US Army Corps of Engineers®
New York District

THE PORT AUTHORITY OF NY & NJ

Liberty State Park Environmental Resources Inventory

Appendices

April 2004

Appendix A

Inventory of Plants, Benthic Macroinvertebrates, Fish and Wildlife Species Observed in Liberty State Park Jersey City, NJ

Table A-1 (Page 1 of 7). Plant species observed at Liberty State Park, Jersey City, N.J. during 1975-1976, 2001 and 2003 biological surveys.

Scientific Name	Common Name	Texas Instruments (1976)	MacFarlane (2001)	ERC (2003)	U.S. Nativity (Yes/No)[1]
Abutilon theophrasti	velvetleaf			X	N
Acer Rubrum	red maple	X		X	Y
Acer spp.	maple species		X		--
Achillea millefolium	yarrow	X	X	X	N
Agrostis hyemalis	bentgrass	X			Y
Agrostis sp.	bentgrass species			X	--
Ailanthus altissima	tree-of-heaven		X	X	N
Alliaria petiolata	garlic mustard			X	N
Ambrosia atremesifolia	common ragweed	X		X	Y
Ambrosia sp.	ragweed species			X	--
Amelanchier sp.	shadbush			X	--
Amorpha sp.	indigo species			X	--
Ampelopsis brevipedunculata	porcelainberry		X		N
Anaphalis margaritcea	pearly everlasting	X	X		Y
Andropogon sp.	beardgrass species			X	--
Andropogon virginianus	broomsedge	X	X		Y
Anthemis cotula	mayweed			X	N
Apocyanum cannibinum	hemp dogbane		X	X	Y
Apocyanum medium	intermediate dogbane	X			NL
Arabis sp.	rock-cress species			X	--
Arctium lappa	great burdock	X			N
Arctium minus	annual wormwood	X			N
Aristida oligantha	prairie three-awn			X	Y
Aristida sp.	three-awn grass species			X	--
Artemesia vulgaris	mugwort	X	X	X	N
Asclepias syrica	common milkweed	X	X	X	Y
Asclepias tuberosa	butterfly weed		X		Y
Asclepias variegata	white milkweed			X	Y
Asparagus officinalis	asparagus	X			N
Aster sp.	aster species	X	X	X	Y
Atriplex sp.	orache species	X			--
Baccharus halimifolia	eastern baccharis			X	Y
Barbarea vulgaris	winter cress	X		X	N
Betula papyrifera	paper birch	X			Y
Betula pendula	white birch			X	N
Betula populifolia	gray birch		X	X	Y
Betula sp.	birch species			X	--
Bidens aristosa	tickseed sunflower	X			Y
Boehmeria cylindrica	false nettle			X	Y
Brassica sp.	mustard species			X	--
Bulbostylis capillaris	hairgrass		X		Y
Bulbostylis sp.	bulbostylis species			X	--
Calamagrostis canadensis	bluejoint	X			Y
Calamagrostis epigeios	reed steppe grass		X	X	N
Cardaria draba	pepperweed			X	N

Table A-1 (Page 2 of 7). Plant species observed at Liberty State Park, Jersey City, N.J. during 1975-1976, 2001 and 2003 biological surveys.

Scientific Name	Common Name	Texas Instruments (1976)	MacFarlane (2001)	ERC (2003)	U.S. Nativity (Yes/No)[1]
Carex sp.	sedge species	X		X	--
Cassia nictitans	wild sensitive plant			X	Y
Celtis occidentalis	hackberry	X			Y
Centaurea sp.	knapweed species	X			--
Centauria maculosa	spotted knapweed		X	X	NL
Cerastium sp.	mouse-ear chickweed species			X	--
Cerastium vulgatum	mouse-ear chickweed	X			N
Chenopodium album	lambsquarters	X		X	N
Chichorium intybus	chickory	X			NL
Chrysanthemum luecanthemum	oxe-eye daisy	X	X		NL
Cinna sp.	woodreed species			X	--
Cirsium altissimum	tall thistle			X	Y
Cirsium arvense	Canada thistle	X	X	X	N
Cirsium discolor	field thistle			X	Y
Cirsium muticum	swamp thistle			X	Y
Cirsium vulgare	bull thistle	X			N
Cladonia cristatella	british soldier lichen		X	X	Y
Commelina communis	asiatic dayflower	X			N
Convolvulus arvensis	field bindweed	X			N
Convolvulus sp.	bindweed species			X	--
Cornus alterniflora	alternate-leaf dogwood			X	NL
Crepis sp.	hawksbeard species	X			--
Cyperus esculentus	yellow nutsedge			X	N
Cyperus odoratus	galingale	X			Y
Cyperus ovularis	ball sedge		X		Y
Cyperus ovularis	spike-ball sedge		X		Y
Cyperus strigosus	straw-colored cyperus		X	X	NL
Danthonia sp.	wild oat grass	X			--
Datura stramonium	jimsonweed	X		X	N
Daucus carota	wild carrot	X	X	X	N
Desmodium sp.	beggar's tick species			X	--
Dianthus sp.	pink species			X	--
Digitaria sanguinalis	large hairy crabgrass	X			Y
Dipsacus sp.	teasel species			X	--
Echium vulgare	vipers bugloss			X	N
Elaeagnus sp.	olive species			X	--
Elaeagnus umbellata	autumn olive			X	N
Eleocharis obtusa	blunt spike rush		X		Y
Eleocharis parvula	dwarf spike rush		X		Y
Eleocharis sp.	spike rush species	X		X	--
Equisetum arvense	horsetail		X	X	Y
Equisetum sp.	scouring rush species	X		X	--
Eragrostis pectinacea	nees pink grass			X	Y
Erigeron annuus	daisy fleabane			X	Y

Table A-1 (Page 3 of 7). Plant species observed at Liberty State Park, Jersey City, N.J. during 1975-1976, 2001 and 2003 biological surveys.

Scientific Name	Common Name	Texas Instruments (1976)	MacFarlane (2001)	ERC (2003)	U.S. Nativity (Yes/No)[1]
Erigeron philadelphicus	common fleabane			X	Y
Eupatorium hyssopifolium	hyssop-leaved boneset		X	X	Y
Eupatorium perfoliatum	boneset	X			Y
Eupatorium pilosum	hairy boneset		X		Y
Eupatorium rugosum	white snakeroot	X		X	Y
Eupatorium sp.	thoroughwort			X	--
Euphorbia supina	milk purslane			X	Y
Festuca elatior	meadow fescue	X			N
Festuca sp.	fescue species			X	--
Fragaria virginiana	wild strawberry	X			Y
Fraxinus americana	white ash		X		Y
Geranium carolinianum	Carolina cranesbill	X			Y
Graminae sp.	grass species			X	--
Habernaria sp.	orchis species			X	--
Helianthus tuberosus	Jerusalem artichoke	X			Y
Heterotheca subaxillaris	camphor weed		X		Y
Hibiscus palustris	marsh mallows		X	X	Y
Hieracium canadensis	Canada hawkweed	X			NL
Hieracium sp.	hawkweed species		X	X	--
Hydrangea sp.	hydrangea species			X	--
Hypericum gentianoides	orange grass		X	X	Y
Hypericum perforatum	common St. Johnswort	X		X	N
Hypericum punctatum	spotted St. Johnswort			X	Y
Hypericum sp.	St. Johnswort species			X	--
Juncus acuminatus	sharp-fruited rush		X		Y
Juncus effusus	common rush		X		Y
Juncus tennis	path rush			X	NL
Juncus torreyi	torrey's rush		X	X	Y
Juniperus virginiana	eastern red cedar			X	Y
Lactuca canadensis	prickly lettuce			X	Y
Lactuca sp.	lettuce species	X			--
Larix sp.	larch species			X	--
Lepidium sp.	peppergrass species			X	--
Lepidium virginicum	peppergrass	X			Y
Lespedeza sp.	bush clover species			X	--
Leucobryum glaucum	white cushion moss		X		Y
Lichen sp.	lichens species			X	--
Linaria vulgaris	butter and eggs	X		X	N
Linum sp.	flax species			X	--
Liquidambar sp.	sweetgum species			X	--
Lonicera japonica	Japanese honeysuckle			X	N
Lonicera morrocui x Bella	bella honeysuckle			X	NL
Lycopdium complantanum	running ground pine		X		NL
Lycopodium alopecuroides	fox-tail clubmoss		X		Y
Lycopus sp.	waterhorehound			X	--
Lythrum salicaria	purple loosestrife	X	X	X	N

Table A-1 (Page 4 of 7). Plant species observed at Liberty State Park, Jersey City, N.J. during 1975-1976, 2001 and 2003 biological surveys.

Scientific Name	Common Name	Texas Instruments (1976)	MacFarlane (2001)	ERC (2003)	U.S. Nativity (Yes/No)[1]
Malve moschata	musk mallow			X	NL
Marshallia sp.	marshallia species			X	--
Matricaria matricarioides	pineapple-weed	X			N
Medicago lupulina	black medik	X			NL
Medicago sativa	alfalfa	X			N
Melilotus alba	white sweet clover	X	X	X	N
Melilotus officianale	yellow sweet clover		X		NL
Melilotus sp.	sweet clover species			X	--
Mirabilis nyctaginea	4-o'clock	X			Y
Mirabilis sp.	4-o'clock species			X	--
Morella cerifera	common waxmyrtle			X	Y
Morus alba	white mulberry			X	N
Morus sp.	mulberry species			X	--
Moss sp.	moss species			X	--
Muhlenbergia sp.	muhly grass species			X	--
Myrica pensylvanica	northern bayberry		X	X	Y
Oenothera biennis	common evening primrose	X			Y
Onoclea sensibilis	sensitive fern	X	X	X	Y
Oxalis stricta	yellow wood sorrel	X			Y
Panicum dichotomiflorum	spreading witch grass	X		X	Y
Panicum sp.	panicum species	X		X	--
Panicum virgatum	switchgrass		X	X	Y
Parthenocissus quinquefolia	virginia creeper	X	X	X	Y
Parthenocissus tricuspidata	Boston ivy	X			N
Paspalum sp.	paspalum	X			--
Pastinaca sativa	wild parsnip	X	X	X	N
Phalaris arundinacea	reed canary grass			X	Y
Phlox paniculata	garden phlox			X	Y
Phragmites australis	common reed	X	X	X	Y
Phytolacca americana	American pokeweed	X			Y
Phytolacca sp.	pokeweed species			X	--
Picea glauca	white spruce			X	Y
Pinus strobus	white pine			X	Y
Pinus sylvestris	scotch pine			X	N
Plantago lanceolata	narrow-leaved plantain	X		X	N
Plantago major	common plantain	X			Y
Plantago sp.	plantain species			X	--
Platanus occidentalis	American sycamore			X	Y
Poa palustris	fowl meadow grass			X	Y
Poa pratensis	Kentucky bluegrass	X			N
Poa sp.	poa species			X	--
Poltrichum commune	hair-cap moss		X		NL
Polygonum aviculare	prostrate knotweed	X			N

Table A-1 (Page 5 of 7). Plant species observed at Liberty State Park, Jersey City, N.J. during 1975-1976, 2001 and 2003 biological surveys.

Scientific Name	Common Name	Texas Instruments (1976)	MacFarlane (2001)	ERC (2003)	U.S. Nativity (Yes/No)[1]
Polygonum cespitosum	lady's thumb	X		X	N
Polygonum cuspidatum	Japanese knotweed	X	X	X	N
Polygonum prolificum	knotweed	X			NL
Polygonum scandens	climbing false buckwheat	X		X	Y
Polygonum sp.	smartweed species			X	--
Polyporaceae sp.	bracket fungi species			X	--
Populus alba	white poplar	X	X	X	N
Populus deltoides	eastern cottonwood	X	X	X	Y
Populus grandidentata	big-toothed aspen		X	X	Y
Populus nigra	lombardy poplar			X	N
Populus sp.	poplar species			X	--
Populus tremuloidies	quaking aspen		X	X	Y
Potentilla intergrifolia	downy cinquefoil			X	NL
Potentilla recta	rough-fruited cinquefoil	X		X	N
Potentilla simplex	common cinquefoil	X			Y
Potentilla sp.	cinquefoil species			X	--
Prunus serotina	black cherry	X		X	Y
Prunus sp.	wild cherry species		X	X	--
Pyrola sp.	wintergreen species			X	--
Quercus palustris	pin oak			X	Y
Quercus sp.	oak species		X	X	--
Quercus velutina	black oak			X	Y
Ranunculus sp.	buttercup species			X	--
Rhododendron sp.	rhododendron species			X	--
Rhus copallina	winged sumac	X	X	X	Y
Rhus glabra	smooth sumac		X	X	Y
Rhus typhina	staghorn sumac	X	X	X	Y
Robinia pseudoacacia	black locust	X	X	X	Y
Rosa multiflora	multiflora rose	X			N
Rubus laciniata	cut-leaved blackberry			X	NL
Rubus ostryifolius	highbush blackberry			X	Y
Rubus sp.	blackberry species	X		X	--
Rudbeckia hirta	black-eye susan	X		X	Y
Rumex acetosella	field sorrel	X		X	N
Rumex crispus	curled dock	X		X	N
Salix alba	white willow			X	N
Salix discolor	pussywillow		X	X	Y
Salix sp.	salix species			X	--
Sambucus canadensis	elderberry	X	X	X	Y
Saponaria officinalis	bouncing bet	X	X	X	N
Scirpus americana	three-square		X		Y
Scirpus cyperinus	woolgrass		X		Y
Scirpus sp.	bulrush species	X			--
Scutellaria intergrifolia	larger skullcap			X	NL
Scutellaria sp.	skullcap species			X	--
Senecio vulgaris	groundsel tree	X		X	N

Table A-1 (Page 6 of 7). Plant species observed at Liberty State Park, Jersey City, N.J. during 1975-1976, 2001 and 2003 biological surveys.

Scientific Name	Common Name	Texas Instruments (1976)	MacFarlane (2001)	ERC (2003)	U.S. Nativity (Yes/No)[1]
Setaria sp.	foxtail	X			--
Setaria viridis	green foxtail			X	N
Silene antirrhina	sleepy catchfly		X		Y
Silene cucubalus	bladder campion	X			N
Silene latifolia	white champion			X	N
Silene sp.	champion species			X	--
Sisymbrium altissimum	tumble mustard	X			N
Sisyrinchium sp.	blue-eyed grass species	X			--
Solanum interius	deadly nightshade			X	Y
Solanum nigrum	common nightshade	X			N
Solanum sp.	nightshade species	X		X	--
Solidago altissima	tall goldenrod	X		X	Y
Solidago arguta	sharp-leaved goldenrod			X	Y
Solidago canadensis	Canada goldenrod			X	Y
Solidago gigantea	late goldenrod			X	Y
Solidago gramnifolia	narrow-leaved goldenrod	X		X	NL
Solidago juncea	early goldenrod			X	Y
Solidago microcephala	slender goldenrod			X	Y
Solidago odora	sweet goldenrod			X	Y
Solidago patula	rough leaved goldenrod			X	Y
Solidago semervirens	seaside goldenrod	X			Y
Solidago sp.	goldenrod species		X	X	--
Solidago speciosa	showy goldenrod			X	Y
Solidago tenuifolia	slender-leaved goldenrod			X	Y
Spartina alterniflora	smooth cordgrass	X			Y
Spartina patens	saltmeadow cordgrass			X	Y
Sphagnum spp.	sphagnum moss		X		--
Spiraea tomentosa	steeplebush	X	X	X	Y
Spiranthes cernua	nodding ladies tresses		X		Y
Stellaria sp.	chickweed species			X	--
Strophostyles helvola	wild bean			X	NL
Symphyotrichum ericoides	heath aster	X		X	Y
Syntherisma sanguinale	large crabgrass			X	NL
Taraxacum officinale	common dandelion	X			N
Thelypteris palustris	marsh fern		X	X	Y
Tilia americana	American basswood			X	Y
Toxicodendron radicans	poison ivy		X	X	Y
Tradescantia virginiana	spiderwort	X			Y
Tragopogon pratensis	yellow goat's-beard	X			N
Trichostema dichotomum	blue curls		X	X	Y
Tridens sp.	purple-top species			X	--
Trifolium hybridum	Alsike clover	X			N
Trifolium pratense	red clover	X		X	N
Trifolium repens	white clover	X			N
Trifolium sp.	clover species			X	--
Typha angustifolia	narrow-leaved cattail	X		X	N

Table A-1 (Page 7 of 7). Plant species observed at Liberty State Park, Jersey City, N.J. during 1975-1976, 2001 and 2003 biological surveys.

Scientific Name	Common Name	Texas Instruments (1976)	MacFarlane (2001)	ERC (2003)	U.S. Nativity (Yes/No)[1]
Typha latifolia	broad-leaved cattail	X			Y
Verbascum blattaria	moth mullein	X			N
Verbascum thapsus	common mullein	X	X	X	N
Verbena hastata	blue vervain			X	Y
Viburnum sp.	viburnum species			X	--
Vitis palmata	red grape			X	Y
Vitis sp.	grape species			X	--
Vitis vulpina	frost grape		X	X	Y

[1] USDA, NRCS. 2004. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Ecosystem Restoration Consultants (ERC). 2003. – August – September 2003 Vegetation surveys

MacFarlane, D.W. 2001. The Ecology of Liberty State Park: A Historical Perspective

Texas Instruments (TI). 1976. Liberty State Park ecological study. Prepared for the Port Authority of New York and New Jersey.

Table A-2 (Page 1 of 4). Benthos collected at Liberty State Park, Jersey City, NJ during the 1975-1976 and 2003 biological surveys.

Phyllum	Group	Lowest Taxa (Family/Genus/Species)	TI (1976)	ERC (2003)
Annelida	Bryozoa	Electra sp.	X	
Annelida	Bryozoa	Pedicellina sp.	X	
Annelida	Bryozoa	Unidentified sp.	X	
Annelida	Chordata-Tunicata	Ascidiacea	X	
Annelida	Chordata-Tunicata	Molgula sp.	X	
Annelida	Chordata-Tunicata	Unidentified sp.	X	
Annelida	Cirripedia	Balanus sp.	X	
Annelida	Copepoda	Calanoida	X	
Annelida	Copepoda	Cyclopoida	X	
Annelida	Copepoda	Cyclops sp.	X	
Annelida	Copepoda	Harpacticoida	X	
Annelida	Crustacea	Chiridotea sp.	X	
Annelida	Crustacea	*Corophium insidiosum*	X	
Annelida	Crustacea	Cyathura sp.	X	
Annelida	Crustacea	*Edotea montosa*	X	
Annelida	Crustacea	Gammaridae	X	
Annelida	Crustacea	Gammarus sp.	X	
Annelida	Crustacea	Melita nitida	X	
Annelida	Cumacea	Cyclapsis sp.	X	
Annelida	Cumacea	*Leucon americana*	X	
Annelida	Cumacea	Oxyyrostylis sp.	X	
Annelida	Decapoda	*Callinectes sapidus*	X	
Annelida	Decapoda	*Crangon septemspinosus*	X	

Table A-2 (Page 2 of 4). Benthos collected at Liberty State Park, Jersey City, NJ during the 1975-1976 and 2003 biological surveys.

Phyllum	Group	Lowest Taxa (Family/Genus/Species)	TI (1976)	ERC (2003)
Annelida	Decapoda	*Neopanope texana*	X	
Annelida	Decapoda	*Palaemonetes pugio*	X	
Annelida	Decapoda	*Rhithropanopeus harrisi*	X	
Annelida	Gastropoda	Amnicolidae	X	
Annelida	Gastropoda	Calliostoma sp.	X	
Annelida	Gastropoda	Corambella sp.	X	
Annelida	Gastropoda	*Crepidula fornicata*	X	
Annelida	Gastropoda	*Ilyanarsa (Nassarius) obsolita*	X	
Annelida	Gastropoda	Nudibranchia	X	
Annelida	Insecta	Ceratopogonidae	X	
Annelida	Insecta	Chaoborus sp.	X	
Annelida	Insecta	Chrionomidae	X	
Annelida	Insecta	Coleoptera	X	
Annelida	Insecta	Cricotopus sp.	X	
Annelida	Insecta	Culicidae	X	
Annelida	Insecta	Psychoda sp.	X	
Annelida	Insecta	Psychodidae	X	
Annelida	Insecta	Stenelmis sp.	X	
Annelida	Insecta	Telmatoscopus sp.	X	
Annelida	Insecta	Unidentified sp.	X	
Annelida	Mollusca	*Crassostrea virginica*	X	
Annelida	Mollusca	*Macoma balthica*	X	
Annelida	Mollusca	*Mulinia lateralis*	X	
Annelida	Mollusca	*Mya arenaria*	X	

Table A-2 (Page 3 of 4). Benthos collected at Liberty State Park, Jersey City, NJ during the 1975-1976 and 2003 biological surveys.

Phyllum	Group	Lowest Taxa (Family/Genus/Species)	TI (1976)	ERC (2003)
Annelida	Mollusca	Pelecypoda	X	
Annelida	Mollusca	Tellina sp.	X	
Annelida	Mysidacea	*Neomysis americana*	X	
Annelida	Oligochaeta	Unidentified (probably *Limnodrilus Nais* sp.)	X	
Annelida	Oligochaete	Oligochaeta		X
Annelida	Polychaete	Capitella sp.		X
Annelida	Polychaete	*Cirratulidae tharyx*	X	
Annelida	Polychaete	*Diopatra cuprea*		X
Annelida	Polychaete	*Eteone heteropoda*	X	
Annelida	Polychaete	Eteone sp.		X
Annelida	Polychaete	*Glycera americana*	X	
Annelida	Polychaete	Glycera sp.		X
Annelida	Polychaete	Glycera sp.	X	
Annelida	Polychaete	Leitoscoloplos sp.		X
Annelida	Polychaete	Nephtys sp.		X
Annelida	Polychaete	Nereis sp.	X	
Annelida	Polychaete	Nereis virens		X
Annelida	Polychaete	Paraonidae		X
Annelida	Polychaete	*Pectinaria gouldii*		X
Annelida	Polychaete	*Pectinaria gouldii*	X	
Annelida	Polychaete	Phyllodoce sp.		X
Annelida	Polychaete	*Polydora ligni*	X	X
Annelida	Polychaete	*Sabellaria vulgaris*	X	

Table A-2 (Page 4 of 4). Benthos collected at Liberty State Park, Jersey City, NJ during the 1975-1976 and 2003 biological surveys.

Phyllum	Group	Lowest Taxa (Family/Genus/Species)	TI (1976)	ERC (2003)
Annelida	Polychaete	*Scoloplos robustus*	X	
Annelida	Polychaete	Spirorbis sp.	X	
Annelida	Polychaete	*Streblospio benedicti*	X	X
Annelida	Polychaete	Streblospio sp.	X	
Annelida	Polychaete	Unidentified sp.	X	
Annelida	Polychaete	Unidentified sp.	X	
Annelida	Polychaete	Unidentified sp.	X	
Annelida	Xiphosura	*Limulus polyphemus*	X	
Arthropoda	Amphipod	Gammarus sp.		X
Arthropoda	Amphipod	Melitidae		X
Arthropoda	Decapod	*Crangon septemspinosa*		X
Arthropoda	Decapod	*Neomysis americana*		X
Arthropoda	Merostomata	*Limulus polyphemus*		X
Arthropoda	Pagurid	Pagurus sp.		X
Mollusca	Bivalve	*Mulinia lateralis*		X
Mollusca	Gastropod	*Ilyanassa obsoleta*		X
Nematoda	Nemertina	Cerabratulus sp.	X	
Nematoda	Nemertina	Unidentifed sp.	X	
Cnidaria	Anthozoa	Unidentifed sp.	X	
Platyhelminthes	Turbellaria	Unidentifed sp.	X	

Data Sources:

Ecosystem Restoration Consultants (ERC). 2003. Benthic Macroinvertebrate surveys

Texas Instruments (TI). 1976. Liberty State Park ecological study. Prepared for the Port Authority of New York and New Jersey.

Table A-3 (Page 1 of 3). Gear type and fish species collected at Liberty State Park, Jersey City, N.J. during 1975-1976 and 2003 biological surveys.

Scientific Name	Common Name	Gear Type	TI (1976)	ERC (2003)
Alosa aestivalis	Blueback herring	Beach Seine	X	
		Fyke Net	X	
		Otter Trawl	X	
Alosa pseudoharengus	Alewife	Beach Seine	X	X
		Fyke Net	X	
		Otter Trawl	X	
Alosa sapidissima	American shad	Beach Seine	X	
		Otter Trawl	X	
Anchoa mitchilli	Bay Anchovy	Beach Seine	X	X
		Fyke Net	X	
		Otter Trawl	X	
Anguilla rostrata	American Eel	Trap Net		X
		Beach Seine	X	X
		Fyke Net	X	
Apeltes quadracus	Fourspine stickleback	Fyke Net	X	
Astroscopus guttatus	Northern stargazer	Beach Seine	X	
Brevoortia tyrannus	Atlantic Menhaden	Beach Seine	X	X
		Otter Trawl	X	
		Trap Net	X	X
Caranx hippos	Crevalle jack	Beach Seine	X	
Clupea harengus	Atlantic herring	Beach Seine	X	
Cynoscion regalis	Weakfish	Beach Seine	X	X
		Trap Net		X
Fundulus heteroclitus	Common mummichog	Beach Seine	X	
Fundulus majalis	Striped killifish	Beach Seine	X	
		Fyke Net	X	

Table A-3 (Page 2 of 3). Gear type and fish species collected at Liberty State Park, Jersey City, N.J. during 1975-1976 and 2003 biological surveys.

Scientific Name	Common Name	Gear Type	TI (1976)	ERC (2003)
Gasterosteus aculeatus	Threespine stickleback	Beach Seine	X	
		Fyke Net	X	
Gobiosoma bosci	Naked goby	Beach Seine	X	
Leiostomous xanthurus	Spot	Beach Seine	X	
Membras martinica	Rough silverside	Beach Seine	X	
Menidia beryllina	Tidewater silverside	Beach Seine	X	
Menidia menidia	Atlantic Silverside	Beach Seine	X	X
		Trap Net		X
Menticirrhus saxatilis	Northern kingfish	Beach Seine	X	
Merluccius bilinearis	Silver hake	Fyke Net	X	
		Otter Trawl	X	
Microgadus tomcod	Atlantic tomcod	Beach Seine	X	
		Fyke Net	X	
		Otter Trawl	X	
Morone americana	White Perch	Beach Seine	X	X
		Fyke Net	X	
		Trap Net		X
Morone saxatilis	Striped Bass	Beach Seine	X	X
		Fyke Net	X	
		Otter Trawl	X	
		Trap Net		X
Mugil curema	White mullet	Beach Seine	X	
Myoxocephalus aeneus	Little sculpin	Fyke Net	X	
Opsanus tau	Oyster Toadfish	Trap Net		X
Osmerus mordax	Rainbow smelt	Fyke Net	X	

Scientific Name	Common Name	Gear Type	TI (1976)	ERC (2003)
Paralichthys dentatus	Summer Flounder	Trap Net		X
Pomatomus saltatrix	Bluefish	Beach Seine	X	
		Otter Trawl	X	
Prionotus carolinus	Common searobin	Beach Seine	X	
Pseudopleuronectes americanus	Winter Flounder	Beach Seine	X	
		Fyke Net	X	
		Trap Net		X
Stenotomus chrysops	Scup	Trap Net		X
Strongylura marina	Atlantic needlefish	Beach Seine	X	
Syngnathus fuscus	Northern Pipefish	Beach Seine	X	X
		Fyke Net	X	
		Otter Trawl	X	
Tautoga onitis	Tautog	Trap Net		X
Trinectes maculatus	Hogchocker	Trap Net		X

Data Sources:

Ecosystem Restoration Consultants (ERC). 2003. North Cove fish surveys

Texas Instruments (TI). 1976. Liberty State Park ecological study. Prepared for the Port Authority of New York and New Jersey.

Appendix B

Wetland Delineation Data Sheets for Liberty State Park
Jersey City, NJ

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale:
50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale:
Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale:
Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision:
Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site.
*According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
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6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
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7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
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4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
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4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
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5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
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4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
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7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

Depth (inches)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance %

Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. Lythrum salicaria	FACW+	Herb	11.		
2. Rubus argutus	FACU	Shrub	12.		
3. Apocynum cannabinum	FACU	Herb	13.		
4. Spiraea tomentosa	FACW	Herb	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
Rationale: 50% vegetation is hydrophytic vegetation

SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

Soil Profile Description

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes [✔] No [ ] (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
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10.			20.		

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Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
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SOILS

Series/phase: *See remarks Subgroup:[2]
Is the soil on the hydric soils list? Yes [ ] No [ ] Undetermined [✔]
Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
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Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
Rationale: Soils were disturbed however mottling was present

HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
Depth to free-standing water in pit/soil probe hole:
List other field evidence of surface inundation or soil saturation.
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Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

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Rationale for jurisdictional decision: Hydrology and vegetation parameters satisfied. See remarks

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): C. Robbins/D. Fargo Date: 8/5/2003
Project/Site: Liberty State Park State: NJ County: Hudson
Applicant/Owner: ACOE Plant Community #/Name: Wetland 1
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes [✔] No [ ] (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
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Percent of dominant species that are OBL, FACW, and/or FAC 50%
Is the hydrophytic vegetation criterion met? Yes [✔] No [ ]
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Series/phase: *See remarks Subgroup:[2]
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Is the soil a Histosol? Yes [ ] No [ ] Histic epipedon present? Yes [ ] No [ ]
Is the soil: Mottled? Yes [✔] No [ ] Gleyed? Yes [ ] No [✔]
Matrix Color: See remarks Mottle Colors: See remarks
Other hydric soil indicators:
Is the hydric soil criterion met? Yes [✔] No [ ]
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HYDROLOGY

Is the ground surface inundated? Yes [✔] No [ ] Surface water depth: 2"
Is the soil saturated? Yes [✔] No [ ]
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List other field evidence of surface inundation or soil saturation.
none
Is the wetland hydrology criterion met? Yes [✔] No [ ]
Rationale: Primary hydrologic indicators present

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [✔] No [ ]
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Soil Profile Description

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Remarks:

Soil pit contained black cinder material to a depth of 12". At 12" a color change to gray is apparent however no Munsell color match was made. Soils beyond 12" contained muddy soils. Standing water in pit at 6". Wetland determination was heavily based on hydrology and vegetation parameters due to the presence of disturbed soils at the site. *According to the Bergen Area, New Jersey soil survey (1925), the soils are classified as "Unclassified City Land." Unclassified city land is defined as the land "within or adjacent to boundaries of numerous towns and cities in the eastern and northeastern parts of the area. This district, separated from New York City only by Hudson River, is used entirely as building sites and is so densely populated that DETERMINATION OF VARIOUS SOIL TYPES IS NOT PRACTICAL."

Appendix C

Water Quality Survey Data From the North Cove of Liberty State Park, Jersey City, NJ

Table C-1: Liberty State Park North Cove 2003 Weekly Water Quality Data

Survey #1

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO_3/ NO_2 (mg/L)	P (Total) (mg/L)
1	7-Aug	1015	17	9	Ebb	23.8	4.1	29,720	18.5	7.4	2.30	11.7	<1.00	1.40	110	0.160
2	7-Aug	1030	4	2	Ebb	24.2	4.3	27,770	17.0	7.5	<2.00	21.9	<1.00	1.44	112	0.150
3	7-Aug	1040	6	3	Ebb	24.2	4.3	28,710	17.6	7.5	5.00	17.7	<1.00	1.53	0.500	0.140
4	7-Aug	1055	7	3.5	Ebb	23.9	4.1	29,460	18.3	7.5	<2.00	16.3	<1.00	1.53	0.550	0.230
5	7-Aug	1120	15	7.5	Ebb	24.8	4.8	22,060	13.3	7.5	<2.00	24.1	<1.00	1.49	152	0.150
1	7-Aug	1150	13	1	Ebb	24.4	4.7	25,290	15.4	7.5	NA	NA	NA	NA	NA	NA
1	7-Aug	1150	13	6	Ebb	24.0	4.4	27,910	17.0	7.5	NA	NA	NA	NA	NA	NA
1	7-Aug	1150	13	12	Ebb	23.4	4.0	31,220	19.4	7.5	NA	NA	NA	NA	NA	NA
2	7-Aug	1220	4	2	Ebb	24.7	4.9	27,610	17.0	7.5	NA	NA	NA	NA	NA	NA
3	7-Aug	1225	7	1	Ebb	24.4	4.8	25,640	15.6	7.5	NA	NA	NA	NA	NA	NA
3	7-Aug	1225	7	6	Ebb	24.4	4.6	27,240	16.7	7.5	NA	NA	NA	NA	NA	NA
4	7-Aug	1236	8	1	Ebb	24.4	4.6	25,290	15.4	7.5	NA	NA	NA	NA	NA	NA
4	7-Aug	1236	8	7	Ebb	24.3	4.5	25,870	15.8	7.5	NA	NA	NA	NA	NA	NA
5	7-Aug	1247	15	1	Ebb	25.0	5.1	20,310	12.1	7.5	NA	NA	NA	NA	NA	NA
5	7-Aug	1247	15	7	Ebb	24.7	4.8	22,910	13.8	7.5	NA	NA	NA	NA	NA	NA
5	7-Aug	1247	15	14	Ebb	24.5	4.7	24,000	14.6	7.5	NA	NA	NA	NA	NA	NA
1	7-Aug	1340	19	1	Flood	24.4	4.8	26,140	16.0	7.5	NA	NA	NA	NA	NA	NA
1	7-Aug	1340	19	9	Flood	24.2	4.5	27,930	17.2	7.5	NA	NA	NA	NA	NA	NA
1	7-Aug	1340	19	18	Flood	23.8	4.0	30,250	18.8	7.5	NA	NA	NA	NA	NA	NA
2	7-Aug	1400	6	1	Flood	24.6	4.9	25,620	15.9	7.5	NA	NA	NA	NA	NA	NA
2	7-Aug	1400	6	5	Flood	24.6	4.8	25,780	15.7	7.5	NA	NA	NA	NA	NA	NA
3	7-Aug	1410	9	1	Flood	24.5	4.8	25,850	15.8	7.5	NA	NA	NA	NA	NA	NA
3	7-Aug	1410	9	8	Flood	24.5	4.6	26,270	16.1	7.5	NA	NA	NA	NA	NA	NA
4	7-Aug	1430	11	1	Flood	24.7	5.1	23,730	14.4	7.5	NA	NA	NA	NA	NA	NA
4	7-Aug	1430	11	5	Flood	24.4	4.8	25,980	15.9	7.5	NA	NA	NA	NA	NA	NA

Table C-1 (Page 2 of 8): Liberty State Park North Cove 2003 Weekly Water Quality Data

Survey #1 (cont'd)

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO_3/ NO_2 (mg/L)	P (Total) (mg/L)
4	7-Aug	1430	11	10	Flood	24.4	4.6	26,660	16.3	7.5	NA	NA	NA	NA	NA	NA
5	7-Aug	1455	18	1	Flood	25.0	5.2	20,800	12.4	7.6	NA	NA	NA	NA	NA	NA
5	7-Aug	1455	18	9	Flood	24.6	5.0	24,460	14.8	7.5	NA	NA	NA	NA	NA	NA
5	7-Aug	1455	18	17	Flood	24.4	4.7	26,360	16.1	7.5	NA	NA	NA	NA	NA	NA
1	7-Aug	1545	19	9.5	Flood	24.6	5.0	24,840	15.1	7.6	<2.00	12.4	<1.00	1.35	206	0.140
2	7-Aug	1605	9	4.5	Flood	24.7	5.1	25,040	15.2	7.7	<2.00	7.87	<1.00	1.52	0.510	0.130
3	7-Aug	1615	11	5.5	Flood	24.7	5.1	24,960	15.2	7.7	2.41	10.1	<1.00	1.55	0.590	0.130
4	7-Aug	1630	14	7	Flood	24.8	5.1	24,510	14.8	7.6	<2.00	13.7	<1.00	1.34	0.580	0.130
5	7-Aug	1650	20	10	Flood	24.6	5.0	24,800	15.1	7.6	<2.00	18.0	<1.00	1.47	0.580	0.120

NA = Not Analyzed

Table C-1 (Page 3 of 8): Liberty State Park North Cove 2003 Weekly Water Quality Data

Survey #2

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/ NO2 (mg/L)	P (Total) (mg/L)
1	20-Aug	0725	17	1	Ebb	24.8	5.3	19,770	11.8	7.8	NA	NA	NA	NA	NA	NA
1	20-Aug	0725	17	8	Ebb	24.5	4.5	25,330	15.4	7.6	<2.00	16.4	<1.00	1.64	0.430	0.130
1	20-Aug	0725	17	16	Ebb	23.9	3.5	29,000	17.9	7.4	NA	NA	NA	NA	NA	NA
2	20-Aug	0745	3	1.5	Ebb	24.4	5.0	19,880	11.9	7.6	<2.00	14.8	<1.00	1.50	0.460	0.120
3	20-Aug	0800	6	1	Ebb	24.6	5.4	18,950	11.3	7.7	NA	NA	NA	NA	NA	NA
3	20-Aug	0800	6	3	Ebb	24.8	5.3	19,610	11.6	7.5	<2.00	9.00	<1.00	1.68	0.440	0.100
3	20-Aug	0800	6	5	Ebb	24.7	4.9	21,490	13.1	7.5	NA	NA	NA	NA	NA	NA
4	20-Aug	0815	8	1	Ebb	24.8	5.3	19,960	11.9	7.6	NA	NA	NA	NA	NA	NA
4	20-Aug	0815	8	4	Ebb	24.7	5.3	20,150	12.1	7.6	<2.00	26.8	<1.00	1.48	0.390	0.140
4	20-Aug	0815	8	7	Ebb	24.4	4.6	23,450	14.2	7.5	NA	NA	NA	NA	NA	NA
5	20-Aug	0835	12	1	Ebb	25.2	5.9	17,130	9.8	7.7	NA	NA	NA	NA	NA	NA
5	20-Aug	0835	12	5	Ebb	25.1	5.9	16,430	9.7	7.5	7.64	11.0	<1.00	<1.00	0.420	<0.100
5	20-Aug	0835	12	11	Ebb	23.5	3.8	30,000	18.6	7.4	NA	NA	NA	NA	NA	NA
1	20-Aug	0900	16	1	Ebb	24.9	5.3	19,770	11.7	7.6	NA	NA	NA	NA	NA	NA
1	20-Aug	0900	16	8	Ebb	24.5	4.7	24,230	14.7	7.4	NA	NA	NA	NA	NA	NA
1	20-Aug	0900	16	15	Ebb	23.7	3.6	29,170	18.0	7.4	NA	NA	NA	NA	NA	NA
2	20-Aug	0915	4	1	Ebb	24.9	5.5	19,470	11.5	7.6	NA	NA	NA	NA	NA	NA
2	20-Aug	0915	4	3	Ebb	24.8	5.6	19,650	11.7	7.6	NA	NA	NA	NA	NA	NA
3	20-Aug	0930	6	1	Ebb	25.2	5.6	19,150	11.4	7.6	NA	NA	NA	NA	NA	NA
3	20-Aug	0930	6	5	Ebb	24.9	5.5	19,670	11.7	7.6	NA	NA	NA	NA	NA	NA
4	20-Aug	0936	7	1	Ebb	25.2	5.9	18,820	11.1	7.6	NA	NA	NA	NA	NA	NA
4	20-Aug	0936	7	6	Ebb	24.7	5.1	21,470	12.8	7.6	NA	NA	NA	NA	NA	NA
5	20-Aug	0945	12	1	Ebb	25.5	5.9	16,900	9.8	7.7	NA	NA	NA	NA	NA	NA

Table C-1 (Page 4 of 8): Liberty State Park North Cove 2003 Weekly Water Quality Data

Survey #2 (cont'd)

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
5	20-Aug	0945	12	5	Ebb	25.1	5.6	18,310	10.9	7.6	NA	NA	NA	NA	NA	NA
5	20-Aug	0945	12	11	Ebb	24.5	4.6	22,810	13.9	7.5	NA	NA	NA	NA	NA	NA
1	20-Aug	1005	17	1	Ebb	25.1	5.7	20,790	12.4	7.6	NA	NA	NA	NA	NA	NA
1	20-Aug	1005	17	8	Ebb	24.8	5.3	21,480	12.9	7.6	NA	NA	NA	NA	NA	NA
1	20-Aug	1005	17	16	Ebb	23.9	3.6	28,800	17.8	7.5	NA	NA	NA	NA	NA	NA
2	20-Aug	1020	4	1	Ebb	25.5	5.6	19,210	11.4	7.6	NA	NA	NA	NA	NA	NA
2	20-Aug	1020	4	3	Ebb	25.0	5.7	19,530	11.6	7.6	NA	NA	NA	NA	NA	NA
3	20-Aug	1025	6	1	Ebb	25.6	5.9	18,500	11.0	7.6	NA	NA	NA	NA	NA	NA
3	20-Aug	1025	6	5	Ebb	25.1	6.0	19,500	11.6	7.6	NA	NA	NA	NA	NA	NA
4	20-Aug	1035	7	1	Ebb	25.4	6.0	18,410	10.9	7.7	NA	NA	NA	NA	NA	NA
4	20-Aug	1035	7	6	Ebb	25.0	5.5	20,500	12.2	7.6	NA	NA	NA	NA	NA	NA
5	20-Aug	1055	12	1	Ebb	26.2	7.0	12,740	7.2	7.8	NA	NA	NA	NA	NA	NA
5	20-Aug	1055	12	5	Ebb	25.6	6.2	16,950	10.1	7.7	NA	NA	NA	NA	NA	NA
5	20-Aug	1055	12	11	Ebb	24.7	4.9	21,590	12.9	7.6	NA	NA	NA	NA	NA	NA
1	20-Aug	1140	17	1	Ebb	26.3	6.9	16,710	9.8	7.6	NA	NA	NA	NA	NA	NA
1	20-Aug	1140	17	8	Ebb	25.3	5.9	19,810	11.7	7.4	NA	NA	NA	NA	NA	NA
1	20-Aug	1140	17	16	Ebb	24.1	4.0	27,800	17.1	7.4	NA	NA	NA	NA	NA	NA
2	20-Aug	1205	5	1	Ebb	26.4	6.7	17,150	10.1	7.8	NA	NA	NA	NA	NA	NA
2	20-Aug	1205	5	4	Ebb	26.1	6.9	17,780	10.5	7.8	NA	NA	NA	NA	NA	NA
3	20-Aug	1215	7	1	Ebb	26.4	6.7	15,950	9.2	7.8	NA	NA	NA	NA	NA	NA
3	20-Aug	1215	7	6	Ebb	25.6	6.2	19,510	11.5	7.6	NA	NA	NA	NA	NA	NA
4	20-Aug	1220	9	1	Flood	26.2	7.0	16,430	9.6	7.8	NA	NA	NA	NA	NA	NA
4	20-Aug	1220	9	4	Flood	25.8	7.0	17,330	10.2	7.8	NA	NA	NA	NA	NA	NA
4	20-Aug	1220	9	8	Flood	25.1	5.9	20,820	12.5	7.6	NA	NA	NA	NA	NA	NA
5	20-Aug	1240	13	1	Flood	27.0	7.4	11,610	6.6	7.8	NA	NA	NA	NA	NA	NA

