fields, sandy flats, limestone bluffs and cindery waste ground.
1					1						Aralia	nudicaulis	Wild sarsaparilla	N	5		FACU	Dry to moist woods.NJ: fields.
1							1				Arisaema	dracontium	Green-dragon	N	7		FACW	Low woods, floodplains and swamps.
7		1	1			1	1	1	1	1	Arisaema	triphyllum ssp. triphyllum	Jack-in-the-pulpit	N	5		FACW-	Moist woods, swamps and bogs.
1	1										Aronia	arbutifolia	Red chokeberry	N	5		FACW	Swamps, bogs and moist woods.
1	1										Aronia	melanocarpa	Black chokeberry	N	6		FAC	Swamps, bogs and wet or dry woods or barrens.
1	1										Aronia	prunifolia	Purple chokeberry	N	5		FACW	Swampy woods, bogs, rocky ledges and dry, mountaintop thickets.
5		1	1					1	1	1	Artemisia	vulgaris	Common mugwort	I	0		N	Gardens, lawns, roadsides, thickets, waste ground and rubbish dumps.
2				1		1					Arthraxon	hispidus	Grass/ Arthraxon	I	0		FAC	Moist meadows and waste ground.
1			1								Asarum	canadense var. canadense	Wild ginger	N	8		FACU-	Moist, rich woods.
1						1					Asclepias	incarnata ssp. incarnata	Swamp milkweed	N	5		OBL	Swamps, floodplains and wet meadows.
1						1					Asclepias	purpurascens	Purple milkweed	N	7		FACU	Dry to moist woods, thickets, fields and roadsides.
1	1										Asimina	triloba	Pawpaw	N	10	S1	FACU+	Moist, rich woodlands.
3			1			1	1				Asplenium	platyneuron	Ebony spleenwort	N	3		FACU	Dry to moist, wooded slopes and rock ledges, in subacidic soils.
2		1				1					Athyrium	filix-femina var. angustum	Lady fern	N	7		FAC	Damp woods, swamps and thickets, in subacidic soils.
1						1					Barbarea	vulgaris var. vulgaris	Common wintercress	I	0		FACU	Moist, open ground.
6	1	1	1			1	1			1	Berberis	thunbergii	Japanese barberry	I	0		N	Disturbed woods, roadsides and hedgerows.

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Present	BBG	611	746	756	981	2111	5511	5516	5521	5526	Genus	Specific epithet	Common Name PA/NJ	NJ list	NJ CC	NJ rank	Wetland Status	Comments
1	1										Berberis	vulgaris	European barberry	I	0		N	Fields, pastures and disturbed woods, escaped from cultivation.
1	1										Betula	alleghaniensis	Yellow birch	N	10		FAC	Cool, moist, northern woods.
3	1	1	1								Betula	lenta	Black birch	N	6		FACU	Woods and stream banks.
4	1		1				1		1		Betula	nigra	River birch	N	7		FACW	Floodplains, stream banks, wet woods and swamps.
1	1										Betula	papyrifera var papyrifera	Paper birch	N	10	S2		
2	1				1						Betula	populifolia	Gray birch	N	2		FAC	Old fields, open woods and disturbed areas, especially on dry, sterile soils.
4		1	1			1		1			Bidens	frondosa	Beggar-ticks	N	2		FACW	Moist, open ground, stream banks and roadsides.
1						1					Bidens	polylepis	Tickseed-sunflower	N	1		FACW	Moist fields, vacant lots and roadsides.
3								1	1	1	Blephilia	ciliata	Wood-mint	N	*		N	Wooded slopes, swamps and calcareous hillsides.
5		1			1	1		1		1	Boehmeria	cylindrica	False Nettle	N	5			
1					1						Boehmeria	cylindrica var. cylindrica	False nettle	N	*		FACW+	Moist, shady ground of wet woods and stream margins.
2		1	1								Botrychium	dissectum	Cut-leaved grape-fern	N	5		FAC	Moist, open woods, meadows and barrens, in moderately acidic soils.
3		1	1			1					Botrychium	virginianum	Rattlesnake fern	N	6		FACU	Dry or moist, humus-rich woods, in subacidic to circumneutral soils.
1					1						Brachyelytrum	erectum	Brachyelytrum/Bearded Short-husk	N	7		N	Moist, wooded hillsides, alluvial woods and moist thickets.
2				1		1					Bromus	inermis	Smooth brome/Hungarian Brome	I	0		N	Fields, roadsides and waste ground.
2			1							1	Bromus	pubescens	Canada brome/Hairy Brome	N	8		N	Dry to moist woods and thickets.
1	1										Broussonetia	papyrifera	Paper-mulberry	I	0		N	Escaped from cultivation, waste ground and woods margins.
1					1						Calamagrostis	canadensis	Bluejoint Grass	N	5			
1						1					Callitriche	heterophylla	Water-starwort; larger water starwort	N	3		OBL	Ponds, slow-running streams and muddy shores.
1						1					Calystegia	sepium	Hedge bindweed	N	5		FAC-	Waste ground, fields and woods edges.
2	1					1					Campsis	radicans	Trumpet-vine; trumpet creeper	N	3		FAC	River banks, roadside thickets and fencerows, also occasionally escaped from cultivation.
1						1					Cardamine	bulbosa	Bittercress	N	7		OBL	Low wet ground, shallow water, swamps or springy areas.
1						1					Cardamine	concatenata	Toothwort; cut-leaved toothwort	N	7		FACU	Rich, deciduous woods.
1		1									Cardamine	impatiens	Bittercress; narrowleaf bitter cress	I	0		N	Moist slopes.
1						1					Carex	annectens	Sedge; yellow fruited sedge	N	3		FACW	Dry to moist woods, fields and ditches.
4		1	1			1	1				Carex	blanda	Sedge; woodland sedge	N	6		FAC	Dry to moist woods, thickets and meadows.
2						1				1	Carex	complanata	Flattened sedge	N	7			NJ: Coastal plain.
2						1				1	Carex	crinita var. crinita	Short hair sedge; fringed sedge	N	5		OBL	Moist to wet woods, thickets, marshes, ditches and stream banks.
1		1									Carex	debilis var. debilis	Sedge; White-edged sedge	N	6		FAC	Swamps, thickets and low woods.
1						1					Carex	festucacea	Sedge; Fescue sedge	N	7		FAC	Moist, open woods or thickets.
1						1					Carex	grayi	Sedge; Gray's sedge	N	8		FACW+	Swamps and wet woods.
1						1					Carex	grisea	Sedge	N	6		FAC	Dry to moist woods, meadows and swales.
2							1			1	Carex	hirtifolia	Sedge; pubescent sedge	N	10		N	Dry woods.
1		1									Carex	laxiculmis var. laxiculmis	Sedge; spreading sedge	N	8		N	Rich woods.
1									1		Carex	lupulina	Sedge; hop sedge	N	6		OBL	Swamps, bogs and wet woods.
3						1		1	1		Carex	lurida	Sedge; sallow sedge	N	4		OBL	Swamps, bogs and wet meadows.
2		1	1								Carex	pensylvanica	Sedge; pennsylvania sedge	N	5		N	Open woods and wooded slopes.
1						1					Carex	platyphylla	Broad-leaf sedge	N	10		N	Rich woods and wooded slopes.NJ: Limestone rocky woods.
5						1	1	1	1	1	Carex	radiata	Sedge; stellate sedge	N	7		N	Dry to moist woods southern NJ
2						1			1		Carex	scoparia	Broom sedge; pointed broom sedge	N	3		FACW	Moist to dry, open ground.
1		1									Carex	sparganioides	Sedge; Bur-reed sedge	N	4		FACU	Rich woods and meadows.
5						1	1	1	1	1	Carex	squarrosa	Sedge/ squarrose sedge	N	5		FACW	Swamps and wet woods.
4						1		1	1	1	Carex	stipata var. stipata	Sedge/ awl-fruited sedge	N	3		N	Wet meadows and swampy woods.
3							1	1	1		Carex	striatula	Sedge/ striate sedge	N	7		N	Rich, open woods NJ: Piedmont
2		1				1					Carex	swanii	Sedge/ swan's sedge	N	6		FACU	Dry woods, meadows and fields.
1						1					Carex	typhina	Cat-tail sedge	N	8	S3	FACW+	Calcareous swamps, wet woods and swales.
3						1		1	1		Carex	vulpinoidea var. vulpinoidea	Sedge/ fox sedge	N	4		OBL	Moist meadows, fields and roadside ditches.
7	1	1	1			1	1	1		1	Carpinus	caroliniana	Hornbeam; ironwood	N	7		FAC	Rich, moist woods and stream edges.NJ: Floodplains.
5	1		1				1	1	1		Carya	cordiformis	Bitternut hickory	N	8		FACU+	Moist woods and stream banks.
3	1		1			1					Carya	glabra	Pignut hickory	N	7		FACU-	Upland woods, dry ridge tops and slopes.
2	1									1	Carya	ovalis	Sweet Pignut Hickory	N	7			

Appendix L. Plants of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

		BHWP List #														
Present	BBG	611	746	756	981	2111	5511	5516	5521	5526	Genus	Specific epithet	Common Name PA/NJ	NJ list	NJ CC	NJ rank	Wetland Status	Comments
7	1	1	1			1	1	1	1		Carya	ovata	Shagbark hickory	N	7		FACU	Low, moist woods and slopes, in rich soil.
4	1	1	1			1					Carya	tomentosa	Mockernut hickory	N	5		FACU	Moist, open woods and slopes.
1	1										Castanea	dentata	American chestnut	N	5		N	Wooded slopes and ridges, in dry, acidic soils.
1	1										Castanea	pumila	Chinquapin	N	4	S1	N	Moist to dry wooded slopes. NJ: Dry, acid ground.
1	1										Catalpa	bignonioides	Catalpa	I	0		UPL	Cultivated and frequently naturalized in disturbed woods, floodplains, fields and waste ground.
1		1									Caulophyllum	thalictroides	Blue cohosh	N	9		N	Moist, rich woods.
1	1										Ceanothus	americanus	New Jersey tea	N	7		N	Wooded bluffs, roadside banks and shaly slopes.
1	1										Celastrus	orbiculatus	Oriental bittersweet	I	0		UPL	Disturbed woods, fields, fencerows and edges.
1	1										Celastrus	scandens	American bittersweet	N	5		FACU-	Dry fields, rocky ledges, woods and thickets.
2	1				1						Celtis	occidentalis	Hackberry	N	0			
1						1					Centaurea	maculosa	Bushy knapweed	I	0		N	Woods, fields, roadsides and shale barrens.
4	1					1		1	1		Cephalanthus	occidentalis	Buttonbush	N	6		OBL	Low wet ground, swamps, bogs and lake edges.
1						1					Cerastium	vulgatum	Common mouse-ear chickweed	I	0			
1	1										Cercis	canadensis	Redbud	N	8		N	Wooded slopes and ravines in dry to moist, rich soils on limestone or diabase.
1	1										Chamaecyparis	thyoides	Atlantic white-cedar	N	5		OBL	Sphagnum bogs.
1	1										Chamaedaphne	calyculata	Leatherleaf	N	6			
4		1			1	1				1	Chelone	glabra	Turtlehead	N	7		OBL	Stream banks, wet woods and swamps.
2	1		1								Chimaphila	maculata	Pipsissewa/ Spotted Wintergreen	N	5		N	Woods.
1	1										Chimaphila	umbellata ssp. cisatlantica	Pipsissewa	N	7		N	Dry, upland woods and barrens.
1						1					Chrysanthemum	leucanthemum	Ox-eye daisy	I	0		N	Fields, woods, meadows and roadsides.
1						1					Cichorium	intybus	Blue chicory	I	0		N	Fields, roadsides and waste ground.
3		1			1	1					Cicuta	maculata var. maculata	Beaver-poison/ water hemlock	N	5		OBL	Swamps, marshes, wet meadows, stream banks and ditches.
3			1			1	1				Cimicifuga	racemosa	Black snakeroot	N	9		N	Rich woods.
4		1	1			1		1			Cinna	arundinacea	Wood reedgrass	N	4		FACW	Swamps and wet woods.
7		1	1			1	1	1	1	1	Circaea	lutetiana ssp. canadensis	Enchanter's-nightshade	N	6		FACU	Rocky, upland woods, damp woods and floodplains.
1						1					Cirsium	arvense var. arvense	Canada thistle	I	0		FACU	Fields, pastures, roadsides and waste ground.
2				1		1					Cirsium	discolor	Field thistle	N	1		UPL	Abandoned fields, open hillsides and roadside banks.
1						1					Cirsium	muticum	Swamp thistle	N	8		OBL	Swamps, bogs, stream banks and wet meadows.
1						1					Claytonia	virginica	Spring-beauty	N	5		FAC	Moist woods and meadows, frequently on alluvial soils.
1	1										Clematis	occidentalis var occidentalis	Purple clematis	N	10	S2	N	Rocky slopes and open woods, often calcareous.
1	1										Clematis	terniflora	Sweet autumn clematis/ Yam-leaved Clematus	I	0		FACU-	Thickets, fencerows and roadsides.
3	1	1			1						Clematis	virginiana	Virgin's-bower	N	5		FAC	Thickets and woods edges, in low ground.
1	1										Clethra	alnifolia	Sweet pepperbush	N	5		FAC+	Low, wet woods and swamps.
3					1	1	1				Collinsonia	canadensis	Horse balm	N	9		FAC+	Rich woods and wooded floodplains.
1	1										Colutea	arborescens	Bladder Senna	I	0			
5		1	1			1		1	1		Commelina	communis var. communis	Asiatic dayflower	I	0		FAC-	Gardens, woods, roadsides, stream banks and disturbed ground.
1	1										Comptonia	peregrina	Sweet-fern	N	3		N	Dry, sterile soils of open woods and barrens.
1	1										Cornus	alternifolia	Alternate-leaved dogwood	N	8		N	Low, moist woods and shaded ravines.
5	1	1			1	1			1		Cornus	amomum ssp. amomum	Kinnikinik; silky dogwood	N	5		FACW	Moist woods, meadows, old fields and swamps.
4	1	1	1			1					Cornus	florida	Flowering dogwood	N	5		FACU-	Rich, moist woods and woods edges.
1	1										Cornus	foemina	Stiff swamp dogwood	N	8	S2		Calcareous wooded slopes
1					1						Cornus	racemosa	Grey dogwood/ Northern swamp dogwood	N	3		FAC-	Swampy meadows, wet woods and thickets.
1	1										Cornus	rugosa	Round-leaved dogwood	N	8		N	Dry, rocky woods and cliffs.
1	1										Cornus	sericea	Red-osier dogwood	N	7		FACW+	Swamps, moist fields and thickets.
1										1	Coronilla	varia	Crown-vetch	I	0		N	Planted extensively along highways.
1	1										Corylus	americana	American filber/; American hazel	N	5		FACU-	Rich woods and edges.
1	1										Corylus	cornuta	Beaked hazelnut	N	7		FACU-	Dry, rocky woods and thickets.
1							1				Crataegus	crus-galli	Cockspur hawthorn	N	2		FACU	Woods, meadows, roadsides and thickets.
1	1										Crataegus	flabellata	Fanleaf hawthorn	N	*		N	Open woods, fencerows, abandoned fields and roadsides.
1	1										Crataegus	intricata	Biltmore hawthorn/ Copenhagen Hawthorne	N	*		N	Woods, pastures, thickets and barrens.
1	1										Crataegus	monogyna	English hawthorn/ One-seed Hawthorne	I	0		N	Escaped from cultivation to roadsides and waste ground.

Appendix L. Plants of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

		BHWP List #														
Present	BBG	611	746	756	981	2111	5511	5516	5521	5526	Genus	Specific epithet	Common Name PA/NJ	NJ list	NJ CC	NJ rank	Wetland Status	Comments
1	1										Crataegus	phaenopyrum	Washington hawthorn	I	*		FAC	Cultivated and occasionally escaped to roadsides, hedgerows and open ground.
1	1										Crataegus	pruinosa	Frosted hawthorn/ Waxy-fruited Hawthorne	N	4		N	Open woods and thickets.
1	1										Crataegus	succulenta	Long-spined hawthorn/ Fleshy Hawthorne	N	*	S1	N	Woods, thickets, banks, fencerows and meadows.
1	1										Crataegus	uniflora	One-fruited hawthorn/ Dwarf hawthorne	N	3		N	Open woods and dry slopes.
5		1			1		1	1	1		Cryptotaenia	canadensis	Honewort	N	5		FAC	Moist woods, wooded stream banks and seeps.
2		1				1					Cuscuta	gronovii var. gronovii	Common dodder	N	3		N	Parasitic on a wide range of woody and herbaceous plants of low, wet habitats.
1				1							Cyperus	strigosus	False nutsedge; straw-colored flatsedge	N	1		FACW	Moist fields, woods, swamps and stream banks.
1					1						Cystopteris	fragilis	Fragile fern	N	*		FACU	Cool rock crevices and talus slopes, in neutral to subacidic soils.
6				1		1	1	1	1	1	Dactylis	glomerata	Orchardgrass	I	0		FACU	Fields, meadows and roadsides.
1						1					Danthonia	compressa	Northern oatgrass/Flattened Wild Oat-grass	N	7		FACU-	Dry, rocky woods and clearings.
2						1			1		Daucus	carota	Queen Anne's-lace	I	0		N	Roadsides, old fields, gardens and waste ground.
2		1	1								Dennstaedtia	punctilobula	Hay-scented fern	N	4		N	Open woods, meadows and slopes, in acidic soils.NJ: Banks.
1					1						Deschampsia	flexuosa	Common hairgrass	N	3		N	Dry woods or rocky slopes.
1						1					Desmodium	canadense	Showy tick-trefoil	N	4		FAC	Open woods.
1						1					Desmodium	paniculatum	Tick-trefoil	N	4		UPL	Clearings and edges of moist or dry woods.
6		1				1	1	1	1	1	Dichanthelium	clandestinum	Deertongue Grass	N	3			
2						1	1				Dichanthelium	dichotomum var dicotomum	Cypress Panic-grass	N	8			NJ: Moist, sandy soils
1						1					Dichanthelium	villosissimum	White-haired Panic-grass	N	7			NJ: Sandy, disturbed, woods edges
1	1										Diervilla	lonicera	Bush-honeysuckle	N	8		N	Dry woods and rocky slopes.
5		1	1			1		1	1		Dioscorea	villosa	Wild yam	N	7		FAC+	Woods, thickets and rocky slopes.
1	1										Diospyros	virginiana	Persimmon	N	3		FAC-	Thin woods, edges, floodplains and old fields.
1	1										Dirca	palustris	Leatherwood	N	10	S2	FAC	Rich, deciduous woods, rocky banks and thickets.
1								1			Doellingeria	infirma	Flat-topped white aster/ Cornel-leaf aster	N	9	S2	N	Rocky woods, thickets and barrens.
5		1	1			1	1	1			Dryopteris	carthusiana	Spinulose wood fern	N	5		FAC+	Moist to wet woods and swamps.
2		1	1								Dryopteris	intermedia	Evergreen wood-fern	N	8		FACU	Moist woods, shaded slopes and swamp hummocks, in humus-rich, acidic to neutral soils.
3		1	1				1				Dryopteris	marginalis	Marginal wood fern	N	9		FACU-	Rocky ledges, talus slopes and shaded edges, in subacidic to circumneutral soils.
1				1							Echinochloa	crusgalli var. crusgalli	Barnyard-grass	I	0		FACU	Fields, meadows, roadsides and waste ground.
1				1							Echinochloa	muricata var muricata		N	1			
1	1										Elaeagnus	angustifolia	Russian-olive	I	0		FACU	Cultivated and escaped to waste ground, also planted for erosion control.
6	1		1			1	1		1	1	Elaeagnus	umbellata	Autumn-olive	I	0		N	Planted by the Game Commission and extensively naturalized in old fields and abandoned pastures.
1						1					Eleocharis	tenuis var. tenuis	Spike-rush	N	3		FACW+	Moist fields, swamps, bogs and wet ditches.
5			1			1	1	1	1		Elymus	hystrix	Bottlebrush-grass	N	5		N	Moist, alluvial woods.NJ: floodplains.
2			1							1	Elymus	riparius	Riverbank wild-rye	N	5		FACW	Alluvial flats, meadows and stream banks.NJ: floodplains.
2		1	1								Epifagus	virginiana	Beechdrops	N	10		N	Beech woods, parasitic on the roots of Fagus grandifolia.
1	1										Epigaea	repens	Trailing-arbutus	N	10		N	Dry to moist, acidic woods and edges.
1						1					Eragrostis	spectabilis	Purple lovegrass	N	1		UPL	Dry, sandy fields and roadsides.
2		1	1								Erechtites	hieraciifolia	Fireweed	N	0		FACU	Fields, woods, clearings and waste ground.
2		1				1					Erigeron	annuus	Daisy fleabane	N	0		FACU	Fields, roadsides and waste ground.
3						1		1	1		Erigeron	philadelphicus	Daisy fleabane/ philadelphia fleabane	N	2		FACU	Woods, edges, fields, roadsides and lawns.
1						1					Erythronium	americanum	Yellow trout-lily	N	5		N	Moist woods, bottomlands and meadows.
4	1	1				1		1			Euonymus	alatus	Winged euonymous	I	0		N	Cultivated and occasionally naturalized in disturbed woods, stream banks, fencerows and edges.
1	1										Euonymus	americanus	Hearts-a-bursting/ Strawberyy bush	N	7		FAC	Moist woods, swamps, floodplains and wet thickets.
1	1										Euonymus	atropurpureus	Burning-bush/ Wahoo	N	10	S1	FACU	Wooded limestone slopes, rocky bluffs and floodplain thickets.
1	1										Euonymus	europaeus	European spindletree	I	0		N	Cultivated and occasionally escaped.
1	1										Euonymus	fortunei	Wintercreeper	I	*		N	Cultivated and occasionally naturalized in woods and wooded floodplains.
2						1			1		Eupatorium	fistulosum	Joe-pye-weed/ hollow-stemmed joe-pye weed	N	5		FACW	Floodplains, meadows, moist thickets and roadsides.
2		1				1					Eupatorium	perfoliatum	Boneset	N	3		FACW+	Floodplains, swamps, bogs, stream banks and wet meadows.
7		1	1			1	1	1	1	1	Eupatorium	rugosum	White-snakeroot	N	3		N	Woods, meadows and roadsides.
6		1	1			1	1	1		1	Eurybia	divaricata	White wood aster	N	4		N	Woods.
1					1						Eurybia	macrophylla	Bigleaf aster	N	7		N	Woods, rocky slopes and edges.
3		1		1		1					Euthamia	graminifolia var. graminifolia	Grass-leaved goldenrod	N	1		FAC	Fields, roadsides, moist ditches or shores.

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5	1	1	1			1				1	Fagus	grandifolia	American beech	N	8		FACU	A dominant tree of mature forests on moist, rich soils.
4						1	1	1	1		Festuca	elatior	Fescue/Tall Fescue	I	0		FACU-	Roadsides, fields and open ground.
5		1				1	1	1		1	Festuca	subverticillata	Nodding fescue	N	8			NJ woodlands
1						1					Fragaria	virginiana ssp. virginiana	Wild strawberry	N	2		FACU	Woods, meadows, old fields and other dry, open ground.
6	1	1	1			1	1			1	Fraxinus	americana var. americana	White ash	N	7		FACU	Woods, fencerows and old fields.
1	1										Fraxinus	nigra	Black ash	N	10		FACW	Swamps, wet woods and bottomlands.
2	1				1						Fraxinus	pennsylvanica	Red ash/ Green Ash	N	4		FACW	Alluvial woods, stream banks and moist fields.
1			1								Galinsoga	parviflora	Small-flowered quickweed	I	0		N	Floodplains, streets, waste ground and ballast.
1						1					Galium	aparine	Bedstraw/ Cleavers	N	1		FACU	Woods, stream banks, wooded slopes and roadsides.
4		1					1	1		1	Galium	asprellum	Rough bedstraw	N	8		OBL	Swamps, bogs, stream banks and wet thickets.
5		1	1			1	1			1	Galium	circaezans var. circaezans	Wild licorice	N	8		UPL	Rich woods and wooded, calcareous slopes.
1		1									Galium	lanceolatum	Wild licorice/ Lance-leaved Wild Licorice	N	8		N	Woods and wooded slopes.
2		1	1								Galium	triflorum	Sweet-scented bedstraw/ Fragrant Bedstraw	N	5		FACU	Rocky woods, shaded hillsides and roadside banks.
1	1										Gaultheria	procumbens	Teaberry	N	5		FACU	Dry to moist, acidic woods.
1	1										Gaylussacia	baccata	Black huckleberry	N	8		FACU	Dry to moist, acidic woods and bogs.
1	1										Gaylussacia	dumosa	Dwarf huckleberry	N	10		FAC	Moist, acidic woods and swamps.NJ:bogs
1	1										Gaylussacia	frondosa	Dangleberry	N	7		FAC	Moist, acidic woods, swamps and bogs.NJ: some woods edges
5		1	1			1	1			1	Geranium	maculatum	Wood geranium	N	4		FACU	Rich woods, roadsides and fields.
1						1					Geum	aleppicum	Yellow avens	N	9		FAC	Woods, moist fields, swamps, and roadsides.
5		1					1	1	1	1	Geum	canadense var. canadense	White avens	N	5		FACU	Woods, stream banks and roadsides.
1	1										Ginkgo	biloba	Maidenhair tree	I	*		N	An occasional garden escape, naturalizing in disturbed woods.
3		1	1			1					Glechoma	hederacea	Gill-over-the-ground	I	0		FACU	Fields, disturbed woods, roadsides, gardens and waste ground.
5		1				1	1		1	1	Glyceria	striata	Fowl mannagrass	N	3		OBL	Wet woods, swamps and bogs.
1	1										Gymnocladus	dioica	Kentucky coffee-tree	I	0		N	Rich, moist woods and bottomlands, also occasionally planted.
2			1							1	Hackelia	virginiana	Beggar's-lice; virginia stickseed	N	2		FACU	Dry to moist woods, wooded slopes and roadsides.
4	1	1	1			1					Hamamelis	virginiana	Witch-hazel	N	7		FACU+	Rich, rocky woods.
1			1								Hedeoma	pulegioides	American pennyroyal	N	1		N	Dry fields, pastures, woods and roadsides.
1	1										Hedera	helix	English ivy	I	0		N	Cultivated and occasionally naturalized in disturbed woods.
1						1					Helenium	autumnale	Common sneezeweed	N	5		FACW+	Swamps, moist river banks, alluvial thickets and wet fields.
2					1	1					Helianthus	decapetalus	Thin-leaved sunflower	N	4		FACU	Fields, moist bottomlands, stream banks and roadsides.
1					1						Helianthus	divaricatus	Rough sunflower	N	6		N	Dry, wooded slopes, shale barrens and roadsides.
1									1		Helianthus	strumosus	Rough-leaved sunflower/ pale-leaved sunflower	N	4		N	Fields, woods, stream banks and roadsides.
2		1						1			Hemerocallis	fulva	Orange day-lily	I	0		UPL	Fields, roadsides, stream banks, floodplains and woods edges.
1							1				Hepatica	nobilis var. obtusa	Liverleaf/ Hepatica	N	9		N	Rich woods.
1					1						Heuchera	americana	Alum-root	N	10		N	Rich woods, rocky slopes and shaly cliffs.
1						1					Hibiscus	moscheutos	Rose-mallow	N	5		OBL	Swamps, marshes and ditches, in shallow water.
1	1										Hibiscus	syriacus	Rose-of-sharon	I	*		N	Cultivated and occasionally spreading to empty lots or roadsides.
1						1					Hieracium	caespitosum	King-devil	I	0		N	Woods, fields and roadsides.
1						1					Hieracium	pilosselloides	King-devil/ glaucous king devil	I	0		N	Dry fields, meadows and roadsides.
1						1					Holcus	lanatus	Velvetgrass	I	0		FACU	Meadows, old fields, river shores and roadsides.
1	1										Hydrangea	arborescens	Sevenbark	N	9		FACU	Rich woods, slopes and stream banks.
2			1							1	Hydrophyllum	virginianum	Virginia waterleaf	N	9		FAC	Moist woods, thickets and stream banks.
5		1				1	1	1	1		Hypericum	punctatum	Spotted St. John's-wort	N	1		FAC-	Moist fields, floodplains, thickets and roadsides.
1							1				Hypoxis	hirsuta	Yellow star-grass	N	6		FAC	Dry, open woods and meadows.
4	1	1			1	1					Ilex	verticillata	Winterberry	N	5		FACW+	Swamps, bogs, moist woods and wet shores.
7		1	1			1	1	1	1	1	Impatiens	capensis	Jewelweed; spotted touch-me-not	N	2		FACW	Moist meadows, swamps and stream banks.
1						1					Iris	versicolor	Northern blue flag	N	5		OBL	Wet meadows, bogs and marshes.
1	1										Juglans	cinerea	Butternut	N	10		FACU+	Lowland woods and rich, wooded hillsides.NJ: Floodplains.
6	1	1	1			1		1	1		Juglans	nigra	Black walnut	N	2		FACU	Open woods and meadows in moist, rich, alluvial soils.
2								1	1		Juncus	acuminatus	Sharp-fruited rush	N	4		OBL	Wet meadows, swamps, marshes and stream banks.
1						1					Juncus	effusus	Common rush	N	1			

Appendix L. Plants of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

		BHWP List #															
Present	BBG	611	746	756	981	2111	5511	5516	5521	5526	Genus	Specific epithet	Common Name PA/NJ	NJ list	NJ CC	NJ rank	Wetland Status	Comments
1						1					Juncus	tenuis var. tenuis	Path rush	N	1		FAC-	Moist to dry, often heavily compacted soil of woods, fields, waste ground and paths.
1	1										Juniperus	communis var depressa	Common juniper/ Dwarf Juniper	N	8	S3	N	Dry slopes or pastures.NJ:open woods
4	1		1			1			1		Juniperus	virginiana	Eastern red-cedar	N	2		FACU	Old fields, serpentine barrens and other moist to dry, sterile soils.
1	1										Kalmia	angustifolia	Sheep laurel	N	5		FAC	Moist, acidic woods and bogs.
2	1				1						Kalmia	latifolia	Mountain laurel	N	7		FACU	Dry to moist, acidic woods and slopes.
1						1					Krigia	biflora	Dwarf dandelion/ two-flowered cynthia	N	3		FACW	Fields, meadows, woods and sandy banks.
1								1			Lactuca	biennis	Blue lettuce	N	3		FACU	Woods, stream banks, roadsides and vacant lots in moist, open soil.
1						1					Lactuca	canadensis var. canadensis	Wild lettuce	N	2		FACU-	Meadows, fields, rocky hillsides and roadside banks.
5		1	1			1		1		1	Laportea	canadensis	Wood-nettle	N	6		FAC	Low, moist woods and stream banks.
1	1										Larix	decidua	European larch	I	0		N	Forest plantations.
1	1										Larix	laricina	American larch	N	10			NJ: fens and bogs
3		1						1	1		Leersia	oryzoides	Rice cutgrass	N	3		OBL	Marshes, bogs or wet meadows.
5		1	1			1	1			1	Leersia	virginica	Cutgrass/White grass	N	3		FACW	Swamps or moist woods.
1	1										Lespedeza	thunbergii	Thunberg's bush-clover	I	0		N	Dry fields and open woods.
1	1										Leucothoe	racemosa	Fetter-bush	N	6		FACW	Moist, acidic woods.
1	1										Ligustrum	obtusifolium	Obtuse-leaved privet	I	0		N	Cultivated and frequently naturalized in disturbed woods, thickets, hedgerows and old fields.
2	1									1	Ligustrum	vulgare	Common privet	I	0		FACU	Cultivated and frequently escaped to roadside banks, woods edges and waste ground.
1					1						Lilium	canadense ssp. canadense	Canada lily	N	7		FAC+	Wet meadows, moist woods and thickets.
1				1							Linaria	vulgaris	Butter-and-eggs	I	0		N	Fields, roadsides, shale barrens, railroad tracks and waste ground.
8	1	1	1			1	1	1	1	1	Lindera	benzoin	Spicebush	N	5		FACW-	A common component of moist, rich woods.
1	1										Liquidambar	styraciflua	Sweetgum	N	1		FAC	Low, wet, coastal plain woods.
5	1	1	1			1		1			Liriodendron	tulipifera	Tuliptree	N	5		FACU	A common forest tree of rich woods.
4					1	1		1	1		Lobelia	cardinalis	Cardinal-flower	N	5		FACW+	Wet meadows, swamps, ditches, stream banks and lake shores.
2		1				1					Lobelia	inflata	Indian-tobacco	N	2		FACU	Woods, old fields, meadows and roadsides.
2					1	1					Lobelia	siphilitica	Great blue lobelia	N	4		FACW+	Swamps, moist meadows, stream banks and ditches.
2						1		1			Lolium	perenne	Perennial ryegrass	I	0		FACU-	Cultivated and frequently escaped.
1	1										Lonicera	dioica var. dioica	Mountain honeysuckle	N	*		FACU	Moist cliffs, rocky wooded banks and thickets.
1	1										Lonicera	fragrantissima	Fragrant honeysuckle	I	0		N	Cultivated and occasionally escaped to wooded slopes, thickets and rubbish dumps.
8	1	1	1			1	1	1	1	1	Lonicera	japonica var. japonica	Japanese honeysuckle	I	0		FAC-	Disturbed woods, fields, thickets, banks and roadsides.
1	1										Lonicera	maackii	Amur honeysuckle	I	0		N	Cultivated and frequently naturalized in disturbed woods, thickets, old fields and roadsides.
1	1										Lonicera	morrowii	Morrow's honeysuckle	I	0		N	Cultivated and frequently naturalized in disturbed woods, old fields, roadsides and thickets.
1	1										Lonicera	sempervirens	Trumpet honeysuckle	N	3		FACU	Fencerows, thickets and roadsides.
1	1										Lonicera	tatarica	Tartarian honeysuckle	I	0		FACU	Cultivated and frequently escaped to disturbed or waste ground, woods edges and roadsides.
1						1					Ludwigia	alternifolia	False loosestrife/Seedbox	N	3		FACW+	Swampy fields and wet woods.
3					1	1		1			Ludwigia	palustris	Marsh-purslane	N	1		OBL	Swamps, moist meadows, muddy shores, stream banks and ditches.
2					1	1					Lycopus	americanus var longii	Water-horehound	N	4	S2S3	OBL	Shaded hillsides, fields, moist thickets, wet ditches and swamps.
1		1									Lycopus	rubellus	Gypsy-wort/ Stalked Water Horehound	N	5	S2	OBL	Bogs, river banks, pond margins and wet ditches.
2					1		1				Lycopus	virginicus	Bugleweed	N	4		OBL	Moist woods, stream banks, swamps and wet ditches.
1	1										Lyonia	ligustrina	Maleberry	N	6		FACW	Moist woods and swamps.
1	1										Lyonia	mariana	Staggerbush	N	4		FAC-	Dry slopes and barrens.
6		1			1		1	1	1	1	Lysimachia	ciliata	Fringed loosestrife	N	2		FACW	Low, moist ground of fields, stream banks and swamp edges.
4		1					1	1	1		Lysimachia	nummularia	Creeping-charlie/ Moneywort	I	0		FACW-	Lawns, meadows, wet woods and floodplains.
1						1					Lysimachia	terrestris	Swamp-candles/ Swamp Loosestrife	N	3		OBL	Swamps and bogs.
2		1						1			Lythrum	salicaria	Purple loosestrife	I	0		FACW+	Swamps, wet meadows and shores.
1	1										Maclura	pomifera	Osage-orange	I	0		UPL	Roadsides, fencerows and abandoned pastures.
2		1	1								Maianthemum	canadensis var canadensis	Canada mayflower	N	4		FAC-	NJ: Moist woods, beech forests, mesic marshes.
5		1	1			1	1	1			Maianthemum	racemosum	False Solomon's Seal	N	5			
1	1										Malus	coronaria var. coronaria	Sweet crabapple	N	4		N	Woods, old fields and thickets.
1	1										Malus	pumila	Apple	I	*		N	Cultivated and often persisting at abandoned farm or garden sites, hedgerows and roadsides.
1										1	Matteuccia	struthiopteris	Ostrich fern	N	6		FACW	Moist, alluvial flats and swamps, in circumneutral soils.
1					1						Melampyrum	lineare	Cow Wheat	N	5			

