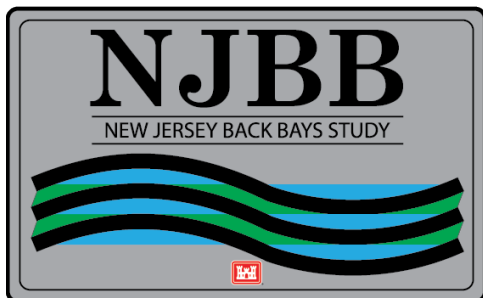

**ENVIRONMENTAL APPENDIX
WILD AND SCENIC RIVERS
SECTION 7(a) EVALUATION**

**NEW JERSEY BACK BAYS
COASTAL STORM RISK MANAGEMENT
FEASIBILITY STUDY**

PHILADELPHIA, PENNSYLVANIA

APPENDIX F.6

December 2024



THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	GREAT EGG HARBOR WILD AND SCENIC RIVER DESCRIPTION.....	1
2.1	Designated Reach:.....	2
2.2	Wild and Scenic River Classification/Mileage.....	4
3.0	GREAT EGG HARBOR RIVER AFFECTED ENVIRONMENT	7
3.1	General Environment	7
3.2	Resources.....	7
3.2.1	Outstandingly Remarkable Resources	7
3.2.2	Priority Resources	17
4.0	ACTION AREA.....	19
5.0	PROJECT DESCRIPTION	19
5.1	Nonstructural Measures	19
5.1.1	Pre-construction	22
5.1.2	Construction	22
5.1.3	Operations and Maintenance.....	22
5.1.4	Measures to Avoid and Minimize Effects on Fish and Wildlife.....	23
6.0	PROJECT EFFECTS ON GREAT EGG HARBOR SCENIC AND RECREATIONAL RIVER RESOURCES.....	26
6.1	Outstandingly Remarkable Resources.....	26
6.1.1	Cultural Resources (Includes Archaeological Resources).....	26
6.1.2	Fauna	26
6.1.3	Fisheries	27
6.1.4	Rare and/or Special Status Species	27
6.1.5	Recreation	28
6.1.6	Physiographic/Geologic Setting.....	29
6.1.7	Scenic Resources.....	29
6.1.8	Surface Hydrology and Salinity and Water Quality.....	29
6.2	Priority Resources.....	29
6.2.1	Wetlands.....	29
6.2.2	Flood Hazard Areas.....	30

7.0	SECTION 7 WILD AND SCENIC RIVERS ACT APPLICABILITY REVIEW	30
8.0	REFERENCES.....	34

TABLES

Table 1.	Great Egg Harbor River (GEHR) Mainstem and Tributaries Wild and Scenic River Classifications.	4
Table 2.	Special Status Species Potentially Occurring within the NJBB Affected Area of the GEHWSR.....	14
Table 3.	Seasonal Restrictions for nonstructural measures.....	23
Table 4.	Section 7 Determination Decision Framework (from USFS, 2004)	30
Table 5.	NJBB TSP and other Measures Section 7(a) Decision Matrix	33

FIGURES

Figure 1.	Great Egg Harbor Wild and Scenic River and TSP Features.....	3
Figure 2.	Great Egg Harbor Wild and Scenic River Classifications.....	6
Figure 3.	Fresh and Saline Wetlands within the Central Region of the NJBB Study Area.....	13
Figure 4.	<i>Home Elevation Concept Diagram – Extended Foundation</i>	20
Figure 5.	<i>Before/After Home Elevation Renderings</i>	21
Figure 6.	<i>Dry Flood Proofing Rendering at Island Park Fire Department</i>	22
Figure 7.	WSR Section 7(a) Decision Framework	32

1.0 INTRODUCTION

The proposed Tentatively Selected Plan (TSP) identified in the New Jersey Back Bays (NJBB) Feasibility Study require compliance with the Wild and Scenic Rivers Act (WSRA) of 1968 (Public Law 90-542; 16 U.S.C. 1271, et seq. The Great Egg Harbor River (GEHR) is located within the NJBB study area and was designated in October 27, 1992. In the NJBB study area, Wild and Scenic River (WSR) status of the Great Egg Harbor River and tributaries occur in the Central Region of the study area and are generally west of the Garden State Parkway. Key drainages that are part of the system include Patcong Creek and the Tuckahoe River at near the Great Egg Harbor confluence west of the Garden State Parkway. The TSP includes approximately 72 residential structures to be elevated and 5 structures critical infrastructures to be floodproofed within the management boundaries of the of the GEHR and tributaries. These have potential to have indirect effects on the GEHR. Therefore, USACE will undertake coordination with the National Park Service for review under Section 7(a) of the Wild and Scenic Rivers Act.

2.0 GREAT EGG HARBOR WILD AND SCENIC RIVER DESCRIPTION

The following is taken directly from the Great Egg Harbor National Scenic River and Recreational River Comprehensive Management Plan and Environmental Impact Statement (National Park Service, 2000):

“The Great Harbor River begins in suburban towns and meanders for 59 miles on its way to the Atlantic Ocean, draining 304 square miles of wetlands in the lower half of the New Jersey Pinelands National Reserve. Dissolved iron and tannin, a product of fallen leaves and cedar roots, produce the river’s tea colored ‘cedar water’ along much of its length. The freshwater and tidal wetlands serve as resting, feeding, and breeding areas for waterfowl throughout the year amid undisturbed forests and swamp areas. The watershed has been occupied since pre-historic times, lived upon traditionally by the Lenape Indians before occupations by Europeans in the early 1700s. The lands contained all the necessary materials for shipbuilding, and in the Revolutionary War its ‘bog iron’ made cannon balls while its hidden coves sheltered privateers. Blast furnaces, sawmills, glass factories, and brick and tile works followed until the Industrial Revolution drew its people away. Over 99 percent of the eligible waterways and adjacent lands are within the boundary of the Pinelands National Reserve, which was established by the United States Congress in 1978. Much of the land within the National Reserve is also within the state-designated Pinelands Area and falls under the jurisdiction of the New Jersey Pinelands Commission. Uses of the lands and waters within the Pinelands Area are governed by a Comprehensive Management Plan that is administered by the Pinelands Commission. Eligible waterways and adjacent lands outside of the Pinelands Area, but within the boundaries of the Pinelands National Reserve, are subject to New Jersey’s Coastal Area Facilities Review Act (CAFRA), which must be consistent with the Pinelands Comprehensive Management Plan (and is ensured through joint review).”

“Remaining acreage outside of the National Reserve but within the designated river corridor is predominantly wetlands and is either publicly owned or regulated by state and federal agencies. The Great Egg Harbor National Scenic and Recreational River passes through, or along, twelve communities located in four counties in the State of New Jersey. The following communities are within the 129- mile designated section of the River: Buena Vista Township, Corbin City, Egg Harbor Township, City of Estell Manor, Borough of Folsom, Hamilton Township, Town of Hammonton, Monroe Township, City of Somers Point, Upper Township, Weymouth Township, and Winslow Township. The four counties are: Atlantic, Gloucester, Camden, and Cape May.”

Figure 1 shows the non-structural TSP features within the GEHR boundaries and local management area.

“The Great Egg Harbor River flows within and is representative of rivers in the Pinelands ecosystem and the Embayed Coastal Plain physiographic province of New Jersey. The Pinelands National Reserve, which encompasses a major part of the river area, is recognized as a nationally significant resource because of its vast pine-oak forest, extensive surface and groundwater resources of high quality, and a wide diversity of rare plant and animal species. The Pinelands National Reserve is also internationally recognized as a unit of the South Atlantic Coastal Plain Biosphere Reserve under the United Nations Man and the Biosphere Program.”

2.1 Designated Reach:

October 27, 1992. From the mouth of Patcong Creek to the Mill Street Bridge. From Lake Lenape to the Atlantic City Expressway. From the Williamstown-New Freedom Road to the Pennsylvania Railroad right-of-way.

The following tributaries from their confluence with the GEHR: Squankum Branch to Malaga Road; Big Bridge Branch to its headwaters; Penny Pot Stream Branch to 14th Street; Deep Run to Pancoast Mill Road; Mare Run to Weymouth Avenue; Babcock Creek to its headwaters; Gravelly Run to the Pennsylvania Railroad right-of-way; Miry Run to Asbury Road; South River to Main Avenue; Stephen Creek to New Jersey Route 50; Gibson Creek to First Avenue; English Creek to Zion Road; Lakes Creek to the dam; Middle River to the levee; Patcong Creek to the Garden State Parkway; Tuckahoe River to the Route 49 Bridge; Cedar Swamp Creek from its confluence with the Tuckahoe River to its headwaters.