Table C-1 (Page 5 of 8): Liberty State Park North Cove 2003 Weekly Water Quality Data

Survey #2 (cont'd)

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
5	20-Aug	1240	13	6	Flood	26.8	7.5	12,170	6.8	7.8	NA	NA	NA	NA	NA	NA
5	20-Aug	1240	13	12	Flood	25.3	6.1	20,110	12.0	7.7	NA	NA	NA	NA	NA	NA
1	20-Aug	1330	15	1	Flood	26.3	9.3	18,920	11.1	7.9	NA	NA	NA	NA	NA	NA
1	20-Aug	1330	15	7	Flood	25.2	8.1	21,910	13.2	7.7	<2.00	13.0	<1.00	<1.00	0.420	<0.100
1	20-Aug	1330	15	14	Flood	24.6	6.2	23,770	14.4	7.6	NA	NA	NA	NA	NA	NA
2	20-Aug	1345	6	1	Flood	27.1	9.6	16,270	9.5	8.0	NA	NA	NA	NA	NA	NA
2	20-Aug	1345	6	3	Flood	26.5	9.3	16,730	9.8	8.0	<2.00	8.00	<1.00	1.13	0.420	<0.100
2	20-Aug	1345	6	5	Flood	26.0	8.5	18,600	10.9	7.9	NA	NA	NA	NA	NA	NA
3	20-Aug	1405	9	1	Flood	27.1	10.0	16,530	9.7	8.1	NA	NA	NA	NA	NA	NA
3	20-Aug	1405	9	4	Flood	26.2	8.8	17,650	10.4	7.9	<2.00	8.60	<1.00	<1.00	0.420	<0.100
3	20-Aug	1405	9	8	Flood	25.1	6.6	21,390	12.8	7.8	NA	NA	NA	NA	NA	NA
4	20-Aug	1415	11	1	Flood	26.6	9.9	17,910	10.5	8.0	NA	NA	NA	NA	NA	NA
4	20-Aug	1415	11	5	Flood	26.0	9.4	19,140	11.4	7.9	<2.00	7.60	<1.00	<1.00	0.420	0.100
4	20-Aug	1415	11	10	Flood	25.1	7.5	21,160	12.7	7.8	NA	NA	NA	NA	NA	NA
5	20-Aug	1425	16	1	Flood	26.8	10.1	17,540	10.3	8.0	NA	NA	NA	NA	NA	NA
5	20-Aug	1425	16	7	Flood	26.3	10.4	17,920	10.5	7.9	<2.00	7.40	<1.00	1.06	0.430	0.100
5	20-Aug	1425	16	15	Flood	24.5	6.6	22,530	13.5	7.8	NA	NA	NA	NA	NA	NA

NA = Not Analyzed

Table C-1 (Page 6 of 8): Liberty State Park North Cove 2003 Weekly Water Quality Data

Survey # 3

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
1	3-Sep	0745	17	1	Ebb	20.8	4.2	33,870	21.3	7.6	NA	NA	NA	NA	NA	NA
1	3-Sep	0745	17	8	Ebb	20.9	4.1	34,020	21.3	7.4	<2.00	23.9	<1.00	1.94	0.310	0.140
1	3-Sep	0745	17	16	Ebb	20.7	3.6	37,250	23.6	7.4	NA	NA	NA	NA	NA	NA
2	3-Sep	0805	4	2	Ebb	20.3	4.3	34,510	21.7	7.4	<2.00	28.1	<1.00	<1.00	0.350	0.160
3	3-Sep	0815	6	2	Ebb	20.7	4.1	34,390	21.6	7.4	NA	NA	NA	NA	NA	NA
3	3-Sep	0815	6	3	Ebb	NA	NA	NA	NA	NA	<2.00	13.1	<1.00	1.37	0.300	0.130
3	3-Sep	0815	6	5	Ebb	20.6	4.0	34,990	22.4	7.4	NA	NA	NA	NA	NA	NA
4	3-Sep	0830	7	2	Ebb	20.7	4.0	34,450	21.7	7.4	NA	NA	NA	NA	NA	NA
4	3-Sep	0830	7	3.5	Ebb	NA	NA	NA	NA	NA	<2.00	13.4	<1.00	1.64	0.310	0.130
4	3-Sep	0830	7	5	Ebb	20.7	3.6	38,060	24.1	7.4	NA	NA	NA	NA	NA	NA
5	3-Sep	0840	11	1	Ebb	21.4	4.5	29,440	18.3	7.5	NA	NA	NA	NA	NA	NA
5	3-Sep	0840	11	5	Ebb	21.4	4.4	30,450	19.0	7.4	<2.00	85.4	<1.00	1.49	0.340	0.210
5	3-Sep	0840	11	10	Ebb	21.1	3.7	34,650	21.7	7.4	NA	NA	NA	NA	NA	NA
1	3-Sep	0855	17	1	Ebb	21.0	4.1	33,450	21.0	7.4	NA	NA	NA	NA	NA	NA
1	3-Sep	0855	17	8	Ebb	21.0	3.9	33,940	21.3	7.4	NA	NA	NA	NA	NA	NA
1	3-Sep	0855	17	16	Ebb	20.8	3.7	36,650	23.2	7.4	NA	NA	NA	NA	NA	NA
2	3-Sep	0910	3	1	Ebb	20.6	3.9	34,410	21.7	7.4	NA	NA	NA	NA	NA	NA
3	3-Sep	0920	6	1	Ebb	20.7	4.0	34,710	21.8	7.4	NA	NA	NA	NA	NA	NA
3	3-Sep	0920	6	5	Ebb	20.7	3.8	35,570	22.8	7.4	NA	NA	NA	NA	NA	NA
4	3-Sep	0930	8	2	Ebb	20.8	4.2	33,700	21.2	7.3	NA	NA	NA	NA	NA	NA
4	3-Sep	0930	8	6	Ebb	20.8	3.9	35,360	22.6	7.2	NA	NA	NA	NA	NA	NA
5	3-Sep	0940	11	1	Ebb	21.7	4.5	27,280	16.7	7.3	NA	NA	NA	NA	NA	NA
5	3-Sep	0940	11	5	Ebb	21.6	4.3	28,470	17.4	7.1	NA	NA	NA	NA	NA	NA

Table C-1 (Page 7 of 8): Liberty State Park North Cove 2003 Weekly Water Quality Data

Survey # 3 (cont'd)

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
5	3-Sep	0940	11	10	Ebb	20.9	3.9	33,660	21.5	7.1	NA	NA	NA	NA	NA	NA
1	3-Sep	0955	19	1	Ebb	21.0	4.0	32,790	20.5	7.1	NA	NA	NA	NA	NA	NA
1	3-Sep	0955	19	10	Ebb	20.8	3.7	36,110	22.9	7.1	NA	NA	NA	NA	NA	NA
1	3-Sep	0955	19	18	Ebb	20.8	3.6	36,510	23.1	7.0	NA	NA	NA	NA	NA	NA
2	3-Sep	1015	4	2	Ebb	20.4	4.2	34,280	21.6	7.2	NA	NA	NA	NA	NA	NA
3	3-Sep	1030	7	1	Ebb	21.0	4.0	32,110	20.1	7.6	NA	NA	NA	NA	NA	NA
3	3-Sep	1030	7	6	Ebb	21.0	4.0	32,800	20.4	7.6	NA	NA	NA	NA	NA	NA
4	3-Sep	1035	9	1	Ebb	21.1	4.3	31,070	19.3	7.6	NA	NA	NA	NA	NA	NA
4	3-Sep	1035	9	4	Ebb	21.2	4.2	32,170	20.1	7.6	NA	NA	NA	NA	NA	NA
4	3-Sep	1035	9	8	Ebb	21.0	4.2	32,870	20.5	7.6	NA	NA	NA	NA	NA	NA
5	3-Sep	1045	13	1	Ebb	21.6	4.3	27,810	17.0	7.6	NA	NA	NA	NA	NA	NA
5	3-Sep	1045	13	6	Ebb	21.5	4.2	29,090	17.9	7.6	NA	NA	NA	NA	NA	NA
5	3-Sep	1045	13	12	Ebb	21.1	4.1	32,130	20.1	7.7	NA	NA	NA	NA	NA	NA
1	3-Sep	1200	16	1	Flood	20.9	4.4	32,280	20.1	7.6	NA	NA	NA	NA	NA	NA
1	3-Sep	1200	16	8	Flood	21.0	4.3	32,800	20.5	7.3	NA	NA	NA	NA	NA	NA
1	3-Sep	1200	16	15	Flood	20.8	4.1	34,330	21.6	7.6	NA	NA	NA	NA	NA	NA
2	3-Sep	1210	7	1	Flood	21.0	4.2	31,780	19.8	7.6	NA	NA	NA	NA	NA	NA
2	3-Sep	1210	7	6	Flood	21.1	4.1	31,780	19.8	7.6	NA	NA	NA	NA	NA	NA
3	3-Sep	1215	10	1	Flood	21.0	4.3	31,590	19.7	7.6	NA	NA	NA	NA	NA	NA
3	3-Sep	1215	10	5	Flood	21.1	4.1	32,100	20.1	7.6	NA	NA	NA	NA	NA	NA
3	3-Sep	1215	10	9	Flood	21.1	4.1	32,280	20.3	7.6	NA	NA	NA	NA	NA	NA
4	3-Sep	1225	11	1	Flood	21.2	4.5	30,550	19.0	7.6	NA	NA	NA	NA	NA	NA
4	3-Sep	1225	11	5	Flood	21.2	4.4	31,740	19.8	7.6	NA	NA	NA	NA	NA	NA
4	3-Sep	1225	11	10	Flood	21.1	4.0	33,010	20.7	7.6	NA	NA	NA	NA	NA	NA

Table C-1 (Page 8 of 8): Liberty State Park North Cove 2003 Weekly Water Quality Data

Survey # 3 (cont'd)

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
5	3-Sep	1235	10	1	Flood	21.2	4.5	31,360	19.5	7.7	NA	NA	NA	NA	NA	NA
5	3-Sep	1235	10	5	Flood	21.2	4.5	31,410	19.6	7.6	NA	NA	NA	NA	NA	NA
5	3-Sep	1235	10	10	Flood	21.1	4.2	32,220	20.0	7.6	NA	NA	NA	NA	NA	NA
1	3-Sep	1320	16	1	Flood	21.2	4.6	31,150	19.4	7.6	NA	NA	NA	NA	NA	NA
1	3-Sep	1320	16	8	Flood	21.1	4.5	31,930	19.8	7.6	<2.00	20.6	<1.00	2.50	0.340	0.140
1	3-Sep	1320	16	15	Flood	21.0	4.1	32,670	20.4	7.6	NA	NA	NA	NA	NA	NA
2	3-Sep	1330	7	1	Flood	21.1	4.3	31,380	19.6	7.6	NA	NA	NA	NA	NA	NA
2	3-Sep	1330	7	3.5	Flood	NA	NA	NA	NA	NA	<2.00	28.4	<1.00	2.09	0.380	0.150
2	3-Sep	1330	7	6	Flood	21.1	4.3	31,560	19.7	7.6	NA	NA	NA	NA	NA	NA
3	3-Sep	1340	10	1	Flood	21.1	4.2	31,380	19.6	7.6	NA	NA	NA	NA	NA	NA
3	3-Sep	1340	10	5	Flood	21.2	4.1	31,390	19.6	7.6	<2.00	21.1	<1.00	1.82	0.350	0.140
3	3-Sep	1340	10	9	Flood	21.1	3.9	31,820	19.9	7.6	NA	NA	NA	NA	NA	NA
4	3-Sep	1355	10	1	Flood	21.2	4.4	30,950	19.3	7.6	NA	NA	NA	NA	NA	NA
4	3-Sep	1355	10	5	Flood	21.3	4.4	30,980	19.3	7.6	<2.00	13.9	<1.00	1.05	0.330	0.140
4	3-Sep	1355	10	9	Flood	21.3	4.4	31,040	19.3	7.7	NA	NA	NA	NA	NA	NA
5	3-Sep	1410	16	1	Flood	21.2	4.4	31,350	19.5	7.6	NA	NA	NA	NA	NA	NA
5	3-Sep	1410	16	8	Flood	21.2	4.4	31,320	19.5	7.7	<2.00	14.4	<1.00	1.60	0.330	0.150
5	3-Sep	1410	16	15	Flood	21.2	4.3	31,380	19.5	7.7	NA	NA	NA	NA	NA	NA

NA = Not Analyzed

Table C-2: Liberty State Park North Cove 2003 Dry Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/ NO2 (mg/L)	P (Total) (mg/L)
1	10-Sep	0755	20	2	Flood	21.0	4.5	33,440	21.0	7.2	NA	NA	NA	NA	NA	NA
1	10-Sep	0806	20	10	Flood	21.0	4.8	33,520	21.0	7.3	<2.00	16.7	<1.00	<1.00	0.400	0.130
1	10-Sep	0821	20	18	Flood	21.1	4.8	33,730	21.2	7.3	NA	NA	NA	NA	NA	NA
6	10-Sep	0833	14	2	Flood	21.0	4.8	33,540	21.1	7.3	NA	NA	NA	NA	NA	NA
6	10-Sep	0835	14	7	Flood	21.0	4.6	33,760	21.2	7.3	<2.00	21.7	<1.00	<1.00	0.400	0.130
6	10-Sep	0837	14	12	Flood	21.1	4.6	33,730	21.2	7.3	NA	NA	NA	NA	NA	NA
2	10-Sep	0846	7	2	Flood	21.1	4.4	33,750	21.2	7.2	NA	NA	NA	NA	NA	NA
2	10-Sep	0848	7	4	Flood	NA	NA	NA	NA	NA	<2.00	18.4	<1.00	<1.00	0.420	0.120
2	10-Sep	0850	7	5	Flood	21.2	4.2	33,930	21.3	7.2	NA	NA	NA	NA	NA	NA
3	10-Sep	0858	9	2	Flood	21.1	4.4	33,610	21.1	7.2	NA	NA	NA	NA	NA	NA
3	10-Sep	0900	9	5	Flood	NA	NA	NA	NA	NA	<2.00	10.4	<1.00	<1.00	0.430	0.120
3	10-Sep	0902	9	7	Flood	21.1	4.2	34,000	21.4	7.3	NA	NA	NA	NA	NA	NA
4	10-Sep	0909	10	2	Flood	20.9	4.6	33,560	21.1	7.5	NA	NA	NA	NA	NA	NA
4	10-Sep	0911	10	5	Flood	NA	NA	NA	NA	NA	<2.00	20.4	<1.00	1.29	0.400	0.130
4	10-Sep	0913	10	8	Flood	21	4.5	33,560	21.1	7.5	NA	NA	NA	NA	NA	NA
5	10-Sep	0923	14	2	Flood	21.1	4.7	33,810	21.2	7.5	NA	NA	NA	NA	NA	NA
5	10-Sep	0925	14	7	Flood	21.1	4.8	33,800	21.2	7.5	<2.00	19.5	<1.00	<1.00	0.400	0.130
5	10-Sep	0927	14	12	Flood	21.1	4.7	33,810	21.2	7.5	NA	NA	NA	NA	NA	NA
1	10-Sep	0939	20	2	Slack	21.1	4.7	33,870	21.3	7.5	NA	NA	NA	NA	NA	NA
1	10-Sep	0941	20	10	Slack	21.2	4.7	34,030	21.4	7.5	<2.00	13.0	<1.00	1.47	0.410	0.120
1	10-Sep	0943	20	18	Slack	21.2	4.7	34,100	21.5	7.5	NA	NA	NA	NA	NA	NA
2	10-Sep	0955	6	2	Slack	21.5	4.4	33,870	21.2	7.5	NA	NA	NA	NA	NA	NA
2	10-Sep	0957	6	3	Slack	NA	NA	NA	NA	NA	<2.00	17.5	<1.00	<1.00	0.410	0.130
2	10-Sep	0959	6	4	Slack	21.3	4.3	33,970	21.4	7.5	NA	NA	NA	NA	NA	NA
4	10-Sep	1005	11	2	Ebb	21.2	4.7	33,700	21.2	7.5	NA	NA	NA	NA	NA	NA
4	10-Sep	1007	11	5	Ebb	21.2	4.6	33,800	21.2	7.5	<2.00	31.4	<1.00	1.53	0.380	0.140

Table C-2 (Page 2 of 7): Liberty State Park North Cove 2003 Dry Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/ NO2 (mg/L)	P (Total) (mg/L)
4	10-Sep	1009	11	9	Ebb	21.1	4.4	33,850	21.3	7.5	NA	NA	NA	NA	NA	NA
3	10-Sep	1014	9	2	Ebb	21.3	4.5	33,610	21.1	7.5	NA	NA	NA	NA	NA	NA
3	10-Sep	1016	9	5	Ebb	NA	NA	NA	NA	NA	<2.00	9.10	<1.00	<1.00	0.420	0.120
3	10-Sep	1018	9	7	Ebb	21.1	4.4	33,740	21.2	7.5	NA	NA	NA	NA	NA	NA
5	10-Sep	1027	13	2	Ebb	21.7	4.5	31,540	19.7	7.5	NA	NA	NA	NA	NA	NA
5	10-Sep	1029	13	6	Ebb	21.2	4.6	33,760	21.2	7.5	<2.00	14.3	<1.00	1.45	0.420	0.130
5	10-Sep	1031	13	11	Ebb	21.2	4.6	34,090	21.4	7.5	NA	NA	NA	NA	NA	NA
6	10-Sep	1039	14	2	Ebb	21.3	4.8	33,770	21.2	7.5	NA	NA	NA	NA	NA	NA
6	10-Sep	1041	14	7	Ebb	21.2	4.6	34,050	21.4	7.5	<2.00	12.3	<1.00	<1.00	0.400	0.130
6	10-Sep	1043	14	12	Ebb	21.2	4.6	34,110	21.4	7.5	NA	NA	NA	NA	NA	NA
1	10-Sep	1211	21	2	Ebb	22.3	4.9	33,030	20.7	7.5	NA	NA	NA	NA	NA	NA
1	10-Sep	1213	21	10	Ebb	21.7	4.7	33,640	21.1	7.5	<2.00	11.5	<1.00	NA	NA	NA
1	10-Sep	1215	21	19	Ebb	21.4	4.6	33,800	21.3	7.5	NA	NA	NA	NA	NA	NA
2	10-Sep	1226	4	2	Ebb	22.1	5.5	33,640	21.1	7.7	<2.00	15.8	<1.00	NA	NA	NA
4	10-Sep	1235	9	2	Ebb	21.7	4.7	34,160	21.5	7.5	NA	NA	NA	NA	NA	NA
4	10-Sep	1237	9	5	Ebb	NA	NA	NA	NA	NA	<2.00	15.6	<1.00	NA	NA	NA
4	10-Sep	1239	9	7	Ebb	21.5	4.2	35,740	22.6	7.5	NA	NA	NA	NA	NA	NA
3	10-Sep	1305	6	2	Ebb	22.2	4.7	33,650	21.0	7.5	NA	NA	NA	NA	NA	NA
3	10-Sep	1307	6	4	Ebb	21.7	4.1	35,330	22.3	7.5	NA	NA	NA	NA	NA	NA
5	10-Sep	1312	10	2	Ebb	22.1	4.6	31,960	20.1	7.5	NA	NA	NA	NA	NA	NA
5	10-Sep	1314	10	8	Ebb	21.6	4.1	35,610	22.5	7.5	NA	NA	NA	NA	NA	NA
6	10-Sep	1320	10	2	Ebb	22.0	4.3	34,530	21.6	7.5	NA	NA	NA	NA	NA	NA
6	10-Sep	1322	10	8	Ebb	21.6	4.1	35,510	22.4	7.5	NA	NA	NA	NA	NA	NA
1	10-Sep	1502	16	2	Ebb	22.4	4.5	32,890	20.6	7.5	NA	NA	NA	NA	NA	NA
1	10-Sep	1504	16	8	Ebb	22.1	4.5	33,490	21.1	7.5	<2.00	18.0	<1.00	NA	NA	NA
1	10-Sep	1506	16	14	Ebb	22.1	4.6	33,950	21.3	7.5	NA	NA	NA	NA	NA	NA

Table C-2 (Page 3 of 7): Liberty State Park North Cove 2003 Dry Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/ NO2 (mg/L)	P (Total) (mg/L)
2	10-Sep	1524	2	1	Ebb	23.7	5.9	33,200	20.8	7.7	2.3000	41.0	<1.00	NA	NA	NA
4	10-Sep	1534	7	2	Ebb	22.6	4.6	33,930	21.3	7.5	NA	NA	NA	NA	NA	NA
4	10-Sep	1536	7	3	Ebb	NA	NA	NA	NA	NA	<2.00	19.5	<1.00	NA	NA	NA
4	10-Sep	1538	7	5	Ebb	21.7	4.1	35,610	22.5	7.5	NA	NA	NA	NA	NA	NA
3	10-Sep	1605	5	3	Ebb	22.5	4.6	34,090	21.3	7.5	<2.00	18.2	<1.00	NA	NA	NA
5	10-Sep	1620	8	2	Ebb	22.4	4.6	30,460	18.9	7.5	NA	NA	NA	NA	NA	NA
5	10-Sep	1622	8	4	Ebb	NA	NA	NA	NA	NA	<2.00	48.8	<1.00	NA	NA	NA
5	10-Sep	1624	8	6	Ebb	21.7	4.1	35,210	22.3	7.5	NA	NA	NA	NA	NA	NA
6	10-Sep	1631	11	2	Slack	22.3	4.5	31,630	19.7	7.5	NA	NA	NA	NA	NA	NA
6	10-Sep	1633	11	6	Slack	22.1	4.3	32,740	20.5	7.5	<2.00	31.2	<1.00	NA	NA	NA
6	10-Sep	1635	11	9	Slack	22.1	4.4	32,850	20.6	7.5	NA	NA	NA	NA	NA	NA
1	10-Sep	1800	19	2	Flood	22.6	4.7	33,570	21.1	7.5	NA	NA	NA	NA	NA	NA
1	10-Sep	1802	19	10	Flood	22.3	4.7	33,930	21.3	7.5	<2.00	28.0	<1.00	NA	NA	NA
1	10-Sep	1804	19	17	Flood	22.2	4.8	34,190	21.5	7.5	NA	NA	NA	NA	NA	NA
2	10-Sep	1814	5	3	Flood	22.4	4.7	32,600	20.4	7.5	<2.00	19.6	<1.00	NA	NA	NA
4	10-Sep	1821	10	2	Flood	22.2	4.7	32,840	20.6	7.5	NA	NA	NA	NA	NA	NA
4	10-Sep	1823	10	5	Flood	NA	NA	NA	NA	NA	<2.00	25.4	<1.00	NA	NA	NA
4	10-Sep	1825	10	8	Flood	22.1	4.5	33,530	21.0	7.5	NA	NA	NA	NA	NA	NA
3	10-Sep	1903	9	2	Flood	22.1	4.5	33,140	20.8	7.6	NA	NA	NA	NA	NA	NA
3	10-Sep	1905	9	7	Flood	22.1	4.3	33,490	21.0	7.5	NA	NA	NA	NA	NA	NA
5	10-Sep	1912	20	2	Flood	22.1	4.7	33,210	20.7	7.5	NA	NA	NA	NA	NA	NA
5	10-Sep	1914	20	10	Flood	22.1	4.6	33,270	20.9	7.6	NA	NA	NA	NA	NA	NA
5	10-Sep	1916	20	18	Flood	22.1	4.5	33,270	20.9	7.6	NA	NA	NA	NA	NA	NA
6	10-Sep	1922	13	2	Flood	22.1	4.7	30,360	19.1	7.6	NA	NA	NA	NA	NA	NA
6	10-Sep	1924	13	6	Flood	22.1	4.7	31,540	19.6	7.5	NA	NA	NA	NA	NA	NA
6	10-Sep	1926	13	11	Flood	22.1	4.7	31,830	19.8	7.5	NA	NA	NA	NA	NA	NA

Table C-2 (Page 4 of 7): Liberty State Park North Cove 2003 Dry Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/ NO2 (mg/L)	P (Total) (mg/L)
1	10-Sep	2030	16	2	Flood	21.9	4.8	32,400	20.2	7.4	NA	NA	NA	NA	NA	NA
1	10-Sep	2030	16	8	Flood	21.9	4.9	32,490	20.4	7.3	<2.00	29.6	<1.00	NA	NA	NA
1	10-Sep	2030	16	14	Flood	21.9	4.9	33,280	20.9	7.4	NA	NA	NA	NA	NA	NA
2	10-Sep	2050	7	2	Flood	21.9	4.5	31,490	19.6	7.4	NA	NA	NA	NA	NA	NA
2	10-Sep	2050	7	3.5	Flood	NA	NA	NA	NA	NA	<2.00	14.8	<1.00	NA	NA	NA
2	10-Sep	2050	7	5	Flood	21.9	4.5	31,940	20.0	7.4	NA	NA	NA	NA	NA	NA
4	10-Sep	2100	11	2	Flood	21.8	4.7	31,210	19.4	7.4	NA	NA	NA	NA	NA	NA
4	10-Sep	2100	11	5	Flood	21.8	4.7	31,190	19.4	7.5	<2.00	14.4	<1.00	NA	NA	NA
4	10-Sep	2100	11	9	Flood	21.9	4.7	31,240	19.5	7.4	NA	NA	NA	NA	NA	NA
6	10-Sep	2130	15	2	Flood	21.8	4.8	32,550	20.3	7.5	NA	NA	NA	NA	NA	NA
6	10-Sep	2130	15	7	Flood	21.9	4.9	32,520	20.3	7.5	<2.00	13.0	<1.00	NA	NA	NA
6	10-Sep	2130	15	13	Flood	21.9	4.9	32,530	20.4	7.5	NA	NA	NA	NA	NA	NA
3	10-Sep	2145	10	2	Flood	21.8	4.4	31,350	19.5	7.6	NA	NA	NA	NA	NA	NA
3	10-Sep	2145	10	5	Flood	21.9	4.3	31,330	19.5	7.6	<2.00	13.0	<1.00	NA	NA	NA
3	10-Sep	2145	10	8	Flood	21.9	4.3	31,890	19.9	7.6	NA	NA	NA	NA	NA	NA
5	10-Sep	2205	15	2	Flood	21.7	4.7	31,900	19.9	7.6	NA	NA	NA	NA	NA	NA
5	10-Sep	2205	15	7	Flood	21.8	4.7	32,210	20.1	7.6	<2.00	13.8	<1.00	NA	NA	NA
5	10-Sep	2205	15	13	Flood	21.6	4.2	35,880	22.3	7.6	NA	NA	NA	NA	NA	NA
1	10-Sep	2330	19	2	Ebb	21.4	5.0	32,510	20.3	7.6	NA	NA	NA	NA	NA	NA
1	10-Sep	2330	19	9	Ebb	21.8	4.4	33,030	20.7	7.5	<2.00	6.80	<1.00	<1.00	0.410	0.120
1	10-Sep	2330	19	17	Ebb	21.8	4.3	33,130	20.8	7.6	NA	NA	NA	NA	NA	NA
2	10-Sep	2340	6	2	Ebb	21.5	4.5	31,420	19.6	7.6	NA	NA	NA	NA	NA	NA
2	10-Sep	2340	6	3	Ebb	NA	NA	NA	NA	NA	<2.00	13.6	<1.00	<1.00	0.440	0.130
2	10-Sep	2340	6	4	Ebb	21.8	4.7	32,190	20.1	7.6	NA	NA	NA	NA	NA	NA
4	10-Sep	2355	10	2	Ebb	21.7	4.9	32,210	20.1	7.6	NA	NA	NA	NA	NA	NA
4	10-Sep	2355	10	5	Ebb	21.8	4.5	33,810	21.1	7.6	<2.00	6.57	<1.00	<1.00	0.410	0.110

Table C-2 (Page 5 of 7): Liberty State Park North Cove 2003 Dry Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
4	10-Sep	2355	10	8	Ebb	21.7	4.8	34,400	21.6	7.6	NA	NA	NA	NA	NA	NA
6	11-Sep	0030	12	2	Ebb	21.7	4.8	33,030	20.6	7.6	NA	NA	NA	NA	NA	NA
6	11-Sep	0030	12	6	Ebb	21.8	4.5	33,700	21.1	7.6	NA	NA	NA	NA	NA	NA
6	11-Sep	0030	12	10	Ebb	21.8	4.5	33,760	21.2	7.6	NA	NA	NA	NA	NA	NA
5	11-Sep	0045	12	2	Ebb	21.9	4.7	31,020	19.4	7.6	NA	NA	NA	NA	NA	NA
5	11-Sep	0045	12	5	Ebb	21.7	4.5	34,470	22.1	7.6	NA	NA	NA	NA	NA	NA
5	11-Sep	0045	12	10	Ebb	21.5	4.3	37,080	23.6	7.6	NA	NA	NA	NA	NA	NA
3	11-Sep	0055	6	2	Ebb	21.8	4.7	32,180	20.1	7.6	NA	NA	NA	NA	NA	NA
3	11-Sep	0055	6	4	Ebb	21.8	4.5	33,690	21.1	7.6	NA	NA	NA	NA	NA	NA
1	11-Sep	0230	19	2	Ebb	21.5	4.4	34,040	21.2	7.7	NA	NA	NA	NA	NA	NA
1	11-Sep	0230	19	9	Ebb	21.6	4.4	35,030	22.1	7.6	<2.00	9.60	<1.00	NA	NA	NA
1	11-Sep	0230	19	17	Ebb	21.6	4.3	35,270	22.3	7.5	NA	NA	NA	NA	NA	NA
2	11-Sep	0240	3	1.5	Ebb	21.3	4.4	33,290	20.5	7.6	<2.00	7.00	<1.00	NA	NA	NA
4	11-Sep	0255	6	2	Ebb	21.3	4.6	33,190	20.8	7.6	NA	NA	NA	NA	NA	NA
4	11-Sep	0255	6	3	Ebb	NA	NA	NA	NA	NA	<2.00	17.0	<1.00	NA	NA	NA
4	11-Sep	0255	6	4	Ebb	21.6	4.3	34,800	21.9	7.6	NA	NA	NA	NA	NA	NA
6	11-Sep	0330	10	2	Ebb	21.5	4.4	33,740	21.2	7.7	NA	NA	NA	NA	NA	NA
6	11-Sep	0330	10	5	Ebb	21.6	4.4	35,480	22.5	7.4	<2.00	33.2	<1.00	NA	NA	NA
6	11-Sep	0330	10	8	Ebb	21.6	4.4	35,650	22.5	7.6	NA	NA	NA	NA	NA	NA
3	11-Sep	0340	5	2.5	Ebb	21.5	4.4	34,410	21.7	7.7	<2.00	12.8	<1.00	NA	NA	NA
5	11-Sep	0350	10	2	Ebb	21.7	4.5	31,690	19.8	7.8	NA	NA	NA	NA	NA	NA
5	11-Sep	0350	10	5	Ebb	21.7	4.3	33,310	20.5	7.8	<2.00	54.8	<1.00	NA	NA	NA
5	11-Sep	0350	10	7	Ebb	21.7	4.3	33,400	20.7	7.8	NA	NA	NA	NA	NA	NA
1	11-Sep	0530	17	2	Slack	21.1	4.5	33,160	20.7	7.6	NA	NA	NA	NA	NA	NA
1	11-Sep	0530	17	8	Slack	21.6	4.3	33,700	21.1	7.6	<2.00	8.93	<1.00	NA	NA	NA
1	11-Sep	0530	17	15	Slack	21.6	4.2	34,470	21.6	7.6	NA	NA	NA	NA	NA	NA

Table C-2 (Page 6 of 7): Liberty State Park North Cove 2003 Dry Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
2	11-Sep	0535	4	2	Slack	21.1	4.4	34,400	21.5	7.6	<2.00	6.80	<1.00	NA	NA	NA
4	11-Sep	0545	8	2	Slack	21.6	4.3	32,720	20.5	7.6	NA	NA	NA	NA	NA	NA
4	11-Sep	0545	8	4	Slack	NA	NA	NA	NA	NA	<2.00	12.2	<1.00	NA	NA	NA
4	11-Sep	0545	8	6	Slack	21.5	4.3	33,340	20.8	7.6	NA	NA	NA	NA	NA	NA
6	11-Sep	0630	11	2	Flood	21.3	4.4	33,840	21.1	7.6	NA	NA	NA	NA	NA	NA
6	11-Sep	0630	11	5	Flood	21.5	4.4	33,860	21.3	7.6	NA	NA	NA	NA	NA	NA
6	11-Sep	0630	11	9	Flood	21.5	4.3	34,180	21.3	7.6	NA	NA	NA	NA	NA	NA
3	11-Sep	0635	7	2	Flood	21.4	4.4	32,960	20.5	7.6	NA	NA	NA	NA	NA	NA
3	11-Sep	0635	7	5	Flood	21.3	4.3	33,960	21.3	7.6	NA	NA	NA	NA	NA	NA
5	11-Sep	0645	12	2	Flood	21.8	4.5	27,270	17.1	7.6	NA	NA	NA	NA	NA	NA
5	11-Sep	0645	12	5	Flood	21.5	4.5	31,410	21.1	7.6	NA	NA	NA	NA	NA	NA
5	11-Sep	0645	12	10	Flood	21.5	4.4	33,690	21.1	7.6	NA	NA	NA	NA	NA	NA
1	11-Sep	0830	15	2	Flood	21.5	4.8	31,250	19.5	7.6	NA	NA	NA	NA	NA	NA
1	11-Sep	0830	15	7	Flood	21.3	4.4	33,450	21.0	7.8	<2.00	16.8	<1.00	<1.00	0.420	0.140
1	11-Sep	0830	15	13	Flood	21.4	4.4	33,830	21.3	7.8	NA	NA	NA	NA	NA	NA
6	11-Sep	0840	12	2	Flood	21.5	4.6	31,600	19.8	7.7	NA	NA	NA	NA	NA	NA
6	11-Sep	0840	12	6	Flood	21.5	4.6	32,450	20.2	7.6	<2.00	12.4	<1.00	1.34	0.440	0.130
6	11-Sep	0840	12	10	Flood	21.4	4.5	32,740	20.5	7.6	NA	NA	NA	NA	NA	NA
2	11-Sep	0850	7	2	Flood	21.4	4.5	32,300	20.2	7.9	NA	NA	NA	NA	NA	NA
2	11-Sep	0850	7	3.5	Flood	NA	NA	NA	NA	NA	<2.00	13.9	<1.00	<1.00	0.460	0.130
2	11-Sep	0850	7	5	Flood	21.3	4.6	32,570	20.4	7.9	NA	NA	NA	NA	NA	NA
3	11-Sep	0900	9	2	Slack	21.4	4.5	32,160	20.0	8.0	NA	NA	NA	NA	NA	NA
3	11-Sep	0900	9	4	Slack	NA	NA	NA	NA	NA	<2.00	14.0	<1.00	<1.00	0.460	0.130
3	11-Sep	0900	9	7	Slack	21.3	4.3	33,060	20.7	7.8	NA	NA	NA	NA	NA	NA
4	11-Sep	0910	12	2	Slack	21.6	4.8	31,830	19.9	7.7	NA	NA	NA	NA	NA	NA
4	11-Sep	0910	12	6	Slack	21.5	4.6	32,360	20.2	7.6	<2.00	17.4	<1.00	<1.00	0.440	0.130

Table C-2 (Page 7 of 7): Liberty State Park North Cove 2003 Dry Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
4	11-Sep	0910	12	10	Slack	21.5	4.5	32,370	20.2	7.6	NA	NA	NA	NA	NA	NA
5	11-Sep	0920	15	2	Ebb	21.6	4.7	32,000	19.9	7.8	NA	NA	NA	NA	NA	NA
5	11-Sep	0920	15	7	Ebb	21.5	4.3	32,750	20.5	7.7	<2.00	25.3	<1.00	1.23	0.440	0.150
5	11-Sep	0920	15	13	Ebb	21.4	4.3	32,830	20.6	7.6	NA	NA	NA	NA	NA	NA

NA = Not Analyzed

Table C-3: Liberty State Park North Cove 2003 Wet Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/ NO2 (mg/L)	P (Total) (mg/L)
1	19-Nov	1536	NDA	4	Flood	12.7	8.6	22,760	13.7	7.7	<2.00	34.0	<1.00	1.01	0.390	0.150
6	19-Nov	1645	10	5	Flood	12.0	8.3	25,560	15.6	7.9	<2.00	44.2	<1.00	<1.00	0.420	0.140
4	19-Nov	1720	12	2	Flood	11.5	8.6	22,370	13.5	7.8	NA	NA	NA	NA	NA	NA
4	19-Nov	1720	12	6	Flood	11.3	8.1	23,010	13.8	7.8	<2.00	21.4	<1.00	<1.00	0.390	<0.100
4	19-Nov	1720	12	10	Flood	11.5	7.4	29,330	18.1	7.9	NA	NA	NA	NA	NA	NA
3	19-Nov	1742	12	2	Flood	11.6	8.6	22,210	13.4	7.9	NA	NA	NA	NA	NA	NA
3	19-Nov	1742	12	6	Flood	11.5	7.7	28,050	17.3	7.9	<2.00	21.8	<1.00	<1.00	0.410	<0.100
3	19-Nov	1742	12	10	Flood	11.4	7.7	28,330	17.5	7.9	NA	NA	NA	NA	NA	NA
5	19-Nov	1805	7	2	Flood	11.6	7.7	29,040	18.3	7.9	NA	NA	NA	NA	NA	NA
5	19-Nov	1805	7	3.5	Flood	NA	NA	NA	NA	NA	<2.00	50.8	<1.00	<1.00	0.370	<0.100
5	19-Nov	1805	7	5	Flood	11.6	7.4	30,620	19.0	7.9	NA	NA	NA	NA	NA	NA
2	19-Nov	1820	NA	2	Flood	12.1	8.5	21,200	12.7	7.9	<2.00	17.6	<1.00	<1.00	0.460	0.110
1	19-Nov	1930	NDA	3	Ebb	14.4	6.3	27,210	16.8	7.8	<2.00	53.0	<1.00	<1.00	0.440	0.130
4	19-Nov	2005	10	2	Ebb	11.8	8.3	22,960	14.1	7.9	NA	NA	NA	NA	NA	NA
4	19-Nov	2005	10	5	Ebb	11.6	7.1	29,650	17.9	7.9	<2.00	25.1	<1.00	<1.00	0.350	0.100
4	19-Nov	2005	10	8	Ebb	11.6	6.7	33,430	20.9	7.9	NA	NA	NA	NA	NA	NA
2	19-Nov	2015	NDA	2	Ebb	11.9	8.4	21,880	13.2	7.8	<2.00	53.6	<1.00	<1.00	0.480	0.210
6	19-Nov	2045	NDA	5	Ebb	12.3	7.8	27,730	17.1	7.8	<2.00	23.2	<1.00	<1.00	0.460	0.100
3	19-Nov	2055	9	2	Ebb	11.8	7.9	24,070	14.4	7.9	NA	NA	NA	NA	NA	NA
3	19-Nov	2055	9	4.5	Ebb	NA	NA	NA	NA	NA	<2.00	22.0	<1.00	1.19	0.330	0.100
3	19-Nov	2055	9	7	Ebb	11.7	6.4	35,410	22.3	7.8	NA	NA	NA	NA	NA	NA
5	19-Nov	2110	5	2	Ebb	11.7	7.1	31,600	19.4	7.9	<2.00	43.4	<1.00	<1.00	0.350	0.130
1	19-Nov	2300	NDA	2	Ebb	12.5	5.8	27,660	17.0	7.7	<2.00	27.9	<1.00	NA	NA	NA
4	19-Nov	2310	8	2	Ebb	11.8	6.8	34,130	21.3	7.9	NA	NA	NA	NA	NA	NA
4	19-Nov	2310	8	4	Ebb	NA	NA	NA	NA	NA	<2.00	28.2	<1.00	NA	NA	NA

