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NATURAL RESOURCES

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TABLE 1
PHYTOPLANKTON TAXONOMIC GROUPINGS COLLECTED IN THE ARTHUR KILL, APRIL-OCTOBER 1988

Order	Species
Bacillariophyta	*Asterionella japonica* *Chaetoceras* sp. *Cyclotella atomus* *Cyclotella meneghiniana* *Cyclotella* sp. *Gomphonema* sp. *Gyrosigma* sp. *Rhizoselenia* sp. *Skeletonema* sp. *Thallassiosira* sp. Unidentified Diatoms
Chlorophyta	*Ankistrodesmus falcatus* *Carteria* sp. *Chlamydomonas* sp. *Closterium* sp. Unidentified Greens
Chrysophyta	Unidentified Chrysophyte
Cryptophyta	*Chroomonas* sp. *Cryptomonas* sp. *Rhodomonas minuta* *Rhodomonas* sp. Unidentified Cryptophyte
Cyanophyta	Unidentified blue-green
Euglenophyta	*Euglena* sp. *Lepocinclis* sp.
Pyrrophyta	Unidentified Dinoflagellate

Source: EA, 1989.

TABLE 2
ABUNDANCE AND SPECIES COMPOSITION OF MICROZOOPLANKTON COLLECTED IN THE ARTHUR KILL, APRIL-OCTOBER 1988

Phylum	Taxon	Number Collected	Percent Composition
Cnidaria	Hydrozoa	<1	<0.1
Rotifera	*Asplanchna* sp.	154	2.1
Nematoda	Nematoda	1	<0.1
Annelida	Polychaeta	854	11.6
Arthropoda (Crustacea)	*Neopanope texana sayi* (Decapoda)	1	<0.1
	Crangon septemspinosa (Decapoda)	6	0.1
	Copepoda nauplii (Copepoda)	2,089	28.3
	Acartia (Copepoda)	1,484	20.1
	Eurvtemora (Copepoda)	438	5.9
	Harpacticoida (Copepoda)	165	2.2
	Pseudodiaptomus (Copepoda)	74	1
	Temora (Copepoda)	10	0.1
	Cyclops (Copepoda)	73	1
	Cyclopoida (Copepoda)	349	4.7
	Neomvsis Americana (Mysidicea)	1	<0.1
	Barnacle nauplii (Thoracica)	1,606	21.7
	Daphnia (Cladocera)	1	<0.1
	Podon sp. (Cladocera)	34	0.5
	Ostracoda	1	<0.1
Mollusca	Gastropoda (veliger)	27	0.4
	Bivalvia	1	<0.1
Chordata	Ascidiacea (larvae)	17	0.2
	Total	7,383	100

Source: EA, 1989.

TABLE 3
ABUNDANCE AND SPECIES COMPOSITION OF MACROZOO-PLANKTON COLLECTED IN THE ARTHUR KILL, APRIL-OCTOBER 1988

Phylum	Taxon	Number Collected	Percent Composition
Cnidaria	Anthozoa	9	<0.1
	Scyphozoa (Semaeostomaeae)	16	<0.1
	Hydrozoa (Hydromedusae)	948	1.9
Annelida	Oligochaeta	48	0.1
	Polychaeta	484	1
	Polychaeta epitoke	470	0.9
	Polydora sp. (Spionidae)	3	<0.1
	Polynoidae	4	<0.1
Arthropoda (Crustacea)	Amphipoda	10	<0.1
	Ampelisca sp. (Amphipoda)	55	0.1
	Caprellidae (Amphipoda)	8	<0.1
	Corophium sp . (Amphipoda)	28	0.1
	Gammarus spp. (Amphipoda)	150	0.3
	Gammarus mucronatus (Amphipoda)	4	<0.1
	Leptocheirus pinguis (Amphipoda)	3	<0.1
	Melita nitida (Amphipoda)	67	0.1
	Parametopella cvpris (Amphipoda)	109	0.2
	Unciola serrata (Amphipoda)	6	<0.1
	Brachyuran megalop (Decapoda)	8	<0.1
	Crab megalop (Decapoda)	96	0.2
	Brachyuran zoea (Decapoda)	1	<0.1
	Xanthidae zoea (Decapoda)	9,015	18.3
	Neopanope texana savi zoea (Decapoda)	14,374	28.9
	Uca spp. zoea (Decapoda)	345	0.7
	Panopeus herbstii zoea (Decapoda)	871	1.8
	Pinnixa spp. zoea (Decapoda)	1	<0.1
	Pinnixa spp. juvenile (Decapoda)	2	<0.1
	Rhithropanopeus harrissi zoea (Decapoda)	6,595	13.3
	Shrimp zoea (Decapoda)	318	0.6
	Crangon septemspinosa zoea (Decapoda)	2,737	5.5
	Palaemontes spp. (Decapoda)	4	<0.1
	Palaemonetes spp. zoea (Decapoda)	5,596	11.3
	Pagurus spp. zoea (Decapoda)	1,596	3.2
	Pagurus spp. megalop (Decapoda)	19	<0.1
	Leucon americanus (Cumacea)	27	<0.1
	Oxyurostylis smithi (Cumacea)	4	<0.1
	Copepoda (parasitic)	10	<0.1
	Edotea triloba (Isopoda)	27	0.1
	Lironeca ovalis (Isopoda)	10	<0.1
	Neomysis americana (Mysidacea)	5,160	10.4
	Pycnogonida (Arachnida)	10	<0.1

TABLE 3 (CONTINUED)
ABUNDANCE AND SPECIES COMPOSITION OF MACROZOOPLANKTON COLLECTED IN THE ARTHUR KILL, APRIL-OCTOBER 1988

Phylum	Taxon	Number Collected	Percent Composition
Molllusca	Gastropoda	345	0.7
	Bivalvia	15	<0.1
Chaetognatha	*Sagitta* sp.	20	<0.1
	Total	**49,718**	**100**

Source: EA, 1989.

TABLE 4
BENTHIC INVERTEBRATE TAXA COLLECTED FROM ARTHUR KILL, OLD PLACE CREEK, GOETHALS BRIDGE, 1988 AND 1995

Phylum	Species	Arthur Kill	Old Place Creek	Goethals Bridge
Cnidaria	Actiniaria			x
Rhynchocoela	Nemertea	x		
Aschelminthes	Nematoda		x	x
Annelida	*Polydora* sp.		x	x
	Scoloplos sp.	x	x	x
	Sabellaria vulgaris	x		
	Nereis succinea		x	x
	Scolecolepidis viridis	x		x
	Diopatra cuprea	x		
	Spiophanes bombyx	x		
	Syllidae		x	x
	Phyllodoce sp.	x		
	Nereididae		x	x
	Harmothoe imbricata		x	x
	Capitella capitata			x
	Oligochaeta	x	x	x
	Streblospio benedicti	x	x	x
	Pectinaria gouldii	x		
	Nephtys spp.	x		
	Ophellidae	x		
	Eteone spp.			x
	Eteone heteropoda			x
	Paraonidae	x	x	
	Glycera sp.	x		
Arthropoda	*Crangon septemspinosus*			x
	Uca sp.		x	
	Leucon americanus	x		
	Oxyurostylis smithii	x		
	Melita nitida	x		
	Corophium sp.	x		
	Gammarus sp.	x		
	Edotea triloba	x		
	Limnoria lignorum	x		
	Ampelisca abdita	x		
	Cyathura polita	x	x	
	Balanus sp.	x		
	Palaemonetes pugio		x	x
	Callinectes sapidus		x	x
	Dyspanopeus sayi		x	x
	Rithropanopeus harrisii		x	x
Mollusca	*Mya arenaria*	x	x	
	Mulinia lateralis	x	x	
	Tellina sp.	x		
	Retusa sp.	x		
Chordata	*Mogula manhattensis*	x	x	x

Source: LBA 1992; LMS 1996.

TABLE 5
LIST OF EPIBENTHIC SPECIES COLLECTED IN NEW YORK/ NEW JERSEY HARBOR SYSTEM, 1998 TO 2000.

Phylum	Species	Phylum	Species
Porifera	*Haliclona oculata*	Arthropoda	*Listriella* spp.
	Haliclona loosanoffi		*Microdeutopus gryllotalpa*
	Microciona prolifera		*Melita nitida*
Cnidaria	*Tubularia* spp.		*Leptocheirus pinguis*
	Diadumene lineata		*Gammarus* spp.
	Metridium senile		*Jassa falcata*
Platyhelminthes	*Euplana gracilis*		*Ampelisca abdita*
Bryozoa	*Alcyonidium polyoum*		*Parametopella cypris*
	Electra monostachys		*Pleustidae* unid. sp.
Annelida	*Pectinaria gouldii*		*Photidae* unid. sp.
	Asabellides oculata		*Ampithoidae* unid. sp.
	Sabellaria vulgaris		*Edotea* spp.
	Sabella spp.		*Limnoria lignorum*
	Ampharete arctica		*Cyathura polita*
	Tharyx spp.		*Semibalanus balanoides*
	Lepidonotus spp.		*Palaemonetes* spp.
	Harmothoe imbricata		*Pagurus* spp.
	Polydora cornuta		*Ovalipes ocellatus*
	Streblospio benedicti		*Callinectes sapidus*
	Nereis spp.		*Carcinus maenas*
	Paranaitis speciosa		*Dyspanopeus sayi*
	Nephtys spp.		*Rithropanopeus harrisii*
	Ophelia spp.	Mollusca	*Crepidula fornicata*
	Leitoscoloplos spp.		*Crepidula plana*
	Mediomastus ambiseta		*Acteocina canaliculata*
	Heteromastus spp.		*Hydrobia totteni*
	Oligochaeta unid. sp.		*Nudibranchia* unid. sp.
	Capitella capitata		*Mytilus edulis*
	Eteone spp.		*Mya arenaria*
	Hydroides dianthus		*Macoma balthica*
Arthropoda	*Pycnogonida* unid. sp.		*Ensis directus*
	Calanoida unid. sp.		*Ilyanassa obsoleta*
	Cyclopoida unid. sp.		*Ilyanassa trivittata*
	Harpacticoida unid. sp.		*Rictaxis punctostriatus*
	Caprella penantis		*Buccinum undatum*
	Unciola irrorata	Chordata	*Molgula manhattensis*
	Corophium insidiosum		*Styela clava*
	Phoxocephalus holbolii		*Botryllus schlosseri*

Source: Zappala 2001.

TABLE 6
VEGETATION OBSERVED IN THE PRIMARY STUDY AREA

Trees		Study Area	
Scientific Name	**Common Name**	**New Jersey**	**New York**
Acer platanoides	Norway maple		√
Acer rubrum	red maple		√
Ailanthus altissima	tree-of-heaven	√	√
Betula alba	white birch		√
Calalpa speciosa	catalpa		√
Diospyros virginiana	persimmon		√
Fraxinus pennsylvanica	Green ash		
Malus sp.	crabapple		√
Morus sp.	mulberry	√	√
Paulownia tomentosa	royal paulowina		√
Pinus sylvestris	scotch pine	√	√
Polygonum orientale	princess-feather		√
Populus deltoids	cottonwood	√	
Populus tremuloides	quacking aspen	√	√
Prunus serotina	black cherry	√	√
Robinia pseudoacacia	black locust	√	√
Salix sp.	willow	√	√
Sassafras albidum	sassafras		√
Rhus copallinum	winged sumac	√	√
Tilia americana	American basswood		√
Quercus rubra	red oak		√
Nyssa sylvatica	black gum		√
Quercus stellata	post oak		√
Ulmus rubra	slippery elm		√
Alnus rugosa	speckled alder	√	√
Gleditsia triacanthos	honey locust		√
Quercus bicolor	swamp white oak		√
Quercus palustris	pin oak	√	√
Quercus velutina	black oak		√
Crataegus sp.	hawthorn		√
Liquidambar styraciflua	sweet gum		√

Shrubs/Vines		Study Area	
Scientific Name	**Common Name**	**New Jersey**	**New York**
Rubus sp.	raspberry	√	√
Baccharis halimifolia	groundsel bush	√	√
Berberis thunbergii	barberry		√
Celastrus orbiculata	Asia bittersweet		√
Elaeagnus angustifolium	Russian olive	√	√
Iva frutescense	marsh elder	√	√
Lonicera japonica	Japanese honeysuckle	√	√
Myrica pensylvanica	northern bayberry		√

TABLE 6 (CONTINUED)
VEGETATION OBSERVED IN THE PRIMARY STUDY AREA

Parthenocissus quinquefolia	Virginia creeper	√	√
Rhus copallina	dwarf sumac	√	√
Rhus typha	staghorn sumac		√
Rosa multiflora	multi-flora rose	√	√
Rubus flagellis	dewberry		√
Sambucus Canadensis	elderberry		√
Toxodendron radicans	poison ivy	√	√
Vitis aestivalis	fox grape		√
Ampelopsis brevipedunculata	porcelain berry	√	√
Cornus alternifolia	alternate-leaf dogwood		√
Viburnum recognitum	northern arrowwood		√
Smilax rotundifolia	geenbriar		√
Lindera benzoin	spicebush		√
Vaccinium corymbosum	highbush blueberry		√
Cornus amomum	silky dogwood		√

Herbaceous		Study Area	
Scientific Name	**Common Name**	**New Jersey**	**New Jersey**
Chlorophyta	algae	√	√
Achillea millefolium	yarrow	√	√
Allium vineale	field garlic		√
Ambrosia trifida	giant ragweed	√	√
Ammophila breviligulata	beach grass		√
Andropogon scoparious	little bluestem grass		√
Andropogon virginicus	broomsedge		√
Apocynum cannibinum	hemp dogbane	√	√
Arctium minus	burdock	√	√
Artemisia vulgaris	mugwort	√	√
Asclepias syriaca	milkweed	√	√
Aster sp.	aster	√	√
Atriplex patula	spearscale		√
Bidens frondosa	devil's beggarticks		√
Centaurea nigra	knapweed	√	√
Chenopodium album	lamb's quarters		√
Chicorium intybus	chicory	√	√
Commelina virginica	dayflower		√
Coronilla varia	crown vetch	√	√
Danthonia spicata	daygrass		√
Datura stramonium	jimson weed		√
Daucus carota	wild carrot	√	√
Digitaria sp.	crabgrass	√	√
Distichlis spicata	spike-grass		√
Fucus sp.	rockweed	√	√
Impatiens capensis	jewelweed	√	√

TABLE 6 (CONTINUED)
VEGETATION OBSERVED IN THE PRIMARY STUDY AREA

Juncus gerardii	black-grass		√
Lactuca serriola	prickly lettuce		√
Lepedium sp.	pepper grass		√
Lespedeza capitata	bush clover	√	√
Linaria vulgaris	butter and eggs	√	√
Lotus corniculatus	birdsfoot trefoil	√	√
Lynchis alba	white cockle	√	
Oenothera sp.	evening primrose	√	√
Panicum virgatum	Panic grass		√
Phragmites australis	common reed	√	√
Phytollaca americana	pokeweed	√	√
Plantago minor	plantain	√	√
Poa pretense	timothy	√	√
Polygonum cuspidatum	Japanese knotweed	√	√
Rumex cripus	dock	√	√
Salicornia europa	gasswort		√
Solanum dulcamara	climbing nightshade		√
Solidago sempervirens	seaside goldenrod		√
Solidago sp.	goldenrod	√	√
Spartina alterniflora	saltmarsh cordgrass		√
Spartina patens	saltmeadow cordgrass		√
Verbascum thapsus	mullein	√	√
Xanthium pensylvanicum	cocklebur		√
Saponaria officinalis	bouncing bet	√	√
Taxodium distichum	dandelion	√	√
Pluckia purpurascens	Saltmarsh Camphor-weed		√
Apocynum cannabinum	dogbane	√	√
Vicia sp.	vetch		√
Amaranthus cannabinus	water hemp		√
Ageratina sp.	snake root		√
Lythrum salicaria	purple loosestrife		√
Carex sp.	umbrella sedge	√	√
Daucus carota	wild carrot	√	√
Rumex acetosella	sheep sorrel		√
Dactylic glomerata	orchard grass	√	√
Plantago lanceolata	English plantain		√
Osmunda cinnamomea	cinnamon fern		√
Osmunda regalis	royal fern		√
Dennstaedtia punctilobula	hayscented fern		√
Tanacetum vulgare	common tansy	√	√
Althaea officinalis	marsh mallow		√
Solanum carolinense	horse nettle		√

Source: The Louis Berger Group, Inc., 2005.
LMS, 2005.

TABLE 7
BIRD SPECIES LIKELY TO USE THE PRIMARY STUDY AREA

Common Name	Scientific Name	LMS (2004) Individuals Observed	Breeding Birds (2000-2004) Individuals Observed	LMS (1994) Individuals Observed	Harbor Herons (1990) Individuals Observed	Bernick (2002-2004) Individuals Observed
Pied-billed grebe	*Podilymbus podiceps*			x	x	
Double-crested cormorant	*Phalacrocorax auritus*	x		x	x	
Great blue heron	*Ardea herodias*	x		x	x	x
Green-backed heron	*Butorides striatus*	x	x	x	x	
Little blue heron	*Egretta caerulea*				x	
Cattle egret	*Bulbucus ibis*				x	
Great egret	*Casmerodius albus*	x		x	x	x
Snowy egret	*Egretta thula*	x		x	x	x
Black-crowned night heron	*Nycticorax nycticorax*	x	x	x	x	x
Yellow-crowned night heron	*Nycticorax violacea*	x	x	x	x	x
Least bittern	*Ixobrychus exilis*				x	
American bittern	*Botaurus lentiginosus*				x	
Glossy ibis	*Plegadis falcinellus*	x		x	x	
Louisiana heron	*Hydranassa tricolor*				x	
White-faced ibis	*Plegadis chihi*				x	
Brant goose	*Branta bernicla*				x	
Canada goose	*Branta canadensis*	x	x	x	x	x
Mallard	*Anas platyrhynchos*	x	x	x	x	x
Black duck	*Anas rubripes*	x	x	x	x	x
Gadwall	*Anas strepera*	x	x	x	x	x
Northern pintail	*Anas acuta*				x	
Ruddy duck	*Oxyura jamaicensis*				x	

TABLE 7 (CONTINUED)
BIRD SPECIES LIKELY TO USE THE PRIMARY STUDY AREA

Common Name	Scientific Name	LMS (2004) Individuals Observed	Breeding Birds (2000-2004) Individuals Observed	LMS (1994) Individuals Observed	Harbor Herons (1990) Individuals Observed	Bernick (2002-2004) Individuals Observed
Canvasback	*Aythya valisineria*				x	
Lesser scaup	*Aythya affinis*				x	
Greater scaup	*Aythya marila*				x	
Green-winged teal	*Anas crecca*			x	x	x
Blue-winged teal	*Anas discors*			x	x	
American wigeon	*Anas americana*			x	x	
Northern shoveler	*Anas clypeata*				x	
Wood duck	*Aix sponsa*		x		x	
Bufflehead	*Bucephala albeola*				x	
Hooded merganser	*Lophodytes cucullatus*			x	x	
Red-breasted merganser	*Mergus serrator*				x	
Mute swan	*Cygnus olor*		x			
Whistling swan	*Cygnus olor columbianus*				x	
Turkey vulture	*Cathartes aura*	x	x	x		
Cooper's hawk	*Accipiter cooperii*		x			
Sharp-shinned hawk	*Accipiter striatus*			x	x	
Red-tailed hawk	*Buteo jamaicensis*	x	x	x	x	
Northern harrier	*Circus cyaneus*		x	x	x	
Rough-legged hawk	*Buteo lagopus*				x	
Osprey	*Pandion haliaetus*		x		x	
Peregrine falcon	*Falco peregrinus*	x	x	x	x	
Merlin	*Falco columbarius*			x		

TABLE 7 (CONTINUED)
BIRD SPECIES LIKELY TO USE THE PRIMARY STUDY AREA

Common Name	Scientific Name	LMS (2004) Individuals Observed	Breeding Birds (2000-2004) Individuals Observed	LMS (1994) Individuals Observed	Harbor Herons (1990) Individuals Observed	Bernick (2002-2004) Individuals Observed
American kestrel	*Falco sparverius*		x	x	x	
Ring-necked pheasant	*Phasianus colchicus*		x	x	x	
King rail	*Rallus elegans*				x	
Clapper rail	*Rallus longirostris*		x	x	x	x
Virginia rail	*Rallus limicola*		x	x	x	x
Sora	*Porzana carolina*				x	
Common moorhen	*Gallinula chloropus*		x	x	x	
American coot	*Fulica americana*				x	
Semipalmated plover	*Charadrius semipalmatus*			x		x
Killdeer	*Charadrius vociferous*	x	x	x	x	x
American woodcock	*Scolopax minor*		x	x	x	x
Common snipe	*Gallinago gallinago*				x	x
Wilson's snipe	*Gallinago delicate*		x			
Spotted sandpiper	*Actitis macularia*	x	x	x	x	x
Solitary sandpiper	*Tringa solitaria*			x	x	
Greater yellowlegs	*Tringa melanoleuca*			x	x	x
Lesser yellowlegs	*Tringa flavipes*			x	x	x
Pectoral sandpiper	*Calidris melanotos*			x	x	
Least sandpiper	*Calidris minutilla*			x		x
Semipalmated sandpiper	*Calidris pusilla*			x	x	
Black-bellied plover	*Pluvialis squataroia*				x	
Red knot	*Calidris canutus*				x	

TABLE 7 (CONTINUED)
BIRD SPECIES LIKELY TO USE THE PRIMARY STUDY AREA

Common Name	Scientific Name	LMS (2004) Individuals Observed	Breeding Birds (2000-2004) Individuals Observed	LMS (1994) Individuals Observed	Harbor Herons (1990) Individuals Observed	Bernick (2002-2004) Individuals Observed
Sanderling	*Calidris alba*				x	
Dowitcher sp.	*Limnodromus* sp.				x	
Short-billed dowitcher	*Limnodromus griseus*					x
Wilson's phalarope	*Steganopus tricolor*				x	
Great black-backed gull	*Larus marinus*	x		x	x	
Herring gull	*Larus argentatus*	x	x	x	x	
Ring-billed gull	*Larus delawarensis*	x		x	x	
Laughing gull	*Larus atricilla*	x		x	x	
Bonaparte's gull	*Larus philadelphia*				x	
Common tern	*Sterna hirundo*				x	
Roseate tern	*Sterna dougallii*				x	
Least tern	*Sterna albifrons*				x	
Black skimmer	*Rynchops niger*	x			x	x
Rock dove	*Columba livia*	x	x	x	x	
Mourning dove	*Zenaida macroura*	x	x	x	x	
Monk parakeet	*Myiopsitta monachus*		x			
Yellow-billed cuckoo	*Coccyzus americanus*			x		
Black-billed cuckoo	*Coccyzus erythropthalmus*		x			
Common barn-owl	*Tyto alba*		x	x	x	x
Screech-owl	*Otus asio*				x	
Great horned owl	*Bubo virginianus*				x	
Snowy owl	*Nyctea scandiaca*				x	

TABLE 7 (CONTINUED)
BIRD SPECIES LIKELY TO USE THE PRIMARY STUDY AREA

Common Name	Scientific Name	LMS (2004) Individuals Observed	Breeding Birds (2000-2004) Individuals Observed	LMS (1994) Individuals Observed	Harbor Herons (1990) Individuals Observed	Bernick (2002-2004) Individuals Observed
Short-eared owl	*Asio flammeus*				x	
Common nighthawk	*Chordeiles minor*					x
Ruby-throated hummingbird	*Archilochus colubris*				x	
Chimney swift	*Chaetura pelagica*	x	x	x		
Belted kingfisher	*Ceryle alcyon*	x	x	x	x	
Northern flicker	*Colaptes auratus*	x	x	x	x	
Hairy woodpecker	*Picoides villosus*			x	x	
Downy woodpecker	*Picoides pubescens*	x	x	x		
Eastern kingbird	*Tyrannus tyrannus*	x	x	x	x	x
Flycatcher sp.	*Empidonax* sp.			x	x	
Great crested flycatcher	*Myiarchus crinitus*		x	x	x	
Eastern phoebe	*Sayornis phoebe*			x		
Eastern wood-pewee	*Contopus virens*			x	x	
Willow flycatcher	*Empidonax traillii*		x	x		x
Tree swallow	*Iridoprocne bicolor*	x	x	x	x	x
Bank swallow	*Riparia riparia*			x	x	
Southern rough-winged swallow	*Stelgidopteryx ruficollis*			x		
Northern rough-winged swallow	*Stelgidopteryx serripennis*		x			
Barn swallow	*Hirundo rustica*	x	x	x	x	x
Blue jay	*Cyanocitta cristata*		x	x	x	
American crow	*Corvus brachyrynchos*	x	x	x	x	

TABLE 7 (CONTINUED)
BIRD SPECIES LIKELY TO USE THE PRIMARY STUDY AREA

Common Name	Scientific Name	LMS (2004) Individuals Observed	Breeding Birds (2000-2004) Individuals Observed	LMS (1994) Individuals Observed	Harbor Herons (1990) Individuals Observed	Bernick (2002-2004) Individuals Observed
Fish crow	*Corvus ossifragus*	x	x	x	x	
Black-capped chickadee	*Parus atricapillus*		x	x	x	
Tufted titmouse	*Parus bicolor*			x		
House wren	*Troglodytes aedon*	x	x	x	x	
Carolina wren	*Thryothorus ludovicianus*		x	x		
Marsh wren	*Cistothorus palustris*	x	x	x	x	x
Northern mockingbird	*Mimus polyglottos*	x	x	x	x	x
Gray catbird	*Dumetella carolinensis*	x	x	x	x	
Brown thrasher	*Toxostoma rufum*		x	x	x	
American robin	*Turdus migratorius*	x	x	x	x	x
Wood thrush	*Hylocichla mustelina*		x	x		
Veery	*Catharus fuscescens*			x	x	
Golden-crowned kinglet	*Regulus satrapa*			x	x	
Ruby-crowned kinglet	*Regulus calendula*			x		
Cedar waxwing	*Bombycilla cedrorum*	x	x	x		
European starling	*Sturnus vulgaris*	x	x	x	x	
White-eyed vireo	*Vireo griseus*		x			
Warbling vireo	*Vireo gilvus*		x			
Solitary vireo	*Vireo solitarius*			x		
Red-eyed vireo	*Vireo olivaceus*			x	x	
Black-&-white warbler	*Mniotilta varia*			x	x	
Nashville warbler	*Vermivora ruficapilla*			x		

TABLE 7 (CONTINUED)
BIRD SPECIES LIKELY TO USE THE PRIMARY STUDY AREA

Common Name	Scientific Name	LMS (2004) Individuals Observed	Breeding Birds (2000-2004) Individuals Observed	LMS (1994) Individuals Observed	Harbor Herons (1990) Individuals Observed	Bernick (2002-2004) Individuals Observed
Northern parula	*Parula americana*			x		
Yellow warbler	*Dendroica petechia*	x	x	x		
Magnolia warbler	*Dendroica magnolia*			x	x	
Yellow-rumped warbler	*Dendroica coronata*	x		x	x	
Chestnut-sided warbler	*Dendroica pensylvanica*			x		
Bay-breasted warbler	*Dendroica castanea*			x		
Blackpoll warbler	*Dendroica striata*			x		
Palm warbler	*Dendroica palmarum*			x		
Ovenbird	*Seiurus aurocapillus*			x		
Common yellowthroat	*Geothlypis trichas*	x	x	x	x	
American redstart	*Setophaga ruticilla*			x	x	
Connecticut warbler	*Oporornis agilis*				x	
Blue-winged warbler	*Vermivora pinus*				x	
Bobolink	*Dolichonyx oryzivorus*				x	
Eastern meadowlark	*Sturnella magna*			x		
Red-winged blackbird	*Agelaius phoeniceus*	x	x	x	x	x
Orchard oriole	*Icterus spurius*		x			
Baltimore oriole	*Icterus galbula*	x	x	x	x	
Boat-tailed grackle	*Quiscalus major*	x				
Common grackle	*Quiscalus quiscula*	x	x	x	x	
Brown-headed cowbird	*Molothrus ater*	x	x	x		
Scarlet tanager	*Piranga olivacea*			x		

TABLE 7 (CONTINUED)
BIRD SPECIES LIKELY TO USE THE PRIMARY STUDY AREA

Common Name	Scientific Name	LMS (2004) Individuals Observed	Breeding Birds (2000-2004) Individuals Observed	LMS (1994) Individuals Observed	Harbor Herons (1990) Individuals Observed	Bernick (2002-2004) Individuals Observed
Northern cardinal	*Cardinalis cardinalis*	x	x	x	x	
Rose-breasted grosbeak	*Pheucticus ludovicianus*			x		
Indigo bunting	*Passerina cyanea*			x		
House finch	*Carpodacus mexicanus*	x	x	x		
Common redpoll	*Carduelis flammea*				x	
American goldfinch	*Carduelis tristis*	x	x	x	x	
Eastern towhee	*Pipilo erythrophthalmus*	x	x	x	x	x
Savannah sparrow	*Passerculus sandwichensis*			x		
American tree sparrow	*Spizella arborea*			x	x	
Chipping sparrow	*Spizella passerina*	x				
Field sparrow	*Spizella pusilla*			x		
White-crowned sparrow	*Zanotrichia leucophrys*			x		
White-throated sparrow	*Zanotrichia albicollis*			x	x	
Seaside sparrow	*Ammodramus maritimus*		x			
Saltmarsh sharp-tailed sparrow	*Ammodramus caudacutus*		x		x	
Lincoln's sparrow	*Melospiza lincolnii*			x		
Swamp sparrow	*Melospiza georgiana*	x	x	x	x	x
Song sparrow	*Melospiza melodia*	x	x	x	x	x
House sparrow	*Passer domesticus*	x	x	x	x	
Number of species:		56	73	116	125	

Sources: Bernick 2005, LMS Data (2004; 1997), NYSDEC 2004, The Trust for Public Land 1990.