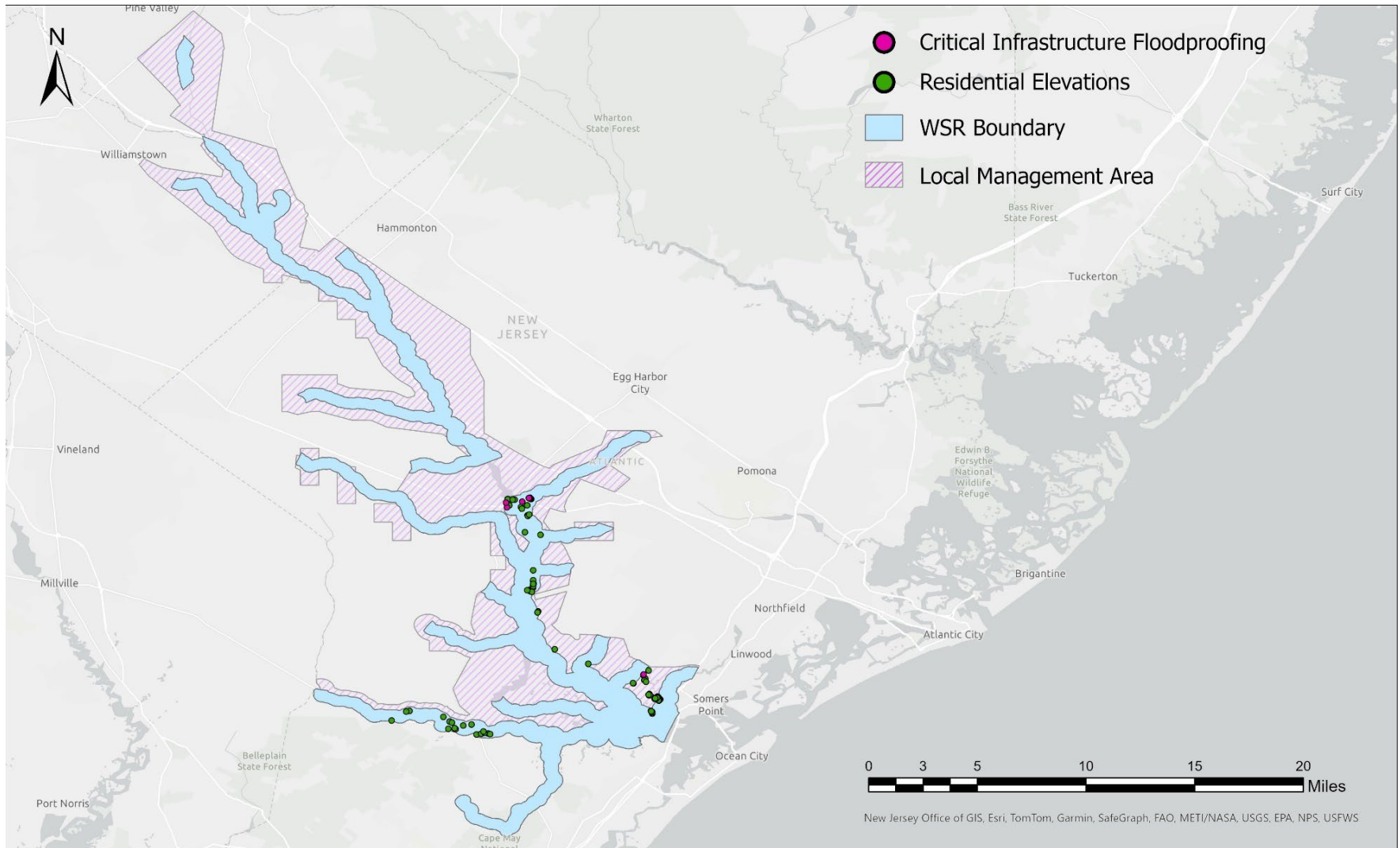


Figure 1. Great Egg Harbor Wild and Scenic River and TSP Features

2.2 Wild and Scenic River Classification/Mileage

There are three designations for wild and scenic rivers as defined below:

Wild River Areas – Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

Scenic River Areas – Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

Recreational River Areas – Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

In the GEHR basin designations, there are 30.6 miles of scenic river and 98.4 miles of recreational river that make up a total of 129.0 miles. There are no wild river areas designated in the GEHR and Tributaries. Table 1 and Figure 2 provides classifications of river segments and tributaries.

The scenic and recreational classifications are based on five outstanding resource values (ORV's), that are:

- Historic,
- Recreation,
- Wildlife,
- Hydrology
- Traditional Use

On the GEHR Mainstem, the river is tidally influenced up to the dam at Lake Lenape. A number of the tributaries that feed the GEHR below Lake Lenape are also tidally influenced Table 1 and Figure 2.

Table 1. Great Egg Harbor River (GEHR) Mainstem and Tributaries Wild and Scenic River Classifications.

Location	Reach (upstream to downstream)	Classification	Tidal Regime
GEHR Mainstem	Atlantic City Expwy. to Big Ditch	Recreational	Non-tidal
GEHR Mainstem	Deep Run to Big Ditch	Recreational	Non-tidal
GEHR Mainstem	Big Ditch to Lake Lenape	Recreational	Non-tidal

	Lake Lenape to Perch Cove Run	Recreational	Tidal
GEHR Mainstem	Perch Cove Run to Patcong Creek	Scenic	Tidal
TRIBUTARY	Squankum Branch	Recreational	Non-tidal
TRIBUTARY	Big Bridge Branch	Recreational	Non-tidal
TRIBUTARY	Penny Pot Stream	Recreational	Non-tidal
TRIBUTARY	Big Ditch	Recreational	Non-tidal
TRIBUTARY	Deep Run	Recreational	Non-tidal
TRIBUTARY	Mare Run	Recreational	Non-tidal
TRIBUTARY	Babcock Creek	Recreational	Tidal + Non-tidal
TRIBUTARY	Miry Run	Recreational	Tidal + Non-tidal
TRIBUTARY	South River	Recreational	Tidal + Non-tidal
TRIBUTARY	Stephen Creek	Recreational	Tidal + Non-tidal
TRIBUTARY	Gibson Creek	Recreational	Tidal + Non-tidal
TRIBUTARY	English Creek	Recreational	Tidal + Non-tidal
TRIBUTARY	Lakes Creek	Recreational	Tidal + Non-tidal
TRIBUTARY	Middle River	Scenic	Tidal + Non-tidal
TRIBUTARY	Cedar Swamp Creek	Scenic	Tidal + Non-tidal
TRIBUTARY	Tuckahoe River	Recreational/Scenic	Tidal
TRIBUTARY	Patcong Creek	Recreational	Tidal

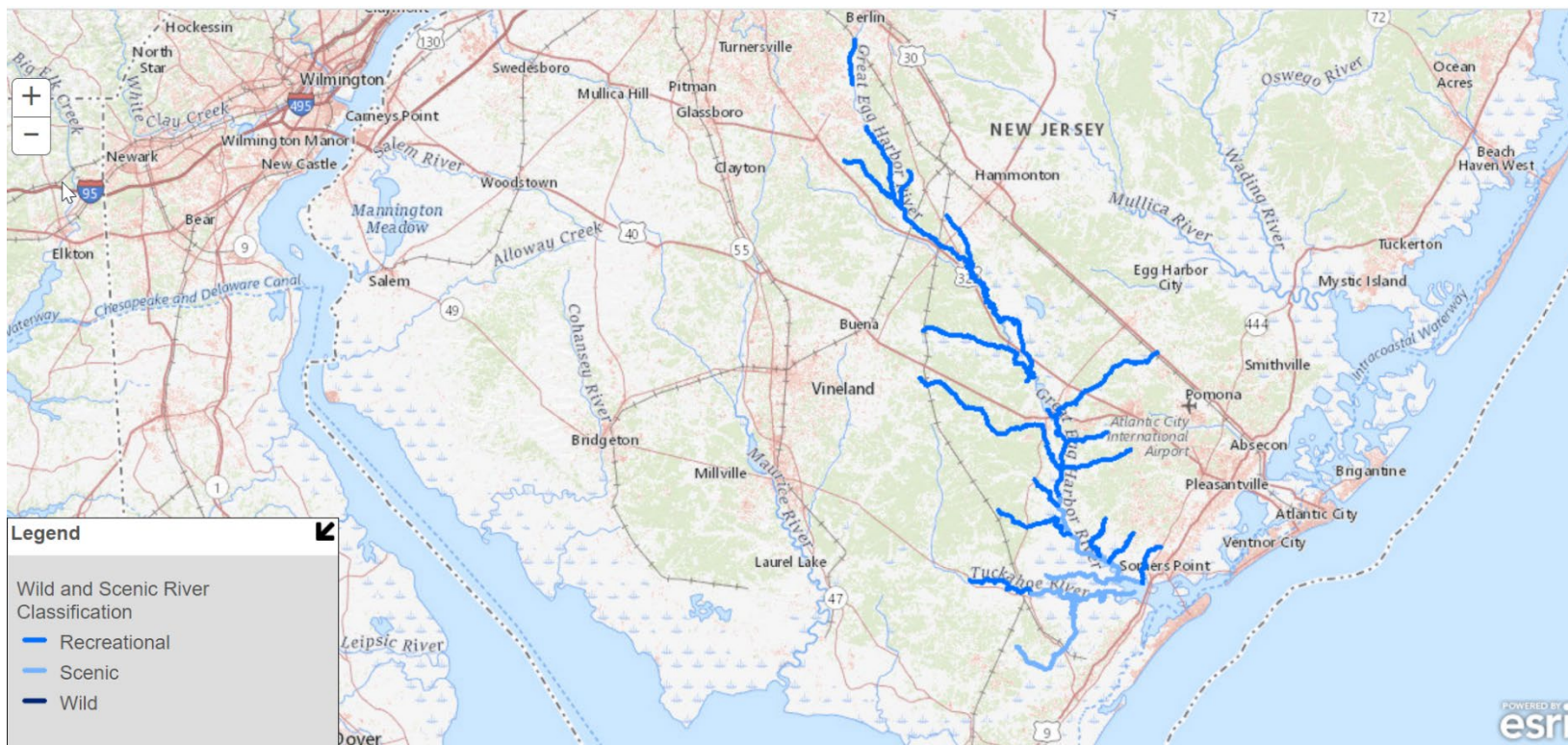


Figure 2. Great Egg Harbor Wild and Scenic River Classifications (mapping accessed from <https://www.rivers.gov>)

3.0 GREAT EGG HARBOR RIVER AFFECTED ENVIRONMENT

The following descriptions of important affected resources are taken directly from the “Great Egg Harbor Comprehensive Management Plan and Environmental Impact Statement” (NPS, 2000) and from the “Significant Habitats and Habitat Complexes of the New York Bight Watershed -Great Egg Harbor Estuary Complex #3” (USFWS,1997) as whole sections or excerpts, and are incorporated by reference.