Appendix L. Plants of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

		BHWP List #														
Present	BBG	611	746	756	981	2111	5511	5516	5521	5526	Genus	Specific epithet	Common Name PA/NJ	NJ list	NJ CC	NJ rank	Wetland Status	Comments
1									1		Melilotus	alba	White sweet-clover	I	0		FACU	Roadsides and old fields in rich soil.
4	1		1			1			1		Menispermum	canadense	Moonseed	N	6		FACU	Moist ground of stream banks and edges.
1								1			Mentha	x piperita	Peppermint	I	0			
7		1	1			1	1	1	1	1	Microstegium	vimineum	Stiltgrass	I	0		FAC	Moist ground of open woods, thickets, paths, clearings, fields and gardens.
4		1			1	1			1		Mimulus	alatus	Winged monkey-flower	N	7	S3	OBL	Swamps, wet meadows and shores.
2					1	1					Mimulus	ringens	Allegheny monkey-flower/ Square-stemmed Monkey-flower	N	5		OBL	Wet, open ground of swamps, meadows and shores.
3		1	1			1					Mitchella	repens	Partridge-berry	N	5		FACU	Woods.
2		1				1					Monotropa	uniflora	Indian-pipe	N	8		FACU-	Dry to moist woods, in humus.
2	1									1	Morus	alba	White mulberry	I	0		UPL	Fencerows, woods edges and waste ground.
1	1										Morus	rubra	Red mulberry	N	10		FACU	Rich, moist, alluvial soils and wooded slopes.
1			1								Muhlenbergia	frondosa	Wirestem muhly/Leafy Dropseed	N	3		FAC	Moist, open woods and stream banks.NJ: Highlands
1						1					Muhlenbergia	schreberi	Dropseed/Nimblewill	N	1		FAC	Woods, thickets and waste ground.
1			1								Muhlenbergia	sobolifera	Creeping muhly/Rock Dropseed	N	7		N	Dry, rocky slopes./ NJ: Rocky woods
2								1	1		Myosotis	laxa	Wild forget-me-not	N	3		OBL	Wet, open ground and swamps.NJ: Rocky streams
2	1				1						Myrica	pensylvanica	Bayberry	N	*		FAC	Old fields or open woods, in dry to moist, sterile, sandy soils.
1	1										Nemopanthus	mucronatus	Mountain holly	N	9		OBL	Swamps, bogs, moist woods and rocky slopes.
1		1									Nuphar	advena	Spatterdock	N	4		OBL	Ponds, lake margins, slow-moving streams, swamps and tidal marshes.
4	1	1			1		1				Nyssa	sylvatica	Sourgum	N	4		FAC	Dry to moist woods, rocky slopes and ridge tops.
1						1					Oenothera	biennis	Evening-primrose	N	1		FACU-	Cultivated fields, waste ground and roadsides.
6		1	1			1		1	1	1	Onoclea	sensibilis	Sensitive fern	N	2		FACW	Marshes, swamps, moist open woods and wet meadows, in subacidic soils.
3		1	1				1				Osmorhiza	claytonii	Sweet-cicely	N	4		FACU-	Rich woods, wooded stream banks and wet meadows.NJ: North.
1			1								Osmorhiza	longistylis	Anise root	N	5		FACU	Rich woods, moist wooded slopes and thickets.NJ: North jersey inner coastal plain
1					1						Osmunda	cinnamomea	Cinnamon fern	N	4		FACW	Swamps, bog margins and stream banks, in wet acidic soils.
1			1								Osmunda	claytoniana	Interrupted fern	N	7		FAC	Moist woodlands, bog edges and hummocks, in subacidic to neutral soilsNJ: Wetland edges..
3	1		1			1					Ostrya	virginiana	Hop-hornbeam	N	7		FACU-	Dry, wooded slopes, often on calcareous soils.
2		1				1					Oxalis	stricta	Common yellow wood-sorrel	N	0		UPL	Lawns, gardens and fields.
1				1							Panicum	dichotomiflorum	Smooth panic grass/Spreading Panic-grass	N	0		FACW-	Dry to moist, open woods and meadows.
1					1						Parietaria	pensylvanica	Pellitory	N	9		N	Dry, rocky or gravelly woods, roadside banks and waste ground.
2			1			1					Paronychia	canadensis	Forked chickweed	N	5		N	Open woods, in dry rocky or sandy soil.
8	1	1	1			1	1	1	1	1	Parthenocissus	quinquefolia	Virginia-creeper	N	1		FACU	Woods, fields and edges.
1	1										Parthenocissus	tricuspidata	Boston ivy	I	0		N	Cultivated and occasionally escaped.
1						1					Paspalum	laeve	Field Beadgrass	N	4			
1	1										Paulownia	tomentosa	Empress-tree	I	0		N	Cultivated, and frequently escaped to roadsides, railroad banks and woods edges.
2			1			1					Penstemon	digitalis	Tall white beard-tongue/ Foxglove Beardtongue	N	3		FAC	Meadows, old fields and roadsides.
1					1						Penthorum	sedoides	Ditch stonecrop	N	3		OBL	Low, wet ground and ditches.
3				1					1	1	Phalaris	arundinacea	Reed canary-grass	I	0		FACW	Marshes, alluvial meadows, shores and ditches.
1			1								Phegopteris	hexagonoptera	Broad beech fern	N	8		FAC	Rich, moist wooded slopes and swamp margins, in humus-rich, moderately acidic soils.
1	1										Philadelphus	coronarius	Mock-orange	I	0		N	Cultivated and occasionally spreading to banks, roadsides or alluvial woods.
1						1					Phleum	pratense	Timothy	I	0		FACU	Fields, meadows and roadsides.
3						1	1		1		Phlox	maculata ssp. maculata	Wild sweet-william/ Spotted Plhox	N	10	S3	FACW	Wet meadows, abandoned fields and open thickets.
1						1					Phlox	paniculata	Summer phlox	N	3		FACU	Thickets, hillsides and stream banks, often in calcareous soils.
1						1					Phryma	leptostachya	Lopseed	N	8			
1						1					Physalis	heterophylla	Clammy ground-cherry	N	1		N	Fields, sandy or cindery open ground and cultivated areas.
1	1										Physocarpus	opulifolius	Ninebark	N	8		FACW-	Moist cliffs, wet woods, sandy or rocky banks and shores.
1			1								Phytolacca	americana	Pokeweed	N	0		FACU+	Forest openings, waste ground and gardens.
1	1										Picea	abies	Norway spruce	I	0		N	Forest plantations.
1	1										Picea	mariana	Black spruce	N	10		FACW-	Sphagnum bogs.
1	1										Picea	rubens	Red spruce	N	10	S1		NJ: Bogs.
4		1	1					1		1	Pilea	pumila	Clearweed	N	3		FACW	Cool, moist, shady areas.
1	1										Pinus	pungens	Table-mountain pine	N	10	S1.1	N	Dry, rocky and gravelly slopes and ridge tops.
1	1										Pinus	resinosa	Norway pine/ red pine	N	10	S1.1	FACU	Native on dry slopes in Luzerne, Wyoming, Tioga and Centre Cos.NJ: Sussex.

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1	1										Pinus	rigida	Pitch pine	N	6		FACU	Moist to dry, sterile soils including serpentine barrens. NJ: Throughout Pine Barrens
1	1										Pinus	strobus	Eastern white pine	N	3		FACU	Moist to dry woodlands and forested slopes.NJ: North jersey.
1	1										Pinus	sylvestris	Scots pine	I	0		N	Forest plantations and other cultivated sites.
1						1					Plantago	lanceolata	English plantain	I	0		UPL	Lawns, roadsides, old fields, clearings and waste ground.
1						1					Plantago	major	Broad-leaved plantain	I	0		FACU	Lawns, gardens, roadsides, railroad embankments and waste ground.
1						1					Platanthera	lacera	Ragged fringed-orchid	N	8		FACW	Open woods, moist meadows, bogs and ditches.
3	1		1			1					Platanus	occidentalis	Sycamore	N	4		FACW-	Stream banks, low woods, floodplains and alluvial soils.
1						1					Poa	compressa	Canada bluegrass	I	0		FACU	Dry woods, fields and rock outcrops.
1						1					Poa	pratensis	Kentucky bluegrass	I	0		FACU	Cultivated and widely naturalized in meadows, roadsides, open woods and waste ground.
1						1					Poa	trivialis	Rough bluegrass	I	0		FACW	Cultivated and frequently established in wet meadows, swamps and alluvial woods.
5		1				1	1	1		1	Podophyllum	peltatum	Mayapple	N	6		N	Moist woods.
1				1							Polygala	verticillata var. verticillata	Whorled milkwort	N	5		UPL	Dry, open woods, old fields and roadsides.
3		1	1				1				Polygonatum	biflorum var. biflorum	Solomon's-seal	N	8		FACU	Deciduous woods, rocky slopes and roadside banks.
3		1			1	1					Polygonatum	pubescens	Solomon's-seal	N	8		N	Wooded slopes, stream banks and fields.
6		1				1	1	1	1	1	Polygonum	arifolium	Halberd-leaf tearthumb	N	6		OBL	Wet woods, boggy thickets, swamps, wet meadows and ditches.
4		1	1			1	1				Polygonum	caespitosum	Cespitose Knotweed	I	0			
3								1	1	1	Polygonum	caespitosum var. longisetum	Low smartweed	I	0		FACU-	Damp ground of wooded hillsides, roadsides, fields and waste places.
1					1						Polygonum	pensylvanicum	Smartweed/ Pennsylvania Smartweed	N	2		FACW	Fields, woodland edges, stream banks, roadsides and waste ground.
1			1								Polygonum	punctatum	Dotted Smartweed	N	*			
7		1	1			1	1	1	1	1	Polygonum	sagittatum	Tearthumb/ Arrow-leaved tearthumb	N	5		OBL	Low moist ground, vernal ponds, bogs, swamps or marshes.
6		1	1			1	1	1	1		Polygonum	virginianum	Jumpseed	N	4		FAC	Moist open woods, floodplains and roadsides.
5		1	1			1	1		1		Polystichum	acrostichoides	Christmas fern	N	7		N	Shaded slopes and well-drained flats, in subacidic to circumneutral soils.
1	1										Populus	alba	White poplar	I	0		N	Cultivated and occasionally escaped to roadsides and old fields.
1	1										Populus	balsamifera	Balsam poplar	I	*		FACW	Swamps, thickets, alluvial gravels and river banks.
1	1										Populus	deltoides	Eastern cottonwood/ Cottonwood	N	2		FACU-	River banks and rich alluvial soils.
2	1				1						Populus	grandidentata	Bigtooth aspen	N	4		FACU-	Early successional woods and floodplains.
1	1										Populus	tremuloides	Quaking aspen	N	2		N	Old fields, open woods or barrens, usually on sandy or gravelly soils.
3		1			1	1					Potentilla	canadensis	Cinquefoil/ Dwarf Cinquefoil	N	2		N	Dry, open woods and fields.
5		1	1			1	1			1	Potentilla	simplex	Old-field cinquefoil/ Common Cinquefoil	N	2		FACU-	Dry woods, fields, meadows and roadsides.
5		1	1			1	1			1	Prenanthes	alba	Rattlesnake-root; white rattlesnake-root	N	6		FACU	Rocky woods, barrens and roadsides.
6		1	1			1	1	1	1		Prunella	vulgaris ssp. vulgaris	Heal-all	I	0		FACU+	Moist fields and fencerows.
1	1										Prunus	alleghaniensis	Alleghany Plum	N	10*	SH		
1	1										Prunus	americana	Wild plum	N	8		FACU-	Wooded slopes, river banks, hedgerows, and roadside thickets.
4	1					1	1	1			Prunus	avium	Sweet cherry	I	0		N	Woods margins and fencerows.
1	1										Prunus	cerasus	Pie cherry/ Sour Cherry	I	0		N	Cultivated, and occasionally naturalized in woods edges, thickets or waste ground.
1	1										Prunus	domestica	Plum	I	0			
1	1										Prunus	pensylvanica	Pin cherry/ Fire Cherry	N	3		FACU-	Dry woods and openings.
1	1										Prunus	persica	Peach	I	0		N	Cultivated and occasionally escaped.
4	1	1	1					1			Prunus	serotina	Wild black cherry	N	1		FACU	Woods and fencerows.
1					1						Prunus	virginiana	Choke cherry	N	2		FACU	Rocky upland woods.
1	1										Ptelea	trifoliata	Hoptree/ Three-leaved Hop Tree	N	7	S1	FAC	Stream banks and roadside thickets.
1				1							Pycnanthemum	tenuifolium	Mountain-mint	N	4		FACW	Moist old fields, sandy river banks or floodplains.
1						1					Pycnanthemum	virginianum	Mountain-mint	N	4		FAC	Boggy fields, swamps and moist woods.
1					1						Pyrola	elliptica	Shinleaf	N	7		UPL	Dry to moist woods, on rich soils.
1	1										Pyrus	communis	Pear	I	0		N	Cultivated and occasionally persisting at abandoned home sites.
1					1						Pyrus	coronaria	Wild Crab	N	*			
6	1	1	1			1	1			1	Quercus	alba	White oak	N	4		FACU	A dominant forest tree on dry to moist sites.
3	1				1	1					Quercus	bicolor	Swamp white oak	N	7		FACW+	Low, moist forests and wooded swamps.
2	1				1						Quercus	coccinea	Scarlet oak	N	6		N	Dry upper slopes and ridges, in poor soil.
1	1										Quercus	ilicifolia	Scrub oak	N	7		N	Dry ridge tops and barrens, in sterile, sandy soil.
1	1										Quercus	macrocarpa	Bur oak	N	10		FAC-	Dry to moist forests, in neutral or calcareous soils. NJ: Prairie fen.

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2	1						1				Quercus	montana	Chestnut oak	N	4		FACW	A dominant forest tree on dry slopes and ridgetops, in acidic soils.
4	1	1	1			1					Quercus	palustris	Pin oak	N	3		FACW	Low, moist or seasonally wet woods or swamps.
1	1										Quercus	prinoides	Dwarf chestnut oak	N	8		N	Dry, rocky ridgetops and slopes and serpentine barrens.
7	1	1	1			1	1		1	1	Quercus	rubra	Northern red oak	N	7		FACU-	A dominant forest tree on moist to dry sites.
1	1										Quercus	stellata	Post oak	N	6		UPL	Dry woods and hillsides, serpentine barrens.
3	1		1			1					Quercus	velutina	Black oak	N	6		N	A dominant forest tree on moist to dry soils.
5		1	1			1		1		1	Ranunculus	abortivus	Kidney-leaf Buttercup	N	1			
2							1			1	Ranunculus	abortivus var. abortivus	Small-flowered crowfoot	N	*		FACW-	Low woods, clearings and damp shores.
1					1						Ranunculus	hispidus	Hairy buttercup	N	*		FAC	Dry rocky to rich moist oak and oak-hickory woods.
1								1			Ranunculus	hispudus var caricetorum	Hairy Buttercup	N	9			
1		1									Ranunculus	hispudus var hispudus		N	4			
2			1					1			Ranunculus	recurvatus	Hooked crowfoot	N	3		FAC+	Damp or swampy woods or stream edges.
1						1					Ranunculus	reptans	Creeping buttercup	I	5*	SH	FAC	Wet, open ground, ditches and swales.
1	1										Rhamnus	cathartica	Buckthorn	I	0		N	Open woods, pastures, fencerows and roadside banks.
1	1										Rhododendron	maximum	Rosebay	N	8		FAC	Moist woods, swamps and ravines.
2	1					1					Rhododendron	periclymenoides	Pinxter-flower	N	5		FAC	Dry to moist, acidic woods.
1	1										Rhododendron	prinophyllum	Mountain azalea	N	8	S3	FAC	Open woods, bogs and swamps.
1	1										Rhododendron	viscosum	Swamp azalea	N	6		FACW+	Swamps, bogs and wet woods.
1	1										Rhodotypos	scandens	Jetbead	I	*		N	Cultivated and occasionally escaped.
1	1										Rhus	aromatica	Fragrant sumac	N	4			NJ: Upland Somerset, Middlesex, Mercer.
1	1										Rhus	copallina var. copallina	Shining sumac	N	2		N	Dry, open woods, thickets and old fields.
2	1				1						Rhus	glabra	Smooth sumac	N	2		N	Shale barrens, old fields and dry, open slopes.
3	1				1	1					Rhus	typhina	Staghorn sumac	N	2		N	Dry, open soil of old fields, roadsides and woods edges.
1	1										Ribes	americanum	Wild black currant	N	8		FACW	Moist woods, swamps and thickets.
1	1										Ribes	hirtellum	Northern wild gooseberry	N	10		FAC	Calcareous marshes, swamps, rocky woods and cliffs.NJ: Bogs.
1	1										Ribes	missouriense	Missouri gooseberry	N	10		N	Rich woods.NJ: Hunterdon.
1	1										Ribes	rotundifolium	Wild gooseberry	N	10		N	Rocky, upland woods and slopes. NJ: Shaded edges, Hunterdon.
1	1										Ribes	rubrum	Garden red currant	I	*		N	Cultivated and often naturalized in moist woods, thickets and banks.
1	1										Ribes	uva-crispa var. sativum	European garden gooseberry	I	0		N	Cultivated and occasionally escaped.
1	1										Robinia	hispida	Bristly locust	I	0		N	Dry, open woods, slopes and roadsides.
2	1							1			Robinia	pseudoacacia	Black locust	N	0		FACU-	Open woods, floodplains, thickets and fencerows.
1	1										Robinia	viscosa	Clammy locust	N	2		N	Dry, open ground, thin woods or slopes.
1	1										Rosa	canina	Dog rose	I	0		N	Cultivated and occasionally escaped to roadsides and old fields.
2	1					1					Rosa	carolina	Pasture rose	N	4		UPL	Fields, rocky banks, shale barrens and other dry, open ground.
1	1										Rosa	eglanteria	Sweetbrier/ Eglantine Rose	I	0		N	Dry fields, shaly hillsides and roadsides.
6	1		1			1	1	1	1		Rosa	multiflora	Multiflora rose	I	0		FACU	Disturbed woods, pastures, old fields, roadsides and thickets.
2	1									1	Rosa	palustris var palustrus	Swamp rose	N	6		OBL	Swamps and marshes.
1	1										Rosa	rugosa	Rugosa rose	I	0		FACU-	Cultivated and occasionally escaped.
1	1										Rosa	setigera	Prairie rose	I	*		FACU	Sandy old fields, open thickets, roadsides and fencerows.
1	1										Rosa	virginiana	Wild rose/ Virginia Rose	N	4		FAC	Pastures, fields, open woods, thickets and roadsides.
3	1				1	1					Rubus	allegheniensis	Common blackberry/ Allegheny Blackberry	N	3		FACU-	Old fields, open woods and clearings.
2	1				1						Rubus	argutus	Sawtooth Blackberry	N	*			
1	1										Rubus	canadensis	Smooth blackberry	N	6	S1	N	Cool, moist woods, rocky slopes and thickets.
1	1										Rubus	cuneifolius	Sand blackberry	N	3		UPL	Dry, open thickets and roadsides, in sandy soil.
1	1										Rubus	enslenii	Southern dewberry	N	7		FACU	Sandy banks.
3	1				1	1					Rubus	flagellaris	Prickly dewberry/ Norther Dewberry	N	2		FACU	Rocky or shaly slopes, cliffs and fields.
1	1										Rubus	hispidus	Swamp dewberry/ Bog Dewberry	N	5		FACW	Bogs, swamps, moist woods, thickets and barrens.
1	1										Rubus	ideaus	Red raspberry	N	*			
1	1										Rubus	laciniatus	Cut-leaved blackberry	I	0		UPL	Spreading from cultivation to roadsides, fields, sandy woods and waste ground.
6	1		1			1		1	1	1	Rubus	occidentalis	Black-cap/ Black Raspberry	N	1		N	Sandy or rocky woods, wooded slopes and thickets.
1	1										Rubus	odoratus	Purple-flowering raspberry	N	6		N	Cliffs, ledges and rocky, wooded slopes.NJ: Moist, shaded.

Appendix L. Plants of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

		BHWP List #														
Present	BBG	611	746	756	981	2111	5511	5516	5521	5526	Genus	Specific epithet	Common Name PA/NJ	NJ list	NJ CC	NJ rank	Wetland Status	Comments
1	1										Rubus	pensilvanicus	Blackberry/ Pennsylvania Blackberry	N	2		N	Thickets, rocky banks, woods, fields and waste ground.
7	1	1	1			1	1	1		1	Rubus	phoenicolasius	Wineberry	I	0		N	Roadsides, banks and thickets.
1						1					Rudbeckia	hirta var. hirta	Black-eyed-susan	N	*		FACU-	Fields, meadows and roadsides.
1						1					Rumex	acetosella	Sheep sorrel	I	0		UPL	Fields, lawns, waste places and shale barrens, in acidic soils.
1						1					Rumex	crispus	Curly dock	I	0		FACU	Cultivated fields, roadsides and waste ground.
1	1										Salix	alba var. alba	White willow	I	0		FACW	Naturalized in low ground and along stream banks and roadsides.
1	1										Salix	babylonica	Weeping willow	I	0		FACW-	Cultivated and occasionally naturalized.
1	1										Salix	discolor	Pussy willow	N	2		FACW	Swamps and moist or wet woods.
1	1										Salix	eriocephala	Diamond willow	N	4		FACW+	Shores and bottomlands.
1	1										Salix	exigua	Sandbar willow	N	8		OBL	Sandy or gravelly alluvial bars and shores.
1	1										Salix	fragilis	Crack willow	I	0		FAC+	Cultivated and occasionally escaped to roadsides and woods edges.
1	1										Salix	lucida	Shining willow	N	*			
2	1				1						Salix	nigra	Black willow	N	3		FACW+	Swamps, wet meadows and rich alluvial soils.
1	1										Salix	sericea	Silky willow	N	6		OBL	Swamps, bogs, stream banks and low woods.
1	1										Sambucus	racemosa var. pubens	Red-berried elder	N	8		FACU	Ravines, moist cliffs and rocky woods.
6	1	1			1	1		1	1		Sambucus	canadensis	American elder	N	2		FACW	Woods, fields, stream banks and moist roadsides.
6		1	1			1	1		1	1	Sanguinaria	canadensis	Bloodroot	N	8		UPL	Rich woods and roadside banks.
4							1	1	1	1	Sanicula	gregaria	Clustered black snakeroot	N	4			NJ: Streams.
1					1						Sanicula	marilandica	Black snake root	N	4		UPL	Moist woods, wooded limestone slopes, bogs and barrens.
6	1	1	1			1	1		1		Sassafras	albidum	Sassafras	N	2		FACU-	Old fields, hedgerows and woods edges.
1			1								Saxifraga	virginiensis	Early saxifrage	N	6		FAC-	Moist or dry rock crevices and gravelly slopes.
2				1		1					Scirpus	atrovirens	Black bulrush; dark green bulrush	N	3		OBL	Moist meadows, marshes, bogs, pond and lake margins and stream banks.
1						1					Scirpus	cyperinus	Wool-grass	N	2		FACW+	Marshes, moist meadows, swamps, shores and ditches.
1						1					Scutellaria	integrifolia	Hyssop skullcup	N	4		FACW	Swamps, bogs and moist woods or fields.
1		1									Scutellaria	lateriflora	Mad-dog skullcap	N	4		FACW+	Wet woods, bogs, lake margins, river banks, floodplains and swampy pastures.
7		1	1			1	1	1	1	1	Sedum	ternatum	Wild stonecrop	N	9		N	Rocky banks, cliffs and woods.NJ: Piedmont, Wickecheoke floodplain.
1					1						Senecio	aureus	Golden ragwort	N	4		FACW	Moist fields, woods, floodplains and roadsides.
1				1							Setaria	glauca	Yellow Foxtail	I	0			
1						1					Sisyrinchium	angustifolium	Blue-eyed-grass	N	5		FACW-	Damp soil of meadows, floodplains, fields and open woods.
1	1										Smilax	glauca	Catbrier/ Glaucus Greenbrier	N	3		FACU	Dry to moist, sandy soil of fields, woods, thickets, swamps and roadsides.
3		1			1		1				Smilax	herbacea	Carrion-flower	N	5		FAC	Damp thickets, moist woods and floodplains.
1	1										Smilax	hispida	Bristly greenbrier	N	5	S3	N	Swamps, moist woods, thickets and roadsides.NJ: Hunterdon.
1					1						Smilax	pseudochina	Halberd-leaved Greenbrier/ Bamboo vine	N	5	S3		NJ: Damp woods.
5	1	1			1	1				1	Smilax	rotundifolia	Catbrier/ Common Greenbrier	N	2		FAC	Moist to dry woods, thickets, roadsides, old fields and serpentine barrens.
1	1										Solanum	dulcamara	Bittersweet Nightshade	I	0			
4			1			1	1			1	Solidago	caesia var. caesia	Bluestem goldenrod	N	6		FACU	Rich woods.
3		1	1			1					Solidago	canadensis var. canadensis	Canada goldenrod	N	2		FACU	Fields and roadsides.
1						1					Solidago	flexicaulis	Zigzag goldenrod	N	7		FACU	Moist woods and rocky, wooded slopes.NJ: North.
2						1		1			Solidago	gigantea var. gigantea	Smooth goldenrod	N	3		FACW	Moist fields, swamps, marshy shores and swales.
1						1					Solidago	juncea	Early goldenrod	N	2		N	Fields, meadows, rocky slopes and roadsides.
1						1					Solidago	patula	Spreading goldenrod	N	9		OBL	Swamps, floodplains and moist woods.NJ: marl seep.
3		1				1	1				Solidago	rugosa var. rugosa	Wrinkle-leaf goldenrod	N	2		FAC	Fields, woods, floodplains, thickets, roadsides and waste ground.
1	1										Sorbaria	sorbifolia	False spiraea	I	*		N	Cultivated and occasionally escaped to roadsides, stream banks or moist thickets.
1	1										Sorbus	americana	American Mountain Ash	N	10	S2S3		NJ: Ridges.
2				1		1					Sorghastrum	nutans	Indian-grass	N	7		UPL	Moist or dry fields, roadsides and serpentine barrens.
1	1										Spiraea	alba var alba	Meadow-sweet/ Narrow-leaved Meadowsweet	N	10	S1	FACW+	Bogs and moist, peaty meadows.NJ: Calcareous seeps, upper Delaware River.
1	1										Spiraea	tomentosa	Hardhack/ Steeplebush	N	5		FACW-	Wet meadows, moist old fields, bogs and swamps.
2	1		1								Staphylea	trifolia	Bladdernut	N	8		FAC	Moist, rocky woods and stream banks.
1						1					Stellaria	graminea	Lesser stitchwort	N	3		FACU-	Swampy woods, moist meadows, stream banks or moist shores.
3		1					1		1		Stellaria	longifolia	Long-leaved stitchwort	N	7		FACW	Marshy open ground, swamps, rich woods and moist roadsides.
1			1								Stellaria	media	Common chickweed	I	0		N	A common weed of fields and gardens.

Appendix L. Plants of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

		BHWP List #														
Present	BBG	611	746	756	981	2111	5511	5516	5521	5526	Genus	Specific epithet	Common Name PA/NJ	NJ list	NJ CC	NJ rank	Wetland Status	Comments
1	1										Symphoricarpos	albus var. albus	Snowberry	N	0		FACU-	Rocky, wooded, limestone slopes and barrens, also escaped from cultivation.
1	1										Symphoricarpos	orbiculatus	Coralberry	N	1		UPL	Open woods, thickets, old fields, and dry banks, also escaped from cultivation.
1		1									Symphyotrichum	novi-belgii var. novi-belgii	New York aster	N	5		FACW+	Swamps and moist meadows.
1			1								Symphyotrichum	cordifolium ssp. cordifolium	Blue wood aster; heart-leaved aster	N	7		N	Woods, meadows and roadsides.
1						1					Symphyotrichum	lateriflorum	Calico aster	N	3		FACW-	Old fields, rocky woods, roadsides and waste ground.
2				1		1					Symphyotrichum	racemosum	Small white aster	N	3		FAC	Low meadows, floodplains and swamps.
2		1								1	Symplocarpus	foetidus	Skunk cabbage	N	5		OBL	Moist woods, swamps and bogs.
1	1										Syringa	vulgaris	Common lilac	I	0		N	Cultivated and occasionally persisting on roadsides or old home sites.
1						1					Taraxacum	officinale	Common dandelion	I	0		FACU-	Fields, roadsides, lawns, gardens and waste ground.
4		1			1	1			1		Teucrium	canadense	American germander	N	10			
6		1	1			1	1	1	1		Thalictrum	pubescens	Tall meadow-rue	N	5		FACW+	Wet meadows, low open woods and swamps.
2						1	1				Thalictrum	thalictroides	Rue anemone	N	7		FACU-	Rich woods.
1					1						Thaspium	trifoliatum var. trifoliatum	Purple meadow-parsnip	N	7	S3	N	Woods, wooded slopes and edges.NJ: Mercer, Hunterdon, Somerset.
3		1	1			1					Thelypteris	noveboracensis	New York fern	N	3		FAC	Moist woods, thickets and swamps, in humus-rich, moderately acidic soils.
8	1	1	1			1	1	1	1	1	Tilia	americana var. americana	Basswood	N	7		FACU	Rich woods.
1					1						Tipularia	discolor	Cranefly orchid	N	8	S3	FACU	Deciduous woods and stream banks.
7	1	1				1	1	1	1	1	Toxicodendron	radicans	Poison-ivy	N	1		FAC	Open woods, roadside thickets, fencerows and edges.
1	1										Toxicodendron	vernix	Poison sumac	N	7		OBL	Swamps, fens and marshes.
1				1							Tridens	flavus	Purpletop	N	1		FACU	Meadows, old fields and roadsides.
1						1					Trifolium	aureum	Large yellow hop-clover	I	0		N	Roadsides, dry fields and waste places.
1						1					Trifolium	dubium	Little hop-clover	I	0		UPL	Dry roadsides, old sand pits and lawns.
1						1					Trifolium	hybridum	Alsike clover	I	0		FACU-	Roadsides, clearings and fields.
2						1			1		Trifolium	pratense	Red clover	I	0		FACU-	Widely grown as a forage plant, also extensively naturalized on roadsides, pastures and fields.
2				1		1					Trifolium	repens	White clover	I	0		FACU-	Roadsides, meadows, old fields and lawns.
2	1		1								Tsuga	canadensis	Canada hemlock/ eastern hemlock	N	8		FACU	Cool, moist woods and shaded slopes.
7	1	1	1			1	1		1	1	Ulmus	americana	American elm	N	6		FACW-	Stream banks and floodplains, in rich, alluvial soil.
1	1										Ulmus	rubra	Red elm/ Slippery Elm	N	8		FAC-	Moist woods, stream banks and floodplains in circumneutral soils.
3		1				1	1				Uvularia	sessilifolia	Bellwort	N	6		FACU-	Moist, rich woods.
1	1										Vaccinium	angustifolium	Low sweet blueberry	N	8		FACU-	Dry, open woods and barrens.
1	1										Vaccinium	corymbosum	Highbush blueberry	N	5		FACW-	Moist woods, bogs and swamps.NJ: Weedy edges.
1	1										Vaccinium	macrocarpon	Cranberry	N	4		OBL	Sphagnum bogs.
2	1				1						Vaccinium	pallidum	Lowbush blueberry	N	7		N	Dry, acidic woods.
1	1										Vaccinium	stamineum	Deerberry	N	7		FACU-	Dry, open, acidic woods and slopes.
1				1							Verbascum	thapsus	Common mullein	I	0		N	Fields, roadsides, shale barrens, railroad embankments and waste ground.
1						1					Verbena	hastata	Blue vervain	N	3		FACW+	Moist thickets, floodplains, wet ditches and roadsides.
1		1									Verbena	urticifolia var. urticifolia	White vervain	N	*		FACU	Moist fields, meadows and waste ground.
1						1					Vernonia	noveboracensis	New York ironweed	N	4		FACW+	Stream banks and wet fields, pastures or meadows.
3		1	1							1	Veronica	officinalis	Common speedwell	I	0		FACU-	Woods, roadsides and shale barrens.
4	1	1	1				1				Viburnum	acerifolium	Maple-leaved viburnum	N	8		N	Woods and thickets.
7	1	1	1			1	1	1	1		Viburnum	dentatum	Southern arrow-wood	N	5		FAC	Swamps and wet woods.
1	1										Viburnum	lentago	Nannyberry	N	7		FAC	Woods, swamps and roadsides.
6	1	1	1			1	1	1			Viburnum	prunifolium	Black-haw	N	5		FACU	Woods, old fields, thickets and roadsides.
2						1				1	Vinca	minor	Common periwinkle	I	0		N	Cultivated and occasionally naturalized in woods, fields and on roadside banks.
1						1					Viola	blanda var blanda	Sweet white violet	N	6		FACW	Moist, shady woods and cool ravines.
3		1			1	1					Viola	cucullata	Blue marsh violet/ Marsh Violet	N	10		FACW+	Swamps, bogs and wet meadows.
1					1						Viola	hirsutula	Southern wood violet	N	10	S2	N	Rich, dry, open woods.NJ: Upland woods
1		1									Viola	labradorica	American dog violet/ Alpine Violet	N	8		FACW	Swamps, meadows amd alluvial woods.
1		1									Viola	palmata	Early blue violet/ Wood Violet	N	9		N	Rich, dry, open woods and edges.NJ: North Jersey.
4		1	1			1	1				Viola	pubescens var pubescens	Downy yellow violet	N	7			NJ: Rich woods, a little drier woods.
1					1						Viola	rostrata	Long-spurred violet	N	10		FACU	Rich woods.NJ: Hemlock ravines.
1		1									Viola	rotundifolia	Round-leaved violet/ Round-leaved Yellow Violet	N	10		FAC+	Cool, moist, shady woods and banks.NJ: Hemlock ravines, Voorhees State Park.