NDA = No Depth Available
NA = Not Analyzed

Table C-3 (Page 2 of 5): Liberty State Park North Cove 2003 Wet Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
6	19-Nov	2353	4	2	Ebb	11.9	7.3	29,030	17.9	7.7	NA	NA	NA	NA	NA	NA
3	20-Nov	0010	8	2	Ebb	11.8	7.1	31,900	19.1	7.8	NA	NA	NA	NA	NA	NA
3	20-Nov	0010	8	6	Ebb	11.7	6.4	34,740	21.8	7.9	NA	NA	NA	NA	NA	NA
5	20-Nov	0025	4	2	Ebb	11.7	7.2	29,990	18.6	7.8	NA	NA	NA	NA	NA	NA
4	19-Nov	2310	8	6	Ebb	11.7	6.2	34,660	21.8	7.8	NA	NA	NA	NA	NA	NA
2	19-Nov	2320	NDA	2	Ebb	12.6	8.1	14,100	8.2	7.7	2.17	28.2	<1.00	NA	NA	NA
1	20-Nov	0145	NDA	2	Flood	12.4	5.9	27,400	16.4	7.9	<2.00	12.8	<1.00	NA	NA	NA
4	20-Nov	0200	12	2	Flood	11.7	7.6	30,770	19.2	7.8	NA	NA	NA	NA	NA	NA
4	20-Nov	0200	12	6	Flood	11.7	7.5	30,820	19.2	7.8	<2.00	28.4	<1.00	NA	NA	NA
4	20-Nov	0200	12	10	Flood	11.6	7.6	30,950	19.2	7.8	NA	NA	NA	NA	NA	NA
2	20-Nov	0230	4	2	Flood	11.6	7.2	32,280	20.1	7.8	<2.00	11.7	<1.00	NA	NA	NA
6	20-Nov	0245	NDA	2	Flood	11.5	7.2	30,870	19.2	7.8	<2.00	10.0	<1.00	NA	NA	NA
3	20-Nov	0300	12	2	Flood	11.3	7.4	31,290	19.2	7.8	NA	NA	NA	NA	NA	NA
3	20-Nov	0300	12	6	Flood	11.5	7.4	31,400	19.5	7.8	<2.00	15.3	<1.00	NA	NA	NA
3	20-Nov	0300	12	10	Flood	11.5	7.5	31,470	19.3	7.8	NA	NA	NA	NA	NA	NA
5	20-Nov	0315	12	2	Flood	11.5	7.6	29,880	18.5	7.9	NA	NA	NA	NA	NA	NA
5	20-Nov	0315	12	6	Flood	11.6	7.6	29,700	18.4	7.9	5.01	14.4	<1.00	NA	NA	NA
5	20-Nov	0315	12	10	Flood	11.5	7.6	29,700	18.4	7.9	NA	NA	NA	NA	NA	NA
1	20-Nov	0445	7	2	Flood	11.8	7.2	30,960	19.2	7.8	NA	NA	NA	NA	NA	NA
1	20-Nov	0445	7	3.5	Flood	NA	NA	NA	NA	NA	<2.00	11.6	<1.00	NA	NA	NA
1	20-Nov	0445	7	5	Flood	12.2	5.8	28,890	17.8	7.8	NA	NA	NA	NA	NA	NA
4	20-Nov	0500	13	2	Flood	11.4	7.6	31,620	19.7	7.8	NA	NA	NA	NA	NA	NA
4	20-Nov	0500	13	6	Flood	11.5	7.4	31,480	19.5	7.8	<2.00	9.87	<1.00	NA	NA	NA
4	20-Nov	0500	13	11	Flood	11.5	7.3	31,650	19.7	7.8	NA	NA	NA	NA	NA	NA

NDA = No Depth Available
NA = Not Analyzed

Table C-3 (Page 3 of 5): Liberty State Park North Cove 2003 Wet Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
2	20-Nov	0520	5	2	Flood	11.3	7.2	30,790	19.2	7.9	<2.00	8.20	<1.00	NA	NA	NA
6	20-Nov	0545	7	2	Slack	11.5	7.3	30,280	18.8	7.8	NA	NA	NA	NA	NA	NA
6	20-Nov	0545	7	5	Slack	11.5	7.2	31,480	19.6	7.8	NA	NA	NA	NA	NA	NA
3	20-Nov	0600	14	2	Ebb	11.4	7.5	31,590	19.7	7.8	NA	NA	NA	NA	NA	NA
3	20-Nov	0600	14	7	Ebb	11.4	7.6	31,440	19.5	7.8	NA	NA	NA	NA	NA	NA
3	20-Nov	0600	14	12	Ebb	11.5	7.1	32,210	20.2	7.8	NA	NA	NA	NA	NA	NA
5	20-Nov	0615	7	2	Ebb	11.6	7.3	26,580	16.2	7.9	NA	NA	NA	NA	NA	NA
5	20-Nov	0615	7	5	Ebb	11.7	7.1	31,210	19.4	7.9	NA	NA	NA	NA	NA	NA
1	20-Nov	0745	NDA	2	Ebb	12.3	5.4	31,980	19.9	7.8	<2.00	26.6	<1.00	NA	NA	NA
4	20-Nov	0800	8	2	Ebb	11.5	7.5	32,340	20.2	7.9	NA	NA	NA	NA	NA	NA
4	20-Nov	0800	8	4	Ebb	NA	NA	NA	NA	NA	<2.00	30.1	<1.00	NA	NA	NA
4	20-Nov	0800	8	6	Ebb	11.7	7.3	33,530	21.0	7.9	NA	NA	NA	NA	NA	NA
2	20-Nov	0815	4	2	Ebb	11.5	7.1	32,550	20.3	7.8	3.21	89.6	<1.00	NA	NA	NA
6	20-Nov	0845	NDA	2	Ebb	11.7	6.9	34,140	21.4	7.9	<2.00	31.0	<1.00	NA	NA	NA
3	20-Nov	0900	6	2	Ebb	11.2	7.4	33,030	21.2	7.8	NA	NA	NA	NA	NA	NA
3	20-Nov	0900	6	3	Ebb	NA	NA	NA	NA	NA	<2.00	15.4	<1.00	NA	NA	NA
3	20-Nov	0900	6	4	Ebb	11.4	7.2	33,770	21.1	7.9	NA	NA	NA	NA	NA	NA
5	20-Nov	0910	5	3	Ebb	11.5	7.6	30,280	18.8	7.9	2.43	47.0	<1.00	NA	NA	NA
1	20-Nov	1045	NDA	3	Slack	12.2	5.6	31,720	19.8	7.9	<2.00	15.0	<1.00	<1.00	0.490	0.120
4	20-Nov	1055	8	2	Slack	11.5	7.1	32,180	20.0	7.9	NA	NA	NA	NA	NA	NA
4	20-Nov	1055	8	4	Slack	NA	NA	NA	NA	NA	2.99	26.6	<1.00	1.28	0.380	0.110
4	20-Nov	1055	8	6	Slack	11.7	7.2	31,810	19.8	7.9	NA	NA	NA	NA	NA	NA
2	20-Nov	1105	4	2	Slack	11.6	6.8	34,200	21.5	7.9	4.07	78.0	<1.00	1.50	0.390	0.210
6	20-Nov	1145	NDA	3	Flood	11.3	7.7	29,090	17.9	7.9	NA	NA	NA	NA	NA	NA
3	20-Nov	1155	7	2	Flood	11.4	7.6	28,600	17.7	7.9	NA	NA	NA	NA	NA	NA

NDA = No Depth Available
NA = Not Analyzed

Table C-3 (Page 4 of 5): Liberty State Park North Cove 2003 Wet Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
3	20-Nov	1155	7	5	Flood	11.4	7.7	29,500	18.3	7.9	NA	NA	NA	NA	NA	NA
5	20-Nov	1210	5	3	Flood	11.3	7.9	25,300	15.5	7.9	NA	NA	NA	NA	NA	NA
1	20-Nov	1352	NDA	2	Flood	13.2	5.8	29,060	18.0	7.7	<2.00	14.2	<1.00	NA	NA	NA
4	20-Nov	1412	8	2	Flood	11.5	7.5	27,490	16.9	7.7	NA	NA	NA	NA	NA	NA
4	20-Nov	1412	8	4	Flood	NA	NA	NA	NA	NA	<2.00	20.6	<1.00	NA	NA	NA
4	20-Nov	1412	8	6	Flood	11.5	7.0	30,190	18.7	7.7	NA	NA	NA	NA	NA	NA
2	20-Nov	1417	NDA	2	Flood	11.5	7.9	27,600	16.9	7.7	<2.00	18.4	<1.00	NA	NA	NA
6	20-Nov	1446	NDA	2	Flood	11.5	7.4	28,440	17.5	7.7	<2.00	18.8	<1.00	NA	NA	NA
3	20-Nov	1505	8	2	Flood	11.2	7.5	27,480	16.9	7.7	NA	NA	NA	NA	NA	NA
3	20-Nov	1505	8	4	Flood	NA	NA	NA	NA	NA	<2.00	21.0	<1.00	NA	NA	NA
3	20-Nov	1505	8	6	Flood	11.4	7.1	29,480	18.2	7.7	NA	NA	NA	NA	NA	NA
5	20-Nov	1520	7	2	Flood	10.8	8.4	18,740	11.1	7.7	NA	NA	NA	NA	NA	NA
5	20-Nov	1520	7	3.5	Flood	NA	NA	NA	NA	NA	<2.00	24.2	<1.00	NA	NA	NA
5	20-Nov	1520	7	5	Flood	10.9	8.3	18,780	11.2	7.7	NA	NA	NA	NA	NA	NA
1	20-Nov	1646	NDA	2	Flood	12.0	6.0	30,930	19.2	7.7	<2.00	20.8	<1.00	NA	NA	NA
4	20-Nov	1700	9	2	Flood	11.1	7.5	28,740	17.7	7.7	NA	NA	NA	NA	NA	NA
4	20-Nov	1700	9	4.5	Flood	NA	NA	NA	NA	NA	<2.00	17.4	<1.00	NA	NA	NA
4	20-Nov	1700	9	7	Flood	11.5	7.2	29,560	18.3	7.7	NA	NA	NA	NA	NA	NA
2	20-Nov	1710	NDA	2	Flood	10.8	8.0	29,360	18.1	7.7	<2.00	28.8	<1.00	NA	NA	NA
6	20-Nov	1755	NDA	2	Flood	10.8	7.7	30,990	19.3	7.7	NA	NA	NA	NA	NA	NA
3	20-Nov	1805	9	2	Flood	10.9	8.0	22,560	13.3	7.8	NA	NA	NA	NA	NA	NA
3	20-Nov	1805	9	7	Flood	11.3	7.2	29,750	18.6	7.7	NA	NA	NA	NA	NA	NA
5	20-Nov	1815	6	2	Flood	10.8	8.2	20,620	12.4	7.7	NA	NA	NA	NA	NA	NA
5	20-Nov	1815	6	4	Flood	10.9	8.0	21,190	12.7	7.7	NA	NA	NA	NA	NA	NA

NDA = No Depth Available
NA = Not Analyzed

Table C-3 (Page 5 of 5): Liberty State Park North Cove 2003 Wet Weather CSO Water Quality Data

Station	Date	Time	Station Depth (ft)	Sample Depth (ft)	Tide	Temp (°C)	DO (mg/L)	SPC @ 25°C (µS)	Salinity (ppt)	pH	BOD5 (mg/L)	TSS (mg/L)	NH3 (mg/L)	TKN (mg/L)	NO3/NO2 (mg/L)	P (Total) (mg/L)
1	20-Nov	1945	NDA	2	Ebb	10.9	5.8	24,040	14.5	7.6	<2.00	18.6	<1.00	<1.00	0.490	0.110
6	20-Nov	2000	NDA	2	Ebb	10.6	8.0	25,780	15.7	7.7	<2.00	25.2	<1.00	<1.00	0.490	0.140
4	20-Nov	2005	8	2	Ebb	10.8	7.9	25,400	15.4	7.7	NA	NA	NA	NA	NA	NA
4	20-Nov	2005	8	4	Ebb	NA	NA	NA	NA	NA	<2.00	28.0	<1.00	<1.00	0.430	0.130
4	20-Nov	2005	8	6	Ebb	11.2	7.2	28,040	17.3	7.7	NA	NA	NA	NA	NA	NA
3	20-Nov	2020	8	2	Ebb	10.6	7.6	25,770	15.7	7.7	NA	NA	NA	NA	NA	NA
3	20-Nov	2020	8	4	Ebb	NA	NA	NA	NA	NA	<2.00	20.6	<1.00	<1.00	0.430	0.120
3	20-Nov	2020	8	6	Ebb	11.3	6.7	29,140	18.0	7.7	NA	NA	NA	NA	NA	NA
5	20-Nov	2030	4	2	Ebb	11.0	7.8	22,100	13.3	7.7	<2.00	36.2	<1.00	<1.00	0.440	0.160
2	20-Nov	2040	NDA	2	Ebb	10.4	7.5	25,510	15.5	7.7	9.30	233	<1.00	4.93	0.460	0.640

NDA = No Depth Available
NA = Not Analyzed

Appendix D

North Cove Benthic Assessment for Liberty State Park
Jersey City, NJ

North Cove Benthic Assessment
Liberty State Park, Jersey City, NJ

Hudson-Raritan Estuary Ecosystem Restoration Project

REPORT

September 16, 2003

For:

U.S. Army Corps of Engineers
New York District
Planning Division – Environmental Analysis Branch
26 Federal Plaza
New York, NY 10278-0090

Submitted by:

Ecosystem Restoration Consultants
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TABLE OF CONTENTS

LIST OF TABLES……D-2
LIST OF FIGURES..... D-3
I. INTRODUCTION D-4
1. BACKGROUND..... D-4
2. STUDY AREA..... D-4
II. OBJECTIVES..... D-4
III. METHODS..... D-5
1. FIELD PROCEDURES..... D-5
2. LABORATORY PROCEDURES..... D-5
2.1. Sorting D-5
2.2. Sub- sampling..... D-6
2. 3. Identification D-6
3. QUALITY CONTROL PROCEDURES..... D-6
IV. RESULTS D-7
1. SEDIMENT..... D-7
2. BIOLOGICAL..... D-7
2.1. Abundance, Biomass and Species Diversity D-7
2.1.1. Station 1..... D-7
2.1.2. Station 2..... D-7
2.1.3. Station 3..... D-7
2.1.4. Station 4..... D-8
2.1.5. Station 5..... D-8
2.1.6. Station 6..... D-8
2.1.7. Station 7..... D-8
V.DISCUSSION..... D-8
VI REFERENCES..... 11

LIST OF TABLES

Table 1. Benthos mean abundance (animals/m2) and species diversity (H) at Liberty State Park North Cove, Jersey City, NJ.....D-12

Table 2. Benthos Biomass (g/m2) for Liberty State Park North Cove, Jersey City, NJ.....D-13

LIST OF FIGURES

Figure 1. Benthic survey sampling stations.....……D-14

Figure 2. Percent composition and biomass for infaunal communities in North Cove, Liberty State Park, Jersey City, NJ.....…….....D-15

I. INTRODUCTION

1. BACKGROUND

Natural estuaries are typically biologically highly productive ecological systems which are characterized by vegetated shorelines and tidal wetlands. However, intense coastal development with increasing urbanization and industrial use, often result in modification of estuaries as in the case of the Hudson – Raritan Estuary. The loss of marginal wetlands and shallows and a variety of urban and industrial inputs may impact estuarine systems. Aquatic biotic communities associated with watersheds with high urban land use are generally characterized by lower species diversity, altered community composition and reduced habitat diversity (Dauer et al 2000). New York/New Jersey Harbor is a well demonstrated example of the impacts of urbanization within an estuarine system. Despite extensive changes and urbanization of NY/NJ Harbor it is still a productive estuary supporting diverse communities of fish and invertebrates (Woodhead et al. 1999).

The invertebrate communities are an important part of the marine environment in the Harbor. Benthic organisms are important links in the flow of energy and cycling of nutrients between the sediment and the water column. It is important to examine the lower trophic levels of the food web in the Estuary because the benthos influences the fish population through their role as a food source for fish. The infaunal community (benthos) is composed of suspension and deposit feeders. They include polychaetes, crustaceans and bivalves. Their life strategies and sediment characteristics are tightly coupled. The grain size, chemistry and physical properties of the sediment limit which benthic organisms colonize an area.

2. STUDY AREA

The North Cove Benthic Assessment is part of the larger Environmental Sampling Program for the Liberty State Park Draft Feasibility Report and the USACE Hudson Raritan Estuary Ecosystem Restoration Project. The North Cove is located in the north east corner of Liberty State Park. The cove is approximately 800 feet long and at its widest point 850 feet wide, with depths ranging from 5 to 9 feet in the center of the Cove. The North Cove is characterized by a rip-rap shoreline, steep slopes and areas of unconsolidated sediments.

II. OBJECTIVES

The objectives of the North Cove Benthic Assessment are:

- To establish a benthic baseline for predicting what types of bottom environment may be possible to create in the proposed tidal creek;
- To predict the environmental impact of the proposed tidal marsh;
- To collect baseline data to use in assessing the level of restoration attained in the post construction of the tidal portion of the project.

III. METHODS

1. FIELD PROCEDURES

LMS collected twenty one (21) benthic grab samples from seven proposed stations (3 replicate samples at each station) within North Cove using a standard Ponar grab ($0.05m^2$). Four (4) stations were located along a transect that began at the proposed mouth of the tidal creek and ended outside of the promenade. The remaining three (3) stations were located in the shallowest water possible at the edges of the Cove and were taken in the intertidal zone at low tide (Figure 1). Sample stations were located by Global Positioning System (GPS).

STATION	LOCATION
1	Back of the North Cove at the southwestern shore.
2	Back of the North Cove at western shore.
3	Back of the North Cove at the northwestern shore.
4	Middle of the cove.
5	Middle of the cove towards the promenade
6	Middle of the cove towards the back of the cove
7	Outside the promenade

The boat was brought on station and the YSI meter probes were lowered over the side of the sampling vessel to approximately 1-foot above the bottom. Measurements for temperature, salinity, and dissolved oxygen were recorded on the field data sheet. A Niskin water sampling bottle was lowered to approximately 1 foot above bottom to collect a water sample for measuring pH with a calibrated pHtester2 pH pen.

The sediment was characterized as being coarse, fine, gravel, clay or mixed type. Also the presence of petroleum and shell hash was recorded. Obvious odors such as hydrogen sulfide or petroleum or lack of odor were recorded.

After the sample description was completed, the sediment was washed through a 500 micron sieve. The remaining material transferred from the 500-micron sieve into a labeled sample container and preserved with a solution of 10% formalin with rose bengal stain.

The samples were brought to the LMS Nyack laboratory to be sorted, enumerated and identified to the lowest practical taxon.

2. LABORATORY PROCEDURES

2.1. Sorting

Each sample was washed through a 500-μ sieve in a sink under a fume hood to remove all traces of formalin. The samples were sorted in a glass laboratory pan, which was placed on a light box. The organisms were removed and enumerated. Only whole organisms or parts of organisms with heads were counted, but all identifiable fragments were saved. The enumerated organisms were preserved in 10% formalin, placed in labeled vials, and stored with the other samples from the survey.

2.2. Sub- sampling

Samples containing excessive sand and detritus, or organisms in significant number, were split using a Caton Macroinvertebrate Subsampler. This subsampler consists of a rectangular screen (~380-μ mesh) and has sets of grid coordinates, which allows for as many as 30, 6 x 6-cm subsamples. Actual organism densities will determine the number of subsamples sorted.

The preservative-free washed sample was transferred to the subsampler screen, which had been placed in a tray on a level surface. A sufficient quantity of water was added to the tray to ensure thorough mixing and dispersal of the sample across the entire subsampler screen. Initially, more cells were selected than the anticipated number of sub-samples. The selected subsamples were lifted off of the sampling screen using a subsample square and a scoop. Subsamples were then transferred directly to sorting pans for analysis. The process of selecting and sorting subsamples continued until the total number of organisms removed and sorted was at least 100, or the entire sample had been sorted. Selected squares were sorted in their entirety, even after the 100-organism count had been reached.

2. 3. Identification

After sorting, the organisms were identified to the lowest practical taxon and counted. Organisms such as barnacles, calanoid copepods, bryozoan statoblasts and hydroids, which could not be quantitatively sampled with the dredge, were not counted. However, their presence was noted. All organisms were then preserved in 10% formalin.

3. QUALITY CONTROL PROCEDURES

3.1 *Sorting.*

Sorting was checked using a continuous sampling plan (CSP-1) that required that each batch of samples pass the required level of QC before continuing the analysis of the next batch. This plan required that the first eight (f = 8) samples that were analyzed by the laboratory be resorted and meet a 90% accuracy level before continuing the sorting of subsequent samples. After this criterion was met, one randomly selected sample out of the next seven (i=7) samples was resorted to determine if the 90% accuracy level had been attained. As long as this criterion was met, one random sample out of every seven was checked for the remainder of the program. If there was a failure to meet this criterion, the next eight samples were resorted to reestablish a 90 % accuracy level.

3.2 Identification.

Quality control of the identification phase of the analysis was done by an individual taxonomist, and followed the CSP-1 format outlined above for sorting.

IV. RESULTS

1. SEDIMENT

Sediment samples were collected at all seven sites in the North Cove. Grab samples collected at the back end of the cove were odorless and consisted of a mix of coarse and fine grain size sediments. Particle size varied from 0.075 – 9.5 mm. Site 1 had the highest organic content, 10.2 percent. Site 2 had the lowest organic content, 3.1 percent. The samples collected along a transect in the middle of North Cove (the back of the cove to outside the promenade) were black soft muds containing a strong petroleum odor. Particle size varied from 0.002 – 4.75mm.

2. BIOLOGICAL

2.1. Abundance, Biomass and Species Diversity

The overall mean density of organisms from the open seabed samples (N=7) taken in the North Cove was 737 animals/m^2. The infaunal community collected from Station 1 contained the lowest mean density (320 animals/m^2). Faunal densities were the greatest at Station 7, 1,320 animals/m^2 (Table 1). The overall mean biomass of infaunal communities located in the North Cove was 59 g/m^2. Sediment infaunal communities at Station 1 had the lowest biomass, 0.6 g/m^2. Species diversity was greatest at Stations 6 (middle of the cove) and 7 (outside the cove). Each station contained 10 taxa (Table 2).

2.1.1. Station 1

In sediment at Station 1, the infaunal communities were comprised of small polychaete worms and amphipods in low densities, 320 animals/m^2. Species diversity was also low. Amphipods dominated by Melitidae and *Gammarus sp*. were the most abundant organisms, comprising 67% of the infaunal community. Polychaetes, *Capitella sp*., were also present in low numbers. The infaunal biomass was also low, 0.58 g/m^2. Two of the three replicate samples resulted in no catches. The samples were valid grabs.

2.1.2. Station 2

At Station 2, the horseshoe crab, *Limulus polyphemus*, comprised 100% of the infaunal composition. The infaunal community was low in abundance (540 animals/m^2) and biomass (26.6 g/m^2). One of the three replicates resulted in a no catch. It was a valid grab sample.

2.1.3. Station 3

Worms (polychaetes and oligochaetes) comprised about 67% of the infaunal community. Gastropods (*Illynassa obsoleta*, 17%) and hermits crabs (*Pagurus* sp., 17%) were also present but in lower numbers. The most abundant polychaetes were *Capitella sp*., *Leitoscoloplos sp*., and *Glycera* sp. The mean density of the infaunal community was 340 animals/m^2. Species diversity was among the highest out of the seven sites. The mean infaunal biomass was high due to the shells of the hermit crabs and the gastropods, 177.586 g/m^2. Polychaetes comprised of 12% of the infaunal biomass.

2.1.4. Station 4

At station 4, the infaunal community was comprised of several different organisms living in the sediment but in low densities, 340 animals/m^2. Polychaete worms comprised about 83% of the infaunal community; *Leitoscoloplos sp.* and *Capitella sp* were the most abundant species. The bivalve, *Mulinia lateralis* and polychaetes, Nephtys *sp.*, *Diopatra cuprea* and *Paraonidae* were also present in low numbers. The mean overall biomass of the infaunal community is 38 g/m^2. Overall, the faunal community from this station was approximately four times more abundant than sites along the beach at the back end of the cove.

2.1.5. Station 5

In sediment at Station 5, the infaunal community was comprised solely of polychaetes, 620 animals/m^2. *Leitoscoloplos sp*. and *Capitella sp*. were the most abundant polychaetes. These species comprised 96% of the infaunal community. Other polychaete species included *Pectinaria gouldii*, *Eteone sp*. and *Glycera sp*. The overall mean biomass for the infaunal community was 13 g/m^2

2.1.6. Station 6

At station 6 polychaetes and oligochaetes comprised 70% of the infaunal community. *Leitoscoloplos sp.*, *Capitella sp*., and Paraonidae worms were most abundant species. Gastropods (*Illynassa obsoleta*), mysid (*Neomysis americana*) and amphipods (Melitidae) comprised 30% of the infaunal population. The overall mean abundance of the community was 740 animals/m^2. Faunal diversity was relatively high with 10 taxa. Mean biomass was relatively high, 133 g/m^2. Polychaetes comprised 30% of the biomass weighing 40 g/m^2. The gastropods comprised 70% of the biomass, 93 g/m^2.

2.1.7. Station 7

Polychaetes comprised about 80% of the infaunal community. Principle polychaetes included *Leitoscoloplos sp*., *Capitella sp*., *Streblospio benedicti*, *Polydora ligni*, *Phyllodoce sp.*, *Pectinaria Gouldii*, *Nephtys sp.* and *Paraonidae*. Other infaunal organisms present in small numbers included amphipods (Melitidae) and shrimp (*Crangon septemspinosa*). Faunal diversity was relatively high with 10 taxa. The mean biomass was 22 g/m2.

V.DISCUSSION

The Hudson-Raritan Estuary has undergone intense urbanization. Natural estuarine habitat characterized by sunlit shallows and submerged vegetation have been modified; nevertheless the Hudson-Raritan Estuary still supports a large invertebrate community. This invertebrate community is important in an estuary because it is the source of food for the fish population.

In the North Cove of Liberty State Park, NJ, grab and sediment samples were collected to determine existing benthic communities and sediment type. This evaluation was conducted to provide the physical and biological information necessary to evaluate the potential for creating a tidal creek at the back of North Cove. Overall, the faunal communities increased in species diversity and abundance from the back of North Cove station 2 (520 animals/m^2) to outside the

promenade station 7 (1,320 animals/m^2). The infaunal community at station 2 was comprised solely of horseshoe crabs. In contrast to this, the infaunal community living in the seabed at station 7 consisted of polychaetes, amphipods and decapods (Figure 2.).

Sediment

The characteristics of North Cove are typical of low energy habitats where settling of silt and organic matter occurs. These sediment conditions promote the accumulation of detritus in the water column for zooplankton to feed. Typically, the organic content for unpolluted coastal sediments can range between 1% for clean sand and 8% for fine mud. The high organic content found in North Cove sediments (102%) could be from groundwater, runoff, or sewage from nearby CSOs.

Biology

Polychaetes were collected at all 7 sampling sites. They comprised the majority of all species. Polychaetes are used as bioindicators due to their direct contact with the sediment, thus showing sensitivity to anthropogenic compounds. *Capitella sp*., *Leitoscoloplos sp*., *Streblospio benedicti* and *Nephtys sp*. are considered environmental indicator species because they are tolerant of degraded habitat conditions. They are often found in sediments characterized by high organic matter, petroleum contamination, sewage, and in waters with low dissolved oxygen levels. *Capitella sp*. are often one of the first groups to recolonize an area impacted by dredging or oil spill (Llanso 1991, NOAA 2003).

Amphipods were present in two of the seven stations. *Gammarus sp*. and Melitid amphipods feed on detritus and are found in muddy and sandy substrates. They are an important food source for fish. The absence of the amphipod *Ampelesca abdita* is an environmental indicator. *A. abdita* is reported to be sensitive to pollutants such as petroleum compounds and are typically not found in highly polluted sediments (NOAA 2003).

Horseshoe crabs were collected at site 2, which is at the back of North Cove. They are environmental generalists and can survive within a wide range of environmental conditions including variations in salinity and oxygen levels (Shuster 1982). Currently, there is little information to suggest unusual sensitivity by horseshoe crabs to low dissolved oxygen, high turbidity or urban pollution (Botton 1995).

In surveys of benthic habitats Iocco et al. (1995) found that sediments were dominated by opportunistic or pollution tolerant species. Common infaunal species of the Upper Bay included capitellid worms, *Streblospio benedicti* and the bivalve *Mulinia lateralis*. Abundance, biomass and species richness were used as indicators of benthic community health. Abundant species and species diversity for the Upper Bay are consistent with the species found in the North Cove.

Comparable studies of benthic communities in New York/New Jersey Harbor, (Zappala 2001) found that open seabed areas were comprised of fine black mud and contained rather low densities (1,500 animals/m^2) of macrobenthic infauna. Polychaetes were the dominant taxa. The common species were *Leitoscoloplos sp*, *Capitella sp*., *Heteromastus sp*., *Polydora sp*., *Neries sp*., and *Streblospio benedicti*. Other infaunal organisms present in small numbers included, gastropods and a few amphipods (*Ampelesca abdita*, Melitidae and *Gammarus sp*.)

Colonization of the seabed by macrobenthos in stressed habitats (such as polluted sediments) typically follows the Pearson – Rosenberg paradigm (Pearson – Rosenberg 1978). For infauna distributed along a gradient of decreasing organic input, this paradigm suggests that an area of azoic sediments is followed by an assemblage of small opportunistic organisms (worms and tube dwelling amphipods). Further from the source of organic input, the opportunists are gradually replaced by larger burrowing species (Zappala 2001). The open seabed in the North Cove consisted of unconsolidated fine black mud, which contained oily globules. The predominant organisms found living in the black mud were small opportunistic capitellid worms and *Leitoscoloplos sp*. The seabed close to the back of the cove was coarser and there was no apparent petroleum odor. The colonization of the sediments in the North Cove appears to resemble the early opportunistic stage in the Pearson-Rosenberg stress gradient model.

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Table 1. Benthos mean abundance (animals/m2) and species diversity (H) at Liberty State Park North Cove, Jersey City, NJ.

			Mean Abundance (animals/m2)						
Family	**Group**	**Species**	**NC 1**	**NC 2**	**NC 3**	**NC 4**	**NC 5**	**NC 6**	**NC 7**
Arthropoda	Amphipod	*Melitidae*	240	0	0	0	0	20	220
Arthropoda	Amphipod	*Gammarus sp.*	20	0	0	0	0	0	0
Annelida	Polychaete	*Capitella sp.*	60	0	100	80	140	100	140
Arthropoda	Merostomata	*Limulus polyphemus*	0	520	0	0	0	0	0
Annelida	Oligochaete	*Oligochaeta*	0	0	20	0	0	20	0
Annelida	Polychaete	*Glycera sp.*	0	0	80	0	20	20	0
Arthropoda	Pagurid	*Pagurus sp.*	0	0	40	0	0	0	0
Annelida	Polychaete	*Leitoscoloplos sp.*	0	0	60	1120	420	280	600
Mollusca	Gastropod	*Ilyanassa obsoleta*	0	0	40	0	0	40	0
Mollusca	Bivalve	*Mulinia lateralis*	0	0	0	20	0	0	0
Annelida	Polychaete	*Paraonidae*	0	0	0	40	0	180	20
Annelida	Polychaete	*Nephtys sp.*	0	0	0	20	0	20	140
Annelida	Polychaete	*Diopatra cuprea*	0	0	0	20	0	0	0
Annelida	Polychaete	*Eteone sp.*	0	0	0	0	20	0	0
Annelida	Polychaete	*Pectinaria gouldii*	0	0	0	0	20	0	20
Arthropoda	Decapod	*Neomysis americana*	0	0	0	0	0	20	0
Annelida	Polychaete	*Nereis virens*	0	0	0	0	0	40	0
Annelida	Polychaete	*Phyllodoce sp.*	0	0	0	0	0	0	20
Annelida	Polychaete	*Polydora ligni*	0	0	0	0	0	0	40
Annelida	Polychaete	*Streblospio benedicti*	0	0	0	0	0	0	100
Arthropoda	Decapod	*Crangon septemspinosa*	0	0	0	0	0	0	20
			NC 1	**NC 2**	**NC 3**	**NC 4**	**NC 5**	**NC 6**	**NC 7**
	Species Richness (total number of taxa)		3	1	6	6	5	10	10
	TRUE Species Richness (total # of taxa)		3	1	6	6	5	10	10
	Mean Density (individuals/m2)		320	520	340	1300	620	740	1320
	Diversity (Shannon-Wiener Function, H')		1.01	0	2.41	0.86	1.34	2.57	2.43
	H' max		1.58	0	2.584	2.58	2.32	3.32	3.32
	Evenness (E)		0.63	1	0.93	0.33	0.57	0.77	0.73
			NC 1	**NC 2**	**NC 3**	**NC 4**	**NC 5**	**NC 6**	**NC 7**
# Taxa occurring	Annelida	#	1	0	4	5	5	7	8
		%	33%	0%	67%	83%	100%	70%	80%
	Arthropoda	#	2	1	1	0	0	2	2
		%	67%	100%	17%	0%	0%	20%	20%
	Mollusca	#	0	0	1	1	0	1	0
		%	0%	0%	17%	17%	0%	10%	0%
# Individuals occurring	Annelida	#	60	0	260	1280	620	660	1080
		%	19%	0%	76%	98%	100%	89%	82%
	Arthropoda	#	260	520	40	0	0	40	240
		%	81%	100%	12%	0%	0%	5%	18%
	Mollusca	#	0	0	4	20	0	40	0
		%	0%	0%	1%	2%	0%	5%	0%

Table 2. Benthos Biomass (g/m2) for Liberty State Park North Cove, Jersey City, NJ.

	Biomass (g/m2)								
	Family	**Group**	**NC 1**	**NC 2**	**NC 3**	**NC 4**	**NC 5**	**NC 6**	**NC 7**
	Arthropoda	Amphipods	0.5	0	0	0	0	0.08	0.626
	Annelida	Polychaetes	0.086	0	21.922	35.056	12.532	39.538	20.146
	Arthropoda	Merostomata	0	26.58	0	0	0	0	0
	Annelida	Oligochaetes	0	0	0.024	0	0	0.064	0
	Mollusca	Gastropods	0	0	60.982	0	0	93.492	0
	Arthropoda	Paguridae	0	0	94.658	0	0	0	0
	Mollusca	Bivalves	0	0	0	3.028	0	0	0
	Arthropoda	Crustaceans	0	0	0	0	0	0	0.958
		TOTAL	0.586	26.58	177.586	38.084	12.532	133.174	21.73

			NC 1	**NC 2**	**NC 3**	**NC 4**	**NC 5**	**NC 6**	**NC 7**
Biomass	Annelida	g/m2	0.086	0	21.946	35.056	12.532	39.602	20.146
		%	15%	0%	12%	92%	100%	30%	93%
	Arthropoda	g/m2	0.5	26.58	94.658	0	0	0.08	1.584
		%	85%	100%	53%	0%	0%	0.06%	7%
	Mollusca	g/m2	0	0	60.982	3.028	0	93.492	0
		%	0%	0%	34%	8%	0%	70%	0%

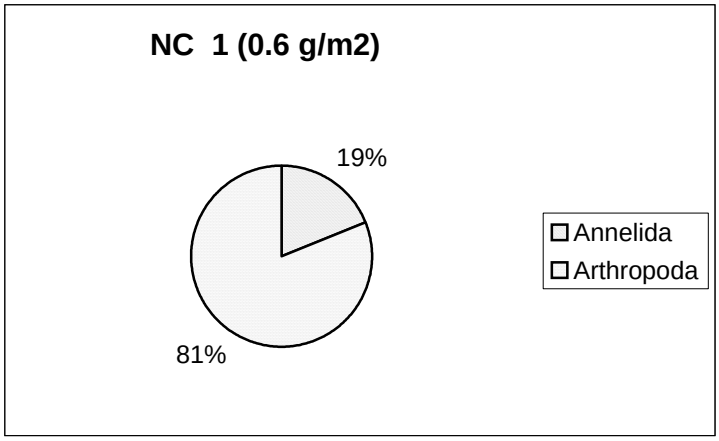
Legend

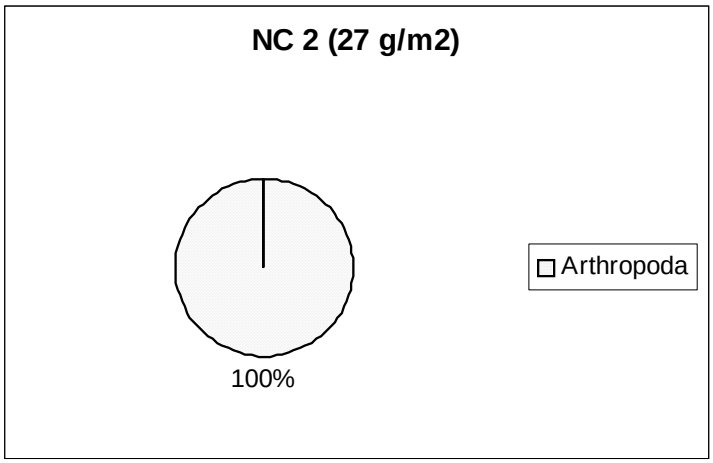
Sampling Point

0 50 100 200 Feet

Benthyic Survey Sampling Stations

FIGURE 1





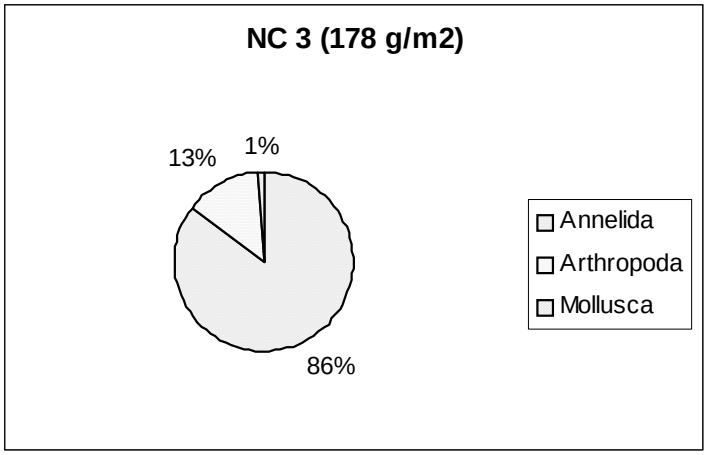
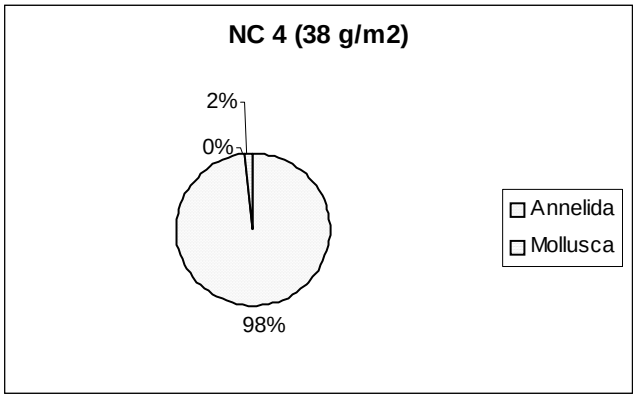
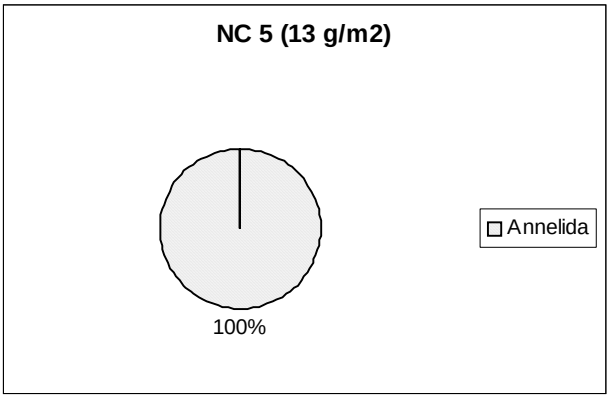
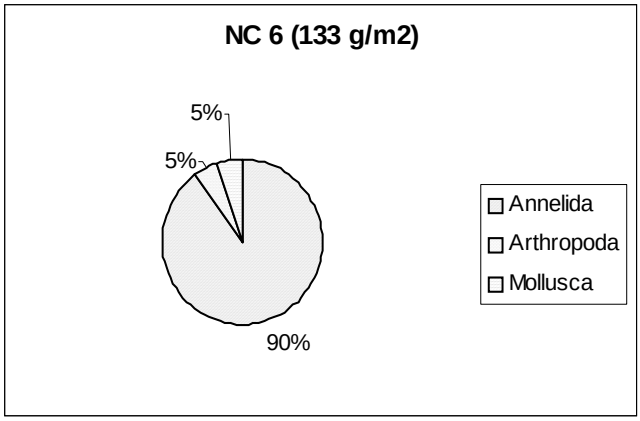


Figure 2: Percent composition and biomass for infaunal communities in North Cove, Liberty State Park, Jersey City, NJ.







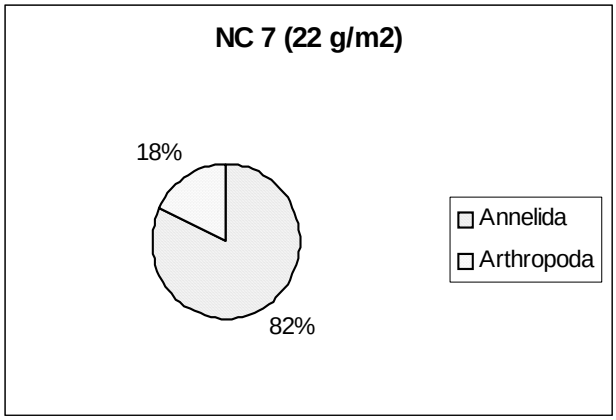


Figure 2 (page 2 of 2). Percent composition and biomass for infaunal communities in North Cove, Liberty State Park, Jersey City, NJ.