TABLE 8
PERCENT COMPOSITION OF BIRD GROUPS FOUND IN THE PRIMARY STUDY AREA

Group	Current Study (June-July 2004)		Breeding Birds (2000-2004)		Andrew Bernick PhD research (2002-2004)		LMS (1994)		Harbor Herons (1990)		All Surveys (1990-2004)	
	Percent of Total	(no. of species)	Percent of Total	(no. of species)	Percent of Total	(no. of species)	Percent of Total	(no. of species)	Percent of Total	(no. of species)	Percent of Total	(no. of species)
Passerines	50.0%	(28)	52.8%	(38)	31.4%	(11)	55.7%	(64)	34.1%	(42)	44.4%	(76)
Shorebirds	3.6%	(2)	5.6%	(4)	25.7%	(9)	8.7%	(10)	10.6%	(13)	9.9%	(17)
Gulls and Terns	8.9%	(5)	1.4%	(1)	2.9%	(1)	3.5%	(4)	7.3%	(9)	5.3%	(9)
Waterfowl	7.1%	(4)	8.3%	(6)	14.3%	(5)	7.0%	(8)	15.4%	(19)	11.7%	(20)
Herons, Ibis and New World Vultures	14.3%	(8)	5.6%	(4)	14.3%	(5)	7.0%	(8)	10.6%	(13)	8.2%	(14)
Raptors	3.6%	(2)	8.3%	(6)	0.0%	(0)	5.2%	(6)	5.7%	(7)	5.3%	(9)
Grebes	0.0%	(0)	0.0%	(0)	0.0%	(0)	0.87%	(1)	0.81%	(1)	0.58%	(1)
Cormorants	1.8%	(1)	0.0%	(0)	0.0%	(0)	0.87%	(1)	0.81%	(1)	0.58%	(1)
Gamebirds	0.0%	(0)	1.4%	(1)	0.0%	(0)	0.87%	(1)	0.81%	(1)	0.58%	(1)
Woodpeckers	3.6%	(2)	2.8%	(2)	0.0%	(0)	2.6%	(3)	1.6%	(2)	1.8%	(3)
Pigeons and Doves	3.6%	(2)	2.8%	(2)	0.0%	(0)	1.7%	(2)	1.6%	(2)	1.2%	(2)
Cuckoos	0.0%	(0)	1.4%	(1)	0.0%	(0)	0.87%	(1)	0.0%	(0)	1.2%	(2)
Hummingbirds and Swifts	1.8%	(1)	1.4%	(1)	0.0%	(0)	0.87%	(1)	0.81%	(1)	1.2%	(2)
Kingfisher	1.8%	(1)	1.4%	(1)	0.0%	(0)	0.87%	(1)	0.81%	(1)	0.58%	(1)
Rails, Gallinules and Coots	0.0%	(0)	4.2%	(3)	5.7%	(2)	2.6%	(3)	4.9%	(6)	3.5%	(6)
Owls	0.0%	(0)	1.4%	(1)	2.9%	(1)	0.87%	(1)	4.1%	(5)	2.9%	(5)
Goatsuckers	0.0%	(0)	0.0%	(0)	2.9%	(1)	0.0%	(0)	0.0%	(0)	0.58%	(1)
Total		56		72*		35		115		123		171*

* - Does not include observations of monk parakeet

Sources: LMS Data (2004; USCG, 1997); NYSDEC 2004; Bernick (2005); The Trust for Public Land 1990.

TABLE 9
NESTING PAIRS OF WADING BIRDS IN ARTHUR KILL/KILL VAN KULL ROOKERIES
1990 TO 2004
NUMBER OF NESTING PAIRS ON SHOOTERS ISLAND

Species	1990		1994		1999		2001		2002		2003		2004	
	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%
Black-crowned night heron	93	32%	215	80%	0	0%	180	69%	0	0%	0	0%	0	0%
Yellow-crowned night heron	2	1%	11	4%	1	100%	1	0%	0	0%	0	0%	0	0%
Great egret	26	9%	85	32%	0	0%	40	15%	0	0%	0	0%	0	0%
Snowy egret	62	21%	3	1%	0	0%	11	4%	0	0%	0	0%	0	0%
Little blue heron	1	0%	0	0%	0	0%	1	0%	0	0%	0	0%	0	0%
Tricolored heron	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Cattle egret	36	12%	3	1%	0	0%	0	0%	0	0%	0	0%	0	0%
Green-backed heron	6	2%	6	2%	0	0%	0	0%	0	0%	0	0%	0	0%
Glossy ibis	35	12%	22	8%	0	0%	23	9%	0	0%	0	0%	0	0%
Unknown	32	11%	24	9%	0	0%	4	2%	0	0%	0	0%	0	0%
Total	293		269		1		261		0		0		0	

Source: Kerlinger, 2004.

TABLE 10
NESTING PAIRS OF WADING BIRDS IN ARTHUR KILL/KILL VAN KULL ROOKERIES
1990 TO 2004
NUMBER OF NESTING PAIRS ON PRALLS ISLAND

Species	1990		1994		1999		2001		2002		2003		2004	
	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%
Black-crowned night heron	124	31%	38	15%	0	0%	0	0%	0	0%	0	0%	0	0%
Yellow-crowned night heron	1	0%	7	3%	0	0%	0	0%	0	0%	0	0%	0	0%
Great egret	13	3%	4	2%	0	0%	0	0%	0	0%	0	0%	0	0%
Snowy egret	75	19%	52	21%	0	0%	0	0%	0	0%	0	0%	0	0%
Little blue heron	1	0%	1	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Tricolored heron	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Cattle egret	62	16%	51	21%	0	0%	0	0%	0	0%	0	0%	0	0%
Green-backed heron	1	0%	3	1%	0	0%	0	0%	0	0%	0	0%	0	0%
Glossy ibis	105	27%	57	23%	0	0%	0	0%	0	0%	0	0%	0	0%
Unknown	12	3%	33	13%	0	0%	0	0%	0	0%	0	0%	0	0%
Total	394		246		0		0		0		0		0	

Source: Kerlinger, 2004.

TABLE 11
NESTING PAIRS OF WADING BIRDS IN ARTHUR KILL/KILL VAN KULL ROOKERIES
1990 TO 2004
NUMBER OF NESTING PAIRS ON ISLE OF MEADOWS

Species	1990		1994		1999		2001		2002		2003		2004	
	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%
Black-crowned night heron	208	44%	142	28%	389	51%	0	0%	0	0%	0	0%	0	0%
Yellow-crowned night heron	1	0%	2	0%	1	0%	0	0%	0	0%	0	0%	0	0%
Great egret	10	2%	34	7%	95	12%	0	0%	0	0%	0	0%	0	0%
Snowy egret	43	9%	36	7%	94	12%	0	0%	0	0%	0	0%	0	0%
Little blue heron	1	0%	4	1%	2	0%	0	0%	0	0%	0	0%	0	0%
Tricolored heron	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Cattle egret	54	12%	87	17%	3	0%	0	0%	0	0%	0	0%	0	0%
Green-backed heron	1	0%	0	0%	1	0%	0	0%	0	0%	0	0%	0	0%
Glossy ibis	102	22%	165	32%	155	20%	0	0%	0	0%	0	0%	0	0%
Unknown	49	10%	40	8%	22	3%	0	0%	0	0%	0	0%	0	0%
Total	469		510		762		0		0		0		0	

Source: Kerlinger, 2004.

TABLE 12
RARE SPECIES DOCUMENTED IN UNION COUNTY, NEW JERSEY

Common Name	Scientific Name	NJ State Status; Global Rank; State Rank	Habitat Preference[1]	Habitat Present on Project Site
Birds				
Upland sandpiper	*Bartramia longicauda*	E; G5; S1B	Resides in grasslands, fallow fields, and meadows associated with pastures, farms, or airports. Nest in upland meadows and short-grass grasslands. Require early successional habitat.	No
Savannah sparrow	*Passerculus sandwichensis*	T/T; G5; S2B, S4N	Breeds in hay and alfalfa fields, fallow fields, grasslands, upland meadows, airports, pastures, and vegetated landfills. When not breeding, reside in coastal dunes, dry areas in salt marshes, roadsides, agricultural and fallow fields, pastures, airports, vegetated landfills and golf courses.	No
Least tern	*Sterna antillarum*	E; G4; S1B	In NJ, nesting colonies are found mainly along barrier island beaches or mainland beach strands, as well as on sandy dredge disposal sites. Typically prefer bare to sparsely vegetated sandy areas just beyond the reach of spring tides. Forage in bays, lagoons, estuaries, rivers and lakes along the coast.	No
Barred owl	*Strix varia*	T/T; G5; S3B	In northern NJ, reside in hemlock ravines and mixed deciduous wetland or riparian forests. In northern NJ, often favored sites that were at least 500m from human habitation.	No
Reptiles				
Wood turtle	*Clemmys insculpta*	T; G4; S3	Requires freshwater streams, brooks, creeks, or relatively remote rivers. Sometimes found on abandoned rail beds or agricultural fields and pastures. Usually occur in areas that are over half of a mile away from populated areas.	No
Bog turtle	*Clemmys muhlenbergii*	E; G3; S2	Found in limestone fens, sphagnum bogs, and wet grassy pastures with soft, muddy bottoms and perennial groundwater seepage. Usually in well drained areas; bask and nest in open areas	No
Amphibians				
Longtail salamander	*Eurycea longicauda longicauda*	T; G5T5; S2	Reside in clean, limestone, spring-fed seepages, spring kettleholes, swampy floodplains, artesian wells, and spring-fed ponds. Sometimes found in abandoned mines or caves with calcareous groundwater.	No

TABLE 12 (CONTINUED)
RARE SPECIES DOCUMENTED IN UNION COUNTY, NEW JERSEY

Common Name	Scientific Name	NJ State Status; Global Rank; State Rank	Habitat Preference[1]	Habitat Present on Project Site
Invertebrates				
Triangle floater	*Alasmidonta undulata*	T; G4; S3	Generalist; found in various freshwater stream and river habitats[1]	No
A Borer moth	*Papaipema aerata*	Not listed; GH; SH	No information available.	Unknown
Long dash	*Polites mystic*	Not listed; G5; S3?	Found in open, moist areas; meadows, marshes, streamsides and wood edges[3].	Unlikely
Checkered white	*Pontia protodice*	T; G4; S1	Reside in open areas, including savannahs, old fields, vacant lots, and power line right of ways; sometimes found at forest edges[1]	Urban vacant lot community
Plants				
Bebb's sedge	*Carex Bebbii*	Not listed; G5; S2	Found in wet, often calcareous, open soils of watersides, low meadows, and swales.	No
Variable sedge	*Carex polymorpha*	E; G3; S1	Found in dry, open woods and shaded edges, and meadows; usually sandy soils.	No
Wild comfrey	*Cynoglossum virginianum var. virginianum*	Not listed; G5T5; S2	Found in well-drained open areas, and thin deciduous woods; usually on trap rock.	No
Pale duckweed	*Lemna valdiviana*	E; G5; S1	Aquatic plant. Found on still waters in ponds, streams and swamps.	Unlikely
Northern blazing-star	*Liatris scariosa var novae-angliae*	E; G5?T3; SH	Grows on open, dry and sandy soils in thin woods and shaded areas.	No

Source: New Jersey Natural Heritage Program
[1]Beans, B.E. and L. Niles. Endangered and Threatened Wildlife of New Jersey. New Jersey: Rutgers University Press. 303pp. 2003.
[2]Hough, M.Y. New Jersey Wild Plants. New Jersey: Harmony Press. 414pp. 1983.
[3]Struttman, J. 2005. Butterflies of North America-Long dash. USGS Northern Prairie Research Center. Available: *http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/usa/546.htm.*

TABLE 12 (CONTINUED)
RARE SPECIES DOCUMENTED IN UNION COUNTY, NEW JERSEY

Notes:

Global Ranks

G3: Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range or because of other factors making it vulnerable to extinction throughout it's range; with the number of occurrences in the range of 21 to 100.
G4: Apparently secure globally; although it may be quite rare in parts of its range, especially at the periphery
G5: Demonstrably secure globally; although it may be quite rare in parts of its range, especially at the periphery
GH: Of historical occurrence throughout its range i.e., formerly part of the established biota, with the exception that it may be rediscovered.

State Ranks

S1: Critically imperiled in NJ because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state. These are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered.
S2: Imperiled in NJ because of rarity (6 to 20 occurrences). Historically many of these elements may have been more frequent but are now known from very few extant occurrences, primarily because of habitat destruction. Diligent seaching may yield additional occurrences.
S3: Rare in state with 21 to 100 ocurrences (plants in this category only have 21 to 50 occurences). Includes elements which are widely distributed in the state but with small populations/acreage or elements with restricted distribution, but locally abundant. Not yet imperiled in the state but may soon be if current trends continue. Searching often yields additional occurrences.
S4: Apparently secure in state, with many occurrences
SH: Elements of historical occurrence in NJ. Despite searching of historical occurrences and/or potential habitat, no extant occurrences are known.

T: Element ranks containing a "T" indicate that the infraspecific taxon is being ranked differently than the full species.
B: Refers to the breeding population of the element in the state
N: Refers to the non-breeding population of the element in the state
?: Either it has not been determined if the recored is indicative of significant habitat or the identification of the species or community may be confusing or disputed

TABLE 13
ENDANGERED, THREATENED, OR WILDLIFE SPECIES OF SPECIAL CONCERN IN THE PRIMARY STUDY AREA

Common Name	Scientific Name	Federal	New York	New Jersey	Comments	Habitat Requirements[I,II]	Breeding Habitat Present	Foraging Habitat Present
Pied-billed grebe[2]	*Podilymbus podiceps*	-	T	E/SC	Breeding populations are endangered in NJ/Non-breeding populations are of special concern in NJ	Typically construct floating nests in well-vegetated lakes, ponds, sluggish streams and marshes in open water among reeds or rushes. Feed primarily by diving under water for aquatic insects. They also feed on snails, fish, frogs, and incidental aquatic vegetation	Yes	Yes
Great blue heron[1,2]	*Ardea herodias*	-	-	SC	Only breeding populations are listed	Breed in freshwater and brackish marshes, swamps, lakes, rivers and mangroves. Builds nests in deciduous trees. Opportunistic species; feed primarily on fish, but also eat aquatic invertebrates, small vertebrates, human scraps, nestlings, and small mammals.	Yes	Yes
Black-crowned night heron[1,2]	*Nycticorax nycticorax*	-	-	T	Only breeding populations are listed	Breed in marshes, swamps, ponds, lakes, lagoons, mangroves, and occasionally grasslands and rice fields. Construct nests in deciduous trees and sometimes shrubs. Diet consists mainly of fish, but can also include insects, eggs, young birds, small mammals, amphibians, and other vertebrates.	Yes	Yes

TABLE 13 (CONTINUED)
ENDANGERED, THREATENED, OR WILDLIFE SPECIES OF SPECIAL CONCERN IN THE PRIMARY STUDY AREA

Common Name	Scientific Name	Federal	New York	New Jersey	Comments	Habitat Requirements[I,II]	Breeding Habitat Present	Foraging Habitat Present
Yellow-crowned night heron[1,2]	*Nycticorax vidaceus*	-	-	T		Breed in marshes, swamps, lakes, lagoons, tidal mud flats, rocky shores and mangroves. Construct nests in deciduous trees in wooded habitats near water; also in parkland and suburbs. Feed primarily on crustaceans, particularly crayfish and crabs; also feed on lower vertebrates, fish, insects, leeches, and young birds.	Yes	Yes
Sharp-shinned hawk[2]	*Accipiter striatus*	-	SC	SC		Breed in woodlands, and mountainous coniferous/deciduous forests. Construct nests primarily in coniferous trees, and occasionally in deciduous trees. Feeds primarily on birds which are obtained in flight. Rarely feed on small mammals, frogs, lizards and insects.	No	No
Northern Harrier[2]	*Circus cyaneus*	-	T	E/SC	Hunts in marsh. Breeding populations are listed as endangered in NJ/Non-breeding populations are listed as special concern in NJ	Breed in prairies, savannas, sloughs, wet meadows, and marshes. Construct flimsy nests on slightly elevated ground or in thick vegetations. Occasionally builds nests in shrubs. Feed mainly on small mammals, and also on small vertebrates, insects, and carrion. Searches for prey in low flights.	Yes	Yes

TABLE 13 (CONTINUED)
ENDANGERED, THREATENED, OR WILDLIFE SPECIES OF SPECIAL CONCERN IN THE PRIMARY STUDY AREA

Common Name	Scientific Name	Federal	New York	New Jersey	Comments	Habitat Requirements[I,II]	Breeding Habitat Present	Foraging Habitat Present
Peregrine Falcon[1,2,3]	*Falco peregrinus*	-	E	E	Nests under Goethals Bridge	Mainly breed in open habitats but also utilizes open forests and tall buildings. Construct nests on cliffs and ledges; rarely will use an old tree nest or cavity. Feeds primarily on birds which are obtained in flight.	Yes	Yes
American kestrel[2]	*Falco sparverius*	-	-	SC	Only breeding populations are listed	Breed in open or partly open habitats with scattered trees and also in cultivated and urban areas. Construct nests primarily in snags and sometimes on cliffs. Feeds mainly on terrestrial invertebrates but sometimes on small vertebrates and small mammals.	Yes	Yes
Spotted sandpiper[1,2]	*Actitis macularia*	-	-	SC	Only breeding populations are listed	Breed in many different types of habitats. Construct nests on elevated grounds in grass, among rocks, within moss, forbs, shrubs etc. Feed primarily on terrestrial invertebrates especially flying insects; occasionally feed on aquatic invertebrates.	Yes	Yes
Black skimmer[1]	*Rynchops niger*	-	SC	E/T	Breeding populations listed as endangered in NJ/ non-breeding populations listed as threatened in NJ	Breed on coastal beaches, sandbars, shell banks, islands, salt marshes, and sometimes on gravel rooftops. Nests are unlined scrapes among shells. Feed primarily on fish, and sometimes on aquatic invertebrates.	Yes	Yes

TABLE 13 (CONTINUED)
ENDANGERED, THREATENED, OR WILDLIFE SPECIES OF SPECIAL CONCERN IN THE PRIMARY STUDY AREA

Common Name	Scientific Name	Federal	New York	New Jersey	Comments	Habitat Requirements[I,II]	Breeding Habitat Present	Foraging Habitat Present
Common barn-owl[2]	*Tyto alba*	-	-	SC		Breed in open and partly open habitats, especially grasslands, farmlands. Often breed in or near towns. Mainly build nests in snags, and also are known to use buildings, cliff crevices, and caves. Feed mainly on small mammals (mostly rodents) and occasionally on birds. Rarely feed on amphibians, reptiles and insects.	Yes	Yes
Veery[2]	*Catharus fuscescens*	-	-	SC	Only breeding populations are listed	Breed in shaded moist woodlands that have understories. Primarily construct nests on the ground and sometimes in shrubs. Feed mainly on terrestrial invertebrates and sometimes on fruit.	No	No
Solitary vireo[2]	*Vireo solitarius*	-	-	SC	Only breeding populations are listed	Breed in coniferous to deciduous woodlands. In the east, usually construct nests in coniferous trees; sometimes will use deciduous trees. Feed almost entirely on insects and on some fleshy fruits (mostly in January).	No	No
Northern parula[2]	*Parula americana*	-	-	SC	Only breeding populations are listed	Breed mainly in open coniferous and deciduous woods. Construct nests in deciduous trees. Feed almost entirely on insects.	No	Yes

TABLE 13 (CONTINUED)
ENDANGERED, THREATENED, OR WILDLIFE SPECIES OF SPECIAL CONCERN IN THE PRIMARY STUDY AREA

Common Name	Scientific Name	Federal	New York	New Jersey	Comments	Habitat Requirements[I,II]	Breeding Habitat Present	Foraging Habitat Present
Eastern meadowlark[2]	*Sturnella magna*	-	-	SC	Only breeding populations are listed	Breed in grasslands, savannahs, and fields. Construct nests in natural or scraped depressions on the ground in dense cover. Feed primarily on terrestrial invertebrates and occasionally on seeds and fruit.	No	No
Savannah sparrow[2]	*Passerculus sandwichensis*	-	-	T	Only breeding populations are listed	Breed in grasslands, meadows, tundra, marshes, bogs, and cultivated grassy areas. Construct nests in natural or excavated depressions on the ground in areas that are well concealed by vegetation. Feed primarily on terrestrial invertebrates, and sometimes on grass seeds and snails.	Yes	Yes
Northern diamondback terrapin[1,2]	*Malaclemys t. terrapin*	-	-	SC		Habitat is coastal marshes, tidal flats, coves, estuaries, and inner edges of barrier beaches. Prefers sheltered and unpolluted bodies of salt or brackish water. Feeds on fish, crustaceans, mollusks, and insects.	Yes	Yes
Fowler's toad[2]	*Bufo woodhousii fowlen*	-	-	SC		Habitat is mainly sandy areas near marshes, around shores of lakes or in river valleys.	Yes	Yes

Notes:
[1] - Observed by LMS 2004
[2] - Observed by LMS 1994 (USCG, 1997).
[3] - Listed by the NY Natural Heritage Program

E = Endangered
T = Threatened
SC = Special Concern
BCC=Bird of Conservation Concern

Sources:
I. Ehrlich, P.R., D.S. Dobkin, and D. Wheye. The Birders Handbook. A Field Guide to the Natural History of North American Birds. New York: Simon and Schuster. 785pp. 1988.
II. Conant, R. and J.T. Collins. Peterson Field Guide to the Reptiles and Amphibians of Eastern and Central North America. New York: Houghton Mifflin Company. 616pp. 1998

Appendix H.2
Wetland Data Forms

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	A8
Field Investigators:	C. Hanlon/E. McTague	Date:	9/30/04
Project/Site:	Goethals Bridge	County:	Richmond
Applicant/Owner:	Port Authority of NY/NJ	State:	NY

Wetland: SP-1

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	H	FACW
2	*Baccharis halmifolia*	S	FACW
3			
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-20	10YR1/1			organic

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: Low chroma values

Wetland Hydrology

Ground Surface Inundated? Yes Depth (Inches): 12"

Soil Saturated? Yes Depth to Saturation (Inches): 0

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: Drainage patterns

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-2

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Cornus amomum*	S	FACW
2	*Baccharis halmifolia*	S	FACW
3	*Parthenocissus quinquefolia*	V	FACU
4	*Rhus copallina*	S	NI
5	*Robinia pseudoacacia*	T	FACU-
6	*Phragmites australis*	H	FACW
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-4	10YR2/1			silty sand
4-10	10YR3/3			silty sand
10-16	10YR5/6			sand
16-20	10YR3/3	5YR5/6	10	silty sand

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale: High chroma values

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? Yes Depth to Saturation (Inches): 14

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? Yes

Comments: Disturbed fill material present in upland.

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	B20
Field Investigators:	C. Hanlon/E. McTague	Date:	10/01/04
Project/Site:	Goethals Bridge	County:	Richmond
Applicant/Owner:	Port Authority of NY/NJ	State:	NY

Wetland: SP-3

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	H	FACW
2	*Baccharis halmifolia*	S	FACW
3	*Distichilis spicata*	H	FACW+
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-3	10YR4/4			sand
3-11	7.5YR5/6	10YR4/6	10	sandy silt
11-18	2.5YR4/6	10YR5/8	15	silty sand

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: mottling

Wetland Hydrology

Ground Surface Inundated? Yes Depth (Inches): 10

Soil Saturated? Yes Depth to Saturation (Inches): 0

Depth to Free-standing Water in Probe Hole (Inches): 0

Field Evidence of Hydrology: Open water
Old Place Creek streambed

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-4

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Rhus copallinum*	H	NI
2	*Solidago* spp.	H	--
3	*Saponaria officinalis*	H	FACU-
4	*Phragmites australis*	H	FACW
5	*Poa* spp.	H	--
6	*Panicum* spp	H	--
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

___ Yes (Hydrophytic Vegetation Criterion Met)

✓ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-10	10YR3/4			silty sand
10-20	7.5YR4/6			sand

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale: High chroma values
No mottling

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? No Depth to Saturation (Inches): ---

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? No **Comments:**

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	E17
Field Investigators:	C. Hanlon/E. McTague	Date:	10/04/04
Project/Site:	Goethals Bridge	County:	Richmond
Applicant/Owner:	Port Authority of NY/NJ	State:	NY

Wetland: SP-5

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Spartina alterniflora*	H	OBL
2	*Spartina patens*	H	FACW+
3	*Pluchea purpurascens*	H	OBL
4	*Phragmites australis*	H	FACW
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-20	10YR2/1			muck

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: Low chroma values

Wetland Hydrology

Ground Surface Inundated? Yes Depth (Inches): 1

Soil Saturated? Yes Depth to Saturation (Inches): 0

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: water stained vegetation, inundation draniage patterns

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-6

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	H	FACW
2	*Ailanthus altissima*	T	NI
3			
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-4	10YR3/3			sandy silt
>4	auger refusal			

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale: High chroma values, no mottling.

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? No Depth to Saturation (Inches): ---

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? Yes

Comments: upland soil point in fill

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	G10
Field Investigators:	C. Hanlon/E. McTague	Date:	10/05/04
Project/Site:	Goethals Bridge	County:	Richmond
Applicant/Owner:	Port Authority of NY/NJ	State:	NY

Wetland: SP-7

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Tilia americana*	T	FACU
2	*Quercus rubra*	T	FACU-
3	*Prunus serotina*	T	FACU
4	*Polygonum cuspitatum*	H	FACU-
5	*Parthenocissus quinquefolia*	V	FACU
6	*Toxicodendron radicans*	V	FAC
7	*Tartarian honeysuckle*	V	FACU
8			

>50% FAC or Wetter, or Prevalence Index <3?

___ Yes (Hydrophytic Vegetation Criterion Met)

✓ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-2	10YR3/2			muck
2-18	10YR3/1			muck

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma values

Wetland Hydrology

Ground Surface Inundated? Yes Depth (Inches): 1

Soil Saturated? Yes Depth to Saturation (Inches): 0

Depth to Free-standing Water in Probe Hole (Inches): 0

Field Evidence of Hydrology: water stained vegetation, inundation drainage patterns

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-8

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	H	FACW
2	*Tilia americana*	T	FACU
3			
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-3	10YR3/2			loamy sand
3-18	10YR3/8			silty sand

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale: high chroma values, no mottling

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? No Depth to Saturation (Inches): ---

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? Yes

Comments: upland is fill material

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	I15
Field Investigators:	C. Hanlon/E. McTague	Date:	10/06/04
Project/Site:	Goethals Bridge	County:	Richmond
Applicant/Owner:	Port Authority of NY/NJ	State:	NY

Wetland: SP-9

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	H	FACW
2	*Baccharis halmifolia*	S	FACW
3			
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-16	10YR2/1			org. loamy sand
16-18	10YR5/1			sand

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma values

Wetland Hydrology

Ground Surface Inundated? no Depth (Inches): ---

Soil Saturated? Yes Depth to Saturation (Inches): 2

Depth to Free-standing Water in Probe Hole (Inches): 0

Field Evidence of Hydrology: saturation
draniage patterns

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-10

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	H	FACW
2	*Baccharis halmifolia*	S	FACW
3	*Panicum* spp.	H	--
4	*Elaeagnus angustifolia*	S	FACU
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-4	10YR2/1			loamy sand
4-6	7.5YR4/4			sandy silt
6-16	10YR3/4			sand
16-18	10YR5/3			sand

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale: high chroma values, no mottling

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? No Depth to Saturation (Inches): ---

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? Yes

Comments: Island adjacent to Arthur Kill, dredged spoil

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	K4
Field Investigators:	C. Hanlon/E. McTague	Date:	10/08/04
Project/Site:	Goethals Bridge	County:	Union
Applicant/Owner:	Port Authority of NY/NJ	State:	NJ

Wetland: SP-11

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	H	FACW
2	*Poa* spp.	H	FACW
3			
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Urban land

Is the Soil Listed as Hydric? N

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-2	10YR3/1			clay silt
2-12	5YR3/3			silty clay
>12	auger refusal			

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma values, Fe redox

Wetland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? Yes Depth to Saturation (Inches): 13

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: Saturation

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-12

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Apocynum sibiricum*	H	FAC
2	*Poa* spp.	H	FACW
3	*Vicia sativa*	H	FACU-
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

___ Yes (Hydrophytic Vegetation Criterion Met)

✓ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Urban land

Is the Soil Listed as Hydric? N

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-5	10YR3/2			sandy loam
5-10	5YR4/6			silt loam
10-14	10YR3/1			silt sand
14-18	5YR4/4			gravelly sandy lm

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale: high chroma values, no mottling

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? No Depth to Saturation (Inches): ---

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? Yes

Comments: road embankment-upland

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	L2
Field Investigators:	C. Hanlon/E. McTague	Date:	10/08/04
Project/Site:	Goethals Bridge	County:	Union
Applicant/Owner:	Port Authority of NY/NJ	State:	NJ

Wetland: SP-13

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	H	FACW
2	*Lonicera japonica*	H	FAC-
3	*Rhus copallinum*	S	NI
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Urban Land

Is the Soil Listed as Hydric? N

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-6	10YR4/1			organic loam
6-10	10YR4/2	10YR6/8	10	gravel sandy loam
10-18	10YR4/2	5YR4/5	20	gravelly loam

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma values, mottling, iron redox

Wetland Hydrology

Ground Surface Inundated? no Depth (Inches): ---

Soil Saturated? yes Depth to Saturation (Inches): 12

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: water stained vegetation
saturation

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-14

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	H	FACW
2	*Poa* spp.	H	—
3			
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Urban Land

Is the Soil Listed as Hydric? N

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
	Fill debris			

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale:

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? No Depth to Saturation (Inches): ---

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? Yes

Comments: fill in uplands

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	M6
Field Investigators:	C. Hanlon/E. McTague	Date:	10/08/04
Project/Site:	Goethals Bridge	County:	Union
Applicant/Owner:	Port Authority of NY/NJ	State:	NJ

Wetland: SP-15

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	H	FACW
2	*Toxicodendron radicans*	V	FAC
3			
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Urban Land

Is the Soil Listed as Hydric? N

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-8	10YR3/2			loamy clay
8-12	7.5YR3/2	7.5YR5/6	20	silty sand
12-18	5YR3/4			clayey silt

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma values, mottling

Wetland Hydrology

Ground Surface Inundated? Yes Depth (Inches): 1

Soil Saturated? Yes Depth to Saturation (Inches): 0

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: drainage patterns
inundation

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-16

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Populus deltoides*	H	FAC
2	*Polygonum cuspitatum*	H	FACU-
3	*Parthenocissus quinquefolia*	V	FACU
4	*Artemisia vulgaris*	V	NI
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

___ Yes (Hydrophytic Vegetation Criterion Met)

✓ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Urban Land

Is the Soil Listed as Hydric? N

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
	Fill debris			

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale:

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? No Depth to Saturation (Inches): ---

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? Yes

Comments: upland is fill/debris

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	H-10
Field Investigators:	C. Hanlon/E. McTague	Date:	10/18/04
Project/Site:	Goethals Bridge	County:	Richmond
Applicant/Owner:	Port Authority NY/NJ	State:	NY

Wetland: SP-17

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Acer rubrum*	T	FAC
2	*Viburnum recognitum*	S	FACW-
3	*Osmunda cinnamomea*	H	FACW
4	*Phragmites australis*	H	FACW
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-18	10YR3/1			muck

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma values

Wetland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? Yes Depth to Saturation (Inches): 0