Appendix L. Plants of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

		BHWP List #														
Present	BBG	611	746	756	981	2111	5511	5516	5521	5526	Genus	Specific epithet	Common Name PA/NJ	NJ list	NJ CC	NJ rank	Wetland Status	Comments
7		1	1			1	1	1	1	1	Viola	sororia var. sororia	Common blue violet/ Confederate Violet	N	2		FAC-	Meadows and woods.
1	1										Vitis	aestivalis	Summer grape	N	7		FACU	Upland woods and wooded slopes.
4	1	1			1	1					Vitis	labrusca	Fox grape	N	7		FACU	Rocky woods, moist thickets and stream banks.
3	1					1			1		Vitis	riparia	Frost grape/ Riverbank Grape	N	4		FACW	River banks and alluvial thickets.
2			1			1					Vitis	vulpina	Frost grape	N	4		FAC	Woods, thickets, rocky slopes, roadsides and sand dunes.
1	1										Wisteria	sinensis	Chinese wisteria	I	0		N	Disturbed woodlands, abandoned nurseries and gardens.
1						1					Wolffia	punctata	Dotted Wolffia	N	4			NJ: Stagnant waters.
1					1						Woodsia	obtusa	Blunt-lobed woodsia	N	5		N	Shaded rock crevices, talus slopes, sandy banks or masonry, in acidic to neutral soil.
1	1										Yucca	filamentosa	Adam's Needle	N	5			NJ: Dry sandy , old homesites.
1	1										Zanthoxylum	americanum	Prickly-ash	N	4		FACU	Stream banks, river bluffs and roadside thickets, usually on calcareous soils or diabase.
2					1		1				Zizia	aurea	Golden-alexander	N	5		FAC	Wooded bottomland, stream banks, moist meadows and floodplains.

BOWMAN'S HILL WILDFLOWER PRESERVE

PO BOX 685
NEW HOPE, PA 18938
(215) 862-2924 • FAX (215) 862-1846
vannais@bhwp.org • www.bhwp.org

Bowman's Hill Wildflower Preserve's Plant Stewardship Index

Site Information

BHWP List #: 5516

State: New Jersey

Zip code: 12345

Restoration: No

Plot Information

Plot Code	Plot Description

Site Summary

This list contains 86 plants, of which 79% are native to New Jersey

Plant Stewardship Index	Total Mean C	Native Mean C	Floristic Quality Index
27.42	3.33	4.21	34.68

Bowman's Hill Wildflower Preserve is extremely grateful to the following persons for contributing their time and expertise so generously in assigning the Coefficients of Conservatism, producing the checklist of species in the database, and other expert assistance. Pennsylvania: Janet Ebert, Jack Holt and Anne Rhoads New Jersey: Karl Anderson, Emile De Vito, Ted Gordon, Tom Halliwell, Linda Kelly, Mary Leck, Bill Olson, Bill Rawlyk and Kathleen Strakosch Walz And of course for the invaluable guidance and experienced advice of Dr. Gerould Wilhelm and Leslie Jones Sauer.

Key to Index Header

PA CC	Pennsylvania Piedmont Coefficient of Conservatism
NJ CC	New Jersey Coefficient of Conservatism
N	Native
I	Introduced
na	Not on state list
*	Under consideration, or may not be enough specimen data

Wetland Indicator Definitions (Rhoads and Block)

OBL	Obligate Wetland Species	99%
FACW	Facultative Wetland Species	67-99%
FAC	Facultative Species	34-66%
FACU	Facultative Upload Species	1-33%
UPL	Obligate Upland Species	1%

Rank

	NJ Rank		**PA Rank**
SX	Extirpated	PE	Endangered
S1	Critically imperiled	PT	Threatened
S2	Imperiled	PR	Rare
S3	Vulnerable	PX	Extirpated
SH	Historic	PV	Vulnerable
.1	Elements documented from a single location	TU	Tentatively Undertermined

Assignment of Coefficients

0 to 3	Plants with a high range of ecological tolerances/found in a variety of plant communities
4 to 6	Plants with an intermediate range of ecological tolerances/associated with a specific plant community
7 to 8	Plants with a poor range of ecological tolerances/associated with advanced successional state
9 to 10	Plants with a high degree of fidelity to a narrow range of habitats

Methodology

1) Compile a plant list of the species within the assessment area.

2) Assign the Coefficient of Conservatism (CC) to each plant documented on the plant list.

3) Calculate the Native Mean Coefficient value by totaling the CCs and divide the sum by the number of native plant species within the assessed area.

4) **OR** Calculate the Total Mean Coefficient value by totaling the CCs and divide by the sum of the total number of plants (native and introduced) within the assessed area.

5) Multiply the Native Mean Coefficient OR the Total Mean Coefficient by the square root of the total of the number of native plant species

FQI = Native Mean C x Sqrt N

PSI = Total Mean C x Sqrt N

FQI =	Floristic Quality Index
PSI =	Plant Stewardship Index
N =	Number of native species
I =	Number of introduced species
Native Mean C =	Sum of Coefficients / N
Total Mean C =	Sum of Coefficients / N + I

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Acer	saccharum var. saccharum	Sugar maple	N	5		FACU	Natural	Moist woods, wooded slopes, ravines and alluvial areas.
Alisma	subcordatum	Plantain, water	N	3		OBL	Natural	Marshes, stream and pond margins and muddy shores.NJ: tidal flats, ditches.
Alliaria	petiolata	Mustard, garlic	I	0		FACU-	Natural	Disturbed woods, floodplains and waste ground.
Amphicarpaea	bracteata	Hog peanut	N	4		FAC	Natural	Moist woods and alluvium.
Arisaema	dracontium	Green-dragon	N	7		FACW	Natural	Low woods, floodplains and swamps.
Arisaema	triphyllum ssp. triphyllum	Jack-in-the-pulpit	N	5		FACW-	Natural	Moist woods, swamps and bogs.
Artemisia	vulgaris	Common mugwort	I	0		N	Natural	Gardens, lawns, roadsides, thickets, waste ground and rubbish dumps.
Bidens	frondosa	Beggar-ticks	N	2		FACW	Natural	Moist, open ground, stream banks and roadsides.
Blephilia	ciliata	Wood-mint	N	0		N	Natural	Wooded slopes, swamps and calcareous hillsides.
Carex	lurida	Sedge	N	4		OBL	Natural	Swamps, bogs and wet meadows.
Carex	radiata	Sedge	N	7		N	Natural	Dry to moist woods southern NJ
Carex	stipata var. stipata	Sedge/ awl-fruited sedge	N	3		N	Natural	Wet meadows and swampy woods.
Carex	squarrosa	Sedge, Squarrose	N	5		FACW	Natural	Swamps and wet woods.
Carex	striatula	Sedge/ striate sedge	N	7		N	Natural	Rich, open woods NJ: Piedmont
Carex	vulpinoidea var. vulpinoidea	Sedge/ fox sedge	N	4		OBL	Natural	Moist meadows, fields and roadside ditches.
Carpinus	caroliniana	Hornbeam; Ironwood	N	7		FAC	Natural	Rich, moist woods and stream edges.NJ: Floodplains.
Carya	cordiformis	Hickory, bitternut	N	8		FACU+	Natural	Moist woods and stream banks.
Carya	ovata	Hickory, shagbark	N	7		FACU	Natural	Low, moist woods and slopes, in rich soil.
Cephalanthus	occidentalis	Buttonbush	N	6		OBL	Natural	Low wet ground, swamps, bogs and lake edges.
Cinna	arundinacea	Reedgrass, wood	N	4		FACW	Natural	Swamps and wet woods.
Circaea	lutetiana ssp. canadensis	Enchanter's-nightshade	N	6		FACU	Natural	Rocky, upland woods, damp woods and floodplains.
Commelina	communis var. communis	Asiatic dayflower	I	0		FAC-	Natural	Gardens, woods, roadsides, stream banks and disturbed ground.
Cryptotaenia	canadensis	Honewort	N	5		FAC	Natural	Moist woods, wooded stream banks and seeps.
Dactylis	glomerata	Orchard Grass	I	0		FACU	Natural	Fields, meadows and roadsides.
Dichanthelium	clandestinum	Panic grass, hidden	N	3			Natural	
Dioscorea	villosa	Wild yam	N	7		FAC+	Natural	Woods, thickets and rocky slopes.
Doellingeria	umbellata var. umbellata	Flat-topped white aster	N	4		FACW	Natural	Swampy woods and moist fields.
Dryopteris	carthusiana	Fern, toothed wood	N	5		FAC+	Natural	Moist to wet woods and swamps.
Elymus	hystrix	Grass, bottlebrush	N	5		N	Natural	Moist, alluvial woods.NJ: floodplains.
Erigeron	philadelphicus	Fleabane, Philadelphia	N	2		FACU	Natural	Woods, edges, fields, roadsides and lawns.
Eupatorium	rugosum	Snakeroot, white	N	3		N	Natural	Woods, meadows and roadsides.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Euonymus	alatus	Burning-bush; Winged euonymus	I	0		N	Natural	Cultivated and occasionally naturalized in disturbed woods, stream banks, fencerows and edges.
Eurybia	divaricata	White wood aster	N	4		N	Natural	Woods.
Festuca	elatior	Fescue	I	0		FACU-	Natural	Roadsides, fields and open ground.
Festuca	subverticillata	Nodding fescue	N	8			Natural	NJ woodlands
Galium	asprellum	Rough bedstraw	N	8		OBL	Natural	Swamps, bogs, stream banks and wet thickets.
Geum	canadense var. canadense	White avens	N	5		FACU	Natural	Woods, stream banks and roadsides.
Hemerocallis	fulva	Day-lily, orange	I	0		UPL	Natural	Fields, roadsides, stream banks, floodplains and woods edges.
Hypericum	punctatum	St. John's-wort, spotted	N	1		FAC-	Natural	Moist fields, floodplains, thickets and roadsides.
Impatiens	capensis	Jewelweed; Touch-me-not	N	2		FACW	Natural	Moist meadows, swamps and stream banks.
Juglans	nigra	Walnut, black	N	2		FACU	Natural	Open woods and meadows in moist, rich, alluvial soils.
Juncus	acuminatus	Sharp-fruited rush	N	4		OBL	Natural	Wet meadows, swamps, marshes and stream banks.
Lactuca	biennis	Blue lettuce	N	3		FACU	Natural	Woods, stream banks, roadsides and vacant lots in moist, open soil.
Laportea	canadensis	Nettle, wood	N	6		FAC	Natural	Low, moist woods and stream banks.
Leersia	oryzoides	Grass, rice Cut	N	3		OBL	Natural	Marshes, bogs or wet meadows.
Lindera	benzoin	Spicebush	N	5		FACW-	Natural	A common component of moist, rich woods.
Liriodendron	tulipifera	Tuliptree; Yellow poplar	N	5		FACU	Natural	A common forest tree of rich woods.
Lobelia	cardinalis	Cardinal-flower	N	5		FACW+	Natural	Wet meadows, swamps, ditches, stream banks and lake shores.
Lolium	perenne	Rye Grass, perrenial	I	0		FACU-	Natural	Cultivated and frequently escaped.
Lonicera	japonica var. japonica	Japanese honeysuckle	I	0		FAC-	Natural	Disturbed woods, fields, thickets, banks and roadsides.
Ludwigia	palustris	Marsh-purslane	N	1		OBL	Natural	Swamps, moist meadows, muddy shores, stream banks and ditches.
Lysimachia	ciliata	Loosestrife, fringed	N	2		FACW	Natural	Low, moist ground of fields, stream banks and swamp edges.
Lysimachia	nummularia	Moneywort	I	0		FACW-	Natural	Lawns, meadows, wet woods and floodplains.
Lythrum	salicaria	Loosestrife, purple	I	0		FACW+	Natural	Swamps, wet meadows and shores.
Maianthemum	racemosum	False Solomon's Seal	N	5			Natural	
Mentha	x piperita	Peppermint	I	0			Natural	
Microstegium	vimineum	Stiltgrass, japanese	I	0		FAC	Natural	Moist ground of open woods, thickets, paths, clearings, fields and gardens.
Myosotis	laxa	Forget-me-not, wild	N	3		OBL	Natural	Wet, open ground and swamps.NJ: Rocky streams
Onoclea	sensibilis	Fern, sensitive	N	2		FACW	Natural	Marshes, swamps, moist open woods and wet meadows, in subacidic soils.
Parthenocissus	quinquefolia	Virginia-creeper	N	1		FACU	Natural	Woods, fields and edges.
Pilea	pumila	Clearweed	N	3		FACW	Natural	Cool, moist, shady areas.
Podophyllum	peltatum	May-apple	N	6		N	Natural	Moist woods.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Polygonum	arifolium	Tearthumb, halberd-leaved	N	6		OBL	Natural	Wet woods, boggy thickets, swamps, wet meadows and ditches.
Polygonum	caespitosum var. longisetum	Low smartweed	I	0		FACU-	Natural	Damp ground of wooded hillsides, roadsides, fields and waste places.
Polygonum	sagittatum	Tearthumb, arrow-leaved	N	5		OBL	Natural	Low moist ground, vernal ponds, bogs, swamps or marshes.
Polygonum	virginianum	Jumpseed	N	4		FAC	Natural	Moist open woods, floodplains and roadsides.
Prunus	avium	Cherry, sweet	I	0		N	Natural	Woods margins and fencerows.
Prunus	serotina	Cherry, wild black	N	1		FACU	Natural	Woods and fencerows.
Ranunculus	recurvatus	Hooked crowfoot	N	3		FAC+	Natural	Damp or swampy woods or stream edges.
Ranunculus	hispudus var caricetorum	Hairy Buttercup	N	9			Natural	
Robinia	pseudoacacia	Black locust	N	0		FACU-	Natural	Open woods, floodplains, thickets and fencerows.
Rosa	multiflora	Rose, multiflora	I	0		FACU	Natural	Disturbed woods, pastures, old fields, roadsides and thickets.
Rubus	occidentalis	Raspberry, black	N	1		N	Natural	Sandy or rocky woods, wooded slopes and thickets.
Rubus	phoenicolasius	Wineberry	I	0		N	Natural	Roadsides, banks and thickets.
Sambucus	canadensis	Elder, american	N	2		FACW	Natural	Woods, fields, stream banks and moist roadsides.
Sanicula	gregaria	Clustered black snakeroot	S	4			Natural	NJ: Streams.
Sedum	ternatum	Stonecrop, wild	N	9		N	Natural	Rocky banks, cliffs and woods.NJ: Piedmont, Wickecheoke floodplain.
Solidago	gigantea var. gigantea	Smooth goldenrod	N	3		FACW	Natural	Moist fields, swamps, marshy shores and swales.
Thalictrum	pubescens	Meadow-rue, tall	N	5		FACW+	Natural	Wet meadows, low open woods and swamps.
Tilia	americana var. americana	Basswood	N	7		FACU	Natural	Rich woods.
Toxicodendron	radicans	Ivy, poison	N	1		FAC	Natural	Open woods, roadside thickets, fencerows and edges.
Viburnum	dentatum	Arrowwood, southern	N	5		FAC	Natural	Swamps and wet woods.
Viburnum	prunifolium	Viburnum, blackhaw	N	5		FACU	Natural	Woods, old fields, thickets and roadsides.
Viola	sororia var. sororia	Violet, common blue	N	2		FAC-	Natural	Meadows and woods.
Boehmeria	cylindrica	False Nettle	N	5			Natural	
Prunella	vulgaris ssp. vulgaris	Heal-all	I	0		FACU+	Natural	Moist fields and fencerows.
Ranunculus	abortivus	Kidney-leaf Buttercup	N	1			Natural	

BOWMAN'S HILL WILDFLOWER PRESERVE

PO BOX 685
NEW HOPE, PA 18938
(215) 862-2924 • FAX (215) 862-1846
vannais@bhwp.org • www.bhwp.org

Bowman's Hill Wildflower Preserve's Plant Stewardship Index

Site Information

BHWP List #: 5521

State: New Jersey

Zip code: 12345

Restoration: No

Plot Information

Plot Code	Plot Description

Site Summary

This list contains 84 plants, of which 77% are native to New Jersey

Plant Stewardship Index	Total Mean C	Native Mean C	Floristic Quality Index
28.60	3.55	4.58	36.96

Bowman's Hill Wildflower Preserve is extremely grateful to the following persons for contributing their time and expertise so generously in assigning the Coefficients of Conservatism, producing the checklist of species in the database, and other expert assistance. Pennsylvania: Janet Ebert, Jack Holt and Anne Rhoads New Jersey: Karl Anderson, Emile De Vito, Ted Gordon, Tom Halliwell, Linda Kelly, Mary Leck, Bill Olson, Bill Rawlyk and Kathleen Strakosch Walz And of course for the invaluable guidance and experienced advice of Dr. Gerould Wilhelm and Leslie Jones Sauer.

Key to Index Header

PA CC	Pennsylvania Piedmont Coefficient of Conservatism
NJ CC	New Jersey Coefficient of Conservatism
N	Native
I	Introduced
na	Not on state list
*	Under consideration, or may not be enough specimen data

Wetland Indicator Definitions (Rhoads and Block)

OBL	Obligate Wetland Species	99%
FACW	Facultative Wetland Species	67-99%
FAC	Facultative Species	34-66%
FACU	Facultative Upload Species	1-33%
UPL	Obligate Upland Species	1%

Rank

	NJ Rank		**PA Rank**
SX	Extirpated	PE	Endangered
S1	Critically imperiled	PT	Threatened
S2	Imperiled	PR	Rare
S3	Vulnerable	PX	Extirpated
SH	Historic	PV	Vulnerable
.1	Elements documented from a single location	TU	Tentatively Undertermined

Assignment of Coefficients

0 to 3	Plants with a high range of ecological tolerances/found in a variety of plant communities
4 to 6	Plants with an intermediate range of ecological tolerances/associated with a specific plant community
7 to 8	Plants with a poor range of ecological tolerances/associated with advanced successional state
9 to 10	Plants with a high degree of fidelity to a narrow range of habitats

Methodology

1) Compile a plant list of the species within the assessment area.

2) Assign the Coefficient of Conservatism (CC) to each plant documented on the plant list.

3) Calculate the Native Mean Coefficient value by totaling the CCs and divide the sum by the number of native plant species within the assessed area.

4) **OR** Calculate the Total Mean Coefficient value by totaling the CCs and divide by the sum of the total number of plants (native and introduced) within the assessed area.

5) Multiply the Native Mean Coefficient OR the Total Mean Coefficient by the square root of the total of the number of native plant species

FQI = Native Mean C x Sqrt N

PSI = Total Mean C x Sqrt N

FQI =	Floristic Quality Index
PSI =	Plant Stewardship Index
N =	Number of native species
I =	Number of introduced species
Native Mean C =	Sum of Coefficients / N
Total Mean C =	Sum of Coefficients / N + I

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Acer	saccharum var. saccharum	Sugar maple	N	5		FACU	Natural	Moist woods, wooded slopes, ravines and alluvial areas.
Alisma	subcordatum	Plantain, water	N	3		OBL	Natural	Marshes, stream and pond margins and muddy shores.NJ: tidal flats, ditches.
Alliaria	petiolata	Mustard, garlic	I	0		FACU-	Natural	Disturbed woods, floodplains and waste ground.
Amphicarpaea	bracteata	Hog peanut	N	4		FAC	Natural	Moist woods and alluvium.
Arisaema	triphyllum ssp. triphyllum	Jack-in-the-pulpit	N	5		FACW-	Natural	Moist woods, swamps and bogs.
Artemisia	vulgaris	Common mugwort	I	0		N	Natural	Gardens, lawns, roadsides, thickets, waste ground and rubbish dumps.
Blephilia	ciliata	Wood-mint	N	0		N	Natural	Wooded slopes, swamps and calcareous hillsides.
Carex	lurida	Sedge	N	4		OBL	Natural	Swamps, bogs and wet meadows.
Carex	radiata	Sedge	N	7		N	Natural	Dry to moist woods southern NJ
Carex	stipata var. stipata	Sedge/ awl-fruited sedge	N	3		N	Natural	Wet meadows and swampy woods.
Carex	squarrosa	Sedge, Squarrose	N	5		FACW	Natural	Swamps and wet woods.
Carex	striatula	Sedge/ striate sedge	N	7		N	Natural	Rich, open woods NJ: Piedmont
Carex	vulpinoidea var. vulpinoidea	Sedge/ fox sedge	N	4		OBL	Natural	Moist meadows, fields and roadside ditches.
Carya	cordiformis	Hickory, bitternut	N	8		FACU+	Natural	Moist woods and stream banks.
Carya	ovata	Hickory, shagbark	N	7		FACU	Natural	Low, moist woods and slopes, in rich soil.
Cephalanthus	occidentalis	Buttonbush	N	6		OBL	Natural	Low wet ground, swamps, bogs and lake edges.
Circaea	lutetiana ssp. canadensis	Enchanter's-nightshade	N	6		FACU	Natural	Rocky, upland woods, damp woods and floodplains.
Commelina	communis var. communis	Asiatic dayflower	I	0		FAC-	Natural	Gardens, woods, roadsides, stream banks and disturbed ground.
Cryptotaenia	canadensis	Honewort	N	5		FAC	Natural	Moist woods, wooded stream banks and seeps.
Dactylis	glomerata	Orchard Grass	I	0		FACU	Natural	Fields, meadows and roadsides.
Dichanthelium	clandestinum	Panic grass, hidden	N	3			Natural	
Dioscorea	villosa	Wild yam	N	7		FAC+	Natural	Woods, thickets and rocky slopes.
Elymus	hystrix	Grass, bottlebrush	N	5		N	Natural	Moist, alluvial woods.NJ: floodplains.
Erigeron	philadelphicus	Fleabane, Philadelphia	N	2		FACU	Natural	Woods, edges, fields, roadsides and lawns.
Eupatorium	rugosum	Snakeroot, white	N	3		N	Natural	Woods, meadows and roadsides.
Festuca	elatior	Fescue	I	0		FACU-	Natural	Roadsides, fields and open ground.
Geum	canadense var. canadense	White avens	N	5		FACU	Natural	Woods, stream banks and roadsides.
Hypericum	punctatum	St. John's-wort, spotted	N	1		FAC-	Natural	Moist fields, floodplains, thickets and roadsides.
Impatiens	capensis	Jewelweed; Touch-me-not	N	2		FACW	Natural	Moist meadows, swamps and stream banks.
Juglans	nigra	Walnut, black	N	2		FACU	Natural	Open woods and meadows in moist, rich, alluvial soils.
Juncus	acuminatus	Sharp-fruited rush	N	4		OBL	Natural	Wet meadows, swamps, marshes and stream banks.
Leersia	oryzoides	Grass, rice Cut	N	3		OBL	Natural	Marshes, bogs or wet meadows.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Lindera	benzoin	Spicebush	N	5		FACW-	Natural	A common component of moist, rich woods.
Lobelia	cardinalis	Cardinal-flower	N	5		FACW+	Natural	Wet meadows, swamps, ditches, stream banks and lake shores.
Lonicera	japonica var. japonica	Japanese honeysuckle	I	0		FAC-	Natural	Disturbed woods, fields, thickets, banks and roadsides.
Lysimachia	nummularia	Moneywort	I	0		FACW-	Natural	Lawns, meadows, wet woods and floodplains.
Microstegium	vimineum	Stiltgrass, japanese	I	0		FAC	Natural	Moist ground of open woods, thickets, paths, clearings, fields and gardens.
Myosotis	laxa	Forget-me-not, wild	N	3		OBL	Natural	Wet, open ground and swamps.NJ: Rocky streams
Polygonum	caespitosum var. longisetum	Low smartweed	I	0		FACU-	Natural	Damp ground of wooded hillsides, roadsides, fields and waste places.
Rosa	multiflora	Rose, multiflora	I	0		FACU	Natural	Disturbed woods, pastures, old fields, roadsides and thickets.
Rubus	occidentalis	Raspberry, black	N	1		N	Natural	Sandy or rocky woods, wooded slopes and thickets.
Rubus	phoenicolasius	Wineberry	I	0		N	Natural	Roadsides, banks and thickets.
Sambucus	canadensis	Elder, american	N	2		FACW	Natural	Woods, fields, stream banks and moist roadsides.
Sanicula	gregaria	Clustered black snakeroot	S	4			Natural	NJ: Streams.
Sedum	ternatum	Stonecrop, wild	N	9		N	Natural	Rocky banks, cliffs and woods.NJ: Piedmont, Wickecheoke floodplain.
Thalictrum	pubescens	Meadow-rue, tall	N	5		FACW+	Natural	Wet meadows, low open woods and swamps.
Tilia	americana var. americana	Basswood	N	7		FACU	Natural	Rich woods.
Toxicodendron	radicans	Ivy, poison	N	1		FAC	Natural	Open woods, roadside thickets, fencerows and edges.
Viburnum	dentatum	Arrowwood, southern	N	5		FAC	Natural	Swamps and wet woods.
Viola	sororia var. sororia	Violet, common blue	N	2		FAC-	Natural	Meadows and woods.
Acer	rubrum var. rubrum	Red maple	N	3		FAC	Natural	Dry to moist woods, swamps and bogs. NJ: throughout.
Anthoxanthum	odoratum	Sweet vernal grass	I	0		FACU	Natural	Open fields, meadows and roadsides.
Apios	americana	Ground-nut	N	5		FACW	Natural	Low, rich, moist ground and thickets.NJ: Floodplains.
Betula	nigra	Birch, river	N	7		FACW	Natural	Floodplains, stream banks, wet woods and swamps.
Carex	lupulina	Sedge, hop	N	6		OBL	Natural	Swamps, bogs and wet woods.
Carex	scoparia	Sedge, broom	N	3		FACW	Natural	Moist to dry, open ground.
Cornus	amomum ssp. amomum	Kinnikinik; silky dogwood	N	5		FACW	Natural	Moist woods, meadows, old fields and swamps.
Daucus	carota	Queen-Anne's-lace	I	0		N	Natural	Roadsides, old fields, gardens and waste ground.
Elaeagnus	umbellata	Olive, autumn	I	0		N	Natural	Planted by the Game Commission and extensively naturalized in old fields and abandoned pastures.
Eupatorium	fistulosum	Joe-pye-weed	N	5		FACW	Natural	Floodplains, meadows, moist thickets and roadsides.
Glyceria	striata	Fowl mannagrass	N	3		OBL	Natural	Wet woods, swamps and bogs.
Helianthus	strumosus	Sunflower, pale-leaved	N	4		N	Natural	Fields, woods, stream banks and roadsides.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Lysimachia	ciliata	Loosestrife, fringed	N	2		FACW	Natural	Low, moist ground of fields, stream banks and swamp edges.
Melilotus	alba	White sweet-clover	I	0		FACU	Natural	Roadsides and old fields in rich soil.
Menispermum	canadense	Moonseed	N	6		FACU	Natural	Moist ground of stream banks and edges.
Mimulus	alatus	Monkey-flower, winged	N	7	S3	OBL	Natural	Swamps, wet meadows and shores.
Onoclea	sensibilis	Fern, sensitive	N	2		FACW	Natural	Marshes, swamps, moist open woods and wet meadows, in subacidic soils.
Parthenocissus	quinquefolia	Virginia-creeper	N	1		FACU	Natural	Woods, fields and edges.
Phalaris	arundinacea	Reed canary grass	I	0		FACW	Natural	Marshes, alluvial meadows, shores and ditches.
Polygonum	arifolium	Tearthumb, halberd-leaved	N	6		OBL	Natural	Wet woods, boggy thickets, swamps, wet meadows and ditches.
Polygonum	sagittatum	Tearthumb, arrow-leaved	N	5		OBL	Natural	Low moist ground, vernal ponds, bogs, swamps or marshes.
Polygonum	virginianum	Jumpseed	N	4		FAC	Natural	Moist open woods, floodplains and roadsides.
Polystichum	acrostichoides	Fern, Christmas	N	7		N	Natural	Shaded slopes and well-drained flats, in subacidic to circumneutral soils.
Quercus	rubra	Oak, northern red	N	7		FACU-	Natural	A dominant forest tree on moist to dry sites.
Sanguinaria	canadensis	Bloodroot	N	8		UPL	Natural	Rich woods and roadside banks.
Sassafras	albidum	Sassafras	N	2		FACU-	Natural	Old fields, hedgerows and woods edges.
Stellaria	longifolia	Stitchwort, long-leaved	N	7		FACW	Natural	Marshy open ground, swamps, rich woods and moist roadsides.
Trifolium	pratense	Clover, red	I	0		FACU-	Natural	Widely grown as a forage plant, also extensively naturalized on roadsides, pastures and fields.
Ulmus	americana	Elm, american	N	6		FACW-	Natural	Stream banks and floodplains, in rich, alluvial soil.
Vitis	riparia	Grape, frost	N	4		FACW	Natural	River banks and alluvial thickets.
Allium	vineale	Garlic, field	I	0		FACU-	Natural	Disturbed woods, fields and lawns.
Juniperus	virginiana	Eastern red-cedar	N	2		FACU	Natural	Old fields, serpentine barrens and other moist to dry, sterile soils.
Teucrium	canadense	Germander, american	N	10			Natural	
Phlox	maculata ssp. maculata	Wild sweet-william/ Spotted Plhox	N	10	S3	FACW	Natural	Wet meadows, abandoned fields and open thickets.
Prunella	vulgaris ssp. vulgaris	Heal-all	I	0		FACU+	Natural	Moist fields and fencerows.

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PO BOX 685
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vannais@bhwp.org • www.bhwp.org

Bowman's Hill Wildflower Preserve's Plant Stewardship Index

Site Information

BHWP List #: 5531

State: New Jersey

Zip code: 12345

Restoration: No

Additional Information

Site Name: Wichecheoke Corridor, Area 3 2010

Surveyors: BHWP: Karl Anderson, Tama Matsuoka, Gil Smith

Survey Date: 06/14/2010

Time Spent: 0

Address (1):

Address (2):

GPS Coordinations: 0 N 0 W

Description

One of four areas surveyed in the vacinity of Locktown stone Church, area 3 is a very rocky decidious woods along Wichecheoke Creek on Upper Creek Road, ca. 0.4 mile south of Kingwood-Locktown, Road.

Plot Information

Plot Code	Plot Description

Site Summary

This list contains 92 plants, of which 86% are native to New Jersey

Plant Stewardship Index	Total Mean C	Native Mean C	Floristic Quality Index
40.09	4.51	5.25	46.69

Bowman's Hill Wildflower Preserve is extremely grateful to the following persons for contributing their time and expertise so generously in assigning the Coefficients of Conservatism, producing the checklist of species in the database, and other expert assistance. Pennsylvania: Janet Ebert, Jack Holt and Anne Rhoads New Jersey: Karl Anderson, Emile De Vito, Ted Gordon, Tom Halliwell, Linda Kelly, Mary Leck, Bill Olson, Bill Rawlyk and Kathleen Strakosch Walz And of course for the invaluable guidance and experienced advice of Dr. Gerould Wilhelm and Leslie Jones Sauer.

Key to Index Header

PA CC	Pennsylvania Piedmont Coefficient of Conservatism
NJ CC	New Jersey Coefficient of Conservatism
N	Native
I	Introduced
na	Not on state list
*	Under consideration, or may not be enough specimen data

Wetland Indicator Definitions (Rhoads and Block)

OBL	Obligate Wetland Species	99%
FACW	Facultative Wetland Species	67-99%
FAC	Facultative Species	34-66%
FACU	Facultative Upload Species	1-33%
UPL	Obligate Upland Species	1%

Rank

	NJ Rank		**PA Rank**
SX	Extirpated	PE	Endangered
S1	Critically imperiled	PT	Threatened
S2	Imperiled	PR	Rare
S3	Vulnerable	PX	Extirpated
SH	Historic	PV	Vulnerable
.1	Elements documented from a single location	TU	Tentatively Undertermined

Assignment of Coefficients

0 to 3	Plants with a high range of ecological tolerances/found in a variety of plant communities
4 to 6	Plants with an intermediate range of ecological tolerances/associated with a specific plant community
7 to 8	Plants with a poor range of ecological tolerances/associated with advanced successional state
9 to 10	Plants with a high degree of fidelity to a narrow range of habitats

Methodology

1) Compile a plant list of the species within the assessment area.

2) Assign the Coefficient of Conservatism (CC) to each plant documented on the plant list.

3) Calculate the Native Mean Coefficient value by totaling the CCs and divide the sum by the number of native plant species within the assessed area.

4) **OR** Calculate the Total Mean Coefficient value by totaling the CCs and divide by the sum of the total number of plants (native and introduced) within the assessed area.