Appendix E

Modified Highway Functional Assessment Considerations and Qualifiers and Evaluation Sheets for Liberty State Park Jersey City, NJ

Functional Evaluation
The Highway Methodology (New England Division; USACE)

Wetland Evaluation supporting Documentation

- **Groundwater Recharge/Discharge:**

This function considers the potential for a wetland to serve as a groundwater recharge and or discharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either.

Considerations/Qualifiers:

1. Public or private wells occur downstream from wetland.
2. Potential exists for public or private wells downstream of the wetland.
3. Wetland is underlain with stratified drift
4. Gravel or sandy soils present in/or adjacent to the wetland.
5. Fragipan does not occur in the wetland.
6. Fragipan, impervious soils, or bedrock does occur in the wetland.
7. Wetland is associated with a perennial or intermittent watercourse.
8. Signs of groundwater recharge are present.
9. Wetland is associated with a watercourse.
10. Wetland contains only an outlet.
11. Groundwater quality of stratified drift aquifer within or downstream of wetland meets drinking water standards.
12. Quality of water associated with the wetland is high.
13. Signs of groundwater discharge are present. (E.g. springs).
14. Water temperature suggests it is a discharge site.
15. Wetland shows signs of variable water levels.
16. Gravel or sandy soils present in or adjacent to wetland.
17. Piezometer data demonstrates discharge.
18. Other.

- **Floodflow Alteration (Storage and Desynchronization)**

This function considers the effectiveness of the wetland in reducing flood damage by water retention for prolonged periods following precipitation events and the gradual release of floodwaters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value relative to erosion and/or flood prone areas.

Considerations/Qualifiers:

1. Area of this wetland is large relative to its watershed.
2. Wetland occurs in the upper portions of the watershed
3. Effective flood storage is small or non-existent upslope of or above the wetland.
4. Wetland watershed contains a high degree of impervious surfaces.

5. Wetland contains hydric soils which are able to absorb and detain water.
6. Wetland exists in relatively flat area that has flood storage potential.
7. Wetland has an intermittent outlet, ponded water, or signs are present of variable water level.
8. during flood events, this wetland can retain higher volumes of water than under normal or average rainfall conditions
9. Wetland receives and retains overland or sheet flow runoff from surrounding uplands.
10. In the event of a large storm, this wetland may receive and detain excessive flood water from a nearby watercourse.
11. Valuable properties, structures or resources are located in or near the floodplain downstream from the wetland.
12. The watershed has a history of economic loss due to flooding
13. The wetland is associated with one or more watercourses.
14. This wetland watercourse is sinuous or diffuse.
15. This wetland outlet is restricted
16. Channel flow velocity is affected by this wetland.
17. Land uses downstream are protected by this wetland.
18. This wetland contains a high density of vegetation.
19. Other.

- **Fish and Shellfish Habitat**

This function considers the effectiveness of seasonal or permanent watercourses associated the wetland in question for fish and shellfish habitat.

Considerations/Qualifiers:

1. Forest land dominant in the watershed above this wetland
2. Abundance of cover objects present.

- **Sediment/Toxicant/Pathogen Retention**

This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens in runoff water from surrounding uplands, or upstream eroding wetland areas.

Considerations/Qualifiers:

1. Potential sources of excess sediment are in the watershed above the wetland.
2. Potential or known sources of toxicants are in the watershed above the wetland.
3. Opportunity for sediment trapping by slow moving water or deepwater habitat is present in this wetland.
4. Mineral, fine grained or organic soils are present.
5. Long duration water retention time is present in this wetland.
6. Public or private water sources occur downstream.
7. The wetland edge is broad and intermittently aerobic.
8. The wetland is known to have existed for more than 50 years.
9. Drainage ditches have not been constructed in the wetland.

- **Nutrient Removal/Retention/Transformation**

This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands, and the ability of the wetland to process these nutrients into other forms of trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers or estuaries.

Considerations/Qualifiers:

1. Wetland is large relative to the size of its watershed.
2. Deep water or open water habitat exists.
3. Overall potential for sediment trapping exists in the wetland.
4. Potential sources of excess nutrients present in the watershed above the wetlands.
5. Wetland saturated for most of the season. Ponded water is present in the wetland.
6. Deep organic/sediment deposits are present.
7. Slowly drained mineral, fine grained, or organic soils, are present.
8. Dense vegetation is present
9. Emergent vegetation and/or dense woody stems are dominant.
10. Aquatic diversity/abundance sufficient to utilize nutrients.
11. Opportunity of nutrient attenuation exists.
12. Vegetation diversity/abundance sufficient to utilize nutrients.

- **Production Export (Nutrient)**

This function evaluated the effectiveness of the wetland to produce food or usable products for man or other living organisms.

Considerations/Qualifiers:

1. Wildlife food sources grow within this wetland.
2. Detritus development is present within this wetland.
3. Economically or commercially used products found in this wetland.
4. Evidence of wildlife use found within the wetland.
5. Higher trophic level consumers are utilizing this wetland.
6. Fish or shellfish develop or occur in this wetland.
7. High vegetation density is present
8. Wetland exhibits a high degree of plant community structure/species diversity.
9. High aquatic diversity/abundance is present.
10. Nutrients exported in wetland watercourses (permanent outlet present).
11. “Flushing” of relatively large amounts of organic plant materials occurs from this wetland.
12. Wetland contains flowering plants which are used by nectar-gathering insects.
13. Indications of export are present.
14. High production levels occurring however, no visible signs of export (assumes export is attenuated).
15. Other.

- **Sediment/Shoreline Stabilization**

This function considers the effectiveness of a wetland to stabilize stream banks and shorelines against erosion.

Considerations/Qualifiers:

1. Indications of erosion, siltation present.
2. Topographic gradient is present in wetland.
3. Potential sediment sources are present up-slope.
4. No distinct shoreline or bank is evident between the waterbody and the wetland or upland.
5. A distinct step between the open waterbody or stream and the adjacent land exists (i.e. sharp bank) with dense roots throughout.
6. Wide wetland (>10') bordering watercourse, lake or pond.
7. High flow velocities in the wetland.
8. Potential sediment sources present upstream.
9. The watershed is of sufficient size to produce channelized flow.
10. Open water fetch is present.
11. Boating activity is present.
12. Dense vegetation is bordering watercourse, lake or pond.
13. High percentage of energy absorbing emergents and/or shrubs bordering watercourse, lake or pond.
14. Vegetation comprised of large trees and shrubs which withstand major flood events or erosive incident and stabilize the shoreline on a large scale (feet).
15. Vegetation comprised of dense resilient herbaceous layer which stabilizes sediments and the shoreline on a small scale (inches) during minor flood events or potentially erosive events.
16. Other.

- **Wildlife Habitat**

This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered. Species lists of observed and potential animals should be included in the wetland assessment report.2

Considerations/Qualifiers:

1. Wetland is not degraded by human activity.
2. Water quality of the watercourse, pond, or lake associated with this wetland meets or exceeds Class A or B standards.
3. Wetland is not fragmented by development.
4. Upland surrounding this wetland is undeveloped.
5. More than 40% of this wetland edge is bordered by upland wildlife habitat (e.g. brushland, woodland, active farmland, or idle land) at least 500 feet in width.
6. Wetland contiguous with other wetland systems connected by watercourse or lake.
7. Wildlife overland access to other wetlands is present.
8. Wildlife food sources are within this wetland or are nearby.
9. Wetland exhibits a high degree of interspersion of vegetation classes and or open

water.

10. Two or more islands or inclusions of upland within the wetland are present.
11. Dominant wetland class includes deep or shallow marsh or wooded swamp.
12. More than three acres of shallow permanent open water (less than 6.6 feet deep) including streams in or adjacent to wetland are present.
13. Density of the wetland vegetation is high.
14. Wetland exhibits a high degree of plant species diversity.
15. Wetland exhibits a high degree of diversity in plant community structure (e.g. tree/shrub/vine/grasses/mosses/etc.).
16. Plant/animal indicator present.
17. Animal signs observed (tracks, scats, nesting areas, etc.).
18. Seasonal uses vary for wildlife, and wetland appears to support varied population diversity/abundance during different seasons.
19. Wetland contains or has potential to contain a high population of insects.
20. Wetland contains or has potential to contain large amphibian populations.
21. Wetland has a high avian utilization or its potential.
22. Indications of less disturbance-tolerant species present.
23. Sighs of wildlife habitat enhancement present (birdhouses, nesting boxes, food sources, etc.)
24. Other.

- **Recreation (Consumptive and Non-Consumptive)**

This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating fishing, hunting or other passive or active recreational activities. Consumptive opportunities consume or diminish the plants, animals or other resources that are intrinsic to the wetland. Non-consumptive opportunities do not consume or diminish these resources of the wetland.

Considerations/Qualifiers:

1. Wetland is part of a recreation area, park, forest, or refuge.
2. Fishing is available within or from the wetland.
3. Hunting is permitted in the wetland.
4. Hiking occurs or has potential to occur within the wetland.
5. Wetland is a valuable wildlife habitat.
6. The watercourse, pond, or lake, associated with the wetland is unpolluted.
7. High visual/aesthetic quality of this potential recreation site.
8. Access to water is available at this potential recreation site.
9. The watercourse associated with this wetland is wide and deep enough to accommodate canoeing and/or non-powered boating.
10. Off-road public parking available at the potential recreation site.
11. Accessibility and travel ease is present at this site.
12. The wetland is within a short drive or safe walk from highly populated public and private areas.
13. Other

- **Educational/Scientific Value**

This value considers the suitability of the wetland as a site for an “outdoor classroom” or as a

location for scientific study or research.

Considerations/Qualifiers:

1. Wetland contains or is known to contain threatened, rare, or endangered species.
2. Little or no disturbance is occurring in this wetland.
3. Potential educational site contains a diversity of wetland classes which are accessible or potentially accessible.
4. Potential educational site is undisturbed and natural.
5. Wetland is considered to be a valuable wildlife habitat.
6. Wetland is located within a nature preserve or wildlife management area.
7. Signs of wildlife habitat enhancement present (bird houses, nesting boxes, food sources, etc.).
8. Off-road parking at potential educational site suitable for school bus access in or near wetland.
9. Potential educational site is within safe walking distance or a short drive to schools.
10. Potential educational site within safe walking distance to other plant communities.
11. Direct access to perennial stream at potential educational site available.
12. Direct access to pond or lake at potential educational site available.
13. No known safety hazards within the potential educational site.
14. Public access to the potential educational site is controlled.
15. Handicap accessibility is available.
16. Site is currently used for educational or scientific purposes.
17. Other

- **Uniqueness/Heritage**

This value considers the effectiveness of the wetland or its associated waterbodies to provide certain special values. These may include archaeological sites, critical habitat for endangered species, its overall health and appearance, its role in the ecological system of the area, its relative importance as a typical wetland class for this geographic location. These functions are clearly valuable wetland attributes relative to aspects of public health, recreation, and habitat diversity.

Considerations/Qualifiers:

1. Upland surrounding wetland primarily urban.
2. Upland surrounding wetland developing rapidly.
3. More than 3 acres of shallow permanent open water occur in wetlands (less than 6.6 feet deep) including streams
4. Three or more wetland classes present.
5. Deep and/or shallow marsh, or wooded swamp dominated.
6. High degree of interspersion of vegetation and/or open water occurring in this wetland.
7. Well-vegetated stream corridor (15 feet on each side of the stream) occurs in this wetland.
8. Potential educational site is within a short drive or a safe walk from schools.
9. Off-road parking at potential educational site is suitable for school buses.
10. No known safety hazards exist within this potential educational site.
11. Direct access to perennial stream or lake at potential educational site.
12. Two or more wetland classes visible from primary viewing locations.

13. Low-growing wetlands (marshes, scrub-shrub, bogs, open water) visible from primary viewing locations.
14. Half an acre of open water or 200 feet of stream is visible from the primary viewing locations.
15. Large area of wetland is dominated by flowering plants, or plants which turn vibrant colors in different seasons.
16. General appearance of the wetland visible from primary viewing locations is unpolluted and/or undisturbed.
17. Overall view of the wetland is available from the surrounding upland.
18. Quality of the water associated with the wetland is high.
19. Opportunities for wildlife observations are available.
20. Historical buildings occur within the wetland.
21. Presence of pond or pond site and remains of a dam occur within the wetland.
22. Wetland within 50 yards of the nearest perennial watercourse.
23. Visible stone or earthen foundations, berms, dams, standing structures or associated features occur within the wetland.
24. Wetland contains critical habitat for a state or federally listed threatened or endangered species.
25. Wetland is known to be a study site for scientific research.
26. Wetland is a natural landmark or recognized by the state natural heritage inventory authority as an exemplary natural community.
27. Wetland has local significance because it serves several functional values.
28. Wetland has local significance because it has biological, geological, or other features which are locally rare or unique.
29. Wetland is known to contain an important archaeological site.
30. Wetland is hydrologically connected to a state or federally designated scenic river.
31. Wetland is located in an area experiencing a high wetland loss rate.
32. Other

- **Visual Quality/Aesthetics**

This value considers the visual *and* aesthetic quality or usefulness of the wetland.

Considerations/Qualifiers:

1. Multiple wetland classes visible from primary viewing locations.
2. Emergent marsh and/or open water visible from primary viewing locations.
3. Diversity of vegetation species visible from primary viewing locations.
4. Wetland dominated by flowering plants, or plants which turn vibrant colors in different seasons.
5. Land use surrounding the wetland is undeveloped as seen from primary viewing locations.
6. Visible surrounding land use form contrasts with wetland.
7. Wetland views absent of trash, debris, and signs of disturbance
8. Wetland is considered to be a valuable wildlife habitat.
9. Wetland is easily accessed.
10. Low noise level at primary viewing locations.
11. Unpleasant odors absent at primary viewing locations.
12. Relatively unobstructed sight line exists through wetland.

13. Other

- **Endangered Species Habitat**

This value considers the suitability of the wetland to support threatened or endangered species.

Considerations/Qualifiers:

1. Wetland contains or is known to contain threatened or endangered species.
2. Wetland contains critical habitat for a state or federally listed threatened or endangered species.
3. Other

Although the above example refers to freshwater wetlands, it can also be adapted for marine ecosystems. Below is an example of an adaptation for the fish and shellfish function provided by the National Marine Fisheries Service.

- **Fish and Shellfish Habitat**

This function considers the effectiveness of wetlands, embayments, tidal flats, vegetated shallows, and other environments in supporting marine
resources such as fish, shellfish, marine mammals, and sea turtles.

Considerations/Qualifiers: (Marine)

1. Special aquatic sites (tidal marsh, mud flats, and eelgrass beds) are present.
2. Suitable spawning habitat is present at the site or in the area.
3. Commercially or recreationally important species are present or suitable habitat exists.
4. The wetland/waterway supports prey for higher trophic level marine organisms.
5. The waterway provides migratory habitat for anadromous fish.
6. Other

Wetland Function-Value Evaluation Form

Habitat Code: CRDW

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	1	1	4,5,8		*3 have no recharge
Floodflow Alteration					
Fish and Shellfish Habitat (freshwater)	0	0			
Sediment/Toxicant Retention					
Nutrient Removal					
Production Export					
Sediment/Shoreline Stabilization					
Wildlife Breeding Habitat					
Wildlife Foraging Habitat					
Wildlife Dependency					
Recreation	0*	1	1,4,10,11,12		*No Public Access
Educational Scientific Value	1	1	2,8,9,10,14		
Uniqueness/Heritage					
Visual Quality/Aesthetics					
Endangered Species Habitat	0	0			
Fish and Shellfish Habitat (marine)	0	0			
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Habitat Code: FFW

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	2	2	4, 5, 8, 15		
Floodflow Alteration	2	2	3, 5, 6, 7, 8, 9, 10, 18		
Fish and Shellfish Habitat (freshwater)	0	0			
Sediment/Toxicant Retention	1	1	1, 2, 3, 4, 9		
Nutrient Removal	1	1	7, 8, 9, 11, 12		
Production Export	2	2	1, 2, 4, 5*, 7, 8, 12, 14		*-Check Matrix
Sediment/Shoreline Stabilization	0	0	N/A		
Wildlife Breeding Habitat	3	3			* See Appendix - Wdlife Matrix
Wildlife Foraging Habitat	3	3			
Wildlife Dependency	3	3			
Recreation	0*	1	1, 5, 10, 11, 12		*No Public Access
Educational Scientific Value	2	2	1, 2, 3, 5, 8, 9, 10, 14, 16*		*Future only
Uniqueness/Heritage	2	2	1, 5, 6, 8, 9, 15, 19, 24, 25*, 27, 28		*Future only
Visual Quality/Aesthetics	1	1	4, 8, 9*, 11		
Endangered Species Habitat	2	2	1, 2		2 non-observed Listed sp. Breed-Canada
Fish and Shellfish Habitat (marine)	0	0			
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Habitat Code: SSW

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	2	2	4, 5, 8, 15		
Floodflow Alteration	1	1	3, 5, 6, 9, 10,		*Minimal Flood Storage
Fish and Shellfish Habitat (freshwater)	0	0			
Sediment/Toxicant Retention	1	1	1, 2, 4, 9		
Nutrient Removal	1	1	7, 8, 9, 11, 12		
Production Export	2	2	1, 2, 4, 7, 8, 12, 14		
Sediment/Shoreline Stabilization	0	0	N/A		
Wildlife Breeding Habitat	2	2			* See Appendix - Wildlife Matrix
Wildlife Foraging Habitat	1	1			
Wildlife Dependency	2	2			
Recreation	0*	0	1, 5		*No Public Access; No Future Access
Educational Scientific Value	1	1	2, 8, 9, 10, 14		
Uniqueness/Heritage	2	2	1, 5, 6, 8, 9, 15, 19, 24, 25*, 27, 28		*Future only
Visual Quality/Aesthetics	1	1	4, 8, 9*, 11		
Endangered Species Habitat	2	2	1, 2		Foraging For Cooper's Hawk + Savannah
Fish and Shellfish Habitat (marine)	0	0			
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Habitat Code: SEM

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	2	2	4, 5, 7*, 8, 12*, 15		*Future Condition only, W-3 will have improved WQ
Floodflow Alteration	2	3	3, 5, 6, 7, 8, 9, 10, 13*, 16*, 18		*Future only
Fish and Shellfish Habitat (freshwater)	0	0			
Sediment/Toxicant Retention	2	3	1, 2, 3, 4, 7, 9, 10*, 11*, 12*, 13*, 14*, 15*, 16*		*Future only
Nutrient Removal	2	3	2, 3, 4*, 5, 7, 8, 9, 10, 11, 12, 13*, 14*, 15*		*Future only, increased watershed size
Production Export	2	3	1, 2, 4, 5, 7, 8*, 10*, 11*Δ, 12, 14		*Future only, *Δ Can't Answer until Final PLAN
Sediment/Shoreline Stabilization	0	3	3*, 4*, 6*, 8*, 12*, 13*, 14*, 15*		*Future only
Wildlife Breeding Habitat	2	2			* See Appendix - Wildlife Matrix
Wildlife Foraging Habitat	3	3			
Wildlife Dependency	3	3			
Recreation	0*	2	1, 4, 5, 8, 10, 11, 12		*No Public Access; Future Condition W-3 will have improved WQ
Educational Scientific Value	2	2	1, 2, 3, 5, 8, 9, 10, 14, 16*		* Future only
Uniqueness/Heritage	2	3	1, 4*, 5, 6, 7*, 8, 9, 11*, 12*, 14*, 19, 22*, 24*, 25*, 27, 28		* Future only
Visual Quality/Aesthetics	3	3	1*, 2*, 3, 4*, 6, 7, 8, 9*, 11, 12		* Future only
Endangered Species Habitat	3	3	1, 2		Bobolink Breeding
Fish and Shellfish Habitat (marine)	0	0			
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Habitat Code: DEM

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	X	1	4,5,7,15		
Floodflow Alteration	X	3	3,5,6,7,8,9,10,13,16,18		
Fish and Shellfish Habitat (freshwater)	X	3	2,4,5,7,8,10,12,13,16,17		
Sediment/Toxicant Retention	X	3	1,2,3,4,7,9,10,11,12,13,14,15,16		
Nutrient Removal	X	3	2,3,4,5,7, 10,11,12, 13,14,15		
Production Export	X	3	1,2,4,5,6,9,10,11*,12,13		* Check Final Design
Sediment/Shoreline Stabilization	X	3	3,4,6,8,12,13,14,15		
Wildlife Breeding Habitat	X	0			* See Wildlife Matrix
Wildlife Foraging Habitat	X	3			
Wildlife Dependency	X	3			
Recreation	X	2	1,4,5,10,11,12		
Educational Scientific Value	X	3	1,2,3,5,7,8,9,10,13,14,16		
Uniqueness/Heritage	X	3	1,3,4*,5,6,7,8,9,11,12,14,19,22,24,25,27,28		
Visual Quality/Aesthetics	X	3	1*,2*,3,4*,6,7,8,9*	11,12	* Future Only
Endangered Species Habitat	X	3	1,2		Night Herons Breeding
Fish and Shellfish Habitat (marine)	X	0			
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Habitat Code: SNH

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	1	1	4,5,17?		Waiting on DATA from Proponent
Floodflow Alteration	1	1	3*,6,10,18		*Flood Storage better in Future
Fish and Shellfish Habitat (freshwater)	0	0	N/A		
Sediment/Toxicant Retention	0	0	2,3		
Nutrient Removal	1	1	8,9,12		
Production Export	2	2	1,2,4,5,7,12,	14	
Sediment/Shoreline Stabilization	0	0	N/A		
Wildlife Breeding Habitat	2	2			See Appendix — Wildlife Matrix
Wildlife Foraging Habitat	2	2			
~~Wildlife~~ Dependency	2	2			
Recreation	0*	2	1,4,5,10,11,12		*No Existing Access to Site
Educational Scientific Value	2	2	1,2,3,5,6,8,9,10,14	16*	* Future will have Sci Purpose #16
Uniqueness/Heritage	2	2	1,9,15,19,24,27,28	25*,27	*Future only
Visual Quality/Aesthetics	1	1	4,8,9*,11		*Future only
Endangered Species Habitat	3	3	1,2		Cooper's Hawk Breeding
Fish and Shellfish Habitat (marine)	0	0	N/A		
Total Functional Habitat Value					

Habitat Dependent

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Habitat Code: SSB

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	1	1	4, 5, 17?		Waiting on DATA [illegible]
Floodflow Alteration	1	1	3, 6, 10, 18		
Fish and Shellfish Habitat (freshwater)	0	0			
Sediment/Toxicant Retention	0	0			
Nutrient Removal	1	1	8, 9, 12		
Production Export	2	2	1, 2, 4, 5, 7, 12, 14		
Sediment/Shoreline Stabilization	0	0	N/A		
Wildlife Breeding Habitat	1	1			* See Appendix — Wildlife Matrix
Wildlife Foraging Habitat	2	2			
Wildlife Dependency	0	0			
Recreation	0*	1	1, 4, 5, 10, 11, 12		* No Access Permitted
Educational Scientific Value	1	1	2, 8, 9, 17, 19, 16*		*Future only
Uniqueness/Heritage	1	1	1, 8, 9, 19, 24, 25*, 27, 28		*Future Only scientific Research
Visual Quality/Aesthetics	1	1	6, 8, ~~#~~ 9*, 11		*Future only
Endangered Species Habitat	2	2	1		
Fish and Shellfish Habitat (marine)	0	0			
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Habitat Code: SOF

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	1	1	4,5,		
Floodflow Alteration	1	1	3,6,10,18*		* Veg will be more dense in Future
Fish and Shellfish Habitat (freshwater)	0	0			
Sediment/Toxicant Retention	0	0			
Nutrient Removal	1	1	8,9,12		
Production Export	2	2	1,2,4,5,7,8,12,14		
Sediment/Shoreline Stabilization	0	0	N/A		
Wildlife Breeding Habitat	3	3			* See Appendix – Wildlife Matrix
Wildlife Foraging Habitat	2	2			
Wildlife Dependency	2	2			
Recreation	0*	2	1,4,5,10,11,12		* No Public Access
Educational Scientific Value	1	2	1,2,5,8,9,10,14,16		* Future Only
Uniqueness/Heritage	1	2	1,8,9,18,19,24,25*,27,28		
Visual Quality/Aesthetics	2	2	3,4,8,9*,12,6		* Future only
Endangered Species Habitat	3	3	1,2		N. Harrier Breed
Fish and Shellfish Habitat (marine)	0	0			
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Habitat Code: ML

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	1	1	4,5		
Floodflow Alteration	1	1	3,6,10,18		
Fish and Shellfish Habitat (freshwater)	0	0			
Sediment/Toxicant Retention	0	0			
Nutrient Removal	1	1	8,9		
Production Export	1	1	1,4,7		
Sediment/Shoreline Stabilization	0	0	N/A		
Wildlife Breeding Habitat	0	0			* See Appendix – Wildlife Matrix
Wildlife Foraging Habitat	0	0			
Wildlife Dependency	0	0			
Recreation	1	1	1,10,11,12		
Educational Scientific Value	0	0	13,		
Uniqueness/Heritage	0	0	1,19		
Visual Quality/Aesthetics	1	1	6,9,11,12		
Endangered Species Habitat	0	0			
Fish and Shellfish Habitat (marine)					
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Habitat Code: MF

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	+	1	4,5,		
Floodflow Alteration	—	1	3,6,10,18		
Fish and Shellfish Habitat (freshwater)	~~0~~	0			
Sediment/Toxicant Retention	—	0	2		
Nutrient Removal	—	1	8,9,12		
Production Export	—	2	1,2,4,5,7,12,14		
Sediment/Shoreline Stabilization	—	0	N/A		
Wildlife Breeding Habitat	—	3			
Wildlife Foraging Habitat	—	3			
Wildlife Dependency	—	2			
Recreation	~~0~~*	2	1,4,5,10,11,12		* No Public Access
Educational Scientific Value	—	3	1,2,5,8,9,10,13,14,16		
Uniqueness/Heritage	—	2	1,8,9,15,19,24,27,~~28~~,25*,27		* Future Only
Visual Quality/Aesthetics	—	1	4,8,9,11		
Endangered Species Habitat	—	3	1,2		Coopers Hawk Breeding
Fish and Shellfish Habitat (marine)	~~0~~	0			
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Habitat Code: MG

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	1	1	4, 5		
Floodflow Alteration	–	1	3,6,10,18		
Fish and Shellfish Habitat (freshwater)	0	0			
Sediment/Toxicant Retention	0	0	2		
Nutrient Removal	1	1	8, 9, 12		
Production Export	2	2	1,2,4,5,7,8,12,14		
Sediment/Shoreline Stabilization	0	0	N/A		
Wildlife Breeding Habitat	3	3			
Wildlife Foraging Habitat	2	2			
Wildlife Dependency	3	3			
Recreation	0*	2	1,4,5,10,11,12		* No Public Access
Educational Scientific Value	1	2	1,2,5,8,9,10,14,16*		* Future Only
Uniqueness/Heritage	2	2	1,8,9,15,19,24,25*,27,28		
Visual Quality/Aesthetics	2	2	3,4,8,9*,12,6		*Future only
Endangered Species Habitat	3	3	1,2		N. Harrier
Fish and Shellfish Habitat (marine)	0	0			
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Habitat Code: MS

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	1	1	4,5		
Floodflow Alteration	1	1	3,6,10,18		
Fish and Shellfish Habitat (freshwater)	0	0			
Sediment/Toxicant Retention	0	0	2		
Nutrient Removal	1	1	8,9,12		
Production Export	2	2	1,2,4,5,7,12,14		
Sediment/Shoreline Stabilization	0	0	N/A		
Wildlife Breeding Habitat	2	2			
Wildlife Foraging Habitat	1	1			
Wildlife Dependency	0	0			
Recreation	0*	1	1,4,10,11,12		*No Public Access
Educational Scientific Value	1	1	2,8,9,10,11,14,16*		*Future only
Uniqueness/Heritage	1	2	1,8,9,15,19,24,25*,27,28		*Future only
Visual Quality/Aesthetics	1	1	6,8,9*,11		*Future
Endangered Species Habitat	3	3	1,2		Savannah Sparrow & Cooper's Obligate
Fish and Shellfish Habitat (marine)	0	0			
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Wetland Function-Value Evaluation Form

Habitat Code: SM

Total area of existing habitat _____ acres.

Total area of proposed habitat _____ acres.

Wildlife & vegetation diversity/abundance (see Appendix --)

Prepared by: ERC Date _____

Evaluation based on:
Office √ Field √

Function /Value	Occurrence* E	Occurrence* P	Rationale (reference #)*	Principal Function(s) Value(s)	Comments
Groundwater Recharge/Discharge	~~0~~	1	4,5,7		
Floodflow Alteration	~~0~~	3	1,3,5*,8,9,10,13	14,16,18**	*SAND will turn Organic; **excluding Mud Flats
Fish and Shellfish Habitat (freshwater)	~~0~~	~~0~~	N/N		
Sediment/Toxicant Retention	~~0~~	3	1,2,3,4,7,9,10,11,12	14,15,16	
Nutrient Removal	~~0~~	3	1,2,3,4,5,7,8*,9*	10,11,12,13,14,15	*Excluding Mud Flats
Production Export	~~0~~	3	1,2,3,4,5,6,7*,9	10,11,13	*Excluding Mud Flats
Sediment/Shoreline Stabilization	~~0~~	3	1,3,5,6,7,8,12	13,15	
Wildlife Breeding Habitat	~~0~~	2			* See Matrix
Wildlife Foraging Habitat	~~0~~	3			
Wildlife Dependency	~~0~~	3			
Recreation	~~0~~*N	2	1,4,5,10,11,12		
Educational Scientific Value	~~0~~	3	1,2,3,5,8,9,10,13	14,16	
Uniqueness/Heritage	~~0~~	3	1,4,5,6,8,9,10,12,13	14,16,17,19,24	25,27,28
Visual Quality/Aesthetics	~~0~~	3	1,2,3,6,7,8,9	12	
Endangered Species Habitat	~~0~~	3	1,2		Night Herons Breeding
Fish and Shellfish Habitat (marine)	~~0~~	3	1,2,3,4		
Total Functional Habitat Value					

Notes:* H= 3; M=2; L=1; No function = 0; *Wetland assessment is relatively indicative of functions and values present in both Existing (E) and Proposed (P) conditions.*

Appendix F

Wildlife Matrix Developed for Liberty State Park
Jersey City, NJ

					Successional Northern Hardwood			Successional Shrubland		
	Habitat Specificity	Trophic Level	Regulatory Status	Species Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
American Black Duck	3	1	3	2.33	--	--	--	--	--	--
American Coot	1	1	4	2.00	--	--	--	--	--	--
American Crow	1	1	1	1.00	2.00	1.00	--	--	1.00	--
American Goldfinch	1	2	1	1.33	--	--	--	2.67	1.33	--
American Kestrel	5	4	1	3.33	--	--	--	--	--	--
American Redstart	1	4	1	2.00	--	--	--	--	2.00	--
American Robin	1	1	1	1.00	2.00	1.00	--	2.00	1.00	--
American Tree Sparrow	1	2	1	1.33	--	--	--	--	1.33	--
American Wigeon	3	1	3	2.33	--	--	--	--	--	--
American Woodcock	3	5	3	3.67	--	--	--	7.33	3.67	--
Bairds Sandpiper	3	4	1	2.67	--	--	--	--	--	--
Baltimore Oriole*	1	1	5	2.33	4.67	2.33	--	--	--	--
Barn Swallow	1	4	1	2.00	--	--	--	--	2.00	--
Belted Kingfisher	5	5	1	3.67	--	--	--	--	--	--
Black crowned Night Heron*	5	4	1	3.33	--	--	--	--	--	--
Black Skimmer*	5	4	5	4.67	--	--	--	--	--	--
Bobolink*	1	1	5	2.33	--	--	--	--	--	--
Brant	5	3	3	3.67	--	--	--	--	--	--
Brown Thrasher	1	1	1	1.00	--	--	--	2.00	1.00	--
Brown-headed Cowbird	1	1	1	1.00	2.00	--	--	2.00	1.00	--
Bufflehead	3	4	3	3.33	--	--	--	--	--	--
Canada Goose	1	2	1	1.33	--	--	--	--	--	--
Canvasback	5	3	3	3.67	--	--	--	--	--	--
Cedar Waxwing	1	3	1	1.67	--	1.67	--	--	1.67	--
Chimney Swift	1	4	1	2.00	--	--	--	--	2.00	--
Clapper Rail	3	1	1	1.67	--	--	--	--	--	--
Common Goldeneye	5	1	3	3.00	--	--	--	--	--	--
Common Tern	3	4	1	2.67	--	--	--	--	--	--
Common Yellowthroat	1	4	1	2.00	--	--	--	--	--	--
Cooper's Hawk*	3	4	5	4.00	8.00	4.00	--	--	4.00	--
Doubled-crested Cormorant	1	5	1	2.33	--	--	--	--	--	--
Downy Woodpecker	1	4	1	2.00	4.00	2.00	--	--	2.00	--
Eastern Kingbird	1	1	1	1.00	--	--	--	--	--	--
Eastern Meadowlark	1	1	1	1.00	--	--	--	--	1.00	--
Eastern Phoebe	1	4	1	2.00	--	2.00	--	--	--	--

					Successional Northern Hardwood			Successional Shrubland		
	Habitat Specificity	Trophic Level	Regulatory Status	Species Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Eastern Towhee	1	1	1	1.00	2.00	1.00	--	--	1.00	--
European Starling	3	1	--	1.33	--	1.33	--	--	--	--
Field Sparrow	1	1	1	1.00	--	--	--	--	--	--
Flycatcher sp.				--	--	--	--	--	--	--
Gadwall	3	1	3	2.33	--	--	--	--	--	--
Glossy Ibis	5	4	4	4.33	--	--	--	--	4.33	--
Golden-crowned Kinglet	3	4	1	2.67	--	2.67	--	--	2.67	--
Gray Catbird	1	1	1	1.00	--	--	--	2.00	1.00	--
Great Black-backed Gull	1	1	1	1.00	--	--	--	--	--	--
Great Blue Heron	5	4	1	3.33	--	--	--	--	--	--
Great Egret	5	4	1	3.33	--	--	--	--	--	--
Great Horned Owl	1	4	1	2.00	--	2.00	--	--	2.00	--
Greater Yellowlegs	3	4	1	2.67	--	--	--	--	--	--
Herring Gull	1	1	1	1.00	--	--	--	--	--	--
Hooded Merganser	5	4	3	4.00	--	--	--	--	--	--
Horned Grebe	1	4	1	2.00	--	--	--	--	--	--
Horned Lark	1	1	1	1.00	--	--	--	--	--	--
House Sparrow	1	1	--	0.67	--	--	--	--	0.67	--
House Wren	1	4	1	2.00	--	--	--	4.00	2.00	--
Killdeer	1	4	1	2.00	--	--	--	--	--	--
Laughing Gull	1	4	1	2.00	--	--	--	--	--	--
Lesser Yellowlegs	3	4	1	2.67	--	--	--	--	--	--
Long-eared owl*	3	4	5	4.00	--	4.00	--	--	--	--
Mallard	1	1	3	1.67	--	--	--	--	--	--
Marsh Wren*	3	4	1	2.67	--	--	--	--	--	--
Merlin	3	4	1	2.67	--	2.67	--	--	2.67	--
Mourning Dove	1	2	1	1.33	--	--	--	--	--	--
Northern Cardinal	1	2	1	1.33	--	1.33	--	2.67	1.33	--
Northern Flicker	3	1	1	1.67	3.33	1.67	--	--	1.67	--
Northern Harrier*	3	4	5	4.00	--	--	--	--	--	--
Northern Mockingbird	1	1	1	1.00	--	--	--	2.00	1.00	--
Osprey*	5	5	5	5.00	--	--	--	--	--	--
Pied-biled Grebe*	1	4	5	3.33	--	--	--	--	--	--
Red-breasted Merganser	3	4	3	3.33	--	--	--	--	--	--
Red-tailed Hawk	1	4	1	2.00	4.00	--	--	--	--	--
Red-throated Loon	3	5	1	3.00	--	--	--	--	--	--
Red-winged Blackbird	1	1	1	1.00	--	--	--	--	--	--

					Successional Northern Hardwood			Successional Shrubland		
	Habitat Specificity	Trophic Level	Regulatory Status	Species Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Ring-billed Gull*	1	1	5	2.33	--	--	--	--	--	--
Ring-necked Pheasant	1	1	--	0.67	--	--	--	--	0.67	--
Rock Dove	1	2	--	1.00	--	--	--	--	--	--
Ruddy Duck	3	2	3	2.67	--	--	--	--	--	--
Savannah Sparrow*	1	1	5	2.33	--	--	--	--	--	--
Short-eared Owl *	3	4	5	4.00	--	--	--	--	--	--
Snowy Egret	3	4	1	2.67	--	--	--	--	--	--
Snowy Owl	3	4	1	2.67	--	--	--	--	--	--
Song Sparrow	1	1	1	1.00	--	--	--	2.00	1.00	--
Spotted Sandpiper	3	4	4	3.67	--	--	--	--	--	--
Tree swallow	5	4	1	3.33	--	--	--	--	3.33	--
White-throated Sparrow	1	1	1	1.00	--	--	--	--	1.00	--
Wild Turkey	3	1	3	2.33	4.67	2.33	--	--	2.33	--
Willow Flycatcher	1	4	1	2.00	--	--	--	--	2.00	--
Yellow crowned Night Heron*	5	4	5	4.67	--	--	--	--	--	--
Yellow Warbler	1	4	1	2.00	--	--	--	--	2.00	--
Peregrine Falcon*	5	4	5	4.67	--	--	--	--	--	--
Black-bellied Plover	3	4	1	2.67	--	--	--	--	--	--
Hermit Thrush	3	1	1	1.67	--	1.67	3.33	--	1.67	--
Palm Warbler	3	3	1	2.33	--	--	--	--	--	--
Yellow-rumped Warbler	3	1	1	1.67	--	1.67	--	--	1.67	--
Dark-eyed Junco	1	1	1	1.00	--	1.00	--	--	1.00	--
Least Tern*	3	4	5	4.00	--	--	--	--	--	--
Sharp-shinned Hawk	3	4	4	3.67	7.33	3.67	7.33	--	3.67	--
Barn Owl*	3	4	5	4.00	--	--	--	--	--	--
Ruby-Crowned Kinglet	3	1	1	1.67	--	1.67	--	--	1.67	--
Least Sandpiper	3	4	1	2.67	--	--	--	--	--	--
Wood Thrush*	3	1	5	3.00	--	3.00	--	--	--	--
Rough-legged Hawk	3	4	1	2.67	--	--	--	--	--	--
White-eyed vireo	1	4	1	2.00	--	--	--	--	2.00	--
Yellow-throated vireo	3	4	1	2.67	--	--	--	--	--	--
Warbling vireo	1	4	1	2.00	--	2.00	--	--	--	--
Rey-eyed vireo	1	4	1	2.00	--	2.00	--	--	--	--
Philadelphia vireo	1	4	1	2.00	--	2.00	--	--	2.00	--
Black & white warbler	3	4	1	2.67	--	2.67	--	--	2.67	--
Tennessee warbler	1	4	1	2.00	--	2.00	--	--	2.00	--

					Successional Northern Hardwood			Successional Shrubland		
	Habitat Specificity	Trophic Level	Regulatory Status	Species Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Nashville warbler	1	4	1	2.00	--	2.00	--	--	2.00	--
Northern Parula	5	4	1	3.33	--	3.33	--	--	3.33	--
Magnolia warbler	1	4	1	2.00	--	2.00	--	--	2.00	--
Cape May Warbler	5	4	1	3.33	--	3.33	--	--	3.33	--
Black-throated Blue Warbler	3	4	1	2.67	--	2.67	--	--	--	--
Chestnut-sided Warbler	1	4	1	2.00	--	2.00	--	--	2.00	--
Black-throated Green Warbler	3	4	1	2.67	--	2.67	--	--	--	--
Blackburnian Warbler	5	4	1	3.33	--	3.33	--	--	--	--
Bay-breasted Warbler	3	4	1	2.67	--	2.67	--	--	--	--
Blackpoll Warbler	3	4	1	2.67	--	2.67	--	--	--	--
Pine Warbler	3	4	1	2.67	--	2.67	--	--	2.67	--
Prairie Warbler*	1	4	1	2.00	--	2.00	--	--	2.00	--
Ovenbird	3	4	1	2.67	--	--	--	--	--	--
Northern Waterthrush	3	4	1	2.67	--	2.67	--	--	--	--
Louisiana Waterthrush	3	4	1	2.67	--	--	--	--	--	--
Yellow-breasted Chat	3	1	1	1.67	--	--	--	--	1.67	--
Wilson's Warbler	3	4	1	2.67	--	--	--	--	--	--
Canada Warbler *	1	4	1	2.00	--	--	--	--	--	--
Scarlet Tanager	1	1	1	1.00	--	--	--	--	--	--
Black-capped Chickadee	1	1	1	1.00	--	1.00	--	--	--	--
Tufted Titmouse	3	1	1	1.67	3.33	1.67	--	--	--	--
White-breasted Nuthatch	5	1	1	2.33	--	--	--	--	--	--
Red-breasted Nuthatch	5	1	1	2.33	--	--	--	--	--	--
Brown Creeper	5	4	1	3.33	--	3.33	--	--	--	--
Winter Wren	3	4	1	2.67	--	2.67	--	--	--	--
Carolina Wren	1	4	1	2.00	--	--	--	--	--	--
Blue-Gray Gnatcatcher	3	4	1	2.67	--	2.67	--	--	--	--
Veery	3	1	1	1.67	--	--	--	--	--	--
Gray-cheeked Thrush	3	1	1	1.67	--	--	--	--	--	--
Swainson's Thrush	3	1	1	1.67	--	1.67	--	--	--	--
Yellow-billed Cuckoo	1	1	1	1.00	2.00	1.00	--	--	--	--
Acadian Flycatcher	3	4	1	2.67	--	--	--	--	--	--
Least Flycatcher	1	4	5	3.33	--	3.33	--	--	3.33	--
Hairy Woodpecker	3	4	1	2.67	--	--	--	--	--	--
Yellow-bellied Sapsucker	5	1	5	3.67	--	3.67	--	--	--	--
Red-bellied Woodpecker	3	1	1	1.67	--	1.67	--	--	--	--