Depth to Free-standing Water in Probe Hole (Inches): 0

Field Evidence of Hydrology: drainage patterns, water stained veg

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-18

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Viburnum recognitum*	S	FACW-
2	*Lindera benzoin*	S	NI
3	*Nyssa Sylvatica*	T	FAC
4	*Prunus serotina*	T	FACU
5	*Acer rubrum*	T	FAC
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

___ Yes (Hydrophytic Vegetation Criterion Met)

✓ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-2				organic duff
2-4	10YR2/1			sandy loam
4-12	7.5YR3/4			loamy sand
12-16	7.5YR3/4			sand
16-18	7.5YR4/6			sand

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale: high chroma values, no mottling

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? Yes Depth to Saturation (Inches): 16

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? No

Comments:

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	P10
Field Investigators:	C. Hanlon/E. McTague	Date:	10/18/04
Project/Site:	Goethals Bridge	County:	Richmond
Applicant/Owner:	Port Authority of NY/NJ	State:	NY

Wetland: SP-19

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Acer rubrum*	T	FAC
2	*Phragmites australis*	H	FACW
3			
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Booton-Haledon Complex

Is the Soil Listed as Hydric? N

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-3	10YR2/1			muck
3-12	10YR6/1			loamy sand
12-18	10YR6/1			sand

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma values, sulfur odor

Wetland Hydrology

Ground Surface Inundated? Yes Depth (Inches): 1

Soil Saturated? Yes Depth to Saturation (Inches): 0

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: drainage patterns, inundation

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-20

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Acer rubrum*	T	FAC
2	*Prunus serotina*	T	FACU
3	*Viburnum recognitum*	S	FACW-
4	*Rhus copallina*	S	NI
5	*Dactylis glomerata*	H	FACU
6	*Linaria vulgaris*	H	NI
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

___ Yes (Hydrophytic Vegetation Criterion Met)

✓ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Booton-Haledon Complex

Is the Soil Listed as Hydric? N

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-1	10YR3/2			loamy sand
1-10	10YR5/3			sand
10-14	10YR6/3			sand
14-18	10YR6/3	5YR5/6	10	sand

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale: high chroma values

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? No Depth to Saturation (Inches): ---

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? No

Comments:

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	Q-5
Field Investigators:	C. Hanlon/E. McTague	Date:	10/20/04
Project/Site:	Goethals Bridge	County:	Richmond
Applicant/Owner:	Port Authority of NY/NJ	State:	NY

Wetland: SP-21

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Baccarharis halmifolia*	S	FACW
2	*Phragmities australis*	H	FACW
3			
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-2	10YR3/2			muck
2-4	10YR4/4			sandy loam
4-8	10YR4/1			sandy silt
8-18	10YR4/1	10YR3/6	5	clay loam

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma values, mottling

Wetland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? Yes Depth to Saturation (Inches): 0

Depth to Free-standing Water in Probe Hole (Inches): 2

Field Evidence of Hydrology: drainage patterns, water stained veg

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-22

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Populus tremula*	T	FACU
2	*Viburnum recognitum*	S	FACW-
3	*Rosa multiflora*	S	FACU
4	*Baccarharis halmifolia*	S	FACW
5	*Soliadago*	H	--
6	*Lonicera japonica*	V	FAC-
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

___ Yes (Hydrophytic Vegetation Criterion Met)

✓ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-10	10YR3/4			loamy sand
10-14	5YR4/4			laomy sand
14-16	5YR3/4			clay loam
16+	auger refusal			

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale: high chroma values, no mottling

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? No Depth to Saturation (Inches): ---

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? No

Comments:

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	R-11
Field Investigators:	C. Hanlon/E. McTague	Date:	10/20/04
Project/Site:	Goethals Bridge	County:	Richmond
Applicant/Owner:	Port Authority of NY/NJ	State:	NY

Wetland: SP-23

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Quercus palustris*	T	FACW
2	*Phragmities australis*	H	FACW
3	*Spartinapatens*	H	FACW+
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-15	10YR2/1			muck
15-24	G1 2.5 10Y			silty sand

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma values, gleying
sulfur odor

Wetland Hydrology

Ground Surface Inundated? Yes Depth (Inches): 8

Soil Saturated? Yes Depth to Saturation (Inches): 0

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: inundation, incoming tide

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-24

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Quercus palustris*	T	FACW
2	*Morus alba*	T	UPL
3	*Lonicera japonica*	V	FAC-
4	*Viburnum recognitum*	S	FACW-
5	*Phragmites australis*	H	FACW
6	*Poa* spp.	H	--
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-2	10YR3/1			loamy sand
2-6	10YR4/4			sandy loam
6-11	7.5YR4/6			sandy silt
11-18	10YR6/4			sand

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale: high chroma values, no mottling

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? No Depth to Saturation (Inches): ---

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? No

Comments:

FIELD DATA FORM

Job Number:	JR2663	Nearest Wetland Flag:	S-10
Field Investigators:	C. Hanlon/E. McTague	Date:	10/21/04
Project/Site:	Goethals Bridge	County:	Richmond
Applicant/Owner:	Port Authority of NY/NJ	State:	NY

Wetland: SP-25

Wetland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Phragmites australis*	H	FACW
2			
3			
4			
5			
6			
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

✓ Yes (Hydrophytic Vegetation Criterion Met)

___ No (Hydrophytic Vegetation Criterion Not Met)

Wetland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-1	10YR2/1			organic loam
1-6	10YR5/2	10YR7/8	10	sandy loam
6-10	10YR6/2	10YR6/4	5	sand
10-14	10YR5/2	7.5YR4/6	30	sandy silt
14-18	10YR5/3	7.5YR4/6	20	silty clay

Hydric Soil Criterion Met?

✓ Yes (Hydric Soil Criterion Met)

___ No (Hydric Soil Criterion Not Met)

Rationale: low chroma values, mottling

Wetland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? Yes Depth to Saturation (Inches): 0

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: drainage patterns, water stained veg

Evidence of Prolonged Saturation and/or Inundation?

✓ Yes (Wetland Hydrology Criterion Met)

___ No (Wetland Hydrology Criterion Not Met)

Upland: SP-26

Upland Vegetation

	Dominant Plant Species	Stratum	Indicator Status
1	*Daucus carota*	H	NI
2	*Poa* sp.	H	-
3	*Artemisia vulgaris*	H	NI
4	*Agropyron repens*	H	FACU-
5	*Plantago lanceolata*	H	UPL
6	*Ambrosia artemisifolia*	H	FACU
7			
8			

>50% FAC or Wetter, or Prevalence Index <3?

___ Yes (Hydrophytic Vegetation Criterion Met)

✓ No (Hydrophytic Vegetation Criterion Not Met)

Upland Soils

Soil Series/Phase: Ipswich-Pawcatuck-Matunuck mucky peats

Is the Soil Listed as Hydric? Y

Depth (Inches)	Matrix	Mottling	Mottling %	Texture
0-3	10YR2/1			loamy silt
3-16	10YR3/2			loamy sand
16-18	10YR6/3	10YR7/8	20	silt

Hydric Soil Criterion Met?

___ Yes (Hydric Soil Criterion Met)

✓ No (Hydric Soil Criterion Not Met)

Rationale: high chroma values

Upland Hydrology

Ground Surface Inundated? No Depth (Inches): ---

Soil Saturated? No Depth to Saturation (Inches): ---

Depth to Free-standing Water in Probe Hole (Inches): ---

Field Evidence of Hydrology: None

Evidence of Prolonged Saturation and/or Inundation?

___ Yes (Wetland Hydrology Criterion Met)

✓ No (Wetland Hydrology Criterion Not Met)

Atypical Situation in Upland and/or Wetland? No

Comments:

Appendix H.3
Wetland Functions and Values

WETLAND FUNCTIONS AND VALUES

The functions and values of the wetlands within the Primary Study Area were identified using a descriptive methodology, developed by the U.S. Army Corps of Engineers, New England Regulatory Division (USACE, 1995) for use with highway planning and engineering and the National Environmental Policy Act (NEPA). The method considers eight wetland functions and five wetland values that are part of the USACE's Section 404 wetland permit process (see Table 1). A number of function-specific considerations (ranging from eight to 32, depending on the function or value) are used to identify whether the function or value is occurring within the wetland. Once identified, the dominant or principal functions are determined. Functions and values are considered principal if they are an important physical component of a wetland ecosystem, and/or are considered of special value to society, from a local, regional, and/or national perspective (USACE, 1995). Identifying dominant wetland functions within a given wetland complex can be used to guide future mitigation efforts to replace those functions lost or diminished as a result of construction activities.

The individual wetlands were categorized into five wetland areas based on similarity of type (tidal versus non-tidal) and their location within the Primary Study Area (see Table 2). The first area is the Old Place Creek wetland complex and the adjacent Arthur Kill (Wetlands A, B, C, D, E and F). The second area includes the wetlands associated with Goethals Bridge Pond and those to the west of the Travis Branch of the Staten Island Railroad Company railroad grade (Wetlands G and H). The third area includes tidal wetlands connected to Old Place Creek via culverts within the Route 440 and I-278 medians (Wetlands P, Q, R, S and T). The fourth wetland area includes the four isolated non-tidal common reed wetlands located inland near the New Jersey Turnpike (Wetlands K, L, M and N). The fifth wetland area, Wetland O, is associated with the interpier area, west of the Arthur Kill.

The wetland function-value evaluation forms were prepared using field notes, site photographs, wetland maps, prior site investigations, and additional information (e.g., NYCDPR SMRT data) to identify wetland functions and values of the five wetland areas (data forms are herein provided in Appendix H.3). Each form identifies which function(s)/value(s) occur, listing the components of the wetland function(s)/value(s), and identifying the principal function(s)/values(s) present. Comments were also included citing specific reasons (e.g., sightings of threatened or endangered species) why each function or value is or is not performed by the wetland. The functions and values identified for each of the wetland areas are discussed below and summarized in Table 2.

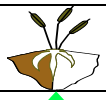
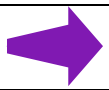
Area One (Wetlands A, B, C, D, E and F)

Three principal functions were identified for the Area One wetlands (Old Place Creek and associated tidal wetlands from the Arthur Kill, east to the Gulf Avenue culvert): fish/shellfish habitat; sediment/shoreline stabilization and wildlife habitat.

Fish/shellfish habitat. Evaluations identified the wetlands as part of the larger New York/New Jersey Harbor Estuary, providing tidal creeks, saltmarsh vegetation, and mudflat habitat to support fish and shellfish populations. Water quality, food production, and the size of the wetland areas were considered sufficient to support forage fish and invertebrates, as well as young-of-year gamefish (e.g., bluefish, striped bass) and blue crab.

Wildlife habitat. Foraging and resting habitat for waterfowl, herons, egrets and shore birds was identified as the second principal function performed by the Wetland Area One. The tidal creek, mudflats, and saltmarsh areas provide foraging habitat for a number of wading bird species. The seasonal use of the areas by over-wintering, migratory and breeding bird species, as well as the interspersion of saltmarsh vegetation, mudflats, and open water, were also considered important characteristics of the wetlands. The wetlands are included as part of the larger Harbor Heron Rookery Complex identified in the USFWS Significant Coastal Habitats Study.

TABLE 1
WETLAND FUNCTIONS AND VALUES CONSIDERED FOR THE DESCRIPTIVE APPROACH METHODOLOGY

	FUNCTION/VALUE	DEFINITION
	Groundwater Recharge/Discharge	This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. Recharge should relate to the potential for the wetland to contribute water to an aquifer. Discharge should relate to the potential for the wetland to serve as an area where groundwater can be discharged to the surface.
	Floodflow Alteration (Storage & Desynchronization)	This function considers the effectiveness of the wetland in reducing flood damage by attenuation of floodwaters for prolonged periods following precipitation events.
	Fish and Shellfish Habitat	This function considers the effectiveness of seasonal or permanent waterbodies associated with the wetland in question for fish and shellfish habitat.
	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.
	Nutrient Removal/Retention/Transformation	This function relates to the effectiveness of the wetland to prevent adverse effects of excess nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.
	Production Export (Nutrient)	This function relates to the effectiveness of the wetland to produce food or usable products for humans or other living organisms.
	Sediment/Shoreline Stabilization	This function relates to the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.
	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.
	Recreation (Consumptive and Non-Consumptive)	This value considers the effectiveness of the wetland and associated watercourses to provide recreational opportunities such as canoeing, boating, fishing, hunting, and other active or passive recreational activities. Consumptive activities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland, whereas non-consumptive activities do not.
	Educational/Scientific Value	This value considers the effectiveness of the wetland as a site for an "outdoor classroom" or as a location for scientific study or research.
	Uniqueness/Heritage	This value relates to the effectiveness of the wetland or its associated waterbodies to produce certain special values. Special values may include such things as archaeological sites, unusual aesthetic quality, historical events, or unique plants, animals, or geologic features.
	Visual Quality/Aesthetics	This value relates to the visual and aesthetic qualities of the wetland.
ES	Threatened or Endangered Species Habitat	This value relates to the effectiveness of the wetland or associated waterbodies to support threatened or endangered species.

Source: USACE, New England Regulatory Division, 1995.

TABLE 2
WETLAND FUNCTION AND VALUE EVALUATION: PRIMARY STUDY AREA WETLANDS

WETLAND FUNCTION/ VALUE	STUDY AREA WETLAND AREAS				
	Area One (A,B,C,D,E,F) Old Place Creek	**Area Two** (G, H) Goethals Bridge Pond & west	**Area Three** (P, Q, R, S, T) Route 440 & I-278	**Area Four** (K, L, M, N) NJ Turnpike	**Area Five** (O) NJ side of Arthur Kill
Groundwater Recharge/Discharge	NA	NA	NA	NA	NA
Floodflow Alteration					
Fish and Shellfish Habitat				NA	
Sediment/Toxicant Retention				NA	
Nutrient Removal				NA	
Production Export				NA	
Sediment/Shoreline Stabilization		NA	NA	NA	NA
Wildlife Habitat					
Recreation	NA	NA	NA	NA	NA
Education/Scientific Value				NA	NA
Uniqueness/Heritage				NA	
Visual Quality/Aesthetics	NA	NA	NA	NA	NA
Endangered Species Habitat	ES	ES	ES	NA	ES

= Principal valuable function **NA** indicated the function was not identified or not applicable.

Source: USACE, New England Regulatory Division, 1995.

Sediment/shoreline stabilization. The vegetative banks of the Arthur Kill and Old Place Creek provide shoreline protection from wave and tidal flows. Because the area is inundated twice daily, these vegetative banks are subject to frequent erosive forces. The vegetation's (saltmarsh cordgrass) roots anchor soil/sediment and prevent erosion of stream banks and the tidal marsh edge.

The wetlands in Area One also provide seven additional functions/values, but were not principal functions. These include: floodflow alteration; sediment/toxicant retention; nutrient removal; production export; education/scientific value; uniqueness heritage and endangered species habitat.

Other functions that are not present or are performing at some level of impairment include: groundwater recharge/discharge; recreation; and visual quality/aesthetics. Because the wetlands/watercourses are inundated regularly through tidal action, groundwater recharge/discharge is not applicable.

Area Two (Wetlands G and H)

Area Two consists of tidal wetlands north of the Port Authority's Goethals Bridge Administration Building (Goethals Bridge Pond) and tidal wetlands west of the Travis Branch of the Staten Island Railroad Company berm. One principal function, wildlife habitat, was identified for the Area Two wetlands.

Wildlife habitat. As stated in the Area One narrative, foraging and resting habitat for waterfowl, herons, egrets and shore birds was identified as a principal function performed by both wetland areas. The tidal creek, mudbank, and saltmarsh areas provide foraging habitat for a number of wading bird species. The seasonal use of the areas by over-wintering, migratory and breeding bird species, as well as the interspersion of saltmarsh vegetation, mudbank, and open water, were also considered important characteristics of the wetlands. These wetland areas are also included as part of the larger Harbor Heron Rookery Complex identified in the USFWS Significant Coastal Habitats Study.

The wetlands in Area Two also provide eight additional functions/values, but were not principal functions. These include: floodflow alteration; fish and shellfish habitat; sediment/toxicant retention; nutrient removal; production export; education/scientific value; uniqueness heritage; and endangered species habitat.

Other functions which are not present or are performing at some level of impairment include: groundwater recharge/discharge; sediment/shoreline stabilization; and visual quality/aesthetics. Because the wetlands/watercourses are inundated regularly through tidal action, groundwater recharge/discharge is not applicable.

Area Three (Wetlands P, Q, R, S and T)

Area Three consists of tidal wetlands connected by culverts to Old Place Creek located within the medians of Route 440 and I-278. As with Area Two, one principal function, wildlife habitat, was identified for the wetlands.

Wildlife habitat. As with Areas One and Two, foraging and resting habitat for waterfowl, herons, egrets and shore birds was identified as a principal function performed by these wetland areas. The tidal creek, mudflat, and saltmarsh areas provide foraging habitat for a number of wading bird species. The seasonal use of the areas by over-wintering, migratory and breeding bird species, as well as the interspersion of saltmarsh vegetation, mudflat, and open water, were also considered important characteristics of the wetlands.

The wetlands in Area Three also provide eight additional functions/values, but were not principal functions. These include: floodflow alteration; fish and shellfish habitat; sediment/toxicant retention;

nutrient removal; production export; education/scientific value; uniqueness heritage; and endangered species habitat.

Other functions which are not present or are performing at some level of impairment include: groundwater recharge/discharge; sediment/shoreline stabilization; and visual quality/aesthetics. Because the wetlands/watercourses are inundated regularly through tidal action, groundwater recharge/discharge is not applicable.

Area Four (Wetlands K, L, M and N)

Wetlands K, L, M and N are low in value as they are small and isolated from other wetlands and water sources; surrounded by development; and consist of a monoculture of common reed. Based on the September and October 2004 field studies, typical wetland functions (wildlife habitat, food production, education and research, aesthetic appreciation and recreation) are lacking. The main function of these wetlands is floodflow retention during storm events. Runoff from the existing network of highways, access ramps, and secondary roads drain into these wetlands; some infiltration and absorption of nutrients/sediments presumably occur prior to discharge into the Arthur Kill.

Floodflow retention. Collection of stormwater from nearby highways and paved surface areas was cited in the functions evaluation. The proximity of the wetlands near these paved areas and observations of standing or ponded water provided evidence for floodflow retention as the principal function. Dense vegetation (specifically common reed) also provides for the potential uptake and assimilation of nutrients derived from roadway and urban runoff.

Area Five (Wetland/Open Water O)

Fish/shellfish habitat. Wetland O is part of the larger New York/New Jersey Harbor Estuary, providing tidal creeks, saltmarsh vegetation, and mudflat habitat to support fish and shellfish populations. Water quality, food production, and the size of the wetland/open water area were considered sufficient to support forage fish and invertebrates, as well as young-of-year gamefish (e.g., bluefish, striped bass) and blue crab.

Wetland O also provides seven additional functions/values which are not considered to be principal functions. These include: floodflow alteration; sediment/toxicant retention; nutrient removal; production export; uniqueness heritage; wildlife habitat; and endangered species habitat.

Other functions which are not present or are performing at some level of impairment include: groundwater recharge/discharge; sediment/shoreline stabilization; recreation; education/scientific value; and visual quality/aesthetics. Because the wetlands/watercourses are inundated regularly through tidal action, groundwater recharge/discharge is not applicable.

WETLAND EVALUATION FORM

PROJECT: **Goethals Bridge Replacement**

WETLAND I.D. **A,B,C,D,E,F** LOCATION: **New York** INVESTIGATORS: **Hanlon** FIELD DATE: **September 2004**

Approx. Wetland Area:	Geomorphology: **Estuarine**
Wetland Classes: (Circle Dominant): **Tidal Marsh**	Drainage System: **Newark Bay**
Mapping Classification	Contiguous Waterbody for Evaluation: **Arthur Kill, Old Place Creek**
NWI: **E1UBL, E2EM1Pd, E2EM1N**	Inlets: **Old Place Creek** Outlets: **Arthur Kill**
	Wildlife Observed: **gulls, sparrows, brown snake, blue crabs**
Vegetation: Species Richness: **L** Density: **H**	
Interspersion: Veg/Water: **H** Class/Class: **L**	
Surrounding Lands (%): **30% Industrial, 70% Roads**	

	FUNCTIONAL ASSESSMENT	Occurrence Yes	Occurrence No	Rationale* (Question No.)	Principal Yes	Principal No	Comments
	Groundwater recharge Groundwater discharge		X	3,7,8,15			Areas inundated, with no groundwater dicharge.
	Floodflow alteration	X		1, 3, 4, 5, 6, 7, 13, 14, 18		X	Soils inundated twice a day.
	Fish and shellfish habitat	X		1, 2, 3, 4, 5, 6	X		Stream habitat suitable for fish and shellfish (marine)
	Sediment/toxicant/pathogen retention	X		2,3,4,5,7,8,10,11,12,13, 15,16		X	Sediments can drop out during slack tide
	Nutrient removal/retention/transformation	X		1,2,3,4,5,6,7,8,9, 10,11,12,13,14		X	Thick wetland vegetation growth can remove nutrients from upstream urban-industrial area
	Production export (nutrient)	X		1,2,4,5,6,7,10,11,13,14		X	Wetland vegetation produce seed for animal consumption
	Sediment/shoreline stabilization	X		1,3,6,7,9,11,12,15		X	Low flow gradient, low erosion
	Wildlife habitat	X		6,8,9,10,11,12,13,16,17 ,18,19,21,22	X		Although highly disturbed upland area adjacent to wetland, high numbers of wildlife species use
	Recreation	X		1,2,5,7,8,9,12		X	Potential exists for recreation, but site access and security inhibit use
	Education/scientific value	X		1,5,6			No easy site access. Site controlled- security issues
	Uniqueness/heritage	X		1,3,5,6,7,12,13,14, 17,22,24,25,27,28		X	Area is identified as local significant resource (NYCDEP)
	Visual quality/aesthetics		X	1,2,3,6,8			Wetland altered by ditching. Surrounding land use inhibits visual quality.
ES	Endangered species habitat	X		1,2		X	Special status species present

* Refer to Wetland Function Rationale List

WETLAND EVALUATION FORM

PROJECT: **Goethals Bridge Replacement**

WETLAND I.D. **G,H** LOCATION: **New York** INVESTIGATORS: **Hanlon** FIELD DATE: **October 2004**

Approx. Wetland Area:	Geomorphology: **Estuarine (Wetland G= Goethals Bridge Pond)**
Wetland Classes: (Circle Dominant): **Estuarine**	Drainage System: **Old Place Creek**
Mapping Classification	Contiguous Waterbody for Evaluation:
NWI: **E2EM1N6, E2EM5P6**	Inlets: **N/A** Outlets: **Unnamed tributary to Old Place Creek**
	Wildlife Observed: **gulls, sparrows, great blue heron**
Vegetation: Species Richness: **M** Density: **M**	
Interspersion: Veg/Water: **M** Class/Class: **L**	
Surrounding Lands (%): **Roads 40, Commercial 60**	

	FUNCTIONAL ASSESSMENT	Occurrence Yes	Occurrence No	Rationale* (Question No.)	Principal Yes	Principal No	Comments
	Groundwater recharge Groundwater discharge		X	3,7,8,9,10,15			Areas inundated, with no groundwater dicharge.
	Floodflow alteration	X		1,3,4,5,6,7,13,14, 15,16,18		X	Soils inundated twice a day.
	Fish and shellfish habitat	X		1,2,4		X	Constricted outlet inhibits fish-shellfish
	Sediment/toxicant/pathogen retention	X		2,3,4,5,7,8,10,11, 12,14,15,16		X	Sediments can drop out during slack tide
	Nutrient removal/retention/transformation	X		1,2,3,4,5,6,7,8,9, 10,11,12,13,14		X	Thick wetland vegetation growth can remove nutrients from upstream urban-industrial area
	Production export (nutrient)	X		1,2,4,5,7,10,11,13,14		X	Wetland Vegetation produce seed for animal consumption
	Sediment/shoreline stabilization		X	1,3,7,9,10,12,13,15			Low flow gradient, low erosion
	Wildlife habitat	X		6,8,9,11,12,13,16,17,18 ,19,21,22	X		Although highly disturbed upland area adjacent to wetland, high numbers of wildlife species use
	Recreation	X		1,5,7,12		X	Private or restricted access
	Education/scientific value	X		1,5,6		X	Private or restricted access
	Uniqueness/heritage	X		1,3,5,6,7,12,13,14, 17,22,24,25,26,27		X	Area is identified as local significant resource (NYCDEP)
	Visual quality/aesthetics		X	1,2,3,6,8			Wetland altered by ditching. Surrounding land use inhibits visual quality.
ES	Endangered species habitat	X		1,2		X	Special status species present

* Refer to Wetland Function Rationale List

WETLAND EVALUATION FORM

PROJECT: **Goethals Bridge Replacement**

WETLAND I.D. **K,L,M,N** LOCATION: **New Jersey** INVESTIGATORS: **Hanlon** FIELD DATE: **October, 2004**

Approx. Wetland Area:	Geomorphology: **Depression**
Wetland Classes: (Circle Dominant): **Emergent scrub shrub**	Drainage System: **Arthur Kill**
Mapping Classification	Contiguous Waterbody for Evaluation:
NWI: **PEM1, PSS1**	Inlets: **None** Outlets: **None**
	Wildlife Observed: **sparrows**
Vegetation: Species Richness: **L** Density: **H**	
Interspersion: Veg/Water: **L** Class/Class: **L**	
Surrounding Lands (%): **100 Roads**	

	FUNCTIONAL ASSESSMENT	Occurrence Yes	Occurrence No	Rationale* (Question No.)	Principal Yes	Principal No	Comments
	Groundwater recharge Groundwater discharge		X	4,6			**Isolated depressional wetlands**
	Floodflow alteration	X		2,3,4,5,9,18	X		**Able to retain stormwater.**
	Fish and shellfish habitat		X				**No watercourse present or open water**
	Sediment/toxicant/pathogen retention		X	1,2,4,5,9			**Depressional wetlands adjcent to roadway**
	Nutrient removal/retention/transformation		X	3,7,8,9,10			**Small size of wetlands inhibit this function**
	Production export (nutrient)		X	1,2,7			**No outlet present**
	Sediment/shoreline stabilization		X	3			**No stream present**
	Wildlife habitat	X		8,13		X	**Small size, isolated area between roadways**
	Recreation		X				**Small size, restricted areas**
	Education/scientific value		X	9			**Small size, restricted areas**
	Uniqueness/heritage		X	1,17			**Small size, restricted areas**
	Visual quality/aesthetics		X	6			**Small size, restricted areas**
ES	Endangered species habitat		X				**No threatened or endangered species present**

* Refer to Wetland Function Rationale List

WETLAND EVALUATION FORM

PROJECT: **Goethals Bridge Replacement**

WETLAND I.D. **P,Q,R,S,T** LOCATION: **New York** INVESTIGATORS: **Hanlon** FIELD DATE: **October, 2004**

Approx. Wetland Area:	Geomorphology: **Estuarine**
Wetland Classes: (Circle Dominant): **Tidal Marsh**	Drainage System: **Old Place Creek**
Mapping Classification	Contiguous Waterbody for Evaluation:
NWI: **E2EM5P**	Inlets: **N/A** Outlets: **Old Place Creek**
	Wildlife Observed: **gulls, sparrows, crabs**
Vegetation: Species Richness: **L** Density: **H**	
Interspersion: Veg/Water: **M** Class/Class: **L**	
Surrounding Lands (%): **Industrial 10, Roads 90**	

	FUNCTIONAL ASSESSMENT	Occurrence Yes	Occurrence No	Rationale* (Question No.)	Principal Yes	Principal No	Comments
	Groundwater recharge Groundwater discharge		X	3,7,8,9,15			Areas inundated, with no groundwater dicharge.
	Floodflow alteration	X		3,4,5,6,7,13,14,15, 16,18		X	Soils able to hold stormwater.
	Fish and shellfish habitat	X		1,2,4		X	Constricted outlet inhibits fish/ shellfish
	Sediment/toxicant/pathogen retention	X		2,3,4,5,7,8,9,10,11, 12,13,14,15,16		X	Sediments can drop out during slack tide
	Nutrient removal/retention/transformation	X		2,3,4,5,6,7,8,9,10, 11,12,13,14		X	Thick wetland vegetation growth can remove nutrients from upstream urban-industrial area
	Production export (nutrient)	X		1,2,4,5,7,10,11,13,14		X	Wetland vegetation produce seed for animal consumption
	Sediment/shoreline stabilization		X	7,9,10,12,13,15		X	Low flow gradient, low erosion
	Wildlife habitat	X		6,8,9,11,13,16,17,18,19 ,21,22	X		Although highly disturbed upland area adjacent to wetland, high numbers of wildlife species use
	Recreation		X	5,12			Private or restricted access
	Education/scientific value	X		1,5		X	Private or restricted access
	Uniqueness/heritage	X		1,5,6,7,12,13,22,24,27, 28		X	Area is identified as local significant resource (NYCDEP)
	Visual quality/aesthetics		X	1,2,3,6,8			Wetland altered by ditching. Surrounding land use inhibits visual quality.
ES	Endangered species habitat	X		1,2		X	Special status species present

* Refer to Wetland Function Rationale List

Wetlands Plant Species List

Wetlands A, B, C, D, E, F	Abundance*
Phragmites australis	A
Baccharis halmifolia	A
Distichilis spicata	A
Spartina alterniflora	A
Spartina patens	A
Pluchea purpurascens	A
Toxicodendron radicans	C
Ampelopsis brevipedunculata	C
Cornus amomum	C
Populus tremuloides	I
Betula populifolia	I
Sambucus canadensis	C
Lonicera japonica	C
Wetlands G,H	
Tilia americana	C
Quercus rubra	C
Prunus serotina	A
Polygonum cuspitatum	A
Parthenocissus quinquefolia	A
Toxicodendron radicans	A
Lonicera tatarica	A
Acer rubrum	A
Viburnum recognitum	A
Osmunda cinnamomea	C
Phragmites australis	A
Lonicera japonica	A

Wetlands K,L,M,N	Abundance*
Phragmites australis	C
Poa spp.	C
Lonicera japonica	C
Rhus copallinum	C
Toxicodendron radicans	C
Wetlands P,Q,R,S,T	
Acer rubrum	C
Phragmites australis	A
Baccarharis halmifolia	A
Quercus palustris	I
Spartinia patens	A
Viburnum recognitum	C
Osmunda cinnamomea	C
Nyssa Sylvatica	C
Rosa multiflora	C
Populus tremuloides	I
Liquidambar styraciflua	C
Polygonum cuspitatum	C
Toxicodendron radicans	C
Ampelopsis brevipedunculata	
Pluchea purpurascens	I
Myrica pensylvanica	I
Onoclea sensibilis	C
Sambucus canadensis	C
Fraxinus Pennsylvanica	C

* A = Abundant, C = Common, I = Infrequent

Appendix H.4
Essential Fish Habitat (EFH) Assessment

NOTE: The EFH Assessment is still marked as a draft since it has not been officially submitted to the National Marine Fisheries Service (NMFS) for review.

