EAGLES ISLAND

Brunswick and New Hanover Counties, North Carolina

Conservation Management Plan
2015-2025

Prepared by the Eagles Island Coalition
Conservation Planning Committee

February 2015

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Conservation Management Plan

2015-2025

Acknowledgements

Eagles Island Coalition Conservation Planning Committee

Kristina Fischer, Chair (NCDA&CS Division of Soil and Water Conservation)
Dru Harrison (New Hanover Soil and Water Conservation District)
Marilyn Meares (Retired)
Philip Prete (City of Wilmington)

Eagles Island Coalition Executive Committee

Niel Brooks, Chair
Chris Vargo, Vice Chair
Dawn York, Secretary
Marilyn Meares, Grants Officer
Philip Prete, Immediate Past Chair
Kristina Fischer, Conservation Planning Committee Chair
Dr. Jim Herstine, Recreation and Cultural Resources Committee Chair
Gordon Johnson, Education and Outreach Committee Chair

Special Acknowledgement and Thanks **to our experts who voluntarily brought their knowledge to bear on the development of the conservation planning matrix and strategies***:*

EXPERTS

Captain Terry Bragg *– Battleship NORTH CAROLINA,* ***Jan Davidson*** *– Cape Fear Museum,* ***Anne Deaton*** *– NC Division of Marine Fisheries,* ***Nathan Henry*** *– NC Office of State Archaeology, Underwater Archeology Branch,* ***Dr. James Kapetsky****,* ***Marilyn Meares****,* ***Scott Pohlman*** *and* ***Michael Schafale*** *– NC Natural Heritage Program,* ***Andy Wood*** *– Coastal Plain Conservation Group*

www.eaglesisland.org

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Appendices

All documents can be downloaded from the Eagles Island Coalition web site:

www.eaglesisland.org

Eagles Island – Conservation Management Plan – 2015-2025

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January 2015

Executive Summary

Eagles Island, located in Brunswick and New Hanover Counties, North Carolina, consists of approximately 2,100 acres situated between the Brunswick and Cape Fear Rivers. The land of the island is presently owned by private and corporate individuals, the State of North Carolina (NC Division of Soil and Water Conservation, NC Department of Transportation, and NC Ports Authority), the New Hanover Soil and Water Conservation District, the Town of Leland, and the United States of America.

Eagles Island is part of a number of Natural Heritage Areas (NHA), which are natural areas identified by the North Carolina Department of Environment and Natural Resources Natural Heritage Program (NHP) as an area of biological interest, usually because of exemplary natural communities or a clustering of rare species, or both. Natural area boundaries are generally drawn to encompass the ecological features of primary interest, and the areas that influence them the most. Natural areas are referred to as "standard sites," "macrosites," or "megasites." Standard sites can range in size from one to thousands of acres and tend to have good natural integrity throughout. When sites occur in clusters with strong geographical connections and ecological relationships they are designated as macrosites. Larger or multiple macrosites forming a distinct geographical unit within a region are designated as megasites. Megasites can contain macrosites, and both typically contain lower quality lands that are not included in a standard site, but which provide ecologically important buffers and landscape connections

Eagles Island is at the upstream most extent of the nationally significant Cape Fear River Megasite and the nationally significant Lower Cape Fear River Macrosite. The significance of a natural area is cataloged as national significance because it is considered by the NHP in consultation with The Nature Conservancy to contain examples of natural communities, rare plant or animal populations, or other significant ecological features that are among the highest quality or best (top five or six) examples of their kind in the nation. Eagles Island is also within two standalone standard NHAs: The Lower Cape Fear River Aquatic Habitat NHA and the Brunswick River/Cape Fear River Marshes SNHA. Both of these sites are of State significance. In addition to NHAs, Eagles Island contains large Managed Areas – the US Army Corps of Engineers dredge spoil disposal cells that occupy the lower half of the island. Managed Areas are public lands or private nature preserves of conservation interest.