3.1 General Environment

In NPS (2000),“The Great Egg Harbor River flows within and is representative of rivers in the Pinelands ecosystem and the Embayed Coastal Plain physiographic province of New Jersey. The Pinelands National Reserve, which encompasses a major part of the river area, is recognized as a nationally significant resource because of its vast pine-oak forest, extensive surface and groundwater resources of high quality, and a wide diversity of rare plant and animal species. The Pinelands National Reserve is also internationally recognized as a unit of the South Atlantic Coastal Plain Biosphere Reserve under the United Nations Man and the Biosphere Program” (NPS, 2000).

3.2 Resources

In NPS (2000),“The Great Egg Harbor River is home to a wide array of natural, cultural, scenic, and recreational resources. The presence of these resources is what made the Great Egg Harbor River a candidate for designation into the National Wild and Scenic River System. A number of “outstandingly remarkable” and “priority” resources were identified in the river corridor during the study process.

3.2.1 Outstandingly Remarkable Resources

3.2.1.1 Cultural Resources

NPS (2000) states: “The adjacent lands along the lower Great Egg Harbor River and its tributaries contain a number of historically significant sites that were important in the early maritime industry in southern New Jersey. Sites that were crucial to the development of the bog iron industry also exist on the Great Egg Harbor River and its tributaries. A number of these sites are on, or are eligible for, the National Register of Historic Places and are recognized by the Office of Historic Preservation and the Pinelands Commission. In addition, significant American Indian and archeological sites exist along the river corridor.

Several historic properties, historic districts, and Pre-Contact Period and historic archaeological sites have been documented in the GEHR area. Most of the recorded historic properties have been identified as part of the following seven NRHP Historic Districts (HD): Atlantic City Railroad Cape May Division HD (Eligible), Estellville Glassworks Industrial HD (Listed), Marshallville HD (Listed), Mays Landing HD (Listed), Morris Beach HD (Eligible), North and South Tuckahoe HD (Eligible), and South Tuckahoe HD (Listed).

3.2.1.2 Fauna

NPS (2000) states: “The lower Great Egg Harbor River and its tributaries provide breeding habitat for the peregrine falcon. Hardwood swamps and wetlands adjacent to the lower, middle and upper Great Egg Harbor River and its tributaries provide habitat for rare and endangered species such as the northern harrier and Pine Barrens tree frog. All of these areas are documented by the New Jersey Natural Heritage Program.

As a National Scenic and Recreational River, the Great Egg Harbor River provides a means of preserving wildlife habitat, protecting water quality and supply, managing land use, and affording the public with recreational opportunities to observe fish and wildlife resources within a densely populated area.

The Great Egg Harbor River complex provides aquatic and wetlands habitats for numerous wildlife species currently listed as rare, threatened, or endangered by the NJ Department

of Environmental Protection (NJDEP) and the Pinelands Commission. Wildlife habitats contained within the Great Egg River corridor are characterized as “exceptional” by the NJDEP. Wetland cover types within and adjacent to the Great Egg Harbor River, such as riverine, tidal and nontidal emergent wetlands, provide habitat for migratory waterfowl and passerine birds” (NPS, 2000).

USFWS (1997) provides a thorough discussion of fauna in the Great Egg Harbor Estuary and the following is taken from that publication: “*Significant concentrations of migrating and wintering waterfowl occur in the Great Egg Harbor estuary, with an average of over 12,000 waterfowl counted on midwinter aerial surveys. The most abundant species observed in the estuary, in descending order, are: American black duck (Anas rubripes), greater and lesser scaup (Aythya marila and A. affinis), brant (Branta bernicla), and mallard (Anas platyrhynchos), with lesser numbers of Canada goose (Branta canadensis), bufflehead (Bucephala albeola), northern pintail (Anas acuta), long-tailed duck (Clangula hyemalis), scoters (Melanitta spp.), green-winged teal (Anas crecca), American wigeon (Anas americana), red-breasted, common, and hooded mergansers (Mergus serrator, M. merganser, and Lophodytes cucullatus), tundra swan (Cygnus colombianus), canvasback (Aythya valisneria), and common goldeneye (Bucephala clangula). Dabbling ducks and bufflehead are fairly evenly distributed along the shorelines and tidal creeks of the estuary; diving ducks occur mostly in the more open water areas of Great Egg Harbor, and sea ducks occur near the inlet. Small flocks of tundra swan, averaging around 50 birds, are consistently found in or near the impoundments at MacNamara Wildlife Management Area (Tuckahoe Corbin Salt Marsh) before freeze-up. American black duck and northern pintail are common in the marshes at MacNamara. Scaup are found in the deeper open water of Great Egg Harbor Bay, while brant generally occupy the shallower water areas. Breeding waterfowl in the estuary include American black duck, gadwall (Anas strepera), mallard, and Canada goose.*

Waterbird colonies occur on most of the salt marsh and dredged material islands in the bay, including a sizable heronry at Cowpens Island with snowy egret (*Egretta thula*), glossy ibis (*Plegadis falcinellus*), great egret (*Casmerodius albus*), black-crowned night-heron (*Nycticorax nycticorax*), tricolored heron (*Egretta tricolor*), little blue heron, yellow-crowned night-heron, and cattle egret (*Bubulcus ibis*). Common terns (over 190 terns in 1995) and gulls (over 870 gulls in 1995) occur on several islands. Nesting gulls are predominantly laughing gull (*Larus atricilla*), with lesser numbers of herring gull (*L. argentatus*) and a few great black-backed gull (*L. marinus*). The sandy shoreline along the inlet and ocean beach of Ocean City (Waverly Beach) supports nesting by small numbers of piping plover and least tern and this beach, as well as the Longport beach on the other side of the inlet, supports occurrences of seaside evening primrose (*Oenothera humifusa*). Longport Sodbanks Island, just to the north of Great Egg Harbor Bay, has also supported nesting by piping plover, least tern, and Forster's tern (*Sterna forsteri*). Northern diamondback terrapin feed throughout the estuary and nest on appropriate sandy shoreline habitat.

The entire New Jersey barrier beach/backbarrier lagoon system is extremely important for shorebirds during spring and, especially, fall migration. Great Egg Harbor is considered one of the top 20 sites for spring and fall migration in the eastern United States. Willet (*Catoptrophorus semipalmatus*) and spotted sandpiper (*Actitis macularia*) breed in the area. Nearby Delaware Bay is one of the top spring migratory sites in the hemisphere for semipalmated sandpiper (*Calidris pusilla*), ruddy turnstone (*Arenaria interpres*), red knot (*Calidris canutus*), and sanderling (*Calidris alba*), with lesser numbers of dunlin (*Calidris alpina*) and dowitchers (*Limnodromus* spp.). These birds utilize the marshes on the Atlantic coast, including those within this complex, for roosting and feeding.

The rich food resources of the tidal marshes and creeks support several rare raptor species. There are numerous osprey nests on platforms within the MacNamara Wildlife Management Area; this area is one of the more important sites in the state for the recovery of the osprey. The marshes are an important bald eagle wintering site and pairs of eagles have also been observed during nesting season, though none have yet nested here. This is an important breeding area for northern harriers who nest and forage in the salt and brackish marshes. Barred owl also nest in the swamps adjoining the marshes. Clapper rail (*Rallus longirostris*) nest in the salt marsh area and black rail (*Latterallus jamiacensis*) may also nest here. Nearly 100 species of birds were recorded as probable or confirmed breeders in or adjacent to the Great Egg Harbor River (tidal river and estuary) in the first two years of the state's Breeding Bird Atlas. These breeding birds include marsh nesters mentioned above, as well as passerines typical of pine barrens such as gray catbird (*Dumetella carolinensis*) and pine warbler (*Dendroica pinus*)" (USFWS, 1997).

3.2.1.3 Fisheries

NPS (2000) states: “The US Fish and Wildlife Service views the Great Egg Harbor River, its tributaries and associated wetland systems, as having high value to fish and wildlife resources. Estuaries and wetlands associated with the Great Egg Harbor River produce food and provide spawning and nursery habitats for anadromous fish, including: alewife (*Alosa pseudoharengus*),

striped bass (*Morone saxatilis*), and American shad (*Alosa sapidissima*). Migratory birds and anadromous fish are a federal trust resource responsibility.

The US Fish and Wildlife Service has designated over 8,000 acres encompassing the upper reaches of Cedar Swamp Creek (a tributary to the Tuckahoe and Great Egg Harbor Rivers) as

a unit of the Cape May National Wildlife Refuge. The State of New Jersey owns in excess of 30,000 acres of land in five state Wildlife Management Areas that adjoin both the tidal and freshwater reaches of the Great Egg Harbor River and its tributaries.