DRAFT ESSENTIAL FISH HABITAT (EFH) ASSESSMENT FOR THE GOETHALS BRIDGE REPLACEMENT

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1.0 INTRODUCTION

In compliance with Section 305(b) (2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended by the Sustainable Fisheries Act (SFA) of 1996 (Public Law 104-267), this Essential Fish Habitat (EFH) assessment is provided to evaluate the potential effects on EFH-designated species of constructing a replacement bridge for the Goethals Bridge, which spans the Arthur Kill between Staten Island, NY and Elizabeth, NJ. This assessment includes an analysis of the direct, indirect and cumulative effects of the proposed project on those species and life stages for which EFH has been designated.

Potential impacts of the proposed bridge construction and demolition of the existing bridge were evaluated using information collected during previous aquatic sampling programs and relevant literature to evaluate species occurrence and existing habitat. Direct, indirect, and cumulative effects of the proposed project on the EFH were assessed in terms of the seasonal distribution, relative abundance, and habitat requirements of the designated species and life stages. The assessment addresses the physical and biological effects of the proposed in-water construction and operation activities on the 16 EFH-designated species which may occur in the Primary Study Area.

Also included in this EFH Assessment are four forage species including Bay anchovy (*Anchoa mitchelli*), Atlantic silverside (*Menidia menidia*), Atlantic tomcod (*Microgradus tomcod*) and Atlantic menhaden (*Brevoortia tyrannus*).

2.0 ENVIRONMENTAL SETTINGS AND PROJECT DESCRIPTION

2.1. Site Description

The Arthur Kill is a tidal strait connecting the Kill Van Kull and Newark Bay to the north with Raritan Bay and the Raritan River to the south. It is bordered to the east by Staten Island and to the west by New Jersey. The Arthur Kill is approximately thirteen miles long extending from Wards Point to the south and Newark Bay to the north, having a width ranging from about 800 to 2,800 feet. The shoreline along the Arthur Kill varies, consisting of bulkheads or rip rap to the north and largely wetlands to the south.

This Primary Study Area has undergone intense coastal development and urbanization. To the east and west of the Goethals Bridge there exist railroad yards, bulkheads, docks, an extensive highway infrastructure and many industrial buildings. However, the area still consists of tidal and non-tidal marshes, mudflats, ponds (Goethals Bridge Pond), and creeks (Old Place Creek) typical of a natural setting. A variety of urban, industrial inputs and modifications to the nearshore zone of the Arthur Kill has modified flow conditions, decreased water quality and altered biotic communities. Over the years, many acres of intertidal salt marsh have been degraded or lost as a result of filling and mosquito control measures; however, some of the remaining tidal marshes and mudflats are among the most valuable fish and wildlife habitats on Staten Island.

Aquatic or estuarine habitats in the Arthur Kill include deep channels, shallow, intertidal mudflats, salt marshes, and freshwater (non-tidal) marshes and swamps. Several islands within the Arthur Kill have historically supported large colonial waterbird rookeries. Although the Arthur Kill is highly developed and industrialized, some 55% of the total shoreline (including island shores) remains as natural mudflats and marshes. Old Place Creek is the largest tidal creek system in northern Staten Island, with an extensive high intertidal salt marsh community surrounding its banks (USFWS, 1997). Characteristic invertebrates of the Arthur Kill's intertidal and shallow aquatic habitats include fiddler crabs (*Uca* spp.) and ribbed mussels (*Geukensia demissus*). The common mummichog (*Fundulus heteroclitus*) and dagger-blade grass shrimp (*Palaemonetes pugio*) provide an abundant forage base for resident and transient estuarine predators. A variety of epifaunal invertebrates (e.g. sponges, barnacles, tunicates)

utilize the surfaces of submerged structures, bulkheads, piers, and pilings as habitat. The intertidal mudflats support a variety of benthic organisms including amphipods, isopods, worms, and mollusks; however, pollution–tolerant species dominate (USFWS, 1997).

The New York State Department of Environmental Conservation (NYSDEC) has classified the Arthur Kill as Class SD saline surface water. This classification is given to waters that, because of natural or man-made conditions, cannot meet the requirements for primary and secondary contact recreation and fish propagation. Sources of water pollution in the Arthur Kill include combined sewer overflows (CSOs), storm water and other runoff, commercial and industrial discharges, and landfill leachate and contaminated groundwater. Water quality was assessed at several stations in the Arthur Kill during the USACE's 2005 Aquatic Biological Survey (USACE, 2005). The New York City Department of Environmental Protection (NYCDEP) included several stations in the Arthur Kill in its 2002 Harborwide water quality survey (NYCDEP, 2003) Seasonal averages of temperature, dissolved oxygen and salinity are provided in Table 1.

TABLE 1:
AVERAGE MONTHLY BOTTOM WATER QUALITY MEASUREMENTS IN THE ARTHUR KILL DURING THE 2005 USACE AQUATIC BIOLOGICAL SURVEY.

Month	Temperature (° C)	DO (mg/l)	Salinity (ppt)
January	5.6	9.8	16.4
February	3.1	10.5	19.5
March	3.8	11.7	19.5
April	8.8	10.6	13.6
May	12.8	8.0	18.2
June	18.3	6.6	20.8
July	23.4	5.5	20.9

2.2. Project Description

The Port Authority of NY/NJ, under the Goethals Bridge Replacement (GBR) project, has proposed to replace the existing Goethals Bridge, which spans the Arthur Kill between Staten Island, NY and Elizabeth, NJ. The Primary Study Area for the GBR is one square mile of the industrial waterfront in Elizabeth and Linden NJ and two square miles of less developed land in northwestern Staten Island, NY (Figure 1). The Goethals Bridge is an important link in transportation connecting the two states but is functionally and physically deficient with narrow lanes, no emergency shoulders and a pronounced bend in the alignment of the approach span in New Jersey. These conditions reduce traffic service, safety conditions and the ability to quickly clear accidents. Also, the nearly 80-year-old bridge requires ongoing repairs, maintenance, and rehabilitation at escalating costs (USCG, 1997).

Project alternatives include replacing the existing bridge with a 6-lane bridge of cable-stayed design with: 1) eastbound lanes located over the footprint of the existing bridge (Existing Alignment South); 2) westbound lanes located over the footprint of the existing bridge (Existing Alignment North); 3) all lanes south of the existing bridge (New Alignment South); or 4) all lanes located north of the existing bridge (New Alignment North) (Figure 2). The construction of the new bridge will require the construction of permanent access roads and barge and equipment staging areas. Because of the nearness of the project alternatives, the amount of in-water work for all alternatives would be similar, and would require the permanent fill of between 0.2 and 0.3 acres of subtidal shallows. For the Existing Alignment South and New Alignment South alternatives, a temporary construction access road would be built over the interpier basin on a pile-supported trestle which would be removed after construction. Both of these southern

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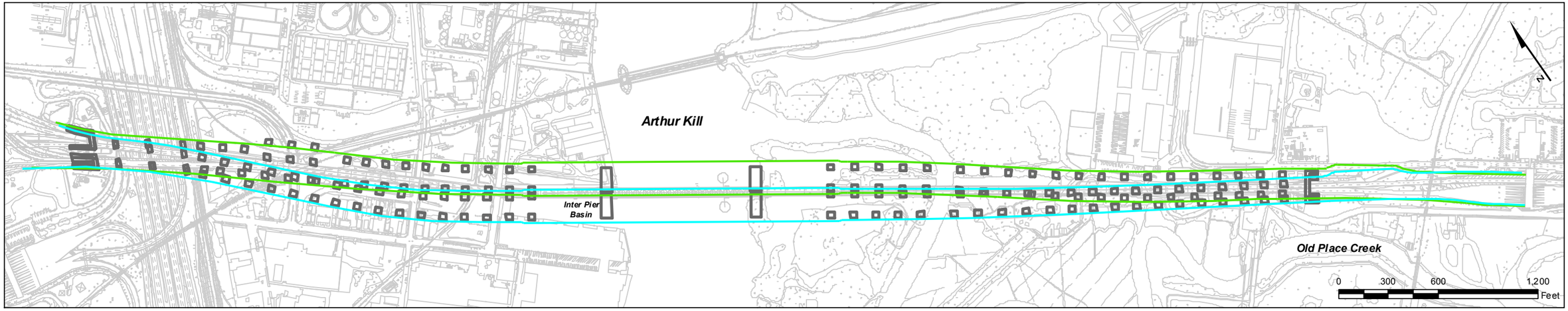
Source:
Basemapping: Port Authority of New York and New Jersey, 2002.

Goethals Bridge Replacement EIS

FIGURE 1

Goethals Bridge Study Area

United States Coast Guard



EXISTING ALIGNMENT NORTH AND SOUTH

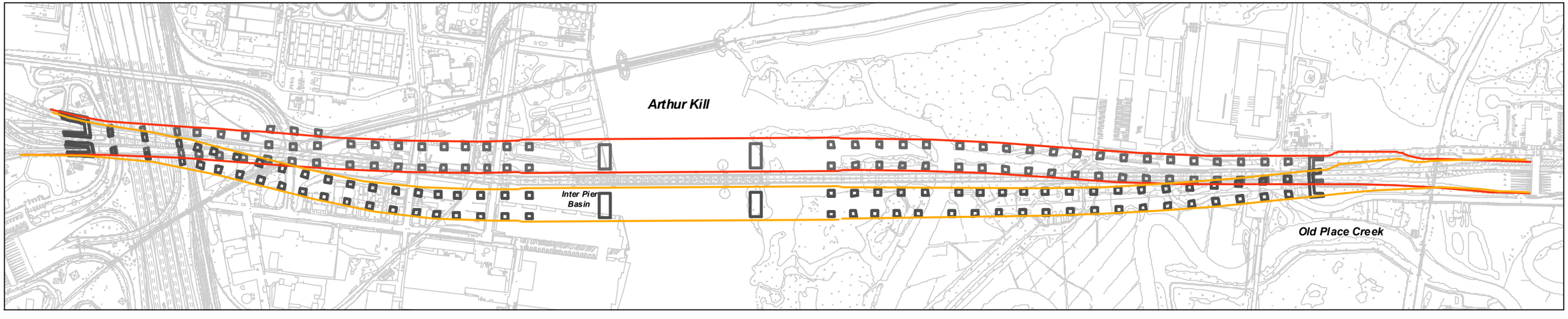
Legend

Alignments

- Edge of Structure - Existing Alignment North
- Edge of Structure - Existing Alignment South

Bridge Structures

- Pier/Tower



NEW ALIGNMENT NORTH AND SOUTH

Legend

Alignments

- Edge of Structure - New Alignment South
- Edge of Structure - New Alignment North

Bridge Structures

- Pier/Tower

Goethals Bridge Replacement EIS

FIGURE 2

Proposed Alignments

United States Coast Guard

alignment alternatives also include placement of the New Jersey main span pier partially or completely in the water at the mouth of the interpier basin. All in-water dredging, construction, and demolition would take place within cofferdams in order to minimize impacts to the aquatic community. As sediments in the Arthur Kill are composed of sand, silt, and clay, pilings and sheetpile cofferdams could be installed using vibration-powered driving instead of impact driving. Under all of the GBR project alternatives, the existing bridge deck and footings (down to a minimum of two feet below the mudline) would be demolished and removed. Removal of the existing Goethals Bridge would result in a gain of water column habitat in place of Pier C and its pier protective cells and the restoration of approximately 0.2 acres of river bottom habitat.

2.3. Potential Project Impacts

The EFH Assessment for the identified species is based on the potential impacts resulting from both short and long term effects to local habitats resulting from bridge construction and demolition activities. For the purpose of this assessment, the three types of impacts are defined as follows:

- *Direct* impacts occur generally at the same time as the action and in the immediate vicinity.
- *Indirect* effects occur as a result of secondary responses, such as a population shift of fish due to changes in benthic prey resources.
- *Cumulative* impacts result from the incremental impact of the actions when added to other previous, present or foreseeable future actions, either direct or indirect in nature.

The potential project impacts are evaluated on the basis of short-term and long-term effects on each the EFH designated species as they may occur temporarily during construction or permanently due to changes in turbidity, hydrodynamic patterns, loss of benthic and vertical habitat, noise and vibrations, loss of wetland and marsh habitat, and a temporary loss of habitat from equipment and cofferdams.

- **Short-term effects** on habitat resulting from the proposed action will be limited to (1) exclusion of fish from useable water column habitat due to fish avoidance of construction and dredging equipment and activities (i.e., water disturbance, noise and vibrations); (2) increased turbidity and levels of re-suspended solids and contaminants; (3) temporary sediment disturbance remaining upon completion of the construction and temporary loss of the associated benthic community; and (4) shading of fish habitat by work vessels.

- **Long-term effects** on habitat will be limited to the effects associated with the result of construction and dredging activities in the Arthur Kill including (1) alteration of river bottom habitats and substrate changes; (2) changes in water column depth, bathymetric contours, hydrodynamics, and consequently sedimentation rates, (3) periodic disturbances to benthic habitat and water quality due to recurring maintenance activities, (4) change in shading of aquatic and wetland habitats, and (5) permanent fill of forage fish nursery habitat and subtidal shallows

Potential cumulative impacts are difficult to predict; however, a number of ongoing or proposed development projects in the Arthur Kill region have the potential to incrementally impact EFH-listed species in combination with the GBR. These include the Jay Cashman Dredged Material Processing Facility in Elizabeth, NJ, as well as the As-of-Right Development of the Former GATX Site, the Howland Hook Redevelopment Program and the West Shore Expressway Corridor/Road Service Improvement Project in Staten Island. Regional transportation projects in the Primary Study Area include the Staten Island Freight Rail Reactivation, completed in 2006, and the Arthur Kill Channel Deepening Program, which will deepen the 35-foot channel to 40 feet in the Primary Study Area, scheduled to be completed in 2008.

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3.0 EFH DESIGNATIONS

EFH is defined under the MSFCMA, as amended by the SFA of 1996, as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The SFA requires that EFH be identified for those species actively managed under Federal Fishery Management Plans (FMPs). This includes species managed by the eight regional Fishery Management Councils (FMCs), established under the MSFCMA, as well as those managed by the National Oceanographic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries Service) under FMPs developed by the Secretary of Commerce.

EFH designations emphasize the importance of habitat protection to healthy fisheries and serve to protect and conserve the habitat of marine, estuarine, and anadromous finfish and turtles. EFH includes both the water column (including its physical, chemical, and biological growth properties) and the underlying substrate (including sediment, hard bottom, and other submerged structures). Under the EFH definition, necessary habitat is that which is required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. EFH is designated for a species' complete life cycle, including spawning, feeding, and growth to maturity, and may be specific for each life stage (e.g., eggs, larvae). EFH designations are based on various levels of information available for a species life stage distribution, abundance, and habitat-productivity relationships. Information levels include: presence/absence (Level 1); habitat-related densities (Level 2); growth, reproduction, and survival rates within habitats (Level 3); and production rates by habitat types (Level 4).

A summary of EFH-designated species within the 10 minute by 10 minute square (40°40' N, 74°10' W southeast corner boundary) where the proposed project will take place, is provided in Table 2. This information was obtained from the EFH designation table of the NOAA Fisheries Service's Guide to Essential Fish Habitat Designations in the Northeastern United States (http://www.nero.noaa.gov/hcd/STATES4/new_jersey/40307410.html).

EFH that is judged to be particularly important to the long-term productivity of populations of one or more managed species, or to be particularly vulnerable to degradation, may also be identified by Fisheries Management Councils (FMC) and NMFS as habitat areas of particular concern (HAPC). Areas of EFH considered HAPC must be proven by NOAA Fisheries Service to be important to the ecological function provided by the habitat for managed species. The extent to which the habitat is sensitive to human-induced environmental degradation, including development activities that stress the habitat and the rarity of the habitat are considered in designating HAPC (NMFS, 2003).

In NY/NJ Harbor, the only managed species for which HAPC has been identified is summer flounder. NOAA Fisheries Service identifies HAPC for juvenile and adult summer flounder across its entire range as "all native species of macro-algae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH." Seagrasses are not present in the Arthur Kill, however macroalage (primarily sea lettuce, *Ulva lactuca*) occurs in shallow areas where hard substrate is present, and *Spartina alterniflora* marshes are present along the Staten Island end of the existing Goethals Bridge. Therefore, HAPC for summer flounder is present in the vicinity of the proposed action. The remainder of the EFH species in the Primary Study Area have no HAPC identified anywhere in their range (NMFS, 2003).

4.0 EFH ASSESSMENT

The EFH Assessment addresses the potential direct, indirect and cumulative impacts on individual species and their respective habitats. The species addressed include the 16 EFH-designated species which may occur in the Primary Study Area (Table 2).

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TABLE 2:
SUMMARY OF EFH-DESIGNATED SPECIES NEAR THE GOETHALS BRIDGE STUDY AREA.

Species	Eggs	Larvae	Juveniles	Adults
Red hake (*Urophycis tenuis*)	X	X	X	
Winter flounder (*Pleuronectes americanus*)	X	X	X	X
Windowpane flounder (*Scopthalmus aquosus*)	X	X	X	X
Atlantic sea herring (*Clupea harengus*)		X	X	X
Bluefish (*Pomatomus saltatrix*)			X	X
Butterfish (*Peprilus triacanthus*)		X	X	X
Atlantic mackerel (*Scomber scombrus*)			X	X
Summer flounder (*Paralicthys dentatus*)		X	X	X
Scup (*Stenotomus chrysops*)	X	X	X	X
King mackerel (*Scomberomorus cavalla*)	X	X	X	X
Spanish mackerel (*Scomberomorus maculatus*)	X	X	X	X
Cobia (*Rachycentron canadum*)	X	X	X	X
Sandbar shark (*Charcharinus plumbeus*)		X		X
Winter skate (*Raja ocellata*)			X	X
Little skate (*Raja erinacea*)			X	X
Clearnose skate (*Raja eglanteria*)			X	X

Source: National Marine Fisheries Service (NMFS). "Summary of Essential Fish Habitat (EFH) Designation" at www.nero.noaa.gov/hcd/STATES4/new_jersey/40307410.html and "Guide to Essential Fish Habitat Descriptions" at www.nero.noaa.gov/hcd/skateefhmaps.htm

4.1. Description of Data Sources

Previous biological investigations have characterized the seasonal distribution and composition of the fish community in various habitats and areas of NY/NJ Harbor, including Newark Bay. Several fish sampling studies have been conducted in the general vicinity of the proposed Primary Study Area.

The U.S. Army Corps of Engineers, New York District (USACE-NYD) surveyed seasonal use patterns and distribution trends of finfish in NY/NJ Harbor from October 1998 through September 1999 (USACE 1999). Two stations were located in the Arthur Kill. Sampling was conducted on a bi-monthly basis beginning in October using a 30 foot Wilcox flat bottom trawl. Ichthyoplankton tows, using a 0.5 meter net with 500 micron mesh netting mounted in a benthic sled, were conducted from February to June 1999. Sampling also included water quality parameters (temperature, salinity, and dissolved oxygen).

USACE (2002) provided supplemental data to that collected during the 1998-1999 surveys. The new program was designed to obtain additional information on the distribution patterns of the egg and larval stages of demersal species with emphasis on winter flounder. Sampling was conducted from December 2000 through June 2001. During this program, four sampling stations were located on the Arthur Kill.

USACE (2003a, 2003b, 2005, 2006) document the continuation of the USACE's monthly trawl and ichthyoplankton sampling program from December 2001 through July 2005. During this program, four sampling stations were located on the Arthur Kill.

During 1995-1996, The Port Authority of New York/New Jersey (PANY/NJ) conducted a fisheries sampling program in support of the Newark Bay Confined Disposal Facility Environmental Impact Statement. Monthly surveys, using a 30 foot Wilcox flat bottom trawl were conducted at four shallow water stations in Newark Bay, two channel stations in the Arthur Kill, and one in the Kill Van Kull (LMS, 1996).

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The surveys described above were used to prepare a composite summary of the expected seasonal occurrence of EFH-designated species in the Arthur Kill Study area (Tables 3 and 4). The data presented in this assessment were summarized and consolidated from the above mentioned sampling programs. The data are presented for the purpose of identifying general trends in species occurrence and relative abundance within the vicinity of the proposed project site.

TABLE 3:
NUMBER OF YEARS EARLY LIFE STAGES OF EFH-DESIGNATED SPECIES COLLECTED FROM THE ARTHUR KILL DURING THE 1998 THROUGH 2005 USACE ICHTHYOPLANKTON SAMPLING PROGRAM.

EFH-Designated Species	Life Stage	Month Collected							
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Winter flounder	E				2	2			
	YS			2	3	5	1		
	PYSL			1	4	5	4	5	1
	J					1	1		2
Windowpane flounder	E						3	5	1
	YS							1	
	PYSL			1		1	4	5	1
	J								
Atlantic sea herring	E								
	YS								
	PYSL			2	3	2	1		
	J								
Atlantic mackerel	E								
	YS								
	PYSL						1	1	
	J								
Summer flounder	E								
	YS								
	PYSL	1		1		2	1		
	J								

Key: E = egg; YS = yolk sac larvae; PYSL = post yolk sac larvae; J=juvenile

TABLE 4:
NUMBER OF YEARS ADULT AND/OR JUVENILE EFH-DESIGNATED SPECIES COLLECTED IN MONTHLY BOTTOM TRAWL SAMPLES FROM THE ARTHUR KILL DURING THE USACE 1998 THROUGH 2005 TRAWL SAMPLING PROGRAM.

EFH-Designated Species	Month							
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Red hake					1	1		
Winter flounder	2	4	4	4	5	4	2	
Windowpane flounder	2	1	1	2	4	3	3	
Atlantic herring		1		1			1	
Bluefish					1			
Butterfish							1	
Summer flounder				1	2	2	3	

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4.2. EFH-Designated Species Assessment

Of the sixteen species for which EFH has been designated in the project area, five (winter flounder, windowpane flounder, summer flounder, Atlantic mackerel and Atlantic herring) were collected in early life stages (eggs or larvae) (Table 3). The presence of winter flounder and windowpane flounder eggs suggests possible spawning near the Primary Study Area (LMS, 1997; USACE 1999, 2002, 2003a, 2003b, 2004, 2005). Juveniles and/or adults of seven EFH-designated species (red hake, winter flounder, windowpane flounder, Atlantic herring, bluefish, butterfish, summer flounder, and scup) have been caught in the project area (USACE 1999, 2002, 2003a, 2003b, 2004, 2005) (Table 4).

Winter flounder are year round residents in the upper NY/NJ Harbor and Newark Bay areas. Windowpane flounder were collected in Arthur Kill/Newark Bay in every month but, unlike winter flounder, they were not found in every survey. Other species (red hake, Atlantic herring, bluefish, butterfish, summer flounder, and scup) are seasonally present in the area and could be impacted by the project. Atlantic mackerel eggs have been collected in the project area (USACE 1999, 2002, 2003a, 2003b, 2005, 2006), however, the project area is not designated as EFH for this life stage. King mackerel, Spanish mackerel, cobia, winter skate, little skate, clearnose skate, and sandbar shark were not identified in any of the sampling programs used in this Report (LMS, 1996; USACE 1999, 2002, 2003a, 2003b, 2005, 2006). These species not collected in the study area typically prefer more saline waters (≥25 ppt) and deeper water habitats. Potential project impacts to EFH for these species are expected to be negligible.

4.2.1. Red hake

The Arthur Kill is designated as EFH for egg, larval, and juvenile stages of red hake (NMFS, 2003). Red hake make seasonal migrations in response to changing water temperatures, inhabiting shallow water in the spring and summer but move to deep offshore water to over-winter. Eggs and larvae are pelagic and tend to be restricted to deeper marine areas over the inner continental shelf (Able and Fahay, 1998). Red hake eggs are typically found in surface waters with temperature less than 10°C and salinity less than 25 ppt while larvae are typically found in surface waters with temperatures below 19°C, depths less than 200 meters, and salinities greater than 0.5 ppt. Eggs and larvae are most often found throughout the mid-Atlantic Bight from May through December, and peak abundance is during June and October (Wilk et al., 1990). Larval red hake typically feed on copepods (Steimle et al., 1999).

Juveniles are pelagic until they reach approximately 25 mm total length (TL) or greater at which time they become demersal seeking shelter along the continental shelf bottom within depressions in the sediment or among live sea scallop beds (Steimle et al., 1999). Juveniles also may associate with other forms of shelter including debris and artificial reefs (Steimle et al., 1999). Juveniles are typically found on shell substrates with water temperatures below 16°C, depths of less than 100 meters, and a salinity range of 31 to 33 ppt. Juveniles remain associated with sea scallop beds through their first fall and winter (until approximately 90-116 mm in length), and then occupy either estuarine or inshore marine waters over sand or mud substrate, prior to joining adults in the offshore migration during their second winter. Juvenile red hake typically feed on benthic and pelagic crustaceans such as decapod shrimp, mysids, euphausiids and amphipods (Steimle et al., 1999).

No red hake eggs or larvae were collected in the Arthur Kill during the USACE's ichthyoplanton sampling programs. Adult and/or juvenile red hake were collected at the Arthur Kill stations in April 2002 and May 2003 during the USACE's surveys (Table 4). No adult or juvenile red hake were collected during other years of the USACE sampling program. Red hake were not collected during the PANY/NJ's Newark Bay trawl survey (LMS, 1996).

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Potential Project Effects on Red Hake EFH

Red hake may be present within the Arthur Kill study area, however, the frequency of their occurrence would be limited by water quality and habitat preferences. Because Red hake eggs and larvae are pelagic, and tend to be restricted to areas east and north of the Hudson River (Able and Fahay, 1998), impacts to EFH of these life stages in the project area is not anticipated. The shelly substrate preferred by juveniles for shelter is lacking in the project area. Potential impacts to juvenile EFH would be limited to disturbance of bottom habitat during dredging and construction activities. These activities would cause sediment resuspension, indirectly affecting red hake through a temporary loss of foraging habitat and benthic prey species. Any potential impact would be limited to the spring, when juveniles make inshore migrations. Because few juvenile red hake have been collected near the Primary Study Area and no eggs or larval red hake have been reported, the proposed bridge construction and demolition is expected to have a negligible impact on EFH of this species. Impacts to red hake EFH would be short-term and would be restricted to the local area of construction.

4.2.2. Winter flounder

The Arthur Kill is designated as EFH for all life stages of winter flounder (NMFS, 2003). Winter flounder is a commercially and recreationally important species that resides in NY/NJ Harbor waters. Spawning occurs between February and April in estuaries and bays of the Mid-Atlantic Bight, including NY/NJ Harbor. Adults spawn in late winter through spring, at water temperatures below 15°C, at salinity between 10 - 32 ppt over sand, mud and gravel substrate (< 6 meters deep) (Pereira et al., 1999). Winter flounder eggs are demersal, adhesive, and stick together in clusters. Eggs are typically found in water with temperatures less than 10°C and depths less than 5 meters over sand, muddy sand, mud, and gravel substrates. These substrates may provide EFH for winter flounder spawning adults, eggs, and larvae throughout the estuarine and marine portions of the NY/NJ Harbor. Larvae are non-buoyant and have a strong benthic orientation, often resting on the bottom between swimming efforts (Pearcy, 1962). Winter flounder larvae prefer water temperatures less than 15°C, depths less than 6 meters, and a salinity range of 4 to 40 ppt. Juvenile winter flounder use habitats from 1 to 50 meters, at water temperatures below 25°C and at salinity between 10-33 ppt. During summer months, winter flounder adults reside in nearshore coastal waters, with the distance offshore dependent upon water temperature, i.e., the warmer the water temperature the further offshore adults move. Winter flounder adults are typically found on mud, sand, and gravel substrates, at water temperatures below 25°C, salinity between 15-33 ppt, and water depths between 1-100 meters.

Prey items for larval winter flounder include copepod nauplii, small polychaetes and invertebrate eggs (Pereira et al., 1999). Juvenile and adult winter flounder are opportunistic feeders, consuming mostly invertebrates (e.g. amphipods, bivalve siphons, polychaetes, anthozoans), and on rare occasions, small fishes.

Winter flounder is among the most common finfish species occurring within the Arthur Kill. Juvenile and adult life stage abundance varies, with the majority of individuals occurring during late-spring and early summer.

Winter flounder eggs and larvae were commonly collected from all of the Arthur Kill stations sampled during the 1998-1999 baseline survey as well as the 2001 through 2005 surveys. Eggs were collected during March and April 1999 and 2003, and February 2005. USACE (2003a, 2003b) reported that winter flounder larvae dominated ichthyoplankton connections from the Arthur Kill/Newark Bay area during February-March. Larval winter flounder were collected from the Arthur Kill stations each year between March and June during the USACE 2002-2005 sampling program. However they were collected as early as February in 2002 and 2004 (Table 3) (USACE 1999, 2002, 2003a, 2003b, 2005, 2006).

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Winter flounder adults and juveniles were collected at both Arthur Kill stations during the USACE's 1998-1999 baseline survey (USACE 1999). At Shooters Island Reach, winter flounder were collected in October, December, February, April and June. At Elizabeth Reach, winter flounder were present in April, June and August collections. During the USACE's 2001-2005 fish surveys, juvenile and/or adult winter flounder were collected from the Arthur Kill stations each year during February, March, April and May, but were also collected from the Arthur Kill during January in 2001, 2003, 2004, and July in 2002 and 2003 (Table 4) (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). Winter flounder adults and juveniles were collected during the PANY/NJ's 1995-1996 Newark Bay trawl survey from April through November, accounting for 2.5% of the total number of fish collected (LMS, 1996). Winter flounder were caught in the interpier basin on the New Jersey side of the Arthur Kill in September, October, and November 1994 (USCG 1997).

Potential Project Effects on Winter Flounder EFH

All winter flounder life stages are expected to occur within the Primary Study Area of the Arthur Kill. Potential direct impacts to winter flounder EFH would most likely include temporary disruption of spawning and early life-stage (i.e. larval settlement) habitat through increased turbidity and burial or physical removal of substrate and associated loss of demersal eggs. Restricting in-water work to work windows outside of the winter flounder spawning season (January to June) will avoid impacts to these sensitive life stages. Impacts to EFH for these early life stages are expected to be minimal because the majority of the early life stage winter flounder collected during the USACE's baseline harbor-wide fisheries survey (USACE, 1999), were found in the Lower Bay where water temperature and sediment characteristics are more suitable for winter flounder young-of-year than in the Arthur Kill. Juveniles and adults that frequent the Primary Study Area will actively avoid in-water construction, opting for other suitable habitat within the general vicinity of the Primary Study Area. Potential long-term impacts may include the alteration of shallow-water bathymetry and hydrodynamics, but these areas would still provide suitable depth and habitat substrate for winter flounder.