					Successional Northern Hardwood			Successional Shrubland		
	Habitat Specificity	Trophic Level	Regulatory Status	Species Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Meadow Vole	1	2	1	1.33	--	--	--	--	1.33	--
White-footed Mouse	1	1	1	1.00	--	--	--	2.00	1.00	--
House Mouse	1	1	--	0.67	--	--	--	1.33	0.67	--
Norway Rat	1	1	--	0.67	--	--	--	--	0.67	--
Gray Squirrel	5	3	3	3.67	7.33	3.67	7.33	--	3.67	--
Muskrat	1	2	3	2.00	--	--	--	--	--	--
Raccoon	1	1	3	1.67	3.33	1.67	--	--	1.67	--
Cottontail Rabbit	1	2	3	2.00	4.00	2.00	--	4.00	2.00	--
Feral Dog	1	4	--	1.67	--	1.67	--	--	1.67	--
Feral Cat	1	4	--	1.67	--	--	--	--	1.67	--
Northern Water Snake	1	4	1	2.00	--	--	--	--	--	--
Northern Brown Snake	1	4	1	2.00	--	--	--	4.00	2.00	--
Green Frog	1	4	1	2.00	--	--	--	--	--	--
Fowler's Toad*	1	4	1	2.00	--	2.00	--	4.00	2.00	--
Eastern Garter Snake	1	4	1	2.00	--	--	--	4.00	2.00	--
Northern Diamond-backed Terrapin	5	1	1	2.33	--	--	--	--	--	--
Total Habitat Value					**64.00**	**124.00**	**18.00**	**48.00**	**118.67**	**0.00**

	Successional Old Field			Common Reed/ Mugwort			Mowed Lawn		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
American Black Duck	--	--	--	--	--	--	--	--	--
American Coot	--	--	--	--	--	--	--	--	--
American Crow	--	1.00	--	--	1.00	--	--	1.00	--
American Goldfinch	--	1.33	--	--	1.33	--	--	--	--
American Kestrel	--	3.33	--	--	3.33	--	--	--	--
American Redstart	--	2.00	--	--	2.00	--	--	--	--
American Robin	--	1.00	--	--	--	--	--	1.00	--
American Tree Sparrow	--	1.33	--	--	--	--	--	--	--
American Wigeon	--	--	--	--	--	--	--	--	--
American Woodcock	7.33	3.67	--	7.33	3.67	--	--	3.67	--
Bairds Sandpiper	--	--	--	--	--	--	--	--	--
Baltimore Oriole*	--	--	--	--	--	--	--	--	--
Barn Swallow	--	2.00	--	--	2.00	--	--	2.00	--
Belted Kingfisher	--	--	--	--	--	--	--	--	--
Black crowned Night Heron*	--	--	--	--	--	--	--	--	--
Black Skimmer*	--	--	--	--	--	--	--	--	--
Bobolink*	4.67	2.33	4.67	--	2.33	--	--	--	--
Brant	--	--	--	--	--	--	--	3.67	--
Brown Thrasher	2.00	1.00	--	--	1.00	--	--	--	--
Brown-headed Cowbird	2.00	1.00	--	2.00	1.00	--	--	1.00	--
Bufflehead	--	--	--	--	--	--	--	--	--
Canada Goose	2.67	--	--	--	--	--	--	1.33	--
Canvasback	--	--	--	--	--	--	--	--	--
Cedar Waxwing	--	--	--	--	--	--	--	--	--
Chimney Swift	--	2.00	--	--	2.00	--	--	2.00	--
Clapper Rail	--	--	--	--	--	--	--	--	--
Common Goldeneye	--	--	--	--	--	--	--	--	--
Common Tern	--	--	--	--	--	--	--	--	--
Common Yellowthroat	4.00	2.00	--	4.00	2.00	--	--	--	--
Cooper's Hawk*	--	4.00	--	--	4.00	--	--	--	--
Doubled-crested Cormorant	--	--	--	--	--	--	--	--	--
Downy Woodpecker	--	2.00	--	--	2.00	--	--	--	--
Eastern Kingbird	2.00	1.00	--	2.00	1.00	--	--	--	--
Eastern Meadowlark	--	1.00	2.00	--	1.00	--	--	--	--
Eastern Phoebe	--	--	--	--	--	--	--	--	--

	Successional Old Field			Common Reed/ Mugwort			Mowed Lawn		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Eastern Towhee	2.00	1.00	--	--	--	--	--	--	--
European Starling	--	1.33	--	--	--	--	--	1.33	--
Field Sparrow	2.00	1.00	--	--	--	--	--	--	--
Flycatcher sp.	--	--	--	--	--	--	--	--	--
Gadwall	--	--	--	--	--	--	--	--	--
Glossy Ibis	--	--	--	--	--	--	--	--	--
Golden-crowned Kinglet	--	2.67	--	--	--	--	--	--	--
Gray Catbird	--	1.00	--	--	1.00	--	--	--	--
Great Black-backed Gull	--	--	--	--	--	--	--	--	--
Great Blue Heron	--	--	--	--	--	--	--	--	--
Great Egret	--	--	--	--	--	--	--	--	--
Great Horned Owl	--	2.00	--	--	2.00	--	--	--	--
Greater Yellowlegs	--	--	--	--	--	--	--	--	--
Herring Gull	--	--	--	--	--	--	--	--	--
Hooded Merganser	--	--	--	--	--	--	--	--	--
Horned Grebe	--	--	--	--	--	--	--	--	--
Horned Lark	--	1.00	--	--	--	--	--	1.00	--
House Sparrow	--	--	--	--	0.67	--	--	0.67	--
House Wren	4.00	2.00	--	--	--	--	--	--	--
Killdeer	--	2.00	--	--	--	--	4.00	2.00	--
Laughing Gull	--	--	--	--	--	--	--	--	--
Lesser Yellowlegs	--	--	--	--	--	--	--	--	--
Long-eared owl*	--	4.00	--	--	4.00	--	--	--	--
Mallard	3.33	--	--	--	--	--	--	1.67	--
Marsh Wren*	--	--	--	--	--	--	--	--	--
Merlin	--	--	--	--	--	--	--	--	--
Mourning Dove	--	1.33	--	--	--	--	--	1.33	--
Northern Cardinal	--	1.33	--	--	--	--	--	--	--
Northern Flicker	--	--	--	--	--	--	--	1.67	--
Northern Harrier*	8.00	4.00	8.00	8.00	4.00	--	--	--	--
Northern Mockingbird	2.00	1.00	--	--	1.00	--	--	--	--
Osprey*	--	--	--	--	--	--	--	--	--
Pied-biled Grebe*	--	--	--	--	--	--	--	--	--
Red-breasted Merganser	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	--	2.00	--	--	2.00	--	--	--	--
Red-throated Loon	--	--	--	--	--	--	--	--	--
Red-winged Blackbird	2.00	1.00	--	2.00	1.00	--	--	--	--

	Successional Old Field			Common Reed/ Mugwort			Mowed Lawn		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Ring-billed Gull*	--	--	--	--	--	--	--	2.33	--
Ring-necked Pheasant	1.33	0.67	--	1.33	0.67	--	--	0.67	--
Rock Dove	--	--	--	--	--	--	--	1.00	--
Ruddy Duck	--	--	--	--	--	--	--	--	--
Savannah Sparrow*	4.67	2.33	4.67	4.67	2.33	--	--	--	--
Short-eared Owl *	8.00	4.00	8.00	--	4.00	--	--	--	--
Snowy Egret	--	--	--	--	--	--	--	--	--
Snowy Owl	--	2.67	--	--	2.67	--	--	--	--
Song Sparrow	2.00	1.00	--	2.00	1.00	--	--	--	--
Spotted Sandpiper	--	--	--	--	--	--	--	--	--
Tree swallow	--	3.33	--	--	--	--	--	3.33	--
White-throated Sparrow	--	1.00	--	--	1.00	--	--	--	--
Wild Turkey	4.67	2.33	--	--	--	--	--	--	--
Willow Flycatcher	--	2.00	--	--	2.00	--	--	--	--
Yellow crowned Night Heron*	--	--	--	--	--	--	--	--	--
Yellow Warbler	--	2.00	--	--	2.00	--	--	--	--
Peregrine Falcon*	--	--	--	--	--	--	--	--	--
Black-bellied Plover	--	--	--	--	--	--	--	--	--
Hermit Thrush	--	--	--	--	--	--	--	--	--
Palm Warbler	--	2.33	--	--	--	--	--	--	--
Yellow-rumped Warbler	--	1.67	--	--	1.67	--	--	--	--
Dark-eyed Junco	--	1.00	--	--	1.00	--	--	--	--
Least Tern*	--	--	--	--	--	--	--	--	--
Sharp-shinned Hawk	--	3.67	--	--	3.67	--	--	--	--
Barn Owl*	--	4.00	--	--	4.00	--	--	4.00	--
Ruby-Crowned Kinglet	--	--	--	--	--	--	--	--	--
Least Sandpiper	--	--	--	--	--	--	--	--	--
Wood Thrush*	--	--	--	--	--	--	--	--	--
Rough-legged Hawk	--	2.67	--	--	2.67	--	--	--	--
White-eyed vireo	--	--	--	--	--	--	--	--	--
Yellow-throated vireo	--	--	--	--	--	--	--	--	--
Warbling vireo	--	--	--	--	--	--	--	--	--
Rey-eyed vireo	--	--	--	--	--	--	--	--	--
Philadelphia vireo	--	--	--	--	--	--	--	--	--
Black & white warbler	--	2.67	--	--	--	--	--	2.67	--
Tennessee warbler	--	--	--	--	--	--	--	--	--

	Successional Old Field			Common Reed/ Mugwort			Mowed Lawn		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Nashville warbler	--	--	--	--	--	--	--	--	--
Northern Parula	--	3.33	--	--	--	--	--	3.33	--
Magnolia warbler	--	--	--	--	--	--	--	--	--
Cape May Warbler	--	--	--	--	--	--	--	3.33	--
Black-throated Blue Warbler	--	--	--	--	--	--	--	--	--
Chestnut-sided Warbler	--	--	--	--	--	--	--	--	--
Black-throated Green Warbler	--	--	--	--	--	--	--	--	--
Blackburnian Warbler	--	--	--	--	--	--	--	--	--
Bay-breasted Warbler	--	--	--	--	--	--	--	--	--
Blackpoll Warbler	--	--	--	--	--	--	--	--	--
Pine Warbler	--	--	--	--	--	--	--	--	--
Prairie Warbler*	--	--	--	--	--	--	--	--	--
Ovenbird	--	--	--	--	--	--	--	--	--
Northern Waterthrush	--	--	--	--	--	--	--	--	--
Louisiana Waterthrush	--	--	--	--	--	--	--	--	--
Yellow-breasted Chat	--	--	--	--	--	--	--	--	--
Wilson's Warbler	--	--	--	--	--	--	--	--	--
Canada Warbler *	--	--	--	--	--	--	--	--	--
Scarlet Tanager	--	--	--	--	--	--	--	--	--
Black-capped Chickadee	--	--	--	--	--	--	--	--	--
Tufted Titmouse	--	--	--	--	--	--	--	--	--
White-breasted Nuthatch	--	--	--	--	--	--	--	--	--
Red-breasted Nuthatch	--	--	--	--	--	--	--	--	--
Brown Creeper	--	--	--	--	--	--	--	--	--
Winter Wren	--	--	--	--	--	--	--	--	--
Carolina Wren	--	--	--	--	--	--	--	--	--
Blue-Gray Gnatcatcher	--	--	--	--	--	--	--	--	--
Veery	--	--	--	--	--	--	--	--	--
Gray-cheeked Thrush	--	--	--	--	--	--	--	--	--
Swainson's Thrush	--	--	--	--	--	--	--	--	--
Yellow-billed Cuckoo	--	--	--	--	--	--	--	--	--
Acadian Flycatcher	--	--	--	--	--	--	--	--	--
Least Flycatcher	--	--	--	--	--	--	--	--	--
Hairy Woodpecker	--	--	--	--	--	--	--	--	--
Yellow-bellied Sapsucker	--	--	--	--	--	--	--	--	--
Red-bellied Woodpecker	--	--	--	--	--	--	--	--	--

	Successional Old Field			Common Reed/ Mugwort			Mowed Lawn		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Meadow Vole	2.67	1.33	2.67	2.67	1.33	--	--	--	--
White-footed Mouse	2.00	1.00	--	2.00	1.00	--	--	--	--
House Mouse	1.33	0.67	--	--	--	--	--	--	--
Norway Rat	--	0.67	--	--	--	--	--	--	--
Gray Squirrel	--	--	--	--	--	--	--	--	--
Muskrat	--	--	--	--	--	--	--	--	--
Raccoon	--	--	--	--	--	--	--	--	--
Cottontail Rabbit	--	2.00	--	--	--	--	--	--	--
Feral Dog	--	1.67	--	--	--	--	--	--	--
Feral Cat	--	1.67	--	--	1.67	--	--	--	--
Northern Water Snake	--	--	--	--	--	--	--	--	--
Northern Brown Snake	4.00	2.00	--	--	--	--	--	--	--
Green Frog	--	--	--	--	--	--	--	--	--
Fowler's Toad*	--	--	--	--	2.00	--	--	--	--
Eastern Garter Snake	--	2.00	--	--	2.00	--	--	--	--
Northern Diamond-backed Terrapin	--	--	--	--	--	--	--	--	--
Total Habitat Value	**78.67**	**116.33**	**30.00**	**38.00**	**82.00**	**0.00**	**4.00**	**46.00**	**0.00**

	Floodplain Forest Wetland			Shrub Swamp			Shallow Emergent Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
American Black Duck	--	--	--	--	--	--	4.67	2.33	4.67
American Coot	--	--	--	--	--	--	--	--	--
American Crow	2.00	1.00	--	--	1.00	--	--	--	--
American Goldfinch	--	--	--	2.67	1.33	--	--	1.33	--
American Kestrel	--	--	--	--	--	--	--	3.33	--
American Redstart	--	--	--	--	2.00	--	--	--	--
American Robin	2.00	1.00	--	2.00	1.00	--	--	--	--
American Tree Sparrow	--	--	--	--	1.33	--	--	--	--
American Wigeon	--	--	--	--	--	--	--	2.33	4.67
American Woodcock	--	--	--	7.33	3.67	--	--	3.67	--
Bairds Sandpiper	--	--	--	--	--	--	--	2.67	5.33
Baltimore Oriole*	4.67	2.33	--	--	--	--	--	--	--
Barn Swallow	--	--	--	--	--	--	--	2.00	--
Belted Kingfisher	--	--	--	--	--	--	--	--	--
Black crowned Night Heron*	--	--	--	--	--	--	--	--	--
Black Skimmer*	--	--	--	--	--	--	--	--	--
Bobolink*	--	--	--	--	--	--	4.67	2.33	4.67
Brant	--	--	--	--	--	--	--	3.67	--
Brown Thrasher	--	--	--	--	1.00	--	--	--	--
Brown-headed Cowbird	2.00	--	--	2.00	--	--	--	--	--
Bufflehead	--	--	--	--	--	--	--	--	--
Canada Goose	--	--	--	--	--	--	2.67	1.33	--
Canvasback	--	--	--	--	--	--	--	--	--
Cedar Waxwing	--	1.67	--	--	1.67	--	--	--	--
Chimney Swift	--	--	--	--	2.00	--	--	2.00	--
Clapper Rail	--	--	--	--	--	--	--	1.67	3.33
Common Goldeneye	--	--	--	--	--	--	--	--	--
Common Tern	--	--	--	--	--	--	--	--	--
Common Yellowthroat	--	--	--	4.00	2.00	--	4.00	2.00	--
Cooper's Hawk*	8.00	4.00	--	--	4.00	--	--	4.00	--
Doubled-crested Cormorant	--	--	--	--	--	--	--	--	--
Downy Woodpecker	4.00	2.00	--	--	2.00	--	--	2.00	--
Eastern Kingbird	--	--	--	--	--	--	--	--	--
Eastern Meadowlark	--	--	--	--	--	--	--	1.00	--
Eastern Phoebe	--	2.00	--	--	--	--	--	2.00	--

	Floodplain Forest Wetland			Shrub Swamp			Shallow Emergent Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Eastern Towhee	--	1.00	--	--	1.00	--	--	--	--
European Starling	2.67	--	--	--	--	--	--	--	--
Field Sparrow	--	--	--	--	--	--	--	--	--
Flycatcher sp.	--	--	--	--	--	--	--	--	--
Gadwall	--	--	--	--	--	--	--	2.33	--
Glossy Ibis	--	--	--	--	--	--	--	4.33	8.67
Golden-crowned Kinglet	--	2.67	--	--	2.67	--	--	--	--
Gray Catbird	--	--	--	2.00	1.00	--	--	--	--
Great Black-backed Gull	--	--	--	--	--	--	--	--	--
Great Blue Heron	6.67	--	--	--	--	--	--	3.33	6.67
Great Egret	--	--	--	--	--	--	--	3.33	6.67
Great Horned Owl	4.00	2.00	--	--	--	--	--	2.00	--
Greater Yellowlegs	--	--	--	--	--	--	--	2.67	5.33
Herring Gull	--	--	--	--	--	--	--	--	--
Hooded Merganser	--	--	--	--	--	--	--	--	--
Horned Grebe	--	--	--	--	--	--	--	--	--
Horned Lark	--	--	--	--	--	--	--	--	--
House Sparrow	--	--	--	--	--	--	--	--	--
House Wren	--	--	--	--	--	--	--	--	--
Killdeer	--	--	--	--	--	--	--	2.00	4.00
Laughing Gull	--	--	--	--	--	--	--	--	--
Lesser Yellowlegs	--	--	--	--	--	--	--	2.67	5.33
Long-eared owl*	--	4.00	--	--	--	--	--	--	--
Mallard	--	--	--	--	--	--	--	1.67	3.33
Marsh Wren*	--	--	--	--	--	--	5.33	2.67	5.33
Merlin	--	2.67	--	--	--	--	--	--	--
Mourning Dove	--	--	--	2.67	--	--	--	--	--
Northern Cardinal	--	1.33	--	--	1.33	--	--	--	--
Northern Flicker	3.33	1.67	--	--	--	--	--	--	--
Northern Harrier*	--	--	--	--	--	--	--	4.00	--
Northern Mockingbird	--	--	--	2.00	1.00	--	--	1.00	--
Osprey*	--	--	--	--	--	--	--	--	--
Pied-biled Grebe*	--	--	--	--	--	--	--	--	--
Red-breasted Merganser	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	4.00	--	--	--	2.00	--	--	2.00	--
Red-throated Loon	--	--	--	--	--	--	--	--	--
Red-winged Blackbird	--	--	--	2.00	1.00	--	2.00	1.00	--

	Floodplain Forest Wetland			Shrub Swamp			Shallow Emergent Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Ring-billed Gull*	--	--	--	--	--	--	--	--	--
Ring-necked Pheasant	--	--	--	--	0.67	--	--	--	--
Rock Dove	--	--	--	--	--	--	--	--	--
Ruddy Duck	--	--	--	--	--	--	--	--	--
Savannah Sparrow*	--	--	--	--	2.33	--	--	2.33	--
Short-eared Owl *	--	--	--	--	--	--	--	4.00	--
Snowy Egret	--	--	--	--	--	--	--	2.67	--
Snowy Owl	--	--	--	--	--	--	--	--	--
Song Sparrow	--	--	--	--	--	--	--	1.00	--
Spotted Sandpiper	--	--	--	--	--	--	--	3.67	7.33
Tree swallow	--	--	--	--	3.33	--	--	3.33	--
White-throated Sparrow	--	--	--	--	1.00	--	--	--	--
Wild Turkey	4.67	2.33	--	--	2.33	--	--	--	--
Willow Flycatcher	--	--	--	--	2.00	--	--	2.00	--
Yellow crowned Night Heron*	--	--	--	--	--	--	--	--	--
Yellow Warbler	--	--	--	4.00	2.00	--	--	--	--
Peregrine Falcon*	--	--	--	--	--	--	--	--	--
Black-bellied Plover	--	--	--	--	--	--	--	2.67	5.33
Hermit Thrush	--	1.67	3.33	--	--	--	--	--	--
Palm Warbler	--	--	--	--	--	--	--	2.33	--
Yellow-rumped Warbler	--	1.67	--	--	1.67	--	--	--	--
Dark-eyed Junco	--	--	--	--	--	--	--	--	--
Least Tern*	--	--	--	--	--	--	--	--	--
Sharp-shinned Hawk	7.33	3.67	--	--	3.67	--	--	3.67	--
Barn Owl*	--	--	--	--	--	--	--	4.00	--
Ruby-Crowned Kinglet	--	1.67	--	--	1.67	--	--	--	--
Least Sandpiper	--	--	--	--	--	--	--	2.67	5.33
Wood Thrush*	--	3.00	6.00	--	--	--	--	--	--
Rough-legged Hawk	--	--	--	--	--	--	--	--	--
White-eyed vireo	--	--	--	--	2.00	--	--	--	--
Yellow-throated vireo	--	2.67	--	--	--	--	--	--	--
Warbling vireo	--	2.00	--	--	--	--	--	--	--
Rey-eyed vireo	--	2.00	--	--	--	--	--	--	--
Philadelphia vireo	--	--	--	--	--	--	--	--	--
Black & white warbler	--	2.67	--	--	2.67	--	--	--	--
Tennessee warbler	--	2.00	--	--	2.00	--	--	--	--

	Floodplain Forest Wetland			Shrub Swamp			Shallow Emergent Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Nashville warbler	--	2.00	--	--	2.00	--	--	--	--
Northern Parula	--	3.33	--	--	3.33	--	--	--	--
Magnolia warbler	--	2.00	--	--	2.00	--	--	--	--
Cape May Warbler	--	3.33	--	--	3.33	--	--	--	--
Black-throated Blue Warbler	--	2.67	--	--	--	--	--	--	--
Chestnut-sided Warbler	--	--	--	--	--	--	--	--	--
Black-throated Green Warbler	--	2.67	--	--	--	--	--	--	--
Blackburnian Warbler	--	3.33	--	--	--	--	--	--	--
Bay-breasted Warbler	--	2.67	--	--	--	--	--	--	--
Blackpoll Warbler	--	2.67	--	--	--	--	--	--	--
Pine Warbler	--	2.67	--	--	2.67	--	--	--	--
Prairie Warbler*	--	--	--	--	--	--	--	--	--
Ovenbird	--	2.67	5.33	--	--	--	--	--	--
Northern Waterthrush	--	2.67	5.33	--	2.67	--	--	--	--
Louisiana Waterthrush	--	2.67	5.33	--	--	--	--	--	--
Yellow-breasted Chat	--	--	--	--	1.67	--	--	--	--
Wilson's Warbler	--	--	--	--	2.67	5.33	--	--	--
Canada Warbler *	--	2.00	4.00	--	--	--	--	--	--
Scarlet Tanager	--	--	--	--	--	--	--	--	--
Black-capped Chickadee	--	--	--	--	--	--	--	--	--
Tufted Titmouse	3.33	1.67	--	--	--	--	--	--	--
White-breasted Nuthatch	4.67	2.33	--	--	--	--	--	--	--
Red-breasted Nuthatch	--	--	--	--	--	--	--	--	--
Brown Creeper	--	--	--	--	--	--	--	--	--
Winter Wren	--	2.67	--	--	--	--	--	--	--
Carolina Wren	4.00	2.00	--	4.00	2.00	--	--	--	--
Blue-Gray Gnatcatcher	--	2.67	--	--	2.67	--	--	--	--
Veery	--	1.67	3.33	--	1.67	--	--	--	--
Gray-cheeked Thrush	--	--	--	--	--	--	--	--	--
Swainson's Thrush	--	--	--	--	1.67	--	--	--	--
Yellow-billed Cuckoo	2.00	1.00	--	2.00	1.00	--	--	--	--
Acadian Flycatcher	--	2.67	5.33	--	--	--	--	--	--
Least Flycatcher	--	--	--	--	--	--	--	--	--
Hairy Woodpecker	5.33	2.67	--	--	--	--	--	--	--
Yellow-bellied Sapsucker	--	--	--	--	--	--	--	--	--
Red-bellied Woodpecker	3.33	1.67	--	--	--	--	--	--	--

	Floodplain Forest Wetland			Shrub Swamp			Shallow Emergent Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Meadow Vole	--	--	--	2.67	1.33	--	2.67	1.33	--
White-footed Mouse	--	--	--	2.00	1.00	--	--	--	--
House Mouse	--	--	--	--	--	--	--	--	--
Norway Rat	--	--	--	--	--	--	--	--	--
Gray Squirrel	7.33	3.67	--	--	--	--	--	--	--
Muskrat	--	--	--	--	--	--	--	2.00	--
Raccoon	3.33	1.67	--	--	--	--	--	1.67	--
Cottontail Rabbit	4.00	2.00	--	--	2.00	--	--	--	--
Feral Dog	--	1.67	--	--	1.67	--	--	--	--
Feral Cat	--	--	--	--	1.67	--	--	--	--
Northern Water Snake	--	--	--	--	--	--	--	2.00	--
Northern Brown Snake	--	--	--	4.00	2.00	--	--	2.00	--
Green Frog	--	--	--	--	--	--	--	--	--
Fowler's Toad*	--	2.00	--	--	--	--	4.00	2.00	4.00
Eastern Garter Snake	--	--	--	4.00	2.00	--	--	2.00	--
Northern Diamond-backed Terrapin	--	--	--	--	--	--	--	--	--
Total Habitat Value	**92.67**	**124.00**	**38.00**	**49.33**	**101.33**	**5.33**	**30.00**	**122.00**	**90.00**

	Deep Emergent Marsh			Common Reed-Dominated Wetland			Maritime Forest		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
American Black Duck	4.67	2.33	4.67	--	--	--	--	--	--
American Coot	--	2.00	--	--	--	--	--	--	--
American Crow	--	--	--	--	--	--	2.00	1.00	--
American Goldfinch	--	1.33	--	--	1.33	--	2.67	1.33	--
American Kestrel	--	3.33	--	--	3.33	--	--	--	--
American Redstart	--	--	--	--	--	--	--	--	--
American Robin	--	--	--	--	--	--	2.00	1.00	--
American Tree Sparrow	--	--	--	--	1.33	--	--	--	--
American Wigeon	--	2.33	4.67	--	--	--	--	--	--
American Woodcock	--	--	--	--	3.67	--	7.33	3.67	--
Bairds Sandpiper	--	--	--	--	--	--	--	--	--
Baltimore Oriole*	--	--	--	--	--	--	4.67	2.33	--
Barn Swallow	--	2.00	--	--	2.00	--	--	--	--
Belted Kingfisher	--	3.67	7.33	--	--	--	--	--	--
Black crowned Night Heron*	--	3.33	6.67	--	--	--	--	--	--
Black Skimmer*	--	--	--	--	--	--	--	--	--
Bobolink*	--	--	--	4.67	2.33	--	--	--	--
Brant	--	3.67	7.33	--	--	--	--	--	--
Brown Thrasher	--	--	--	--	--	--	--	--	--
Brown-headed Cowbird	--	--	--	--	--	--	2.00	--	--
Bufflehead	--	3.33	6.67	--	--	--	--	--	--
Canada Goose	--	1.33	--	--	--	--	--	--	--
Canvasback	--	3.67	7.33	--	--	--	--	--	--
Cedar Waxwing	--	--	--	--	--	--	--	1.67	--
Chimney Swift	--	2.00	--	--	2.00	--	--	--	--
Clapper Rail	--	--	--	--	--	--	--	--	--
Common Goldeneye	--	3.00	6.00	--	--	--	--	--	--
Common Tern	--	2.67	5.33	--	--	--	--	--	--
Common Yellowthroat	--	--	--	4.00	2.00	--	--	--	--
Cooper's Hawk*	--	4.00	--	--	4.00	--	8.00	4.00	--
Doubled-crested Cormorant	--	2.33	4.67	--	--	--	--	--	--
Downy Woodpecker	--	--	--	--	2.00	--	4.00	2.00	--
Eastern Kingbird	--	--	--	--	--	--	--	--	--
Eastern Meadowlark	--	--	--	--	1.00	--	--	--	--
Eastern Phoebe	--	--	--	--	2.00	--	--	2.00	--

	Deep Emergent Marsh			Common Reed-Dominated Wetland			Maritime Forest		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Eastern Towhee	--	--	--	--	--	--	--	1.00	--
European Starling	--	--	--	--	--	--	2.67	1.33	--
Field Sparrow	--	--	--	--	--	--	--	--	--
Flycatcher sp.	--	--	--	--	--	--	--	--	--
Gadwall	--	2.33	4.67	--	--	--	--	--	--
Glossy Ibis	--	--	--	--	--	--	--	--	--
Golden-crowned Kinglet	--	--	--	--	--	--	--	2.67	--
Gray Catbird	--	--	--	--	--	--	--	--	--
Great Black-backed Gull	--	1.00	--	--	--	--	--	--	--
Great Blue Heron	--	3.33	6.67	--	--	--	6.67	--	--
Great Egret	--	3.33	6.67	--	--	--	--	--	--
Great Horned Owl	--	2.00	--	--	2.00	--	4.00	2.00	--
Greater Yellowlegs	--	--	--	--	--	--	--	--	--
Herring Gull	--	1.00	--	--	--	--	--	--	--
Hooded Merganser	--	4.00	8.00	--	--	--	--	--	--
Horned Grebe	--	2.00	4.00	--	--	--	--	--	--
Horned Lark	--	--	--	--	--	--	--	--	--
House Sparrow	--	--	--	--	--	--	--	--	--
House Wren	--	--	--	--	--	--	--	--	--
Killdeer	--	--	--	--	2.00	--	--	--	--
Laughing Gull	--	2.00	--	--	--	--	--	--	--
Lesser Yellowlegs	--	--	--	--	--	--	--	--	--
Long-eared owl*	--	--	--	--	--	--	8.00	4.00	--
Mallard	--	1.67	3.33	--	--	--	--	--	--
Marsh Wren*	--	--	--	5.33	2.67	--	--	--	--
Merlin	--	--	--	--	--	--	--	2.67	--
Mourning Dove	--	--	--	--	--	--	--	--	--
Northern Cardinal	--	--	--	--	--	--	--	1.33	--
Northern Flicker	--	--	--	--	--	--	3.33	1.67	--
Northern Harrier*	--	4.00	--	--	4.00	--	--	--	--
Northern Mockingbird	--	1.00	--	--	1.00	--	--	--	--
Osprey*	--	5.00	1--	--	--	--	--	--	--
Pied-biled Grebe*	--	3.33	6.67	--	--	--	--	--	--
Red-breasted Merganser	--	3.33	6.67	--	--	--	--	--	--
Red-tailed Hawk	--	--	--	--	2.00	--	4.00	--	--
Red-throated Loon	--	3.00	6.00	--	--	--	--	--	--
Red-winged Blackbird	2.00	1.00	--	2.00	1.00	--	--	--	--

	Deep Emergent Marsh			Common Reed-Dominated Wetland			Maritime Forest		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Ring-billed Gull*	--	2.33	--	--	--	--	--	--	--
Ring-necked Pheasant	--	--	--	--	--	--	--	--	--
Rock Dove	--	--	--	--	--	--	--	--	--
Ruddy Duck	--	2.67	5.33	--	--	--	--	--	--
Savannah Sparrow*	--	--	--	--	2.33	--	--	--	--
Short-eared Owl *	--	--	--	--	4.00	--	--	--	--
Snowy Egret	--	2.67	5.33	--	--	--	--	--	--
Snowy Owl	--	--	--	--	--	--	--	--	--
Song Sparrow	--	--	--	--	1.00	--	--	--	--
Spotted Sandpiper	--	3.67	--	--	--	--	--	--	--
Tree swallow	--	3.33	--	--	3.33	--	--	--	--
White-throated Sparrow	--	--	--	--	--	--	--	--	--
Wild Turkey	--	--	--	--	--	--	4.67	2.33	--
Willow Flycatcher	--	2.00	--	--	2.00	--	--	--	--
Yellow crowned Night Heron*	--	4.67	9.33	--	--	--	--	--	--
Yellow Warbler	--	--	--	--	--	--	--	--	--
Peregrine Falcon*	--	--	--	--	--	--	--	--	--
Black-bellied Plover	--	--	--	--	--	--	--	--	--
Hermit Thrush	--	--	--	--	--	--	--	1.67	3.33
Palm Warbler	--	--	--	--	2.33	--	--	--	--
Yellow-rumped Warbler	--	--	--	--	--	--	--	1.67	--
Dark-eyed Junco	--	--	--	--	--	--	--	1.00	--
Least Tern*	--	4.00	8.00	--	--	--	--	--	--
Sharp-shinned Hawk	--	--	--	--	--	--	7.33	3.67	--
Barn Owl*	--	--	--	--	--	--	--	--	--
Ruby-Crowned Kinglet	--	--	--	--	--	--	--	1.67	--
Least Sandpiper	--	--	--	--	--	--	--	--	--
Wood Thrush*	--	--	--	--	--	--	--	3.00	--
Rough-legged Hawk	--	--	--	--	--	--	--	--	--
White-eyed vireo	--	--	--	--	--	--	--	--	--
Yellow-throated vireo	--	--	--	--	--	--	--	2.67	--
Warbling vireo	--	--	--	--	--	--	--	2.00	--
Rey-eyed vireo	--	--	--	--	--	--	--	2.00	--
Philadelphia vireo	--	--	--	--	--	--	--	2.00	--
Black & white warbler	--	--	--	--	--	--	--	2.67	--
Tennessee warbler	--	--	--	--	--	--	--	2.00	--

	Deep Emergent Marsh			Common Reed-Dominated Wetland			Maritime Forest		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Nashville warbler	--	--	--	--	--	--	--	2.00	--
Northern Parula	--	--	--	--	--	--	--	3.33	--
Magnolia warbler	--	--	--	--	--	--	--	2.00	--
Cape May Warbler	--	--	--	--	--	--	--	3.33	--
Black-throated Blue Warbler	--	--	--	--	--	--	--	2.67	--
Chestnut-sided Warbler	--	--	--	--	--	--	--	--	--
Black-throated Green Warbler	--	--	--	--	--	--	--	2.67	--
Blackburnian Warbler	--	--	--	--	--	--	--	3.33	--
Bay-breasted Warbler	--	--	--	--	--	--	--	2.67	--
Blackpoll Warbler	--	--	--	--	--	--	--	2.67	--
Pine Warbler	--	--	--	--	--	--	--	2.67	--
Prairie Warbler*	--	--	--	--	--	--	--	--	--
Ovenbird	--	--	--	--	--	--	--	2.67	5.33
Northern Waterthrush	--	--	--	--	--	--	--	2.67	--
Louisiana Waterthrush	--	--	--	--	--	--	--	--	--
Yellow-breasted Chat	--	--	--	--	--	--	--	--	--
Wilson's Warbler	--	--	--	--	--	--	--	--	--
Canada Warbler *	--	--	--	--	--	--	--	--	--
Scarlet Tanager	--	--	--	--	--	--	--	1.00	2.00
Black-capped Chickadee	--	--	--	--	--	--	2.00	1.00	--
Tufted Titmouse	--	--	--	--	--	--	3.33	1.67	--
White-breasted Nuthatch	--	--	--	--	--	--	4.67	2.33	--
Red-breasted Nuthatch	--	--	--	--	--	--	--	2.33	--
Brown Creeper	--	--	--	--	--	--	--	3.33	--
Winter Wren	--	--	--	--	--	--	5.33	2.67	--
Carolina Wren	--	--	--	--	--	--	4.00	2.00	--
Blue-Gray Gnatcatcher	--	--	--	--	--	--	--	2.67	--
Veery	--	--	--	--	--	--	--	1.67	--
Gray-cheeked Thrush	--	--	--	--	--	--	--	1.67	3.33
Swainson's Thrush	--	--	--	--	--	--	--	--	3.33
Yellow-billed Cuckoo	--	--	--	--	--	--	--	--	--
Acadian Flycatcher	--	--	--	--	--	--	--	--	--
Least Flycatcher	--	--	--	--	--	--	--	--	--
Hairy Woodpecker	--	--	--	--	--	--	5.33	2.67	--
Yellow-bellied Sapsucker	--	--	--	--	--	--	--	3.67	--
Red-bellied Woodpecker	--	--	--	--	--	--	3.33	1.67	--

	Deep Emergent Marsh			Common Reed-Dominated Wetland			Maritime Forest		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Meadow Vole	2.67	1.33	--	2.67	1.33	--	--	--	--
White-footed Mouse	--	--	--	--	--	--	--	--	--
House Mouse	--	--	--	--	--	--	--	--	--
Norway Rat	--	--	--	--	--	--	--	--	--
Gray Squirrel	--	--	--	--	--	--	7.33	3.67	--
Muskrat	--	2.00	4.00	--	2.00	--	--	--	--
Raccoon	--	1.67	--	--	1.67	--	3.33	1.67	--
Cottontail Rabbit	--	--	--	--	--	--	4.00	2.00	--
Feral Dog	--	--	--	--	--	--	--	1.67	--
Feral Cat	--	--	--	--	--	--	--	--	--
Northern Water Snake	--	2.00	--	--	2.00	--	--	--	--
Northern Brown Snake	--	2.00	--	--	2.00	--	--	--	--
Green Frog	4.00	2.00	4.00	--	--	--	--	--	--
Fowler's Toad*	4.00	2.00	--	4.00	2.00	--	--	2.00	--
Eastern Garter Snake	--	2.00	--	--	2.00	--	--	--	--
Northern Diamond-backed Terrapin	--	--	--	--	--	--	--	--	--
Total Habitat Value	**17.33**	**130.00**	**159.33**	**22.67**	**69.67**	**0.00**	**116.00**	**138.00**	**17.33**

	Maritime Shrubland			Maritime Grassland			Salt Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
American Black Duck	--	--	--	--	--	--	4.67	2.33	4.67
American Coot	--	--	--	--	--	--	--	2.00	4.00
American Crow	--	1.00	--	--	1.00	--	--	1.00	--
American Goldfinch	2.67	1.33	--	--	1.33	--	--	--	--
American Kestrel	--	--	--	--	3.33	--	--	3.33	--
American Redstart	--	2.00	--	--	2.00	--	--	--	--
American Robin	2.00	1.00	--	--	1.00	--	--	--	--
American Tree Sparrow	--	1.33	--	--	1.33	--	--	--	--
American Wigeon	--	--	--	--	--	--	--	2.33	4.67
American Woodcock	7.33	3.67	--	7.33	3.67	--	--	--	--
Bairds Sandpiper	--	--	--	--	--	--	--	2.67	5.33
Baltimore Oriole*	--	--	--	--	--	--	--	--	--
Barn Swallow	--	--	--	--	2.00	--	--	2.00	4.00
Belted Kingfisher	--	--	--	--	--	--	7.33	3.67	7.33
Black crowned Night Heron*	--	--	--	--	--	--	6.67	3.33	6.67
Black Skimmer*	--	--	--	--	--	--	9.33	4.67	9.33
Bobolink*	--	--	--	4.67	2.33	4.67	--	--	--
Brant	--	--	--	--	--	--	--	3.67	--
Brown Thrasher	--	1.00	--	2.00	1.00	--	--	1.00	2.00
Brown-headed Cowbird	2.00	--	--	2.00	1.00	--	--	--	--
Bufflehead	--	--	--	--	--	--	--	3.33	6.67
Canada Goose	--	--	--	2.67	--	--	2.67	1.33	2.67
Canvasback	--	--	--	--	--	--	--	3.67	--
Cedar Waxwing	--	1.67	--	--	--	--	--	--	--
Chimney Swift	--	2.00	--	--	2.00	--	--	2.00	--
Clapper Rail	--	--	--	--	--	--	3.33	1.67	3.33
Common Goldeneye	--	--	--	--	--	--	--	3.00	6.00
Common Tern	--	--	--	--	--	--	--	2.67	5.33
Common Yellowthroat	4.00	2.00	--	4.00	2.00	--	--	--	--
Cooper's Hawk*	--	4.00	--	--	4.00	--	--	4.00	--
Doubled-crested Cormorant	--	--	--	--	--	--	--	2.33	4.67
Downy Woodpecker	--	2.00	--	--	--	--	--	--	--
Eastern Kingbird	--	--	--	2.00	1.00	--	--	1.00	--
Eastern Meadowlark	--	--	--	--	1.00	2.00	--	--	--
Eastern Phoebe	--	--	--	--	2.00	--	--	--	--