The lower tidal portions of the Great Egg Harbor River (below Mays Landing) and its tributaries serve as critical nursery habitat and spawning grounds for anadromous, resident estuarine and transient marine fish, including alewife herring and striped bass. The lower Great Egg Harbor River is also one of only four areas in the State of New Jersey where commercially important quantities of seed oyster still exist (NPS, 2000).”

Fisheries of the Great Egg Harbor Estuary are described in USFWS (1997), and the following was taken directly from USFWS (1997): “*A total of 67 species of fish were caught in a one-year fisheries inventory of the Great Egg Harbor estuary. The most abundant species were Atlantic silversides (Menidia menidia), Atlantic menhaden (Brevoortia tyrannus), bay anchovy (Anchoa mitchilli), banded killifish (Fundulus diaphanus), alewife (Alosa psuedoharengus), hogchoker (Trinectes maculatus), white perch (Morone americanus), white catfish (Ameirus catus), and winter flounder (Plueronectes americanus). Great Egg Harbor Bay, with 32 species, had the highest diversity of fish taken. Great Egg Harbor Bay is an important commercial hard clam fishery, and the upper (western) bay inland of the Garden State Parkway is one of the few remaining oyster seed production areas in the state. The 1985 New Jersey Department of Environmental Protection survey indicates that there are over 40 hectares (100 acres) of oyster beds in the Great Egg Harbor River and nearly 16 hectares (40 acres) in the Tuckahoe River. Anadromous fish, including blueback herring (Alosa aestivalis), alewife, and striped bass (Morone saxatilis), spawn in streams of the Pinelands; this estuary serves as the major thoroughfare in the spring to the upriver sections and as the nursery area for newly-hatched fish. Other anadromous species present are hickory shad (Alosa mediocris), Atlantic menhaden, and the catadromous species American eel (Anguilla rostrata). Fish passage, especially upstream migrations, is impeded by obstructions, usually dams, which generally restrict activity to the lower reaches of these rivers (USFWS, 1997).*”

3.2.1.4 Flora

NPS (2000) states: “The lower Great Egg Harbor River and its tributaries contain large expanses of ecologically significant tidal marshland and hardwood swamp. The middle and upper segments of the Great Egg Harbor River and its tributaries contain significant areas of hardwood swamp. Both areas have sites with rare plants or plant communities recognized by federal and state agencies and the Pinelands Commission. These rare plants and plant communities include Pine Barrens Boneset, Parker’s Pipewort, Barratt’s Sedge, and others. These areas are documented by the New Jersey Natural Heritage Program.

The following two species have been recognized by the US Fish and Wildlife Service as federally listed threatened plants:

Swamp pink: Numerous known occurrences of swamp pink (*Helonias bullata*) exist within the Great Egg Harbor River watershed. Swamp pink is an obligate wetland species that occurs in a variety of palustrine forested wetlands in NJ, including forested wetlands bordering meandering streams, headwater wetlands, Atlantic white-cedar (*Chamaecyparis thyoides*) swamps, and spring seepage areas. Swamp pink typically occurs in forested wetlands, although occurrence in scrub/shrub wetlands is known.

Knieskern’s beaked rush: Numerous known occurrences of knieskern’s beaked-rush (*Rhynchospora knieskernii*) have been documented within the Great Egg Harbor River drainage basin. Knieskern’s beaked-rush typically occurs in early successional wetland habitats, often on bog-iron substrate or mud deposits adjacent to slow-moving streams in southern New Jersey. This species is also found in man-disturbed wet areas including abandoned borrow pits, clay pits, ditches, rights-of-way, and unimproved roads” (NPS, 2000).

USFWS (1997) provides a vegetative description within the Great Egg Harbor River estuary and the following is taken directly from USFWS (1997): “*Small areas of submerged aquatic vegetation (SAV) may occur in the brackish waters of the mainstem of the Great Egg Harbor River, as well as the Tuckahoe River and Patcong Creek. Typical submerged aquatic vegetation plant species include horned pondweed (Zannichellia palustris), water celery (Vallisneria americana), slender pondweed (Potamogeton pusillus), redhead grass (P. perfoliatus), widgeon grass (Ruppia maritima), and naiad (Najas flexilis). In the freshwater tidal reaches, submerged aquatics intersperse with the floating-leaved and emergent plants of the lower tidal marsh that are more characteristic of freshwater communities in the Pinelands; these include ribbonleaf pondweed (Potamogeton epihydrus), arrowheads (Sagittaria latifolia, S. englemannia and S. spatulata), American mannagrass (Glyceria grandis), and bulrush (Scirpus spp.).*

There are 7,662 hectares (18,932 acres) of tidal marsh in the Great Egg Harbor estuary, predominantly high marsh dominated by salt-meadow cordgrass (*Spartina patens*) interspersed by numerous intertidal creeks and ditches with smooth cordgrass (*Spartina*

alterniflora). The salt marshes in the estuary are extensively ditched. Smaller areas of brackish tidal marsh complex occur adjacent to the Tuckahoe River, Cedar Swamp Creek, Patcong Creek and along the mainstem, with dominance by narrow-leaved cattail (*Typha angustifolia*), big cordgrass (*Spartina cyosuroides*), common reed (*Phragmites australis*), and Olney three-square bulrush (*Scirpus americanus*). Freshwater intertidal wetlands are found in a few locations in the upper reaches of tidal influence in the Great Egg Harbor and Tuckahoe Rivers as well as in small areas on other tributaries. These freshwater tidal wetlands can be divided into different zones depending on the degree of tidal inundation: the lower tidal zone, exposed only at low tide, consisting of sparsely vegetated intertidal flats with riverbank quillwort (*Isoetes riparia*), bluntscale bulrush (*Scirpus smithii* var. *smithii*), the regionally rare Parker's pipewort (*Eriocaulon parkeri*), stiff arrowhead (*Sagittaria rigida*), grass-leaved arrowhead (*S. graminea*), and Hudson arrowhead (*S. subulata*); a mid-tidal zone with wild rice (*Zizania aquatica*), spatterdock (*Nuphar advena*), pickerel-weed (*Pontedariacordata*), three-square bulrush (*Scirpus pungens*), arrow arum (*Peltandra virginica*), water hemp (*Amaranthus cannabinus*), and dotted smartweed (*Polygonum punctatum*); and an upper tidal marsh zone dominated by cattails (*Typha angustifolia* and *T. glauca*) and a diversity of other species, including sensitive fern (*Onoclea sensibilis*), halberd-leaved tearthumb (*Polygonum arifolium*), arrowheads, river bulrush (*Scirpus fluviatilis*), sweet flag (*Acorus calamus*), smooth bur-marigold (*Bidens laevis*), orange jewelweed (*Impatiens capensis*), rose-mallow (*Hibiscus moscheutos* var. *moscheutos*), as well as the invasive common reed and exotic purple loosestrife (*Lythrum salicaria*). Shrubs include knob-styled dogwood (*Cornus amomum*), buttonbush (*Cephalanthus occidentalis*), and swamp rose (*Rosa palustris*).

The emergent marshes along the tidal mainstem and tributaries grade into seasonally-flooded hardwood and Atlantic white cedar swamps further from the creeks. The hardwood swamps are dominated by red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), sweet bay (*Magnolia virginiana*), sweet gum (*Liquidambar styraciflua*), and ash (*Fraxinus* spp.)” (USFWS, 1997). Figure 3 provides a general distribution of freshwater and saline wetland habitats in the Central Region of the study area, which includes the Great Egg Harbor River.

3.2.1.5 Rare and/or Special Status Species

Threatened and endangered flora and fauna are known to occur in and adjacent to areas within the Great Egg Harbor River and its tributaries. Table 2 provides a list of potential special status species entering into the GEHR WSR portion of the project area.

USFWS (1997) describes rare flora and fauna in the Great Egg Harbor Estuary as: “Rare plants within the salt marsh include red goosefoot, and within the brackish marsh include Koehn's toothcup, clustered bluets (*Oldenlandia uniflora*), and small-headed beaked-rush. Brackish marsh habitat also supports rare skipper. A population of eastern mud salamander occurs in the freshwater/brackish marshes along South Creek. Rare freshwater tidal marsh communities occur at the upper reaches of tidal influence,

Table 2. Special Status Species Potentially Occurring within the NJBB Affected Area of the GEHWSR.