Disturbance of the benthic and pelagic habitats occupied by prey organisms are the primary indirect impact to winter flounder. Temporary loss or relocation of benthic prey species resulting from physical removal of substrate and burial due to settlement of resuspended sediments will cause winter flounder to move to other feeding habitats within the harbor. These impacts will be limited to the time of the construction operations.

Benthic invertebrate communities are expected to recolonize impacted areas following cessation of construction activities (Newell et al., 1998). The habitat area impacted during the construction and dredging is a small fraction of the total subtidal benthic habitat available in the Arthur Kill. Impacts to winter flounder EFH from the project are expected to be short-term and largely avoidable through the use of work windows for in-water work.

4.2.3. Windowpane flounder

The Arthur Kill is designated as EFH for all life stages of windowpane flounder (NMFS, 2003). Windowpane flounder occur at all depths in estuaries of the Mid-Atlantic Bight, including the NY/NJ Harbor, with juveniles and adults seasonally most abundant in deeper channels occurring over mud or fine-grained sand (Chang et al., 1999). Spawning adults, eggs, and larvae are often observed from February to December, with a spring-spawning event (peak in May) in the polyhaline portion of estuaries and a fall-spawning event (peak in October) in offshore waters of the continental shelf. Eggs and larvae are concentrated in the mid to upper water column, and juveniles and adults prefer bottom habitats of mud or fine-grained sand. Larvae are pelagic, settling to the bottom at approximately 10-20 mm TL, and occur in the brackish portion of the estuary, primarily in spring (Able and Fahay, 1998). Juveniles, adults and spawning adults are typically found on bottom habitats with water temperatures below 21°C, salinity

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between 5-36 ppt and water depths between 1-75 meters. Eggs and larvae are respectively found in surface and pelagic waters with temperatures below 20°C.

Windowpane flounder are among the dominant finfish species occurring within the Arthur Kill. Windowpane eggs were collected from the Arthur Kill in May and June of 2001, 2003 and 2005, in June in 2002, and in June and July in 2004 during the USACE ichthyoplankton sampling program. Larval windowpane were collected during May and June of most of the years sampled during the USACE program (Table 3) (USACE 1999, 2002, 2003a, 2003b, 2005, 2006).

Adult windowpane flounder were present in Arthur Kill collections during the USACE's 1998-1999 and 2002-2005 fish surveys. Adult and/or juvenile flounder were collected in surveys during the months of January through June between 2001 and 2003, and in February and March of 2004 (Table 4). No adult and/or juvenile windowpane flounder were collected during the 2005 USACE surveys (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). During the PANY/NJ's1995-1996 Newark Bay trawl survey, windowpane flounder were only collected during July, accounting for only 0.03% of the total fish collected (LMS, 1996).

Potential Project Effects on Windowpane Flounder EFH

All windowpane flounder life stages are expected to occur within the Primary Study Area of the Arthur Kill. Potential direct impacts to windowpane flounder EFH include the temporary disruption of spawning and nursery habitat during the spring-spawning season from increased turbidity and disturbance of water column habitat. However, no significant impact to spawning habitat is expected because this species typically spawns in deeper areas of the estuary (especially the Lower Bay), and because eggs and larvae are pelagic and therefore not expected to remain within the Primary Study Area.

Potential indirect impacts to windowpane flounder EFH would be related to bottom habitat disturbance and the potential loss of forage organisms in the immediate vicinity of construction. Impacts to windowpane flounder EFH would be short-term since natural sedimentation and subsequent recolonization by benthic invertebrates and other prey are expected to occur within a year following bridge construction. As a significant portion of the windowpane flounder's prey is pelagic, in-water construction activity may induce avoidance behavior in most of these prey species, and may cause winter flounder to move to other areas to find prey. Impacts to windowpane flounder EFH from the proposed project are expected to be indirect, minimal, and short term.

4.2.4. Atlantic herring

EFH for larval, juvenile, and adult stages of Atlantic herring has been designated in the Arthur Kill (NMFS, 2003). Atlantic herring eggs are demersal, stick to the seabed or algae on the ocean floor, and hatch in 10 to 15 days. Atlantic herring larvae are pelagic and occur throughout the mid-Atlantic Bight at water temperatures below 16 °C, depths from 50 - 90 meters and salinities around 32 ppt (Reid et al., 1998). Juveniles and adults occur in schools in temperatures below 10°C at depths from 15 - 135 meters and at salinities from 26 - 32 ppt and above 28 ppt, respectively (Reid et al., 1998). Atlantic herring are primarily pelagic but may also be found in shallow, nearshore areas. Atlantic herring juveniles and adults of the George's Bank stock use the New York Bight as a wintering area between December and April, when they may occur in the Arthur Kill Primary Study Area (Anthony, 1982).

No Atlantic herring eggs or yolk sac larvae were collected in the Arthur Kill during the USACE's ichthyoplankton sampling program. Post yolk sac larvae was collected between February and May during the program, though they were most commonly collected during February and March (Table 3) (USACE 1999, 2002, 2003a, 2003b, 2005, 2006).

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During the USACE's 1998-2005 surveys, Atlantic herring juveniles and/or adults were collected in the Arthur Kill between January and May (Table 4) (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). Atlantic herring were collected in May during the PANY/NJ's 1995-1996 Newark Bay trawl survey, however very few were present (0.12% of the total fish collected) (LMS, 1996).

Potential Project Effects on Atlantic Herring EFH

Atlantic herring is a schooling pelagic species, not generally associated with bottom habitats or nearshore areas. Atlantic Herring may be present in the project area, although larvae are typically found in deeper water and higher salinities than occur in the project area. Juveniles and adults also prefer deep, cool waters of high salinity. If present in the study area, short-term increases in turbidity caused by dredging and demolition activities are not likely to affect this pelagic species. The proposed project is not expected to impact EFH for Atlantic herring.

4.2.5. Bluefish

The Arthur Kill is designated as EFH for juvenile and adult stages of bluefish (NMFS, 2003). Juveniles are pelagic, using estuaries as nursery areas, and can be found over sand, mud, silt, or clay substrates. Juveniles typically inhabit estuaries from May to October, preferring temperatures between 19-24°C, and salinities between 23-36 ppt. Juveniles have been reported to intrude into waters with salinities as low as 3 ppt. Juvenile bluefish prey upon crustaceans and polychaetes (Fahay et al., 1999).

Adults travel in pelagic schools and are generally not associated with bottom habitats. They prefer temperatures between 18-22 °C, and salinity above 25 ppt. Adults are highly migratory and seasonally occur in NY/NJ Harbor from April to October. Bluefish adults generally migrate in warm waters, moving north to the New York Bight and southern New England during the spring and summer and to the South Atlantic Bight and/or offshore during the fall and winter (Shepherd and Packer 2006). Adults feed on a wide variety of available forage fish, such as bay anchovy, menhaden and river herring.

Adult and/or juvenile bluefish were only collected during two surveys in the Arthur Kill during the USACE's 1998 through 2005 trawl surveys (October 1998 and June 2003) (Table 4) (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). Bluefish were collected from August through October during the PANY/NJ's 1995-1996 Newark Bay trawl survey (LMS, 1996). Bluefish were caught in the interpier basin on the New Jersey side of the Arthur Kill in August 1994 (USCG 1997). The occurrence of bluefish in shallow water samples may reflect the presence of transient individuals that followed prey into the shallows.

Potential Project Effects on Bluefish EFH

Relatively low abundance of bluefish in Newark Bay shoal samples is indicative of the pelagic lifestyle of this species. The seasonal occurrence and pelagic behavior of bluefish greatly limits any potential impact due to bridge construction/demolition. Potential direct impacts to EFH would be short term and limited to actual construction in the water column. Indirect impacts are expected to be negligible as their primary forage species are pelagic (e.g. bay anchovy and Atlantic menhaden). No long-term impacts on bluefish EFH in the Primary Study Area are anticipated as a result of the proposed project.

4.2.6. Atlantic butterfish

The Arthur Kill is designated as EFH for larval, juvenile, and adult stages of Atlantic butterfish (NMFS, 2003). Butterfish are euryhaline (5-32 ppt) and eurythermal (4-21°C) (Cross et al., 1999). Butterfish range from Nova Scotia to Florida along the Atlantic coast. Butterfish migrate seasonally between offshore waters in the southern part of their range during winter and coastal waters in the northern part of their range during the summer. Spawning occurs primarily over continental shelf waters in the Mid

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Atlantic Bight between May and October, although some eggs and larvae have been collected in coastal and estuarine waters (Able and Fahay, 1998).

Larvae are typically found at temperatures between 9-19 °C, depths greater than 10 meters, and salinity ranging between 6-37 ppt. Juveniles and adults are typically found over sandy and muddy substrates at temperatures between 3-28 °C, depths greater than 10 meters, and salinity ranging between 4-26 ppt.

Larval, juvenile, and adult butterfish are pelagic, occurring in the Primary Study Area during warmer summer months in both shallow and deeper bay waters. Juveniles form loose schools often near the surface, and are found over a range of sand, mud and mixed fine grain substrates. During the summer, butterfish have been reported over shallow flats, in sheltered bays, estuaries, and the surf zone. Larger juveniles and adults may congregate near the bottom during the day and move upward at night. Prey species include small fishes and crustaceans such as copepods, amphipods, decapods and polychaetes (Cross et al., 1999).

No early life stages of this species were collected at the Arthur Kill stations during the USACE's ichthyoplankton surveys (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). During the USACE's 1998-1999 fish survey, butterfish were collected from one survey from at the Arthur Kill (August 1999). This species was present in only one (June 2002) of the Arthur Kill station collections during the 2001 – 2005 trawl survey program (Table 4) (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). Butterfish were not collected during the PANY/NJ's 1995-1996 Newark Bay trawl survey (LMS, 1996).

Potential Project Effects on Butterfish EFH

The habitat and water quality conditions of the Arthur Kill are not especially suitable for butterfish, but occasional juveniles and adults may occur seasonally in shallow water habitats of the Primary Study Area. Due to the pelagic nature of butterfish, potential direct impacts to EFH would be limited to short term disturbances in the water column such as sediment resuspension or turbidity associated with construction. Potential indirect impacts are expected to be negligible because benthic organisms comprise only a portion of butterfish diets and impacts to bottom habitat would be temporary and located within areas of active construction. Therefore, potential impacts to Atlantic butterfish EFH from the proposed project would be short-term and minimal.

4.2.7. Atlantic mackerel

EFH has been designated for juvenile and adult Atlantic mackerel in the Primary Study Area (NMFS, 2003). Atlantic mackerel are pelagic and are widely distributed across the western Atlantic continental shelf and seasonally within estuaries and bays of the mid-Atlantic Bight. In the Hudson Raritan Estuary, juveniles may be present from April to December, although few were collected in NEFSC otter trawl surveys in the estuary between 1992 and 1997. Juveniles were found in the estuary in the summer at depths ranging from 5 to 10 meters, salinity ranges from 26 to 28.9 ppt, and temperatures from 17.6 to 21.7°C (Studholme et al., 1999). Juveniles primarily feed on amphipods and decapods. Adults prefer salinities of 25 ppt or greater, and water temperatures below 16°C (Studholme et al., 1999). Adults may be present in the Hudson Raritan Estuary during the warmer months, although none were collected in NEFSC trawl surveys of the estuary from 1992 to 1997. Adult Atlantic mackerel have a similar diet to juveniles but also consume squid and small fishes.

Juvenile and/or adult Atlantic mackerel were not collected at Arthur Kill stations during the USACE's 1998-2005 surveys (Table 4) (USACE 1999, 2002, 2003a, 2003b, 2005, 2006) and were not collected during the PANY/NJ's 1995-1996 Newark Bay trawl survey (LMS, 1996).

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Potential Project Effects on Atlantic Mackerel EFH

Juvenile and adult Atlantic mackerel occur seasonally in the Hudson Raritan Estuary, but are not likely to occur in the project area due to their water quality preferences. The average salinity levels of waters in the project area are below the preferred ranges for both juveniles and adults, and high water temperatures during the summer exceed the tolerances of these life stages. Atlantic mackerel were not caught during fish sampling programs in the Primary Study Area. Therefore, no impacts to Atlantic mackerel EFH are expected as a result of the proposed project.

4.2.8. Summer flounder

The Arthur Kill is designated as EFH for larval, juvenile, and adult stages of summer flounder (NMFS, 2003). The study area does contain some summer flounder HAPC, in the form of sea lettuce *and Spartina alterniflora* marshes. In the New York Bight, summer flounder usually occupy inshore regions during the warmer months and move offshore for the winter season. Summer flounder can camouflage themselves to match the surrounding substrate, to avoid predation and conceal themselves from prey. They feed by sight and are most active during daylight hours. Summer flounder larvae and juveniles are opportunistic feeders but primarily feed on microcrustaceans and small polychaetes (Packer et al., 1999). Adult prey includes shrimp, mysids, anchovies (*Anchoa* spp.) and Atlantic silversides.

The pelagic larvae are found over the inner and outer continental shelf, and are transported to estuarine nursery areas by currents. Larvae occur across a wide range of salinities, but are most often captured in the higher salinity portions of estuaries. Larvae are most abundant between 9 and 18°C and found at depths from 10 to 70 meters in the Mid Atlantic Bight. Summer flounder post yolk sac larvae were collected from the Arthur kill during December, February, April and May (Table 3) (USACE 1999, 2002, 2003a, 2003b, 2005, 2006).

Juveniles move into shallow bays and estuaries for the spring, summer and autumn months, and are usually found in depths of 0.5 to 5.0 meters, using these areas as nursery habitat. Juveniles can be found on mud and sand substrates in flats, channels, salt marsh creeks, and eelgrass beds. Juvenile summer flounder are tolerant of the wide ranges of temperature and salinity of estuarine habitats, and can withstand temperatures from 3 to 27°C and salinities from 10 to 30 ppt (Packer et al., 1999).

Adult summer flounder are found offshore during colder months on the outer continental shelf. Adults usually return inshore to coastal waters of the New York Bight in April, and reach their peak abundance during the warm summer months of July and August (Packer et al., 1999). They are often found in the high salinity portions of estuaries, and have been reported as preferring sandy habitats, but can be found in a variety of habitats with both mud and sand substrates, including marsh creeks, seagrass beds, and sand flats. Similar to juveniles, adults can tolerate a wide range of temperatures.

Adult and/or juvenile summer flounder were collected at both Arthur Kill stations during the USACE's 1998-1999 fish surveys. This species was present at Shooters Island Reach in October and June, and at Elizabeth Reach in October, June, and August (Table 4) (USACE 1999). Summer flounder was collected between March and June during the USACE's 2001 – 2005 trawl sampling program (Table 4) (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). During the PANY/NJ's 1995-1996 Newark Bay trawl survey, summer flounder were collected from May through September (LMS, 1996).

Potential Project Effects on Summer Flounder EFH

As summer flounder larvae are pelagic, short-term increases in turbidity from bridge construction and demolition are not expected to significantly impact EFH of this life stage. Potential direct impacts to summer flounder juvenile and adult EFH include temporary disruption of bottom habitat and the

modification of shallow-water habitat in the area. ncreases in turbidity associated with construction activities could interfere with sight-feeding by juveniles and adults. The temporary loss of benthic habitat and forage species due to cofferdam placement and burial by resuspended sediments would also impair feeding opportunities for juvenile and adult summer flounder. However, summer flounder are highly mobile and would likely move to undisturbed areas during construction activities. The area of impact is relatively small compared to the available habitat in the Arthur Kill. No long-term effects and no significant impacts to summer flounder EFH are expected as a result of the project.

4.2.9. Scup

The Arthur Kill is designated as EFH for egg, larval, juvenile, and adult stages of scup (NMFS, 2003). Scup are demersal, and feed on a variety of small benthic invertebrates in open and structured habitats, such as mussel beds, rock rubble, or reefs. Scup spend the summer in coastal waters and estuaries, migrating to offshore winter grounds along the outer continental shelf, as inshore water temperatures decline in the autumn. Scup return to coastal waters off New Jersey and New York by early May. During the summer months, older fish tend to stay in the inshore waters of the bays, while the younger fish are found in the more saline waters of estuaries, including the Hudson Raritan Estuary. Prey for juveniles includes polychaetes, small crustaceans, fish eggs/larvae and mollusks (Steimle et al., 1999). Adults prey on polychaetes, mollusks, small squid and small fish.

Spawning begins in the spring during the inshore migration, and takes place from May through August, with a peak in June. Spawning occurs principally in the estuaries of New Jersey and New York. Scup eggs are buoyant, and hatch in about 2 to 3 days, depending on temperature. In general, scup eggs are found from May through August in waters between 13 and 23°C, and in salinities greater than 15 ppt (Steimle et al., 1999). Newly-hatched larval scup are pelagic, but become demersal after several days. Larvae are found throughout the water column, and occur in coastal waters during warmer months, often in depths less than 50 meters. No early life stage scup were collected from the Arthur Kill during the USACE's ichthyoplankton sampling program (USACE 1999, 2002, 2003a, 2003b, 2005, 2006).

During the spring and summer, juvenile scup are found in estuaries and bays between Virginia and Massachusetts, particularly in areas with sand and mud substrates or mussel and eelgrass beds. Juveniles prefer temperatures from about 9 to 27°C and salinities greater than 15 ppt (Steimle et al., 1999). Juveniles grow quickly and migrate with the rest of the population to offshore wintering grounds starting in late October, and are absent from inshore waters by the end of November. Juvenile and/or adult scup were collected from the Arthur Kill (Elizabeth Reach) during the USACE's baseline survey in August 1999 (USACE 1999), but were absent from monthly trawl collections during all other sampling periods (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). Scup were not collected during the PANY/NJ's 1995-1996 Newark Bay trawl survey (LMS, 1996).

Potential Project Effects on Scup EFH

All life stages of scup may be present in the project area between spring and autumn. If present, these life stages are not likely to be common, since they are typically found in the high salinity portions of estuaries and bays, such as the Lower Bay. Impacts to nursery EFH for scup are not expected, as the early life stages of this species are pelagic and were absent from ichthyoplankton samples from the study area. Potential direct and indirect impacts would be limited to demersal life stage EFH (i.e. juvenile and adult) and would include the temporary disruption of bottom habitat and sediment resuspension during construction. Temporary loss of foraging habitat and prey organisms could occur due to construction. However, impacts are expected to be negligible because water quality and habitat conditions in the project area are not particularly suitable for scup and few adult or juvenile scup have been collected in the Arthur Kill area. Potential impacts to scup EFH from the proposed project are expected to be minimal and short term.

4.2.10. Winter skate

The Arthur Kill is designated as EFH for juvenile and adult winter skate (NMFS, 2003). This species is typically found on sand or gravel bottoms, but has also been reported on mud bottoms (Packer et al., 2003a). Winter skates remain buried in depressions during the day and are more active at night. Winter skates can be found from shallow waters to 371 m in the Mid-Atlantic Bight, but are more abundant at depths less than 110 m. The temperature range of winter skate is generally -1 to 19°C. Winter skate can tolerate salinity ranges between 20-35 ppt but their preferred range is usually 23-32 ppt. Winter skates do not migrate extensively; however, they tend to be less abundant in the NY/NJ Harbor during summer months. Winter skate typically prey upon polychaetes, amphipods, decapods, isopods, bivalves and smaller fish such as alewives, blueback herring and butterfish (Packer et al., 2003a).

Winter skate were not collected at Arthur Kill stations during the USACE's 1998 through 2005 trawl surveys (USACE 1999, 2002, 2003a, 2003b, 2005, 2006) or during the PANY/NJ's 1995-1996 Newark Bay trawl survey (LMS, 1996).

Potential Project Effects on Winter Skate EFH

Winter skate prefer waters of relatively high salinity, so it is unlikely that this species will occur in the project area. Potential indirect impacts to winter skate EFH could result from disturbance of benthic habitat and prey species. Winter skates, if present, may avoid the area to forage in undisturbed habitat. These indirect impacts would be temporary and limited to the area of bottom disturbance. Given the limited extent of the impact area and the relatively low likelihood of winter skates to be present in the Arthur Kill, impacts to winter skate EFH from the proposed project are expected to be negligible.

4.2.11. Little skate

The Arthur Kill is designated as EFH for juvenile and adult stages of little skate (NMFS, 2003). This species is typically found on sand or gravel bottoms but has also been reported from mud (Packer et al., 2003b). Little skates generally remain buried in depressions during the day and are more active at night. Juvenile and adult little skates can be found from shallow waters to 110 m in the Mid-Atlantic Bight. The temperature range of little skate is generally 1-21°C, although most are found between 2-15°C. Little skate can tolerate salinity ranges as low as 15-20 ppt but their preferred range is usually 29-33 ppt.

Little skate do not appear to migrate extensively, but they do move to shallow water during the summer and to deep water in fall or early winter. Little skate prey includes small fish, decapod crustaceans, amphipods and polychaetes (Packer et al., 2003b).

Little skate were not collected at Arthur Kill stations during the USACE's 1998-2005 trawl surveys (USACE 1999, 2002, 2003a, 2003b, 2005, 2006) or during the PANY/NJ's 1995-1996 Newark Bay trawl survey (LMS, 1996).

Potential Project Effects on Little Skate EFH

Little skates prefer waters of relatively high salinity, so it is unlikely that this species will occur in the project area. Potential indirect impacts to little skate EFH could result from disturbance of benthic habitat and prey species. Little skates, if present, may avoid the area to forage in undisturbed habitat. These indirect impacts would be temporary and limited to the area of bottom disturbance. Given the limited extent of the impact area and the relatively low likelihood of this species to be present in the Arthur Kill, impacts to little skate EFH from the proposed project are expected to be negligible.

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4.2.12. Clearnose skate

EFH has been designated for juvenile and adult clearnose skate in the Arthur Kill Primary Study Area. Clearnose skates prefer soft bottom habitats, but can also be found on rocky or gravelly bottoms. Juveniles and adults are most abundant inshore in the summer months and less abundant in the cooler months of autumn, winter and spring. Bigelow and Schroeder (1953) reported clearnose skate occurring off New Jersey and New York from late April to November. In the Hudson Raritan Estuary, juveniles mostly occur at depths of 5 to 7 meters, temperatures between 13 and 24°C, and salinities ranging from 21 to 31 ppt (Packer et al., 2003). Adults in the estuary mostly occur at depths of 5 to 8 meters, temperatures between 9 and 24°C, and salinities ranging from 25 to 30 ppt. Common prey items include polychaetes, amphipods, mysid shrimp, crab and fish including butterfish, scup and weakfish (*Cynoscion regalis*) (Bowman et al., 2000).

No clearnose skate were collected from the Arthur Kill during the USACE's 1998-1999 or 2001-2005 trawl surveys (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). This species was not reported from the PANY/NJ's Newark Bay trawl survey (LMS, 1996).

Potential Project Effects on Clearnose Skate EFH

Since clearnose skate prefer waters of relatively high salinity, it is unlikely that this species will occur in the project area. The average salinity of the project area is well below the preferred salinity range of this species in the Hudson Raritan Estuary. Clearnose skates, if present, may avoid the area to forage in undisturbed habitat. These indirect impacts would be temporary and limited to the area of bottom disturbance. Given the limited extent of the impact area and the relatively low likelihood of this species to be present in the Arthur Kill, impacts to clearnose skate EFH from the proposed project are expected to be negligible.

4.2.13. Sandbar shark

The Arthur Kill is designated as EFH for sandbar shark larvae (neonates) and adults. This bottom-dwelling species is found in many coastal habitats, most commonly at depths of 20 to 55 meters. The sandbar shark is a slow-growing species, reaching sexual maturity at approximately 15 years. Its gestation period lasts up to a year, and reproduction is every other year. This shark is live-bearing, and the young are born from March to July, in litters typically numbering 6 to 13 pups.

In the western Atlantic, EFH for sandbar shark neonates and early juveniles is shallow coastal areas out to the 25 meter isobath from Montauk, New York to Cape Canaveral, Florida. Nursery areas include shallow coastal waters from Great Bay, New Jersey to Cape Canaveral, Florida, especially Delaware and Chesapeake Bays during the summer (NOAA, n.d.). Neonates and early juveniles require salinity greater than 22 ppt and temperatures greater than 21°C. EFH for late juveniles/subadults is coastal and pelagic waters off of southern New England and Long Island, and shallow coastal areas to the 25 meter isobath from Barnegat Inlet, New Jersey to Cape Canaveral, Florida. In the winter, the EFH is in the Middle Atlantic Bight from 39° N to 36° N and benthic areas between the 100 and 200 meter isobaths. EFH for adult sandbar sharks includes shallow coastal areas from the coast to the 50 meter isobath from Nantucket, Massachusetts south to Miami, Florida.

Sandbar sharks were not collected during the USACE's 1998 through 2005 trawl surveys in the Arthur Kill (USACE 1999, 2002, 2003a, 2003b, 2005, 2006) or during the PANY/NJ's 1995-1996 Newark Bay trawl surveys (LMS, 1996).

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Potential Project Effects on Sandbar Shark EFH

The preference of sandbar sharks for warm waters of high salinity suggests that it is unlikely that this species will occur within the Arthur Kill study area, except as occasional transient individuals. The absence of sandbar sharks from samples collected in the Arthur Kill also indicates that they are uncommon or absent in this area. No impacts to sandbar shark EFH are expected from the proposed project.

4.2.14. Coastal Migratory Pelagic Species

King mackerel, Spanish mackerel, and Cobia are considered highly migratory species by NOAA Fisheries Service. EFH has been designated for all life stages of these species in the Primary Study Area. EFH for these three species includes sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shell break zone, including coastal inlets.

King Mackerel

King mackerel inhabit coastal waters from Maine to Florida and the Gulf of Mexico. Larval distribution indicates that spawning most likely occurs offshore of the Carolinas, to south Florida and the northern Gulf of Mexico. Larvae have been collected from May to October, in surface water temperatures from 26 to 31°C and salinities of 26 to 37 ppt (Godcharles and Murphy, 1986). Temperature and salinity are the most important factors controlling the distribution of king mackerel. Juvenile and adult king mackerel are highly migratory and seldom enter waters below 20°C. The northern extent of the range of king mackerel is typically the 20°C isotherm and the 18-meter contour, near Block Island, Rhode Island. Immature fish tend to school, sometimes mixing with schools of similar-sized Spanish mackerel (DeVane, 1978, Bowman et al., 2000). Adult king mackerel are solitary and tend to be found near shore, often among underwater structures. Juvenile and adult king mackerel feed on fish, including menhaden and alewives, as well as shrimp and squid (DeVane, 1978, Bowman et al., 2000).

No king mackerel were collected from the Arthur Kill stations during the USACE's ichthyoplankton or trawl sampling programs (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). King mackerel were not collected in the PANY/NJ's 1995-1996 Newark Bay trawl survey (LMS, 1996).

Potential Project Effects on King Mackerel EFH

No impacts to king mackerel eggs or larvae are expected from the proposed project because they remain in the water column and are very unlikely to occur within the Primary Study Area. The potential direct impacts for juvenile and adult EFH for this species may include temporary loss of water column habitat during construction. However, no impacts to juvenile or adult king mackerel EFH are expected to occur, as these life stages have also been absent from collections in the vicinity of the Primary Study Area. Therefore, no impacts to EFH for any life stage of king mackerel are expected as a result of the proposed project.

Spanish Mackerel

Spanish mackerel occur from the Florida Keys to New York, wintering in the warmer waters off Florida and moving northward to North Carolina in early April and to New York waters in June (Desfosse et al., 1999). All life stages of Spanish mackerel are pelagic and primarily found in waters over 17.7°C and within the high salinity range of 32 to 36 ppt (Godcharles and Murphy, 1986). Spanish mackerel spawn in the northern portions of their ranges, along the northern Gulf Coast, and along the Atlantic Coast from the Carolinas northward. Spawning progresses from south to north, generally as waters warm in the spring and summer to above 26°C. The buoyant larvae are generally found in surface water temperatures of 19.6 to 29.8°C and in salinities above 28 ppt. Most juveniles stay in nearshore ocean waters, although

some use estuaries as nursery grounds, but avoid waters surrounding the mouths of freshwater rivers. Similar to king mackerel, Spanish mackerel are highly temperature-dependent, and typically range north only to the 20°C isotherm off Rhode Island. Adult Spanish mackerel feed on fish, primarily menhaden, alewives, and anchovies, as well as shrimp and squid (DeVane 1978, Bowman et al., 2000).

No Spanish mackerel were collected during the USACE's 1998 through 2005 ichthyoplankton or trawl surveys in the Arthur Kill (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). Spanish mackerel were not collected during the PANY/NJ's 1995-1996 Newark Bay trawl survey (LMS, 1996).

Potential Project Effects on Spanish Mackerel EFH

Due to the affinity of Spanish mackerel for warm waters of high salinity, it is unlikely that this species regularly occurs in the project area. Salinities and temperatures of the project area are generally well outside the narrow range of preferences of this species for these parameters. The absence of any life stages of Spanish mackerel in collections made in the Arthur Kill suggests that the species is uncommon or absent in this area. Since all life stages of this species are pelagic, they would not be significantly affected by alteration of the seabed and sediment resuspension resulting from bridge construction and demolition. The proposed project is not expected to impact EFH for any life stage of Spanish mackerel.

Cobia

Cobia are found along the U.S. Atlantic coast from Florida to Massachusetts. Most cobia eggs and larvae are found in offshore waters adjacent to the mouth of the Chesapeake Bay and south to Virginia (Vaught-Shaffer and Nakamura, 1989). Early juvenile cobia move inshore and inhabit coastal areas, near beaches, river mouths, barrier islands, lower reaches of bays and inlets, or bays of relatively high salinity (Vaught-Shaffer and Nakamura, 1989). Cobia prefer temperatures greater than 20°C and salinities greater than 25 ppt. Juveniles tolerate temperatures as low as 17°C, but stop feeding at 18°C. Juveniles are primarily found in the southeastern U.S. and in the Gulf of Mexico. Adult cobia migrate from over-wintering grounds near the Florida Keys to spawning/feeding grounds in the mid-Atlantic during spring and summer, occasionally entering estuaries (Richards, 1977, Vaught-Shaffer and Nakamura, 1989). Adults have been collected from waters of 16 to 32ºC and salinities of 22 to 34 ppt. Decapod crustaceans constitute the majority of cobia diets (Murdy et al., 1997).

Cobia were not collected at Arthur Kill stations during the USACE's 1998-2005 trawl and ichthyoplankton surveys (USACE 1999, 2002, 2003a, 2003b, 2005, 2006) or during the PANY/NJ's 1995-1996 Newark Bay trawl survey (LMS, 1996).