5) Multiply the Native Mean Coefficient OR the Total Mean Coefficient by the square root of the total of the number of native plant species

FQI = Native Mean C x Sqrt N

PSI = Total Mean C x Sqrt N

FQI =	Floristic Quality Index
PSI =	Plant Stewardship Index
N =	Number of native species
I =	Number of introduced species
Native Mean C =	Sum of Coefficients / N
Total Mean C =	Sum of Coefficients / N + I

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Acer	rubrum var. rubrum	Red maple	N	3		FAC	Natural	Dry to moist woods, swamps and bogs. NJ: throughout.
Acer	saccharum var. saccharum	Sugar maple	N	5		FACU	Natural	Moist woods, wooded slopes, ravines and alluvial areas.
Alliaria	petiolata	Mustard, garlic	I	0		FACU-	Natural	Disturbed woods, floodplains and waste ground.
Allium	canadense	Garlic, meadow	N	5		FACU	Natural	Low woods, stream banks and thickets.
Allium	vineale	Garlic, field	I	0		FACU-	Natural	Disturbed woods, fields and lawns.
Alnus	serrulata	Alder, smooth	N	4		OBL	Natural	Low, wet woods and swamps.
Amphicarpaea	bracteata	Hog peanut	N	4		FAC	Natural	Moist woods and alluvium.
Arisaema	triphyllum ssp. triphyllum	Jack-in-the-pulpit	N	5		FACW-	Natural	Moist woods, swamps and bogs.
Asplenium	platyneuron	Ebony spleenwort	N	3		FACU	Natural	Dry to moist, wooded slopes and rock ledges, in subacidic soils.
Berberis	thunbergii	Barberry, Japanese	I	0		N	Natural	Disturbed woods, roadsides and hedgerows.
Betula	nigra	Birch, river	N	7		FACW	Natural	Floodplains, stream banks, wet woods and swamps.
Carex	blanda	Sedge; woodland sedge	N	6		FAC	Natural	Dry to moist woods, thickets and meadows.
Carex	hirtifolia	Sedge; pubescent sedge	N	10		N	Natural	Dry woods.
Carex	radiata	Sedge	N	7		N	Natural	Dry to moist woods southern NJ
Carex	squarrosa	Sedge, Squarrose	N	5		FACW	Natural	Swamps and wet woods.
Carex	striatula	Sedge/ striate sedge	N	7		N	Natural	Rich, open woods NJ: Piedmont
Carpinus	caroliniana	Hornbeam; Ironwood	N	7		FAC	Natural	Rich, moist woods and stream edges.NJ: Floodplains.
Carya	cordiformis	Hickory, bitternut	N	8		FACU+	Natural	Moist woods and stream banks.
Carya	ovata	Hickory, shagbark	N	7		FACU	Natural	Low, moist woods and slopes, in rich soil.
Cimicifuga	racemosa	Cohosh, black; Black snakeroot	N	9		N	Natural	Rich woods.
Circaea	lutetiana ssp. canadensis	Enchanter's-nightshade	N	6		FACU	Natural	Rocky, upland woods, damp woods and floodplains.
Collinsonia	canadensis	Horse-balm; Stoneroot	N	9		FAC+	Natural	Rich woods and wooded floodplains.
Crataegus	crus-galli	Cockspur hawthorn	N	2		FACU	Natural	Woods, meadows, roadsides and thickets.
Cryptotaenia	canadensis	Honewort	N	5		FAC	Natural	Moist woods, wooded stream banks and seeps.
Dactylis	glomerata	Orchard Grass	I	0		FACU	Natural	Fields, meadows and roadsides.
Dichanthelium	clandestinum	Panic grass, hidden	N	3			Natural	
Dichanthelium	dichotomum var dicotomum	Cypress Panic-grass	N	8			Natural	NJ: Moist, sandy soils
Dryopteris	carthusiana	Fern, toothed wood	N	5		FAC+	Natural	Moist to wet woods and swamps.
Dryopteris	marginalis	Fern, marginal wood	N	9		FACU-	Natural	Rocky ledges, talus slopes and shaded edges, in subacidic to circumneutral soils.
Elaeagnus	umbellata	Olive, autumn	I	0		N	Natural	Planted by the Game Commission and extensively naturalized in old fields and abandoned pastures.
Elymus	hystrix	Grass, bottlebrush	N	5		N	Natural	Moist, alluvial woods.NJ: floodplains.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Eupatorium	rugosum	Snakeroot, white	N	3		N	Natural	Woods, meadows and roadsides.
Eurybia	divaricata	White wood aster	N	4		N	Natural	Woods.
Festuca	elatior	Fescue	I	0		FACU-	Natural	Roadsides, fields and open ground.
Festuca	subverticillata	Nodding fescue	N	8			Natural	NJ woodlands
Fraxinus	americana var. americana	White ash	N	7		FACU	Natural	Woods, fencerows and old fields.
Galium	circaezans var. circaezans	Wild licorice	N	8		UPL	Natural	Rich woods and wooded, calcareous slopes.
Galium	asprellum	Rough bedstraw	N	8		OBL	Natural	Swamps, bogs, stream banks and wet thickets.
Geranium	maculatum	Geranium, wood	N	4		FACU	Natural	Rich woods, roadsides and fields.
Geum	canadense var. canadense	White avens	N	5		FACU	Natural	Woods, stream banks and roadsides.
Glyceria	striata	Fowl mannagrass	N	3		OBL	Natural	Wet woods, swamps and bogs.
Hepatica	nobilis var. obtusa	Hepatica, round-lobed	N	9		N	Natural	Rich woods.
Hypericum	punctatum	St. John's-wort, spotted	N	1		FAC-	Natural	Moist fields, floodplains, thickets and roadsides.
Hypoxis	hirsuta	Star-grass, yellow	N	6		FAC	Natural	Dry, open woods and meadows.
Impatiens	capensis	Jewelweed; Touch-me-not	N	2		FACW	Natural	Moist meadows, swamps and stream banks.
Leersia	virginica	Cutgrass/White grass	N	3		FACW	Natural	Swamps or moist woods.
Lindera	benzoin	Spicebush	N	5		FACW-	Natural	A common component of moist, rich woods.
Lonicera	japonica var. japonica	Japanese honeysuckle	I	0		FAC-	Natural	Disturbed woods, fields, thickets, banks and roadsides.
Lycopus	virginicus	Bugleweed	N	4		OBL	Natural	Moist woods, stream banks, swamps and wet ditches.
Lysimachia	ciliata	Loosestrife, fringed	N	2		FACW	Natural	Low, moist ground of fields, stream banks and swamp edges.
Lysimachia	nummularia	Moneywort	I	0		FACW-	Natural	Lawns, meadows, wet woods and floodplains.
Maianthemum	racemosum	False Solomon's Seal	N	5			Natural	
Microstegium	vimineum	Stiltgrass, japanese	I	0		FAC	Natural	Moist ground of open woods, thickets, paths, clearings, fields and gardens.
Nyssa	sylvatica	Black gum; Tupelo	N	4		FAC	Natural	Dry to moist woods, rocky slopes and ridge tops.
Osmorhiza	claytonii	Sweet-cicely	N	4		FACU-	Natural	Rich woods, wooded stream banks and wet meadows.NJ: North.
Parthenocissus	quinquefolia	Virginia-creeper	N	1		FACU	Natural	Woods, fields and edges.
Phlox	maculata ssp. maculata	Wild sweet-william/ Spotted Plhox	N	10	S3	FACW	Natural	Wet meadows, abandoned fields and open thickets.
Podophyllum	peltatum	May-apple	N	6		N	Natural	Moist woods.
Polygonatum	biflorum var. biflorum	Solomon's-seal	N	8		FACU	Natural	Deciduous woods, rocky slopes and roadside banks.
Polygonum	arifolium	Tearthumb, halberd-leaved	N	6		OBL	Natural	Wet woods, boggy thickets, swamps, wet meadows and ditches.
Polygonum	caespitosum	Cespitose Knotweed	I	0			Natural	
Polygonum	sagittatum	Tearthumb, arrow-leaved	N	5		OBL	Natural	Low moist ground, vernal ponds, bogs, swamps or marshes.
Polygonum	virginianum	Jumpseed	N	4		FAC	Natural	Moist open woods, floodplains and roadsides.
Polystichum	acrostichoides	Fern, Christmas	N	7		N	Natural	Shaded slopes and well-drained flats, in subacidic to circumneutral soils.
Potentilla	simplex	Cinquefoil, common	N	2		FACU-	Natural	Dry woods, fields, meadows and roadsides.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Prenanthes	alba	Rattlesnake-root; white rattlesnake-root	N	6		FACU	Natural	Rocky woods, barrens and roadsides.
Prunella	vulgaris	Selfheal; Heal-all	N	0			Natural	
Prunus	avium	Cherry, sweet	I	0		N	Natural	Woods margins and fencerows.
Quercus	alba	Oak, white	N	4		FACU	Natural	A dominant forest tree on dry to moist sites.
Quercus	montana	Oak, chestnut	N	4		FACW	Natural	A dominant forest tree on dry slopes and ridgetops, in acidic soils.
Quercus	rubra	Oak, northern red	N	7		FACU-	Natural	A dominant forest tree on moist to dry sites.
Ranunculus	abortivus var. abortivus	Small-flowered crowfoot	N	0		FACW-	Natural	Low woods, clearings and damp shores.
Rosa	multiflora	Rose, multiflora	I	0		FACU	Natural	Disturbed woods, pastures, old fields, roadsides and thickets.
Rubus	phoenicolasius	Wineberry	I	0		N	Natural	Roadsides, banks and thickets.
Sanguinaria	canadensis	Bloodroot	N	8		UPL	Natural	Rich woods and roadside banks.
Sanicula	gregaria	Clustered black snakeroot	S	4			Natural	NJ: Streams.
Sassafras	albidum	Sassafras	N	2		FACU-	Natural	Old fields, hedgerows and woods edges.
Sedum	ternatum	Stonecrop, wild	N	9		N	Natural	Rocky banks, cliffs and woods.NJ: Piedmont, Wickecheoke floodplain.
Smilax	herbacea	Carrion-flower	N	5		FAC	Natural	Damp thickets, moist woods and floodplains.
Solidago	caesia var. caesia	Goldenrod, blue-stem; wreath	N	6		FACU	Natural	Rich woods.
Solidago	rugosa var. rugosa	Wrinkle-leaf goldenrod	N	2		FAC	Natural	Fields, woods, floodplains, thickets, roadsides and waste ground.
Stellaria	longifolia	Stitchwort, long-leaved	N	7		FACW	Natural	Marshy open ground, swamps, rich woods and moist roadsides.
Thalictrum	pubescens	Meadow-rue, tall	N	5		FACW+	Natural	Wet meadows, low open woods and swamps.
Thalictrum	thalictroides	Anemone, rue	S	7		FACU-	Natural	Rich woods.
Tilia	americana var. americana	Basswood	N	7		FACU	Natural	Rich woods.
Toxicodendron	radicans	Ivy, poison	N	1		FAC	Natural	Open woods, roadside thickets, fencerows and edges.
Ulmus	americana	Elm, american	N	6		FACW-	Natural	Stream banks and floodplains, in rich, alluvial soil.
Uvularia	sessilifolia	Bellwort; Wild-oats	N	6		FACU-	Natural	Moist, rich woods.
Viburnum	acerifolium	Viburnum, maple-leaved	N	8		N	Natural	Woods and thickets.
Viburnum	dentatum	Arrowwood, southern	N	5		FAC	Natural	Swamps and wet woods.
Viburnum	prunifolium	Viburnum, blackhaw	N	5		FACU	Natural	Woods, old fields, thickets and roadsides.
Viola	sororia var. sororia	Violet, common blue	N	2		FAC-	Natural	Meadows and woods.
Viola	pubescens var pubescens	Downy yellow violet	N	7			Natural	NJ: Rich woods, a little drier woods.
Zizia	aurea	Golden-alexander	N	5		FAC	Natural	Wooded bottomland, stream banks, moist meadows and floodplains.

BOWMAN'S HILL WILDFLOWER PRESERVE

PO BOX 685
NEW HOPE, PA 18938
(215) 862-2924 • FAX (215) 862-1846
vannais@bhwp.org • www.bhwp.org

Bowman's Hill Wildflower Preserve's Plant Stewardship Index

Site Information

BHWP List #: 5526

State: New Jersey

Zip code: 12345

Restoration: No

Additional Information

Site Name: Wichecheoke Corridor, Area 4 2010

Surveyors: BHWO: Karl Anderson, Tama Matsuoka Gill Smith

Survey Date: 06/14/2010

Time Spent: 0

Address (1): Old Stone Church

Address (2): LOcktown NJ

GPS Coordinations: 0 N 0 W

Description

One of four areas surveyed in the vicinity of Locktown Stone Church, this area comprises the deciduous woods along Wichecheoke Creek on Upper Creek Road, 1.1 mile south of Kingwood-Locktown Rd.

Plot Information

Plot Code	Plot Description

Site Summary

This list contains 74 plants, of which 80% are native to New Jersey

Plant Stewardship Index	Total Mean C	Native Mean C	Floristic Quality Index
29.89	3.89	4.88	37.49

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Assignment of Coefficients

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FQI = Native Mean C x Sqrt N

PSI = Total Mean C x Sqrt N

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I =	Number of introduced species
Native Mean C =	Sum of Coefficients / N
Total Mean C =	Sum of Coefficients / N + I

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Acer	saccharum var. saccharum	Sugar maple	N	5		FACU	Natural	Moist woods, wooded slopes, ravines and alluvial areas.
Alliaria	petiolata	Mustard, garlic	I	0		FACU-	Natural	Disturbed woods, floodplains and waste ground.
Amphicarpaea	bracteata	Hog peanut	N	4		FAC	Natural	Moist woods and alluvium.
Arisaema	triphyllum ssp. triphyllum	Jack-in-the-pulpit	N	5		FACW-	Natural	Moist woods, swamps and bogs.
Artemisia	vulgaris	Common mugwort	I	0		N	Natural	Gardens, lawns, roadsides, thickets, waste ground and rubbish dumps.
Berberis	thunbergii	Barberry, Japanese	I	0		N	Natural	Disturbed woods, roadsides and hedgerows.
Blephilia	ciliata	Wood-mint	N	0		N	Natural	Wooded slopes, swamps and calcareous hillsides.
Bromus	pubescens	Brome, Canada	N	8		N	Natural	Dry to moist woods and thickets.
Carex	complanata	Flattened sedge	N	7			Natural	NJ: Coastal plain.
Boehmeria	cylindrica	False Nettle	N	5			Natural	
Carex	crinita var. crinita	Sedge, short-hair	N	5		OBL	Natural	Moist to wet woods, thickets, marshes, ditches and stream banks.
Carex	hirtifolia	Sedge; pubescent sedge	N	10		N	Natural	Dry woods.
Carex	radiata	Sedge	N	7		N	Natural	Dry to moist woods southern NJ
Carex	squarrosa	Sedge, Squarrose	N	5		FACW	Natural	Swamps and wet woods.
Carpinus	caroliniana	Hornbeam; Ironwood	N	7		FAC	Natural	Rich, moist woods and stream edges.NJ: Floodplains.
Carya	ovalis	Sweet Pignut Hickory	N	7			Natural	
Chelone	glabra	Turtlehead	N	7		OBL	Natural	Stream banks, wet woods and swamps.
Circaea	lutetiana ssp. canadensis	Enchanter's-nightshade	N	6		FACU	Natural	Rocky, upland woods, damp woods and floodplains.
Coronilla	varia	Crown-vetch	I	0		N	Natural	Planted extensively along highways.
Dactylis	glomerata	Orchard Grass	I	0		FACU	Natural	Fields, meadows and roadsides.
Dichanthelium	clandestinum	Panic grass, hidden	N	3			Natural	
Elaeagnus	umbellata	Olive, autumn	I	0		N	Natural	Planted by the Game Commission and extensively naturalized in old fields and abandoned pastures.
Elymus	riparius	Riverbank wild-rye	N	5		FACW	Natural	Alluvial flats, meadows and stream banks.NJ: floodplains.
Eupatorium	rugosum	Snakeroot, white	N	3		N	Natural	Woods, meadows and roadsides.
Eurybia	divaricata	White wood aster	N	4		N	Natural	Woods.
Fagus	grandifolia	Beech, american	N	8		FACU	Natural	A dominant tree of mature forests on moist, rich soils.
Festuca	subverticillata	Nodding fescue	N	8			Natural	NJ woodlands
Fraxinus	americana var. americana	White ash	N	7		FACU	Natural	Woods, fencerows and old fields.
Galium	asprellum	Rough bedstraw	N	8		OBL	Natural	Swamps, bogs, stream banks and wet thickets.
Galium	circaezans var. circaezans	Wild licorice	N	8		UPL	Natural	Rich woods and wooded, calcareous slopes.
Geranium	maculatum	Geranium, wood	N	4		FACU	Natural	Rich woods, roadsides and fields.
Geum	canadense var. canadense	White avens	N	5		FACU	Natural	Woods, stream banks and roadsides.
Glyceria	striata	Fowl mannagrass	N	3		OBL	Natural	Wet woods, swamps and bogs.
Hackelia	virginiana	Beggar's-lice; virginia stickseed	N	2		FACU	Natural	Dry to moist woods, wooded slopes and roadsides.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Hydrophyllum	virginianum	Waterleaf, Virginia	N	9		FAC	Natural	Moist woods, thickets and stream banks.
Impatiens	capensis	Jewelweed; Touch-me-not	N	2		FACW	Natural	Moist meadows, swamps and stream banks.
Laportea	canadensis	Nettle, wood	N	6		FAC	Natural	Low, moist woods and stream banks.
Leersia	virginica	Cutgrass/White grass	N	3		FACW	Natural	Swamps or moist woods.
Ligustrum	vulgare	Privet, common	I	0		FACU	Natural	Cultivated and frequently escaped to roadside banks, woods edges and waste ground.
Lindera	benzoin	Spicebush	N	5		FACW-	Natural	A common component of moist, rich woods.
Lonicera	japonica var. japonica	Japanese honeysuckle	I	0		FAC-	Natural	Disturbed woods, fields, thickets, banks and roadsides.
Lysimachia	ciliata	Loosestrife, fringed	N	2		FACW	Natural	Low, moist ground of fields, stream banks and swamp edges.
Matteuccia	struthiopteris	Fern, ostrich	N	6		FACW	Natural	Moist, alluvial flats and swamps, in circumneutral soils.
Microstegium	vimineum	Stiltgrass, japanese	I	0		FAC	Natural	Moist ground of open woods, thickets, paths, clearings, fields and gardens.
Morus	alba	Mulberry, white	I	0		UPL	Natural	Fencerows, woods edges and waste ground.
Onoclea	sensibilis	Fern, sensitive	N	2		FACW	Natural	Marshes, swamps, moist open woods and wet meadows, in subacidic soils.
Parthenocissus	quinquefolia	Virginia-creeper	N	1		FACU	Natural	Woods, fields and edges.
Phalaris	arundinacea	Reed canary grass	I	0		FACW	Natural	Marshes, alluvial meadows, shores and ditches.
Pilea	pumila	Clearweed	N	3		FACW	Natural	Cool, moist, shady areas.
Podophyllum	peltatum	May-apple	N	6		N	Natural	Moist woods.
Polygonum	arifolium	Tearthumb, halberd-leaved	N	6		OBL	Natural	Wet woods, boggy thickets, swamps, wet meadows and ditches.
Polygonum	sagittatum	Tearthumb, arrow-leaved	N	5		OBL	Natural	Low moist ground, vernal ponds, bogs, swamps or marshes.
Polygonum	caespitosum	Cespitose Knotweed	I	0			Natural	
Potentilla	simplex	Cinquefoil, common	N	2		FACU-	Natural	Dry woods, fields, meadows and roadsides.
Prenanthes	alba	Rattlesnake-root; white rattlesnake-root	N	6		FACU	Natural	Rocky woods, barrens and roadsides.
Quercus	alba	Oak, white	N	4		FACU	Natural	A dominant forest tree on dry to moist sites.
Quercus	rubra	Oak, northern red	N	7		FACU-	Natural	A dominant forest tree on moist to dry sites.
Ranunculus	abortivus var. abortivus	Small-flowered crowfoot	N	0		FACW-	Natural	Low woods, clearings and damp shores.
Ranunculus	abortivus	Kidney-leaf Buttercup	N	1			Natural	
Rosa	palustris var palustrus	Swamp rose	N	6		OBL	Natural	Swamps and marshes.
Rubus	occidentalis	Raspberry, black	N	1		N	Natural	Sandy or rocky woods, wooded slopes and thickets.
Rubus	phoenicolasius	Wineberry	I	0		N	Natural	Roadsides, banks and thickets.
Sanguinaria	canadensis	Bloodroot	N	8		UPL	Natural	Rich woods and roadside banks.
Sanicula	gregaria	Clustered black snakeroot	S	4			Natural	NJ: Streams.
Sedum	ternatum	Stonecrop, wild	N	9		N	Natural	Rocky banks, cliffs and woods.NJ: Piedmont, Wickecheoke floodplain.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Smilax	rotundifolia	Catbrier/ Common Greenbrier	N	2		FAC	Natural	Moist to dry woods, thickets, roadsides, old fields and serpentine barrens.
Solidago	caesia var. caesia	Goldenrod, blue-stem; wreath	N	6		FACU	Natural	Rich woods.
Symplocarpus	foetidus	Skunk-cabbage	N	5		OBL	Natural	Moist woods, swamps and bogs.
Tilia	americana var. americana	Basswood	N	7		FACU	Natural	Rich woods.
Toxicodendron	radicans	Ivy, poison	N	1		FAC	Natural	Open woods, roadside thickets, fencerows and edges.
Ulmus	americana	Elm, american	N	6		FACW-	Natural	Stream banks and floodplains, in rich, alluvial soil.
Veronica	officinalis	Common speedwell	I	0		FACU-	Natural	Woods, roadsides and shale barrens.
Vinca	minor	Periwinkle, common	I	0		N	Natural	Cultivated and occasionally naturalized in woods, fields and on roadside banks.
Viola	sororia var. sororia	Violet, common blue	N	2		FAC-	Natural	Meadows and woods.
Carex	stipata var. stipata	Sedge/ awl-fruited sedge	N	3		N	Natural	Wet meadows and swampy woods.

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vannais@bhwp.org • www.bhwp.org

Bowman's Hill Wildflower Preserve's Plant Stewardship Index

Site Information

BHWP List #: 631

State: New Jersey

Zip code: 08559

Restoration: No

Plot Information

Plot Code	Plot Description

Site Summary

This list contains 148 plants, of which 89% are native to New Jersey

Plant Stewardship Index	Total Mean C	Native Mean C	Floristic Quality Index
49.88	4.36	4.92	56.35

Bowman's Hill Wildflower Preserve is extremely grateful to the following persons for contributing their time and expertise so generously in assigning the Coefficients of Conservatism, producing the checklist of species in the database, and other expert assistance. Pennsylvania: Janet Ebert, Jack Holt and Anne Rhoads New Jersey: Karl Anderson, Emile De Vito, Ted Gordon, Tom Halliwell, Linda Kelly, Mary Leck, Bill Olson, Bill Rawlyk and Kathleen Strakosch Walz And of course for the invaluable guidance and experienced advice of Dr. Gerould Wilhelm and Leslie Jones Sauer.

Key to Index Header

PA CC	Pennsylvania Piedmont Coefficient of Conservatism
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N	Native
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na	Not on state list
*	Under consideration, or may not be enough specimen data

Wetland Indicator Definitions (Rhoads and Block)

OBL	Obligate Wetland Species	99%
FACW	Facultative Wetland Species	67-99%
FAC	Facultative Species	34-66%
FACU	Facultative Upload Species	1-33%
UPL	Obligate Upland Species	1%

Rank

	NJ Rank		**PA Rank**
SX	Extirpated	PE	Endangered
S1	Critically imperiled	PT	Threatened
S2	Imperiled	PR	Rare
S3	Vulnerable	PX	Extirpated
SH	Historic	PV	Vulnerable
.1	Elements documented from a single location	TU	Tentatively Undertermined

Assignment of Coefficients

0 to 3	Plants with a high range of ecological tolerances/found in a variety of plant communities
4 to 6	Plants with an intermediate range of ecological tolerances/associated with a specific plant community
7 to 8	Plants with a poor range of ecological tolerances/associated with advanced successional state
9 to 10	Plants with a high degree of fidelity to a narrow range of habitats

Methodology

1) Compile a plant list of the species within the assessment area.

2) Assign the Coefficient of Conservatism (CC) to each plant documented on the plant list.

3) Calculate the Native Mean Coefficient value by totaling the CCs and divide the sum by the number of native plant species within the assessed area.

4) **OR** Calculate the Total Mean Coefficient value by totaling the CCs and divide by the sum of the total number of plants (native and introduced) within the assessed area.

5) Multiply the Native Mean Coefficient OR the Total Mean Coefficient by the square root of the total of the number of native plant species

FQI = Native Mean C x Sqrt N

PSI = Total Mean C x Sqrt N

FQI =	Floristic Quality Index
PSI =	Plant Stewardship Index
N =	Number of native species
I =	Number of introduced species
Native Mean C =	Sum of Coefficients / N
Total Mean C =	Sum of Coefficients / N + I

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Acer	rubrum var. rubrum	Red maple	N	3		FAC	Natural	Dry to moist woods, swamps and bogs. NJ: throughout.
Acer	saccharum var. saccharum	Sugar maple	N	5		FACU	Natural	Moist woods, wooded slopes, ravines and alluvial areas.
Actaea	alba	White Baneberry/ Doll's Eyes	N	5			Natural	
Alisma	subcordatum	Plantain, water	N	3		OBL	Natural	Marshes, stream and pond margins and muddy shores.NJ: tidal flats, ditches.
Alliaria	petiolata	Mustard, garlic	I	0		FACU-	Natural	Disturbed woods, floodplains and waste ground.
Ambrosia	trifida	Ragweed, giant	N	2		FAC	Natural	Fields, meadows, roadsides and floodplains.
Amelanchier	canadensis	Shadbush; Juneberry	N	8		FAC	Natural	Woods and peaty thickets.NJ: Brackish coastal swamps.
Amphicarpaea	bracteata	Hog peanut	N	4		FAC	Natural	Moist woods and alluvium.
Arisaema	triphyllum	Jack-in-the-pulpit	S	0		FACW-	Natural	Swampy woods, wet thickets and bogs.
Artemisia	vulgaris	Common mugwort	I	0		N	Natural	Gardens, lawns, roadsides, thickets, waste ground and rubbish dumps.
Athyrium	filix-femina var. angustum	Fern, northern lady	N	7		FAC	Natural	Damp woods, swamps and thickets, in subacidic soils.
Berberis	thunbergii	Barberry, Japanese	I	0		N	Natural	Disturbed woods, roadsides and hedgerows.
Betula	lenta	Birch, sweet	N	6		FACU	Natural	Woods and stream banks.
Bidens	frondosa	Beggar-ticks	N	2		FACW	Natural	Moist, open ground, stream banks and roadsides.
Boehmeria	cylindrica	False Nettle	N	5			Natural	
Botrychium	dissectum	Cut-leaved grape-fern	N	5		FAC	Natural	Moist, open woods, meadows and barrens, in moderately acidic soils.
Botrychium	virginianum	Fern, rattlesnake	N	6		FACU	Natural	Dry or moist, humus-rich woods, in subacidic to circumneutral soils.
Cardamine	impatiens	Bittercress; narrowleaf bitter cress	I	0		N	Natural	Moist slopes.
Carex	blanda	Sedge; woodland sedge	N	6		FAC	Natural	Dry to moist woods, thickets and meadows.
Carex	debilis var. debilis	Sedge; White-edged sedge	N	6		FAC	Natural	Swamps, thickets and low woods.
Carex	laxiculmis var. laxiculmis	Sedge; spreading sedge	N	8		N	Natural	Rich woods.
Carex	pensylvanica	Sedge, Pennsylvania	N	5		N	Natural	Open woods and wooded slopes.
Carex	sparganioides	Sedge; Bur-reed sedge	N	4		FACU	Natural	Rich woods and meadows.
Carex	swanii	Sedge, Swan's	N	6		FACU	Natural	Dry woods, meadows and fields.
Carpinus	caroliniana	Hornbeam; Ironwood	N	7		FAC	Natural	Rich, moist woods and stream edges.NJ: Floodplains.
Carya	ovata	Hickory, shagbark	N	7		FACU	Natural	Low, moist woods and slopes, in rich soil.
Carya	tomentosa	Hickory, mockernut	N	5		FACU	Natural	Moist, open woods and slopes.
Caulophyllum	thalictroides	Cohosh, blue	N	9		N	Natural	Moist, rich woods.
Chelone	glabra	Turtlehead	N	7		OBL	Natural	Stream banks, wet woods and swamps.
Cicuta	maculata var. maculata	Beaver-poison/ water hemlock	N	5		OBL	Natural	Swamps, marshes, wet meadows, stream banks and ditches.
Cinna	arundinacea	Reedgrass, wood	N	4		FACW	Natural	Swamps and wet woods.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Circaea	lutetiana ssp. canadensis	Enchanter's-nightshade	N	6		FACU	Natural	Rocky, upland woods, damp woods and floodplains.
Clematis	virginiana	Virgin's bower	N	5		FAC	Natural	Thickets and woods edges, in low ground.
Commelina	communis var. communis	Asiatic dayflower	I	0		FAC-	Natural	Gardens, woods, roadsides, stream banks and disturbed ground.
Cornus	amomum ssp. amomum	Kinnikinik; silky dogwood	N	5		FACW	Natural	Moist woods, meadows, old fields and swamps.
Cornus	florida	Dogwood, flowering	N	5		FACU-	Natural	Rich, moist woods and woods edges.
Cryptotaenia	canadensis	Honewort	N	5		FAC	Natural	Moist woods, wooded stream banks and seeps.
Cuscuta	gronovii var. gronovii	Common dodder	N	3		N	Natural	Parasitic on a wide range of woody and herbaceous plants of low, wet habitats.
Dennstaedtia	punctilobula	Fern, hay-scented	N	4		N	Natural	Open woods, meadows and slopes, in acidic soils.NJ: Banks.
Dichanthelium	clandestinum	Panic grass, hidden	N	3			Natural	
Dioscorea	villosa	Wild yam	N	7		FAC+	Natural	Woods, thickets and rocky slopes.
Dryopteris	carthusiana	Fern, toothed wood	N	5		FAC+	Natural	Moist to wet woods and swamps.
Dryopteris	intermedia	Fern, evergreen wood	N	8		FACU	Natural	Moist woods, shaded slopes and swamp hummocks, in humus-rich, acidic to neutral soils.
Dryopteris	marginalis	Fern, marginal wood	N	9		FACU-	Natural	Rocky ledges, talus slopes and shaded edges, in subacidic to circumneutral soils.
Epifagus	virginiana	Beechdrops	N	10		N	Natural	Beech woods, parasitic on the roots of Fagus grandifolia.
Erechtites	hieraciifolia	Fireweed	N	0		FACU	Natural	Fields, woods, clearings and waste ground.
Erigeron	annuus	Fleabane, daisy	N	0		FACU	Natural	Fields, roadsides and waste ground.
Euonymus	alatus	Burning-bush; Winged euonymus	I	0		N	Natural	Cultivated and occasionally naturalized in disturbed woods, stream banks, fencerows and edges.
Eupatorium	perfoliatum	Boneset	N	3		FACW+	Natural	Floodplains, swamps, bogs, stream banks and wet meadows.
Eupatorium	rugosum	Snakeroot, white	N	3		N	Natural	Woods, meadows and roadsides.
Eurybia	divaricata	White wood aster	N	4		N	Natural	Woods.
Euthamia	graminifolia var. graminifolia	Grass-leaved goldenrod	N	1		FAC	Natural	Fields, roadsides, moist ditches or shores.
Fagus	grandifolia	Beech, american	N	8		FACU	Natural	A dominant tree of mature forests on moist, rich soils.
Festuca	subverticillata	Nodding fescue	N	8			Natural	NJ woodlands
Fraxinus	americana var. americana	White ash	N	7		FACU	Natural	Woods, fencerows and old fields.
Galium	asprellum	Rough bedstraw	N	8		OBL	Natural	Swamps, bogs, stream banks and wet thickets.
Galium	circaezans var. circaezans	Wild licorice	N	8		UPL	Natural	Rich woods and wooded, calcareous slopes.
Galium	lanceolatum	Wild licorice/ Lance-leaved Wild Licorice	N	8		N	Natural	Woods and wooded slopes.
Galium	triflorum	Bedstraw, sweet-scented	N	5		FACU	Natural	Rocky woods, shaded hillsides and roadside banks.
Geranium	maculatum	Geranium, wood	N	4		FACU	Natural	Rich woods, roadsides and fields.
Geum	canadense var. canadense	White avens	N	5		FACU	Natural	Woods, stream banks and roadsides.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Glechoma	hederacea	Ivy, ground	I	0		FACU	Natural	Fields, disturbed woods, roadsides, gardens and waste ground.
Glyceria	striata	Fowl mannagrass	N	3		OBL	Natural	Wet woods, swamps and bogs.
Leersia	virginica	Cutgrass/White grass	N	3		FACW	Natural	Swamps or moist woods.
Leersia	oryzoides	Grass, rice Cut	N	3		OBL	Natural	Marshes, bogs or wet meadows.
Laportea	canadensis	Nettle, wood	N	6		FAC	Natural	Low, moist woods and stream banks.
Juglans	nigra	Walnut, black	N	2		FACU	Natural	Open woods and meadows in moist, rich, alluvial soils.
Impatiens	capensis	Jewelweed; Touch-me-not	N	2		FACW	Natural	Moist meadows, swamps and stream banks.
Ilex	verticillata	Winterberry	N	5		FACW+	Natural	Swamps, bogs, moist woods and wet shores.
Hypericum	punctatum	St. John's-wort, spotted	N	1		FAC-	Natural	Moist fields, floodplains, thickets and roadsides.
Hemerocallis	fulva	Day-lily, orange	I	0		UPL	Natural	Fields, roadsides, stream banks, floodplains and woods edges.
Hamamelis	virginiana	Witchhazel	N	7		FACU+	Natural	Rich, rocky woods.
Lindera	benzoin	Spicebush	N	5		FACW-	Natural	A common component of moist, rich woods.
Liriodendron	tulipifera	Tuliptree; Yellow poplar	N	5		FACU	Natural	A common forest tree of rich woods.
Lobelia	inflata	Indian-tobacco	N	2		FACU	Natural	Woods, old fields, meadows and roadsides.
Lonicera	japonica var. japonica	Japanese honeysuckle	I	0		FAC-	Natural	Disturbed woods, fields, thickets, banks and roadsides.
Lycopus	rubellus	Gypsy-wort/ Stalked Water Horehound	N	5	S2	OBL	Natural	Bogs, river banks, pond margins and wet ditches.
Lysimachia	ciliata	Loosestrife, fringed	N	2		FACW	Natural	Low, moist ground of fields, stream banks and swamp edges.
Lysimachia	nummularia	Moneywort	I	0		FACW-	Natural	Lawns, meadows, wet woods and floodplains.
Lythrum	salicaria	Loosestrife, purple	I	0		FACW+	Natural	Swamps, wet meadows and shores.
Maianthemum	racemosum	False Solomon's Seal	N	5			Natural	
Maianthemum	canadensis var canadensis	Canada mayflower	N	4		FAC-	Natural	NJ: Moist woods, beech forests, mesic marshes.
Microstegium	vimineum	Stiltgrass, japanese	I	0		FAC	Natural	Moist ground of open woods, thickets, paths, clearings, fields and gardens.
Mimulus	alatus	Monkey-flower, winged	N	7	S3	OBL	Natural	Swamps, wet meadows and shores.
Mitchella	repens	Partridge-berry	N	5		FACU	Natural	Woods.
Monotropa	uniflora	Indian-pipe	N	8		FACU-	Natural	Dry to moist woods, in humus.
Nuphar	advena	Spatterdock	N	4		OBL	Natural	Ponds, lake margins, slow-moving streams, swamps and tidal marshes.
Nyssa	sylvatica	Black gum; Tupelo	N	4		FAC	Natural	Dry to moist woods, rocky slopes and ridge tops.
Onoclea	sensibilis	Fern, sensitive	N	2		FACW	Natural	Marshes, swamps, moist open woods and wet meadows, in subacidic soils.
Osmorhiza	claytonii	Sweet-cicely	N	4		FACU-	Natural	Rich woods, wooded stream banks and wet meadows.NJ: North.
Oxalis	stricta	Wood-sorrel, common yellow	N	0		UPL	Natural	Lawns, gardens and fields.
Parthenocissus	quinquefolia	Virginia-creeper	N	1		FACU	Natural	Woods, fields and edges.
Pilea	pumila	Clearweed	N	3		FACW	Natural	Cool, moist, shady areas.
Podophyllum	peltatum	May-apple	N	6		N	Natural	Moist woods.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Polygonatum	biflorum var. biflorum	Solomon's-seal	N	8		FACU	Natural	Deciduous woods, rocky slopes and roadside banks.
Polygonatum	pubescens	Solomon's-seal, hairy	N	8		N	Natural	Wooded slopes, stream banks and fields.
Polygonum	arifolium	Tearthumb, halberd-leaved	N	6		OBL	Natural	Wet woods, boggy thickets, swamps, wet meadows and ditches.
Polygonum	caespitosum	Cespitose Knotweed	I	0			Natural	
Polygonum	sagittatum	Tearthumb, arrow-leaved	N	5		OBL	Natural	Low moist ground, vernal ponds, bogs, swamps or marshes.
Polygonum	virginianum	Jumpseed	N	4		FAC	Natural	Moist open woods, floodplains and roadsides.
Polystichum	acrostichoides	Fern, Christmas	N	7		N	Natural	Shaded slopes and well-drained flats, in subacidic to circumneutral soils.
Potentilla	canadensis	Cinquefoil, dwarf	N	2		N	Natural	Dry, open woods and fields.
Potentilla	simplex	Cinquefoil, common	N	2		FACU-	Natural	Dry woods, fields, meadows and roadsides.
Prenanthes	alba	Rattlesnake-root; white rattlesnake-root	N	6		FACU	Natural	Rocky woods, barrens and roadsides.
Prunella	vulgaris ssp. vulgaris	Heal-all	I	0		FACU+	Natural	Moist fields and fencerows.
Prunus	serotina	Cherry, wild black	N	1		FACU	Natural	Woods and fencerows.
Quercus	alba	Oak, white	N	4		FACU	Natural	A dominant forest tree on dry to moist sites.
Quercus	palustris	Oak, pin	N	3		FACW	Natural	Low, moist or seasonally wet woods or swamps.
Quercus	rubra	Oak, northern red	N	7		FACU-	Natural	A dominant forest tree on moist to dry sites.
Ranunculus	abortivus	Kidney-leaf Buttercup	N	1			Natural	
Ranunculus	hispudus var hispudus		N	4			Natural	
Ranunculus	recurvatus	Hooked crowfoot	N	3		FAC+	Natural	Damp or swampy woods or stream edges.
Rosa	multiflora	Rose, multiflora	I	0		FACU	Natural	Disturbed woods, pastures, old fields, roadsides and thickets.
Rubus	allegheniensis	Blackberry, common	N	3		FACU-	Natural	Old fields, open woods and clearings.
Rubus	flagellaris	Dewberry, northern	N	2		FACU	Natural	Rocky or shaly slopes, cliffs and fields.
Rubus	hispidus	Swamp dewberry/ Bog Dewberry	N	5		FACW	Natural	Bogs, swamps, moist woods, thickets and barrens.
Rubus	phoenicolasius	Wineberry	I	0		N	Natural	Roadsides, banks and thickets.
Sambucus	canadensis	Elder, american	N	2		FACW	Natural	Woods, fields, stream banks and moist roadsides.
Sanguinaria	canadensis	Bloodroot	N	8		UPL	Natural	Rich woods and roadside banks.
Sassafras	albidum	Sassafras	N	2		FACU-	Natural	Old fields, hedgerows and woods edges.
Scutellaria	lateriflora	Skullcap, mad-dog	N	4		FACW+	Natural	Wet woods, bogs, lake margins, river banks, floodplains and swampy pastures.
Sedum	ternatum	Stonecrop, wild	N	9		N	Natural	Rocky banks, cliffs and woods.NJ: Piedmont, Wickecheoke floodplain.
Smilax	herbacea	Carrion-flower	N	5		FAC	Natural	Damp thickets, moist woods and floodplains.
Smilax	rotundifolia	Catbrier/ Common Greenbrier	N	2		FAC	Natural	Moist to dry woods, thickets, roadsides, old fields and serpentine barrens.
Solidago	canadensis var. canadensis	Canada goldenrod	N	2		FACU	Natural	Fields and roadsides.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Solidago	rugosa var. rugosa	Wrinkle-leaf goldenrod	N	2		FAC	Natural	Fields, woods, floodplains, thickets, roadsides and waste ground.
Stellaria	longifolia	Stitchwort, long-leaved	N	7		FACW	Natural	Marshy open ground, swamps, rich woods and moist roadsides.
Symphyotrichum	lateriflorum	Calico aster	N	3		FACW-	Natural	Old fields, rocky woods, roadsides and waste ground.
Symphyotrichum	novi-belgii var. novi-belgii	New York aster	N	5		FACW+	Natural	Swamps and moist meadows.
Symplocarpus	foetidus	Skunk-cabbage	N	5		OBL	Natural	Moist woods, swamps and bogs.
Teucrium	canadense	Germander, american	N	10			Natural	
Thalictrum	pubescens	Meadow-rue, tall	N	5		FACW+	Natural	Wet meadows, low open woods and swamps.
Thelypteris	noveboracensis	Fern, New York	N	3		FAC	Natural	Moist woods, thickets and swamps, in humus-rich, moderately acidic soils.
Tilia	americana	Basswood	N	7			Natural	NJ: Rich woods, Hunterdon>
Toxicodendron	radicans	Ivy, poison	N	1		FAC	Natural	Open woods, roadside thickets, fencerows and edges.
Ulmus	americana	Elm, american	N	6		FACW-	Natural	Stream banks and floodplains, in rich, alluvial soil.
Uvularia	sessilifolia	Bellwort; Wild-oats	N	6		FACU-	Natural	Moist, rich woods.
Verbena	urticifolia var. urticifolia	White vervain	N	0		FACU	Natural	Moist fields, meadows and waste ground.
Veronica	officinalis	Common speedwell	I	0		FACU-	Natural	Woods, roadsides and shale barrens.
Viburnum	acerifolium	Viburnum, maple-leaved	N	8		N	Natural	Woods and thickets.
Viburnum	dentatum	Arrowwood, southern	N	5		FAC	Natural	Swamps and wet woods.
Viburnum	prunifolium	Viburnum, blackhaw	N	5		FACU	Natural	Woods, old fields, thickets and roadsides.
Viola	cucullata	Violet, blue-marsh	N	10		FACW+	Natural	Swamps, bogs and wet meadows.
Viola	labradorica	Violet, dog	N	8		FACW	Natural	Swamps, meadows amd alluvial woods.
Viola	palmata	Violet, early blue	N	9		N	Natural	Rich, dry, open woods and edges.NJ: North Jersey.
Viola	pubescens var pubescens	Downy yellow violet	N	7			Natural	NJ: Rich woods, a little drier woods.
Viola	rotundifolia	Violet, round-leaved	N	10		FAC+	Natural	Cool, moist, shady woods and banks.NJ: Hemlock ravines, Voorhees State Park.
Viola	sororia	Violet, common blue	N	10			Natural	
Vitis	labrusca	Fox grape	N	7		FACU	Natural	Rocky woods, moist thickets and stream banks.