Species	Status	Habitat in NJBB
American Bittern (<i>Botaurus lentiginosus</i>) BR	SE	Brackish marshes
Bald Eagle (<i>Haliaeetus leucocephalus</i>) BR/NB	SE/ ST	Forest edges, open water
Northern Harrier (<i>Circus cyaneus</i>) BR	SE	Tidal marshes
Peregrine Falcon (<i>Falco peregrinus</i>)	SE	Widespread habitats in NJBB. Nest on man-made towers, bridges, buildings, nesting platforms, etc.
Red knot (<i>Calidris canutus rufa</i>) NB	FT, SE	Sandy beaches, spits, marsh islands, tidal flats
Short-Eared Owl (<i>Asio flammeus</i>) BR	SE	Coastal marshes
Black-Crowned Night-Heron (<i>Nycticorax nycticorax</i>) BR	ST	Maritime forests, scrub-shrub, mixed <i>Phragmites</i> marshes
Yellow-Crowned Night-Heron (<i>Nyctanassa violacea</i>)	ST	Maritime forests, scrub-shrub on barrier and bay islands
Osprey (<i>Pandion haliaetus</i>) BR	ST	Coastal rivers, marshes, bays & inlets. Nest on dead trees, platforms, poles
Piping plover (<i>Charadrius melodus</i>)	FT, SE	Ocean beaches, inlets, washover areas, tidal flats
Eastern Black Rail (<i>Laterallus jamaicensis</i>) BR/NB	FT, SE/ST	High marshes
Black Skimmer (<i>Rynchops niger</i>)	SE	Sandy beaches, inlets, sandbars, offshore islands
Least Tern (<i>Sternula antillarum</i>)	SE	Sandy beaches, bay islands
Roseate Tern (<i>Sterna dougallii</i>)	FE/SE	Beaches w/ vegetated dunes
Sedge Wren (<i>Cistothorus platensis</i>)	SE	High marshes
Atlantic Loggerhead (<i>Caretta caretta</i>)	FT/SE	Marine/Estuarine Pelagic
Kemp's Ridley (<i>Lepidochelys kempii</i>)	FE/SE	Marine/Estuarine Pelagic
Atlantic Green Sea Turtle (<i>Chelonia mydas</i>)	FT/ST	Marine/Estuarine Pelagic
Pine barrens treefrog (<i>Hyla andersonii</i>)	ST	Acidic freshwater Atlantic white cedar swamps and pitch pine lowlands in seeps or isolated or temporary woodland ponds.
Northern Long-Eared Bat (<i>Myotis septentrionalis</i>)	FT	Summertime roosts beneath the bark of live and dead trees.

Species	Status	Habitat in NJBB
Atlantic Sturgeon (<i>Acipenser oxyrinchus oxyrinchus</i>)	FE/SE	Marine/estuarine; Demersal/pelagic
Bronze Copper (butterfly) (<i>Lycaena hyllus</i>)	SE	Brackish marshes
Swamp pink (<i>Helonias bullata</i>)	FT/SE	Freshwater forested wetlands bordering small streams
Knieskern's beakrush (<i>Rhynchospora knieskernii</i>)	FT/SE	Early successional freshwater wetlands adjacent to slow moving streams

FT= Federally Threatened *Note: There are over 800 species of Special Status Plants in NJ.

FE= Federally Endangered

ST=State Threatened

SE= State Endangered

BR= Breeding Population Only

NB= Non-Breeding Population Only

supporting rare plants that include Parker's pipewort and golden club (*Orontium aquaticum*). Adjacent palustrine wetlands include forested swamps and bogs containing rare species typical of Pinelands wetlands. Rare plants include swamp pink, southern twayblade (*Listera australis*), pine barren boneset (*Eupatorium resinosum*), hornedbeaked rush (*Rhynchospora inundata*), federally listed threatened Knieskern's beaked-rush (*Rhynchospora knieskernii*), and Barratt's sedge (*Carex barratii*). Rare animal species in these adjacent wetlands include pine barrens tree frog (*Hyla andersonii*), Cope's gray tree frog (*Hyla chrysoscelis*), barred owl, red-headed woodpecker (*Melanerpes erythrocephalus*), and northern pine snake (*Pituophis m. melanoleucus*)” (USFWS, 1997).

3.2.1.6 Recreation

NPS (2000) states: “The Great Egg Harbor River is the longest navigable river in the New Jersey Pinelands. Its upper and middle reaches are toured by canoeists, while the lower tidal reaches provide sailors and power boaters with access to the intracoastal waterway and the ocean. The river and its tributaries, together with related adjacent lands, provide excellent recreational opportunities in close proximity to the major urban centers of Philadelphia, Trenton, Camden, and Wilmington.

The US Fish and Wildlife Service has designated over 8,000 acres encompassing the upper reaches of Cedar Swamp Creek (a tributary to the Tuckahoe and Great Egg Harbor Rivers) as a unit of the Cape May National Wildlife Refuge. The State of New Jersey owns in excess of 30,000 acres of land in five state Wildlife Management Areas that adjoin both the tidal and freshwater reaches of the Great Egg and its tributaries” (NPS, 2000).

3.2.1.7 Physiographic/Geologic Setting

NPS (2000) states: “The Cohansey formation, underlying the Pinelands and the Great Egg Harbor River, is the largest freshwater aquifer in the Mid-Atlantic region of the United States. The water in this shallow aquifer frequently lies near the surface, producing bogs, marshes and swamps” (NPS, 2000).

3.2.1.8 Scenic Resources

NPS (2000) states: “The US Department of the Interior, in cooperation with the Pinelands Commission and the New Jersey Department of Environmental Protection, published a report in 1980 entitled the Pinelands Scenic Study to define and assess the relative value of the scenic resources of the Pinelands. As part of the study, residents and users of the Pinelands were surveyed to evaluate scenic preferences. The most preferred scenic landscape in the Pinelands was surface water in lakes and streams. The next most preferred landscape was undisturbed forest, including cedar and hardwood swamp areas. The Great Egg Harbor River and its tributaries contain an abundance of both of these scenic landscapes.

The Comprehensive Management Plan for the Pinelands National Reserve and the Pinelands Area designates the lower and middle reaches of the Great Egg Harbor River and its tributaries as scenic corridors of special significance to the Pinelands. The Great Egg Harbor National Scenic and Recreational River designation legislation also classifies 24.6 miles of the lower reaches of the river system as scenic” (NPS, 2000).

3.2.1.9 Surface Hydrology and Salinity

NPS (2000) states: “The Great Egg Harbor River is one of two major river systems in the Pinelands National Reserve and drains about 20 percent of the area’s 1.1 million acres. All waters in the Pinelands, including the Great Egg Harbor River and its tributaries, have been designated by the U. S. Environmental Protection Agency as Outstanding National Resource Waters that are to be protected from any change in water quality. Streams of the Pinelands and the coast are typically slow moving and shallow due to the flat topography. About 45% of the flow results from the outcropping of the Cohansey Aquifer.”

“Twenty-five major impounded lakes are located in the Great Egg Harbor River basin. Impoundments on the mainstem of the Great Egg Harbor River are located at Mays Landing (forming Lake Lenape) in Atlantic County and at New Brooklyn in Camden County (forming New Brooklyn Lake). A series of breached small dams exist on the Tuckahoe River above Head of River which are maintained by the NJ Division of Fish, Game and Wildlife as wildlife impoundments. Hospitality Branch and its tributaries, Little Mill Creek, Big Ditch, Watering Race Branch, and Dry Run all exhibit alterations due to dams or impoundments. These alterations have significantly affected the free-flowing riverine characteristics of these tributaries.”

“The mainstem of the lower Great Egg Harbor River is tidally influenced up to Mays Landing while the lower Tuckahoe River is tidal up to Head of River” (NPS, 2000).”

“The following description is taken directly from USFWS (1997): “The estuary of the Great Egg Harbor River receives surface water from two major river sources, the Great Egg Harbor River and the Tuckahoe River (including Cedar Swamp Creek). The Great Egg Harbor River is a 95-kilometer (59-mile) long river that is tidal for its lower 22.5 river kilometers (14 river miles) from the impoundment at May's Landing to its mouth where it joins the Middle and Tuckahoe Rivers at the head of Great Egg Harbor Bay. Smaller tributaries directly entering the estuary include the South River, Stephen Creek, Gibson Creek, and Middle River from the south, and Babcock Creek, Gravelly Run, English Creek, Lakes Creek, and Patcong Creek from the north. The Tuckahoe River is tidal for a distance of 22 river kilometers (13.5 river miles) upriver from the main stem of the Great Egg Harbor River; Patcong Creek is tidal for 9.4 river kilometers (5.8 river miles) from the bay; Cedar Swamp Creek is tidal for about 9.3 river kilometers (5.8 river miles) from its junction with the Tuckahoe; the lower portions of several other tributaries are tidal as well. Salinities in the Great Egg Harbor River vary with the diurnal (twice-daily) tides and the degree of rainfall, evapotranspiration, and consequent freshwater input. Salinities in the main stem of the Great Egg Harbor River range from less than 1 to 30 parts per thousand (ppt), with saltwater extending up the mainstem about 18.5 river kilometers (11.5 river miles) to just above Gravelly Run. Salinities above this point are generally less than 1 ppt. Salinities in the Tuckahoe River range from less than 1 to 21.3 ppt, with saltwater extending upriver about 22 river kilometers (13.5 river miles). Great Egg Harbor Bay itself is a polyhaline (high salinity), well-mixed estuary with salinities ranging from 17 to 32 ppt.”

Figure 4 shows the tidally influenced habitat in the GEHR.

3.2.2 Priority Resources

NPS (2000) identified priority resources as part of the comprehensive management plan and EIS, and states: “In addition to the Outstandingly Remarkable Resources identified above, the following river-related resources of state and local significance were also identified in the protection strategies for the Great Egg Harbor River”.

3.2.2.1 Wetlands

NPS (2000) states: “Soils associated with wetlands adjacent to the Great Egg Harbor River and its tributaries are classified as having severe limitations for development purposes were recommended for protection. These areas are considered important in light of strong state legislation protecting freshwater wetlands.”

3.2.2.2 Flood Hazard Areas

NPS (2000) states: “Flood Insurance Rate Maps for each community in the watershed were used to map the 100-year flood hazard areas. These areas surrounding the Great Egg Harbor River and its tributaries are important since the State Flood Hazard Area Control Act currently authorizes municipalities to regulate stream encroachment activities in the flood hazard areas and to develop conservation-oriented land use ordinances.”