Potential Project Effects on Cobia EFH

Since cobia prefer warm waters of high salinity, it is unlikely that this species will occur in the project area. Salinities and temperatures of the project area are generally below the lower limits tolerated by this species. Although juveniles and adults are occasionally found in estuaries, the absence of any life stages of cobia in collections made in the Arthur Kill suggests that the species is uncommon or absent in this area. Since this species is pelagic, its EFH would not be significantly affected by seabed alteration and sediment re-suspension resulting from bridge construction and demolition. The proposed project is not expected to impact EFH for any life stage of Cobia.

4.3. Forage Species

A number of forage species occur in the Arthur Kill study area. While EFH has not been designated for many forage species, impacts to these species can affect habitat for EFH-designated species which rely on them as a food source. In order to assess impacts to EFH through adverse effects on forage species, potential project impacts to four representative forage species commonly found in the Arthur Kill are

discussed below. Table 5 is a summary of the expected seasonal occurrence of four forage species in the Arthur Kill Study area.

4.3.1. Bay Anchovy

The bay anchovy is a schooling species and is one of the most abundant species in Atlantic coast estuaries. As such, it is an extremely important prey resource for larger, predatory fishes. Bay anchovy are widely distributed throughout the lower Hudson River estuary and its tidal tributaries. Dovel (1981) collected bay anchovies within the Hudson River Estuary in water temperatures from 2 to 27 ºC and salinities ranging from 25-30 ppt. Bay anchovies are likely to occur within the Arthur Kill from spring through fall and juveniles/and or adults were collected in the Arthur Kill trawl samples throughout the year during the 1998 through 2005 USACE trawl surveys (Table 5) (USACE 1999, 2002 2003a, 2003b, 2005, 2006). Bay anchovy numerically dominated collections during the PANY/NJ's Newark Bay trawl survey, and their abundance exceeded all other species by an order of magnitude (LMS, 1996). Bay anchovy were caught in the interpier basin on the New Jersey side of the Arthur Kill in August 1994 (USCG 1997).

TABLE 5:
NUMBER OF YEARS ADULT AND/OR JUVENILE FORAGE SPECIES COLLECTED IN MONTHLY BOTTOM TRAWL SAMPLES FROM THE ARTHUR KILL DURING THE USACE 1998 THROUGH 2005 TRAWL SAMPLING PROGRAM.

Species	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Bay Anchovy (*Anchoa mitchelli)*	3	1	1	2		3	4	
Atlantic Silverside (*Menidia menidia*)		2	2	2				
Atlantic Tomcod (*Microgradus tomcod*)	2	1	1	2		3	4	
Atlantic Menhaden (*Brevoortia tyrannus*)	2	1		1			1	

Potential direct impacts to bay anchovy would be short term and limited to the operation of dredging equipment in the water column and localized turbidity plumes. Bay anchovy are highly mobile fish that can avoid most in-water construction activities. However, anchovy are planktivorous and increased turbidity in the vicinity of construction could impair feeding efficiency. Because of their pelagic nature, potential impacts to this forage species from the proposed project are expected to be short term and minimal.

4.3.2. Atlantic Silverside

Silversides are small schooling fish that frequent tidal marshes, seagrass beds, and shallow inshore areas. Like anchovies, silversides form dense schools and represent an important prey resource for larger predatory fishes in mid-Atlantic estuaries, including NY/NJ Harbor. This fish remains in estuaries areas or the coastal surf zone throughout most of the year, but migrates out of estuaries and occupies deeper coastal waters during winter months (Conover and Murawski, 1982; Conover and Ross, 1982). Atlantic silverside juveniles and/or adults were collected from the Arthur Kill throughout the year, but were most often collected between January and March during the 1998 through 2005 USACE trawl surveys (Table 5) (USACE 1999, 2002, 2003a, 2003b, 2005, 2006). Atlantic silversides were collected from September - November during the PANY/NJ's Newark Bay trawl survey (LMS, 1996). Atlantic silversides were caught in the interpier basin on the New Jersey side of the Arthur Kill in December 1994, and January and February 1995 (USCG 1997).

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Potential direct impacts to Atlantic silversides would be short term and limited to the operation of dredging equipment in the water column and localized turbidity plumes. Atlantic silversides are highly mobile fish that can avoid most in-water construction activities. However, silversides are opportunistic planktivores and increased turbidity in the vicinity of construction could impair feeding efficiency. Because of their pelagic nature, potential impacts to Atlantic silversides from the proposed project are expected to be short term and minimal.

4.3.3. Atlantic tomcod

The Atlantic tomcod is a small codfish, known primarily from north Atlantic inshore waters. Atlantic tomcod spawn in brackish to tidal freshwater portions of estuaries, but migrate into coastal waters during winter. Adult tomcod are able to tolerate a wide range of salinities (0 – 31 ppt) and temperatures (-1 to 25°C) (Collette and Klein MacPhee, 2002). Atlantic tomcod feed on a variety of benthic organisms by dragging its chin barbell and pelvic fins to locate prey (Collette and Klein-MacPhee, 2002; Froese and Pauly, 1999). Predators of Atlantic tomcod include bluefish and summer flounder (Wilk, 1977, Juanes et al., 1993). Tomcod are known to overwinter in the lower Hudson River Estuary (LMS, 1975), though they do not appear to be abundant in the Primary Study Area throughout the year. Adults and juvenile tomcod were collected from the Arthur Kill in August 1999, June 2003, and between February and May 2004 during the 1998 through 2005 USACE trawl surveys (Table 5) (USACE 1999, 2002 2003a, 2003b, 2005, 2006). The PANY/NJ's Newark bay trawl survey documented tomcod during May and July (LMS, 1996).

Due to the transient nature of tomcod, potential direct impacts are limited to short term disturbances in the water column such as sediment resuspension or turbidity associated with dredging. Potential indirect impacts are expected to be negligible because impacts to bottom habitat will be temporary and localized Potential impacts to this forage species from the proposed project are not expected to be significant or long term.

4.3.4. Atlantic Menhaden

The Atlantic menhaden, locally referred to as "bunker" is a seasonally abundant herring, occurring in large schools in coastal bays and estuaries. Atlantic menhaden migrate seasonally along the Atlantic coast, moving north through the mid-Atlantic Bight during Spring and south during Fall to overwinter in waters south of Cape Hatteras (Able and Fahay, 1998). Atlantic menhaden spawn in continental shelf waters and the lower reaches of estuaries and coastal bays along the U.S. Atlantic coast (Dovel, 1971). Large schools of juvenile menhaden use estuaries as nurseries during the summer before migrating offshore in the fall. Adult menhaden have a broad temperature range of 0 to 25°C, and a wide salinity range of <1 to 36 ppt (Ahrenholz et al., 1989). Adults are strictly filter feeders, grazing on phytoplankton and small zooplankton (Ahrenholz et al., 1987). Juvenile and adult Atlantic menhaden are seasonally abundant throughout NY/NJ Harbor, though they were collected infrequently from the Arthur Kill during the 1998 through 2005 USACE trawl surveys (Table 5) (USACE 1999, 2002 2003a, 2003b, 2005, 2006). None were reported in the PANY/NJ's 1995-1996 trawl survey of Newark Bay; this may reflect the largely pelagic distribution of the species.

Atlantic menhaden are highly mobile and can avoid most in-water construction activities. However, menhaden are largely planktivorous and increased turbidity in the vicinity of construction could temporarily impair feeding by juveniles and adults moving through the Arthur Kill. Because of their pelagic nature, potential impacts to Atlantic menhaden from the proposed project are expected to be short term and minimal.

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4.4. Assessment Summary

Review of the life histories of the EFH-designated species for the Arthur Kill project area indicates that the habitat, water quality, and other environmental conditions would not support many of these species and life stages. Only seven EFH-designated species have been collected in the project area, and several of these were infrequently caught. The potentially impacted species include red hake (juveniles), winter flounder (all life stages), windowpane flounder (all life stages), Atlantic herring (larvae, juveniles, and adults), bluefish (juveniles and adults), butterfish (juveniles and adults), summer flounder (larvae, juveniles and adults), and scup (juveniles and adults). All of the other species, based on existing data and relevant literature on species life history and preferred habitat characteristics (salinity, depth, substrate, current, etc.), are not expected to occur in the vicinity of the proposed project, except for occasional, seasonally transient individuals. No adverse impacts are anticipated on the habitat of these other species or to the species themselves.

The proposed bridge construction will use best management practices, such as cofferdams and dredging within appropriate windows in order to minimize impacts on the marine environment. The primary short-term impacts are associated with the removal of aquatic habitats, temporary increases in sediment loadings, the temporary loss of habitat from construction of cofferdams, and required blasting for demolition of the existing bridge. Construction activities may include land clearing, which may result in localized increases in turbidity. The disturbance of benthic habitat will occur via placement of cofferdams and trestles and by excavation for the bridge support piers.

4.4.1. Direct impacts

Potential adverse direct impacts in the Primary Study Area would be limited primarily to the habitat of demersal species and life-stages (i.e., winter flounder eggs, juveniles, and adults), whereas pelagic species and life stages (i.e. Atlantic herring) are expected to continue using portions of the water column during and following bridge construction operations. During construction, pelagic species might experience disturbance to a small portion of habitat and respond by avoidance of the active work area. Early life stages which are pelagic and have limited mobility (i.e. windowpane flounder eggs) would be carried through the project area by tides and currents, resulting in potential exposure to construction-related disturbance.

It is anticipated that most of the direct impacts to habitat would be associated with short-term effects. These short-term effects would result in the exclusion of the fish species from habitat in the Primary Study Area due to increased turbidity, water disturbance, noise, vibration, and blasting associated with bridge removal. These effects would locally reduce the available water column and benthic habitat and would cause mobile organisms to move to other habitat or cause mortality. This avoidance would occur only in those areas where active construction is underway.

Small turbidity increases might occur in the surrounding waters which in turn may have direct impacts to some EFH-designated species that are sensitive to water quality fluctuations or rely on sight feeding (i.e., winter flounder, bluefish). However, turbidity in the NY/NJ harbor is naturally highly variable, depending on freshwater inflow, tidal re-suspension, storms, and other factors. Soil erosion into Old Place Creek and the Arthur Kill will be minimized through the use of standard techniques, including fabric lined silt fences or bales of hay to prevent sediment runoff or a desilting sump pit with a pump to drain off accumulated storm water. Therefore, the construction related turbidity increases will be minimal and have negligible impacts. Upon completion, the local habitats will again be available to all fish species.

The direct impact of construction activities would be limited to a temporary disturbance of habitat in small in-water areas occupied by cofferdams. Benthic habitat would be lost in these areas and fish would

be excluded by the presence of cofferdams. The piles forming the cofferdams will be removed after construction. The removal of piles will induce localized suspension and disturbance of sediments. However, this would be temporary, and the benthic community is expected to recover within in a short time. Changes in hydrodynamic conditions would also be temporary and limited to the area around the pile.

Direct impacts to fish species could result from blasting associated with the removal of the existing bridge footings. However, there would be not in-water blasting since all demolition would be conducted in dry conditions within the cofferdams.

4.4.2. Indirect Impacts

The primary indirect impact to EFH species in the Arthur Kill Primary Study Area is the effect of project construction (especially dredging activity) on the habitat of benthic communities. Many of the EFH-designated species are demersal or benthic feeders, and may experience a reduction in feeding efficiency for some period of time during and immediately following construction.

Dredging will increase turbidity of borrow areas and adjacent areas. Typically, elevated turbidity is limited in duration to the time of actual dredging and impacts on benthic fauna are generally confined to the immediate vicinity of dredging operations (Stern and Stickle, 1978). Elevated levels of suspended silt and clay reduce available planktonic food resources. Excess silt will suffocate some benthic organisms in the surrounding area. Filter feeders will have difficulty locating and capturing food due to increase in suspended non-edible particulates.

Recovery times vary from several months to several years. In most cases, “recovery” is defined as a return of the benthic assemblage to baseline, or pre-dredging, conditions of abundance, biomass, and community composition. In some cases, opportunistic taxa achieve densities many times higher than that reported prior to dredging. If the dredged area is not impacted by continued dredging, unusually high sedimentation rates, or some other disturbance, natural succession should occur, restoring the original benthic community within 1-5 years (Newell et al., 1998). However, if the characteristics of the site are changed such that it fills in with a different type of sediment (e.g. silt vs. clay) or if local hydrodynamics are affected by topographic changes, different species may re-colonize the area and original species may be excluded from the habitat through competition. Sites which experience changes in sediment texture (e.g. reduced average grain size) typically exhibit much longer recovery times.

Indirect impacts to fish and benthic species would also result from the placement of the New Jersey main span pier at the mouth of the interpier basin under the Existing Alignment South and New Alignment South alternatives. Placement of a pier at this location will significantly reduce tidal flushing of this shallow 3-acre area, permanently altering water quality and sedimentation patterns. In the winter months, water temperatures may be reduced below present winter values, while in the summer, temperatures may exceed current maximums, as the main pier will largely isolate the interpier basin’s waters from the temperature-moderating effect of daily tidal flushing. Reduced water exchange with the Arthur Kill will result in reductions in dissolved oxygen, particularly in the warmer months due to the likely increase in maximum water temperatures in the basin. The increased water retention times of the interpier basin will likely increase sedimentation rates and will sequester runoff contaminants in the basin, rather than dispersing them throughout the Arthur Kill. Reductions in dissolved oxygen levels, increases in the water temperature variation, and increased sedimentation will likely result in reduced benthic species diversity and abundance in the interpier basin, with associated impacts to fish species which feed on benthic organisms. While fish use of the interpier basin appears to be limited to small numbers of just a few species, these water quality and habitat changes will reduce habitat quality of the interpier basin, likely resulting in reduced use of this area by EFH-designated and forage fish species.

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4.4.3. Cumulative Impacts

Relative to direct project impacts and indirect impacts, cumulative impacts on EFH-managed fishery species and their forage base may be difficult to discern or predict. There are a number of ways in which cumulative effects may originate (NRC, 1986). These include:

- *Time crowded perturbations* – repeated occurrence of one type of impact in the same area;
- *Space crowded perturbations* – a concentration of a number of different impacts in the same area;
- *Synergisms* – occurrence of more than one impact whose combined impact is greater than the sum of the individual parts
- *Indirect impacts* – those caused by, produced after, or away from the initial perturbation
- *Nibbling* – a combination of all the above taking place slowly and incrementally or decrementally.

Because the Arthur Kill Primary Study Area is densely urban and industrialized, the potential for a variety of ongoing and future activities to cumulatively affect EHF-designated species does exist. Development projects recently completed or proposed for the area include the Jay Cashman Dredged Material Processing Facility in Elizabeth, NJ, as well as the As-of-Right Development of the Former GATX Site, the Howland Hook Redevelopment Program and the West Shore Expressway Corridor/Road Service Improvement Project in Staten Island. Regional transportation projects in the Primary Study Area include the Staten Island Freight Rail Reactivation, completed in 2006, and the Arthur Kill Channel Deepening Program, which will deepen the 35-foot channel to 40 feet in the Primary Study Area, scheduled to be completed in 2008.

However, the affected area associated with the project area is small relative to the total habitat that exists throughout NY/NJ Harbor for any of the EFH-designated and forage species. Cumulative impacts related to the alteration of habitats within and adjacent to the construction areas, in concert with impacts stemming from the above-mentioned development transportation activities are expected to be minimal.

5.0 ASSESSMENT CONCLUSION

The Goethals Bridge Replacement Project would result in short-term localized effects on the fish and benthic community related to construction activities and the presence of new bridge support structures. These new structures would affect the nearshore zone on both sides of the main channel of the Arthur Kill, but would not influence the tidal flow in the channel, limiting the effects to a small area. Construction of the southern alignments would permanently alter water quality and habitat within the interpier basin, likely reducing fish abundance and diversity in this area. Following bridge construction activities, the aquatic community, including EFH-designated species as well as forage species that may have been temporarily displaced or removed, is expected to return to pre-construction conditions. Best management practices will be used, as specified in the permit requirements, in order to further minimize the potential impacts. There would be minimal loss of benthic forage habitat as dredged areas are expected to re-develop within a relatively short time-frame.

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Appendix H.5
Agency Correspondence

Overall Timeline of Ecological Resources Correspondences for GBR EIS

1. 08/26/2004* USDC, NOAA's NMFS Response Letter regarding federally listed threatened or endangered species.
2. 09/08/2004 – USDOI, FWS Response Letter regarding the review of the Notice of Intent to prepare a DEIS and review of a Draft Scoping Document.
3. 09/13/2004* USDOT, FAA Response Letter regarding the review of the Draft Scoping Document.
4. 11/05/2004 – DOA, New York District Corps of Engineers Response Letter regarding request for comments received at the inter-agency scoping meeting held on 09/14/2004.
5. 11/08/2004 – NJDEP, Environmental Regulation, Office of Pollution Prevention and Right to Know, Response Letter regarding review of the Draft Scoping Document.
6. 11/09/2004 – NYSDEC, DFWMR, NYNHP Response Letter regarding list of rare or state-listed animals and plants, significant natural communities, and other significant habitats near the project site.
7. 11/29/2004 – NJDEP, Division of Parks and Forestry, Office of Natural Lands Management, Natural Heritage Program, Response Letter regarding rare species and natural community information request.
8. 12/02/2004* USDC, NOAA's NMFS Response Letter regarding federally listed threatened or endangered species.
9. 12/08/2004 – USEPA, New York - New Jersey Harbor Estuary Program Office, Response Email regarding wetland data and potential wetland mitigation sites in the vicinity of the Goethals Bridge.
10. 12/08/2004 – USDOI, FWS Response Letter regarding federally listed or proposed endangered or threatened species.
11. 03/16/2005 – USDOI, FWS Response Letter regarding the review of "Task I – Alternative Actions and Screening" in preparation for the DEIS.
12. 05/23/2005 - NYCDPR, Natural Resources Group, Response Letter regarding FOIA request for data and maps of restored wetlands in the vicinity of the Goethals Bridge.
13. 08/17/2006 –NYCDEP Phone Conversation with HDR/LMS regarding information on the Peregrine Falcons near the Goethals Bridge.
14. 11/13/2006* USDC, NOAA's NMFS Response Letter regarding federally listed threatened or endangered species.
15. 12/10/2007 –HDR/LMS Email response regarding Peregrine Falcon information for 2007.
16. 09/11/2008 –NYCDEP Email response regarding the status of the Peregrine Falcon activity in the New York State.

***** Indicates that the correspondence letter is undated and the received date is noted.

Abbreviations: United States Coast Guard (USCG); United States Department of Commerce (USDC); National Oceanic and Atmospheric Administration (NOAA); National Marine Fisheries Service (NMFS); United States Department of the Interior (USDOI); Fish and Wildlife Service (FWS); Draft Environmental Impact Statement (DEIS); New Jersey Department of Environmental Protection (NJDEP); New York State Department of Environmental Conservation (NYSDEC); Division of Fish, Wildlife & Marine Resources (DFWMR); New York Natural Heritage Program (NYNHP); Department of the Army (DOA); United States Environmental Protection Agency (USEPA); United States Department of Transportation (USDOT); New York City Department of Environmental Protection (NYCDEP); New York City Department of Parks and recreation (NYCDPR); Freedom Of Information Act (FOIA).

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

Gary Kassof
Bridge Program Manager, First Coast Guard District
US Department of Homeland Security
US Coast Guard
One South Street
Battery Building
New York, New York 10004

AUG 26 2004

RECEIVED
AUG 30 2004

Dear Mr. Kassof,

This is in response to your letter dated August 20, 2004 regarding a Draft Environmental Impact Statement (DEIS) being prepared by the US Coast Guard (USCG) for a proposed new bridge to replace the Goethals Bridge, which crosses the Arthur Kill between Staten Island, New York and Elizabeth, New Jersey.

While several species of listed sea turtles are known to be seasonally present in New York waters, including New York Harbor, and a population of the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) is known to exist in the Hudson River, no listed species are known to occur in the Arthur Kill where the project is located. As such, no consultation under the provisions of Section 7 of the Endangered Species Act of 1973, as amended, is necessary. Should project plans change or new information become available that changes the basis for this determination, consultation should be initiated. As there are no listed species that will be impacted by the proposed project, the Protected Resources Division respectfully declines your invitation to attend the interagency scoping meeting to be held on September 14, 2004. Please note that these comments only apply to species protected under the Endangered Species Act and are offered in addition to any comments you may receive from the National Marine Fisheries Service's Habitat Conservation Division. If you have any questions regarding these comments, please contact Julie Crocker at (978)281-9328 x6530.

Sincerely,

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

Cc: Rusanowsky, F/NER4

File Code: Sec 7 – ACOE NSP New York

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

(ER-04/592)

September 8, 2004

Mr. Gary Kassof
Bridge Program Manager
United States Coast Guard
First Coast Guard District
One South Street, Battery Building
New York, NY 10004

Dear Mr. Kassof:

This responds to your August 20, 2004 request to the U.S. Fish and Wildlife Service (Service) for review of a Notice of Intent (NOI) to prepare a Draft Environmental Impact Statement (DEIS) (Federal Register, Vol. 69, No. 153, Aug. 10, 2004), and review of a draft Scoping Document, regarding the Goethals Bridge Modernization Program (GBMP). Both the NOI and the draft Scoping Document were prepared pursuant to the National Environmental Policy Act (NEPA) of 1969 as amended (83 Stat. 852; 42 U.S.C. 4321 *et seq.*).

The GBMP is proposed by the Port Authority of New York and New Jersey (PANYNJ). The United States Coast Guard (USCG) is the lead federal agency for NEPA compliance, as the proposed project would require a USCG permit pursuant to the General Bridge Act of 1946 (P.L. 79-601, Title V. 60 Stat. 847). In addition to a USCG permit, the proposed project may require Department of the Army permits from the U.S. Army Corps of Engineers, New York District (Corps) pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344 *et seq.*) and/or Section 10 of the Rivers and Harbors Act (30 Stat. 1151, as amended; 33 U.S.C. 403 *et seq.*).

Built in the 1920s, the existing Goethals Bridge spans the Arthur Kill to connect Elizabeth, Union County, New Jersey, with Staten Island, Richmond County, New York. Through the NEPA scoping process, the USCG and the PANYNJ will identify and screen various structural and non-structural alternatives to address traffic, safety, security, and other concerns with the existing bridge. Currently, the PANYNJ's preferred alternative is replacement of the existing bridge south of or within the existing alignment.

Authority

This response is provided pursuant to NEPA; Section 7 the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) to ensure the protection of endangered and threatened species; and the Migratory Bird Treaty Act (40 Stat. 755 as amended; 16 U.S.C. 703-712); and is consistent with the intent of the Service's Mitigation Policy (Federal Register, Vol. 46, No. 15, Jan. 23, 1981). These comments do not preclude separate review and comments

by the Service as afforded by the Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 *et seq.*), or comments on future NEPA documents.

Threatened and Endangered Species

The New York State Department of Environmental Conservation (NYSDEC) and the New Jersey Division of Fish and Wildlife request that you be advised that the peregrine falcon (*Falco peregrinus*), listed as endangered by the State of New York, is known to occur in the vicinity of the proposed project. The project should, therefore, be coordinated with the both states. The New York contact for the peregrine falcon is Mr. Peter Nye, Endangered Species Unit, NYSDEC, 625 Broadway, Albany, NY 12233 (telephone: 518-402-8859). The New Jersey contact is Ms. Kathleen Clark, Endangered and Nongame Species Program, Division of Fish and Wildlife, Tuckahoe Wildlife Management Area, 2201 Route 631, Woodbine, New Jersey 08270.

Except for occasional transient individuals, no other federally listed or proposed endangered or threatened flora or fauna under Service jurisdiction are known to occur within the vicinity of the proposed project site. If additional information on federally listed species becomes available, or if project plans change, this determination may be reconsidered. Because this project will be developed over several years, and because our records are regularly updated with new information, the Service recommends that the project sponsors contact the Service on an annual basis.

Federally listed endangered and threatened marine species may be found near the project area. These species are under the jurisdiction of the National Oceanic and Atmospheric Administration /Fisheries (NOAA/F). We recommend that you continue to coordinate with Mr. Stanley Gorski, Habitat Conservation Division, Field Offices Supervisor, NOAA/F, James J. Howard Marine Sciences Laboratory, 74 Magruder Road, Highlands, NJ 07732 (telephone: 732-872-3037), for additional information on these species and NOAA/F-designated Essential Fish Habitat.

State-listed species may also be present in the project area. Wetlands along Morses Creek in New Jersey are classified by the New Jersey Department of Environmental Protection as foraging habitat for the New Jersey-listed (threatened) black-crowned night-heron (*Nycticorax nycticorax*) and yellow-crowned night heron (*Nyctanassa violaceus*), as well as other colonial nesting waterbirds. Project sponsors should contact the New Jersey Endangered and Nongame Species Program, Division of Fish and Wildlife, P.O. Box 400, Trenton, NJ 08625, for additional information.

Service Comments

The Service provides the following preliminary comments to assist the USCG and the PANYNJ in the NEPA scoping process.

Project Coordination

The Service strongly recommends that project sponsors work closely with other planned and ongoing transportation projects in the New York-New Jersey Harbor region to avoid overlapping efforts and to ensure the most current information is used in the DEIS. In particular, the Comprehensive Port Improvement Plan (CPIP) and the Cross Harbor freight rail project are highly relevant to the GBMP. In fact, one of the Cross Harbor alternatives would involve twinning the rail bridge immediately north of the Goethals Bridge. The Cross Harbor project and

GE

planning within the CPIP could significantly influence the demand for truck crossings of the Goethals Bridge. In addition, the Service recommends that alternatives considered in the DEIS include bridge designs capable of carrying various types of cables (*e.g.*, communication, energy), so that this type of infrastructure can be routed across the Arthur Kill in the future without further aquatic resource impacts.

Aquatic Resources

In New Jersey, a significant expanse of emergent wetlands is located within 0.5 mile south of the Goethals Bridge, along Morses Creek. Smaller wetland areas are mapped near the intersection of Interstate 278 and the New Jersey Turnpike. In Staten Island, important wetland resources in the project area include tidal and non-tidal wetlands associated with Old Place Creek and wetland mitigation projects managed by the New York City Department of Environmental Protection. In the highly urbanized landscape of the project area, wetlands such as these provide important habitats for resident and migratory birds and other wildlife. Many of the wetlands that historically occurred in the project area have been impacted by dredging and filling. Tiner (2000) estimated that nearly two-thirds of Staten Island's tidal wetlands have been filled and 300 formerly tidal wetlands have been converted to freshwater wetlands by tidal restrictions or the elimination of tidal flow. The project sponsors should include a detailed analysis of the direct, indirect, and cumulative wetland impacts associated with the project. Additional information that may be useful in the cumulative effects analysis for the New York portion of the project area is provided in Tiner (2000).

The Service's key recommendation for GBMP project sponsors is to expressly consider avoidance and minimization of wetland impacts during the development and screening of alternatives, and to reject any alternative with unacceptably high wetland impacts. In accordance with the Service's Mitigation Policy, top priority should be afforded to the highest quality wildlife habitats.

Compensatory mitigation options are limited in urban landscapes as available undeveloped land is in relatively short supply and upland areas adjacent to wetlands are important buffers protecting the wetland from inputs of sediment, contaminants, and debris. The project documents mentioned the use of mitigation banks as potential compensatory mitigation options. This option is limited by the lack of approved banks in the immediate project area and should only be considered when all other on-site wetland creation or restoration options have been exhausted.

not true

In anticipation of reviewing USCG and Corps permit applications pursuant to the Fish and Wildlife Coordination Act, the Service is available to provide limited technical assistance to the proposed Interagency Mitigation Group during the NEPA process (*i.e.*, scoping, DEIS development), within the limits of available staff time and agency resources. Consistent with the draft Scoping Document, the Service's priority will be avoidance of impacts to the highest value wetlands in the area, followed by minimization and compensation for unavoidable impacts.

Migratory Birds

All native migratory birds are afforded protection under the Migratory Bird Treaty Act. Migratory birds are a federal trust resource responsibility, and the Service routinely works with project proponents to minimize human-induced causes of bird mortality. Collisions with man-made structures such as communication towers, glass windows, and power lines kill millions of

birds each year (U.S. Fish and Wildlife Service, 2002). Tall, lighted structures with support wires are associated with high collision rates (Manville, 2000). The Service recommends that project proponents evaluate bird collision mortality at the existing Goethals Bridge, and include measures to reduce mortality in the design of all alternatives considered in the DEIS.

The Service appreciates the opportunity to review the NOI and draft Scoping Document for the GBMP. If you have any questions regarding the above Service comments, please contact Alex Chmielewski at the Service's New York Field Office (telephone: 607-753-9334). For specific questions regarding fish and wildlife impacts in New Jersey, please contact John Staples or Wendy Walsh of the New Jersey Field Office at 609-646-9310, extensions 18 and 48, respectively.

Sincerely,

David A. Stilwell
Field Supervisor

References

Manville, A.M., II. 2000. The ABCs of avoiding bird collisions at communication towers: the next steps. Proceedings of the Avian Interactions Workshop, December 2, 1999, Charleston, South Carolina. Electric Power Research Institute. 15 pp.

Tiner, R.W. 2000. Wetlands of Staten Island, New York: valuable vanishing urban wildlands. U.S. Department of the Interior, Fish and Wildlife Service, Ecological Services, Hadley, Massachusetts. 19 pages.

U.S. Fish and Wildlife Service. 2002. Migratory bird mortality: Many human-caused threats afflict our bird populations. U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 2 pp. http://birds.fws.gov.

cc: NYSDEC, Long Island City, NY (Env. Permits)
NYSDEC, Albany, NY (P. Nye)
NJDFW, Woodbine, NJ (K. Clark)
NJDEP, Trenton, NJ
NOAA/F, Highlands, NJ (S. Gorski)
EPA, Chief, Water Programs Division, New York, NY
USACE, New York, NY (R. Tomer)
BFA (ERT), OEPC, Wash., DC (E. Smith)
FWS, NJFO, Pleasantville, NJ (W. Walsh)

U.S. Department
of Transportation
**Federal Aviation
Administration**

Eastern Terminal
Operations Area

1 Aviation Plaza
Jamaica, NY 11434

RECEIVED
SEP 0 8 2004

United States Coast Guard
First Cast Guard District
One South Street, Battery Building
New York, New York 10004

Dear Mr. Kassoff:

RE: Goethals Bridge Modernization Program EIS

We have received the Draft Scoping Document for the Goethals Bridge Modernization Program. The FAA has no comments on environmental issues; however, we are concerned about the projects impact to navigable airspace.

The FAA conducts aeronautical studies on proposal under 14 CFR, Federal Aviation Regulations, Part 77. This review does not constitute study under Part 77. Please have the proponents of this project complete the enclosed Notice of Proposed Construction or Alteration (FAA Form 7460-1), giving exact location and height of the project, including all appurtenances or construction equipment to be used. We will conduct an aeronautical study upon receipt of this information to determine if there is any impact to navigable airspace and if marking and lighting will be necessary.