The island's location, at the confluence of the two most extensive inland rivers in southeastern North Carolina, and the Cape Fear River estuary, historically made it strategically important as a hub of commerce as well as natural resource extraction. Although significantly modified for its present uses, the Eagles Island landmass still contains abundant evidence concerning its utilization by people in the past. Much of this evidence is visibly evident, while much remains hidden beneath the alluvial mud and marsh.

Eagles Island is a wedge of open space in the midst of rapidly urbanizing areas on both banks of the river. This was recognized in the *Cape Fear River Corridor Plan* adopted by the City of Wilmington and the Counties of Brunswick and New Hanover in October 1997. The plan calls for the island to remain in its natural state. More recently, *The Parks, Recreation and Open Space Master Plan*, City of Wilmington, 2010 calls for protection of Eagles Island as well as to work with other interested parties to ensure the continued preservation and recreational access to the island. The plan states that the City of Wilmington is interested in expanding partnerships to acquire Eagles Island, and to develop a conservation management plan for Eagles Island. The 2009 *Parks, Recreation and Open Space Plan* for the Town of Leland also recommends the Town work to assure the preservation of environmental conservation areas, critical wildlife habitats and corridors, natural areas, natural landmarks, significant agricultural land, and in particular, Eagles Island. In addition, Wilmington's Vision 2020 plan for the waterfront recognizes the value of the undeveloped island and calls for enhancing the "green edge" along the west side of the river to enhance pedestrian and bicycle activity.

In 2012 and 2013, articles of dedication were filed for 242-acres owned by the NC Division of Soil and Water Conservation and 383-acres owned by the New Hanover Soil and Water Conservation District, for dedication as an NC nature preserve – the *Eagles Island Natural Area Nature Preserve*. These articles of dedication require the development of a management plan for the preserve. The development of this document seeks to satisfy this requirement, by providing a guide for conservation and management efforts on the island for a ten year period (2015-2025).

Approach

A team of experts has been assembled to develop the strategies and outcomes described in the following matrix. The Eagles Island Coalition (EIC) – *a multi-agency, municipal, and non-governmental organization partnership focused on protecting the existing natural areas on Eagles Island* – has taken the lead in the development of this plan, by providing input and helping to prioritize objectives. A mapping component for select targets has been included, where appropriate, to guide management for these elements.

Information is included in the attached matrix as follows:

- **Target** – the element the plan seeks to impact – *the Eagles Island Conservation Management Plan includes maritime, terrestrial, species, and landscape targets. Examples of target features have been grouped by class, where goals, threats and implementation strategies overlap*
- **Goal** – a formal statement of the ultimate impact we hope to achieve – *goals are linked to project targets and represent the desired status of the targets in the long-term*
- **Direct threat** – human-induced actions or events that directly degrade the conservation targets – *the Eagles Island Conservation Management Plan includes both human activities and natural phenomena altered by human activities (e.g. climate change)*
- **Contributing factor** – root and underlying causes of threats as well as opportunities and enabling conditions – *the Eagles Island Conservation Management Plan includes multiple factors and multiple layers of factors for several targets*
- **Strategy** – a program, policy, or action that acts directly on the target, threat, or contributing factors
- **Partners** – individuals or agencies that are recognized as potential support to accomplish the listed strategy; some are current members of the EIC, others will be approached to request support as appropriate. There certainly may be other partners that could/should support identified strategies.
- **Timeline** – related to implementation of strategy – may be short, mid, or long range
- **Priority** – established by EIC - related to implementation of strategy – may be high, medium, or low

In addition, the following information has been assembled from the Eagles Island experts for select targets, and is tracked in an MSExcel spreadsheet, for future use:

- **Objective (CF)** – desired key outcomes that are results oriented, time oriented, specific, measurable and achievable. Objectives can be short, mid, and long range, and are linked to reduction in threat and/or contributing factors most closely tied to achieving goal for target's viability
- **Indicator** – unit of measure established to monitor the effectiveness of the strategy in obtaining the objective
- **Result (DF)** – desired key outcomes that result from successfully achieving the objective
- **Indicator** – unit of measure established to monitor the effectiveness of the strategy in obtaining the result tied to the direct threat