3.2.2.3 Areas of Archaeological Significance and Sensitivity

NPS (2000) states: “These areas are corridors along intermittent, permanent, and navigable streams where known American Indian sites have been documented and/or the probability of finding new sites is very high. These areas have been identified as corridors directly adjacent to wetlands, both tidal and freshwater, in the Great Egg Harbor River watershed.”

The New Jersey Historic Preservation Office (NJHPO) and New Jersey State Museum (NJSM) site records provide information on the types of sites located in the GEHR area, previous survey results, and recommendations for future investigations. The NJHPO and NJSM files will be consulted once plans are further developed to identify specific areas of archaeological significance and sensitivity and determine any potential impacts resulting from proposed measures.

4.0 ACTION AREA

The action area is defined as all areas that may be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. It encompasses the geographic extent of environmental changes (i.e., the physical, chemical and biotic effects) that will result directly and indirectly from the action and is a subset of the NJBB Study Area.

For the NJBB Study, the action area is all areas directly and indirect affected by the tentatively selected plan (TSP). Under the TSP, only nonstructural measures shown in Figure 1 are expected to affect the resources of the GEHR directly or indirectly. The closest nature-based solution is small scale feature that is 9 miles from the mouth of the GEHR. This component would not directly or indirectly affect the GEHR. Therefore, only nonstructural features within boundary of the GEHR are addressed by this consultation.

5.0 PROJECT DESCRIPTION

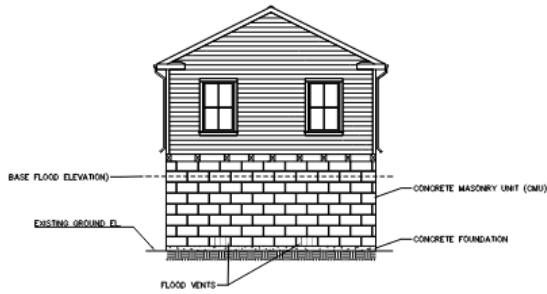
5.1 Nonstructural Measures

Structure Elevation. There are six (6) different design options available for elevation of private residences. These include Extended Foundation, Piers, Posts, Columns, Piles and Fill. The extended foundation would be the most common method to elevate houses. This involves hydraulically lifting the house and building up the foundation underneath it. Figure 4 shows a concept drawing for extended foundation elevations. Figure 5 provides a rendering of a home before and after elevation.

EXISTING HOME



ELEVATED HOME



EXTENDED FOUNDATION

Figure 4. Home Elevation Concept Diagram – Extended Foundation





Figure 5. Before/After Home Elevation Renderings

Pile elevations methods may be the most economical and could be used if the property has enough room to slide the house off its foundation. Once a house is off the foundation, footers would be installed, and wood piles would be driven to elevate the house. Vibratory pile driving would be used to the maximum extent practicable. It is anticipated that most properties would not have enough room to use pile elevation. This method is not expected to be common.

Dry Floodproofing. Dry flood proofing maintains a structure at its current elevation but ensures that the building is impermeable to floodwaters. Large public, industrial or commercial facilities are too complex to elevate and will require dry flood proofing. This technique is also proposed to manage risk to critical infrastructure that has been identified for nonstructural solutions.

Dry flood proofing (Figure 6) includes measures that make a structure watertight below the level that needs FRM to prevent floodwaters from entering. In this study, dry flood proofing included:

- Application of a permeable membrane (up to 3 feet above first floor elevation per NNC guidance) in the form of an epoxy paint/sealer.
- Installation of flood shields and stop logs installed in front of all openings that require ingress and egress. This includes access panels, doorways, garage openings, etc.
- Sealing of all pipe penetrations from the building exterior to ensure impermeability.
- Elevation of all external utilities susceptible to flood damage above design flood elevation.



Figure 6. Dry Flood Proofing Rendering at Island Park Fire Department

Wet Floodproofing. Wet flood proofing is another approach to retrofitting that involves modifying a structure to allow floodwaters to enter it in such a way that damage to the structure and its contents is minimized. Wet flood proofing is often used when all other mitigation techniques are technically infeasible or are too costly. Wet flood proofing is generally appropriate if a structure has available space where damageable items can be stored temporarily. Wet flood proofing may turn out to be more applicable for specific structures based on water surface elevations (possibly greater than 3 feet above ground surface) at such structures.

5.1.1 Pre-construction

Prior to construction detailed investigation of the eligibility of individual structures for nonstructural measures would be conducted.

5.1.2 Construction

Nonstructural measures involve a construction effort similar to home renovations or reconstruction, whether it be from building retrofits such as elevation (including raising a structure on fill or foundation elements such as solid perimeter walls, pier, posts, columns, or pilings) or buyout/ relocations that are likely to involve demolition, grading, and soil stabilization/revegetation. The majority of the construction would occur within the footprint of the existing structure or adjacent developed land such as roads and would most likely be in upland urbanized settings.

5.1.3 Operations and Maintenance

The non-federal sponsor will conduct periodic inspections at each elevated or floodproofed structure. Required repair or maintenance would be conducted on a

structure-by-structure basis and would be negligible. It is anticipated that any required maintenance be similar to home or building renovation.

5.1.4 Measures to Avoid and Minimize Effects on Fish and Wildlife

5.1.4.1 Nonstructural Measures

The following are examples of measures that could be implemented during construction of nonstructural measures, to the maximum extent practicable, to avoid effects on fish and wildlife.

- For residential elevations, vibratory pile installation would be used to the maximum extent practicable.
- Based on the seasonal restrictions in Table 3, impact pile driving would not occur adjacent to piping plover nesting beaches from March 1 through August 31.
- Based on the seasonal restrictions in Table 3, impact pile driving would not occur adjacent to marshes from March 15 through September 30.

Table 3. Seasonal Restrictions for nonstructural measures

Restricted Activity	Time of Year	Resource of Concern
Impact pile driving adjacent to piping plover nesting beaches	March 1 – August 31	Piping plover
Impact pile driving adjacent to beaches, inlets, river mouths, sand spits, and tidal flats	July 1 – September 30	Roseate terns
Impact pile driving adjacent to marshes	April 1 – September 30	Black rail
Removing trees re greater than or equal to 3 inches diameter at breast height (DBH); removal or modifications to bridges, culverts larger than 5 feet wide, and other structures	April 1 – September 30	Northern long-eared bat, tri-colored bat

Black Rail

USACE would implement the following BMPs to avoid impacts to eastern black rail and their habitat:

- If a seasonal restriction in Table 3 cannot be implemented, USACE would contact USFWS to determine if an assessment is necessary to determine if the habitat is suitable for eastern black rail. The results of the habitat assessment would be confirmed with the USFWS prior to construction.
- Use a soil erosion and sediment control plan and best practices to avoid indirect impacts to marsh habitat.

Northern Long-eared Bat and Tri-Colored Bat

USACE would implement the following BMPs to avoid impacts to northern long-eared bats, tri-colored bats, and their habitat:

- If removal of individual trees cannot be avoided during the time of year restriction in Table 3, USACE would coordinate with USFWS to determine if a survey is required.
- Minimize tree clearing, especially of highly suitable roost trees including snags (dead trees), shagbark hickories (*Carya ovata*), other trees with shaggy or exfoliating bark, and trees of any species over 26 inches DBH.
- Avoid impacts to known roosts during any time of year.
- Avoid or minimize impacts to known roosting/foraging areas any time of year.
- Permanently protect known roosting/foraging habitat.
- Maintain forested connections (e.g. hedgerows) between known foraging/roosting areas.
- Minimize forest fragmentation (i.e. consider the landscape when laying out a project).
- Avoid disturbance to riparian areas. Within areas of known fall foraging, summer maternity, and migration route habitats, preserve and restore wooded upland buffers at least 150-foot-wide on wetlands and open waters, and at least 300-foot-wide where possible and/or required by State regulation.
- Use bright flagging/fencing to demarcate trees that will be protected vs. cleared.
- Replant areas where trees have been disturbed for temporary activities or work space.
- Preferentially replant suitable roost tree species.
- Minimize access to areas of known roost sites to prevent disturbance.
- Minimize discharges of pesticides and other environmental contaminants in areas of known northern long-eared bat habitat. Avoid large-scale use of insecticides throughout the species' geographic range.
- Minimize potential lighting impacts (e.g. downward facing lights, shields, timers).

Red Knot

USACE would implement the following BMPs to avoid impacts to red knot and their habitat:

- Minimize and monitor disturbance of rufa red knots from other human activities.
- Avoid deliberate introductions of non-native marine species (e.g., avoid aquaculture of nonnative species). Use care to avoid accidental introductions of non-native marine species and marine diseases (e.g., avoid ballast water discharges near rufa red knot habitat).

Piping Plover

- The introduction or spread of dense or invasive vegetation at suitable piping plover habitat would be avoided. Construction equipment would be thoroughly cleaned, before used on a beach to avoid unintended spread of invasive plants.
- If the seasonal restrictions in Table 3 cannot be implemented for individual structures, USACE would coordinate with USFWS.

Roseate Tern

- If the seasonal restrictions in Table 3 cannot be implemented for individual structures, USACE would coordinate with USFWS to avoid disturbance.

5.1.4.2 General BMPs

The following BMPs would be implemented for all construction activities:

Black Rail

- If an eastern black rail is observed, it would be reported to:
 - The NJFO and the NJDEP Wildlife Tracker (located at: <https://dep.nj.gov/njfw/conservation/reportingrare-wildlife-sightings/>).
 - eBird via smartphone application or online at: <https://ebird.org/>. Identification tips are available from the Cornell Lab of Ornithology. Reports are most helpful when they include specific locations, as well as comments about the kinds of habitats the birds were using.