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Bowman's Hill Wildflower Preserve's Plant Stewardship Index

Site Information

BHWP List #: 2331

State: New Jersey

Zip code: 08822

Restoration: No

Plot Information

Plot Code	Plot Description

Site Summary

This list contains 244 plants, of which 80% are native to New Jersey

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3) Calculate the Native Mean Coefficient value by totaling the CCs and divide the sum by the number of native plant species within the assessed area.

4) **OR** Calculate the Total Mean Coefficient value by totaling the CCs and divide by the sum of the total number of plants (native and introduced) within the assessed area.

5) Multiply the Native Mean Coefficient OR the Total Mean Coefficient by the square root of the total of the number of native plant species

FQI = Native Mean C x Sqrt N

PSI = Total Mean C x Sqrt N

FQI =	Floristic Quality Index
PSI =	Plant Stewardship Index
N =	Number of native species
I =	Number of introduced species
Native Mean C =	Sum of Coefficients / N
Total Mean C =	Sum of Coefficients / N + I

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Barbarea	vulgaris var. vulgaris	Common wintercress	I	0		FACU	Natural	Moist, open ground.
Berberis	thunbergii	Barberry, Japanese	I	0		N	Natural	Disturbed woods, roadsides and hedgerows.
Acer	rubrum var. rubrum	Red maple	N	3		FAC	Natural	Dry to moist woods, swamps and bogs. NJ: throughout.
Acer	saccharum var. saccharum	Sugar maple	N	5		FACU	Natural	Moist woods, wooded slopes, ravines and alluvial areas.
Achillea	millefolium	Yarrow	I	0		FACU	Natural	Fields, roadsides and waste ground.
Agrimonia	gryposepala	Agrimony/ Tall Hairy Agrimony	N	4		FACU	Natural	Woods, fields and floodplains.
Alliaria	petiolata	Mustard, garlic	I	0		FACU-	Natural	Disturbed woods, floodplains and waste ground.
Allium	vineale	Garlic, field	I	0		FACU-	Natural	Disturbed woods, fields and lawns.
Ambrosia	artemisiifolia	Ragweed, common	N	0		FACU	Natural	Fields, meadows, cultivated areas, roadsides and waste ground.
Ambrosia	trifida	Ragweed, giant	N	2		FAC	Natural	Fields, meadows, roadsides and floodplains.
Amphicarpaea	bracteata	Hog peanut	N	4		FAC	Natural	Moist woods and alluvium.
Andropogon	virginicus	Broom-sedge	N	2		FACU	Natural	Old fields, hillsides and waste ground, in dry, sterile soil.
Anthoxanthum	odoratum	Sweet vernal grass	I	0		FACU	Natural	Open fields, meadows and roadsides.
Apocynum	cannabinum var. cannabinum	Indian-hemp	N	2		FACU	Natural	Woods, old fields, sandy flats, limestone bluffs and cindery waste ground.
Arisaema	triphyllum ssp. triphyllum	Jack-in-the-pulpit	N	5		FACW-	Natural	Moist woods, swamps and bogs.
Arthraxon	hispidus	Grass/ Arthraxon	I	0		FAC	Natural	Moist meadows and waste ground.
Asclepias	incarnata ssp. incarnata	Swamp milkweed	N	5		OBL	Natural	Swamps, floodplains and wet meadows.
Asclepias	purpurascens	Milkweed, purple	N	7		FACU	Natural	Dry to moist woods, thickets, fields and roadsides.
Asplenium	platyneuron	Ebony spleenwort	N	3		FACU	Natural	Dry to moist, wooded slopes and rock ledges, in subacidic soils.
Athyrium	filix-femina var. angustum	Fern, northern lady	N	7		FAC	Natural	Damp woods, swamps and thickets, in subacidic soils.
Bidens	frondosa	Beggar-ticks	N	2		FACW	Natural	Moist, open ground, stream banks and roadsides.
Bidens	polylepis	Tickseed-sunflower	N	1		FACW	Natural	Moist fields, vacant lots and roadsides.
Boehmeria	cylindrica	False Nettle	N	5			Natural	
Bromus	inermis	Smooth brome/Hungarian Brome	I	0		N	Natural	Fields, roadsides and waste ground.
Callitriche	heterophylla	Water-starwort; larger water starwort	N	3		OBL	Natural	Ponds, slow-running streams and muddy shores.
Calystegia	sepium	Hedge bindweed	N	5		FAC-	Natural	Waste ground, fields and woods edges.
Campsis	radicans	Trumpet-creeper; Trumpet-vine	N	3		FAC	Natural	River banks, roadside thickets and fencerows, also occasionally escaped from cultivation.
Cardamine	concatenata	Toothwort	N	7		FACU	Natural	Rich, deciduous woods.
Carex	annectens	Sedge; yellow fruited sedge	N	3		FACW	Natural	Dry to moist woods, fields and ditches.
Carex	blanda	Sedge; woodland sedge	N	6		FAC	Natural	Dry to moist woods, thickets and meadows.
Carex	complanata	Flattened sedge	N	7			Natural	NJ: Coastal plain.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Carex	crinita var. crinita	Sedge, short-hair	N	5		OBL	Natural	Moist to wet woods, thickets, marshes, ditches and stream banks.
Carex	festucacea	Sedge; Fescue sedge	N	7		FAC	Natural	Moist, open woods or thickets.
Carex	grayi	Sedge, Gray's	N	8		FACW+	Natural	Swamps and wet woods.
Carex	grisea	Sedge	N	6		FAC	Natural	Dry to moist woods, meadows and swales.
Carex	lurida	Sedge	N	4		OBL	Natural	Swamps, bogs and wet meadows.
Carex	platyphylla	Sedge, broad-leaf	N	10		N	Natural	Rich woods and wooded slopes.NJ: Limestone rocky woods.
Carex	radiata	Sedge	N	7		N	Natural	Dry to moist woods southern NJ
Carex	scoparia	Sedge, broom	N	3		FACW	Natural	Moist to dry, open ground.
Carex	squarrosa	Sedge, Squarrose	N	5		FACW	Natural	Swamps and wet woods.
Carex	stipata var. stipata	Sedge/ awl-fruited sedge	N	3		N	Natural	Wet meadows and swampy woods.
Carex	swanii	Sedge, Swan's	N	6		FACU	Natural	Dry woods, meadows and fields.
Carex	typhina	Sedge, cat-tail	N	8	S3	FACW+	Natural	Calcareous swamps, wet woods and swales.
Carex	vulpinoidea var. vulpinoidea	Sedge/ fox sedge	N	4		OBL	Natural	Moist meadows, fields and roadside ditches.
Carpinus	caroliniana	Hornbeam; Ironwood	N	7		FAC	Natural	Rich, moist woods and stream edges.NJ: Floodplains.
Carya	glabra	Pignut hickory	N	7		FACU-	Natural	Upland woods, dry ridge tops and slopes.
Carya	ovata	Hickory, shagbark	N	7		FACU	Natural	Low, moist woods and slopes, in rich soil.
Carya	tomentosa	Hickory, mockernut	N	5		FACU	Natural	Moist, open woods and slopes.
Centaurea	maculosa	Knapweed, spotted	I	0		N	Natural	Woods, fields, roadsides and shale barrens.
Cephalanthus	occidentalis	Buttonbush	N	6		OBL	Natural	Low wet ground, swamps, bogs and lake edges.
Cerastium	vulgatum	Common mouse-ear chickweed	I	0			Natural	
Chelone	glabra	Turtlehead	N	7		OBL	Natural	Stream banks, wet woods and swamps.
Chrysanthemum	leucanthemum	Daisy, ox-eye	I	0		N	Natural	Fields, woods, meadows and roadsides.
Cichorium	intybus	Chicory	I	0		N	Natural	Fields, roadsides and waste ground.
Cicuta	maculata var. maculata	Beaver-poison/ water hemlock	N	5		OBL	Natural	Swamps, marshes, wet meadows, stream banks and ditches.
Cimicifuga	racemosa	Cohosh, black; Black snakeroot	N	9		N	Natural	Rich woods.
Circaea	lutetiana ssp. canadensis	Enchanter's-nightshade	N	6		FACU	Natural	Rocky, upland woods, damp woods and floodplains.
Cirsium	arvense var. arvense	Canada thistle	I	0		FACU	Natural	Fields, pastures, roadsides and waste ground.
Cirsium	discolor	Field thistle	N	1		UPL	Natural	Abandoned fields, open hillsides and roadside banks.
Cirsium	muticum	Thistle, swamp	N	8		OBL	Natural	Swamps, bogs, stream banks and wet meadows.
Claytonia	virginica	Spring-beauty	N	5		FAC	Natural	Moist woods and meadows, frequently on alluvial soils.
Collinsonia	canadensis	Horse-balm; Stoneroot	N	9		FAC+	Natural	Rich woods and wooded floodplains.
Commelina	communis var. communis	Asiatic dayflower	I	0		FAC-	Natural	Gardens, woods, roadsides, stream banks and disturbed ground.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Cornus	amomum ssp. amomum	Kinnikinik; silky dogwood	N	5		FACW	Natural	Moist woods, meadows, old fields and swamps.
Cornus	florida	Dogwood, flowering	N	5		FACU-	Natural	Rich, moist woods and woods edges.
Cuscuta	gronovii var. gronovii	Common dodder	N	3		N	Natural	Parasitic on a wide range of woody and herbaceous plants of low, wet habitats.
Dactylis	glomerata	Orchard Grass	I	0		FACU	Natural	Fields, meadows and roadsides.
Danthonia	compressa	Northern oatgrass/Flattened Wild Oat-grass	N	7		FACU-	Natural	Dry, rocky woods and clearings.
Daucus	carota	Queen-Anne's-lace	I	0		N	Natural	Roadsides, old fields, gardens and waste ground.
Desmodium	canadense	Tick-trefoil, showy	N	4		FAC	Natural	Open woods.
Desmodium	paniculatum	Tick-trefoil, panicled	N	4		UPL	Natural	Clearings and edges of moist or dry woods.
Dichanthelium	clandestinum	Panic grass, hidden	N	3			Natural	
Dichanthelium	dichotomum var dicotomum	Cypress Panic-grass	N	8			Natural	NJ: Moist, sandy soils
Dichanthelium	villosissimum	White-haired Panic-grass	N	7			Natural	NJ: Sandy, disturbed, woods edges
Dioscorea	villosa	Wild yam	N	7		FAC+	Natural	Woods, thickets and rocky slopes.
Dryopteris	carthusiana	Fern, toothed wood	N	5		FAC+	Natural	Moist to wet woods and swamps.
Elaeagnus	umbellata	Olive, autumn	I	0		N	Natural	Planted by the Game Commission and extensively naturalized in old fields and abandoned pastures.
Eleocharis	tenuis var. tenuis	Spike-rush	N	3		FACW+	Natural	Moist fields, swamps, bogs and wet ditches.
Elymus	hystrix	Grass, bottlebrush	N	5		N	Natural	Moist, alluvial woods.NJ: floodplains.
Eragrostis	spectabilis	Lovegrass, purple ; Tumblegrass	N	1		UPL	Natural	Dry, sandy fields and roadsides.
Erigeron	annuus	Fleabane, daisy	N	0		FACU	Natural	Fields, roadsides and waste ground.
Erigeron	philadelphicus	Fleabane, Philadelphia	N	2		FACU	Natural	Woods, edges, fields, roadsides and lawns.
Erythronium	americanum	Trout-lily, yellow	N	5		N	Natural	Moist woods, bottomlands and meadows.
Euonymus	alatus	Burning-bush; Winged euonymus	I	0		N	Natural	Cultivated and occasionally naturalized in disturbed woods, stream banks, fencerows and edges.
Eupatorium	fistulosum	Joe-pye-weed	N	5		FACW	Natural	Floodplains, meadows, moist thickets and roadsides.
Eupatorium	perfoliatum	Boneset	N	3		FACW+	Natural	Floodplains, swamps, bogs, stream banks and wet meadows.
Eupatorium	rugosum	Snakeroot, white	N	3		N	Natural	Woods, meadows and roadsides.
Eurybia	divaricata	White wood aster	N	4		N	Natural	Woods.
Euthamia	graminifolia var. graminifolia	Grass-leaved goldenrod	N	1		FAC	Natural	Fields, roadsides, moist ditches or shores.
Fagus	grandifolia	Beech, american	N	8		FACU	Natural	A dominant tree of mature forests on moist, rich soils.
Festuca	elatior	Fescue	I	0		FACU-	Natural	Roadsides, fields and open ground.
Festuca	subverticillata	Nodding fescue	N	8			Natural	NJ woodlands
Fragaria	virginiana ssp. virginiana	Wild strawberry	N	2		FACU	Natural	Woods, meadows, old fields and other dry, open ground.
Fraxinus	americana var. americana	White ash	N	7		FACU	Natural	Woods, fencerows and old fields.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Galium	aparine	Bedstraw/ Cleavers	N	1		FACU	Natural	Woods, stream banks, wooded slopes and roadsides.
Galium	circaezans var. circaezans	Wild licorice	N	8		UPL	Natural	Rich woods and wooded, calcareous slopes.
Geranium	maculatum	Geranium, wood	N	4		FACU	Natural	Rich woods, roadsides and fields.
Geum	aleppicum	Avens, yellow	N	9		FAC	Natural	Woods, moist fields, swamps, and roadsides.
Glechoma	hederacea	Ivy, ground	I	0		FACU	Natural	Fields, disturbed woods, roadsides, gardens and waste ground.
Glyceria	striata	Fowl mannagrass	N	3		OBL	Natural	Wet woods, swamps and bogs.
Hamamelis	virginiana	Witchhazel	N	7		FACU+	Natural	Rich, rocky woods.
Helenium	autumnale	Sneezeweed	N	5		FACW+	Natural	Swamps, moist river banks, alluvial thickets and wet fields.
Helianthus	decapetalus	Sunflower, thin-leaved	N	4		FACU	Natural	Fields, moist bottomlands, stream banks and roadsides.
Hieracium	caespitosum	King-devil	I	0		N	Natural	Woods, fields and roadsides.
Hibiscus	moscheutos	Rose-mallow, swamp	N	5		OBL	Natural	Swamps, marshes and ditches, in shallow water.
Hieracium	piloselloides	King-devil/ glaucous king devil	I	0		N	Natural	Dry fields, meadows and roadsides.
Holcus	lanatus	Velvetgrass	I	0		FACU	Natural	Meadows, old fields, river shores and roadsides.
Hypericum	perforatum	St. John's-wort, common	I	0		N	Natural	Fields, roadsides and waste places.
Hypericum	punctatum	St. John's-wort, spotted	N	1		FAC-	Natural	Moist fields, floodplains, thickets and roadsides.
Ilex	verticillata	Winterberry	N	5		FACW+	Natural	Swamps, bogs, moist woods and wet shores.
Impatiens	capensis	Jewelweed; Touch-me-not	N	2		FACW	Natural	Moist meadows, swamps and stream banks.
Iris	versicolor	Blue flag, northern	N	5		OBL	Natural	Wet meadows, bogs and marshes.
Juglans	nigra	Walnut, black	N	2		FACU	Natural	Open woods and meadows in moist, rich, alluvial soils.
Juncus	effusus	Rush, soft	N	1			Natural	
Juncus	tenuis var. tenuis	Path rush	N	1		FAC-	Natural	Moist to dry, often heavily compacted soil of woods, fields, waste ground and paths.
Juniperus	virginiana	Eastern red-cedar	N	2		FACU	Natural	Old fields, serpentine barrens and other moist to dry, sterile soils.
Krigia	biflora	Dandelion, dwarf ; Cynthia	N	3		FACW	Natural	Fields, meadows, woods and sandy banks.
Lactuca	canadensis var. canadensis	Wild lettuce	N	2		FACU-	Natural	Meadows, fields, rocky hillsides and roadside banks.
Leersia	virginica	Cutgrass/White grass	N	3		FACW	Natural	Swamps or moist woods.
Lindera	benzoin	Spicebush	N	5		FACW-	Natural	A common component of moist, rich woods.
Liriodendron	tulipifera	Tuliptree; Yellow poplar	N	5		FACU	Natural	A common forest tree of rich woods.
Lobelia	cardinalis	Cardinal-flower	N	5		FACW+	Natural	Wet meadows, swamps, ditches, stream banks and lake shores.
Lobelia	inflata	Indian-tobacco	N	2		FACU	Natural	Woods, old fields, meadows and roadsides.
Lobelia	siphilitica	Lobelia, great blue	N	4		FACW+	Natural	Swamps, moist meadows, stream banks and ditches.
Lolium	perenne	Rye Grass, perrenial	I	0		FACU-	Natural	Cultivated and frequently escaped.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Lonicera	japonica var. japonica	Japanese honeysuckle	I	0		FAC-	Natural	Disturbed woods, fields, thickets, banks and roadsides.
Ludwigia	alternifolia	Loosestrife, false ; Seedbox	N	3		FACW+	Natural	Swampy fields and wet woods.
Ludwigia	palustris	Marsh-purslane	N	1		OBL	Natural	Swamps, moist meadows, muddy shores, stream banks and ditches.
Lycopus	americanus var longii	Water-horehound	N	4	S2S3	OBL	Natural	Shaded hillsides, fields, moist thickets, wet ditches and swamps.
Lysimachia	terrestris	Swamp-candles	N	3		OBL	Natural	Swamps and bogs.
Maianthemum	racemosum	False Solomon's Seal	N	5			Natural	
Menispermum	canadense	Moonseed	N	6		FACU	Natural	Moist ground of stream banks and edges.
Microstegium	vimineum	Stiltgrass, japanese	I	0		FAC	Natural	Moist ground of open woods, thickets, paths, clearings, fields and gardens.
Mimulus	ringens	Monkey-flower, allegheny	N	5		OBL	Natural	Wet, open ground of swamps, meadows and shores.
Muhlenbergia	schreberi	Dropseed; Nimble-will	N	1		FAC	Natural	Woods, thickets and waste ground.
Oenothera	biennis	Primrose, evening	N	1		FACU-	Natural	Cultivated fields, waste ground and roadsides.
Onoclea	sensibilis	Fern, sensitive	N	2		FACW	Natural	Marshes, swamps, moist open woods and wet meadows, in subacidic soils.
Ostrya	virginiana	Hop-hornbeam	N	7		FACU-	Natural	Dry, wooded slopes, often on calcareous soils.
Oxalis	stricta	Wood-sorrel, common yellow	N	0		UPL	Natural	Lawns, gardens and fields.
Paronychia	canadensis	Chickweed, forked	N	5		N	Natural	Open woods, in dry rocky or sandy soil.
Parthenocissus	quinquefolia	Virginia-creeper	N	1		FACU	Natural	Woods, fields and edges.
Paspalum	laeve	Beadgrass, field	N	4			Natural	
Penstemon	digitalis	Beard-tongue, Foxglove	N	3		FAC	Natural	Meadows, old fields and roadsides.
Phleum	pratense	Timothy	I	0		FACU	Natural	Fields, meadows and roadsides.
Phlox	paniculata	Phlox, summer	N	3		FACU	Natural	Thickets, hillsides and stream banks, often in calcareous soils.
Phryma	leptostachya	Lopseed	N	8			Natural	
Physalis	heterophylla	Clammy ground-cherry	N	1		N	Natural	Fields, sandy or cindery open ground and cultivated areas.
Platanthera	lacera	Orchid, green-fringed	N	8		FACW	Natural	Open woods, moist meadows, bogs and ditches.
Plantago	lanceolata	Plantain, english	I	0		UPL	Natural	Lawns, roadsides, old fields, clearings and waste ground.
Plantago	major	Plantain, common	I	0		FACU	Natural	Lawns, gardens, roadsides, railroad embankments and waste ground.
Platanus	occidentalis	Sycamore	N	4		FACW-	Natural	Stream banks, low woods, floodplains and alluvial soils.
Poa	compressa	Canada bluegrass	I	0		FACU	Natural	Dry woods, fields and rock outcrops.
Poa	pratensis	Kentucky Bluegrass	I	0		FACU	Natural	Cultivated and widely naturalized in meadows, roadsides, open woods and waste ground.
Poa	trivialis	Rough bluegrass	I	0		FACW	Natural	Cultivated and frequently established in wet meadows, swamps and alluvial woods.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Podophyllum	peltatum	May-apple	N	6		N	Natural	Moist woods.
Polygonatum	pubescens	Solomon's-seal, hairy	N	8		N	Natural	Wooded slopes, stream banks and fields.
Polygonum	arifolium	Tearthumb, halberd-leaved	N	6		OBL	Natural	Wet woods, boggy thickets, swamps, wet meadows and ditches.
Polygonum	caespitosum	Cespitose Knotweed	I	0			Natural	
Polygonum	sagittatum	Tearthumb, arrow-leaved	N	5		OBL	Natural	Low moist ground, vernal ponds, bogs, swamps or marshes.
Polygonum	virginianum	Jumpseed	N	4		FAC	Natural	Moist open woods, floodplains and roadsides.
Polystichum	acrostichoides	Fern, Christmas	N	7		N	Natural	Shaded slopes and well-drained flats, in subacidic to circumneutral soils.
Potentilla	canadensis	Cinquefoil, dwarf	N	2		N	Natural	Dry, open woods and fields.
Potentilla	simplex	Cinquefoil, common	N	2		FACU-	Natural	Dry woods, fields, meadows and roadsides.
Prenanthes	alba	Rattlesnake-root; white rattlesnake-root	N	6		FACU	Natural	Rocky woods, barrens and roadsides.
Prunella	vulgaris ssp. vulgaris	Heal-all	I	0		FACU+	Natural	Moist fields and fencerows.
Prunus	avium	Cherry, sweet	I	0		N	Natural	Woods margins and fencerows.
Pycnanthemum	virginianum	Mountain-mint, Virginia	N	4		FAC	Natural	Boggy fields, swamps and moist woods.
Quercus	alba	Oak, white	N	4		FACU	Natural	A dominant forest tree on dry to moist sites.
Quercus	bicolor	Oak, swamp white	N	7		FACW+	Natural	Low, moist forests and wooded swamps.
Quercus	palustris	Oak, pin	N	3		FACW	Natural	Low, moist or seasonally wet woods or swamps.
Quercus	rubra	Oak, northern red	N	7		FACU-	Natural	A dominant forest tree on moist to dry sites.
Quercus	velutina	Oak, black	N	6		N	Natural	A dominant forest tree on moist to dry soils.
Ranunculus	abortivus	Kidney-leaf Buttercup	N	1			Natural	
Ranunculus	repens	Creeping buttercup	I	5	SH	FAC	Natural	Wet, open ground, ditches and swales.
Rhus	typhina	Sumac, staghorn	N	2		N	Natural	Dry, open soil of old fields, roadsides and woods edges.
Rosa	carolina	Rose, pasture	N	4		UPL	Natural	Fields, rocky banks, shale barrens and other dry, open ground.
Rosa	multiflora	Rose, multiflora	I	0		FACU	Natural	Disturbed woods, pastures, old fields, roadsides and thickets.
Rubus	allegheniensis	Blackberry, common	N	3		FACU-	Natural	Old fields, open woods and clearings.
Rubus	flagellaris	Dewberry, northern	N	2		FACU	Natural	Rocky or shaly slopes, cliffs and fields.
Rubus	occidentalis	Raspberry, black	N	1		N	Natural	Sandy or rocky woods, wooded slopes and thickets.
Rubus	phoenicolasius	Wineberry	I	0		N	Natural	Roadsides, banks and thickets.
Rudbeckia	hirta var. hirta	Black-eyed-susan	N	0		FACU-	Natural	Fields, meadows and roadsides.
Rumex	acetosella	Sorrel, sheep	I	0		UPL	Natural	Fields, lawns, waste places and shale barrens, in acidic soils.
Rumex	crispus	Dock, curled	I	0		FACU	Natural	Cultivated fields, roadsides and waste ground.
Sambucus	canadensis	Elder, american	N	2		FACW	Natural	Woods, fields, stream banks and moist roadsides.
Sanguinaria	canadensis	Bloodroot	N	8		UPL	Natural	Rich woods and roadside banks.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Sassafras	albidum	Sassafras	N	2		FACU-	Natural	Old fields, hedgerows and woods edges.
Scirpus	atrovirens	Bulrush, dark green	N	3		OBL	Natural	Moist meadows, marshes, bogs, pond and lake margins and stream banks.
Scirpus	cyperinus	Wool-grass	N	2		FACW+	Natural	Marshes, moist meadows, swamps, shores and ditches.
Scutellaria	integrifolia	Skullcap, hyssop	N	4		FACW	Natural	Swamps, bogs and moist woods or fields.
Scutellaria	lateriflora	Skullcap, mad-dog	N	4		FACW+	Natural	Wet woods, bogs, lake margins, river banks, floodplains and swampy pastures.
Sedum	ternatum	Stonecrop, wild	N	9		N	Natural	Rocky banks, cliffs and woods.NJ: Piedmont, Wickecheoke floodplain.
Sisyrinchium	angustifolium	Blue-eyed-grass	N	5		FACW-	Natural	Damp soil of meadows, floodplains, fields and open woods.
Smilax	rotundifolia	Catbrier/ Common Greenbrier	N	2		FAC	Natural	Moist to dry woods, thickets, roadsides, old fields and serpentine barrens.
Solidago	caesia var. caesia	Goldenrod, blue-stem; wreath	N	6		FACU	Natural	Rich woods.
Solidago	canadensis var. canadensis	Canada goldenrod	N	2		FACU	Natural	Fields and roadsides.
Solidago	flexicaulis	Goldenrod, zig-zag	N	7		FACU	Natural	Moist woods and rocky, wooded slopes.NJ: North.
Solidago	gigantea var. gigantea	Smooth goldenrod	N	3		FACW	Natural	Moist fields, swamps, marshy shores and swales.
Solidago	juncea	Goldenrod, early	N	2		N	Natural	Fields, meadows, rocky slopes and roadsides.
Solidago	rugosa var. rugosa	Wrinkle-leaf goldenrod	N	2		FAC	Natural	Fields, woods, floodplains, thickets, roadsides and waste ground.
Sorghastrum	nutans	Grass, Indian	N	7		UPL	Natural	Moist or dry fields, roadsides and serpentine barrens.
Stellaria	graminea	Lesser stitchwort	N	3		FACU-	Natural	Swampy woods, moist meadows, stream banks or moist shores.
Symphyotrichum	racemosum	Small white aster	N	3		FAC	Natural	Low meadows, floodplains and swamps.
Taraxacum	officinale	Dandelion, common	I	0		FACU-	Natural	Fields, roadsides, lawns, gardens and waste ground.
Thalictrum	pubescens	Meadow-rue, tall	N	5		FACW+	Natural	Wet meadows, low open woods and swamps.
Thalictrum	thalictroides	Anemone, rue	S	7		FACU-	Natural	Rich woods.
Thelypteris	noveboracensis	Fern, New York	N	3		FAC	Natural	Moist woods, thickets and swamps, in humus-rich, moderately acidic soils.
Tilia	americana	Basswood	N	7			Natural	NJ: Rich woods, Hunterdon>
Toxicodendron	radicans	Ivy, poison	N	1		FAC	Natural	Open woods, roadside thickets, fencerows and edges.
Trifolium	aureum	Large yellow hop-clover	I	0		N	Natural	Roadsides, dry fields and waste places.
Trifolium	dubium	Little hop-clover	I	0		UPL	Natural	Dry roadsides, old sand pits and lawns.
Trifolium	hybridum	Alsike clover	I	0		FACU-	Natural	Roadsides, clearings and fields.
Trifolium	pratense	Clover, red	I	0		FACU-	Natural	Widely grown as a forage plant, also extensively naturalized on roadsides, pastures and fields.
Trifolium	repens	Clover, white	I	0		FACU-	Natural	Roadsides, meadows, old fields and lawns.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Ulmus	americana	Elm, american	N	6		FACW-	Natural	Stream banks and floodplains, in rich, alluvial soil.
Uvularia	sessilifolia	Bellwort; Wild-oats	N	6		FACU-	Natural	Moist, rich woods.
Verbena	hastata	Vervain, blue	N	3		FACW+	Natural	Moist thickets, floodplains, wet ditches and roadsides.
Vernonia	noveboracensis	Ironweed, New York	N	4		FACW+	Natural	Stream banks and wet fields, pastures or meadows.
Veronica	arvensis	Corn speedwell	I	0		N	Natural	Woods, roadside banks, meadows and lawns.
Veronica	officinalis	Common speedwell	I	0		FACU-	Natural	Woods, roadsides and shale barrens.
Viburnum	dentatum	Arrowwood, southern	N	5		FAC	Natural	Swamps and wet woods.
Viburnum	prunifolium	Viburnum, blackhaw	N	5		FACU	Natural	Woods, old fields, thickets and roadsides.
Vinca	minor	Periwinkle, common	I	0		N	Natural	Cultivated and occasionally naturalized in woods, fields and on roadside banks.
Viola	cucullata	Violet, blue-marsh	N	10		FACW+	Natural	Swamps, bogs and wet meadows.
Viola	sororia var. sororia	Violet, common blue	N	2		FAC-	Natural	Meadows and woods.
Vitis	labrusca	Fox grape	N	7		FACU	Natural	Rocky woods, moist thickets and stream banks.
Vitis	riparia	Grape, frost	N	4		FACW	Natural	River banks and alluvial thickets.
Vitis	vulpina	Grape, frost	N	4		FAC	Natural	Woods, thickets, rocky slopes, roadsides and sand dunes.
Wolffia	punctata	Dotted Wolffia	N	4			Natural	NJ: Stagnant waters.
Viola	blanda var blanda	Sweet white violet	N	6		FACW	Natural	Moist, shady woods and cool ravines.
Viola	pubescens	Yellow Forest Violet	N	7			Natural	NJ: Rich woods, a little drier woods.
Rosa	palustris var palustrus	Swamp rose	N	6		OBL	Natural	Swamps and marshes.
Viola	affinis	Violet, LeConte's	N	5		FACW	Natural	Rich moist woods, especially on alluvial soil.
Cardamine	bulbosa	Bitter-cress; Spring cress	N	7		OBL	Natural	Low wet ground, shallow water, swamps or springy areas.
Phlox	maculata ssp. maculata	Wild sweet-william/ Spotted Plhox	N	10	S3	FACW	Natural	Wet meadows, abandoned fields and open thickets.
Cinna	arundinacea	Reedgrass, wood	N	4		FACW	Natural	Swamps and wet woods.
Botrychium	virginianum	Fern, rattlesnake	N	6		FACU	Natural	Dry or moist, humus-rich woods, in subacidic to circumneutral soils.
Mitchella	repens	Partridge-berry	N	5		FACU	Natural	Woods.
Mimulus	alatus	Monkey-flower, winged	N	7	S3	OBL	Natural	Swamps, wet meadows and shores.
Teucrium	canadense var. virginicum	Wild germander	N	4		FACW	Natural	Floodplains, moist fields, fencerows and lake margins.
Rhododendron	periclymenoides	Pinxter-flower	N	5		FAC	Natural	Dry to moist, acidic woods.
Monotropa	uniflora	Indian-pipe	N	8		FACU-	Natural	Dry to moist woods, in humus.
Laportea	canadensis	Nettle, wood	N	6		FAC	Natural	Low, moist woods and stream banks.
Symphyotrichum	lateriflorum	Calico aster	N	3		FACW-	Natural	Old fields, rocky woods, roadsides and waste ground.
Solidago	patula	Goldenrod, spreading	N	9		OBL	Natural	Swamps, floodplains and moist woods.NJ: marl seep.