If we may be of further assistance, please contact Mr. Robert P. Alexander at 718-553-4546.

Sincerely,

Diana Crean
Manager, Airspace Branch

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

November 5, 2004

REPLY TO
ATTENTION OF:
Regulatory Branch

SUBJECT: Application No. 2004-00712-Y6, by the Port Authority of New York and New Jersey - Goethals Bridge Modernization Program

United States Coast Guard
Attn: Mr. Ernie Feemster
One South Street
Battery Park Bldg.
New York, New York 10004-1466

Dear Mr. Feemster:

This letter is in regards to the request for comments we received at the inter-agency scoping meeting held on September 14, 2004, for the purpose of gathering information for use in preparing a final scope of work for the Draft Environmental Impact Statement (DEIS).

The subject of this meeting was a proposal to replace the existing Goethals Bridge. The existing bridge crosses over the Arthur Kill, Old Place Creek, at the Borough of Staten Island, Richmond County, New York, and the City of Elizabeth, Union County, New Jersey. At this time we have not received a permit application for activities associated with this project. Therefore, we will offer general comments related to the regulatory authority by which we view this type of project.

As stated in the U.S. Coast Guard (USCG) Notice of Intent to process a Draft Environmental Impact Statement:Goethals Bridge Modernization Program, dated August 20, 2004, the USCG is the lead agency on this action. If the U.S. Army Corps of Engineers (USACE) is a NEPA cooperating agency, we would participate in the preparation of the DEIS, consistent with the extent of our jurisdiction for this project. Title 33 of the Code of Federal Regulations (CFR) Part 230.16(b), copy enclosed, describes the USACE' area of expertise as cooperating agency.

In accordance with the Notice of the Federal Register/Vol. 67, No. 10 dated Tuesday, January 15, 2002, copy enclosed, discharges of dredged or fill material incidental to the construction of bridges across navigational waters of the United States, that meet applicable requirements, may be authorized by Nationwide Permit number 15. Please note that causeways and approach fills are not authorized in this nationwide permit; those activities and other work that is not authorized under the Nationwide Permit Program requires a Department of the Army individual permit, pursuant to Section 404 of the Clean Water Act.

Title 33 CFR Part 323.1, copy enclosed, discusses permits for discharges of dredged or fill material into waters of the United States. As we do not have the proposed project plans at this time, we will be unable to address what impacts to navigation would result from the construction and completion of the proposed new bridge. However, all construction practices that could potentially disrupt navigation, particularly within the Federal navigation channel, should be discussed, along with alternatives that would not result in such disruption.

Waterways and wetlands are vital areas that constitute productive and valuable public resources. Please be advised that impacts to wetlands should also include every activity that would destroy or degrade wetlands and other waters of the United States on a temporary or permanent basis. This includes, but is not limited to, areas that would be permanently or temporarily filled, adversely impacted by the presence of mechanized equipment, excavated, degraded or destroyed, flooded, drained, and/or indirectly impacted by the manner in which the proposed work would be conducted. Federal regulations state that filling of these resources shall not be permitted unless the applicant clearly demonstrates that the project has been designed and constructed to avoid and minimize adverse effects to waters of the United States to the maximum extent practicable and that a practicable alternative to the proposed discharge is not available. You will need to focus on how you have avoided impacts to waters of the United States, or why other sites or construction alternatives are not practicable; and how you have minimized unavoidable impacts.

The USACE is committed to protect waters of the United States and supports the national policy for "no overall net loss" of wetlands. Therefore you will be required to provide a detailed analysis on how you would mitigate for unavoidable impacts. The analysis should include information as to the size of the area proposed for filling, the type of wetlands to be impacted, and an assessment of their functional value. Mitigation will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

Once a complete application package is received, the USACE' formal review process will begin. Please use the above referenced application number when requesting information concerning your project. This number will be used on any further correspondence.

Please contact Ms. Mary Ann Miller, of my staff, at (212) 264-3740 if you have any questions.

Sincerely,

Richard L. Tomer

Richard L. Tomer
Chief, Regulatory Branch

Enclosures

L26

State of New Jersey

James E. McGreevey
Governor

Department of Environmental Protection
Environmental Regulation
Office of Pollution Prevention and Right To Know
401 E. State St., 3rd floor, Trenton, NJ 08625-0420
Tel. (609) 292-3600
Fax. (609) 777-1330

Bradley M. Campbe
Commissioner

RECEIVED
NOV 15 2004

November 8, 2004

Mr. Gary Kassof
Bridge Program Manager
First Coast Guard District
One South Street
Battery Building
New York, NY 10004

RE: **Goethals Bridge Modernization Program EIS Scoping Document Comments**

Dear Mr. Kassof:

The Office of Permit Coordination and Environmental Review of the New Jersey Department of Environmental Protection (NJDEP) has completed its review of the Draft Scoping Document for the Goethals Bridge Modernization Program EIS. We offer the following comments for your consideration.

Regulatory Requirements

The bridge is located within the New Jersey Coastal Zone. The replacement would be regulated under the Coastal Permit Program Rules at N.J.A.C. 7:7.3 for all activity up to a distance of 500 feet from the mean high water line of the Arthur Kill. A review by the NJDEP's Bureau of Tidelands Management reveals that there is currently no riparian instrument in force for the existing crossing. Accordingly, an instrument will be required for activity at or below the New Jersey Tidelands Claims Line as shown on map 651-2124. The claims line has been superimposed on the Department's 2002 aerial photography and enclosed with this memorandum. Compliance with the Coastal Zone Management Rules (N.J.A.C. 7:7e) will need to be demonstrated.

Wetlands at this location would be regulated under the Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 et seq.). Wetlands would potentially be jointly regulated by both the Land Use Regulation Program and the New York District, United States Army Corps of Engineers up to a distance of one thousand feet from the mean high water line of the Arthur Kill. There are no wetlands mapped under the Coastal Wetlands Act of 1970 at this location.

The NJDEP's Transportation Group of the Land Use Regulation Program will be the reviewer for the bridge modernization program project. Please contact Robert Cubberley of the Land Use Regulation Program by phone at 609-984-2532 or by email at robert.cubberley@dep.state.nj.us if you have any questions regarding the above noted regulatory requirements.

Air Quality

The NJDEP's Bureau of Air Quality Planning's (AQP) review of the scoping document notes that the EIS should indicate how Transportation Conformity has been addressed for this proposed project. The Transportation Conformity rules are located at USEPA 40 CFR 93. The Metropolitan Planning Organization (MPO) that would include this proposed project in its Transportation Conformity determinations is the North Jersey Transportation Planning Authority (NJTPA). MPO's are responsible for periodically demonstrating that their Transportation Plans(TP) and Transportation Improvement Programs (TIP) conform to the State Implementation Plans in Nonattainment areas. The NJDEP could not find this proposed project in the current NJTPA TP or TIP.

Please contact the Bureau of Air Quality Planning (Amy Hillman at 609-633-1220) if you have any question regarding the above comments.

Natural Resources

This serves to inform you of the Division of Fish and Wildlife's [DFW] comments and concerns about the subject document "Draft Scoping Document; Goethals Bridge Replacement" for the preparation of an Environmental Impact Statement. Our concerns are directed to the specific impact areas noted below.

Alternatives:

Upon review of the data presented and with deference to the agencies involved, the DFW agrees that some type of replacement is warranted for the Goethals Bridge. However, we strongly suggest the following alternative be given careful consideration. The DFW suggests that a double-tiered bridge, similar to the George Washington Bridge in design, be considered.

This alternative would allow for construction to take place while the existing bridge remains in service and would reduce environmental impacts (e.g. in-water fill) that would result from the proposed construction of two bridges. Strong consideration should also be given to the possibility of incorporating commuter transit lines into the basic bridge design, if warranted, similar to those on the Benjamin Franklin Bridge over the Delaware River.

Additionally, truck traffic could be limited to one level possibly reducing the upper level width. This innovative design would reduce costs and potentially reduce shading impacts of the water over the two (2) bridge alternative. The DFW will

rely on other "expert engineers" outside of the division to determine the feasibility of this alternative design.

If this alternative were determined to be inappropriate, a replacement within the existing footprint or to the north or south would be the DFW's choice, not knowing what the impacts to wildlife would be on the New York side of the Arthur Kill. This potential impact appears to be substantial on the south side.

Fisheries Impacts:

Species of concern: The DFW's Bureau of Marine Fisheries has concerns about the inadequacy of the proposed 2 to 3-day sampling that is proposed to address migratory and resident species potentially present on the proposed site at various times of the year. The DFW has information that the following species of concern are in the project area during various times of the year: anadromous fish (American shad and river herring), striped bass, winter flounder and both species of sturgeon [Atlantic and Shortnose] along with various other species of lesser concern.

Seasonal restrictions: The DFW recommends a timing restriction from 1/1 - 6/30 be imposed on any in-water work, blasting and/or sediment generating activity. Recognizing the importance and the enormity of the project, the DFW recommends that any work that would be covered by the timing restriction be done behind cofferdams installed before the start of the timing restriction and not removed until after the end of the timing restriction. Construction activities could continue within the cofferdams during the timing restriction.

Intertidal shallows impacts: If an alternative is chosen that would result in the elimination of the existing bridge piers, the DFW requests that a portion of those near-shore piers be left above the bottom to provide habitat diversity in the water column. The DFW realizes the resulting remnant should be designed to eliminate any hazard to navigation; the remnant structure and its attached organisms would benefit marine bio-diversity.

Solid Waste Management:

Mr. William Figley from the DFW's Bureau of Marine Fisheries should be contacted at 609-748-2020 about the possibility of placing clean materials on an artificial reef site offshore.

Recreational Fishing Access:

Some type of fishing access should be developed within or near the footprint of the bridge; types of recreational fishing access would be a fishing pier and/or a boat ramp. The current administration is very supportive of recreational fishing access for the public.

Wildlife Impacts:

A search of the NJDEP's Landscape Project V2 and the Heritage database revealed no areas of concern on the New Jersey side for any threatened and/or endangered species. The DFW does recommend that the consultant do a search of the surrounding two (2) mile area using i-MapNJ (www.nj.gov/dep and click on the i-MapNJ magnifying glass logo) to assist with the generation of any T&E species list associated with the project area and the immediate vicinity.

The DFW has the same concerns that were expressed under the Fisheries concerns about the degree of the proposed sampling for species in the area. Various species of waterbirds, for instance, use this area depending upon the weather and the status of their migration; a 2 to 3-day survey is unacceptable to identify project area species. Other methodologies should be explored to determine species presence.

Interagency Program:

Don Byrne from the DFW's Bureau of Marine Fisheries [(609)748-2020] would be willing to assist the committee with any marine fisheries questions and/or concerns.

If there are any questions concerning these comments please feel free to contact Donald Wilkinson of the DFW at 856-785-2711.

Historic Preservation

The NJDEP's Historic Preservation Office (HPO) has reviewed the Draft Scoping Document and attended the public information center in Elizabeth on 10/6/2004. Their two primary concerns are:

(1) The Goethals Bridge was detemined individually eligible to be listed in the New Jersey and National Registers of Historic Places by both the New York and New Jersey State Historic Preservation Offices. According to the New Jersey DSHPO Opinion of 2/14/1995, the Goethals Bridge is eligible under National Register Criteria A and C. Built in 1918-1927 and designed by JAL Waddell with Othmar Ammann, the Goethals Bridge was intended by the Port Authority of New York and New Jersey to alleviate the congested ferry system to Staten Island as well as provide the first link for vehicular traffic between Staten Island and the New Jersey mainland (Criterion A). The bridge consists of a high 672-foot-long main span formed by a cantilever steel through truss and long elevated steel girder approaches (Criterion C). It is clearly a significant and prominent landmark in the region. Means to preserve this important structure need to be explored.

(2) The previously preferred alternative involved the sensitive rehabilitation of the eligible Goethals Bridge and the introduction of a parallel structure to the south - the two bridges would function as a pair of one-way structures. However, in the current project the preferred alternative involves the wholesale demolition

and replacement of the eligible Goethals Bridge. To date no adequate explanation has been offered to explain this radical change. The HPO presumes that eventually an alternatives analysis report will be circulated that satisfactorily addresses this issue and have provided the Coast Guard and the environmental consultant with a copy of the historic bridge alternatives analysis outline developed by the HPO (please find copy attached). The HPO suggested that they begin working towards this in their NEPA work to ensure that one document can serve multiple regulatory functions and avoid duplication of effort.

It should be noted that while the above two issues are of urgent concern, they are not the only cultural resource issues posed by the proposed project. In addition there are:

(a) As a federal agency, the United States Coast Guard is subject to Section 106 review in accordance with the National Historic Preservation Act. Current regulations require the intiation of consultation during the earliest stages of project planning. I strongly encourage the Coast Guard to begin this process to best ensure that their regulatory responsibilities are well coordinated and efficiently executed.

(b) Three additional resources were identifed as eligible during consultation for the Staten Island Bridges Program: the Staten Island Railroad Vertical Lift Bridge, the Staten Island Railroad (portion in New Jersey), and the Scherzer Rolling Vertical Lift Bridge over the Elizabeth River.

Should you have any follow up questions please contact Andrea Tingey, Principal Historic Preservation Specialist, at 609-984-0539

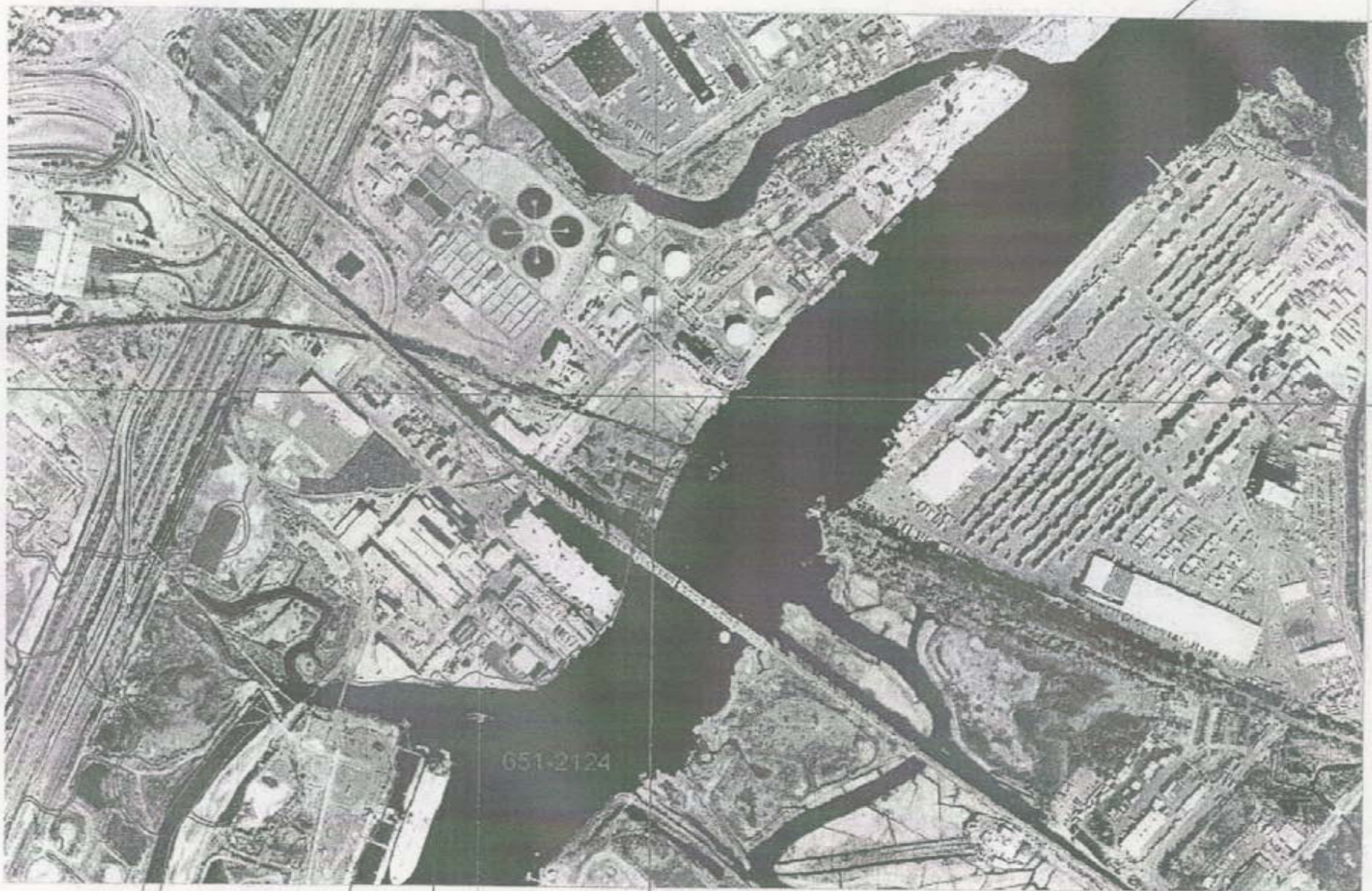
Thanking for the opportunity to be part of the scoping process for this project.

Sincerely,

Kenneth C. Koschek

Kenneth C. Koschek
Supervising Environmental Specialist
Office of Permit Coordination
and Environmental Review

C: Robert Cubberley, NJDEP - LURP
Andrea Tingey, NJDEP - HPO
Dorothy Guzzo, NJDEP - HPO
Martin McHugh, NJDEP - LURP
Donald Wilkinson, NJDEP - LURP
Mark Morellio, NJDEP - LURP
Amy Hilliman, NJDEP - Air Quality
Sandy Krietzman, NJDEP - Air Quality


051-2124

April 19, 1994

Historic Bridge Alternatives Analysis Report Outline

I. Table of Contents
II. Executive Summary
III. Introduction
Explain the reasons this report is being written. Explain the Section 106 process.
IV. Location
Project location should be described in the narrative and illustrated with a labeled USGS Quad map
A. Describe surrounding natural environment
B. Describe surrounding built environment
1. listed or eligible National Register buildings, sites, objects, structures and/or districts in the area
2. Urban/rural character
IV. The Structure
A. Technical Information
1. Bridge type
2. Explanation of functions of parts
3. Materials
B. History/Significance
1. Date of Construction
2. Designer
a. Patented Design
b. Construction Details
3. Fabricator/Builder
C. Identify character defining features of historic bridge
D. Integrity: the extent to which the character defining features have survived
E. Condition
1. A narrative description of existing conditions
2. Photos with captions keyed to an elevation plan of the entire structure
3. The order of the following bridge components reflect the descending urgency of any deterioration. In other words, those areas with the lowest sufficiency ratings should appear first in the report
a. Substructure/abutments
b. superstructure
c. electrical and mechanical systems
d. support structures and buildings
VI Project Need - explain the problems with current conditions
A. Bridge Condition, (if appropriate, explain why the conditions which were

illustrated above are unacceptable)

B. Traffic Volume, both current and future (cite sources and methodologies)
C. Geometrics
D. Accident history
E. Safety features such as railings, etc.

VII. Explanation of Alternatives: all alternatives must include explicit information regarding cost; impacts to nearby cultural resources if existing; impacts to social and economic conditions of surrounding environment

A. No Build: standard maintenance procedures on existing structure
B. Other means of addressing project need
   1. Demand dampening
   2. Alternate crossings
   3. Traffic management
C. Rehabilitation according to Secretary of Interior's Standards for Rehabilitation
D. Modified Rehabilitation: Preserving the character defining elements of the bridge while introducing significant changes (ex. widening a metal truss bridge) if previous consultation with the HPO has resulted in the identification of eligible or listed archaeological sites, then project impacts on the sites should be described and evaluated
E. Replacement: cost information must include demolition costs; If previous consultation with the HPO has resulted in the identification of eligible or listed archaeological sites, then project impacts on the sites should be described and evaluated
   1. Alternative alignments
   2. Alternative replacement structure types

V. Selection of Preferred Alternative: **must include a fully justified rationale, justification must be derived from information previously presented in the report**

A. Narrative justification of selection of preferred alternative
B. Matrix which compares how each alternative meets project goals
   1. Historic Preservation
   2. Cost
   3. Geometrics
   4. Traffic Capacity
   5. Safety
   6. Environmental concerns (e.g. wetlands)
   7. Construction constraints

VI. Conclusion

A. Recommended finding of effect (no effect, no adverse effect, adverse effect)
B. If the recommended finding is for an adverse effect, then suggested mitigation measures should be included.

VII. Appendices

A. Schedule for completion of preferred alternative
B. Copy of most recent bridge inspection report
C. Letters from local officials and citizens expressing their concerns and/or opinions regarding the existing problem (s) and proposed solution
D. Police accident reports
E. Vitae of persons involved in writing report

State of New Jersey
Department of Environmental Protection
Division of Pollution Prevention & Right to Know
PO Box 420
Trenton, NJ 08625-0420

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

November 9, 2004

Jennifer Curran
Lawler, Matusky & Skelly Engineers
1 Blue Hill Plaza, Box 1509
Pearl River, NY 10965

Dear Ms. Curran:

In response to your recent request, we have reviewed the New York Natural Heritage Program databases with respect to an Environmental Assessment for the proposed Goethals Bridge Modernization Program, area as indicated on the map you provided, linking Staten Island, NY with Elizabeth, NJ.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.
PLEASE NOTE: This project is near the Harbor Heron Bird Conservation Area Wildlife Management Area.

This project location is adjacent to a designated Significant Coastal Fish and Wildlife Habitat. This habitat is part of New York State's Coastal Management Program (CMP), which is administered by the NYS Department of State (DOS). Projects which may impact the habitat are reviewed by DOS for consistency with the CMP. For more information regarding this designated habitat and applicable consistency review requirements, please contact:

Jeff Zappieri or Vance Barr - (518) 474-6000
NYS Department of State
Division of Coastal Resources and Waterfront Revitalization
41 State Street, Albany, NY 12231

The presence of rare species may result in your project requiring additional permits, permit conditions, or review. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should NOT be substituted for on-site surveys that may be required for environmental impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

Sincerely,

Betty Ketcham gp

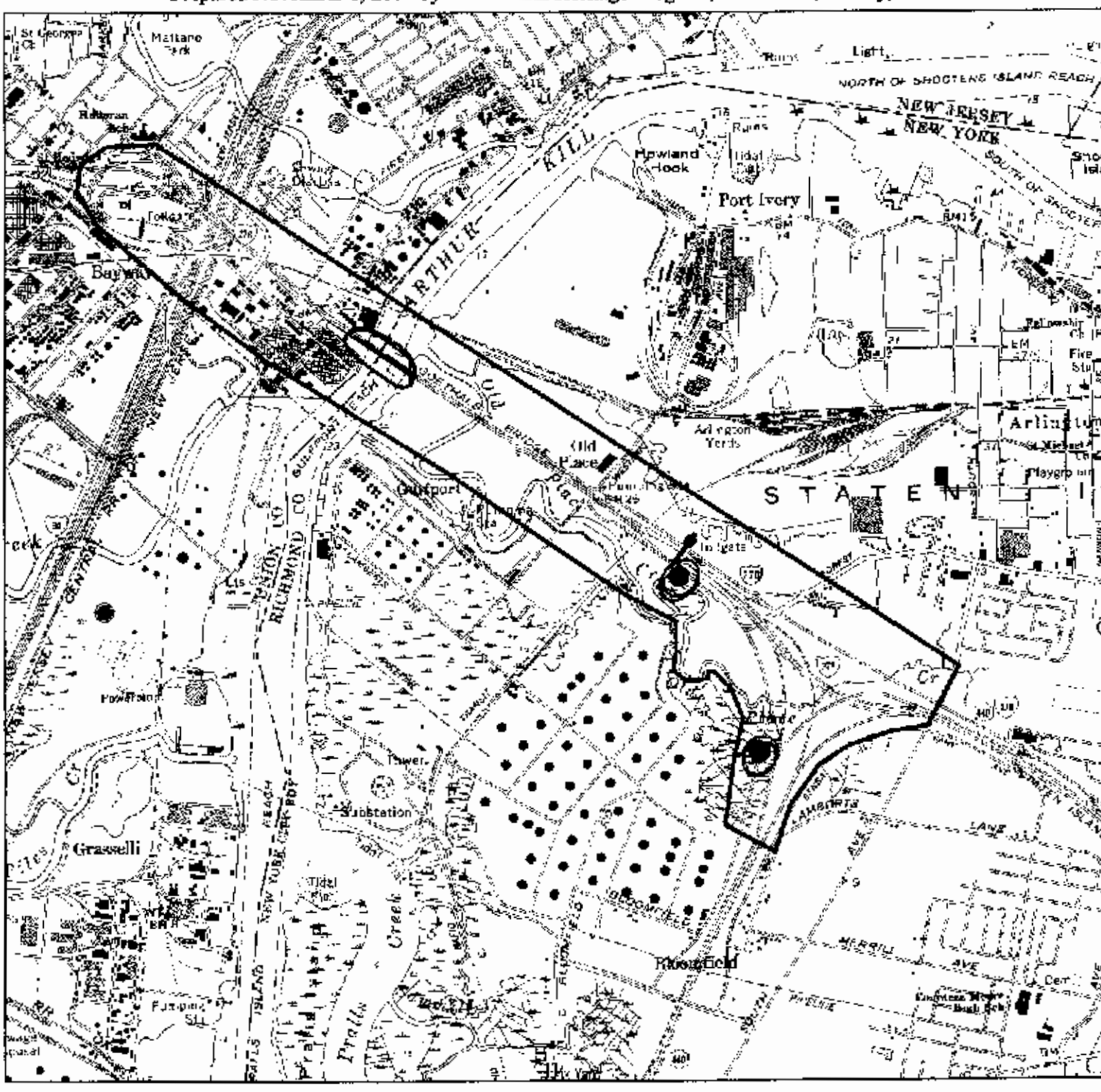
Betty A. Ketcham
Information Services
NY Natural Heritage Program

Encs.

cc: Reg. 2, Wildlife Mgr.
Reg. 2, Fisheries Mgr.
Peter Nye, Endangered Species Unit, Albany

Natural Heritage Map of Rare Species and Ecological Communities

Prepared November 8, 2004 by NY Natural Heritage Program, NYS DEC, Albany, New York



Project Site

NY Natural Heritage Progam Database Records*

- Plant
- Animal
- Animal Concentration Area
- Community

Scale: 1:24000

0.5 0 0.5 1 Miles

N

*** The locations that are displayed are considered sensitive and cannot be released to the public without permission. We do not provide map locations for all records. Please see report for details.**

Natural Heritage Report on Rare Species and Ecological Communities

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

Location displayed on map

is report contains **SENSITIVE** information that may not be released to the public without permission from the NY Natural Heritage Program.
.efer to the User's Guide for explanations of codes, ranks and fields.
-Location maps for certain species and communities may not be provided if 1) the species is vulnerable to disturbance, 2) the location and/or extent is not precisely known, and/or 3) the location and/or extent is too large to display.

BIRDS

Falco peregrinus

Peregrine Falcon

Office Use

NY Legal Status:	Endangered	**NYS Rank:**	Vulnerable	4064
Federal Listing:		**Global Rank:**	Apparently secure	
Last Report:	**	**EO Rank:**	**	ESU
County:	Richmond			
Town:	City Of New York			
Location:	[redacted]			
Directions:	[redacted]			
General Quality and Habitat:	[redacted]			

REPTILES

Kinosternon subrubrum

Eastern Mud Turtle

Office Use

NY Legal Status:	Endangered	**NYS Rank:**	Critically imperiled	1480
Federal Listing:		**Global Rank:**	Demonstrably secure	M
Last Report:	**	**EO Rank:**	**	ESU
County:	Richmond			
Town:	City Of New York			
Location:	[redacted]			
Directions:	[redacted]			
General Quality and Habitat:	[redacted]			

VASCULAR PLANTS

Diospyros virginiana

Persimmon

Office Use

NY Legal Status:	Threatened	**NYS Rank:**	Imperiled	7825
Federal Listing:		**Global Rank:**	Demonstrably secure	S
Last Report:	[redacted]	**EO Rank:**	Fair	
County:	Richmond			
Town:	City Of New York			
Location:	[redacted]			
Directions:	[redacted]			
General Quality and Habitat:	[redacted]			

Records Processed

USERS GUIDE TO NY NATURAL HERITAGE DATA

New York Natural Heritage Program, 625 Broadway, 5th Floor, Albany, NY 12233-4757 phone: (518) 402-8935

NATURAL HERITAGE PROGRAM: The NY Natural Heritage Program is a partnership between the NYS Department of Environmental Conservation (NYS DEC) and The Nature Conservancy. Our mission is to enable and enhance conservation of rare animals, rare plants, and significant communities. We accomplish this mission by combining thorough field inventories, scientific analyses, expert interpretation, and the most comprehensive database on New York's distinctive biodiversity to deliver the highest quality information for natural resource planning, protection, and management.

DATA SENSITIVITY: The data provided in the report are ecologically sensitive and should be treated in a sensitive manner. The report is for your in-house use and should <u>not</u> be released, distributed or incorporated in a public document without prior permission from the Natural Heritage Program.

EO RANK: A letter code for the quality of the occurrence of the rare species or significant natural community, based on population size or area, condition, and landscape context.

A-E = Extant: A=Excellent, B=Good, C=Fair, D=Poor, E=Extant but with insufficient data to assign a rank of A-D.
F = Failed to find. Did not locate species during a limited search, but habitat is still there and further field work is justified.
H = Historical. Historical occurrence without any recent field information.
X = Extirpated. Field/other data indicates element/habitat is destroyed and the element no longer exists at this location.
U = Extant/Historical status uncertain.
Blank = Not assigned.

LAST REPORT: The date that the rare species or significant natural community was last observed at this location, as documented in the Natural Heritage databases. The format is most often YYYY-MM-DD.

NY LEGAL STATUS – Animals:

Categories of Endangered and Threatened species are defined in New York State Environmental Conservation Law section 11-0535. Endangered, Threatened, and Special Concern species are listed in regulation 6NYCRR 182.5.

E - **Endangered Species**: any species which meet one of the following criteria:
- Any native species in imminent danger of extirpation or extinction in New York.
- Any species listed as endangered by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T - **Threatened Species**: any species which meet one of the following criteria:
- Any native species likely to become an endangered species within the foreseeable future in NY.
- Any species listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of the Federal Regulations 50 CFR 17.11.

SC - **Special Concern Species**: those species which are not yet recognized as endangered or threatened, but for which documented concern exists for their continued welfare in New York. Unlike the first two categories, species of special concern receive no additional legal protection under Environmental Conservation Law section 11-0535 (Endangered and Threatened Species).

P - **Protected Wildlife** (defined in Environmental Conservation Law section 11-0103): wild game, protected wild birds, and endangered species of wildlife.

U - **Unprotected** (defined in Environmental Conservation Law section 11-0103): the species may be taken at any time without limit; however a license to take may be required.