Northern Long-eared Bat, Tri-Colored Bats

- If a northern long-eared bat or tri-colored bat is observed, it would be reported to the USFWS NJFO and the NJDEP Wildlife Tracker (located at: <https://dep.nj.gov/njfw/conservation/reporting-rare-wildlife-sightings/>).

Red Knot

- If a red knot is observed, it would be reported to:
 - The NJDEP Wildlife Tracker (located at: <https://dep.nj.gov/njfw/conservation/reporting-rare-wildlifesightings/>).
 - eBird via smartphone application or online at: <https://ebird.org/>. Identification tips are available from the Cornell Lab of Ornithology. Reports are most helpful when they include specific locations, as well as comments about the kinds of habitats the birds were using.
 - If the red knot is banded it would be reported to bandedbirds.org.

Piping Plover

- While beach plantings are unlikely, USFWS would be contacted, prior to any beach plantings.
- If a piping plover is observed, it would be reported to:
 - The NJFO and the NJDEP Wildlife Tracker (located at: <https://dep.nj.gov/njfw/conservation/reportingrare-wildlife-sightings/>);

- <https://www.fws.gov/story/congratulations-spotting-banded-piping-plover-now-what>, if it has a color leg band.

Roseate Tern

- Observations of roseate terns would be reported to the following:
 - The NJDEP Wildlife Tracker (located at: <https://dep.nj.gov/njfw/conservation/reportingrare-wildlife-sightings/>).
 - eBird via smartphone application or online at: <https://ebird.org/>. Identification tips are available from the Cornell Lab of Ornithology. Reports are most helpful when they include specific locations, as well as comments about the kinds of habitats the birds were using.
 - United States Geological Survey Bird Banding Lab, if they are leg banded. Reports are most useful when they include a photo and the alphanumeric code on the colored band.

6.0 PROJECT EFFECTS ON GREAT EGG HARBOR SCENIC AND RECREATIONAL RIVER RESOURCES

6.1 Outstandingly Remarkable Resources

6.1.1 Cultural Resources (Includes Archaeological Resources)

No archaeological sites are located within the Area of Potential Effect (APE) for nonstructural measures proposed for the GEHR. Therefore, potential impacts to GEHR archaeological resources are not anticipated.

The NHRP-listed Marshallville and Mays Landing Historic Districts and the NRHP-eligible North and South Tuckahoe and Morris Beach Historic Districts are within the APE for nonstructural measures. A Programmatic Agreement (PA) is being prepared in accordance with the NJHPO to identify specific properties in the APE, determine adverse effects, and mitigate for such effects. If USACE and NJHPO determine that the TSP will result in adverse effects to any GEHR cultural resources, mitigation or avoidance plans will be developed in consultation with consulting parties and federally recognized tribes.

6.1.2 Fauna

Direct and indirect effects of nonstructural measures are expected to be minor, adverse, and temporary, lasting only the duration of construction. The areas where residential elevation and critical infrastructure floodproofing would occur provide marginal habitat for nesting birds and wildlife. Additionally, most of construction would occur within existing structure footprints and already developed land.

While impacts on woodlands are not expected, there is the potential for individual landscape trees to be removed on already developed lots to accommodate construction equipment for residential home elevations. This could result in direct impacts on birds and bats. While construction equipment could interact with nesting birds resulting in

direct nest disturbance, injury, or mortality. In order to avoid unintentional takes of birds or nests, BMPs would be implemented, such as providing MBTA training to construction workers and having them monitor for bird nesting behavior and bird nests during construction with plans to avoid the nest until the USACE is contacted.

If tree removal is necessary, it would adhere to time-of-year restrictions as required by U.S. Fish and Wildlife Service (USFWS) and other agencies. Individual trees are not expected to provide high value habitat for sensitive or protective species such as tri-colored bat or northern longeared bat roost. In order to avoid direct effects, such as injury, on tri-colored or northern longeared bats. Removal of potential roost trees would be avoided to the extent practicable. If potential roost trees cannot be avoided, the USFWS would be consulted as appropriate. Trees would also be replaced to the extent possible.

Indirect impacts would occur from ground disturbance and the temporary avoidance of the area by wildlife during construction. Noise from the construction activities associated with nonstructural measures has the potential to temporarily disturb migratory birds. Migratory birds in the developed portions of the study area may be habituated to noise or not sensitive to noise, this disturbance is not expected to impact important activities such as breeding, feeding, or resting.

Nonstructural measures would not occur in wetland habitat but could occur near these habitats. Noise associated with house elevations and floodproofing would be similar to typical home renovations. It is expected that the only construction activity, that might impact eastern black rail, red knot, and roseate tern, which are associated with these habitats, is impact pile driving. To avoid impacting these species, vibratory pile driving would be used to the maximum extent practicable. If impact pile driving adjacent to salt marsh habitat is necessary, it would be avoided during black rail breeding and nesting season and red knot and roseate tern migratory seasons. Therefore, eastern black rail, red knot, and roseate tern, which are associated with these habitats, would not be affected by nonstructural measures.

6.1.3 Fisheries

No direct or indirect effects on aquatic resources, include fisheries, shellfish, or their prey or habitat. All construction activities are limited to uplands and with the implementation of relevant BMPs and adherence to all permits, these activities would not directly or indirectly affect aquatic habitat. Sediment and erosion control BMPs would be in place to protect water quality and aquatic assemblages.

6.1.4 Rare and/or Special Status Species

The residential areas where the nonstructural measures would be implemented do not provide suitable habitat for federally listed threatened and endangered species. Helical piles, as opposed to impact pile driving may be used to avoid noise impacts within the GEHR corridor. Therefore, the USACE has determined that the nonstructural plan would have no effect on the following federally listed species.

- Shortnose sturgeon
- Kemp's ridley
- Atlantic green sea turtle
- Leatherback sea turtle
- Atlantic loggerhead
- Northeastern Beach Tiger Beetle
- Seabeach amaranth
- Northern longeared bat

The USACE has determined that the recommended nonstructural plan is not likely to adversely affect the following listed species.

- Eastern black rail
- Roseate tern
- Red knot
- Piping plover

Of these species, only eastern black rail could occur in the GEHR. Additional analysis is provided in the Biological Assessment in Appendix F3. BMPs would be implemented to avoid effects on threatened and endangered species (see Section 5.1.2).

No direct impacts on state-listed species are expected. The recommended plan would be constructed in footprints of existing structures. Sensitive plants and wildlife are not expected to occur there.

For species managed under the NJ Endangered and Nongame Species Program, construction would take place in existing developed areas but could result in noise and disruption temporarily at in nearby habitat locations. TOYRs may be required in locations near sensitive habitats.

A multitude of vascular and non-vascular plant species, terrestrial ecological communities, and Natural Heritage Priority Sites occur throughout the large NJBB affected area. While the nonstructural plan would affect existing properties that are previously developed, a site-specific inventory of rare and imperiled plant species would be conducted prior to implementation. Should these resources be identified at specific construction locations, the Office of Natural Lands Management would be consulted on implementing avoidance measures.

6.1.5 Recreation

There would be no direct effects to recreation. There could be negligible, temporary, indirect, adverse impacts to recreation during construction activities associated with residential elevations and floodproofing of nonresidential buildings. Residential elevations would occur in neighborhoods; therefore, temporary, minor, adverse impacts from noise may indirectly impact recreation activities such as walking or jogging in the area. Sidewalks adjacent to residences may be closed temporarily during construction activities.

6.1.6 Physiographic/Geologic Setting

Elevation of homes and floodproofing of critical infrastructure would have no direct or indirect effects on physiographic or geologic setting. There might be minor direct effects on soils and other geologic resources with ground disturbance and pile driving (if necessary). However, these activities are not expected to have broadscale impacts on regional geological resources.

6.1.7 Scenic Resources

Effects on scenic resources of the GEHR are expected to be minor. The residential home elevations of 72 residential structures would result in direct and permanent alterations to the viewshed; however, these effects would occur in already developed, residential areas. The number of structures would be affected. Access to the scenic areas of GEHR would not be affected. These buildings would be elevated up to 10 feet higher. This will change the aesthetics of neighborhoods and urban centers but not wild and scenic areas. Additionally, these changes to the aesthetics are typical of elevations that have occurred throughout the study area since Superstorm Sandy and are within the character of the existing communities. No changes are expected to the aesthetics of natural areas. Elevations may result in potential visual or viewshed impacts to historic districts and properties. A more detailed analysis of visual and viewshed impacts on cultural resources will be conducted once plans are further developed to identify any potential impacts, determine the need for mitigation plans, and carry out such plans in accordance with the Programmatic Agreement (PA).

Floodproofing of critical infrastructure is not expected to have direct or indirect effects on scenic resources.

6.1.8 Surface Hydrology and Salinity and Water Quality

The TSP features and other measures are not expected to have direct or indirect impacts on surface hydrology, salinity, and water quality of GEHR. All construction activities are limited to uplands and with the implementation of relevant BMPs and adherence to all permits, these activities would not directly or indirectly affect the waters of GEHR. Sediment and erosion control BMPs would be in place to protect water quality and aquatic assemblages.

6.2 Priority Resources

NPS (2000) identified priority resources as part of the comprehensive management plan and EIS, and states: "In addition to the Outstandingly Remarkable Resources identified above, the following river-related resources of state and local significance were also identified in the protection strategies for the Great Egg Harbor River".