Conservation Targets

A number of targets have been identified as important elements on Eagles Island that the conservation management plan seeks to impact:

Maritime Archaeological Resources

- **Shipwrecks** – dozens of recorded shipwrecks and likely many other unknown shipwrecks can be found along the shores of Eagles Island, especially along the Cape Fear River; the largest concentration of these wrecks and remains are between the Battleship North Carolina and the Cape Fear Memorial Bridge. These wrecks include barges, tugboats, and wooden sailing ships. These abandoned vessels and the marine facilities are physical reminders of Eagles Island's historically important role in the commerce along the lower Cape Fear River.
- **Shipyard remnants** – in addition to port facilities, Eagles Island was host to a number of shipyards. The hay day of shipbuilding in the Wilmington area was during the nineteenth century.
- **Historical dockyard remnants** – remains of historical dockyards, where ships were repaired, line the shore of Eagles Island. These remnants are another reminder and connection to Eagles Island as part of the working riverfront that drove Wilmington's economy for centuries.

Rice Culture Remnants

- **Rice canals and water control structures** – agricultural activities on Eagles Island consisted almost exclusively of rice production. The most intensive use of the island for rice production likely occurred starting in the late-eighteenth century and continuing through the antebellum period. GIS mapping shows Rice fields remains on about 45% of the island; their construction involved the hand excavation of canals, the building of embankments, and the operation of water control structures to drain and flood the fields. Rice production was accomplished with slave labor. Enslaved people working in rice fields typically lived in the vicinity of the areas in which they worked, and often had little supervision. This separation allowed enslaved people to develop their own culture and communities and to retain aspects of their original African cultural traditions.
- **Rice fields** – By the 19th century, rice was grown by taking advantage of the river's tidal flows. For the first 190 years of rice production in the US, the principal producers were South Carolina and Georgia, but there were 5000 acres in production along the Lower Cape Fear River area. Remnants of these fields, canals, bulkheads and water control structures can be seen on Eagles Island.

Railway

- **Marine railway** – a marine railway is a set of tracks which are used with a cradle to bring ships up out of the water. Several marine railways operated on Eagles Island in the early 1900s; use of the marine railways declined during the mid-century, and they were only rarely used during the 1950s and early 1960s. The railways were used to haul small vessels up for repair. These facilities are another tie to the rich maritime history of Eagles Island.
- **Remnants of rail line** – the first rail line across the island was chartered in 1846, and opened in 1853, running from Wilmington, across Eagles Island, and west to Camden Crossing in South Carolina. The line across Eagles Island was abandoned in the late 1800s, but the development of these transportation facilities across Eagles Island provided greater connection between Wilmington and Brunswick County, and provided greater access to the interior of Eagles Island.

Maritime Industrial Artifacts

- **Naval stores industry** – the term "naval stores" is used to describe the products produced for the marine and shipbuilding industries from the gum of coniferous trees. The production of naval stores was a major industry through the coastal plain during the colonial era. Because of the vast forests of longleaf pine that blanketed the region, the early inhabitants were able to extract the tar, pitch, and turpentine that were so essential in the naval stores industry. At its height, the naval stores industry in the lower Cape Fear region was producing nearly one-third of all the turpentine in the world. Naval stores activities were conducted on the island, which most

likely would have been related to the processing of gum (resin), turpentine production, and the shipping of naval stores products. The Geechee were West African slaves, brought from coastal Georgia to work in the naval stores industry.

- **Carpentry shop** - remains of the Stone Towing Company carpentry shop exist on Eagles Island; the Stone Towing Company had been formed in 1895 as a towing business and grocer. Remnants of the carpentry shop help to piece together the history and use of Eagles Island, and connect it to the history of the area.
- **Cultural resource sites** – to date, no formal terrestrial cultural resource survey has been conducted on Eagles Island. It is possible there are significant cultural resource sites across Eagles Island that are yet to be discovered - especially given the documented maritime history, and previous rice cultivation on the island.