	Maritime Shrubland			Maritime Grassland			Salt Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Eastern Towhee	--	1.00	--	2.00	1.00	--	--	--	--
European Starling	--	--	--	--	1.33	--	--	1.33	--
Field Sparrow	--	--	--	2.00	1.00	--	--	--	--
Flycatcher sp.	--	--	--	--	--	--	--	--	--
Gadwall	--	--	--	--	--	--	--	2.33	--
Glossy Ibis	--	--	--	--	--	--	8.67	4.33	8.67
Golden-crowned Kinglet	--	2.67	--	--	2.67	--	--	--	--
Gray Catbird	2.00	1.00	--	--	1.00	--	--	--	--
Great Black-backed Gull	--	--	--	--	--	--	--	1.00	2.00
Great Blue Heron	--	--	--	--	--	--	--	3.33	6.67
Great Egret	--	--	--	--	--	--	--	3.33	6.67
Great Horned Owl	--	--	--	--	2.00	--	--	2.00	--
Greater Yellowlegs	--	--	--	--	--	--	--	2.67	5.33
Herring Gull	--	--	--	--	--	--	--	1.00	2.00
Hooded Merganser	--	--	--	--	--	--	--	4.00	8.00
Horned Grebe	--	--	--	--	--	--	--	2.00	--
Horned Lark	--	--	--	--	1.00	--	--	--	--
House Sparrow	--	--	--	--	--	--	--	--	--
House Wren	--	--	--	4.00	2.00	--	--	--	--
Killdeer	--	--	--	--	2.00	--	--	2.00	--
Laughing Gull	--	--	--	--	--	--	--	2.00	4.00
Lesser Yellowlegs	--	--	--	--	--	--	--	2.67	5.33
Long-eared owl*	--	--	--	--	4.00	--	--	--	--
Mallard	--	--	--	3.33	--	--	3.33	1.67	3.33
Marsh Wren*	--	--	--	--	--	--	5.33	2.67	5.33
Merlin	--	--	--	--	2.67	--	--	2.67	--
Mourning Dove	2.67	--	--	--	1.33	--	--	1.33	--
Northern Cardinal	--	1.33	--	--	1.33	--	--	--	--
Northern Flicker	--	--	--	--	--	--	--	--	--
Northern Harrier*	--	--	--	8.00	4.00	8.00	8.00	4.00	--
Northern Mockingbird	2.00	1.00	--	2.00	1.00	--	--	--	--
Osprey*	--	--	--	--	--	--	--	5.00	1--
Pied-biled Grebe*	--	--	--	--	--	--	6.67	3.33	6.67
Red-breasted Merganser	--	--	--	--	--	--	--	3.33	6.67
Red-tailed Hawk	--	2.00	--	--	2.00	--	--	2.00	4.00
Red-throated Loon	--	--	--	--	--	--	--	3.00	6.00
Red-winged Blackbird	2.00	1.00	--	2.00	1.00	--	--	--	--

	Maritime Shrubland			Maritime Grassland			Salt Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Ring-billed Gull*	--	--	--	--	--	--	--	2.33	4.67
Ring-necked Pheasant	--	0.67	--	1.33	0.67	--	--	0.67	1.33
Rock Dove	--	--	--	--	--	--	--	1.00	--
Ruddy Duck	--	--	--	--	--	--	--	2.67	5.33
Savannah Sparrow*	--	2.33	--	4.67	2.33	4.67	--	2.33	--
Short-eared Owl *	--	--	--	8.00	4.00	8.00	--	4.00	--
Snowy Egret	--	--	--	--	--	--	--	2.67	5.33
Snowy Owl	--	2.67	--	--	2.67	--	--	2.67	--
Song Sparrow	2.00	1.00	--	2.00	1.00	--	--	1.00	--
Spotted Sandpiper	--	--	--	--	--	--	--	3.67	7.33
Tree swallow	--	3.33	--	--	3.33	--	--	3.33	--
White-throated Sparrow	--	1.00	--	--	1.00	--	--	--	--
Wild Turkey	--	2.33	--	4.67	2.33	--	--	--	--
Willow Flycatcher	--	2.00	--	--	2.00	4.00	--	--	--
Yellow crowned Night Heron*	--	--	--	--	--	--	--	4.67	9.33
Yellow Warbler	4.00	2.00	--	--	2.00	--	--	--	--
Peregrine Falcon*	--	--	--	--	--	--	--	4.67	--
Black-bellied Plover	--	--	--	--	--	--	--	2.67	5.33
Hermit Thrush	--	--	--	--	--	--	--	--	--
Palm Warbler	--	2.33	--	--	2.33	--	--	2.33	--
Yellow-rumped Warbler	--	1.67	--	--	1.67	--	--	--	--
Dark-eyed Junco	--	1.00	--	--	1.00	--	--	--	--
Least Tern*	--	--	--	--	--	--	--	4.00	8.00
Sharp-shinned Hawk	--	3.67	--	--	--	--	--	3.67	--
Barn Owl*	--	--	--	--	4.00	--	--	4.00	--
Ruby-Crowned Kinglet	--	1.67	--	--	--	--	--	--	--
Least Sandpiper	--	--	--	--	--	--	--	2.67	5.33
Wood Thrush*	--	--	--	--	--	--	--	--	--
Rough-legged Hawk	--	--	--	--	2.67	--	--	--	--
White-eyed vireo	--	2.00	--	--	--	--	--	--	--
Yellow-throated vireo	--	--	--	--	--	--	--	--	--
Warbling vireo	--	--	--	--	--	--	--	--	--
Rey-eyed vireo	--	--	--	--	--	--	--	--	--
Philadelphia vireo	--	2.00	--	--	--	--	--	--	--
Black & white warbler	--	2.67	--	--	2.67	--	--	--	--
Tennessee warbler	--	2.00	--	--	--	--	--	--	--

	Maritime Shrubland			Maritime Grassland			Salt Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Nashville warbler	--	2.00	--	--	--	--	--	--	--
Northern Parula	--	3.33	--	--	3.33	--	--	--	--
Magnolia warbler	--	2.00	--	--	--	--	--	--	--
Cape May Warbler	--	3.33	--	--	--	--	--	--	--
Black-throated Blue Warbler	--	--	--	--	--	--	--	--	--
Chestnut-sided Warbler	--	2.00	--	--	--	--	--	--	--
Black-throated Green Warbler	--	--	--	--	--	--	--	--	--
Blackburnian Warbler	--	--	--	--	--	--	--	--	--
Bay-breasted Warbler	--	--	--	--	--	--	--	--	--
Blackpoll Warbler	--	--	--	--	--	--	--	--	--
Pine Warbler	--	2.67	--	--	--	--	--	--	--
Prairie Warbler*	--	2.00	--	--	--	--	--	--	--
Ovenbird	--	--	--	--	--	--	--	--	--
Northern Waterthrush	--	--	--	--	--	--	--	--	--
Louisiana Waterthrush	--	--	--	--	--	--	--	--	--
Yellow-breasted Chat	--	--	--	--	--	--	--	--	--
Wilson's Warbler	--	--	--	--	--	--	--	--	--
Canada Warbler *	--	--	--	--	--	--	--	--	--
Scarlet Tanager	--	--	--	--	--	--	--	--	--
Black-capped Chickadee	--	--	--	--	--	--	--	--	--
Tufted Titmouse	--	--	--	--	--	--	--	--	--
White-breasted Nuthatch	--	--	--	--	--	--	--	--	--
Red-breasted Nuthatch	--	--	--	--	--	--	--	--	--
Brown Creeper	--	--	--	--	--	--	--	--	--
Winter Wren	--	--	--	--	--	--	--	--	--
Carolina Wren	4.00	2.00	--	--	--	--	--	--	--
Blue-Gray Gnatcatcher	--	--	--	--	--	--	--	--	--
Veery	--	--	--	--	--	--	--	--	--
Gray-cheeked Thrush	--	--	--	--	--	--	--	--	--
Swainson's Thrush	--	--	--	--	--	--	--	--	--
Yellow-billed Cuckoo	--	--	--	--	--	--	--	--	--
Acadian Flycatcher	--	--	--	--	--	--	--	--	--
Least Flycatcher	--	--	--	--	--	--	--	--	--
Hairy Woodpecker	--	--	--	--	--	--	--	--	--
Yellow-bellied Sapsucker	--	--	--	--	--	--	--	--	--
Red-bellied Woodpecker	--	--	--	--	--	--	--	--	--

	Maritime Shrubland			Maritime Grassland			Salt Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Meadow Vole	2.67	1.33	--	2.67	1.33	2.67	2.67	1.33	--
White-footed Mouse	2.00	1.00	--	2.00	1.00	--	--	--	--
House Mouse	--	--	--	1.33	0.67	--	--	--	--
Norway Rat	--	--	--	--	0.67	--	--	0.67	--
Gray Squirrel	--	--	--	--	--	--	--	--	--
Muskrat	--	--	--	--	--	--	4.00	2.00	4.00
Raccoon	--	--	--	--	--	--	--	1.67	--
Cottontail Rabbit	--	2.00	--	--	2.00	--	--	--	--
Feral Dog	--	1.67	--	--	1.67	--	--	--	--
Feral Cat	--	1.67	--	--	1.67	--	--	1.67	--
Northern Water Snake	--	--	--	--	--	--	--	2.00	--
Northern Brown Snake	4.00	2.00	--	4.00	2.00	--	--	2.00	--
Green Frog	--	--	--	--	--	--	--	--	--
Fowler's Toad*	--	--	--	--	--	--	--	--	--
Eastern Garter Snake	4.00	2.00	--	--	2.00	--	--	2.00	--
Northern Diamond-backed Terrapin	--	--	--	--	--	--	4.67	2.33	4.67
Total Habitat Value	**49.33**	**100.33**	**0.00**	**78.67**	**115.33**	**34.00**	**77.33**	**190.67**	**228.00**

* New Jersey State Engangered or Threatened Species

					Successional Northern Hardwood			Successional Shrubland		
	Habitat Specificity	Trophic Level	Regulatory Status	Species Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
American Black Duck	3	1	3	2.33	--	--	--	--	--	--
American Coot	1	1	4	2.00	--	--	--	--	--	--
American Crow	1	1	1	1.00	2.00	1.00	--	--	1.00	--
American Goldfinch	1	2	1	1.33	--	--	--	2.67	1.33	--
American Kestrel	5	4	1	3.33	--	--	--	--	--	--
American Redstart	1	4	1	2.00	--	--	--	--	2.00	--
American Robin	1	1	1	1.00	2.00	1.00	--	2.00	1.00	--
American Tree Sparrow	1	2	1	1.33	--	--	--	--	1.33	--
American Wigeon	3	1	3	2.33	--	--	--	--	--	--
American Woodcock	3	5	3	3.67	--	--	--	7.33	3.67	--
Bairds Sandpiper	3	4	1	2.67	--	--	--	--	--	--
Baltimore Oriole*	1	1	5	2.33	4.67	2.33	--	--	--	--
Barn Swallow	1	4	1	2.00	--	--	--	--	2.00	--
Belted Kingfisher	5	5	1	3.67	--	--	--	--	--	--
Black crowned Night Heron*	5	4	1	3.33	--	--	--	--	--	--
Black Skimmer*	5	4	5	4.67	--	--	--	--	--	--
Bobolink*	1	1	5	2.33	--	--	--	--	--	--
Brant	5	3	3	3.67	--	--	--	--	--	--
Brown Thrasher	1	1	1	1.00	--	--	--	2.00	1.00	--
Brown-headed Cowbird	1	1	1	1.00	2.00	--	--	2.00	1.00	--
Bufflehead	3	4	3	3.33	--	--	--	--	--	--
Canada Goose	1	2	1	1.33	--	--	--	--	--	--
Canvasback	5	3	3	3.67	--	--	--	--	--	--
Cedar Waxwing	1	3	1	1.67	--	1.67	--	--	1.67	--
Chimney Swift	1	4	1	2.00	--	--	--	--	2.00	--
Clapper Rail	3	1	1	1.67	--	--	--	--	--	--
Common Goldeneye	5	1	3	3.00	--	--	--	--	--	--
Common Tern	3	4	1	2.67	--	--	--	--	--	--
Common Yellowthroat	1	4	1	2.00	--	--	--	--	--	--
Cooper's Hawk*	3	4	5	4.00	8.00	4.00	--	--	4.00	--
Doubled-crested Cormorant	1	5	1	2.33	--	--	--	--	--	--
Downy Woodpecker	1	4	1	2.00	4.00	2.00	--	--	2.00	--
Eastern Kingbird	1	1	1	1.00	--	--	--	--	--	--
Eastern Meadowlark	1	1	1	1.00	--	--	--	--	1.00	--
Eastern Phoebe	1	4	1	2.00	--	2.00	--	--	--	--

					Successional Northern Hardwood			Successional Shrubland		
	Habitat Specificity	Trophic Level	Regulatory Status	Species Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Eastern Towhee	1	1	1	1.00	2.00	1.00	--	--	1.00	--
European Starling	3	1	--	1.33	--	1.33	--	--	--	--
Field Sparrow	1	1	1	1.00	--	--	--	--	--	--
Flycatcher sp.				--	--	--	--	--	--	--
Gadwall	3	1	3	2.33	--	--	--	--	--	--
Glossy Ibis	5	4	4	4.33	--	--	--	--	4.33	--
Golden-crowned Kinglet	3	4	1	2.67	--	2.67	--	--	2.67	--
Gray Catbird	1	1	1	1.00	--	--	--	2.00	1.00	--
Great Black-backed Gull	1	1	1	1.00	--	--	--	--	--	--
Great Blue Heron	5	4	1	3.33	--	--	--	--	--	--
Great Egret	5	4	1	3.33	--	--	--	--	--	--
Great Horned Owl	1	4	1	2.00	--	2.00	--	--	2.00	--
Greater Yellowlegs	3	4	1	2.67	--	--	--	--	--	--
Herring Gull	1	1	1	1.00	--	--	--	--	--	--
Hooded Merganser	5	4	3	4.00	--	--	--	--	--	--
Horned Grebe	1	4	1	2.00	--	--	--	--	--	--
Horned Lark	1	1	1	1.00	--	--	--	--	--	--
House Sparrow	1	1	--	0.67	--	--	--	--	0.67	--
House Wren	1	4	1	2.00	--	--	--	4.00	2.00	--
Killdeer	1	4	1	2.00	--	--	--	--	--	--
Laughing Gull	1	4	1	2.00	--	--	--	--	--	--
Lesser Yellowlegs	3	4	1	2.67	--	--	--	--	--	--
Long-eared owl*	3	4	5	4.00	--	4.00	--	--	--	--
Mallard	1	1	3	1.67	--	--	--	--	--	--
Marsh Wren*	3	4	1	2.67	--	--	--	--	--	--
Merlin	3	4	1	2.67	--	2.67	--	--	2.67	--
Mourning Dove	1	2	1	1.33	--	--	--	--	--	--
Northern Cardinal	1	2	1	1.33	--	1.33	--	2.67	1.33	--
Northern Flicker	3	1	1	1.67	3.33	1.67	--	--	1.67	--
Northern Harrier*	3	4	5	4.00	--	--	--	--	--	--
Northern Mockingbird	1	1	1	1.00	--	--	--	2.00	1.00	--
Osprey*	5	5	5	5.00	--	--	--	--	--	--
Pied-biled Grebe*	1	4	5	3.33	--	--	--	--	--	--
Red-breasted Merganser	3	4	3	3.33	--	--	--	--	--	--
Red-tailed Hawk	1	4	1	2.00	4.00	--	--	--	--	--
Red-throated Loon	3	5	1	3.00	--	--	--	--	--	--
Red-winged Blackbird	1	1	1	1.00	--	--	--	--	--	--

					Successional Northern Hardwood			Successional Shrubland		
	Habitat Specificity	Trophic Level	Regulatory Status	Species Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Ring-billed Gull*	1	1	5	2.33	--	--	--	--	--	--
Ring-necked Pheasant	1	1	--	0.67	--	--	--	--	0.67	--
Rock Dove	1	2	--	1.00	--	--	--	--	--	--
Ruddy Duck	3	2	3	2.67	--	--	--	--	--	--
Savannah Sparrow*	1	1	5	2.33	--	--	--	--	--	--
Short-eared Owl *	3	4	5	4.00	--	--	--	--	--	--
Snowy Egret	3	4	1	2.67	--	--	--	--	--	--
Snowy Owl	3	4	1	2.67	--	--	--	--	--	--
Song Sparrow	1	1	1	1.00	--	--	--	2.00	1.00	--
Spotted Sandpiper	3	4	4	3.67	--	--	--	--	--	--
Tree swallow	5	4	1	3.33	--	--	--	--	3.33	--
White-throated Sparrow	1	1	1	1.00	--	--	--	--	1.00	--
Wild Turkey	3	1	3	2.33	4.67	2.33	--	--	2.33	--
Willow Flycatcher	1	4	1	2.00	--	--	--	--	2.00	--
Yellow crowned Night Heron*	5	4	5	4.67	--	--	--	--	--	--
Yellow Warbler	1	4	1	2.00	--	--	--	--	2.00	--
Peregrine Falcon*	5	4	5	4.67	--	--	--	--	--	--
Black-bellied Plover	3	4	1	2.67	--	--	--	--	--	--
Hermit Thrush	3	1	1	1.67	--	1.67	3.33	--	1.67	--
Palm Warbler	3	3	1	2.33	--	--	--	--	--	--
Yellow-rumped Warbler	3	1	1	1.67	--	1.67	--	--	1.67	--
Dark-eyed Junco	1	1	1	1.00	--	1.00	--	--	1.00	--
Least Tern*	3	4	5	4.00	--	--	--	--	--	--
Sharp-shinned Hawk	3	4	4	3.67	7.33	3.67	7.33	--	3.67	--
Barn Owl*	3	4	5	4.00	--	--	--	--	--	--
Ruby-Crowned Kinglet	3	1	1	1.67	--	1.67	--	--	1.67	--
Least Sandpiper	3	4	1	2.67	--	--	--	--	--	--
Wood Thrush*	3	1	5	3.00	--	3.00	--	--	--	--
Rough-legged Hawk	3	4	1	2.67	--	--	--	--	--	--
White-eyed vireo	1	4	1	2.00	--	--	--	--	2.00	--
Yellow-throated vireo	3	4	1	2.67	--	--	--	--	--	--
Warbling vireo	1	4	1	2.00	--	2.00	--	--	--	--
Rey-eyed vireo	1	4	1	2.00	--	2.00	--	--	--	--
Philadelphia vireo	1	4	1	2.00	--	2.00	--	--	2.00	--
Black & white warbler	3	4	1	2.67	--	2.67	--	--	2.67	--
Tennessee warbler	1	4	1	2.00	--	2.00	--	--	2.00	--

					Successional Northern Hardwood			Successional Shrubland		
	Habitat Specificity	Trophic Level	Regulatory Status	Species Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Nashville warbler	1	4	1	2.00	--	2.00	--	--	2.00	--
Northern Parula	5	4	1	3.33	--	3.33	--	--	3.33	--
Magnolia warbler	1	4	1	2.00	--	2.00	--	--	2.00	--
Cape May Warbler	5	4	1	3.33	--	3.33	--	--	3.33	--
Black-throated Blue Warbler	3	4	1	2.67	--	2.67	--	--	--	--
Chestnut-sided Warbler	1	4	1	2.00	--	2.00	--	--	2.00	--
Black-throated Green Warbler	3	4	1	2.67	--	2.67	--	--	--	--
Blackburnian Warbler	5	4	1	3.33	--	3.33	--	--	--	--
Bay-breasted Warbler	3	4	1	2.67	--	2.67	--	--	--	--
Blackpoll Warbler	3	4	1	2.67	--	2.67	--	--	--	--
Pine Warbler	3	4	1	2.67	--	2.67	--	--	2.67	--
Prairie Warbler*	1	4	1	2.00	--	2.00	--	--	2.00	--
Ovenbird	3	4	1	2.67	--	--	--	--	--	--
Northern Waterthrush	3	4	1	2.67	--	2.67	--	--	--	--
Louisiana Waterthrush	3	4	1	2.67	--	--	--	--	--	--
Yellow-breasted Chat	3	1	1	1.67	--	--	--	--	1.67	--
Wilson's Warbler	3	4	1	2.67	--	--	--	--	--	--
Canada Warbler *	1	4	1	2.00	--	--	--	--	--	--
Scarlet Tanager	1	1	1	1.00	--	--	--	--	--	--
Black-capped Chickadee	1	1	1	1.00	--	1.00	--	--	--	--
Tufted Titmouse	3	1	1	1.67	3.33	1.67	--	--	--	--
White-breasted Nuthatch	5	1	1	2.33	--	--	--	--	--	--
Red-breasted Nuthatch	5	1	1	2.33	--	--	--	--	--	--
Brown Creeper	5	4	1	3.33	--	3.33	--	--	--	--
Winter Wren	3	4	1	2.67	--	2.67	--	--	--	--
Carolina Wren	1	4	1	2.00	--	--	--	--	--	--
Blue-Gray Gnatcatcher	3	4	1	2.67	--	2.67	--	--	--	--
Veery	3	1	1	1.67	--	--	--	--	--	--
Gray-cheeked Thrush	3	1	1	1.67	--	--	--	--	--	--
Swainson's Thrush	3	1	1	1.67	--	1.67	--	--	--	--
Yellow-billed Cuckoo	1	1	1	1.00	2.00	1.00	--	--	--	--
Acadian Flycatcher	3	4	1	2.67	--	--	--	--	--	--
Least Flycatcher	1	4	5	3.33	--	3.33	--	--	3.33	--
Hairy Woodpecker	3	4	1	2.67	--	--	--	--	--	--
Yellow-bellied Sapsucker	5	1	5	3.67	--	3.67	--	--	--	--
Red-bellied Woodpecker	3	1	1	1.67	--	1.67	--	--	--	--

					Successional Northern Hardwood			Successional Shrubland		
	Habitat Specificity	Trophic Level	Regulatory Status	Species Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Meadow Vole	1	2	1	1.33	--	--	--	--	1.33	--
White-footed Mouse	1	1	1	1.00	--	--	--	2.00	1.00	--
House Mouse	1	1	--	0.67	--	--	--	1.33	0.67	--
Norway Rat	1	1	--	0.67	--	--	--	--	0.67	--
Gray Squirrel	5	3	3	3.67	7.33	3.67	7.33	--	3.67	--
Muskrat	1	2	3	2.00	--	--	--	--	--	--
Raccoon	1	1	3	1.67	3.33	1.67	--	--	1.67	--
Cottontail Rabbit	1	2	3	2.00	4.00	2.00	--	4.00	2.00	--
Feral Dog	1	4	--	1.67	--	1.67	--	--	1.67	--
Feral Cat	1	4	--	1.67	--	--	--	--	1.67	--
Northern Water Snake	1	4	1	2.00	--	--	--	--	--	--
Northern Brown Snake	1	4	1	2.00	--	--	--	4.00	2.00	--
Green Frog	1	4	1	2.00	--	--	--	--	--	--
Fowler's Toad*	1	4	1	2.00	--	2.00	--	4.00	2.00	--
Eastern Garter Snake	1	4	1	2.00	--	--	--	4.00	2.00	--
Northern Diamond-backed Terrapin	5	1	1	2.33	--	--	--	--	--	--
Total Habitat Value					**64.00**	**124.00**	**18.00**	**48.00**	**118.67**	**0.00**

	Successional Old Field			Common Reed/ Mugwort			Mowed Lawn		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
American Black Duck	--	--	--	--	--	--	--	--	--
American Coot	--	--	--	--	--	--	--	--	--
American Crow	--	1.00	--	--	1.00	--	--	1.00	--
American Goldfinch	--	1.33	--	--	1.33	--	--	--	--
American Kestrel	--	3.33	--	--	3.33	--	--	--	--
American Redstart	--	2.00	--	--	2.00	--	--	--	--
American Robin	--	1.00	--	--	--	--	--	1.00	--
American Tree Sparrow	--	1.33	--	--	--	--	--	--	--
American Wigeon	--	--	--	--	--	--	--	--	--
American Woodcock	7.33	3.67	--	7.33	3.67	--	--	3.67	--
Bairds Sandpiper	--	--	--	--	--	--	--	--	--
Baltimore Oriole*	--	--	--	--	--	--	--	--	--
Barn Swallow	--	2.00	--	--	2.00	--	--	2.00	--
Belted Kingfisher	--	--	--	--	--	--	--	--	--
Black crowned Night Heron*	--	--	--	--	--	--	--	--	--
Black Skimmer*	--	--	--	--	--	--	--	--	--
Bobolink*	4.67	2.33	4.67	--	2.33	--	--	--	--
Brant	--	--	--	--	--	--	--	3.67	--
Brown Thrasher	2.00	1.00	--	--	1.00	--	--	--	--
Brown-headed Cowbird	2.00	1.00	--	2.00	1.00	--	--	1.00	--
Bufflehead	--	--	--	--	--	--	--	--	--
Canada Goose	2.67	--	--	--	--	--	--	1.33	--
Canvasback	--	--	--	--	--	--	--	--	--
Cedar Waxwing	--	--	--	--	--	--	--	--	--
Chimney Swift	--	2.00	--	--	2.00	--	--	2.00	--
Clapper Rail	--	--	--	--	--	--	--	--	--
Common Goldeneye	--	--	--	--	--	--	--	--	--
Common Tern	--	--	--	--	--	--	--	--	--
Common Yellowthroat	4.00	2.00	--	4.00	2.00	--	--	--	--
Cooper's Hawk*	--	4.00	--	--	4.00	--	--	--	--
Doubled-crested Cormorant	--	--	--	--	--	--	--	--	--
Downy Woodpecker	--	2.00	--	--	2.00	--	--	--	--
Eastern Kingbird	2.00	1.00	--	2.00	1.00	--	--	--	--
Eastern Meadowlark	--	1.00	2.00	--	1.00	--	--	--	--
Eastern Phoebe	--	--	--	--	--	--	--	--	--

	Successional Old Field			Common Reed/ Mugwort			Mowed Lawn		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Eastern Towhee	2.00	1.00	--	--	--	--	--	--	--
European Starling	--	1.33	--	--	--	--	--	1.33	--
Field Sparrow	2.00	1.00	--	--	--	--	--	--	--
Flycatcher sp.	--	--	--	--	--	--	--	--	--
Gadwall	--	--	--	--	--	--	--	--	--
Glossy Ibis	--	--	--	--	--	--	--	--	--
Golden-crowned Kinglet	--	2.67	--	--	--	--	--	--	--
Gray Catbird	--	1.00	--	--	1.00	--	--	--	--
Great Black-backed Gull	--	--	--	--	--	--	--	--	--
Great Blue Heron	--	--	--	--	--	--	--	--	--
Great Egret	--	--	--	--	--	--	--	--	--
Great Horned Owl	--	2.00	--	--	2.00	--	--	--	--
Greater Yellowlegs	--	--	--	--	--	--	--	--	--
Herring Gull	--	--	--	--	--	--	--	--	--
Hooded Merganser	--	--	--	--	--	--	--	--	--
Horned Grebe	--	--	--	--	--	--	--	--	--
Horned Lark	--	1.00	--	--	--	--	--	1.00	--
House Sparrow	--	--	--	--	0.67	--	--	0.67	--
House Wren	4.00	2.00	--	--	--	--	--	--	--
Killdeer	--	2.00	--	--	--	--	4.00	2.00	--
Laughing Gull	--	--	--	--	--	--	--	--	--
Lesser Yellowlegs	--	--	--	--	--	--	--	--	--
Long-eared owl*	--	4.00	--	--	4.00	--	--	--	--
Mallard	3.33	--	--	--	--	--	--	1.67	--
Marsh Wren*	--	--	--	--	--	--	--	--	--
Merlin	--	--	--	--	--	--	--	--	--
Mourning Dove	--	1.33	--	--	--	--	--	1.33	--
Northern Cardinal	--	1.33	--	--	--	--	--	--	--
Northern Flicker	--	--	--	--	--	--	--	1.67	--
Northern Harrier*	8.00	4.00	8.00	8.00	4.00	--	--	--	--
Northern Mockingbird	2.00	1.00	--	--	1.00	--	--	--	--
Osprey*	--	--	--	--	--	--	--	--	--
Pied-biled Grebe*	--	--	--	--	--	--	--	--	--
Red-breasted Merganser	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	--	2.00	--	--	2.00	--	--	--	--
Red-throated Loon	--	--	--	--	--	--	--	--	--
Red-winged Blackbird	2.00	1.00	--	2.00	1.00	--	--	--	--

	Successional Old Field			Common Reed/ Mugwort			Mowed Lawn		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Ring-billed Gull*	--	--	--	--	--	--	--	2.33	--
Ring-necked Pheasant	1.33	0.67	--	1.33	0.67	--	--	0.67	--
Rock Dove	--	--	--	--	--	--	--	1.00	--
Ruddy Duck	--	--	--	--	--	--	--	--	--
Savannah Sparrow*	4.67	2.33	4.67	4.67	2.33	--	--	--	--
Short-eared Owl *	8.00	4.00	8.00	--	4.00	--	--	--	--
Snowy Egret	--	--	--	--	--	--	--	--	--
Snowy Owl	--	2.67	--	--	2.67	--	--	--	--
Song Sparrow	2.00	1.00	--	2.00	1.00	--	--	--	--
Spotted Sandpiper	--	--	--	--	--	--	--	--	--
Tree swallow	--	3.33	--	--	--	--	--	3.33	--
White-throated Sparrow	--	1.00	--	--	1.00	--	--	--	--
Wild Turkey	4.67	2.33	--	--	--	--	--	--	--
Willow Flycatcher	--	2.00	--	--	2.00	--	--	--	--
Yellow crowned Night Heron*	--	--	--	--	--	--	--	--	--
Yellow Warbler	--	2.00	--	--	2.00	--	--	--	--
Peregrine Falcon*	--	--	--	--	--	--	--	--	--
Black-bellied Plover	--	--	--	--	--	--	--	--	--
Hermit Thrush	--	--	--	--	--	--	--	--	--
Palm Warbler	--	2.33	--	--	--	--	--	--	--
Yellow-rumped Warbler	--	1.67	--	--	1.67	--	--	--	--
Dark-eyed Junco	--	1.00	--	--	1.00	--	--	--	--
Least Tern*	--	--	--	--	--	--	--	--	--
Sharp-shinned Hawk	--	3.67	--	--	3.67	--	--	--	--
Barn Owl*	--	4.00	--	--	4.00	--	--	4.00	--
Ruby-Crowned Kinglet	--	--	--	--	--	--	--	--	--
Least Sandpiper	--	--	--	--	--	--	--	--	--
Wood Thrush*	--	--	--	--	--	--	--	--	--
Rough-legged Hawk	--	2.67	--	--	2.67	--	--	--	--
White-eyed vireo	--	--	--	--	--	--	--	--	--
Yellow-throated vireo	--	--	--	--	--	--	--	--	--
Warbling vireo	--	--	--	--	--	--	--	--	--
Rey-eyed vireo	--	--	--	--	--	--	--	--	--
Philadelphia vireo	--	--	--	--	--	--	--	--	--
Black & white warbler	--	2.67	--	--	--	--	--	2.67	--
Tennessee warbler	--	--	--	--	--	--	--	--	--

	Successional Old Field			Common Reed/ Mugwort			Mowed Lawn		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Nashville warbler	--	--	--	--	--	--	--	--	--
Northern Parula	--	3.33	--	--	--	--	--	3.33	--
Magnolia warbler	--	--	--	--	--	--	--	--	--
Cape May Warbler	--	--	--	--	--	--	--	3.33	--
Black-throated Blue Warbler	--	--	--	--	--	--	--	--	--
Chestnut-sided Warbler	--	--	--	--	--	--	--	--	--
Black-throated Green Warbler	--	--	--	--	--	--	--	--	--
Blackburnian Warbler	--	--	--	--	--	--	--	--	--
Bay-breasted Warbler	--	--	--	--	--	--	--	--	--
Blackpoll Warbler	--	--	--	--	--	--	--	--	--
Pine Warbler	--	--	--	--	--	--	--	--	--
Prairie Warbler*	--	--	--	--	--	--	--	--	--
Ovenbird	--	--	--	--	--	--	--	--	--
Northern Waterthrush	--	--	--	--	--	--	--	--	--
Louisiana Waterthrush	--	--	--	--	--	--	--	--	--
Yellow-breasted Chat	--	--	--	--	--	--	--	--	--
Wilson's Warbler	--	--	--	--	--	--	--	--	--
Canada Warbler *	--	--	--	--	--	--	--	--	--
Scarlet Tanager	--	--	--	--	--	--	--	--	--
Black-capped Chickadee	--	--	--	--	--	--	--	--	--
Tufted Titmouse	--	--	--	--	--	--	--	--	--
White-breasted Nuthatch	--	--	--	--	--	--	--	--	--
Red-breasted Nuthatch	--	--	--	--	--	--	--	--	--
Brown Creeper	--	--	--	--	--	--	--	--	--
Winter Wren	--	--	--	--	--	--	--	--	--
Carolina Wren	--	--	--	--	--	--	--	--	--
Blue-Gray Gnatcatcher	--	--	--	--	--	--	--	--	--
Veery	--	--	--	--	--	--	--	--	--
Gray-cheeked Thrush	--	--	--	--	--	--	--	--	--
Swainson's Thrush	--	--	--	--	--	--	--	--	--
Yellow-billed Cuckoo	--	--	--	--	--	--	--	--	--
Acadian Flycatcher	--	--	--	--	--	--	--	--	--
Least Flycatcher	--	--	--	--	--	--	--	--	--
Hairy Woodpecker	--	--	--	--	--	--	--	--	--
Yellow-bellied Sapsucker	--	--	--	--	--	--	--	--	--
Red-bellied Woodpecker	--	--	--	--	--	--	--	--	--

	Successional Old Field			Common Reed/ Mugwort			Mowed Lawn		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Meadow Vole	2.67	1.33	2.67	2.67	1.33	--	--	--	--
White-footed Mouse	2.00	1.00	--	2.00	1.00	--	--	--	--
House Mouse	1.33	0.67	--	--	--	--	--	--	--
Norway Rat	--	0.67	--	--	--	--	--	--	--
Gray Squirrel	--	--	--	--	--	--	--	--	--
Muskrat	--	--	--	--	--	--	--	--	--
Raccoon	--	--	--	--	--	--	--	--	--
Cottontail Rabbit	--	2.00	--	--	--	--	--	--	--
Feral Dog	--	1.67	--	--	--	--	--	--	--
Feral Cat	--	1.67	--	--	1.67	--	--	--	--
Northern Water Snake	--	--	--	--	--	--	--	--	--
Northern Brown Snake	4.00	2.00	--	--	--	--	--	--	--
Green Frog	--	--	--	--	--	--	--	--	--
Fowler's Toad*	--	--	--	--	2.00	--	--	--	--
Eastern Garter Snake	--	2.00	--	--	2.00	--	--	--	--
Northern Diamond-backed Terrapin	--	--	--	--	--	--	--	--	--
Total Habitat Value	**78.67**	**116.33**	**30.00**	**38.00**	**82.00**	**0.00**	**4.00**	**46.00**	**0.00**

	Floodplain Forest Wetland			Shrub Swamp			Shallow Emergent Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
American Black Duck	--	--	--	--	--	--	4.67	2.33	4.67
American Coot	--	--	--	--	--	--	--	--	--
American Crow	2.00	1.00	--	--	1.00	--	--	--	--
American Goldfinch	--	--	--	2.67	1.33	--	--	1.33	--
American Kestrel	--	--	--	--	--	--	--	3.33	--
American Redstart	--	--	--	--	2.00	--	--	--	--
American Robin	2.00	1.00	--	2.00	1.00	--	--	--	--
American Tree Sparrow	--	--	--	--	1.33	--	--	--	--
American Wigeon	--	--	--	--	--	--	--	2.33	4.67
American Woodcock	--	--	--	7.33	3.67	--	--	3.67	--
Bairds Sandpiper	--	--	--	--	--	--	--	2.67	5.33
Baltimore Oriole*	4.67	2.33	--	--	--	--	--	--	--
Barn Swallow	--	--	--	--	--	--	--	2.00	--
Belted Kingfisher	--	--	--	--	--	--	--	--	--
Black crowned Night Heron*	--	--	--	--	--	--	--	--	--
Black Skimmer*	--	--	--	--	--	--	--	--	--
Bobolink*	--	--	--	--	--	--	4.67	2.33	4.67
Brant	--	--	--	--	--	--	--	3.67	--
Brown Thrasher	--	--	--	--	1.00	--	--	--	--
Brown-headed Cowbird	2.00	--	--	2.00	--	--	--	--	--
Bufflehead	--	--	--	--	--	--	--	--	--
Canada Goose	--	--	--	--	--	--	2.67	1.33	--
Canvasback	--	--	--	--	--	--	--	--	--
Cedar Waxwing	--	1.67	--	--	1.67	--	--	--	--
Chimney Swift	--	--	--	--	2.00	--	--	2.00	--
Clapper Rail	--	--	--	--	--	--	--	1.67	3.33
Common Goldeneye	--	--	--	--	--	--	--	--	--
Common Tern	--	--	--	--	--	--	--	--	--
Common Yellowthroat	--	--	--	4.00	2.00	--	4.00	2.00	--
Cooper's Hawk*	8.00	4.00	--	--	4.00	--	--	4.00	--
Doubled-crested Cormorant	--	--	--	--	--	--	--	--	--
Downy Woodpecker	4.00	2.00	--	--	2.00	--	--	2.00	--
Eastern Kingbird	--	--	--	--	--	--	--	--	--
Eastern Meadowlark	--	--	--	--	--	--	--	1.00	--
Eastern Phoebe	--	2.00	--	--	--	--	--	2.00	--

	Floodplain Forest Wetland			Shrub Swamp			Shallow Emergent Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Eastern Towhee	--	1.00	--	--	1.00	--	--	--	--
European Starling	2.67	--	--	--	--	--	--	--	--
Field Sparrow	--	--	--	--	--	--	--	--	--
Flycatcher sp.	--	--	--	--	--	--	--	--	--
Gadwall	--	--	--	--	--	--	--	2.33	--
Glossy Ibis	--	--	--	--	--	--	--	4.33	8.67
Golden-crowned Kinglet	--	2.67	--	--	2.67	--	--	--	--
Gray Catbird	--	--	--	2.00	1.00	--	--	--	--
Great Black-backed Gull	--	--	--	--	--	--	--	--	--
Great Blue Heron	6.67	--	--	--	--	--	--	3.33	6.67
Great Egret	--	--	--	--	--	--	--	3.33	6.67
Great Horned Owl	4.00	2.00	--	--	--	--	--	2.00	--
Greater Yellowlegs	--	--	--	--	--	--	--	2.67	5.33
Herring Gull	--	--	--	--	--	--	--	--	--
Hooded Merganser	--	--	--	--	--	--	--	--	--
Horned Grebe	--	--	--	--	--	--	--	--	--
Horned Lark	--	--	--	--	--	--	--	--	--
House Sparrow	--	--	--	--	--	--	--	--	--
House Wren	--	--	--	--	--	--	--	--	--
Killdeer	--	--	--	--	--	--	--	2.00	4.00
Laughing Gull	--	--	--	--	--	--	--	--	--
Lesser Yellowlegs	--	--	--	--	--	--	--	2.67	5.33
Long-eared owl*	--	4.00	--	--	--	--	--	--	--
Mallard	--	--	--	--	--	--	--	1.67	3.33
Marsh Wren*	--	--	--	--	--	--	5.33	2.67	5.33
Merlin	--	2.67	--	--	--	--	--	--	--
Mourning Dove	--	--	--	2.67	--	--	--	--	--
Northern Cardinal	--	1.33	--	--	1.33	--	--	--	--
Northern Flicker	3.33	1.67	--	--	--	--	--	--	--
Northern Harrier*	--	--	--	--	--	--	--	4.00	--
Northern Mockingbird	--	--	--	2.00	1.00	--	--	1.00	--
Osprey*	--	--	--	--	--	--	--	--	--
Pied-biled Grebe*	--	--	--	--	--	--	--	--	--
Red-breasted Merganser	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	4.00	--	--	--	2.00	--	--	2.00	--
Red-throated Loon	--	--	--	--	--	--	--	--	--
Red-winged Blackbird	--	--	--	2.00	1.00	--	2.00	1.00	--

	Floodplain Forest Wetland			Shrub Swamp			Shallow Emergent Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Ring-billed Gull*	--	--	--	--	--	--	--	--	--
Ring-necked Pheasant	--	--	--	--	0.67	--	--	--	--
Rock Dove	--	--	--	--	--	--	--	--	--
Ruddy Duck	--	--	--	--	--	--	--	--	--
Savannah Sparrow*	--	--	--	--	2.33	--	--	2.33	--
Short-eared Owl *	--	--	--	--	--	--	--	4.00	--
Snowy Egret	--	--	--	--	--	--	--	2.67	--
Snowy Owl	--	--	--	--	--	--	--	--	--
Song Sparrow	--	--	--	--	--	--	--	1.00	--
Spotted Sandpiper	--	--	--	--	--	--	--	3.67	7.33
Tree swallow	--	--	--	--	3.33	--	--	3.33	--
White-throated Sparrow	--	--	--	--	1.00	--	--	--	--
Wild Turkey	4.67	2.33	--	--	2.33	--	--	--	--
Willow Flycatcher	--	--	--	--	2.00	--	--	2.00	--
Yellow crowned Night Heron*	--	--	--	--	--	--	--	--	--
Yellow Warbler	--	--	--	4.00	2.00	--	--	--	--
Peregrine Falcon*	--	--	--	--	--	--	--	--	--
Black-bellied Plover	--	--	--	--	--	--	--	2.67	5.33
Hermit Thrush	--	1.67	3.33	--	--	--	--	--	--
Palm Warbler	--	--	--	--	--	--	--	2.33	--
Yellow-rumped Warbler	--	1.67	--	--	1.67	--	--	--	--
Dark-eyed Junco	--	--	--	--	--	--	--	--	--
Least Tern*	--	--	--	--	--	--	--	--	--
Sharp-shinned Hawk	7.33	3.67	--	--	3.67	--	--	3.67	--
Barn Owl*	--	--	--	--	--	--	--	4.00	--
Ruby-Crowned Kinglet	--	1.67	--	--	1.67	--	--	--	--
Least Sandpiper	--	--	--	--	--	--	--	2.67	5.33
Wood Thrush*	--	3.00	6.00	--	--	--	--	--	--
Rough-legged Hawk	--	--	--	--	--	--	--	--	--
White-eyed vireo	--	--	--	--	2.00	--	--	--	--
Yellow-throated vireo	--	2.67	--	--	--	--	--	--	--
Warbling vireo	--	2.00	--	--	--	--	--	--	--
Rey-eyed vireo	--	2.00	--	--	--	--	--	--	--
Philadelphia vireo	--	--	--	--	--	--	--	--	--
Black & white warbler	--	2.67	--	--	2.67	--	--	--	--
Tennessee warbler	--	2.00	--	--	2.00	--	--	--	--