6.2.1 Wetlands

Nonstructural measures such as residential building elevation and critical infrastructure would be limited to the existing building footprint within developed upland locations and will not have any direct effects on wetlands and associated habitats. Any necessary

excavations or earth disturbance on each property would be managed by implementing sediment and erosion control BMPs that would limit sedimentation in wetlands and nearby waterways.

6.2.2 Flood Hazard Areas

The purpose of the TSP and other measures is to provide Coastal Storm Risk Management for areas within flood hazard areas. Nonstructural measures would only be applied to already existing structures in the Great Egg Harbor River. Therefore, no effects are anticipated.

7.0 SECTION 7 WILD AND SCENIC RIVERS ACT APPLICABILITY REVIEW

Based on a review of the TSP measures, and their potential for direct and indirect physical and biological effects on the Great Egg Harbor Wild and Scenic River and tributaries, a Section 7 review is warranted of the nonstructural measures (home elevations and critical infrastructure floodproofing).

Section 7 is one of the most important and powerful parts of the Wild and Scenic Rivers Act (WSRA). This key provision directs Federal agencies to protect the free-flowing condition and other values of designated rivers and congressionally authorized study rivers (USFS, 2004). Section 7(a) of the WSRA states: "...no department or agency of the United States shall assist by loan, grant, license or otherwise in the construction of any water resource project that would have a direct or adverse effect on the values for which such river was established, as determined by the Secretary charged with its administration."

For the Great Egg Harbor WSR, the river-administering agency is the Great Egg Harbor River Council (Council) with oversight from the National Park Service (NPS). If a water resources project on a designated WSR would have a direct and adverse effect on the values for which the river was designated, and those impacts cannot be avoided or eliminated, then the National Park Service (NPS) cannot consent to the project (NPS, 2011).

NPS (2011) and USFS (2004) provide a decision framework to evaluate when a Section 7 determination is required (see Table 4).

Table 4. Section 7 Determination Decision Framework (from USFS, 2004)

A project is proposed in the bed or banks of a designated river or congressionally authorized study river	A project is proposed in the bed or banks of a river below, above or on a stream tributary to a designated river or congressionally authorized study river.
AND	AND
A project is proposed by a Federal agency or it requires some type of Federal assistance such as a permit, license, grant or loan	A project is proposed by a Federal agency or it requires some type of Federal assistance such as a permit, license, grant or loan

	AND
	A project is likely to result in effects within a designated river or congressionally authorized study river.
Only when both of the above conditions exist is a determination required under Section 7.	Only when all of the above conditions exist is a determination required under Section 7.

*Highlighted items represent applicability of the TSP measures to Section 7 WSRA

Because the TSP is a Federal action in an existing WSR, Section 7(a) applies. Section 7(a) of the Act provides a specific standard for review of developments below or above or on a stream tributary to a designated river. Such developments may occur as long as the project “will not invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the areas as of the date of designation...”. This standard applies to projects outside of the river but on the same river or a tributary (USFS, 2004). Figure 7 provides a decision framework for a Section 7(a) evaluation. Table 5 also provides the decision rationale at each step with respect to the structural TSP measures.

The TSP includes 72 home elevations and floodproofing of 4 structures that qualify as critical infrastructure within the designated corridor or tributaries. These have the potential to have indirect effects on outstandingly remarkable resources and priority resources. BMPs would be used to avoid significant effects. The TSP will not result in new structures in the designated corridor or tributaries or new access to scenic areas. Therefore, the TSP is not expected to cause a permanent diminution of the scenic, recreational or fish and wildlife values of the GEHR (see Table 5).

Wild and Scenic River Section 7(a) Evaluation Process (adopted from USFS, 2004)

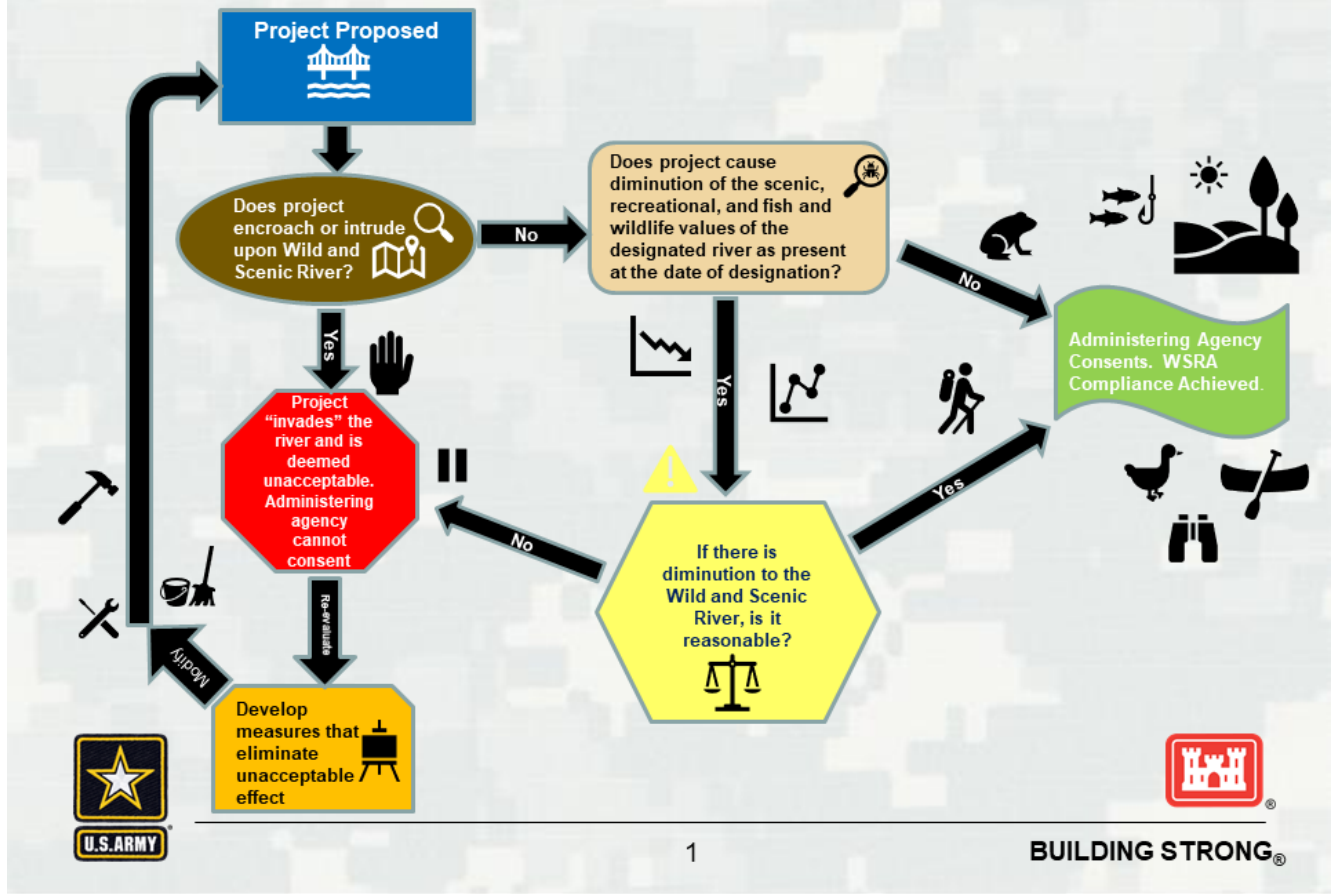


Figure 7. WSR Section 7(a) Decision Framework

Table 5. NJBB TSP and other Measures Section 7(a) Decision Matrix

Coastal Storm Risk Management Feature	Does project encroach or intrude upon Wild and Scenic River?	Does project cause diminution of the scenic, recreational, and fish and wildlife values of the designated river as present at the date of designation?	If there is diminution to the Wild and Scenic River, is it reasonable?
Nonstructural Measures	<p>Nonstructural components may involve modifying buildings and infrastructure within the Wild and Scenic River corridor and management area. If it is determined that specific historic properties would be affected by the TSP, a mitigation or avoidance plans will be developed in consultation with consulting parties and federally recognized tribes. Construction may have minor effects on wildlife as temporary disturbance. BMPs would be used to avoid effects on rare/special status species. Construction could result in negligible impacts on recreation, from temporary sidewalk closures. Elevation of existing buildings could result in a change in view but would not change access to scenic areas of the river.</p>	<p>Nonstructural components that may involve modifying buildings within the Wild and Scenic River corridor may result in a temporary diminution of cultural, scenic, recreational or fish and wildlife areas of the GEHR.</p>	<p>Construction activities are temporary and are a reasonable short-term diminution of the Wild and Scenic River.</p>
Nature-based Solutions	No		

8.0 REFERENCES

National Park Service (NPS). 2000. Comprehensive Management Plan and Environmental Impact Statement for the Great Egg Harbor National Scenic and Recreational River -Final. National Park Service, Philadelphia Support Office In cooperation with the Great Egg Harbor River Planning Committee.

USFWS. (U.S. Fish and Wildlife Service). 1997. Significant Habitats and Habitat Complexes of the New York Bight Watershed. Great Egg Harbor Estuary Complex #3.

U.S. Forest Service (USFS). 2004. Wild and Scenic Rivers Act: Section 7. Technical Report of the Interagency Wild and Scenic Rivers Coordinating Council.