G - **Game** (defined in Environmental Conservation Law section 11-0103): any of a variety of big game or small game species as stated in the Environmental Conservation Law; many normally have an open season for at least part of the year, and are protected at other times.

NY LEGAL STATUS – Plants:

The following categories are defined in regulation 6NYCRR part 193.3 and apply to NYS Environmental Conservation Law section 9- 1503.

E - **Endangered Species**: listed species are those with:
- 5 or fewer extant sites, or
- fewer than 1,000 individuals, or
- restricted to fewer than 4 U.S.G.S. 7 ½ minute topographical maps, or
- species listed as endangered by U.S. Department of Interior, as enumerated in Code of Federal Regulations 50 CFR 17.11.

T - **Threatened**: listed species are those with:
- 6 to fewer than 20 extant sites, or
- 1,000 to fewer than 3,000 individuals, or
- restricted to not less than 4 or more than 7 U.S.G.S. 7 and ½ minute topographical maps, or
- listed as threatened by U.S. Department of Interior, as enumerated in Code of Federal Regulations 50 CFR 17.11.

R - **Rare**: listed species have:
- 20 to 35 extant sites, or
- 3,000 to 5,000 individuals statewide.

continued on back

V - **Exploitably vulnerable**: listed species are likely to become threatened in the near future throughout all or a significant portion of their range within the state if causal factors continue unchecked.
U - **Unprotected**; no state status.

FEDERAL STATUS (PLANTS and ANIMALS): The categories of federal status are defined by the United States Department of the Interior as part of the 1974 Endangered Species Act (see Code of Federal Regulations 50 CFR 17). The species listed under this law are enumerated in the Federal Register vol. 50, no. 188, pp. 39526 - 39527. The codes below without parentheses are those used in the Federal Register. The codes below in parentheses are created by Heritage to deal with species which have different listings in different parts of their range, and/or different listings for different subspecies or varieties.

(blank) = No Federal Endangered Species Act status.
LE = The element is formally listed as endangered.
LT = The element is formally listed as threatened.
PE = The element is proposed as endangered.
PT = The element is proposed as threatened.
C= The element is a candidate for listing.
LE,LT = The species is formally listed as endangered in part of its range, and as threatened in the other part; or, one or more subspecies or varieties is listed as endangered, and the others are listed as threatened.
LT,PDL = Populations of the species in New York are formally listed as threatened, and proposed for delisting.
(LE) = If the element is a full species, all subspecies or varieties are listed as endangered; if the element is a subspecies, the full species is listed as endangered.
LT,T(S/A) = One or more subspecies or populations of the species is formally listed as threatened, and the others are treated as threatened because of similarity of appearance to the listed threatened subspecies or populations.
PS = Partial status: the species is listed in parts of its range and not in others; or, one or more subspecies or varieties is listed, while the others are not listed.

GLOBAL AND STATE RANKS (animals, plants, ecological communities and others): Each element has a global and state rank as determined by the NY Natural Heritage Program. These ranks carry no legal weight. The global rank reflects the rarity of the element throughout the world and the state rank reflects the rarity within New York State. Infraspecific taxa are also assigned a taxon rank to reflect the infraspecific taxon's rank throughout the world. ? = Indicates a question exists about the rank. Range ranks, e.g. S1S2, indicate not enough information is available to distinguish between two ranks.

LOBAL RANK:
G1 - Critically imperiled globally because of extreme rarity (5 or fewer occurrences), or very few remaining acres, or miles of stream) or especially vulnerable to extinction because of some factor of its biology.
G2 - Imperiled globally because of rarity (6 - 20 occurrences, or few remaining acres, or miles of stream) or very vulnerable to extinction throughout its range because of other factors.
G3 - Either rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g. a physiographic region), or vulnerable to extinction throughout its range because of other factors.
G4 - Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5 - Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
GH - Historically known, with the expectation that it might be rediscovered.
GX - Species believed to be extinct.

NYS RANK:
S1 - Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.
S2 - Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.
S3 - Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.
S4 - Apparently secure in New York State.
S5 - Demonstrably secure in New York State.
SH - Historically known from New York State, but not seen in the past 15 years.
SX - Apparently extirpated from New York State.
SZ - Present in New York State only as a transient migrant.

SxB and SxN, where Sx is one of the codes above, are used for migratory animals, and refer to the rarity within New York State of the breeding (B)populations and the non-breeding populations (N), respectively, of the species.

TAXON (T) RANK: The T-ranks (T1 - T5) are defined the same way as the Global ranks (G1 - G5), but the T-rank refers only to the rarity of the subspecific taxon.
T1 through T5 - See Global Rank definitions above.
Q - Indicates a question exists whether or not the taxon is a good taxonomic entity.

State of New Jersey

Department of Environmental Protection

Division of Parks and Forestry
Office of Natural Lands Management
Natural Heritage Program
P.O. Box 404
Trenton, NJ 08625-0404
Tel. #609-984-1339
Fax. #609-984-1427

:hard J. Codey
Acting Governor

Bradley M. Campbell
Commissioner

November 29, 2004

Mark Renna
The Louis Berger Group, Inc.
100 Halsted Street
East Orange, NJ 07018

Re: Goethals Bridge Replacement

Dear Mr. Renna:

Thank you for your data request regarding rare species information for the above referenced project site in Elizabeth City, Union County.

Searches of the Natural Heritage Database and the Landscape Project (Version 2) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Request for Data into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

Neither the Natural Heritage Database nor the Landscape Project has records for any rare wildlife species on the referenced site.

We have also checked the Natural Heritage Database and the Landscape Project habitat mapping for occurrences of any rare wildlife species or wildlife habitat within 1/4 mile of the referenced site. Please see the table below for species list and conservation status.

Species within 1/4 mile of referenced site.

Common Name	Scientific Name	Federal Status	State Status	Grank	Srank
black-crowned night-heron foraging habitat	*Nycticorax nycticorax*		T/S	G5	S3B,S4N
colonial waterbird foraging habitat					
yellow-crowned night-heron foraging habitat	*Nyctanassa violacea*		T/T	G5	S2B

We have also checked the Natural Heritage Database for occurrences of rare plant species or natural communities. The Natural Heritage Data Base does not have any records for rare plants or natural communities on or within 1/4 mile of the site.

Attached is a list of rare species and natural communities that have been documented from Union County. If suitable habitat is present at the project site, these species have potential to be present.

Status and rank codes used in the tables and lists are defined in the attached EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS.

If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive I-Map-NJ website at the following URL, http://www.state.nj.us/dep/gis/imapnj/imapnj.htm or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program.

PLEASE SEE THE ATTACHED 'CAUTIONS AND RESTRICTIONS ON NHP DATA'.

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Recycled Paper

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Herbert A. Lord

Herbert A. Lord
Data Request Specialist

cc: Robert J. Cartica
Lawrence Niles
NHP File No. 04-4007462

UNION COUNTY
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

	NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
*** Vertebrates							
	BARTRAMIA LONGICAUDA	UPLAND SANDPIPER		E		G5	S1B
	CLEMMYS INSCULPTA	WOOD TURTLE		T		G4	S3
	CLEMMYS MUHLENBERGII	BOG TURTLE	LT	E		G3	S2
	EURYCEA LONGICAUDA LONGICAUDA	LONGTAIL SALAMANDER		T		G5T5	S2
	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW		T/T		G5	S2B,S4N
	STERNA ANTILLARUM	LEAST TERN		E		G4	S1B
	STRIX VARIA	BARRED OWL		T/T		G5	S3B
*** Ecosystems							
	TRAPROCK GLADE/ROCK OUTCROP COMMUNITY	TRAPROCK GLADE/ROCK OUTCROP COMMUNITY				G2	S1
*** Invertebrates							
	ALASMIDONTA UNDULATA	TRIANGLE FLOATER		T		G4	S3
	PAPAIPEMA AERATA	A BORER MOTH				GH	SH
	POLITES MYSTIC	LONG DASH				G5	S3?
	PONTIA PROTODICE	CHECKERED WHITE		T		G4	S1
*** Other types							
	COASTAL HERON ROOKERY	COASTAL HERON ROOKERY				GU	S3
*** Vascular plants							
	CAREX BEBBII	BEBB'S SEDGE				G5	S2
	CAREX POLYMORPHA	VARIABLE SEDGE		E		G3	S1
	CYNOGLOSSUM VIRGINIANUM VAR VIRGINIANUM	WILD COMFREY				G5T5	S2
	LEMNA VALDIVIANA	PALE DUCKWEED		E		G5	S1
	LIATRIS SCARIOSA VAR NOVAE-ANGLIAE	NORTHERN BLAZING-STAR		E		G5?T3	SH

UNION COUNTY
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
MIMULUS ALATUS	WINGED MONKEY-FLOWER				G5	S3
MONARDA CLINOPODIA	BASIL BEEBALM		E		G5	SH
MUHLENBERGIA CAPILLARIS	LONG-AWN SMOKE GRASS		E		G5T?	S1
PHLOX PILOSA	DOWNY PHLOX		E		G5T5	SH
RANUNCULUS PUSILLUS VAR PUSILLUS	LOW SPEARWORT				G5T4?	S2
VIOLA CANADENSIS	CANADIAN VIOLET		E		G5T?	S1

24 Records Processed

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

DEC - 2 2004

Gary Kassof
First Coast Guard District
One South Street
Battery Building
New York, NY

DEC 0 6 2004

Attn: Mark Renna

Dear Mr. Kassof,

This is in response to your letter dated November 18, 2004 in regards to the Goethals Bridge Replacement project proposed by the United States Coast Guard and the Louis Berger Group Inc. in which you requested information on the presence of any federally listed threatened or endangered species in the vicinity of the proposed project. The site of the proposed project is the Arthur Kill waterway in Staten Island, NY and Elizabeth, NJ.

While several species of listed sea turtles are known to be seasonally present in the New York/New Jersey Harbor complex, and federally endangered shortnose sturgeon (*Acipenser brevirostrum*) are know to be present in the lower Hudson River, no listed species are expected to be present in the project area and no farfield effects of the project are likely to affect any listed species present in the Harbor Complex or the Hudson River. As such, no consultation under the provisions of Section 7 of the Endangered Species Act of 1973, as amended, is necessary. Should project plans change or new information become available that changes the basis for this determination, consultation should be initiated. If you have any questions regarding these comments, please contact Sara McNulty at (978)281-9328 x6520.

Sincerely,

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

Cc: Rusanowsky, F/NER4 - Milford

File Code: Sec 7 – USCG NSP New York

Magron, Jean Philippe

From: Renna, Mark
Sent: Wednesday, December 08, 2004 9:31 AM
To: jreiden@louisberger.com; Magron, Jean Philippe
Cc: Bach, James; Marc Helman; Hess, Kenneth
Subject: FW: Goethals Bridge mitigation

-----Original Message-----
From: Renna, Mark
Sent: Wednesday, December 08, 2004 9:30 AM
To: 'Nyman.Robert@epamail.epa.gov'
Subject: RE: Goethals Bridge mitigation

Bob:

Thank you for the information. We will review and incorporate into the EIS as appropriate. We would welcome the opportunity to meet with the Habitat Work Group and will contact you in the near future.

Mark

-----Original Message-----
From: Nyman.Robert@epamail.epa.gov [mailto:Nyman.Robert@epamail.epa.gov]
Sent: Wednesday, December 08, 2004 9:16 AM
To: Renna, Mark
Subject: Goethals Bridge mitigation

Mark,

I am responding to a November 18, 2004 letter from Gary Kassof of the Coast Guard regarding potential Goethals Bridge mitigation sites. The Habitat Work Group of the New York - New Jersey Harbor Estuary Program has compiled a list of over 160 sites that it recommends for acquisition and restoration around the harbor, some of which are in close proximity to the Goethals Bridge. There is a link to an interactive map showing their locations on our website www.harborestuary.org. Many of the sites were nominated by citizens and thus, the associated background material on the sites varies in completeness.

I would like to invite you, when the time is appropriate, to make a presentation on the project to the Habitat Work Group. Generally, these meetings are held at the Hudson River Foundation in lower Manhattan. Perhaps members of the group can provide you with some additional local insight.

Thanks, Bob

Robert M. Nyman, Director
New York - New Jersey Harbor Estuary Program Office
U.S. Environmental Protection Agency
290 Broadway, 24th Floor
New York, NY 10007

212-637-3809 Phone
212-637-3889 Fax

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

December 8, 2004

Ms. Jennifer Curran
Senior Environmental Scientist
Lawler, Matusky & Skelly Engineers LLP
P.O. Box 1509
Pearl River, NY 10965

Dear Ms. Curran:

This responds to your letter of October 12, 2004, requesting information on the presence of Federally listed or proposed endangered or threatened species in the vicinity of the proposed modernization of the Goethals Bridge over the Arthur Kill, Staten Island, Richmond County, New York.

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project impact area. In addition, no habitat in the project impact area is currently designated or proposed "critical habitat" in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). Therefore, no further Endangered Species Act coordination or consultation with the U.S. Fish and Wildlife Service (Service) is required. Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered. The most recent compilation of Federally listed and proposed endangered and threatened species in New York* is available for your information. If your project is not completed within one year from the date of this determination, we recommend that you contact us to ensure that the listed species presence/absence information for your proposed project is current.

The above comments pertaining to endangered species under our jurisdiction are provided pursuant to the Endangered Species Act. This response does not preclude additional Service comments under other legislation.

Federally listed endangered and threatened marine species may be found near the project area. These species are under the jurisdiction of the National Oceanic and Atmospheric Administration/Fisheries (NOAA/F). You should contact Mr. Stanley Gorski, Habitat Conservation Division, Field Offices Supervisor, NOAA/F, James J. Howard Marine Sciences Laboratory, 74 Magruder Road, Highlands, NJ 07732, for additional information (telephone: [732] 872-3037).

For additional information on fish and wildlife resources or State-listed species, we suggest you contact the appropriate New York State Department of Environmental Conservation regional office(s),* and:

New York State Department of Environmental Conservation
New York Natural Heritage Program Information Services
625 Broadway
Albany, NY 12233-4757
(518) 402-8935

Since wetlands may be present, you are advised that National Wetlands Inventory (NWI) maps may or may not be available for the project area. However, while the NWI maps are reasonably accurate, they should not be used in lieu of field surveys for determining the presence of wetlands or delineating wetland boundaries for Federal regulatory purposes. Copies of specific NWI maps can be obtained from:

Cornell Institute for Resource Information Systems
302 Rice Hall
Cornell University
Ithaca, NY 14853-5601
(607) 255-6520
web: http://iris.css.cornell.edu
email: cornell-iris@cornell.edu

Work in certain waters of the United States, including wetlands, may require a permit from the U.S. Army Corps of Engineers (Corps). If a permit is required, in reviewing the application pursuant to the Fish and Wildlife Coordination Act, the Service may concur, with or without recommending additional permit conditions, or recommend denial of the permit depending upon potential adverse impacts on fish and wildlife resources associated with project construction or implementation. The need for a Corps permit may be determined by contacting the appropriate Corps office(s).*

If you require additional information or assistance please contact Michael Stoll at (607) 753-9334.

Sincerely,

Mark W. Clough

Acting For
David A. Stilwell
Field Supervisor

*Additional information referred to above may be found on our website at: http://nyfo.fws.gov/es/esdesc.htm.

cc: NYSDEC, Long Island City, NY (Environmental Permits)
NYSDEC, Albany, NY (Natural Heritage Program)
NYSDEC, New Paltz, NY (Hudson River Fisheries Unit, Attn: K. Hatalla)
NOAA/F, Highlands, NJ (Attn: S. Gorski)
NOAA/F, Milford, CT (Attn: M. Ludwig)
COE, New York, NY

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

March 16, 2005

Mr. Gary Kassof
Bridge Program Manager
United States Coast Guard
First Coast Guard District
One South Street, Battery Building
New York, NY 10004

Dear Mr. Kassof:

This responds to your March 3, 2005, request to the U.S. Fish and Wildlife Service (Service) as a member of the Environmental Task Force (ETF) to review "Task 1 - Alternative Actions and Screening," in preparation for the Goethals Bridge Replacement (GBR) Draft Environmental Impact Statement (EIS), pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (83 Stat.852; 42 U.S.C. 4321 *et seq.*).

This response is provided pursuant to the NEPA; Section 7 of the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*), to ensure the protection of endangered and threatened species; and, the Migratory Bird Treaty Act (MBTA) (40 Stat. 755 as amended; 16 U.S.C. 703-712), and is consistent with the intent of the Service's Mitigation Policy (Federal Register, Vol. 46, No. 15, January 23, 1981). These comments do not preclude separate review and comments by the Service as afforded by the Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 *et seq.*), or comments on future NEPA documents.

The Goethals Bridge Replacement is proposed by the Port Authority of New York and New Jersey. Built in the 1920s, the existing Goethals Bridge spans the Arthur Kill to connect Elizabeth, Union County, New Jersey, with Staten Island, Richmond County, New York. The U.S. Coast Guard (USCG) is the lead Federal agency for NEPA compliance, as the proposed project would require a USCG permit, pursuant to the General Bridge Act of 1946 (P.L. 79-601, Title V. 60 Stat. 847). The Service, in reviewing "Task 1 - Alternative Actions and Screening" (Task 1), would like to provide the following comments to assist the USCG in the preparation of the Draft EIS.

As identified in the Service's September 8, 2004, letter reviewing the draft Scoping Document, our fish and wildlife resources of concern included threatened and endangered species, aquatic resources, and migratory birds. Reflected in the Task 1 Criterion CS-4 (*An alternative should seek to minimize potential adverse environmental effects*), is the inclusion of several of these resources of concern for environmental evaluation and consideration.

The Service would like to see the inclusion of an evaluation measure characterizing the potential adverse effects to migratory and wintering waterfowl that use the associated and adjacent wetlands. All native migratory birds are afforded protection under the MBTA. Of primary significance in this location is the presence of major nesting colonies and foraging areas of herons, egrets, and ibises in a complex of closely associated natural habitats occurring within a major metropolitan area. Three island colonies, or heronries, were established in the 1970s. In 1995, these heronries collectively contained nearly 1,400 nesting pairs of colonial wading birds of special regional emphasis or management concern, including, in declining order of abundance, black-crowned night-heron, glossy ibis (*Plegadis falcinellus*), snowy egret (*Egretta thula*), great egret (*Casmerodius albus*), cattle egret (*Bubulcus ibis*), green-backed heron (*Butorides striatus*), and little blue heron (*Egretta caerulea*) nesting pairs. The freshwater wetland areas and forested buffers are also extremely important as some of the only remaining open space in the urban core suitable as feeding and roosting areas for waterbirds and migratory stopover habitat for songbirds and raptors.

In New Jersey, a significant expanse of emergent wetlands is located within 0.5 miles south of the Goethals Bridge, along Morses Creek. These wetlands are classified by the New Jersey Department of Environmental Protection as foraging habitat for the New Jersey-listed threatened black-crowned night heron (*Nycticorax nycticorax*) and yellow-crowned night heron (*Nyctanassa violaceus*). In Staten Island, important wetland resources in the project area include tidal and non-tidal wetlands associated with Old Place Creek, and wetland mitigation projects managed by the New York State Department of Environmental Conservation. Old Place Creek is the most extensive meandering tidal creek in northern Staten Island, with a narrow strip of intertidal marsh and extensive areas of high marsh. Nesting waterfowl species include American black duck (*Anas rubripes*), gadwall (*Anas strepera*), green-winged teal (*Anas crecca*), blue-winged teal (*Anas discors*), and wood duck (*Aix sponsa*), as well as breeding Virginia rail (*Rallus limicola*), common moorhen (*Gallinula chloropus*), least bittern (*Ixobrychus exilis*), American coot (*Fulica americana*), and pied-billed grebe (*Podilymbus podiceps*). Wintering waterfowl of regional importance occurring in the open waters and marshes in this complex include greater and lesser scaup (*Aythya marila* and *A. affinis*), canvasback (*Aythya valisineria*), brant (*Branta bernicla*), American black duck, bufflehead (*Bucephala albeola*), and American widgeon (*Anas americana*) (U.S. Fish and Wildlife Service 1997).

As a result of the diversity and abundance of migratory bird and wintering waterfowl use of the wetland area, the Service is concerned with the human-induced causes of bird mortality. Migratory birds are a Federal trust resource responsibility, and the Service routinely works with project proponents to minimize human-induced causes of bird mortality. Collisions with man-made structures, such as communication towers, glass windows, and power lines, kill millions of birds each year (U.S. Fish and Wildlife Service 2002). Specifically, tall, lighted structures with support wires are associated with high collision rates (Manville 2000). The Service recommends that project screening criterion include an evaluation of bird collision mortality at the existing Goethals Bridge.

The Service appreciates the opportunity to be a component of the ETF and in the coordination of the Draft EIS for the Goethals Bridge Replacement. If you have any questions regarding our

comments, please contact Ms. Jill Olin at the Service's Long Island Field Office at 631-581-2941.

Sincerely,

for David A. Stilwell
Field Supervisor

References

Manville, A.M., II. 2000. The ABCs of Avoiding Bird Collisions at Communication Towers: The Next Steps. Proceedings of the Avian Interactions Workshop, December 2, 1999. Charleston, SC. Electric Power Research Institute. 15 pp.

U.S. Fish and Wildlife Service. 2002. Migratory Bird Mortality: Many Human-caused Threats Afflict Our Bird Populations. U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, VA. 2 pp. http://birds.fws.gov

U.S. Fish and Wildlife Service. 1997. Significant Habitats and Habitat Complexes of the New York Bight Watershed. Southern New England - New York Bight Ecosystem Program. Charlestown, RI.

cc: FWS, Pleasantville, NJ (C. Jones)
FWS, Islip, NY

City of New York
Parks & Recreation

Adrian Benepe
Commissioner

The Arsenal
Central Park
New York, New York 10021

Natural Resources Group

Arsenal North
1234 Fifth Avenue
New York, New York 10029

Bill Tai, Director
(212) 360-1425/bill.tai@parks.nyc.gov

RECEIVED
MAY 3 1 2005

May 23, 2005

Gary Kassoi
Bridge Program Manager
First Coast Guard District
One South Street
Battery Building
New York, NY 10004

RE: Goethals Bridge Replacement, Request for Data

Dear Mr. Kassoi:

In response to your request for data pursuant to the Freedom of Information Act, Parks is providing the following documents to your consultant, Mark Renna with The Louis Berger Group:

"Results of the Breeding Bird Census' at Saw Mill Creek Marsh and Old Place Creek Marsh"; Christopher D. Aquila, February 1994.

"Results of the Breeding Bird Census' at Saw Mill Creek Marsh and Old Place Creek Marsh"; Christopher D. Aquila, February 1995.

"Winter Bird Inventory at Saw Mill Creek, and Old Place Creek Marsh"; Christopher D. Aquila, 1994.

"Summary of Avian Data Recorded for Old Place Creek Marsh" Memorandum to Marc Matsil, December 8, 1994.

Maps:
Winter Bird Inventory 1994, Old Place Creek Marsh, Map #1
Winter Bird Inventory 1994, Old Place Creek Marsh, Map #2
Winter Bird Inventory 1994, Saw Mill Creek
Spring-Summer Breeding Bird Census 1993, Old Place Creek Marsh, Map 1
Spring-Summer Breeding Bird Census 1993, Old Place Creek Marsh, Map 2
3 X Spring-Summer Breeding Bird Census at Old Place Creek Marsh, template
Spring-Summer Breeding Bird Census 1994, Old Place Creek Marsh, Map 1
Spring-Summer Breeding Bird Census 1994, Old Place Creek Marsh, Map 2

Please contact Sami Naim in our Law Division at (212) 360-1314, if you have additional questions.

Sincerely,

Bill Tai

cc: Sami Naim, Parks Law w/o attachments
Mark Renna, Louis Berger Group w/ attachments

Phone Conversation with Chris Nadareski on 17 August 2006 (1504 to 1514hrs):

Re: Information on the Peregrine Falcons near the Goethals Bridge

Chris provided the following information for the years after the raccoon climbed the tower constructed for the peregrine falcons that had previously nested on the Goethals Bridge and predated the eggs/young in the nest box. He didn't remember the year but a prior conversation I had with Chris includes that information.

Peregrine falcons are still territorial in the area.

The center of activity appears to be the old RR bridge and not the Goethals Bridge.

The tower has not been used since the raccoon predated the nest box in the tower.

No confirmed production/fledged falcons since the raccoon predated the nest box.

Mating behavior, courtship observed each year.

It is possible the pair is attempting to nest in the box structures of the RR bridge but have not been successful. Egg – nestling mortality before fledging.

The primary foraging areas are over the marshes in the vicinity of the Goethals BridgeToll Plaza, the area around and over the Oil Refinery in New Jersey, and the marsh area south of the abandoned RR bridge.

The barn owls are still in the area and probably still nest in the box structures of the RR bridge.

Additional Information and Discussion:

Chris also told me that a pair of great horned owls used the peregrine falcon nest in the tower constructed next to the Outer Bridge a few years ago and that pair of falcons abandoned the territory. The following year, osprey nested on the top of the box on the tower.

I reminded Chris that I called and left a message for him that a pair of falcons nested on the Palisades Cliffs just north of Nyack, NY. I told him they nested behind or on an old stick nest probably an old raven's nest. Chris wasn't aware of this and apparently didn't get the message as he didn't call me back. He didn't believe Barbara Loucks at the NYSDEC was aware of this. We plan to meet and check the area out.

Jack H. Hecht 17 August 2006

Additional thoughts I had on 18 August 2006:

One or two years immediately before construction, there should be surveys to determine if peregrines are territorial in the Goethals Bridge area and if so an attempt to determine if and where they are attempting to nest. If their nesting attempts are unsuccessful at the RR bridge, then they could switch back to the constructed tower and nest box or the Goethals Bridge. Therefore the potential impacts of the project could change immediately prior to construction and mitigation would need to be considered.

If falcons were using the old Goethals Bridge, the start of demolition would need to be restricted during the nesting season until a month or so after the young fledge.

I didn't discuss mitigation with Chris as we don't have specifics. I would consider that the tops of cranes and other construction equipment should have excluders to keep perching falcons out of grease and oils. During the demolition of the old Goethals Bridge accumulations of grease and contaminants on debris should not be exposed so that either falcons or prey (or other wildlife) could be exposed.

Jack H. Hecht 18 August 2006

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

NOV 13 2006

RECEIVED
NOV 20 2006

Gary Kassof
Bridge Program Manager
First Coast Guard District
1 South Street
Battery Building
New York, New York 10004

Re: Goethals Bridge Replacement

Dear Mr. Kassof,

This responds to a letter dated October 23, 2006 regarding the proposed replacement of the Goethals Bridge located in Staten Island, New York and Elizabeth, New Jersey. The bridge spans the Arthur Kill. While several species of listed sea turtles are known to be seasonally present in Long Island Sound and a population of the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) is known to exist in the Hudson River, no listed species are known to occur in the Arthur Kill where the project is located. As such, no further coordination with the Protected Resources Division of NOAA's National Marine Fisheries Service (NMFS) is required. If you have any questions regarding these comments, please contact Julie Crocker at (978)281-9328 x6530.

Sincerely,

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

Cc: Rusanowsky, F/NER4

File Code: Sec 7 – NSP New York

From: Curran, Jennifer L. [Jennifer.Curran@hdrinc.com]
Sent: Monday, December 10, 2007 2:07 PM
To: Shinskey, Tom
Cc: VerWeire, Kevin
Subject: FW: Goethals Bridge Peregrine Falcon Information

Tom, see below for the peregrine falcon information for 2007. I'll forward you the information from previous years as well. Or, would you prefer that we update the text?

From: Hecht, Jack H.
Sent: Monday, December 03, 2007 9:35 AM
To: Curran, Jennifer L.
Cc: marc.h.hecht@gmail.com
Subject: FW: Goethals Bridge Peregrine Falcon Information

JC – See below! Single adult, perhaps a potential mate will show up in 2008! -Jack

Jack H. Hecht
Project Manager
HDR and LMS have joined their resources to provide services to our clients as:
HDR | LMS
One Blue Hill Plaza | Pearl River, NY | 10965
Phone: 845.735.8300 ext. 239 | Fax: 845.735.7466 | Email: Jack.Hecht@hdrinc.com
www.hdrinc.com

Please note the change in my return e-mail.

From: Nadareski, Christopher [mailto:CNadareski@dep.nyc.gov]
Sent: Tuesday, November 27, 2007 7:36 AM
To: Hecht, Jack H.
Cc: marc.h.hecht@gmail.com
Subject: RE: Goethals Bridge Peregrine Falcon Information

Jack,

I did not confirm nesting at the Goethals Bridge this year. I inspected both bridges and the falcon nesting tower. I only observed a single bird at the bridge location this year. Chris.

Christopher A. Nadareski, RSII
Section Chief, Wildlife Studies
New York City Department of Environmental Protection
465 Columbus Avenue
Valhalla, New York 10595
Val. (914) 773-4472
Ashokan (845) 657-7082
Pager (914) 445-1572
Cell Phone: (347) 865-1194
e-mail: cnadareski@DEP.NYC.GOV

-----Original Message-----
From: Hecht, Jack H. [mailto:Jack.Hecht@hdrinc.com]
Sent: Monday, November 26, 2007 3:35 PM
To: Nadareski, Christopher
Cc: marc.h.hecht@gmail.com
Subject: Goethals Bridge Peregrine Falcon Information

Chris – Do you have any conformation of nesting or nesting success in 2007? Marc's notes indicate only single adult observed in area of RR Bridge. Has anyone observed a pair, courtship/mating activity, center of activity or potential nesting site in 2007?

Thanks - Jack

Jack H. Hecht
Project Manager
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www.hdrinc.com

Please note the change in my return e-mail.

From: Nadareski, Christopher [CNadareski@dep.nyc.gov]
Sent: Thursday, September 11, 2008 7:02 AM
To: Shinskey, Tom
Cc: Barbara Loucks; jjpane@gw.dec.state.ny.us
Subject: RE: Goethals Bridge Peregrine Falcon Information

Hi Tom,

We are completing this year's data on the Peregrine Falcon activity in New York State. The only information I have for the Goethals Bridge for the 2008 season is that a single bird was observed in the late spring of 2008. There was no confirmation of nesting this season on the nesting tower, Goethals Bridge, or the Railroad Bridge. Chris.

From: Shinskey, Tom [mailto:TShinskey@louisberger.com]
Sent: Thursday, August 14, 2008 12:44 PM
To: Nadareski, Christopher
Subject: FW: Goethals Bridge Peregrine Falcon Information

Chris,

I am working on the Goethals Bridge EIS and need to update the Peregrine falcon status for the project area for 2008. Is there anything to report?

Regards,

Tom Shinskey
Principal Environmental Scientist
The Louis Berger Group
412 Mount Kemble Avenue
P.O. Box 1946
Morristown, NJ 07962
973-407-1470

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e-mail: cnadareski@DEP.NYC.GOV

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