BOWMAN'S HILL WILDFLOWER PRESERVE

PO BOX 685
NEW HOPE, PA 18938
(215) 862-2924 • FAX (215) 862-1846
vannais@bhwp.org • www.bhwp.org

Bowman's Hill Wildflower Preserve's Plant Stewardship Index

Site Information

BHWP List #: 746

State: New Jersey

Zip code: 08559

Restoration: No

Plot Information

Plot Code	Plot Description

Site Summary

This list contains 124 plants, of which 87% are native to New Jersey

Plant Stewardship Index	Total Mean C	Native Mean C	Floristic Quality Index
45.42	4.37	5.02	52.15

Bowman's Hill Wildflower Preserve is extremely grateful to the following persons for contributing their time and expertise so generously in assigning the Coefficients of Conservatism, producing the checklist of species in the database, and other expert assistance. Pennsylvania: Janet Ebert, Jack Holt and Anne Rhoads New Jersey: Karl Anderson, Emile De Vito, Ted Gordon, Tom Halliwell, Linda Kelly, Mary Leck, Bill Olson, Bill Rawlyk and Kathleen Strakosch Walz And of course for the invaluable guidance and experienced advice of Dr. Gerould Wilhelm and Leslie Jones Sauer.

Key to Index Header

PA CC	Pennsylvania Piedmont Coefficient of Conservatism
NJ CC	New Jersey Coefficient of Conservatism
N	Native
I	Introduced
na	Not on state list
*	Under consideration, or may not be enough specimen data

Wetland Indicator Definitions (Rhoads and Block)

OBL	Obligate Wetland Species	99%
FACW	Facultative Wetland Species	67-99%
FAC	Facultative Species	34-66%
FACU	Facultative Upload Species	1-33%
UPL	Obligate Upland Species	1%

Rank

	NJ Rank		**PA Rank**
SX	Extirpated	PE	Endangered
S1	Critically imperiled	PT	Threatened
S2	Imperiled	PR	Rare
S3	Vulnerable	PX	Extirpated
SH	Historic	PV	Vulnerable
.1	Elements documented from a single location	TU	Tentatively Undertermined

Assignment of Coefficients

0 to 3	Plants with a high range of ecological tolerances/found in a variety of plant communities
4 to 6	Plants with an intermediate range of ecological tolerances/associated with a specific plant community
7 to 8	Plants with a poor range of ecological tolerances/associated with advanced successional state
9 to 10	Plants with a high degree of fidelity to a narrow range of habitats

Methodology

1) Compile a plant list of the species within the assessment area.

2) Assign the Coefficient of Conservatism (CC) to each plant documented on the plant list.

3) Calculate the Native Mean Coefficient value by totaling the CCs and divide the sum by the number of native plant species within the assessed area.

4) **OR** Calculate the Total Mean Coefficient value by totaling the CCs and divide by the sum of the total number of plants (native and introduced) within the assessed area.

5) Multiply the Native Mean Coefficient OR the Total Mean Coefficient by the square root of the total of the number of native plant species

FQI = Native Mean C x Sqrt N

PSI = Total Mean C x Sqrt N

FQI =	Floristic Quality Index
PSI =	Plant Stewardship Index
N =	Number of native species
I =	Number of introduced species
Native Mean C =	Sum of Coefficients / N
Total Mean C =	Sum of Coefficients / N + I

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Acer	rubrum var. rubrum	Red maple	N	3		FAC	Natural	Dry to moist woods, swamps and bogs. NJ: throughout.
Acer	saccharum var. saccharum	Sugar maple	N	5		FACU	Natural	Moist woods, wooded slopes, ravines and alluvial areas.
Actaea	alba	White Baneberry/ Doll's Eyes	N	5			Natural	
Adiantum	pedatum	Fern, Northern maidenhair	N	7		FAC-	Natural	Moist, shaded, humus-rich woods, in subacidic to neutral soils.
Eupatorium	rugosum	Snakeroot, white	N	3		N	Natural	Woods, meadows and roadsides.
Agrimonia	gryposepala	Agrimony/ Tall Hairy Agrimony	N	4		FACU	Natural	Woods, fields and floodplains.
Alliaria	petiolata	Mustard, garlic	I	0		FACU-	Natural	Disturbed woods, floodplains and waste ground.
Allium	vineale	Garlic, field	I	0		FACU-	Natural	Disturbed woods, fields and lawns.
Amphicarpaea	bracteata	Hog peanut	N	4		FAC	Natural	Moist woods and alluvium.
Arisaema	triphyllum ssp. triphyllum	Jack-in-the-pulpit	N	5		FACW-	Natural	Moist woods, swamps and bogs.
Artemisia	vulgaris	Common mugwort	I	0		N	Natural	Gardens, lawns, roadsides, thickets, waste ground and rubbish dumps.
Asarum	canadense var. canadense	Wild ginger	N	8		FACU-	Natural	Moist, rich woods.
Asplenium	platyneuron	Ebony spleenwort	N	3		FACU	Natural	Dry to moist, wooded slopes and rock ledges, in subacidic soils.
Berberis	thunbergii	Barberry, Japanese	I	0		N	Natural	Disturbed woods, roadsides and hedgerows.
Betula	lenta	Birch, sweet	N	6		FACU	Natural	Woods and stream banks.
Betula	nigra	Birch, river	N	7		FACW	Natural	Floodplains, stream banks, wet woods and swamps.
Bidens	frondosa	Beggar-ticks	N	2		FACW	Natural	Moist, open ground, stream banks and roadsides.
Botrychium	dissectum	Cut-leaved grape-fern	N	5		FAC	Natural	Moist, open woods, meadows and barrens, in moderately acidic soils.
Botrychium	virginianum	Fern, rattlesnake	N	6		FACU	Natural	Dry or moist, humus-rich woods, in subacidic to circumneutral soils.
Bromus	pubescens	Brome, Canada	N	8		N	Natural	Dry to moist woods and thickets.
Carex	blanda	Sedge; woodland sedge	N	6		FAC	Natural	Dry to moist woods, thickets and meadows.
Carex	pensylvanica	Sedge, Pennsylvania	N	5		N	Natural	Open woods and wooded slopes.
Carpinus	caroliniana	Hornbeam; Ironwood	N	7		FAC	Natural	Rich, moist woods and stream edges.NJ: Floodplains.
Carya	cordiformis	Hickory, bitternut	N	8		FACU+	Natural	Moist woods and stream banks.
Carya	glabra	Pignut hickory	N	7		FACU-	Natural	Upland woods, dry ridge tops and slopes.
Carya	ovata	Hickory, shagbark	N	7		FACU	Natural	Low, moist woods and slopes, in rich soil.
Carya	tomentosa	Hickory, mockernut	N	5		FACU	Natural	Moist, open woods and slopes.
Chimaphila	maculata	Wintergreen, spotted ; Pipsissewa	N	5		N	Natural	Woods.
Cimicifuga	racemosa	Cohosh, black; Black snakeroot	N	9		N	Natural	Rich woods.
Cinna	arundinacea	Reedgrass, wood	N	4		FACW	Natural	Swamps and wet woods.
Circaea	lutetiana ssp. canadensis	Enchanter's-nightshade	N	6		FACU	Natural	Rocky, upland woods, damp woods and floodplains.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Commelina	communis var. communis	Asiatic dayflower	I	0		FAC-	Natural	Gardens, woods, roadsides, stream banks and disturbed ground.
Cornus	florida	Dogwood, flowering	N	5		FACU-	Natural	Rich, moist woods and woods edges.
Dennstaedtia	punctilobula	Fern, hay-scented	N	4		N	Natural	Open woods, meadows and slopes, in acidic soils.NJ: Banks.
Dichanthelium	clandestinum	Panic grass, hidden	N	3			Natural	
Dioscorea	villosa	Wild yam	N	7		FAC+	Natural	Woods, thickets and rocky slopes.
Dryopteris	carthusiana	Fern, toothed wood	N	5		FAC+	Natural	Moist to wet woods and swamps.
Dryopteris	intermedia	Fern, evergreen wood	N	8		FACU	Natural	Moist woods, shaded slopes and swamp hummocks, in humus-rich, acidic to neutral soils.
Dryopteris	marginalis	Fern, marginal wood	N	9		FACU-	Natural	Rocky ledges, talus slopes and shaded edges, in subacidic to circumneutral soils.
Elaeagnus	umbellata	Olive, autumn	I	0		N	Natural	Planted by the Game Commission and extensively naturalized in old fields and abandoned pastures.
Elymus	hystrix	Grass, bottlebrush	N	5		N	Natural	Moist, alluvial woods.NJ: floodplains.
Elymus	riparius	Riverbank wild-rye	N	5		FACW	Natural	Alluvial flats, meadows and stream banks.NJ: floodplains.
Epifagus	virginiana	Beechdrops	N	10		N	Natural	Beech woods, parasitic on the roots of Fagus grandifolia.
Erechtites	hieraciifolia	Fireweed	N	0		FACU	Natural	Fields, woods, clearings and waste ground.
Eurybia	divaricata	White wood aster	N	4		N	Natural	Woods.
Fagus	grandifolia	Beech, american	N	8		FACU	Natural	A dominant tree of mature forests on moist, rich soils.
Fraxinus	americana var. americana	White ash	N	7		FACU	Natural	Woods, fencerows and old fields.
Galinsoga	parviflora	Small-flowered quickweed	I	0		N	Natural	Floodplains, streets, waste ground and ballast.
Galium	circaezans var. circaezans	Wild licorice	N	8		UPL	Natural	Rich woods and wooded, calcareous slopes.
Galium	triflorum	Bedstraw, sweet-scented	N	5		FACU	Natural	Rocky woods, shaded hillsides and roadside banks.
Geranium	maculatum	Geranium, wood	N	4		FACU	Natural	Rich woods, roadsides and fields.
Glechoma	hederacea	Ivy, ground	I	0		FACU	Natural	Fields, disturbed woods, roadsides, gardens and waste ground.
Hackelia	virginiana	Beggar's-lice; virginia stickseed	N	2		FACU	Natural	Dry to moist woods, wooded slopes and roadsides.
Hamamelis	virginiana	Witchhazel	N	7		FACU+	Natural	Rich, rocky woods.
Hedeoma	pulegioides	American pennyroyal	N	1		N	Natural	Dry fields, pastures, woods and roadsides.
Hydrophyllum	virginianum	Waterleaf, Virginia	N	9		FAC	Natural	Moist woods, thickets and stream banks.
Impatiens	capensis	Jewelweed; Touch-me-not	N	2		FACW	Natural	Moist meadows, swamps and stream banks.
Juglans	nigra	Walnut, black	N	2		FACU	Natural	Open woods and meadows in moist, rich, alluvial soils.
Juniperus	virginiana	Eastern red-cedar	N	2		FACU	Natural	Old fields, serpentine barrens and other moist to dry, sterile soils.
Laportea	canadensis	Nettle, wood	N	6		FAC	Natural	Low, moist woods and stream banks.
Leersia	virginica	Cutgrass/White grass	N	3		FACW	Natural	Swamps or moist woods.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Liriodendron	tulipifera	Tuliptree; Yellow poplar	N	5		FACU	Natural	A common forest tree of rich woods.
Lindera	benzoin	Spicebush	N	5		FACW-	Natural	A common component of moist, rich woods.
Lonicera	japonica var. japonica	Japanese honeysuckle	I	0		FAC-	Natural	Disturbed woods, fields, thickets, banks and roadsides.
Maianthemum	canadensis var canadensis	Canada mayflower	N	4		FAC-	Natural	NJ: Moist woods, beech forests, mesic marshes.
Maianthemum	racemosum	False Solomon's Seal	N	5			Natural	
Menispermum	canadense	Moonseed	N	6		FACU	Natural	Moist ground of stream banks and edges.
Microstegium	vimineum	Stiltgrass, japanese	I	0		FAC	Natural	Moist ground of open woods, thickets, paths, clearings, fields and gardens.
Mitchella	repens	Partridge-berry	N	5		FACU	Natural	Woods.
Muhlenbergia	sobolifera	Creeping muhly/Rock Dropseed	N	7		N	Natural	Dry, rocky slopes./ NJ: Rocky woods
Muhlenbergia	frondosa	Wirestem muhly/Leafy Dropseed	N	3		FAC	Natural	Moist, open woods and stream banks.NJ: Highlands
Onoclea	sensibilis	Fern, sensitive	N	2		FACW	Natural	Marshes, swamps, moist open woods and wet meadows, in subacidic soils.
Osmorhiza	claytonii	Sweet-cicely	N	4		FACU-	Natural	Rich woods, wooded stream banks and wet meadows.NJ: North.
Osmorhiza	longistylis	Aniseroot	N	5		FACU	Natural	Rich woods, moist wooded slopes and thickets.NJ: North jersey inner coastal plain
Osmunda	claytoniana	Fern, Interrupted	N	7		FAC	Natural	Moist woodlands, bog edges and hummocks, in subacidic to neutral soilsNJ: Wetland edges..
Ostrya	virginiana	Hop-hornbeam	N	7		FACU-	Natural	Dry, wooded slopes, often on calcareous soils.
Paronychia	canadensis	Chickweed, forked	N	5		N	Natural	Open woods, in dry rocky or sandy soil.
Parthenocissus	quinquefolia	Virginia-creeper	N	1		FACU	Natural	Woods, fields and edges.
Penstemon	digitalis	Beard-tongue, Foxglove	N	3		FAC	Natural	Meadows, old fields and roadsides.
Phegopteris	hexagonoptera	Fern, Southern beech	N	8		FAC	Natural	Rich, moist wooded slopes and swamp margins, in humus-rich, moderately acidic soils.
Phytolacca	americana	Pokeweed	N	0		FACU+	Natural	Forest openings, waste ground and gardens.
Pilea	pumila	Clearweed	N	3		FACW	Natural	Cool, moist, shady areas.
Platanus	occidentalis	Sycamore	N	4		FACW-	Natural	Stream banks, low woods, floodplains and alluvial soils.
Polygonatum	biflorum var. biflorum	Solomon's-seal	N	8		FACU	Natural	Deciduous woods, rocky slopes and roadside banks.
Polygonum	caespitosum	Cespitose Knotweed	I	0			Natural	
Polygonum	sagittatum	Tearthumb, arrow-leaved	N	5		OBL	Natural	Low moist ground, vernal ponds, bogs, swamps or marshes.
Polygonum	virginianum	Jumpseed	N	4		FAC	Natural	Moist open woods, floodplains and roadsides.
Polystichum	acrostichoides	Fern, Christmas	N	7		N	Natural	Shaded slopes and well-drained flats, in subacidic to circumneutral soils.
Potentilla	simplex	Cinquefoil, common	N	2		FACU-	Natural	Dry woods, fields, meadows and roadsides.
Prenanthes	alba	Rattlesnake-root; white rattlesnake-root	N	6		FACU	Natural	Rocky woods, barrens and roadsides.
Prunus	serotina	Cherry, wild black	N	1		FACU	Natural	Woods and fencerows.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Quercus	alba	Oak, white	N	4		FACU	Natural	A dominant forest tree on dry to moist sites.
Quercus	palustris	Oak, pin	N	3		FACW	Natural	Low, moist or seasonally wet woods or swamps.
Quercus	rubra	Oak, northern red	N	7		FACU-	Natural	A dominant forest tree on moist to dry sites.
Quercus	velutina	Oak, black	N	6		N	Natural	A dominant forest tree on moist to dry soils.
Ranunculus	recurvatus	Hooked crowfoot	N	3		FAC+	Natural	Damp or swampy woods or stream edges.
Rosa	multiflora	Rose, multiflora	I	0		FACU	Natural	Disturbed woods, pastures, old fields, roadsides and thickets.
Rubus	occidentalis	Raspberry, black	N	1		N	Natural	Sandy or rocky woods, wooded slopes and thickets.
Rubus	phoenicolasius	Wineberry	I	0		N	Natural	Roadsides, banks and thickets.
Sanguinaria	canadensis	Bloodroot	N	8		UPL	Natural	Rich woods and roadside banks.
Sassafras	albidum	Sassafras	N	2		FACU-	Natural	Old fields, hedgerows and woods edges.
Saxifraga	virginiensis	Saxifrage, early	N	6		FAC-	Natural	Moist or dry rock crevices and gravelly slopes.
Sedum	ternatum	Stonecrop, wild	N	9		N	Natural	Rocky banks, cliffs and woods.NJ: Piedmont, Wickecheoke floodplain.
Solidago	caesia var. caesia	Goldenrod, blue-stem; wreath	N	6		FACU	Natural	Rich woods.
Solidago	canadensis var. canadensis	Canada goldenrod	N	2		FACU	Natural	Fields and roadsides.
Staphylea	trifolia	Bladdernut	N	8		FAC	Natural	Moist, rocky woods and stream banks.
Stellaria	media	Common chickweed	I	0		N	Natural	A common weed of fields and gardens.
Symphyotrichum	cordifolium ssp. cordifolium	Blue wood aster; heart-leaved aster	N	7		N	Natural	Woods, meadows and roadsides.
Thalictrum	pubescens	Meadow-rue, tall	N	5		FACW+	Natural	Wet meadows, low open woods and swamps.
Thelypteris	noveboracensis	Fern, New York	N	3		FAC	Natural	Moist woods, thickets and swamps, in humus-rich, moderately acidic soils.
Tilia	americana var. americana	Basswood	N	7		FACU	Natural	Rich woods.
Toxicodendron	radicans	Ivy, poison	N	1		FAC	Natural	Open woods, roadside thickets, fencerows and edges.
Tsuga	canadensis	Hemlock, Canada	N	8		FACU	Natural	Cool, moist woods and shaded slopes.
Ulmus	americana	Elm, american	N	6		FACW-	Natural	Stream banks and floodplains, in rich, alluvial soil.
Veronica	officinalis	Common speedwell	I	0		FACU-	Natural	Woods, roadsides and shale barrens.
Viburnum	acerifolium	Viburnum, maple-leaved	N	8		N	Natural	Woods and thickets.
Viburnum	dentatum	Arrowwood, southern	N	5		FAC	Natural	Swamps and wet woods.
Viburnum	prunifolium	Viburnum, blackhaw	N	5		FACU	Natural	Woods, old fields, thickets and roadsides.
Viola	pubescens var pubescens	Downy yellow violet	N	7			Natural	NJ: Rich woods, a little drier woods.
Viola	sororia var. sororia	Violet, common blue	N	2		FAC-	Natural	Meadows and woods.
Vitis	vulpina	Grape, frost	N	4		FAC	Natural	Woods, thickets, rocky slopes, roadsides and sand dunes.
Prunella	vulgaris ssp. vulgaris	Heal-all	I	0		FACU+	Natural	Moist fields and fencerows.
Ranunculus	abortivus	Kidney-leaf Buttercup	N	1			Natural	
Polygonum	punctatum var. punctatum	Dotted smartweed	N	5		OBL	Natural	Moist pastures, river banks, bogs, swamps and swales.

BOWMAN'S HILL WILDFLOWER PRESERVE

PO BOX 685
NEW HOPE, PA 18938
(215) 862-2924 • FAX (215) 862-1846
vannais@bhwp.org • www.bhwp.org

Bowman's Hill Wildflower Preserve's Plant Stewardship Index

Site Information

BHWP List #: 756

State: New Jersey

Zip code: 08559

Restoration: No

Plot Information

Plot Code	Plot Description

Site Summary

This list contains 23 plants, of which 57% are native to New Jersey

Plant Stewardship Index	Total Mean C	Native Mean C	Floristic Quality Index
4.55	1.26	2.23	8.04

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Key to Index Header

PA CC	Pennsylvania Piedmont Coefficient of Conservatism
NJ CC	New Jersey Coefficient of Conservatism
N	Native
I	Introduced
na	Not on state list
*	Under consideration, or may not be enough specimen data

Wetland Indicator Definitions (Rhoads and Block)

OBL	Obligate Wetland Species	99%
FACW	Facultative Wetland Species	67-99%
FAC	Facultative Species	34-66%
FACU	Facultative Upload Species	1-33%
UPL	Obligate Upland Species	1%

Rank

	NJ Rank		**PA Rank**
SX	Extirpated	PE	Endangered
S1	Critically imperiled	PT	Threatened
S2	Imperiled	PR	Rare
S3	Vulnerable	PX	Extirpated
SH	Historic	PV	Vulnerable
.1	Elements documented from a single location	TU	Tentatively Undertermined

Assignment of Coefficients

0 to 3	Plants with a high range of ecological tolerances/found in a variety of plant communities
4 to 6	Plants with an intermediate range of ecological tolerances/associated with a specific plant community
7 to 8	Plants with a poor range of ecological tolerances/associated with advanced successional state
9 to 10	Plants with a high degree of fidelity to a narrow range of habitats

Methodology

1) Compile a plant list of the species within the assessment area.

2) Assign the Coefficient of Conservatism (CC) to each plant documented on the plant list.

3) Calculate the Native Mean Coefficient value by totaling the CCs and divide the sum by the number of native plant species within the assessed area.

4) **OR** Calculate the Total Mean Coefficient value by totaling the CCs and divide by the sum of the total number of plants (native and introduced) within the assessed area.

5) Multiply the Native Mean Coefficient OR the Total Mean Coefficient by the square root of the total of the number of native plant species

FQI = Native Mean C x Sqrt N

PSI = Total Mean C x Sqrt N

FQI =	Floristic Quality Index
PSI =	Plant Stewardship Index
N =	Number of native species
I =	Number of introduced species
Native Mean C =	Sum of Coefficients / N
Total Mean C =	Sum of Coefficients / N + I

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Agrostis	gigantea	Red Top	I	0		FACW-	Natural	Cultivated and frequently established in moist soil of fields, roadsides and waste ground.
Ambrosia	artemisiifolia	Ragweed, common	N	0		FACU	Natural	Fields, meadows, cultivated areas, roadsides and waste ground.
Andropogon	virginicus	Broom-sedge	N	2		FACU	Natural	Old fields, hillsides and waste ground, in dry, sterile soil.
Arthraxon	hispidus	Grass/ Arthraxon	I	0		FAC	Natural	Moist meadows and waste ground.
Bromus	inermis	Smooth brome/Hungarian Brome	I	0		N	Natural	Fields, roadsides and waste ground.
Cirsium	discolor	Field thistle	N	1		UPL	Natural	Abandoned fields, open hillsides and roadside banks.
Cyperus	strigosus	Sedge, false nut	N	1		FACW	Natural	Moist fields, woods, swamps and stream banks.
Dactylis	glomerata	Orchard Grass	I	0		FACU	Natural	Fields, meadows and roadsides.
Echinochloa	crusgalli var. crusgalli	Barnyard-grass	I	0		FACU	Natural	Fields, meadows, roadsides and waste ground.
Echinochloa	muricata var muricata		N	1			Natural	
Euthamia	graminifolia var. graminifolia	Grass-leaved goldenrod	N	1		FAC	Natural	Fields, roadsides, moist ditches or shores.
Linaria	vulgaris	Butter and eggs	I	0		N	Natural	Fields, roadsides, shale barrens, railroad tracks and waste ground.
Panicum	dichotomiflorum	Grass, smooth panic	N	0		FACW-	Natural	Dry to moist, open woods and meadows.
Phalaris	arundinacea	Reed canary grass	I	0		FACW	Natural	Marshes, alluvial meadows, shores and ditches.
Polygala	verticillata var. verticillata	Whorled milkwort	N	5		UPL	Natural	Dry, open woods, old fields and roadsides.
Pycnanthemum	tenuifolium	Mountain-mint, narrow-leaved	N	4		FACW	Natural	Moist old fields, sandy river banks or floodplains.
Scirpus	atrovirens	Bulrush, dark green	N	3		OBL	Natural	Moist meadows, marshes, bogs, pond and lake margins and stream banks.
Setaria	glauca	Yellow Foxtail	I	0			Natural	
Sorghastrum	nutans	Grass, Indian	N	7		UPL	Natural	Moist or dry fields, roadsides and serpentine barrens.
Symphyotrichum	racemosum	Small white aster	N	3		FAC	Natural	Low meadows, floodplains and swamps.
Tridens	flavus	Purpletop	N	1		FACU	Natural	Meadows, old fields and roadsides.
Trifolium	repens	Clover, white	I	0		FACU-	Natural	Roadsides, meadows, old fields and lawns.
Verbascum	thapsus	Common mullein	I	0		N	Natural	Fields, roadsides, shale barrens, railroad embankments and waste ground.