	Floodplain Forest Wetland			Shrub Swamp			Shallow Emergent Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Nashville warbler	--	2.00	--	--	2.00	--	--	--	--
Northern Parula	--	3.33	--	--	3.33	--	--	--	--
Magnolia warbler	--	2.00	--	--	2.00	--	--	--	--
Cape May Warbler	--	3.33	--	--	3.33	--	--	--	--
Black-throated Blue Warbler	--	2.67	--	--	--	--	--	--	--
Chestnut-sided Warbler	--	--	--	--	--	--	--	--	--
Black-throated Green Warbler	--	2.67	--	--	--	--	--	--	--
Blackburnian Warbler	--	3.33	--	--	--	--	--	--	--
Bay-breasted Warbler	--	2.67	--	--	--	--	--	--	--
Blackpoll Warbler	--	2.67	--	--	--	--	--	--	--
Pine Warbler	--	2.67	--	--	2.67	--	--	--	--
Prairie Warbler*	--	--	--	--	--	--	--	--	--
Ovenbird	--	2.67	5.33	--	--	--	--	--	--
Northern Waterthrush	--	2.67	5.33	--	2.67	--	--	--	--
Louisiana Waterthrush	--	2.67	5.33	--	--	--	--	--	--
Yellow-breasted Chat	--	--	--	--	1.67	--	--	--	--
Wilson's Warbler	--	--	--	--	2.67	5.33	--	--	--
Canada Warbler *	--	2.00	4.00	--	--	--	--	--	--
Scarlet Tanager	--	--	--	--	--	--	--	--	--
Black-capped Chickadee	--	--	--	--	--	--	--	--	--
Tufted Titmouse	3.33	1.67	--	--	--	--	--	--	--
White-breasted Nuthatch	4.67	2.33	--	--	--	--	--	--	--
Red-breasted Nuthatch	--	--	--	--	--	--	--	--	--
Brown Creeper	--	--	--	--	--	--	--	--	--
Winter Wren	--	2.67	--	--	--	--	--	--	--
Carolina Wren	4.00	2.00	--	4.00	2.00	--	--	--	--
Blue-Gray Gnatcatcher	--	2.67	--	--	2.67	--	--	--	--
Veery	--	1.67	3.33	--	1.67	--	--	--	--
Gray-cheeked Thrush	--	--	--	--	--	--	--	--	--
Swainson's Thrush	--	--	--	--	1.67	--	--	--	--
Yellow-billed Cuckoo	2.00	1.00	--	2.00	1.00	--	--	--	--
Acadian Flycatcher	--	2.67	5.33	--	--	--	--	--	--
Least Flycatcher	--	--	--	--	--	--	--	--	--
Hairy Woodpecker	5.33	2.67	--	--	--	--	--	--	--
Yellow-bellied Sapsucker	--	--	--	--	--	--	--	--	--
Red-bellied Woodpecker	3.33	1.67	--	--	--	--	--	--	--

	Floodplain Forest Wetland			Shrub Swamp			Shallow Emergent Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Meadow Vole	--	--	--	2.67	1.33	--	2.67	1.33	--
White-footed Mouse	--	--	--	2.00	1.00	--	--	--	--
House Mouse	--	--	--	--	--	--	--	--	--
Norway Rat	--	--	--	--	--	--	--	--	--
Gray Squirrel	7.33	3.67	--	--	--	--	--	--	--
Muskrat	--	--	--	--	--	--	--	2.00	--
Raccoon	3.33	1.67	--	--	--	--	--	1.67	--
Cottontail Rabbit	4.00	2.00	--	--	2.00	--	--	--	--
Feral Dog	--	1.67	--	--	1.67	--	--	--	--
Feral Cat	--	--	--	--	1.67	--	--	--	--
Northern Water Snake	--	--	--	--	--	--	--	2.00	--
Northern Brown Snake	--	--	--	4.00	2.00	--	--	2.00	--
Green Frog	--	--	--	--	--	--	--	--	--
Fowler's Toad*	--	2.00	--	--	--	--	4.00	2.00	4.00
Eastern Garter Snake	--	--	--	4.00	2.00	--	--	2.00	--
Northern Diamond-backed Terrapin	--	--	--	--	--	--	--	--	--
Total Habitat Value	**92.67**	**124.00**	**38.00**	**49.33**	**101.33**	**5.33**	**30.00**	**122.00**	**90.00**

	Deep Emergent Marsh			Common Reed-Dominated Wetland			Maritime Forest		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
American Black Duck	4.67	2.33	4.67	--	--	--	--	--	--
American Coot	--	2.00	--	--	--	--	--	--	--
American Crow	--	--	--	--	--	--	2.00	1.00	--
American Goldfinch	--	1.33	--	--	1.33	--	2.67	1.33	--
American Kestrel	--	3.33	--	--	3.33	--	--	--	--
American Redstart	--	--	--	--	--	--	--	--	--
American Robin	--	--	--	--	--	--	2.00	1.00	--
American Tree Sparrow	--	--	--	--	1.33	--	--	--	--
American Wigeon	--	2.33	4.67	--	--	--	--	--	--
American Woodcock	--	--	--	--	3.67	--	7.33	3.67	--
Bairds Sandpiper	--	--	--	--	--	--	--	--	--
Baltimore Oriole*	--	--	--	--	--	--	4.67	2.33	--
Barn Swallow	--	2.00	--	--	2.00	--	--	--	--
Belted Kingfisher	--	3.67	7.33	--	--	--	--	--	--
Black crowned Night Heron*	--	3.33	6.67	--	--	--	--	--	--
Black Skimmer*	--	--	--	--	--	--	--	--	--
Bobolink*	--	--	--	4.67	2.33	--	--	--	--
Brant	--	3.67	7.33	--	--	--	--	--	--
Brown Thrasher	--	--	--	--	--	--	--	--	--
Brown-headed Cowbird	--	--	--	--	--	--	2.00	--	--
Bufflehead	--	3.33	6.67	--	--	--	--	--	--
Canada Goose	--	1.33	--	--	--	--	--	--	--
Canvasback	--	3.67	7.33	--	--	--	--	--	--
Cedar Waxwing	--	--	--	--	--	--	--	1.67	--
Chimney Swift	--	2.00	--	--	2.00	--	--	--	--
Clapper Rail	--	--	--	--	--	--	--	--	--
Common Goldeneye	--	3.00	6.00	--	--	--	--	--	--
Common Tern	--	2.67	5.33	--	--	--	--	--	--
Common Yellowthroat	--	--	--	4.00	2.00	--	--	--	--
Cooper's Hawk*	--	4.00	--	--	4.00	--	8.00	4.00	--
Doubled-crested Cormorant	--	2.33	4.67	--	--	--	--	--	--
Downy Woodpecker	--	--	--	--	2.00	--	4.00	2.00	--
Eastern Kingbird	--	--	--	--	--	--	--	--	--
Eastern Meadowlark	--	--	--	--	1.00	--	--	--	--
Eastern Phoebe	--	--	--	--	2.00	--	--	2.00	--

	Deep Emergent Marsh			Common Reed-Dominated Wetland			Maritime Forest		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Eastern Towhee	--	--	--	--	--	--	--	1.00	--
European Starling	--	--	--	--	--	--	2.67	1.33	--
Field Sparrow	--	--	--	--	--	--	--	--	--
Flycatcher sp.	--	--	--	--	--	--	--	--	--
Gadwall	--	2.33	4.67	--	--	--	--	--	--
Glossy Ibis	--	--	--	--	--	--	--	--	--
Golden-crowned Kinglet	--	--	--	--	--	--	--	2.67	--
Gray Catbird	--	--	--	--	--	--	--	--	--
Great Black-backed Gull	--	1.00	--	--	--	--	--	--	--
Great Blue Heron	--	3.33	6.67	--	--	--	6.67	--	--
Great Egret	--	3.33	6.67	--	--	--	--	--	--
Great Horned Owl	--	2.00	--	--	2.00	--	4.00	2.00	--
Greater Yellowlegs	--	--	--	--	--	--	--	--	--
Herring Gull	--	1.00	--	--	--	--	--	--	--
Hooded Merganser	--	4.00	8.00	--	--	--	--	--	--
Horned Grebe	--	2.00	4.00	--	--	--	--	--	--
Horned Lark	--	--	--	--	--	--	--	--	--
House Sparrow	--	--	--	--	--	--	--	--	--
House Wren	--	--	--	--	--	--	--	--	--
Killdeer	--	--	--	--	2.00	--	--	--	--
Laughing Gull	--	2.00	--	--	--	--	--	--	--
Lesser Yellowlegs	--	--	--	--	--	--	--	--	--
Long-eared owl*	--	--	--	--	--	--	8.00	4.00	--
Mallard	--	1.67	3.33	--	--	--	--	--	--
Marsh Wren*	--	--	--	5.33	2.67	--	--	--	--
Merlin	--	--	--	--	--	--	--	2.67	--
Mourning Dove	--	--	--	--	--	--	--	--	--
Northern Cardinal	--	--	--	--	--	--	--	1.33	--
Northern Flicker	--	--	--	--	--	--	3.33	1.67	--
Northern Harrier*	--	4.00	--	--	4.00	--	--	--	--
Northern Mockingbird	--	1.00	--	--	1.00	--	--	--	--
Osprey*	--	5.00	1--	--	--	--	--	--	--
Pied-biled Grebe*	--	3.33	6.67	--	--	--	--	--	--
Red-breasted Merganser	--	3.33	6.67	--	--	--	--	--	--
Red-tailed Hawk	--	--	--	--	2.00	--	4.00	--	--
Red-throated Loon	--	3.00	6.00	--	--	--	--	--	--
Red-winged Blackbird	2.00	1.00	--	2.00	1.00	--	--	--	--

	Deep Emergent Marsh			Common Reed-Dominated Wetland			Maritime Forest		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Ring-billed Gull*	--	2.33	--	--	--	--	--	--	--
Ring-necked Pheasant	--	--	--	--	--	--	--	--	--
Rock Dove	--	--	--	--	--	--	--	--	--
Ruddy Duck	--	2.67	5.33	--	--	--	--	--	--
Savannah Sparrow*	--	--	--	--	2.33	--	--	--	--
Short-eared Owl *	--	--	--	--	4.00	--	--	--	--
Snowy Egret	--	2.67	5.33	--	--	--	--	--	--
Snowy Owl	--	--	--	--	--	--	--	--	--
Song Sparrow	--	--	--	--	1.00	--	--	--	--
Spotted Sandpiper	--	3.67	--	--	--	--	--	--	--
Tree swallow	--	3.33	--	--	3.33	--	--	--	--
White-throated Sparrow	--	--	--	--	--	--	--	--	--
Wild Turkey	--	--	--	--	--	--	4.67	2.33	--
Willow Flycatcher	--	2.00	--	--	2.00	--	--	--	--
Yellow crowned Night Heron*	--	4.67	9.33	--	--	--	--	--	--
Yellow Warbler	--	--	--	--	--	--	--	--	--
Peregrine Falcon*	--	--	--	--	--	--	--	--	--
Black-bellied Plover	--	--	--	--	--	--	--	--	--
Hermit Thrush	--	--	--	--	--	--	--	1.67	3.33
Palm Warbler	--	--	--	--	2.33	--	--	--	--
Yellow-rumped Warbler	--	--	--	--	--	--	--	1.67	--
Dark-eyed Junco	--	--	--	--	--	--	--	1.00	--
Least Tern*	--	4.00	8.00	--	--	--	--	--	--
Sharp-shinned Hawk	--	--	--	--	--	--	7.33	3.67	--
Barn Owl*	--	--	--	--	--	--	--	--	--
Ruby-Crowned Kinglet	--	--	--	--	--	--	--	1.67	--
Least Sandpiper	--	--	--	--	--	--	--	--	--
Wood Thrush*	--	--	--	--	--	--	--	3.00	--
Rough-legged Hawk	--	--	--	--	--	--	--	--	--
White-eyed vireo	--	--	--	--	--	--	--	--	--
Yellow-throated vireo	--	--	--	--	--	--	--	2.67	--
Warbling vireo	--	--	--	--	--	--	--	2.00	--
Rey-eyed vireo	--	--	--	--	--	--	--	2.00	--
Philadelphia vireo	--	--	--	--	--	--	--	2.00	--
Black & white warbler	--	--	--	--	--	--	--	2.67	--
Tennessee warbler	--	--	--	--	--	--	--	2.00	--

	Deep Emergent Marsh			Common Reed-Dominated Wetland			Maritime Forest		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Nashville warbler	--	--	--	--	--	--	--	2.00	--
Northern Parula	--	--	--	--	--	--	--	3.33	--
Magnolia warbler	--	--	--	--	--	--	--	2.00	--
Cape May Warbler	--	--	--	--	--	--	--	3.33	--
Black-throated Blue Warbler	--	--	--	--	--	--	--	2.67	--
Chestnut-sided Warbler	--	--	--	--	--	--	--	--	--
Black-throated Green Warbler	--	--	--	--	--	--	--	2.67	--
Blackburnian Warbler	--	--	--	--	--	--	--	3.33	--
Bay-breasted Warbler	--	--	--	--	--	--	--	2.67	--
Blackpoll Warbler	--	--	--	--	--	--	--	2.67	--
Pine Warbler	--	--	--	--	--	--	--	2.67	--
Prairie Warbler*	--	--	--	--	--	--	--	--	--
Ovenbird	--	--	--	--	--	--	--	2.67	5.33
Northern Waterthrush	--	--	--	--	--	--	--	2.67	--
Louisiana Waterthrush	--	--	--	--	--	--	--	--	--
Yellow-breasted Chat	--	--	--	--	--	--	--	--	--
Wilson's Warbler	--	--	--	--	--	--	--	--	--
Canada Warbler *	--	--	--	--	--	--	--	--	--
Scarlet Tanager	--	--	--	--	--	--	--	1.00	2.00
Black-capped Chickadee	--	--	--	--	--	--	2.00	1.00	--
Tufted Titmouse	--	--	--	--	--	--	3.33	1.67	--
White-breasted Nuthatch	--	--	--	--	--	--	4.67	2.33	--
Red-breasted Nuthatch	--	--	--	--	--	--	--	2.33	--
Brown Creeper	--	--	--	--	--	--	--	3.33	--
Winter Wren	--	--	--	--	--	--	5.33	2.67	--
Carolina Wren	--	--	--	--	--	--	4.00	2.00	--
Blue-Gray Gnatcatcher	--	--	--	--	--	--	--	2.67	--
Veery	--	--	--	--	--	--	--	1.67	--
Gray-cheeked Thrush	--	--	--	--	--	--	--	1.67	3.33
Swainson's Thrush	--	--	--	--	--	--	--	--	3.33
Yellow-billed Cuckoo	--	--	--	--	--	--	--	--	--
Acadian Flycatcher	--	--	--	--	--	--	--	--	--
Least Flycatcher	--	--	--	--	--	--	--	--	--
Hairy Woodpecker	--	--	--	--	--	--	5.33	2.67	--
Yellow-bellied Sapsucker	--	--	--	--	--	--	--	3.67	--
Red-bellied Woodpecker	--	--	--	--	--	--	3.33	1.67	--

	Deep Emergent Marsh			Common Reed-Dominated Wetland			Maritime Forest		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Meadow Vole	2.67	1.33	--	2.67	1.33	--	--	--	--
White-footed Mouse	--	--	--	--	--	--	--	--	--
House Mouse	--	--	--	--	--	--	--	--	--
Norway Rat	--	--	--	--	--	--	--	--	--
Gray Squirrel	--	--	--	--	--	--	7.33	3.67	--
Muskrat	--	2.00	4.00	--	2.00	--	--	--	--
Raccoon	--	1.67	--	--	1.67	--	3.33	1.67	--
Cottontail Rabbit	--	--	--	--	--	--	4.00	2.00	--
Feral Dog	--	--	--	--	--	--	--	1.67	--
Feral Cat	--	--	--	--	--	--	--	--	--
Northern Water Snake	--	2.00	--	--	2.00	--	--	--	--
Northern Brown Snake	--	2.00	--	--	2.00	--	--	--	--
Green Frog	4.00	2.00	4.00	--	--	--	--	--	--
Fowler's Toad*	4.00	2.00	--	4.00	2.00	--	--	2.00	--
Eastern Garter Snake	--	2.00	--	--	2.00	--	--	--	--
Northern Diamond-backed Terrapin	--	--	--	--	--	--	--	--	--
Total Habitat Value	**17.33**	**130.00**	**159.33**	**22.67**	**69.67**	**0.00**	**116.00**	**138.00**	**17.33**

	Maritime Shrubland			Maritime Grassland			Salt Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
American Black Duck	--	--	--	--	--	--	4.67	2.33	4.67
American Coot	--	--	--	--	--	--	--	2.00	4.00
American Crow	--	1.00	--	--	1.00	--	--	1.00	--
American Goldfinch	2.67	1.33	--	--	1.33	--	--	--	--
American Kestrel	--	--	--	--	3.33	--	--	3.33	--
American Redstart	--	2.00	--	--	2.00	--	--	--	--
American Robin	2.00	1.00	--	--	1.00	--	--	--	--
American Tree Sparrow	--	1.33	--	--	1.33	--	--	--	--
American Wigeon	--	--	--	--	--	--	--	2.33	4.67
American Woodcock	7.33	3.67	--	7.33	3.67	--	--	--	--
Bairds Sandpiper	--	--	--	--	--	--	--	2.67	5.33
Baltimore Oriole*	--	--	--	--	--	--	--	--	--
Barn Swallow	--	--	--	--	2.00	--	--	2.00	4.00
Belted Kingfisher	--	--	--	--	--	--	7.33	3.67	7.33
Black crowned Night Heron*	--	--	--	--	--	--	6.67	3.33	6.67
Black Skimmer*	--	--	--	--	--	--	9.33	4.67	9.33
Bobolink*	--	--	--	4.67	2.33	4.67	--	--	--
Brant	--	--	--	--	--	--	--	3.67	--
Brown Thrasher	--	1.00	--	2.00	1.00	--	--	1.00	2.00
Brown-headed Cowbird	2.00	--	--	2.00	1.00	--	--	--	--
Bufflehead	--	--	--	--	--	--	--	3.33	6.67
Canada Goose	--	--	--	2.67	--	--	2.67	1.33	2.67
Canvasback	--	--	--	--	--	--	--	3.67	--
Cedar Waxwing	--	1.67	--	--	--	--	--	--	--
Chimney Swift	--	2.00	--	--	2.00	--	--	2.00	--
Clapper Rail	--	--	--	--	--	--	3.33	1.67	3.33
Common Goldeneye	--	--	--	--	--	--	--	3.00	6.00
Common Tern	--	--	--	--	--	--	--	2.67	5.33
Common Yellowthroat	4.00	2.00	--	4.00	2.00	--	--	--	--
Cooper's Hawk*	--	4.00	--	--	4.00	--	--	4.00	--
Doubled-crested Cormorant	--	--	--	--	--	--	--	2.33	4.67
Downy Woodpecker	--	2.00	--	--	--	--	--	--	--
Eastern Kingbird	--	--	--	2.00	1.00	--	--	1.00	--
Eastern Meadowlark	--	--	--	--	1.00	2.00	--	--	--
Eastern Phoebe	--	--	--	--	2.00	--	--	--	--

	Maritime Shrubland			Maritime Grassland			Salt Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Eastern Towhee	--	1.00	--	2.00	1.00	--	--	--	--
European Starling	--	--	--	--	1.33	--	--	1.33	--
Field Sparrow	--	--	--	2.00	1.00	--	--	--	--
Flycatcher sp.	--	--	--	--	--	--	--	--	--
Gadwall	--	--	--	--	--	--	--	2.33	--
Glossy Ibis	--	--	--	--	--	--	8.67	4.33	8.67
Golden-crowned Kinglet	--	2.67	--	--	2.67	--	--	--	--
Gray Catbird	2.00	1.00	--	--	1.00	--	--	--	--
Great Black-backed Gull	--	--	--	--	--	--	--	1.00	2.00
Great Blue Heron	--	--	--	--	--	--	--	3.33	6.67
Great Egret	--	--	--	--	--	--	--	3.33	6.67
Great Horned Owl	--	--	--	--	2.00	--	--	2.00	--
Greater Yellowlegs	--	--	--	--	--	--	--	2.67	5.33
Herring Gull	--	--	--	--	--	--	--	1.00	2.00
Hooded Merganser	--	--	--	--	--	--	--	4.00	8.00
Horned Grebe	--	--	--	--	--	--	--	2.00	--
Horned Lark	--	--	--	--	1.00	--	--	--	--
House Sparrow	--	--	--	--	--	--	--	--	--
House Wren	--	--	--	4.00	2.00	--	--	--	--
Killdeer	--	--	--	--	2.00	--	--	2.00	--
Laughing Gull	--	--	--	--	--	--	--	2.00	4.00
Lesser Yellowlegs	--	--	--	--	--	--	--	2.67	5.33
Long-eared owl*	--	--	--	--	4.00	--	--	--	--
Mallard	--	--	--	3.33	--	--	3.33	1.67	3.33
Marsh Wren*	--	--	--	--	--	--	5.33	2.67	5.33
Merlin	--	--	--	--	2.67	--	--	2.67	--
Mourning Dove	2.67	--	--	--	1.33	--	--	1.33	--
Northern Cardinal	--	1.33	--	--	1.33	--	--	--	--
Northern Flicker	--	--	--	--	--	--	--	--	--
Northern Harrier*	--	--	--	8.00	4.00	8.00	8.00	4.00	--
Northern Mockingbird	2.00	1.00	--	2.00	1.00	--	--	--	--
Osprey*	--	--	--	--	--	--	--	5.00	1--
Pied-biled Grebe*	--	--	--	--	--	--	6.67	3.33	6.67
Red-breasted Merganser	--	--	--	--	--	--	--	3.33	6.67
Red-tailed Hawk	--	2.00	--	--	2.00	--	--	2.00	4.00
Red-throated Loon	--	--	--	--	--	--	--	3.00	6.00
Red-winged Blackbird	2.00	1.00	--	2.00	1.00	--	--	--	--

	Maritime Shrubland			Maritime Grassland			Salt Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Ring-billed Gull*	--	--	--	--	--	--	--	2.33	4.67
Ring-necked Pheasant	--	0.67	--	1.33	0.67	--	--	0.67	1.33
Rock Dove	--	--	--	--	--	--	--	1.00	--
Ruddy Duck	--	--	--	--	--	--	--	2.67	5.33
Savannah Sparrow*	--	2.33	--	4.67	2.33	4.67	--	2.33	--
Short-eared Owl *	--	--	--	8.00	4.00	8.00	--	4.00	--
Snowy Egret	--	--	--	--	--	--	--	2.67	5.33
Snowy Owl	--	2.67	--	--	2.67	--	--	2.67	--
Song Sparrow	2.00	1.00	--	2.00	1.00	--	--	1.00	--
Spotted Sandpiper	--	--	--	--	--	--	--	3.67	7.33
Tree swallow	--	3.33	--	--	3.33	--	--	3.33	--
White-throated Sparrow	--	1.00	--	--	1.00	--	--	--	--
Wild Turkey	--	2.33	--	4.67	2.33	--	--	--	--
Willow Flycatcher	--	2.00	--	--	2.00	4.00	--	--	--
Yellow crowned Night Heron*	--	--	--	--	--	--	--	4.67	9.33
Yellow Warbler	4.00	2.00	--	--	2.00	--	--	--	--
Peregrine Falcon*	--	--	--	--	--	--	--	4.67	--
Black-bellied Plover	--	--	--	--	--	--	--	2.67	5.33
Hermit Thrush	--	--	--	--	--	--	--	--	--
Palm Warbler	--	2.33	--	--	2.33	--	--	2.33	--
Yellow-rumped Warbler	--	1.67	--	--	1.67	--	--	--	--
Dark-eyed Junco	--	1.00	--	--	1.00	--	--	--	--
Least Tern*	--	--	--	--	--	--	--	4.00	8.00
Sharp-shinned Hawk	--	3.67	--	--	--	--	--	3.67	--
Barn Owl*	--	--	--	--	4.00	--	--	4.00	--
Ruby-Crowned Kinglet	--	1.67	--	--	--	--	--	--	--
Least Sandpiper	--	--	--	--	--	--	--	2.67	5.33
Wood Thrush*	--	--	--	--	--	--	--	--	--
Rough-legged Hawk	--	--	--	--	2.67	--	--	--	--
White-eyed vireo	--	2.00	--	--	--	--	--	--	--
Yellow-throated vireo	--	--	--	--	--	--	--	--	--
Warbling vireo	--	--	--	--	--	--	--	--	--
Rey-eyed vireo	--	--	--	--	--	--	--	--	--
Philadelphia vireo	--	2.00	--	--	--	--	--	--	--
Black & white warbler	--	2.67	--	--	2.67	--	--	--	--
Tennessee warbler	--	2.00	--	--	--	--	--	--	--

	Maritime Shrubland			Maritime Grassland			Salt Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Nashville warbler	--	2.00	--	--	--	--	--	--	--
Northern Parula	--	3.33	--	--	3.33	--	--	--	--
Magnolia warbler	--	2.00	--	--	--	--	--	--	--
Cape May Warbler	--	3.33	--	--	--	--	--	--	--
Black-throated Blue Warbler	--	--	--	--	--	--	--	--	--
Chestnut-sided Warbler	--	2.00	--	--	--	--	--	--	--
Black-throated Green Warbler	--	--	--	--	--	--	--	--	--
Blackburnian Warbler	--	--	--	--	--	--	--	--	--
Bay-breasted Warbler	--	--	--	--	--	--	--	--	--
Blackpoll Warbler	--	--	--	--	--	--	--	--	--
Pine Warbler	--	2.67	--	--	--	--	--	--	--
Prairie Warbler*	--	2.00	--	--	--	--	--	--	--
Ovenbird	--	--	--	--	--	--	--	--	--
Northern Waterthrush	--	--	--	--	--	--	--	--	--
Louisiana Waterthrush	--	--	--	--	--	--	--	--	--
Yellow-breasted Chat	--	--	--	--	--	--	--	--	--
Wilson's Warbler	--	--	--	--	--	--	--	--	--
Canada Warbler *	--	--	--	--	--	--	--	--	--
Scarlet Tanager	--	--	--	--	--	--	--	--	--
Black-capped Chickadee	--	--	--	--	--	--	--	--	--
Tufted Titmouse	--	--	--	--	--	--	--	--	--
White-breasted Nuthatch	--	--	--	--	--	--	--	--	--
Red-breasted Nuthatch	--	--	--	--	--	--	--	--	--
Brown Creeper	--	--	--	--	--	--	--	--	--
Winter Wren	--	--	--	--	--	--	--	--	--
Carolina Wren	4.00	2.00	--	--	--	--	--	--	--
Blue-Gray Gnatcatcher	--	--	--	--	--	--	--	--	--
Veery	--	--	--	--	--	--	--	--	--
Gray-cheeked Thrush	--	--	--	--	--	--	--	--	--
Swainson's Thrush	--	--	--	--	--	--	--	--	--
Yellow-billed Cuckoo	--	--	--	--	--	--	--	--	--
Acadian Flycatcher	--	--	--	--	--	--	--	--	--
Least Flycatcher	--	--	--	--	--	--	--	--	--
Hairy Woodpecker	--	--	--	--	--	--	--	--	--
Yellow-bellied Sapsucker	--	--	--	--	--	--	--	--	--
Red-bellied Woodpecker	--	--	--	--	--	--	--	--	--

	Maritime Shrubland			Maritime Grassland			Salt Marsh		
	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value	Breeding Value	Foraging Value	Habitat Dependency Value
Meadow Vole	2.67	1.33	--	2.67	1.33	2.67	2.67	1.33	--
White-footed Mouse	2.00	1.00	--	2.00	1.00	--	--	--	--
House Mouse	--	--	--	1.33	0.67	--	--	--	--
Norway Rat	--	--	--	--	0.67	--	--	0.67	--
Gray Squirrel	--	--	--	--	--	--	--	--	--
Muskrat	--	--	--	--	--	--	4.00	2.00	4.00
Raccoon	--	--	--	--	--	--	--	1.67	--
Cottontail Rabbit	--	2.00	--	--	2.00	--	--	--	--
Feral Dog	--	1.67	--	--	1.67	--	--	--	--
Feral Cat	--	1.67	--	--	1.67	--	--	1.67	--
Northern Water Snake	--	--	--	--	--	--	--	2.00	--
Northern Brown Snake	4.00	2.00	--	4.00	2.00	--	--	2.00	--
Green Frog	--	--	--	--	--	--	--	--	--
Fowler's Toad*	--	--	--	--	--	--	--	--	--
Eastern Garter Snake	4.00	2.00	--	--	2.00	--	--	2.00	--
Northern Diamond-backed Terrapin	--	--	--	--	--	--	4.67	2.33	4.67
Total Habitat Value	**49.33**	**100.33**	**0.00**	**78.67**	**115.33**	**34.00**	**77.33**	**190.67**	**228.00**

* New Jersey State Engangered or Threatened Species

Appendix G

Biobenchmarking Report for Liberty State Park
Jersey City, NJ

Biological Benchmarking

BACKGROUND

Salt marsh vegetation communities are tightly coupled with the tidal regime. Water levels fluctuate over the daily and monthly tidal cycle, flooding the shoreline for different periods of time. The period of inundation is dictated by elevation contours, and zonation among plant species occurs along these contours. The location of plant species along the gradient is determined by the species' tolerance to salinity and water (frequency, duration, and/or depth of inundation). Species that are tolerant to water and salinity occur at lower elevations in the intertidal zone, between the Mean High Water (MHW) level and the Mean Low Water (MLW) level. Less tolerant species occur at higher elevations, which are inundated only during spring-tide high water levels.

The success of a salt marsh restoration effort greatly depends upon the location of the planted vegetation along the shoreline gradient. Since local conditions vary (salinity, tidal amplitude etc), biological benchmarks measured from surrounding local marsh vegetation and local tidal information should be used as a guide for determining the elevations for vegetation replanting. Elevation ranges of plant communities in reference wetlands can be duplicated in the restored salt marsh.

PURPOSE

To assist in the development of conceptual plans for the Liberty State Park salt marsh restoration, bio-benchmarking and hydraulic geometry data was collected from two reference wetlands. Based on initial bio-benchmarking investigations (soil characteristics and tidal elevations), local tide data and geomorphic indices were developed for the reference wetlands. Table G-1 provides definitions for the collected tidal data. This information was used to supplement the regional tide analyses and the tide gauges placed in the Morris Canal and the South Cove of Liberty State Park.

METHODOLOGY

In order to supplement tidal information, existing vegetation communities were used as indicators of local tidal elevation. This information along with nearby tidal record plus newly installed tide gauges provided the information needed to determine proposed target elevations for the new restoration salt marsh and helped establish the best range of elevations for new plantings.

The use of indicator species on or near the project site often enables the establishment of the best elevations for the project site (Garbish 1994; Garbish 1989; Garbish 1986). Since plant zonation and abundance is the result of a series of complex environmental gradients, using existing vegetation markers allows the design team to mimic the remnant patches of the original marsh

Two nearby salt marshes were selected as reference wetlands. One was in the South Cove of Liberty State Park and the second was just south west of the site in Port Liberte. Reference plant communities were located in nearby tidal wetlands and their characteristics were documented by Ecosystem Restoration Consultants (ERC) on 17 and 25th September 2003 and 14 October 2003.

To evaluate local tide condition, indicator species were selected and homogeneous stands of these species located. The elevation range of *Spartina alterniflora*, *Spartina patens*, and key high marsh plants, (e.g., *Baccharis halimifolia*, *Iva frutescens*) were located in nearby salt marshes. Selected reference vegetation boundaries were staked in the field and representative observation points located using differential GPS. In most cases the lowest elevations of these communities were surveyed. In addition, measurements of hydraulic geometry and soil samples were collected to assist in salt marsh design. Soil samples were sent to an outside laboratory, where soil texture, nutrient, and hydrocarbon analyses were conducted.

RESULTS

Locations of the elevations of surveyed plant community boundaries are shown on Figures G-1 and G-2. When discussing these communities, it is useful to refer to their locations in terms of tidal datums. Table G-1 provides definitions of measured tidal datums. Table G-2 summarizes existing regional tide data from the Battery, Governor's Island and Con Rail Railroad Ferry. This data was interpolated for the South Cove and

adjusted to the 1988 NAVD datum. Significant elevations are shown in the last column of Table G-2. The elevations of a number of communities on the two sites are indicated in Table G-3 below. Based on this bio-benchmarking data, the elevation ranges for these tidal communities is as follows:

1. Low Marsh Plants

- *Spartina alterniflora* Lowest elevation = -0.87

2. High Marsh Plants

- *Spartina Patens* – Range of Lowest elevation = 1.69 to 2.77
- *Distichlis spicata* – Range of lowest elevation =1.74 to 2.44

3. Shrubs:

- *Baccharis halimifolia* – Range of Lowest elevation = 2.42 to 3.77
- *Iva frutescens* – Range of Lowest elevation = 2.21 to 2.58

Tide gauges were installed by the Engineering Division of the New York District in the Morris Canal and the South Cove and monitored for a few months. The restoration team analyzed the information from the regional tide gauges, the biobenchmarking field effort and the in-situ tide gauges. Table G-4 shows this data reconstructed for the South Cove tidal datums.

IMPLICATIONS FOR RESTORATION DESIGN

Regional tide data, bio-benchmarking and the examination of tide gauges can be used as guides to planting elevations. Table G-5 indicates that the three methods yield a very close correlation. The average elevations of the existing biobenchmarking plant communities are presented in Table G-6.

The restored salt marsh should replicate natural salt marshes that dominate saline (polyhaline) reaches of New Jersey estuaries. They contain distinct vegetation zones resulting from tidal flooding and frequency of inundation. The major two zones are shown in Figure G-4 and are identified as (1) low marsh and (2) high marsh. Below this is mudflat and open water and above these salt marsh zones is often a maritime scrub shrub zone.

The low marsh is flooded at least once daily by the tides (regularly flooded zone) and extends from approximately mean sea level to the mean high water level (MHW). The tall form of smooth cordgrass (*Spartina alterniflora*) is often an accurate indictor of the landward extent of mean high tide (elevation 1.75) (Kennard, et al. 1983.). The short form of smooth cordgrass forms extensive stands just above the low marsh (Tiner, 1985) and therefore we are recommending planting of the smooth cordgrass to elevation 2.0 ft above MHW. Some authors recommend planting to one foot above MHW (Garbish and Garbish, 1994). For convenience we will call the low marsh from -1.0 to + 2.0.

The high marsh zone begins above the low marsh and is flooded less often (irregularly flooded zone) and is exposed to drying for much greater periods. This zone is usually much less homogeneous than the low marsh, and is often a mosaic of a number of species including salt hay grass (*Spartina patens*), spike grass (*Distichlis spicata*), a short form of smooth cordgrass, black grass (*Juncus gerardii*), switchgrass (*Panicum virgatum*), high-tide bush (*Iva frutescens*) and common reed (*Phragmites australis*) (Tiner, 1985).

Spartina patens grows at a minimum to mean high water spring (elev. 2.29) but often occurs up to the extreme high tide. This upper boundary may be inundated infrequently, in some locations as little as once or twice annually. Such inundation usually occurs during the spring tide cycle (highest annual tides or MHWS) and during the severe storm events. This is confirmed for New Jersey salt marshes by Tiner, (1985), who states “The upper margins of the high marsh may be flooded only during storm tides which are more frequent in winter”. “Extreme high tide” is not specifically recorded in the regional tide data. While, the highest observed water level was actually over 4 feet above MHWS, about one foot above MHWS or an elevation of 3.3 ft is a reasonable estimate of “Extreme high tide” and a possible upper limit for the high marsh.

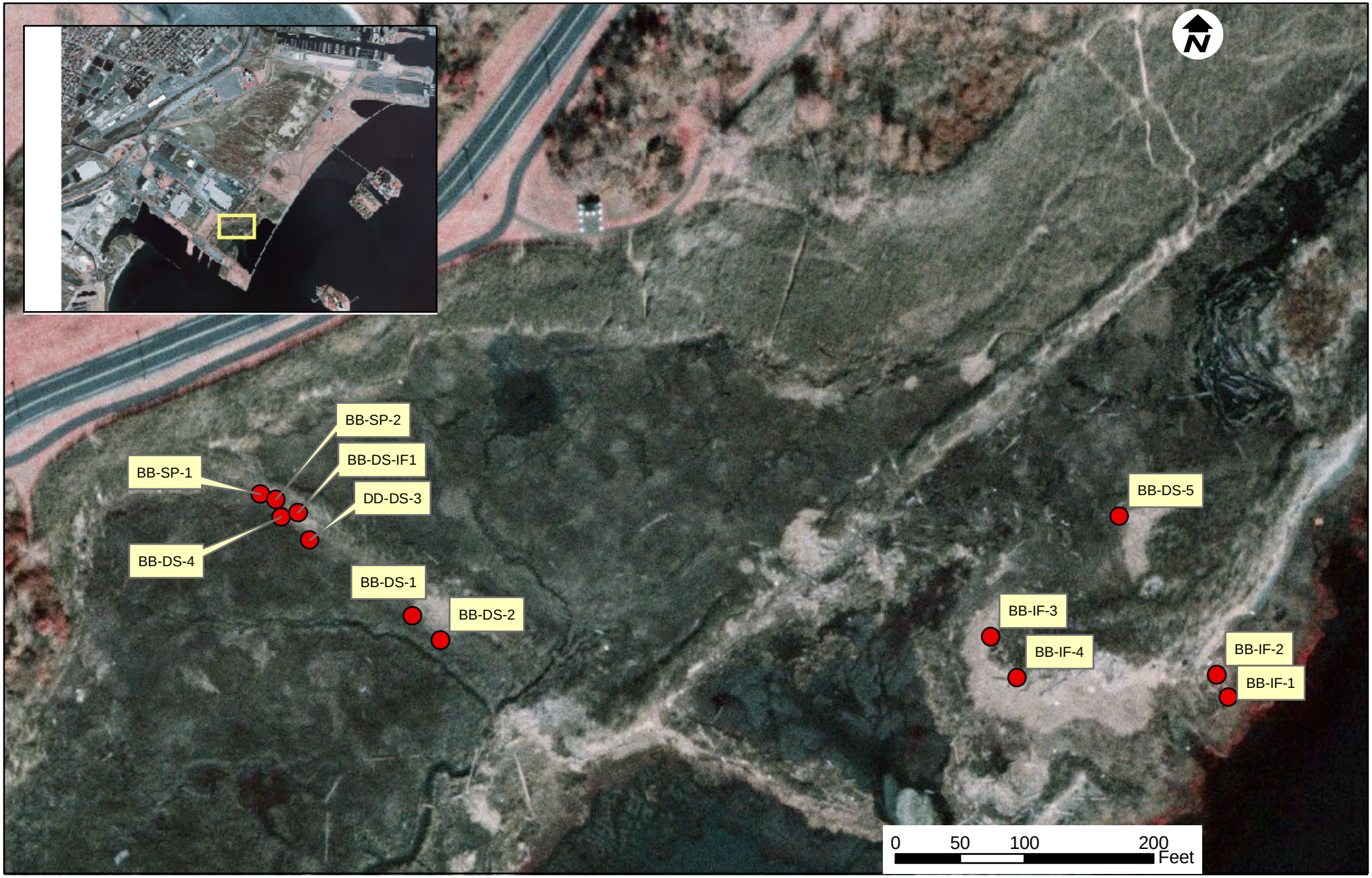
If the final design will contain a high marsh community, we recommend the planting of *Spartina patens* between 1.75 (MHW) and about 3.0. However the area above elevation 2.3 ft, salt hay grass may grow poorly and may be susceptible to invasion of common reed. Consequently, this zone should also be planted with companion species such as high-tide bush and black grass.

Above high marsh is the marsh-upland border or shrub-scrub wetland. This would be planted with sea myrtle (*Baccharis halimifolia*), rose mallow (*Hibiscus moscheutos*), seaside goldenrod (*Solidago sempervirens*) and switchgrass (*Panicum virgatum*). These would be planted above elevation 3.0 as a transition zone between the high marsh and the upland areas.