BOWMAN'S HILL WILDFLOWER PRESERVE

PO BOX 685
NEW HOPE, PA 18938
(215) 862-2924 • FAX (215) 862-1846
vannais@bhwp.org • www.bhwp.org

Bowman's Hill Wildflower Preserve's Plant Stewardship Index

Site Information

BHWP List #: 981

State: New Jersey

Zip code: 08559

Restoration: No

Plot Information

Plot Code	Plot Description

Site Summary

This list contains 73 plants, of which 100% are native to New Jersey

Plant Stewardship Index	Total Mean C	Native Mean C	Floristic Quality Index
39.33	4.60	4.60	39.33

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Total Mean C =	Sum of Coefficients / N + I

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Acalypha	virginica	Three-seeded mercury	N	5		FACU-	Natural	Dry or moist soil of fields, wooded slopes, stream banks and waste ground.
Alisma	subcordatum	Plantain, water	N	3		OBL	Natural	Marshes, stream and pond margins and muddy shores.NJ: tidal flats, ditches.
Amelanchier	arborea	Shadbush	N	7		FAC-	Natural	Rocky bluffs and upper slopes.NJ: North Jersey
Aralia	nudicaulis	Sarsaparilla, wild	N	5		FACU	Natural	Dry to moist woods.NJ: fields.
Eurybia	macrophylla	Bigleaf aster	N	7		N	Natural	Woods, rocky slopes and edges.
Betula	populifolia	Birch, gray	N	2		FAC	Natural	Old fields, open woods and disturbed areas, especially on dry, sterile soils.
Boehmeria	cylindrica var. cylindrica	False nettle	N	0		FACW+	Natural	Moist, shady ground of wet woods and stream margins.
Boehmeria	cylindrica	False Nettle	N	5			Natural	
Brachyelytrum	erectum	Brachyelytrum	N	7		N	Natural	Moist, wooded hillsides, alluvial woods and moist thickets.
Calamagrostis	canadensis	Bluejoint, Canada	N	5			Natural	
Celtis	occidentalis	Hackberry	N	0			Natural	
Chelone	glabra	Turtlehead	N	7		OBL	Natural	Stream banks, wet woods and swamps.
Cicuta	maculata var. maculata	Beaver-poison/ water hemlock	N	5		OBL	Natural	Swamps, marshes, wet meadows, stream banks and ditches.
Clematis	virginiana	Virgin's bower	N	5		FAC	Natural	Thickets and woods edges, in low ground.
Collinsonia	canadensis	Horse-balm; Stoneroot	N	9		FAC+	Natural	Rich woods and wooded floodplains.
Cornus	amomum ssp. amomum	Kinnikinik; silky dogwood	N	5		FACW	Natural	Moist woods, meadows, old fields and swamps.
Cornus	racemosa	Dogwood, gray; swamp	N	3		FAC-	Natural	Swampy meadows, wet woods and thickets.
Cryptotaenia	canadensis	Honewort	N	5		FAC	Natural	Moist woods, wooded stream banks and seeps.
Cystopteris	fragilis	Fern, fragile	N	0		FACU	Natural	Cool rock crevices and talus slopes, in neutral to subacidic soils.
Deschampsia	flexuosa	Hairgrass, common	N	3		N	Natural	Dry woods or rocky slopes.
Fraxinus	pennsylvanica	Ash, red	N	4		FACW	Natural	Alluvial woods, stream banks and moist fields.
Helianthus	decapetalus	Sunflower, thin-leaved	N	4		FACU	Natural	Fields, moist bottomlands, stream banks and roadsides.
Helianthus	divaricatus	Sunflower, woodland	N	6		N	Natural	Dry, wooded slopes, shale barrens and roadsides.
Heuchera	americana	Alum-root	N	10		N	Natural	Rich woods, rocky slopes and shaly cliffs.
Ilex	verticillata	Winterberry	N	5		FACW+	Natural	Swamps, bogs, moist woods and wet shores.
Kalmia	latifolia	Laurel, mountain	N	7		FACU	Natural	Dry to moist, acidic woods and slopes.
Lilium	canadense ssp. canadense	Canada lily		7		FAC+	Natural	Wet meadows, moist woods and thickets.
Lobelia	cardinalis	Cardinal-flower	N	5		FACW+	Natural	Wet meadows, swamps, ditches, stream banks and lake shores.
Lobelia	siphilitica	Lobelia, great blue	N	4		FACW+	Natural	Swamps, moist meadows, stream banks and ditches.
Ludwigia	palustris	Marsh-purslane	N	1		OBL	Natural	Swamps, moist meadows, muddy shores, stream banks and ditches.
Lycopus	americanus var longii	Water-horehound	N	4	S2S3	OBL	Natural	Shaded hillsides, fields, moist thickets, wet ditches and swamps.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Lycopus	virginicus	Bugleweed	N	4		OBL	Natural	Moist woods, stream banks, swamps and wet ditches.
Lysimachia	ciliata	Loosestrife, fringed	N	2		FACW	Natural	Low, moist ground of fields, stream banks and swamp edges.
Melampyrum	lineare	Cow Wheat	N	5			Natural	
Mimulus	alatus	Monkey-flower, winged	N	7	S3	OBL	Natural	Swamps, wet meadows and shores.
Mimulus	ringens	Monkey-flower, allegheny	N	5		OBL	Natural	Wet, open ground of swamps, meadows and shores.
Myrica	pensylvanica	Bayberry	N	0		FAC	Natural	Old fields or open woods, in dry to moist, sterile, sandy soils.
Nyssa	sylvatica	Black gum; Tupelo	N	4		FAC	Natural	Dry to moist woods, rocky slopes and ridge tops.
Osmunda	cinnamomea	Fern, cinnamon	N	4		FACW	Natural	Swamps, bog margins and stream banks, in wet acidic soils.
Parietaria	pensylvanica	Pellitory	N	9		N	Natural	Dry, rocky or gravelly woods, roadside banks and waste ground.
Penthorum	sedoides	Stonecrop, ditch	N	3		OBL	Natural	Low, wet ground and ditches.
Polygonatum	pubescens	Solomon's-seal, hairy	N	8		N	Natural	Wooded slopes, stream banks and fields.
Polygonum	pensylvanicum	Smartweed, Pennsylvania	N	2		FACW	Natural	Fields, woodland edges, stream banks, roadsides and waste ground.
Populus	grandidentata	Aspen, large-toothed	N	4		FACU-	Natural	Early successional woods and floodplains.
Potentilla	canadensis	Cinquefoil, dwarf	N	2		N	Natural	Dry, open woods and fields.
Prunus	virginiana	Cherry, choke	N	2		FACU	Natural	Rocky upland woods.
Pyrola	elliptica	Shinleaf	N	7		UPL	Natural	Dry to moist woods, on rich soils.
Pyrola	rotundifolia	Round-leaved Pyrola	N	8			Natural	NJ: Shaded.
Pyrus	coronaria	Wild Crab	N	0			Natural	
Quercus	bicolor	Oak, swamp white	N	7		FACW+	Natural	Low, moist forests and wooded swamps.
Quercus	coccinea	Oak, scarlet	N	6		N	Natural	Dry upper slopes and ridges, in poor soil.
Ranunculus	hispidus	Hairy buttercup	N	0		FAC	Natural	Dry rocky to rich moist oak and oak-hickory woods.
Rhus	glabra	Sumac, smooth	N	2		N	Natural	Shale barrens, old fields and dry, open slopes.
Rhus	typhina	Sumac, staghorn	N	2		N	Natural	Dry, open soil of old fields, roadsides and woods edges.
Rubus	allegheniensis	Blackberry, common	N	3		FACU-	Natural	Old fields, open woods and clearings.
Rubus	argutus	Sawtooth Blackberry	N	0			Natural	
Rubus	flagellaris	Dewberry, northern	N	2		FACU	Natural	Rocky or shaly slopes, cliffs and fields.
Salix	nigra	Willow, black	N	3		FACW+	Natural	Swamps, wet meadows and rich alluvial soils.
Sambucus	canadensis	Elder, american	N	2		FACW	Natural	Woods, fields, stream banks and moist roadsides.
Sanicula	marilandica	Black snake root	N	4		UPL	Natural	Moist woods, wooded limestone slopes, bogs and barrens.
Senecio	aureus	Ragwort, golden	N	4		FACW	Natural	Moist fields, woods, floodplains and roadsides.
Smilax	herbacea	Carrion-flower	N	5		FAC	Natural	Damp thickets, moist woods and floodplains.
Smilax	pseudochina	Halberd-leaved Greenbrier/ Bamboo vine	N	5	S3		Natural	NJ: Damp woods.
Smilax	rotundifolia	Catbrier/ Common Greenbrier	N	2		FAC	Natural	Moist to dry woods, thickets, roadsides, old fields and serpentine barrens.

Genus	Epithet	Common Name	NJ List	NJ CC	NJ Rank	Wetlands	Planted	Comments
Teucrium	canadense	Germander, american	N	10			Natural	
Thaspium	trifoliatum var. trifoliatum	Meadow-parsnip	N	3	S3	N	Natural	Woods, wooded slopes and edges.NJ: Mercer, Hunterdon, Somerset.
Tipularia	discolor	Orchid, cranefly ; Tallow-root	N	8	S3	FACU	Natural	Deciduous woods and stream banks.
Vaccinium	pallidum	Blueberry, lowbush	N	7		N	Natural	Dry, acidic woods.
Viola	cucullata	Violet, blue-marsh	N	10		FACW+	Natural	Swamps, bogs and wet meadows.
Viola	hirsutula	Violet, southern wood	N	10	S2	N	Natural	Rich, dry, open woods.NJ: Upland woods
Viola	rostrata	Violet, long-spurred	N	10		FACU	Natural	Rich woods.NJ: Hemlock ravines.
Vitis	labrusca	Fox grape	N	7		FACU	Natural	Rocky woods, moist thickets and stream banks.
Woodsia	obtusa	Blunt-lobed woodsia	N	5		N	Natural	Shaded rock crevices, talus slopes, sandy banks or masonry, in acidic to neutral soil.
Zizia	aurea	Golden-alexander	N	5		FAC	Natural	Wooded bottomland, stream banks, moist meadows and floodplains.

Appendix N. Amphibians of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Source: Field Guide to Reptiles and Amphibians of New Jersey Schwartz and Golden 2002

Common Name	Scientific Name	Status	Nativity
Northern Cricket Frog	*Acris crepitans*	U	Native
Jefferson Salamander	*Ambystoma jeffersonianum*	SC	Native
Blue-spotted Salamander	*Ambystoma laterale*	E	Native
Spotted Salamander	*Ambystoma maculatum*	D	Native
Marbled Salamander	*Ambystoma opacum*	SC	Native
American Toad	*Bufo americanus*	S	Native
Fowler's Toad	*Bufo woodhousii fowleri*	SC	Native
Northern Dusky Salamander	*Desmognathus fuscus*	S	Native
Northern Two-lined Salamander	*Eurycea bislineata*	S	Native
Long-tailed Salamander	*Eurycea longicauda*	T	Native
Northern Spring Salamander	*Gyrinophilus porphyriticus*	SC	Native
Four-toed Salamander	*Hemidactylium scutatum*	D	Native
Northern Gray Treefrog	*Hyla versicolor*	S	Native
Red-spotted Newt	*Notophthalmus viridescens*	S	Native
Red-backed Salamander	*Plethodon cinereus*	S	Native
Slimy Salamander	*Plethodon glutinosus*	S	Native
Northern Spring Peeper	*Pseudacris crucifer*	S	Native
Upland Chorus Frog	*Pseudacris triseriata ferarium*	U	Native
Northern Red Salamander	*Pseudotriton ruber*	D	Native
Bullfrog	*Rana catesbeiana*	S	Native
Green Frog	*Rana clamitans melanota*	S	Native
Pickerel Frog	*Rana palustris*	S	Native
Wood Frog	*Rana sylvatica*	S	Native
Southern Leopard Frog	*Rana utricularia*	S	Native

***WAP priority species are highlighted**

Species Status:

E - Endangered
T - Threatened
D - Decreasing
SC - Special Concern
S - Stable
U - Undertermined
I - Introduced
GS - Game Species

Appendix O. Reptiles of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
Source: Field Guide to Reptiles and Amphibians of New Jersey Schwartz and Golden 2002

Common Name	Scientific Name	Status	Nativity
Northern Copperhead	*Agkistrodon contortrix mokasen*	U - SC	Native
Eastern Worm Snake	*Carphophis amoenus*	U	Native
Common Snapping Turtle	*Chelydra serpentina*	S	Native
Eastern Painted Turtle	*Chrysemys picta*	S	Native
Spotted Turtle	*Clemmys guttata*	U - SC	Native
Wood Turtle	*Clemmys insculpta*	T	Native
Bog Turtle	*Clemmys muhlenbergi*	Federally Threatened, State Endangered	Native
Northern Black Racer	*Coluber constrictor*	U	Native
Northern Ringneck Snake	*Diadophis punctatus edwardsi*	S	Native
Black Rat Snake	*Elaphe obsoleta*	U	Native
Five-lined Skink	*Eumeces fasciatus*	U	Native
Map Turtle	*Graptemys geographica*	U	Native
Eastern Hognose Snake	*Heterodon platyrhinos*	D	Native
Eastern Mud Turtle	*Kinosternon subrubrum*	U	Native
Eastern Milk Snake	*Lampropeltis triangulum*	S	Native
Northern Water Snake	*Nerodia sipedon*	S	Native
Smooth Green Snake	*Opheodrys vernalis*	U	Native
Stinkpot	*Sternotherus odoratus*	S	Native
Northern Brown Snake	*Storeria dekayi*	S	Native
Northern Red-bellied Snake	*Storeria occipitomaculata*	S	Native
Eastern Box Turtle	*Terrapene carolina*	S - SC	Native
Eastern Ribbon Snake	*Thamnophis sauritus*	S	Native
Eastern Garter Snake	*Thamnophis sirtalis*	S	Native
Red-eared Slider	*Trachemys scripta elegans*	I	Non-Native

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Appendix P. Birds of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
(Source: Birds of New Jersey, Walsh et al. 1999)

Common Name	Scientific Name	Species Status
Alder Flycatcher	Empidonax alnurum	INC
American Black Duck	Anas rubripes	RP
American Crow	Corvus brachyrhynchos	S
American Goldfinch	Carduelis tristis	INC
American Kestrel	Falco sparverius	SC
American Redstart	Setophaga ruticilla	INC
American Robin	Turdus migratorius	S
American Woodcock	Philohela minor	RP
Baltimore Oriole	Icterus galbula	RP
Bank Swallow	Riparia riparia	S
Barn Swallow	Hirundo rustica	S
Barred Owl	Strix varia	T
Belted Kingfisher	Ceryle alcyon	S
Black Vulture	Coragyps atratus	INC
Black-and-white Warbler	Miniotilta varia	RP
Black-billed Cuckoo	Coccyzus erythropthalmus	RP
Black-capped Chickadee	Paurs atricapillus	S
Black-throated Green Warbler	Dendroica virens	SC
Blue Jay	Cyanocitta cristata	D
Blue-gray Gnatcatcher	Polioptila caerulea	S
Blue-winged Warbler	Vermivora pinus	RP
Bobolink	Dolichonyx oryzivorus	T
Broad-winged hawk	Buteo platypterus	SC
Brown Thrasher	Toxostoma rufum	RP
Brown-headed Cowbird	Molothrus ater	S
Canada Goose	Branta canadensis	INC
Carolina Wren	Thryothorus ludovicianus	INC
Cedar Waxwing	Bombycilla cedrorum	S
Cerulean Warbler	Dendroica cerulea	SC
Chestnut-sided Warbler	Dendroica pensylvanica	S
Chimney Swift	Chaetura pelagica	RP
Chipping Sparrow	Spizella passerina	S
Cliff Swallow	Hirundo pyrrhonota	SC
Common Grackle	Quiscalus quiscula	D
Common Merganser	Mergus merganser	S
Common Moorhen	Gallinula chloropus	U
Common Nighthawk	Chordeiles minor	SC
Common Yellowthroat	Geothlypis trichas	D
Cooper's Hawk	Accipiter Cooperii	T
Downy Woodpecker	Picoides pubescens	S
Eastern Bluebird	Sialia sialis	INC
Eastern Kingbird	Tyrannus Tyrannus	RP
Eastern Meadowlark	Sturnella magna	SC
Eastern Phoebe	Sayornis phoebe	S

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Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
(Source: Birds of New Jersey, Walsh et al. 1999)

Common Name	Scientific Name	Species Status
Eastern Screech Owl	Otus asio	RP
Eastern Towhee	Pipilo erythrophthalmus	RP
Eastern Wild Turkey	Meleagris gallopavo	INC
Eastern Wood Pewee	Contopus virens	RP
European Starling	Sturnus vulgaris	I
Field Sparrow	Spizella pusilla	RP
Fish Crow	Corvus ossifragus	S
Grasshopper Sparrow	Ammodramus savannarum	T
Gray Catbird	Dumetella carolinensis	RP
Great Blue Heron	Ardea herodias	SC
Great Crested Flycatcher	Myiarchus crinitus	RP
Great Horned Owl	Bubo virginianus	S
Green Heron	Butorides striatus	RP
Hairy Woodpecker	Picoides villosus	D
Hooded Warbler	Wilsonia citrina	RP
House Finch	Carpodacus mexicanus	S
House Sparrow	Passer domesticus	I
House Wren	troglogytes aedon	S
Indigo Bunting	Passerina cyanea	RP
Killdeer	Charadrius vociferus	S
Least Flycatcher	Empidonax minimus	SC
Louisiana Waterthrush	Seiurus motacilla	RP
Mallard	Anas platyrhynchos	INC
Mourning Dove	Zenaida macroura	S
Mute Swan	Cygnus olor	I
Northern Bobwhite	Colinus virginianus	RP
Northern Cardinal	Cardinalis cardinalis	INC
Northern Flicker	Colaptes auratus	RP
Northern Goshawk	Accipiter gentilis	E
Northern Mockingbird	Mimus polyglottos	D
Northern Parula	Parula americana	SC
Northern Rough-winged Swallow	Stelgidopteryx serripennis	S
Orchard Oriole	Icterus spurius	S
Osprey	Pandion haliaetus	T
Ovenbird	Seiurus aurocapillus	D
Pileated Woodpecker	Dryocopus pileatus	D
Pine Warbler	Dendroica pinus	RP
Prairie Warbler	Dendroica discolor	RP
Purple martin	Progne subis	S
Red-bellied Woodpecker	Melanerpes carolinus	INC
Red-eyed Vireo	Vireo olivaceus	S
Red-shouldered Hawk	Buteo lineatus	E
Red-tailed Hawk	Buteo jamaicensis	INC
Red-winged Blackbird	Agelaius phoeniceus	S

Appendix P. Birds of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
(Source: Birds of New Jersey, Walsh et al. 1999)

Common Name	Scientific Name	Species Status
Ring-necked Pheasant	Phasianus colchicus	D
Rock Dove	Columba livia	I
Rose-breasted Grosbeak	Pheucticus ludovicianus	RP
Ruby-throated Hummingbird	Archilochus colubris	D
Ruffed Grouse	Bonasa umbellus	D
Savannah Sparrow	Passerclus sandwichensis	T
Scarlet Tanager	Piranga olivacea	RP
Sharp-shinned Hawk	Accipiter striatus	SC
Song Sparrow	Melospiza melodia	D
Spotted Sandpiper	Actitis macularia	SC
Swamp Sparrow	Melospiza georgiana	D
Tree Swallow	Tachycineta bicolor	INC
Tufted Titmouse	Parus bicolor	INC
Turkey Vulture	Cathartes aura	INC
Veery	Catharus fuscescens	SC
Vesper Sparrow	Pooecetes gramineus	E
Warbling Vireo	Vireo gilvus	S
White-breasted Nuthatch	Sitta carolinensis	INC
White-eyed Vireo	Vireo griseus	D
White-throated Sparrow	Zonotrichia albicollis	D
Willow Flycatcher	Empidonax traillii	RP
Wood Duck	Aix sponsa	RP
Wood Thrush	Hylocichla mustelina	RP
Yellow Warbler	Dendroica petechia	S
Yellow-billed Cuckoo	Coccyzus americanus	RP
Yellow-breasted Chat	Icteria virens	SC
Yellow-throated Vireo	Vireo flavifrons	RP
Yellow-throated Warbler	Dendroica dominica	RP

***WAP priority species are highlighted**

Species Status:

E - Endangered
T - Threatened
SC - Special Concern
D - Decreasing
INC - Increasing
RP - Regional Priority
S - Stable
U - Undertermined
I - Introduced
P - Peripheral

Appendix Q. Mammals of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
(Source: The Mammals of the State of New Jersey,
A Preliminary Annotated List, Richard Van Gelder, 1984)

COMMON NAME	SCIENTIFIC NAME	STATUS
Beaver	Castor candensis	INC
Big Brown Bat	Eptesicus fuscus	S
Black Bear	Ursus americanus	INC
Bobcat	Felis rufus	E
Brown Rat	Rattus norvegicus	I
Eastern Chipmunk	Tamias striatus	S
Eastern Cottontail	Sylvilagus floridanus	S
Eastern Coyote	Canis latrans, var.	INC
Eastern Mole	Scalopus aquaticus	S
Eastern Pipistrel	Pipistrellus subflavus	U
Gray Fox	Urocyon cinereoargenteus	S
Gray Squirrel	Sciurus carolinensis	S
House mouse	Mus musculus	I
Little Brown Bat	Myotis lucifugus	S
Long-tailed Weasel	Mustela frenata	S
Masked Shrew	Sorex cinereus	S
Meadow Jumping Mouse	Zapus hudsonius	U
Meadow Vole	Microtus pennsylvanicus	S
Mink	Mustela vison	S
Muskrat	Ondatra zibethicus	S
Opossum	Didelphis marsupialis	S
Raccoon	Procyon lotor	S
Red Bat	Lasiurus borealis	S - SC
Red Fox	Vulpes vulpes	S
Red Squirrel	Tamiasciurus hudsonicus	S
River Otter	Lutra canadensis	S - GS
Short-tailed Shrew	Blarina brevicauda	S
Silver-haired Bat	Lasionycteris noctivagans	U - SC
Southern Flying Squirrel	Glaucomys volans	U
Star-nosed Mole	Condylura cristata	U
Striped Skunk	Mephitis mephitis	S
White-footed Mouse	Peromyscus leucopus	S
White-tailed Deer	Odocoileus virginianus	D
Woodchuck	Marmota monax	S
Woodland Jumping Mouse	Napaeozapus insignis	U

***WAP priority species are highlighted**

Species Status:

E - Endangered	S - Stable
T - Threatened	U - Undertermined
D - Decreasing	I - Introduced
INC - Increasing	P - Peripheral
SC - Special Concern	GS - Game Species

Appendix R. Freshwater Fish of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
(Source: NJ Division of Fish & Wildlife, http://www.njfishandwildlife.com/chkfish.htm)

Common Name	Scientific Name	Family Name	Status	Status
Alewife	*Alosa pseudoharengus*	Clupeidae	None	Native
American Brook Lamprey	*Lampetra appendix*	Petromyzontidae	SC	Native
American Eel	*Anguilla rostrata*	Anguillidae	None	Native
American Shad	*Alosa sapidissima*	Clupeidae	None	Native
Atlantic Sturgeon	*Acipenser oxyrhynchus*	Acipenseridae	SC	Native
Banded Killifish	*Fundulus diaphanus*	Cyprinodontidae	None	Native
Banded Sunfish	*Eleacanthus obesus*	Centrarchidae	None	Native
Black Bullhead	*Ameiurus melas*	Ictaluridae	None	Non-Native
Black Crappie	*Pomoxis nigromaculatus*	Centrarchidae	None	Non-Native
Blackbanded Sunfish	*Eleacanthus chaetodon*	Centrarchidae	None	Native
Blacknose Dace	*Rhinichthys atratulus*	Cyprinidae	None	Native
Blueback Herring	*Alosa aestivalis*	Clupeidae	None	Native
Bluegill	*Lepomis macrochirus*	Centrarchidae	None	Non-Native
Bluespotted Sunfish	*Eleacanthus gloriosus*	Centrarchidae	None	Native
Bluntnose Minnow	*Pimephales notatus*	Cyprinidae	None	Non-Native
Bowfin	*Amia calva*	Amiidae	None	Non-Native
Bridle Shiner	*Notropis bifrenatus*	Cyprinidae	SC	Native
Brook Trout	*Salvelinus fontinalis*	Salmonidae	None	Native
Brown Bullhead	*Ameiurus nebulosus*	Ictaluridae	None	Native
Brown Trout	*Salmo trutta*	Salmonidae	None	Non-native
Chain Pickerel	*Esox niger*	Esocidae	None	Native
Channel Catfish	*Ictalurus punctatus*	Ictaluridae	None	Non-Native
Comely Shiner	*Notropis amoenus*	Cyprinidae	None	Native
Common Carp	*Cyprinus carpio*	Cyprinidae	None	Non-Native
Common Shiner	*Luxilis cornutus*	Cyprinidae	None	Native
Creek Chub	*Semotilus atromaculatus*	Cyprinidae	None	Native
Creek Chubsucker	*Erimyzon oblongus*	Catostomidae	None	Native
Cutlips Minnow	*Exoglossum maxillingua*	Cyprinidae	None	Native
Eastern Mosquitofish	*Gambusia holbrooki*	Poeciliidae	None	Native
Eastern Mudminnow	*Umbra pygmaea*	Umbridae	None	Native
Eastern Silvery Minnow	*Hybognathus regius*	Cyprinidae	None	Native
Fallfish	*Semotilus corporalis*	Cyprinidae	None	Native
Fathead Minnow	*Pimephales promelas*	Cyprinidae	None	Non-Native
Fourspine Stickleback	*Apletes quadracus*	Gasterosteidae	None	Native
Gizzard Shad	*Drosoma cepedianum*	Clupeidae	None	Native
Golden Shiner	*Notemigonus crysoleucas*	Cyprinidae	None	Native
Goldfish	*Carassius auratus*	Cyprinidae	None	Non-Native
Grass Carp	*Ctenopharyngodon idella*	Cyprinidae	None	Non-Native
Green Sunfish	*Lepomis cyanellus*	Centrarchidae	None	Non-Native
Hickory Shad	*Alosa mediocris*	Clupeidae	WAP Priority	Native
Hogchoker	*Trinectes maculatus*	Soleidae	None	Native
Ironcolor Shiner	*Notropis chalybaeus*	Cyprinidae	None	Native
Lake Trout	*Salvelinus namaycush*	Salmonidae	None	Non-Native
Largemouth Bass	*Micropterus salmoides*	Centrarchidae	None	Non-Native
Longnose Dace	*Rhinichthys cataractae*	Cyprinidae	None	Native
Longnose Gar	*Lepisosteus osseus*	Lepisosteidae	None	Native - Extirpated
Margined Madtom	*Noturus insignis*	Ictaluridae	None	Native
Mosquitofish	*Gambusia affinis*	Poeciliidae	None	Non-Native
Mud Sunfish	*Acantharchus pomotis*	Centrarchidae	None	Native
Mummichog	*Fundulus heteroclitus*	Cyprinodontidae	None	Native
Muskellunge	*Esox masquinongy*	Esocidae	None	Non-Native
Ninespine Stickleback	*Pungitius pungitius*	Gasterosteidae	None	Native
Northern Hog Sucker	*Hypentelium nigricans*	Catostomidae	None	Native
Northern Pike	*Esox lucius*	Esocidae	None	Non-Native

Appendix R. Freshwater Fish of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
(Source: NJ Division of Fish & Wildlife, http://www.njfishandwildlife.com/chkfish.htm)

Common Name	Scientific Name	Family Name	Status	Status
Oriental Weatherfish	*Misgurnus anguillicaudatus*	Cobitidae	None	Non-Native
Pirate Perch	*Aphredoderus sayanus*	Aphredoderidae	None	Native
Pumpkinseed	*Lepomis gibbosus*	Centrarchidae	None	Native
Quillback	*Carpiodes cyprinus*	Cyprinidae	None	Native
Rainbow Smelt	*Osmerus mordax*	Osmeridae	None	Native
Rainbow Trout	*Oncorhynchus mykiss*	Salmonidae	None	Non-Native
Redbreasted Sunfish	*Lepomis auritus*	Centrarchidae	None	Native
Redfin Pickerel	*Esox americanus*	Esocidae	None	Native
Rock Bass	*Ambloplites rupestris*	Centrarchidae	None	Non-Native
Satinfin Shiner	*Cyprinella analostana*	Cyprinidae	None	Native
Sea Lamprey	*Petromyzon marinus*	Petromyzontidae	None	Native
Shield Darter	*Percina peltata*	Percidae	None	Native
Shortnose Sturgeon	*Acipenser brevirostrum*	Acipenseridae	Federally and State Endangered	Native
Slimy Sculpin	*Cottus cognatus*	Cottidae	None	Native
Smallmouth Bass	*Micropterus dolomieu*	Centrarchidae	None	Non-Native
Spotfin Shiner	*Cyprinella spiloptera*	Cyprinidae	None	Native
Spottail Shiner	*Notropis husdonius*	Cyprinidae	None	Native
Striped Bass	*Morone saxatilis*	Moronidae	None	Native
Swallowtail Shiner	*Notropis procne*	Cyprinidae	None	Native
Swamp Darter	*Etheostoma fusiforme*	Percidae	None	Native
Tadpole Madtom	*Noturus gyrinus*	Ictaluridae	None	Native
Tessellated Darter	*Etheostoma olmstedi*	Percidae	None	Native
Threespoine Stickleback	*Gasterosteus aculeatus*	Gasterosteidae	None	Native
Walleye	*Sander vitreus*	Percidae	None	Non-Native
Warmouth	*Lepomis gulosus*	Centrarchidae	None	Non-Native
White Catfish	*Ameiurus catus*	Ictaluridae	None	Native
White Crappie	*Pomoxis alularis*	Centrarchidae	None	Non-Native
White Perch	*Morone americana*	Moronidae	None	Native
White Sucker	*Catostomus commersoni*	Catostomidae	None	Native
Yellow Bullhead	*Ameiurus natalis*	Ictaluridae	None	Native
Yellow Perch	*Perca flavescens*	Percidae	None	Native

***WAP priority species are highlighted**

Species Status:

E - Endangered
T - Threatened
D - Decreasing
SC - Special Concern
S - Stable
U - Undertermined
I - Introduced
GS - Game Species

Appendix S. Butterflies and Moths of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Source: National Biological Information Infrastructure and Montana State University
www.butterfliesandmoths.org

Note: Each species has a link to its own webpage.

Brush-footed Butterflies (*Nymphalidae*)	
Admirals and Relatives (*Limenitidinae*)	
'Astyanax' Red-spotted Purple (Limenitis arthemis astyanax)	None
Red-spotted Purple or White Admiral (Limenitis arthemis)	None
Viceroy (Limenitis archippus)	None
Emperors (*Apaturinae*)	
Tawny Emperor (Asterocampa clyton)	None
Longwings (*Heliconiinae*)	
Aphrodite Fritillary (Speyeria aphrodite)	None
Great Spangled Fritillary (Speyeria cybele)	None
Meadow Fritillary (Boloria bellona)	None
Regal Fritillary (Speyeria idalia)	None
Silver-bordered Fritillary (Boloria selene)	T
Milkweed Butterflies (*Danainae*)	
Monarch (Danaus plexippus)	None
Satyrs and Wood-Nymphs (*Satyrinae*)	
Appalachian Brown (Satyrodes appalachia)	None
Common Wood Nymph (Cercyonis pegala)	None
Little Wood Satyr (Megisto cymela)	None
Northern Pearly Eye (Enodia anthedon)	None
Snouts (*Libytheinae*)	
American Snout (Libytheana carinenta)	None
True Brushfoots (*Nymphalinae*)	
American Lady (Vanessa virginiensis)	None
Baltimore (Euphydryas phaeton)	None
Common Buckeye (Junonia coenia)	None
Compton Tortoiseshell (Nymphalis vaualbum)	None
Eastern Comma (Polygonia comma)	None
Gray Comma (Polygonia progne)	None
Harris' Checkerspot (Chlosyne harrisii)	None
Mourning Cloak (Nymphalis antiopa)	None
Painted Lady (Vanessa cardui)	None
Pearl Crescent (Phyciodes tharos)	None
Question Mark (Polygonia interrogationis)	None
Red Admiral (Vanessa atalanta)	None
Gossamer-wing Butterflies (*Lycaenidae*)	
Blues (*Polyommatinae*)	None
Appalachian Azure (Celastrina neglecta-major)	None
Eastern Tailed-Blue (Cupido comyntas)	None
Spring Azure (Celastrina "ladon")	None
Coppers (*Lycaeninae*)	
American Copper (Lycaena phlaeas)	None
Bronze Copper (Lycaena hyllus)	E
Hairstreaks (*Theclinae*)	N/A
Brown Elfin (Callophrys augustinus)	None
Coral Hairstreak (Satyrium titus)	None
Edwards' Hairstreak (Satyrium edwardsii)	None

Appendix S. Butterflies and Moths of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

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Note: Each species has a link to its own webpage.

Frosted Elfin (Callophrys irus)	T
Gray Hairstreak (Strymon melinus)	None
Juniper Hairstreak (Callophrys gryneus)	None
Striped Hairstreak (Satyrium liparops)	None
White M Hairstreak (Parrhasius m-album)	None
Harvesters (*Miletinae*)	
Harvester (Feniseca tarquinius)	None
Parnassians and Swallowtails (*Papilionidae*)	
Swallowtails (*Papilioninae*)	
Eastern Tiger Swallowtail (Papilio glaucus)	None
Black Swallowtail (Papilio polyxenes)	None
Pipevine Swallowtail (Battus philenor)	None
Spicebush Swallowtail (Papilio troilus)	None
Skippers (*Hesperiidae*)	
Grass Skippers (*Hesperiinae*)	
Arogos Skipper (Atrytone arogos)	None
Black Dash (Euphyes conspicua)	None
Broad-winged Skipper (Poanes viator)	None
Common Roadside-Skipper (Amblyscirtes vialis)	None
Delaware Skipper (Anatrytone logan)	None
Dun Skipper (Euphyes vestris)	None
Dusted Skipper (Atrytonopsis hianna)	None
European Skipper (Thymelicus lineola)	None
Fiery Skipper (Hylephila phyleus)	None
Indian Skipper (Hesperia sassacus)	None
Least Skipper (Ancyloxypha numitor)	None
Little Glassywing (Pompeius verna)	None
Long Dash (Polites mystic)	None
Mulberry Wing (Poanes massasoit)	None
Northern Broken-Dash (Wallengrenia egeremet)	None
Ocola Skipper (Panoquina ocola	None
Peck's Skipper (Polites peckius)	None
Sachem (Atalopedes campestris)	None
Swarthy Skipper (Nastra lherminier)	None
Tawny-edged Skipper (Polites themistocles)	None
Zabulon Skipper (Poanes zabulon)	None
Spread-wing Skippers (*Pyrginae*)	
Columbine Duskywing (Erynnis lucilius)	None
Common Checkered-Skipper (Pyrgus communis)	None
Common Sootywing (Pholisora catullus)	None
Dreamy Duskywing (Erynnis icelus)	None
Hoary Edge (Achalarus lyciades)	None
Juvenal's Duskywing (Erynnis juvenalis)	None
Mottled Duskywing (Erynnis martialis)	None
Northern Cloudywing (Thorybes pylades)	None
Silver-spotted Skipper (Epargyreus clarus)	None

Appendix S. Butterflies and Moths of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Source: National Biological Information Infrastructure and Montana State University
www.butterfliesandmoths.org

Note: Each species has a link to its own webpage.

Southern Cloudywing (Thorybes bathyllus)	None
Sphinx Moths, Hawkmoths (*Sphingidae*)	
Sphinginae (*Sphinginae*)	
Ash sphinx (Manduca jasminearum	None
Franck's sphinx (Sphinx franckii	None
Great ash sphinx (Sphinx chersis	None
Pawpaw sphinx (Dolba hyloeus	None
Waved sphinx (Ceratomia undulosa	None
Macroglossinae (*Macroglossinae*)	
Achemon sphinx (Eumorpha achemon	None
Lettered sphinx (Deidamia inscriptum	None
Nessus sphinx (Amphion floridensis	None
Pandorus sphinx (Eumorpha pandorus)	None
Snowberry clearwing (Hemaris diffinis	None
Prominents (*Notodontidae*)	
Angle-Lined Prominent (Clostera inclusa)	None
Angulose Prominent (Peridea angulosa)	None
Angus's Datana (Datana angusii)	None
Black-blotched Schizura (Schizura leptinoides)	None
Black-rimmed Prominent (Pheosia rimosa)	None
Black-Spotted Prominent (Dasylophia anguina)	None
Chestnut Schizura (Schizura badia)	None
Chocolate Prominent (Peridea ferruginea)	None
Clostera strigosa (Clostera strigosa)	None
Common Gluphisia (Gluphisia septentrionis)	None
Double-lined Prominent (Lochmaeus bilineata)	None
Double-toothed Prominent (Nerice bidentata)	None
Drab Prominent (Misogada unicolor)	None
Elegant Prominent (Odontosia elegans)	None
Furcula occidentalis (Furcula occidentalis)	None
Georgian Prominent (Hyperaeschra georgica)	None
Heterocampa zayasi (Heterocampa zayasi)	None
Linden Prominent (Ellida caniplaga)	None
Maple Prominent (Heterocampa guttivitta)	None
Morning-glory Prominent (Schizura ipomoeae)	None
Mottled Prominent (Macrurocampa marthesia)	None
Notodonta scitipennis (Notodonta scitipennis)	None
Oval-based Prominent (Peridea basitriens)	None
Red-washed Prominent (Oligocentria semirufescens)	None
Sigmoid Prominent (Clostera albosigma)	None
Small Heterocampa (Heterocampa subrotata)	None
Unicorn Caterpillar Moth (Schizura unicornis)	None
Variable Oakleaf Caterpillar Moth (Lochmaeus manteo)	None
Wavy-lined Heterocampa (Heterocampa biundata)	None
White Furcula (Furcula borealis)	None
White-blotched Heterocampa (Heterocampa umbrata)	None

Appendix S. Butterflies and Moths of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation

Source: National Biological Information Infrastructure and Montana State University
www.butterfliesandmoths.org

Note: Each species has a link to its own webpage.