Figures G-3 and G-4 summarize the recommended elevations for each tidal community and they are as follows:

1. Open Water (-3.5 to -1.0)
2. Low Marsh (-1.0 to 2.00 ft)
    a. Mud Flat (-1.00 to -0.50 ft)
    b. *Spartina alterniflora* (-0.50 to 1.75 ft)
3. Mixed Marsh* (1.75 to 2.00 ft)
    a. *Spartina alterniflora* (-0.50 to 1.75 ft)
    b. *Spartina patens* (2.00 to 3.00 ft)
4. High Marsh (2.00 to 3.00 ft)
    a. *Spartina patens* (2.00 to 3.00 ft)
    b. *Distichlis spicata* (1.75 to 3.00 ft)
5. Maritime Shrubs (>3.0)
    a. *Baccharis halimifolia,*
    b. *Iva frutescens*)

*This zone would be an overlap area between low marsh and high marsh planted with both species.



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Map Source: LMS (2003)
Aerial Photo Source: USACE (2002)

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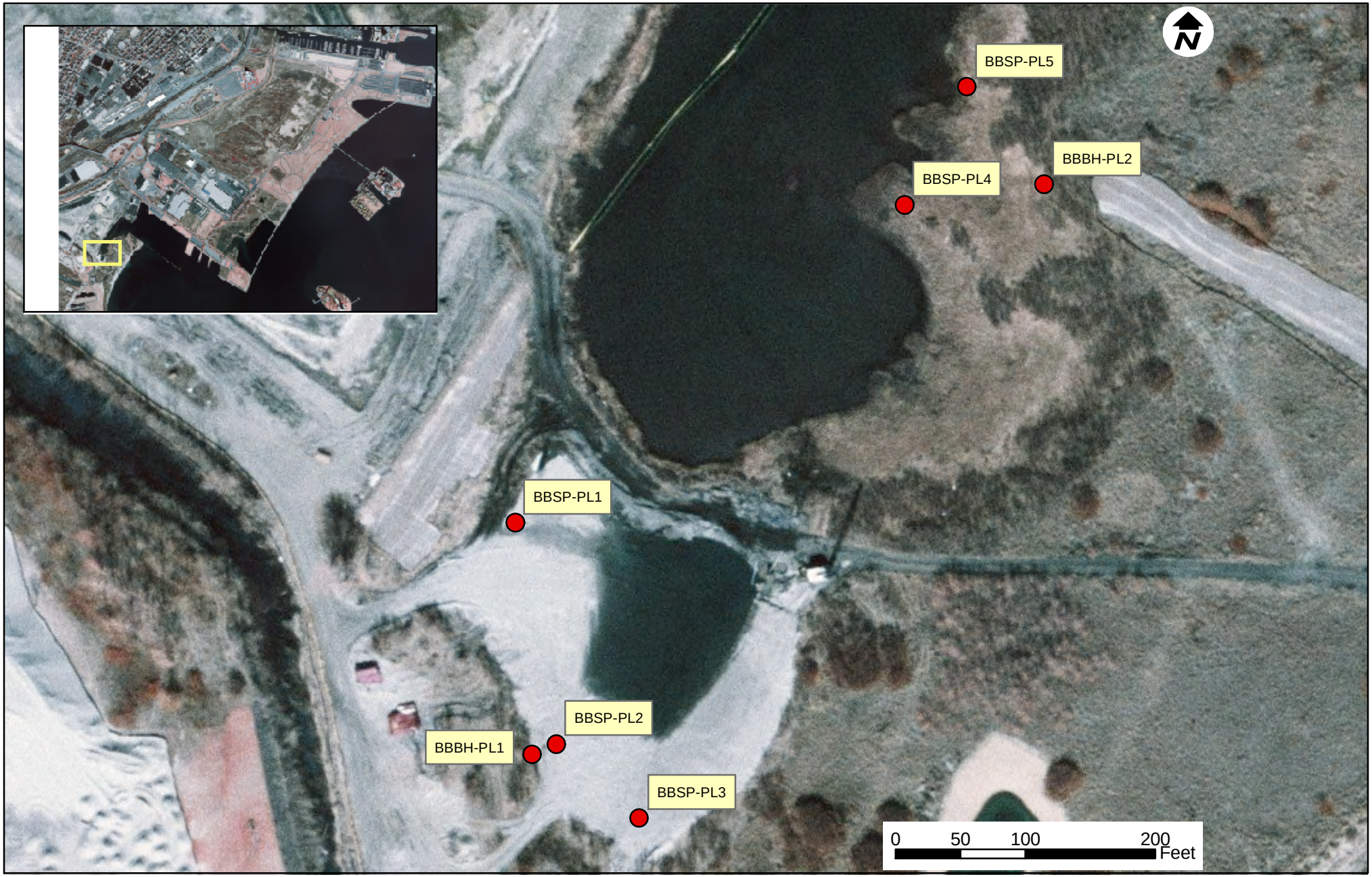
South Cove Wetland With Reference Elevation Locations

Figure G - 1



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Map Source: LMS (2003)
Aerial Photo Source: USACE (2002)

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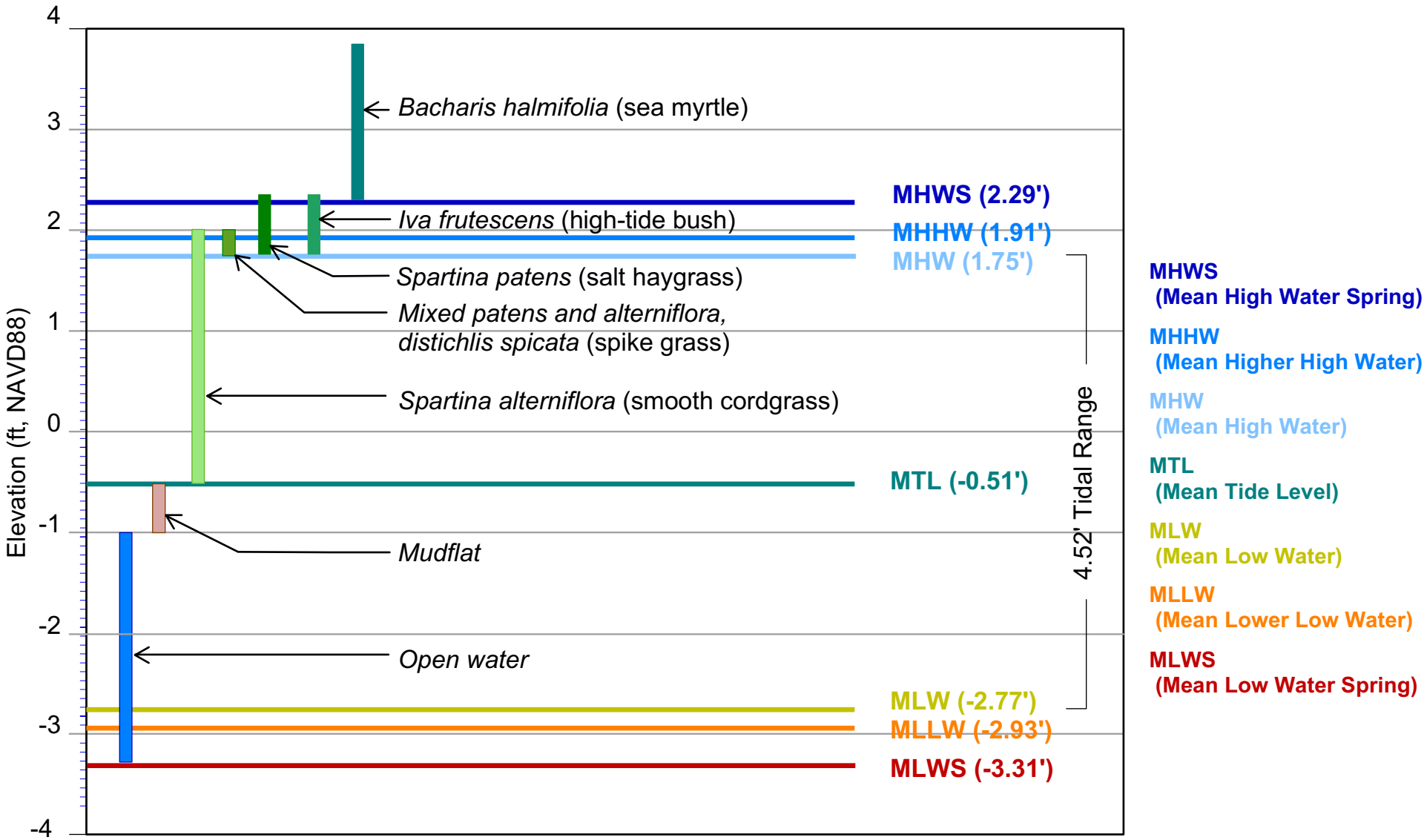
Port Liberte Wetland With Reference Elevation Locations

Figure G - 2



Elevations from Reconstructed South Cove Elevations from 1983 to 2001 Battery Tidal Epoch.

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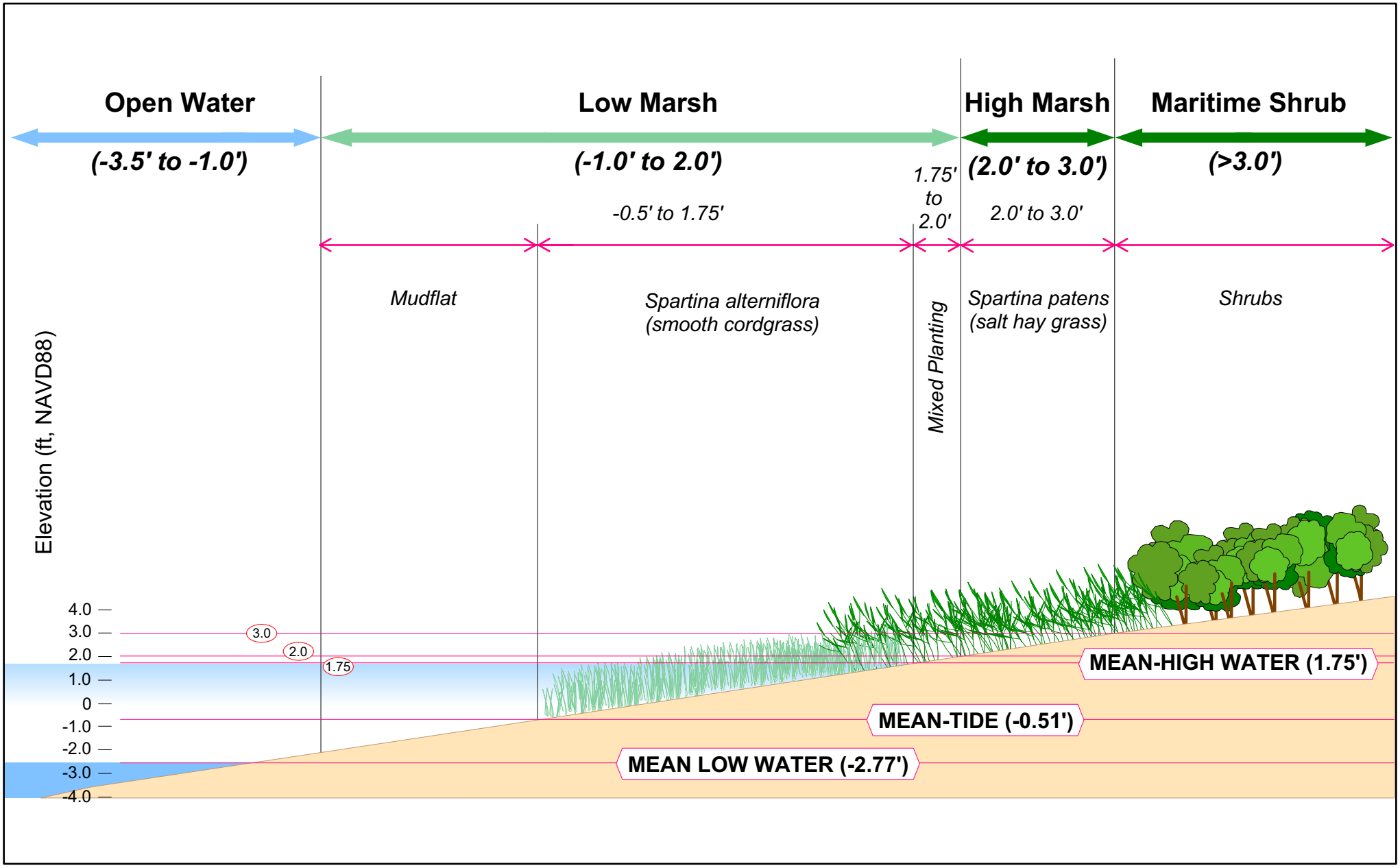
Benchmarking and Tidal Datums Liberty State Park

Figure G-3



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Salt Marsh Profile
Liberty State Park

Figure G-4

Table G-1. Definitions of tidal datums

Term	Definition
High Water	Maximum water level reached during a tidal cycle
Mean High Water (MHW)	The average height of the maximum water level reached in a tidal cycle over a 19-year period
Mean Higher High Water (MHHW)	The average height of the highest annual water level over a 19-year period
Mean High Water Spring (MHWS)	The average height of the high waters occurring at the time of spring tide.
Low Water	Minimum water level reached in a tidal cycle
Mean Low Water (MLW)	The average height of the minimum water level reached in a tidal cycle over a 19-year period
Mean Lower Low Water (MLLW)	The average height of the lowest annual water level, over a 19-year period
Mean Low Water Spring (MLWS)	The average height of the low waters occurring at the time of spring tide.
Mean Tide level	Average of all hourly water levels over the available period of record.

Table G-2. Tidal elevations in the New York/New Jersey Harbor area.

	Abbreviation	Battery (1983-2001)	Governors Island	Con Rail RR Ferry	Liberty State Park (MLLW)	Liberty State Park (NAVD)
Highest Observed Water Level (09/12/1960)	HOWL	10.01	n/a	n/a	n/a	n/a
Mean High Water Spring	MHWS	5.22	5.01	5.01	5.01	2.34
Mean Higher High Water	MHHW	5.06	4.80	4.80	4.80	2.13
Mean High Water	MHW	4.73	4.57	4.57	4.57	1.90
North American Vertical Datum-1988	NAVD	2.78	2.67	2.67	2.67	0.00
Mean Sea Level	MSL	2.57	2.47	2.47	2.47	-0.20
Mean Tide Level	MTL	2.47	2.37	2.37	2.37	-0.30
Mean Low Water	MLW	0.21	0.17	0.17	0.17	-2.50
Mean Lower Low Water	MLLW	0.00	-0.05	-0.05	-0.05	-2.72
Mean Low Water Spring	MLWS	-0.28	-0.27	-0.27	-0.27	-2.94
Lowest Observed Water Level (02/02/1976)	LOWL	-4.29	n/a	n/a	n/a	
Mean Range	MHW-MLW	4.53	4.40	4.40	4.40	1.73
Diurnal Range	MHHW-MLLW	5.06	4.85	4.85	4.85	2.18
Spring Range	MHWS-MLWS	5.50	5.28	5.28	5.28	2.61

Note: Elevations of tidal datums for the Battery referred to Mean Lower Low Water (MLLW), in feet, based on the 19 year tidal epoch January 1983 - December 2001.

Other stations*	Mean Range	Spring Range	MTL
Governors Island	4.4	5.3	2.4
Battery	4.56	5.52	2.5
Jersey City, Con Rail RR. Ferry, N.J	4.4	5.3	2.4

*Based on conversions. Data source: www.co-ops.nos.noaa.gov

Table G-3. Elevation data from reference wetlands at Liberty State Park South Cove, Jersey City, NJ and Port Liberte, Caven Point, NJ.

Species		Spot Elevations (ft)		Mean Elevation (ft)		Range (ft.)
		South Cove	Port Liberte	SC	PL	
S. alterniflora	Lowest Elevations	0.87		0.87		
S. patens	Lowest Elevations	2.04, 2.12	2.77, 2.63, 2.73, 1.69, 1.84	2.08	2.332	1.69-2.77
Distichlis spicata	Lowest Elevations	1.81, 1.74, 1.88, 2.01, 2.44		1.97		1.74-2.44
Baccharis halimifolia	Lowest Elevations		2.42, 3.77		3.09	2.42-3.77
Iva frutescens	Lowest Elevations	2.21, 2.42, 2.58, 2.38		2.39		2.21-2.58

Note: Points were surveyed by BET and elevations were based on NAVD88 datum.
Elevations of tidal datums for the Battery referred to Mean Lower Low Water (MLLW), in feet, based on the 19 year tidal epoch January 1983 - December 2001.

Table G-4. Liberty State Park Water Level Observations: Summer and Fall 2003

	Location	**Morris Canal**	**South Cove**	**NOAA-NOS Battery, NY**	**Morris Canal**	**NOAA-NOS Battery, NY**	**NOAA-NOS Battery, NY**	**Reconstructed* South Cove**
Period of Record	**Start:**	31-Jul	31-Jul	31-Jul	31-Jul	31-Jul	1983 to	1983 to
	Finish:	11-Sep	11-Sep	11-Sep	21-Nov	21-Nov	2001	2001
Mean High Water Spring	**MHWS**	3.01	2.72	3.14	3.17	3.28	2.44	2.29
Mean Higher High Water	**MHHW**	2.36	1.96	2.58	2.24	2.43	2.28	1.91
Mean High Water	**MHW**	2.25	1.84	2.24	2.19	2.12	1.95	1.75
Mean Tide Level	**MTL**	-0.06	-0.51	-0.11	-0.08	-0.08	-0.31	-0.51
Mean Low Water	**MLW**	-2.37	-2.85	-2.46	-2.34	-2.27	-2.57	-2.77
Mean Lower Low Water	**MLLW**	-2.39	-2.86	-2.46	-2.36	-2.47	-2.78	-2.93
Mean Low Water Spring	**MLWS**	-3.20	-3.67	-3.14	-3.26	-3.24	-3.06	-3.31
Diurnal Tide Range	**RangeM**	4.62	4.69	4.70	4.53	4.39	4.52	4.51
Great Diurnal Tide Range	**RangeGD**	4.75	4.82	5.04	4.60	4.90	5.06	4.84
Spring Tide Range	**RangeS**	6.21	6.39	6.28	6.43	6.52	5.50	5.60

* Reconstructed South Cove Tidal Datums were used for the design of the tidal wetland. They were obtained by comparing the South Cove and Battery datums from 31-Jul-2003 to 11-Sep-2003, and reconstructing them to the 1983-2001 tidal epoch, using the Battery as the primary record.

Table G-5. Comparison of tide and bio-benchmarking data at Liberty State Park, Jersey City, NJ.

Vegetation Communities	Edge	Elevation Range (Bio-benchmarking [ft])	Tide Data (ft)	On-site Tide Gauges (ft)
Spartina alterniflora	Low edge	-0.87	-0.30 (MT)	-0.51
	High edge	2.00-2.40 (2.20)	1.90 (MHW)	+1.75
Spartina patens	Low edge	2.00	1.90 (MHW)	+1.75
	High edge	2.30	2.34 (MHWS)	+2.29
Shrubs	Low edge	2.40-3.00 (2.70)	2.34 (MHWS)	+2.29

Note: **S. alterniflora* is usually planted 1.00 ft above MHW

Table G-6. Existing Plant Communities (averages of the biobenchmarking)

	Low Elevation	High Elevation	Elevation Range	Mean Elevation	Range + or -
Spartina alterniflora	-1.0	2.5	3.5	0.75	1.75
Spartina patens	2.0	3.00	1.0	2.0	0.5

Note: *S. alternifolia* could be planted a low as –1.5 however survival at this elevation may be low, the team wanted mudflat areas and felt the *S. alternifolia* will eventually spread in this direction.

Appendix H

Correspondence with U.S. Fish and Wildlife Service, and New Jersey Department of Environmental Protection Endangered Species Unit Regarding Endangered and Threatened Species in Liberty State Park
Jersey City, NJ

Agency Correspondence Regarding Endangered and Threatened Species and Species of Concern for the Liberty State Park Ecosystem Restoration Project

The following section documents the correspondence between the U.S. Army Corps of Engineers (USACE) N.Y. District with interested agencies regarding endangered, threatened wildlife species and species of special concern for the Liberty State Park (LSP) ecosystem restoration project. Wendy Walsh from the U.S. Fish and Wildlife Service (USFWS) attended two Liberty State Park project development team (PDT) meetings, and attended a field visit to the LSP project site. Representatives from the New Jersey Department of Environmental Protection (NJDEP) Endangered and Nongame Species Program (ENSP) attended a field visit to the LSP project site. USACE requested that the USFWS and NJDEP provide a list of wildlife species that may be of concern in the project area, and both agencies complied.

Included in this appendix are:

1. Memo for Record for the LSP PDT meetings that were attended by USFWS (25 September 2003; and 11 December 2003)
2. An email from Wendy Walsh (USFWS) documenting the input she provided during the PDT meeting, and during the LSP field visit
3. A memo summarizing the input USFWS provided during the 9 December 2003 wildlife meeting and field visit, and the 11 December 2003 LSP PDT meeting
4. An email from Kim Korth providing a list of target species that ENSP would like to see established or enhanced in the LSP project site

USFWS provided comments on the conceptual plan for the LSP Restoration site in terms of wildlife habitat enhancement. Of particular concern was the creation of large patches of contiguous vegetation cover types to maximize the area of interior habitat. The conceptual plan was revised to address this concern. The grassland berm in the southwest portion of the LSP Restoration site was expanded, and the forest boundaries have been expanded to create a larger interior core.

Bob Will (USACE)
Olivia Ng (USACE)
Kerry Anne Donohue (USACE)
Bethany McClanahan (USACE)
Webster Shipley (USACE)
Jack Berezniak (USACE)
Frank Gallagher (NJDEP)
David Bean (NJDEP)
John Staples (USFWS)
Wendy Walsh (USFWS)
John Roebig (ERC/LMS)
Jennifer Curran (ERC/LMS)
John Dromsky-Reed (ERC/URS)
Ray Hinkle (ERC/URS)
Roberta Zwier (ERC/URS)

1.0 SUMMARY

The Liberty State Park (LSP) restoration project team met at the LSP Railroad Building to discuss project status and for a presentation of the preliminary results of the Geotech and Biological Survey Investigations.

2.0 INTRODUCTION

Frank Gallagher described the history of Liberty State Park. The substrate for most of the park, a former marsh, was created from fill from New York City (trash, etc.) for the establishment of a railroad. The substrate in the 45-acre rectangle is dredged material that was excavated during the construction of the visitor center.

3.0 PRESENTATION OF PRELIMINARY BIOLOGICAL SURVEY DATA

ERC presented the preliminary findings of the biological surveys. John Roebig described the vegetation surveys, Jennifer Curran summarized the preliminary findings of the North Cove Benthos, Fish, and Water Quality surveys, and Roberta Zwier discussed the preliminary findings of the wildlife (including threatened and endangered species [TES]) surveys. A summary of the findings is presented below.

3.1 Vegetation

The process of mapping the vegetation communities within the park is nearly complete. The community boundaries have been identified and marked with flagging throughout the site, and BET survey crews have located the flags. Wetlands were delineated using the three-parameter approach described in the 1989 USACE wetland delineation manual.

Each community has been characterized as one of the types listed in the "Ecological Communities of New York State." The following community types are present in the park: Successional Northern Hardwoods, Successional Shrubland, Successional Old Field, Maritime Shrubland, Maritime Grassland, Dredge Material, and Paved Path/Road.

Twenty wetlands have been identified on the restoration site. The wetlands have been categorized as: Shallow Emergent Marsh (sedges), Shrub Swamp (winged sumac,

phragmites), Vernal Pool (spikerush), Open water, Dredge Material Wetland (sensitive fern, blackberry) or Reedgrass/Purple Loostrife Wetland.

3.2 Benthos

Replicate grab samples were collected from three North Cove Stations with a 0.5 m^2 Standard Ponar Grab. The replicate samples were composited and brought back to the lab for analysis. Organisms were identified to the lowest practical level.

Overall, the samples were low in diversity and abundance of organisms, and most of the species collected were tolerant polychaete worms, indicating high pollution levels. Two of the six grab samples had no organisms in them. Diversity and abundance were lowest in the shallow areas of the southwest North Cove, where the samples were composed 320-520 individuals/m^2 of 1-3 species. Samples from the deeper waters of the eastern cove contained more individuals (620 – 1320/m^2) of 6-10 species.

Although comparisons of benthic studies are difficult because of seasonal variation in species composition and patchy distribution, it is interesting to note that when compared to other studies in NY/NJ Harbor, the abundance of organisms in the North Cove seems low. Zappala 2001 (A Master's Thesis from SUNY Stony Brook) reported an average abundance of 1,017 organisms/m^2 in shallow open waters. Iocco et al. 2000 reported average harborwide abundance of 7,783 organisms/m^2.

3.3 Fish

Fish communities in the North Cove were sampled with 50-ft beach seines and 3' X 6' box frame trap nets set at three stations. Fish were counted, ID'd to species level and released.

Preliminary results suggest that, although most of the species of fish were collected at early life stages, several species of fish at different life stages utilize the North Cove. Eight fish species were collected with a beach seine, and bay anchovy and juvenile Atlantic menhaden dominated the catch, with 30 or more individuals of one of these species in each sample. Less abundant species included juvenile striped bass, weakfish, northern pipefish, American eel and white perch.

No fish were collected in two of the three trap nets; only the trap nearest to the western shore of the North Cove captured fish. The trap net collected 19 fish of 8 species. Unlike

the beach seine catch, demersal fish that feed on benthic organisms dominated the trap net catch. Juvenile white perch, winter flounder, tautog, and scup, and one adult summer flounder and American eel were collected.

3.4 Water Quality

Surface and Bottom water samples were collected bi-weekly from 5 stations for a period of 5 weeks, between 7 August and 3 September 2003. At stations where the depth exceeded 11 feet, samples were also collected from the middle of the water column. The samples were analyzed for temperature, dissolved oxygen, salinity, total suspended solids, biological oxygen demand, ammonia, TKN, nitrate/nitrite, and total phosphorus. Laboratory analysis was incomplete for several of the parameters, so the discussion was limited to temperature, dissolved oxygen pH and salinity.

The temperature ranged from 20.3°C to 27.1°C, with an average of 23.5°C for all stations and samples combined. Salinity ranged from 6.6 ppt to 24.1 ppt, with the higher values recorded for bottom samples. Overall, the average salinity was 16.0 for all stations and samples. Dissolved oxygen ranged from 3.5 mg/L to 10.4 mg/L, averaging 5.4 mg/L for all samples. The pH ranged from 7.0 to 8.1.

3.5 Wildlife

Fifty species of birds were observed during the wildlife surveys at Liberty State Park. Within restoration area, most species were associated with field/meadow, edge, or successional habitats (e.g., brown thrasher, yellow warbler, American woodcock, song sparrow). Six State-listed threatened/endangered species of birds were observed in the site.

Three northern harriers were observed in the park. An adult male and female were observed on several occasions, and a juvenile was observed once. It is probable that the juvenile was not a resident of the park.

Incidental sightings of mammals and reptiles include: meadow vole, eastern cottontail, raccoon, feral cat, common garter snake and northern brown snake

3.6 Biobenchmarking

The team has identified two nearby wetlands that will be used as reference sites during the design of the tidal wetland in the restoration site. Transition zones between vegetation communities (e.g. Spartina alterniflora and Spartina patens/Phragmites) and open water have been staked.

4.0 GEOTECHNICAL INVESTIGATION

Webster Shipley and Jack Berezniak from USACE discussed progress of the geotechnical work at LSP. The team bored 38 holes down to native marine clay (at 12-15'). Two samples will be analyzed for each hole. The team will also measure in situ permeability. WS said that there was less debris in the soil than expected. The North Cove still needs to be sampled.

Eight 2' diameter temporary piesometers were installed for 30 – 60 day monitoring of groundwater conditions (flow and direction).

The analytical work is on hold because the laboratory was damaged during the hurricane, but results should be expected for the November or December meeting.

5.0 WILDLIFE CONCERNS

Wendy Walsh (WW) initiated a discussion about the formulation of wildlife criteria to ensure that additional wildlife will not be attracted to contaminated areas within the site. The current geotechnical sampling plan does not call for analytical testing on surface sediments, only samples at depths of 17' and 28'.

Bob Will will check about the possibility of additional testing of surface sediments.

WW also spoke about the possibility of wildlife (esp. amphibian) impacts due to the low pH cinder substrate. Since the restoration project calls for excavation of the rectangle, WW suggested that the team should coordinate with USFWS and NJ's Endangered and Nongame Species Program (ENSP) to determine impacts to the threatened and endangered species on the site, to avoid impacts and enhance habitat on the site. She suggested that actions such as predator control, enhancing freshwater wetlands and Phragmites control should be considered.

THE NEXT LSP MEETING IS SCHEDULED FOR 10:00 A.M. THURSDAY, NOVEMBER 6TH AT THE INTERPRETIVE CENTER

CENAN-PL-F 11 December 2003
Memorandum for Record

SUBJECT: Liberty State Park (LSP) Project Delivery Team (PDT) Meeting

1) Liberty State Park PDT members met at 10 AM on 11 December 2003 at the LSP Interpretive Center to review the available data and discuss how the information affected the conceptual plans. The following were present:

Name	Organization	Phone	Email
Bob Will	USACE	212.264.2165	robert.j.will@usace.army.mil
Bethany McClanahan	USACE	212.264.9074	bethany.m.mcclanahan@usace.army.mil
Daniel Kriesant	USACE	212.264.9117	daniel.j.kriesant@usace.army.mil
Richard Dabal	USACE	212.264.5746	richard.p.dabal@usace.army.mil
Bob Hass	USACE	212.264.0146	robert.a.hass@usace.army.mil
Olivia Cackler	USACE	212.264.9088	olivia.n.cackler@usace.army.mil
Jack Berezniak	USACE	410.962.4450	john.n.berezniak@usace.army.mil
Wendy Walsh	USFWS	609.383.3938 x48	wendy_walsh@fws.gov
David Bean	NJDEP/ONRR	609.984.0599	david.bean@dep.state.nj.us
John Roebig	ERC (LMS)	845.735.8300	jroebig@lmseng.com
Jennifer Curran	ERC (LMS)	845.735.8300	jcurran@lmseng.com
John Dromsky-Reed	ERC (URS)	973.785.0700	john_dromsky-reed@urscorp.com
Roberta Zwier	ERC (URS)	973.785.0700	roberta_zwier@urscorp.com
Ray Hinkle	ERC (URS)	973.812.6886	ray_hinkle@urscorp.com

2) Geotechnical presentation (Jack Berezniak).
   a. Samples were collected from 38 drills holes. The soils were dominated by silty sand and fat clay, which accounted for roughly 90% of the total volume of samples. Geotechnical data indicates that the soils on the site are generally fine-grained and mostly impervious.
   b. The geotechnical characterization of the soil as mostly impervious needs to be reconciled with the high infiltration rates observed at the park.
   c. A synoptic ground water reading was also taken from piezometers on 15 November 2003. At present, the readings suggest that ground water is closest to the surface in the northeast corner of the park by North Cove and lowest in the southwest corner underneath the proposed berm. However, these readings were taken over a period of two hours and need to be adjusted to account for tidal fluctuations.

3) HTRW presentation (Richard Dabal).
Samples were taken from the bottom of the 38 drill samples (28.5 feet below surface) collected for geotechnical analysis. In summary, they were less contaminated than the history of the site would lead us to believe. Samples were screened for metals, pesticides, acid base neutrals, and especially for hexavalent chrome, in response to the Consent Decree. Two criteria were used:

Effects Range-Low (ER-L), which is the concentration of a chemical (in parts per million) in sediment below which toxic effects are rarely observed among sensitive species; and NJDEP Non-Residential Direct Contact Soil Clean-up Criteria (NRDCSCC). Samples were also taken from the midpoint of 12-15 feet and are currently in storage. However, due to the time that has elapsed, these samples can only be tested for the presence of metals.

a. It was clarified by NJDEP that ER-L is a screening measure for presence and does not always accurately reflect danger to species. The true concern is bio-availability.
b. Hot spots: Sample Point 20 (close to the proposed inlet for the tidal creek) and Sample point 37 (close to the proposed berm). Additional testing around point 20, to the depth of proposed excavation, 15 ft, has been proposed.
c. Need for additional collections: The PDT believes more sampling is required at the midpoint depth of 15 ft in the proposed excavation areas, especially the tidal creek in the fenced-off 45 acres.
d. The importance of screening the groundwater for contaminants was discussed, as it could affect the sides of the proposed tidal creek. If the groundwater is clean, it would eliminate the need for a clay liner for the sides of the tidal creek.

4) Topographic & bathymetric surveys (John Dromsky-Reed). Draft survey results are in and are in the process of being finalized. The draft version is complete enough to use as the basis for the Hydraulic and Hydrologic modeling. They are also available in a 3-D version.

5) H&H Modeling presentation (Dan Kriesant). The entrance to the tidal creek has been modeled using HEC-RAS. At present, the recommendation is have a straight eco-channel as wide as possible as the entrance. This design ensures the necessary velocity to get water into the tidal creek and the wideness maximizes area to support species. Concerns about the closeness of the inlet to the boundary conditions were noted and will be addressed. The next step is to model the portion of the creek within the 45-acre area, using RMA. In this second phase of modeling, the first concern is to determine how far the water can go inland, then how much sinuosity will be possible given the sustainable length, and then finding the right design for proper flooding and draining.

6) Water budget (John Roebig). These are four options for the freshwater wetland sources, and their calculated acre-ft run-off, based on annual average precipitation from 1993-2003:

1 = Wetland catchment (no action)	4.07
2 = 1 + Liberty Science Center	32.94
3 = 2 + NJ Transit Property	67.03
4 = 3 + pumps	TBD

Taken on a monthly base, Plan 2 generates the minimum amount of water necessary to sustain a wetland on a year round basis. It should be noted that this water budget only takes surface water into account. Ground water levels were not factored into the budget. The PDT recommended moving the proposed freshwater deep pool to the north and west of its current location in the conceptual plans because this would bring it closer to freshwater sources and protect it from salt-

water intrusion from the tidal creek. Also, the berm could be contoured to direct more fresh water into the site.

7) Wildlife survey (Roberta Zwier, Ray Hinkle). Additional wildlife data has been collected since the last briefing on wildlife surveys was provided in September 2003. Small mammal trapping was completed from October 28-November 1, 2003. White-footed mice were the most frequently captured species and they occurred in all habitat types. Meadow voles were captured in old-field/meadow habitat. One Norway rat and one house mouse were also captured. Northern harriers and Cooper's hawks were seen foraging within the 250 acres during the small mammal surveys. A long-eared owl was observed in Liberty State Park on Tuesday December 9, 2003.

8) Harbor Herons meeting briefing (Roberta Zwier). The Harbor Herons meeting was discussed in terms of how it could fit with the CRIP and LSP. Predators and a loss of suitable nest trees thought to be the primary factors causing herons to abandon established colonies such as Shooter's Island and Pralls Island. As wading birds are a group of species that require alternate habitats across the larger landscape, it is possible that they may find new nesting areas in potential HRE projects. For instance, Liberty State Park could provide nesting areas for wading birds in its upland habitats. The Harbor Herons Subcommittee is in favor of ecosystem restoration projects but expressed some concerns because projects in the Hudson-Raritan Estuary have the potential to attract wading birds to forage in areas that could expose them to contaminants.

9) Effects on Conceptual Plans

a. Moving the deep freshwater pool to the west, as discussed in item 6.
b. Less smaller, fragmented habitats scattered throughout the site and more larger, contiguous habitats.
c. Instead of sinuous entrance to tidal creek, or culverts, there should be a straight, wide eco-channel (Item 5).

10) Still need:

Ground water screening
Incorporation of tidal information
Mid-depth HTRW samples, 15 ft
Schedule Planning Committee Meeting in January

11) Next meeting on **Tuesday, 13 January 2003, at NJDEP Offices in Trenton, NJ, 10 AM**.

12) Comments and questions can be directed to Olivia Ng Cackler, Project Planner, at 212.264.9088.

Wendy_Walsh@fws.gov To: Robert.J.Will@nan02.usace.army.mil
cc: roberta_zwier@urscorp.com, jroebig@lmseng.com, fgallagher@dep.state.nj.us, John_Staples@fws.gov
12/12/2003 11:37 AM
Subject: meeting follow-up

Hi Bob:

Thanks very much for arranging Tuesday's wildlife meeting, and including me in yesterday's PDT meeting. I thought these were very informative and productive. I really appreciate the opportunity to provide input while the conceptual plan is still in development. I jotted down a summary of the recommendations I made at the meetings (attached); these are just preliminary based on the preliminary info we reviewed at the meetings. I'll look forward to future iterations of the conceptual plan.

Regarding my suggestion for monitoring to get a better handle on the harrier (before, during, and after construction), I think it would be great if Michael Britt could be involved in the effort. I think his knowledge and enthusiasm would be a real asset. I don't think this harrier work would be a huge or expensive effort.

On my LSP "to do" list, I've got:
- Get in touch with Kim Korth to see if Larry Niles is interested in some pass-through funding so that ENSP can dedicate staff to provide input as I prepare the draft 2(b) report.
- Get in touch with John Roebig the re: habitat evaluation now in progress.
- Next PDT meeting January 13.
- Planning Committee meeting sometime in January.

Here's a list of info I've requested, as it becomes available:
- GIS files of existing cover types, invasive species, and proposed plans;
- North Cove sediment contaminants testing and water quality results;
- full soil testing results;
- sampling plans for any additional contaminants testing;

- preliminary wildlife (terrestrial & aquatic) and vegetation reports;
- Liberty State Park management plan; and
- draft SOW and request for cost estimate.

I'll be looking at March 15 as the target date for the draft 2(b) report.
Please let me know if that changes.

Thanks again.
Happy holidays!
Wendy

(See attached file: USFWS_Dec_meeting_input.doc)
(See attached file: USFWS_Dec_meeting_input.doc)

Summary of U.S. Fish and Wildlife Service Preliminary Input provided at the December 9 and 11, 2003 Liberty State Park Meetings

- The Service strongly supports the general design concept that would provide various tidal marsh and shrub communities, freshwater wetlands and pools (if a water source is available), upland grasslands, and upland forest.

- The Service recommends the Corps:

    - test existing water quality of parking lot runoff proposed as a freshwater source, and design treatment basins to ensure that water directed into the restoration area is sufficiently clean to support diverse aquatic communities; and
    - test North Cove sediments, groundwater, and soils in the excavation areas <u>at depths to be excavated</u> for environmental contaminants. (Based on preliminary review, the Service supports the proposed use of ERLs as screening levels with bioavailability of contaminants as the final determinant of the need for remedial actions (*i.e.*, clay liner). Appropriate wildlife endpoints should be specifically considered.)

- The Service recommends the Corps and the NJDEP:

    - consolidate planned cover types (particularly grassland and forest) into larger patches, designed to maximize the area of interior habitat;
    - test salinity and pH of groundwater and vernal pools as possible limiting factors in amphibian abundance;
    - in accordance with any recommendations from ENSP, conduct or fund northern harrier monitoring before, during, and after construction, including nest site location, nest success, a tagging program, and (if birds are present year-round) contaminants testing;
    - design and schedule construction to minimize disturbance to nesting harriers;
    - plant trees along the interior road to minimize fragmentation effects and control invasive species;
    - plant trees in small patches of “old field” cover types that are too small to support grassland species and that fragment the developing forest;
    - plant a diverse array of native warm season grasses in the grassland areas, with a large “butterfly garden” (native wildflowers) located in an area of high visibility;
    - preserve orchid and moss mat areas; and
    - design construction to avoid impacts to known occurrences of State-listed plants.

- The Service concurs with the NJDEP’s plan to generally leave upland shrub and forest communities to succeed with minimal to moderate interference, and recommends that the NJDEP:

    - develop a long-term habitat management plan (control invasive species, grassland mowing regime); and
    - develop a long-term species monitoring program (e.g., State-listed birds, amphibians), including management actions as appropriate (e.g., predator control, nest platforms).

-----Original Message-----
From: Kim Korth [mailto:Kim.Korth@dep.state.nj.us]
Sent: Tuesday, February 17, 2004 2:40 PM
To: Wendy_walsh@fws.gov; Will, Robert J
Cc: Larry Niles; jroebig@lmseng.com; smetzger@lmseng.com; Henn, Roselle E
Subject: Re: Request for lists of preferred species for habitat enhancement @ Liberty State Park

Hi Bob!

Here is the informal list of species of birds, herps and inverts that ENSP would like to see established or enhanced at LSP. Some are currently using the site and groups/suites of some species would benefit from the similar habitat management plans.

American bittern
Henslow's sparrow
Least Tern
Northern harrier
Peregrine falcon
Vesper sparrow
Black-crowned night-heron
Grasshopper sparrow
Savannah sparrow
Osprey
Yellow-crowned night-heron
American kestrel
Colonial waterbird nesting habitat
Spotted sandpiper
Tricolored heron
Migratory songbird habitat
Eastern box turtle
Fowler's toad
Frosted Elfin
Arogos skipper

Let me know if you have any questions.

Kim

>>> "Will, Robert J NAN02" <Robert.J.Will@nan02.usace.army.mil>
02/06/04 07:31PM >>>
Wendy/Kim. If you remember from our December LSP meeting when we discussed
T&E species, we had asked for an informal list of species of plants, herps,
birds & mammals that your agencies would prefer to see established or
enhanced at LSP. We were discussing this in-house yesterday & think that we
would very much like to reference any species lists your agencies may
provide for use in our biological inventory (you have, or will have copies
of this draft report next week). So if you could send us those lists
("off-the-shelf" lists or reports are fine) we talked about, it would help
to move this project forward significantly at this point. No need to wait
for official FWCA communication or any official letters. That will come
later, we just need to see whatever you have available ASAP so we can warp
up this biological inventory for the site. Thanks again for the help.
Bob

PS We can always amend the biological inventory later in the feasibility
study if additional significant data and/or priorities surface.