White-dotted Prominent (Nadata gibbosa)	None
White-Streaked Prominent (Oligocentria lignicolor)	None
Tiger Moths and Lichen Moths (*Arctiidae*)	
Tiger Moths (*Arctiinae*)	
Apantesis carlotta (Apantesis carlotta)	None
Figured Tiger Moth (Grammia figurata)	None
Virbia nigricans (Virbia nigricans)	None
Syntomine Moths (*Syntominae*)	None
Virginia Ctenucha (Ctenucha virginica)	None
Whites and Sulphurs (*Pieridae*)	
Sulphurs (*Coliadinae*)	
Clouded Sulphur (Colias philodice)	None
Cloudless Sulphur (Phoebis sennae)	None
Little Yellow (Pyrisitia lisa)	None
Orange Sulphur (Colias eurytheme)	None
Whites (*Pierinae*)	N/A
Cabbage White (Pieris rapae)	None
Checkered White (Pontia protodice)	T
Falcate Orangetip (Anthocharis midea)	None
Wild Silk Moths (*Saturniidae*)	
Giant Silkworm Moths (*Saturniinae*)	
Cecropia silkmoth (Hyalophora cecropia)	None
Luna moth (Actias luna)	None
Polyphemus moth (Antheraea polyphemus)	None
Promethea silkmoth (Callosamia promethea)	None
Tuliptree silkmoth (Callosamia angulifera)	None
Royal Moths (*Citheroniinae*)	
Imperial moth (Eacles imperialis)	None
Pink-striped oakworm moth (Anisota virginiensis)	None
Rosy maple moth (Dryocampa rubicunda)	None
Royal Walnut Moth (Citheronia regalis)	None

***WAP priority species are highlighted**

Species Status:
E - Endangered, S - Stable
T - Threatened, U - Undetermined
D - Decreasing, I - Introduced
SC - Special Concern, GS - Game Species

Appendix T. Dragonflies and Damselflies of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
Source: Barlow et al. 2009

Common Name	Scientific Name	Status
BROAD-WINGED DAMSELS	**CALOPTERYGIDAE**	
River Jewelwing	Calopteryx aequabilis	None
Ebony Jewelwing	Calopteryx maculata	None
American Rubyspot	Hetaerina americana	None
SPREADWINGS	**LESTIDAE**	
Great Spreadwing	Archilestes grandis	None
Emerald Spreadwing	Lestes dryas	None
Spotted Spreadwing	Lestes congener	None
Slender Spreadwing	Lestes rectangularis	None
Swamp Spreadwing	Lestes vigilax	None
POND DAMSELS	**COENAGRIONIDAE**	
Dusky Dancer	Argia translata	None
Blue-ringed Dancer	Argia sedula	None
Violet Dancer	Argia fumipennis violacea	None
Powdered Dancer	Argia moesta	None
Blue-fronted Dancer	Argia apicalis	None
Aurora Damsel	Chromagrion condidtum	None
Double-striped Bluet	Enallagma basidens	None
Tule Bluet	Enallagma carunculatum	None
Familiar Bluet	Enallagma civile	None
Azure Bluet	Enallagma aspersum	None
Stream Bluet	Enallagma exsulans	None
Skimming Bluet	Enallagma geminatum	None
Orange Bluet	Enallagma signatum	None
Citrine Forktail	Ischnura hastata	None
Fragile Forktail	Ischnura posita	None
Eastern Forktail	Ischnura verticalis	None
DARNERS	**AESHNIDAE**	
Shadow Darner	Aeshna umbrosa	None
Common Green Darner	Anax junius	None
Green-striped Darner	Aeshna verticalis	None
Springtime Darner	Basiaeschna janata	None
Fawn Darner	Boyeria vinosa	None
Ocellated Darner	Boyeria grafiana	None
Swamp Darner	Epiaeschna heros	None
Dragonhunter	Hagenius brevistylus	None
CLUBTAILS	**GOMPHIDAE**	
Unicorn Clubtail	Arigomphus villosipes	None
Twin-spotted Spiketail	Cordulegaster maculata	None
Tiger Spiketail	Cordulegaster erronea	None
Black-shouldered Spinyleg	Dromogomphus spinosus	None
Cobra Clubtail	Gomphus (Gomphurus) vastus	None
Lancet Clubtail	Gomphus (Gomphus) exilis	None
Ashy Clubtail	Gomphus (Gomphus) lividus	None
Rapids Clubtail	Gomphus quadricolor	None
Arrow Clubtail	Stylurus spiniceps	None

Appendix T. Dragonflies and Damselflies of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
Source: Barlow et al. 2009

Common Name	Scientific Name	Status
Rusty Snaketail	Ophiogomphus rupinsulensis	None
Brook Snaketail	Ophiogomphus aspersus	T
Eastern Least Clubtail	Stylogomphus albistylus	None
CRUISERS	**MACROMIIDAE**	
Stream Cruiser	Didymops transversa	None
Illinois River Cruiser	Macromia illinoiensis illinoiensis	None
EMERALDS	**FAMILY CORDULIIDAE**	
Prince Baskettail	Epitheca (Epicordulia) princeps	None
Common Baskettail	Epitheca (Tetragoneuria) cynosura	None
Umber Shadowdragon	Neurocordulia obsoleata	None
SKIMMERS	**LIBELLULIDAE**	
Calico Pennant	Celithemis elisa	None
Halloween Pennant	Celithemis eponina	None
Eastern Pondhawk	Erythemis simplicicollis	None
White Corporal	Ladona exusta	None
Bar-winged Skimmer	Libellula axilena	None
Slaty Skimmer	Libellula incesta	None
Widow Skimmer	Libellula luctuosa	None
Twelve-spotted Skimmer	Libellula pulchella	None
Painted Skimmer	Libellula semifasciata	None
Great Blue Skimmer	Libellula vibrans	None
Blue Dasher	Pachydiplax longipennis	None
Wandering Glider	Pantala flavescens	None
Eastern Amberwing	Perithemis tenera	None
Common Whitetail	Plathemis lydia	None
Saffron-winted Meadowhawk	Sympetrum costiferum	None
Cherry-faced Meadowhawk	Sympetrum internum	None
Band-winged Meadowhawk	Sympetrum semicinctum	None
Autumn Meadowhawk	Sympetrum vicinum	None
Carolina Saddlebags	Tramea carolina	None
Black Saddlebags	Tramea lacerata	None

***WAP priority species are highlighted**

Species Status:

E - Endangered
T - Threatened
D - Decreasing
SC - Special Concern
S - Stable
U - Undertermined
I - Introduced
GS - Game Species

Appendix U. Freshwater Mussels of the Wickecheoke Creek Project Area
Wickecheoke Creek Preserve Management Plan
New Jersey Conservation Foundation
Source: Center for Biodiversity and Conservation at the
American Museum of Natural History
http://cbc.amnh.org/mussel/index.html

Scientific Name	Common Name	AMNH Abundance	State Status	Nativity
Corbicula fulminea	Asiatic Clam	uncommon, Non-native	**None**	**Non-Native**
Elliptio complanata	Eastern Elliptio	abundant	None	Native
Lampsilis cariosa	Yellow Lampmuseel	rare	T	Native
Lampsilis radiata	Eastern Lampmussel	rare	None	Native
Ligumia nasuta	Eastern Pondmussel	rare	T	Native
Pyganodon cataracta	Eastern Floater	abundant	None	Native

***WAP priority species are highlighted**

Species Status:

E - Endangered	S - Stable
T - Threatened	U - Undertermined
D - Decreasing	I - Introduced
SC - Special Concern	GS - Game Species

Method Name: Sentinel Seedlings

Concept: An experimental approach to measure the effectiveness of deer management programs and investigate potential for natural regeneration of trees and shrubs. The method involves planting red oak seedlings within upland forest habitat and measuring the percentage of browsed individuals after six months. [Note: Red oak is ubiquitous in upland forests of Northern New Jersey. Green ash should be utilized in wetland forests.]

Rationale: Experimental planting is a simple technique to determine current deer browse intensity that reduces 'ecological noise' involved with measuring browse impacts on existing woody plants. Factors that are controlled and/or accounted for within the methodology include: 1) difficulty in locating a statistically valid quantity of naturally occurring woody seedlings (e.g., little or no existing natural woody vegetation below the browse line), 2) lack of natural regeneration following initiation of deer management programs caused by other factors (e.g., recovery lag time caused by various factors such as temporally low seed production, drought conditions that kill seedlings, or continuing impacts of low deer densities when little browse is available), 3) previous browse damage that complicates interpretation of browse levels in the time period of interest (e.g., ambiguity in separating new browse from old browse), and 4) clumped or sparse distribution of natural seedlings (e.g., adequate sampling of an entire area of interest is not possible).

Methods:

Materials –

1. Red Oak seedlings (1' to 3' tall only) - 10 per plot x ____ plots = ____ seedlings. [Note: Bare root seedlings are available from the New Jersey Forest Tree Nursery in Jackson, New Jersey. However, seedlings are usually only shipped in spring. Seedlings are sold in packs of 100. Prices are $38/pack (1-4 packs), $30/pack (5-24 packs), and $20/pack (25-75 packs). An alternative source for all planting is Croshaw Nursery in Columbus, New Jersey. They have 18"+ seedlings for $0.98/seedling (25-199 seedlings), $0.94/seedling (300-499 seedlings), and $0.60/seedling (>500 seedlings).] [Note: I will usually be purchasing seedlings for other organizations, so we could coordinate to achieve a bulk purchase discount.]
2. Meter stick
3. Flagging Tape (enough to mark mature trees surrounding each plot and to mark each seedling)
4. Pin Flags (enough to mark the four corners of each plot)
5. Seedling planting spade / tree bar (or other planting aide)
6. Compass (to determine north-south orientation of each plot)
7. GPS Unit (to determine the location of each plot)
8. Data sheets (see attached)

Procedures –

Timing - Seedlings should be planted while dormant in December. The recording of browse should be performed six months after planting (June). [Note: This timing is associated with the suspected maximum feeding season (i.e., winter through late spring) on woody plants by white-tailed deer. The timing also reduces the possibility of seedling death (and therefore lack of palatability) due to growing season events such as drought, insect herbivory, pathogen attack, etc. Finally, it allows for recording

seedling survival over winter in relation to the intensity of browse (i.e. If the seedling is alive, then they it will have sprouted by June).]

Sample Size - In past studies, I have calculated the total number of plots required by dividing the entire area of interest by 25 (i.e., 1 plot for each 25 acres). This number can be reduced if sampling of large areas is required. Conversely, if the area of interest is small, than plot density can be increased. [Note: Minimum sample size is 10 plots to account for natural variability].

Plot Placement Rules - To remove edge effects when testing forest areas, plots should be at least 25 meters from non-forest habitat (e.g., structures/disturbances including homes, roads, open fields, etc.). Unless specifically part of the experimental design, plots should not be located in large canopy gaps (i.e., canopy coverage less than 30% over an area greater than ¼ acre). Other areas that should be avoided include rock outcrops/areas too rocky to plant seedlings, early successional forest types (e.g., stem exclusion/pole phase, successional/dense red cedar woodlands), and other areas where seedlings are usually not found. If a pre-selected plot location (see below) does not meet the above criteria, then a new point should be randomly selected. [Note: Do not non-randomly shift the plot location to a more suitable nearby area away from the original grid point.]

Plot Location Selection - Each plot location should be chosen *randomly* on the established statewide 100 meter x 100 meter grid (see attached GIS shapefile). Random selection is achieved by systematic assignment of identification numbers to each grid point within the area of interest. Generally, one would 'clip' the statewide grid to the shape of the area of interest before assigning grid identification numbers (this is a simple operation within ArcMap). Plot selection is achieved by using a random numbers table or similar resources (see www.random.org) to select the number of plots desired from the full number of possible plots within the area of interest. [Note: If desired, sample plots can be 'stratified' by sub-areas within the entire area of interest. This would be beneficial wherever there is a special interest in assuring measurements at various locations (e.g., two distinct habitat types, areas near and distant to parking access, etc.).] [Note: The spacing of plot locations on the grid maintains independence of plots (i.e., two plots cannot be simultaneously considered during a single browse event). The 100 meter spacing also aids sample placement across the landscape and avoids potential placement bias (e.g., plot locations in known areas of high or low deer activity).]

Seedling Plot Design - Plant 10 seedlings in two parallel rows of 5 with 1 meter between adjacent seedlings. The long edge of plots should face North-South. Flagging tape should be placed in several trees surrounding the plot and pin flags should be placed in the four plot corners to assist with relocation. Flagging tape should be tied to the base of each seedling to assist with their relocation.

Browse Data Collection - Immediately upon planting seedlings within a plot, the number of intact end bud clusters should be counted on each seedling (end buds in oak species generally consist of a cluster of three or more buds at the terminus of a stem). [Note: Branches may break in the process of transporting and planting seedlings. An initial end bud cluster count allows clear interpretation of browse at the end of the experiment. Seedlings without end bud clusters should not be used in the experiment.] Final end bud cluster counts are performed after six months of exposure to deer browse. [Note: Although browse in forest habitat is usually associated with deer, a variety of other animals may browse woody seedlings. However, removal by deer is associated with a noticeably jagged/torn stem. Removal by rabbits and rodents are associated with a clean, angled stem cut (approximately 45°).]

Data Analysis - The proportion of seedlings receiving browse can be analyzed using Goodness-of-Fit statistics. Results can be compared against a pre-determined benchmark or pre- and post-implementation of a deer management program. If this methodology is used in multiple locations, then results can be compared with each other to statistically determine differences in deer browse between locations based upon a variety of potential factors (e.g., habitat types, deer management strategies, etc.). In addition, a simple review of the spatial pattern of browse should be performed. This can be accomplished by visual assessment of an aerial map depicting plot locations that are labeled with their respective percentages of seedlings browsed. [Note: Previous implementation of this protocol has shown that seedling browse is related to deer density (site 1: 90 deer per square mile = 50% browsed, site 2: 20 deer per square mile = 15% browsed). Neither of these sites had significant natural regeneration, which suggests that experimentally measured browse of 15% is not conducive to regeneration of trees and shrubs. At this time, I can only suggest that measured browse should be below 15%. To provide some guidance, I would assume that experimental seedling browse levels less than 10% would be related to improving advance regeneration and overall forest health.]

Method Name: Forest Secchi

Concept: A measurement of existing shrub and sapling cover in forest habitat. The method involves measuring the amount of a white board that is visually obstructed when viewed from a pre-determined point located 10 meters away.

Rationale: This method is a very rapid assessment of existing forest conditions and acts as an index of forest health. It is meant to complement the Sentinel Seedling study above that provides 'instantaneous measurements'. Interpretation of this method is unambiguous and can be used to determine the success of a mature deer management program (ideally, baseline data should be taken prior to initiation of a deer management program). Although this method is slower to show the benefits of a deer management program (see Sentinel Seedling rationale above), it directly measures a natural response of the forest to reduced deer densities and represents that ultimate desired condition (i.e., dense understory cover).

Methods:

<u>Materials</u> –

1. One meter square white foam board (should be able to be folded in half to facilitate movements through forest habitat)
2. Black tape (placed every 0.25m to create an evenly-spaced 16-cell grid on the white board)
3. Densiometer
4. 'Guide Post' – 1.4m tall (see text below)
5. Plot locations are the same as used above (materials included flagging tape, compass, GPS unit, measuring tape)
6. Data Sheets (see attached)

Procedures –

Forest Secchi measurements should be conducted at the same locations used for the Sentinel Seedling experiment. Measurements should be repeated every 2-4 years after collecting baseline data.
Timing – Sampling of existing woody vegetation can occur at any time during the growing season. To minimize data collection time when using the Sentinel Seedling experiment, measurements should be performed in June. [Note: In past experience, the most time consuming part of both techniques is travel time between plots. Data collection time for both techniques is minimal.]

Sample Size – See Sentinel Seedling above.

Plot Placement Rules – See Sentinel Seedling above.

Plot Location Selection – See Sentinel Seedling above. The same plots used in the Sentinel Seedling study should be used for the Forest Secchi measurements.

Data Collection – A 1-m^2 white foam board should be evenly divided into a 16-cell grid using black tape. The number of obstructed cells (partially or completely) should be recorded at a distance of 10 meters from the center point of the plot. Cover of native and non-native species should be recorded separately. For each point, four readings should be taken at the following compass bearings: NE, SE, SW, NW (readings should not be taken directly N-S so that any impacts on vegetation coincident with seedling planting does not alter measurements). The white board should be held 40 centimeters (1.31 feet) above the ground (top of board will then be 1.4 meters or 4.59 feet above ground). [Note: In past experience, deer begin to 'notice' woody vegetation greater than six inches tall. Therefore, sites with a history of high deer densities tend to have very low cover of woody plants taller than the lowest height of the board (i.e., 40 centimeters). The maximum typical height of deer browse damage does not exceed 1.4 meters.] [Note: The construction of a 1.4 meter post with Velcro strips at 0.4 and 1.4 meters (enough to hold the board - with matching Velcro strips - at the desired height) significantly increases the speed and accuracy of measurements. Ideally, a densiometer should be used to measure forest canopy coverage at each sampling point because shrub and tree sapling density can be impacted by shade (i.e., growth rates are lower under dense canopy coverage). [Note: Additional data collection, if resources permit, could include a list of woody species within plots, canopy species composition, herbaceous cover and species list, etc. Though not essential to data interpretation, this additional data could provide valuable information toward understanding the complexities of forest recovery upon implementation of an effective deer management program.]

Data Analysis – See Sentinel Seedling above. Additional analyses could include comparisons of native and non-native cover related to current browse measured via the Sentinel Seedlings. Unfortunately, there are no absolute thresholds to compare measured values. However, it is known that healthy forests have dense shrub layers. Therefore, an estimated threshold of approximately 70% mean woody cover has been tentatively adopted.

Figure 1. Tabular Data Summary Through 2010

											% Seedlings Browsed[x]			Woody Understory Cover			
Site Name	Site Manager	Municipality	County	# of plots	Site Acreage (Total)	Planted Species	Planting Date*	Ending Date*	Days Exposed	Plots Discovered (%)	Deer Browse	Other Browse	Total Browse	Native Cover	Non - Native Cover	Total Cover	Canopy Cover
Apshawa	NJCF	West Milford Twp	Passaic	19	570	red oak	8-Dec-06	29-Jun-07	201	100	33	3	36	24	4	24	93
Arena	FoHVOS	Hopewell Twp	Mercer	9	27	red oak	14-Dec-07	20-Jun-08	186	100	58	0	58	2	0	2	95
Baldpate Mountain	Mercer County et al.	Hopewell Twp	Mercer	38	1222	red oak	28-Dec-07	1-Jul-08	183	97	59	7	66	22	64	78	87
Blair Creek	TNC	Stillwater Twp	Sussex	20	480	red oak	22-Nov-04	26-May-05	184	60	14	0	14				
Bromley	D&R Greenway	East Amwell Twp	Hunterdon	10	100	green ash	9-Dec-09	8-Jul-10	209	100	50	0	50	37	43	71	99
Deerpath	NJAS	Bethlehem Twp	Hunterdon	10	198	red oak	7-Dec-06	17-May-07	160	80	37	0	37	27	25	52	69
Duke Farms	Duke Farms	Hillsborough Twp	Somerset	20	353	red oak	6-Dec-07	11-Jun-08	185	100	65	1	66	10	10	12	95
Eagle Rock Reservation	Essex County	West Orange / Montclair / Verona	Essex	20	405	red oak	9-Dec-09	15-Jun-10	186	100	64	2	65	12	2	14	93
Eames	FoHVOS	Hopewell Twp	Mercer	10	76	red oak	26-Dec-07	24-Jun-08	178	100	81	2	83	10	22	27	91
Elks	FoHVOS	Hopewell Twp	Mercer	10	46	green ash	3-Dec-06	26-Jun-07	203	100	82	0	82	10	11	20	98
Gomez	Hopewell Twp	Hopewell Twp	Mercer	10	59	red oak	26-Dec-07	25-Jun-08	179	100	74	0	74	12	54	62	82
Great Swamp NWR - Upland	USFWS	Chatham / Harding / Long Hill	Morris	10	9400	red oak	27-Dec-07	30-Jun-08	183	100	65	6	65	36	16	50	98
Great Swamp NWR - Wetland	USFWS	Chatham / Harding / Long Hill	Morris	29	9400	green ash	25-Dec-07	30-Jun-08	185	100	66	1	66	52	10	61	96
Heritage	FoHVOS	Hopewell Twp	Mercer	10	66	green ash	23-Dec-08	16-Jun-09	173	90	25	0	25	39	9	40	92
Johnsonburg	TNC	Frelinghuysen Twp	Warren	20	520	red oak	29-Nov-04	21-May-05	172	100	49	0	49				
Kuser Easement	FoHVOS	Hopewell Twp	Mercer	15	140	red oak	13-Dec-09	28-Jun-10	195	93	47	3	49	21	74	86	91
Lawrence & Stephens	FoHVOS, D&R Greenway	Hopewell Twp	Mercer	9	107	green ash	26-Dec-07	24-Jun-08	178	100	77	0	77	42	15	47	98
Mercer Park NW	Mercer County	Hopewell Twp	Mercer	14	786	green ash	27-Dec-08	18-Jun-09	171	93	48	2	50	25	4	29	92
Nayfield	FoHVOS	Hopewell Twp	Mercer	10	57	green ash	4-Dec-06	26-Jun-07	202	100	62	1	63	20	20	38	99

Figure 1. Tabular Data Summary Through 2010 (continued)

											% Seedlings Browsed[x]			Woody Understory Cover			
Site Name	Site Manager	Municipality	County	# of plots	Site Acreage (Total)	Planted Species	Planting Date*	Ending Date*	Days Exposed	Plots Discovered (%)	Deer Browse	Other Browse	Total Browse	Native Cover	Non - Native Cover	Total Cover	Canopy Cover
Old Farm	NJAS	Independence Twp	Warren	10	151	red oak	1-Dec-06	18-Jun-07	197	90	62	0	62	13	0	14	83
Newhouse Easement	FoHVOS	Hopewell Twp	Mercer	10	214	red oak	18-Dec-08	15-Jun-09	177	100	70	1	71	15	49	59	96
NJDWSC	NJDWSC	Ringwood Boro, Wanaque Boro	Passaic	40	6842	red oak	3-Jan-09	9-Jul-09	186	99	46	1	47	30	5	33	92
Northern Stony Brook - Upland	D&R Greenway	Hopewell Twp / East Amwell Twp	Mercer / Hunterdon	4	298	red oak	18-Dec-08	17-Jun-09	179	75	23	0	23	55	16	63	99
Northern Stony Brook - Wetland	D&R Greenway	Hopewell Twp / East Amwell Twp	Mercer / Hunterdon	8	298	green ash	18-Dec-08	17-Jun-09	179	100	33	3	35	29	37	59	99
Plainsboro	NJAS	Plainsboro Twp	Middlesex	11	600	red oak	11-Dec-06	22-Jun-07	191	100	64	0	64	12	0	12	85
Pochuck	NJAS	Vernon Twp	Sussex	10	221	red oak	19-Dec-06	20-Jul-07	211	100	38	0	38	23	12	35	72
Preston Easement	FoHVOS	Hopewell Twp	Mercer	10	76	red oak	18-Dec-08	15-Jun-09	177	100	62	10	72	6	25	29	97
Regan Property	Private (FoHVOS)	Hopewell Twp	Mercer	15	178	red oak	14-Dec-09	30-Jun-10	196	100	71	7	79	6	24	28	92
SBMWA	SBMWA	Hopewell Twp	Mercer	30	807	red oak	14-Dec-07	16-Jun-08	182	100	63	11	74	28	37	58	94
Scherman - Hoffman	NJAS	Bernards Twp	Morris	20	276	red oak	18-Nov-04	24-May-05	186	95	44	0	44				
Schiff 2006	Schiff	Mendahm Twp	Morris	15	340	red oak	10-Dec-06	30-Jun-07	200	100	57	2	59	6	30	33	95
Schiff 2008	Schiff	Mendahm Twp	Morris	17	512	red oak	4-Jan-09	28-Jun-09	174	100	75	3	78	7	46	53	98
Skyview	FoHVOS	Hopewell Twp	Mercer	10	79	green ash	23-Dec-08	16-Jun-09	173	100	57	8	65	13	60	67	90
South Mountain	Essex County	Maplewood / Millburn / South Orange	Essex	40	2047	red oak	22-Dec-07	24-Jun-08	182	100	82	1	82	10	4	13	95
Sparta Mountain	NJAS	Sparta Twp	Sussex	9	349	red oak	14-Dec-07	18-Jun-08	184	100	48	0	48	31	30	31	80
Tiger Brook / MacGregor	Chester Township	Chester Township	Morris	15	430	red oak	29-Dec-08	22-Jun-09	173	100	67	1	67	19	27	44	93
Thompson	FoHVOS	Hopewell Twp	Mercer	10	57	green ash	3-Dec-06	6-Jul-07	213	100	70	11	81	13	70	80	84
Washington Crossing SP	Division of Parks & Forestry	Hopewell Twp	Mercer	20	800	red oak	7-Dec-09	23-Jun-10	196	100	71	1	72	9	42	50	88
AVERAGES[T]				**16**	**1092**				**187**	**98**	**59**	**2**	**61**	**21**	**26**	**42**	**92**

N/A denotes that measurements were not recorded.

*The average date is presented for sites that required more than one day for planting and/or browse data collecion.

[T]Seedling browse measurements taken prior to June are not included in the average because experience has shown that significant browse occurs post leaf out, which makes May measurements biased toward lower browse percentages.

Figure 2. New Jersey Forest Health Monitoring System – Sentinel Seedling Graphed Data Through 2010

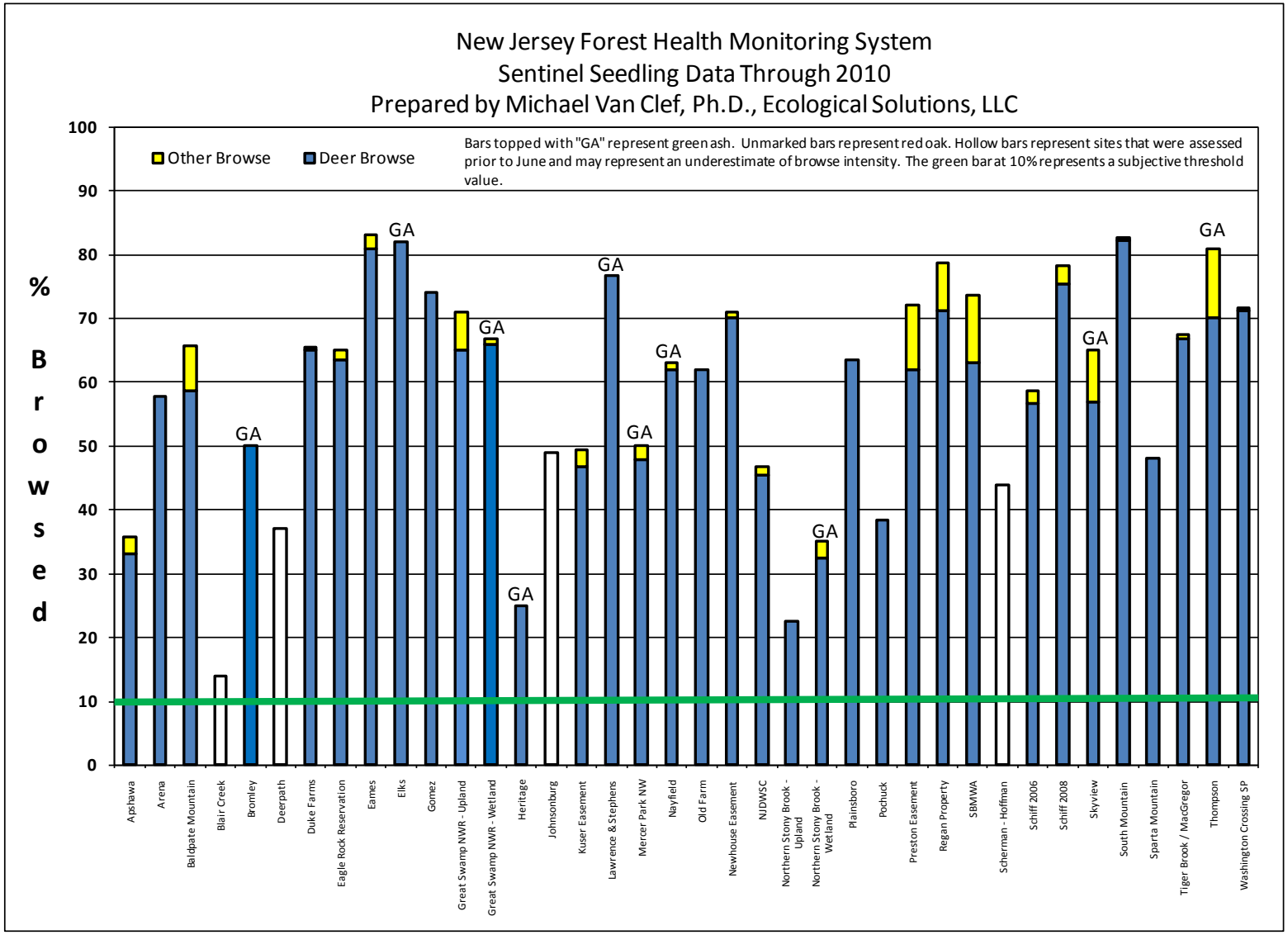
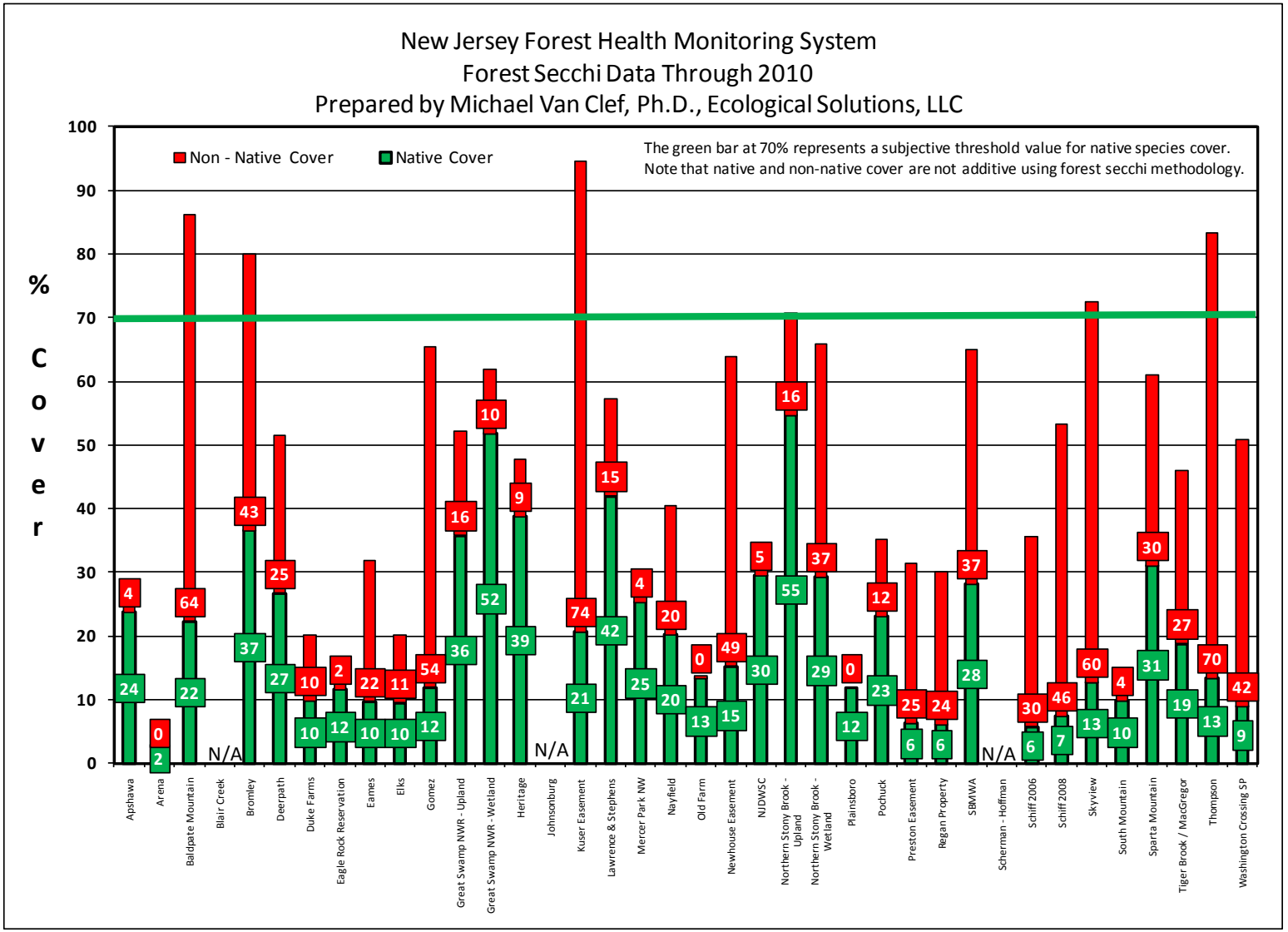


Figure 3. New Jersey Forest Health Monitoring System – Forest Secchi Graphed Data Through 2010



Preserve Monitoring Report

Preserve Name: _____ Inspection Date: _____

Monitor Name and Affiliation: _____

_____

_____

_____

_____

A. parking area and trail condition: Good: __ Fair: __ Poor: __ N/A:__ Explain any problems:

B. Did you see any hazards or potential liability factors? ___ Yes ___ No If yes, please explain:

C. Do any of the following problems exist? If so, please explain.

___ Off-road vehicles	___ Vandalism	___ Fire (including "party rings")
___ Litter / Dumping	___ Soil Erosion	___ Boundary Encroachment
___ Camping	___ Invasive Species	___ Illegal Hunting (Poaching)
___ Drainage issues	___ Pollution	___ Disease/Pest Infestation

___ Other Issues

D. Actions Taken by Monitor:

E. Future projects that should be considered:

F. Unique or unusual species identified:

G. Number of visitors encountered and their activities (e.g. hiking, bird watching, etc.):

FoHVOS Staff Use Only

Report Reviewed By: _____ Date: _____

Recommended Actions: _____