Historical Attraction

- **Battleship North Carolina** – was the lead ship of *North Carolina – class* battleships and the fourth warship in the US Navy to be named in honor of the State of North Carolina. She was the first newly constructed American battleship to enter service during World War II, and she took part in every major naval offensive in the Pacific Theater of Operations to become the most highly decorated American battleship of World War II, accumulating 15 battle stars. The USS North Carolina is now a museum ship and memorial, kept on the shores of Eagles Island. While this Plan does not seek to "manage" Battleship NC, we seek to promote and facilitate Battleship NC projects related to Eagles Island – Battleship NC has served as a valuable, active partner and dedicated member of the EIC.

Tidal Freshwater Marsh Habitat

- **Tidal freshwater marsh natural community** – a diverse group of herbaceous wetlands subject to regular diurnal flooding along the upper tidal reaches of inner Coastal Plain rivers and tributaries. Ranging from New York to North Carolina, freshwater marshes occur in the uppermost portion of the estuarine zone, where the inflow of saltwater from tidal influence is diluted by a much larger volume of freshwater from upstream. Freshwater conditions have salt concentrations < 0.5 ppt, but pulses of higher salinity may occur during spring tides or periods of unusually low river discharge. Invasive non-native species, particularly Phragmites, is a threat to native marsh plants in this community; management methods include making room for native marsh plants by removing Phragmites in areas most suitable for freshwater marsh establishment or restoration. Increases in salinity are a current, chronic threat to this community, which will eventually lead to changes in habitat structure, including wholescale habitat transition from freshwater ecosystems, to brackish, and eventually to saltwater ecosystems; as sea level continues to rise.

  Species of Concern in the tidal freshwater marsh

  - **Rare skipper -** rare to uncommon butterfly with brown to orange coloration. It is similar in appearance to the Delaware Skipper, but is generally larger. Preferred habitat is extensive fresh to slightly brackish marshes in the Wilmington area.
  - **Duke's skipper** - rare to uncommon butterfly with a wingspan of 32 to 38 millimeters that are deep brown on top and light brown to pale yellow on the underside. These butterflies can be found in the eastern United States and a small portion of southern Ontario, Canada. They prefer habitats of shaded wetlands with various species of sedge plants. Sage plants are used as a host plant for larvae.
  - **Carolina bishopweed** - other common names for this plant include Ahles' Mock Bishopweed and Coastal Mock Bishopweed. Considered significantly rare and listed as endangered by the NC Plant Conservation Program. This annual, non-marine plant that is found in freshwater marshes in North Carolina, South Carolina, and Georgia.
  - **White doll's daisy** – a native perennial plant that is 2'-4' tall with white flowers in the shape of a disk of 1/3" wide. Usually linear in shape that blooms July-September. It prefers full to partial sun in dry to wet sandy loamy soils and looks like an aster.

- **Brunswick River / Cape Fear River Marshes** - This habitat is classified as a Natural Heritage Area (NHA) by the state of North Carolina, containing the largest area of tidal freshwater marsh habitat in North Carolina, with most of the site supporting high quality examples of several tidal freshwater marsh subtypes. The natural area primarily comprises marsh habitat in the northern half of Eagle Island. It is directly connected westward to Sturgeon Creek Tidal Wetlands NHA, and southward to Lower Cape Fear River Aquatic Habitat NHA.
- **USACE dredge spoil cells** - Impoundments created on the southern half of the island have been used for decades for the placement of spoil from USACE dredging projects. The extensive dredge spoil disposal area that covers approximately 880 acres of Eagles Island is normally referred to as Disposal Area No. 15. It is managed by the USACE and part of 1,400 acres owned by the U.S. Maritime Commission that occupies a majority of the southern half of the island. These areas serve as important habitat for a number of migratory birds and shorebirds. Best management for bird habitat includes maintaining food source and foraging habitats, maintaining areas of intertidal brackish water with certain plant species, tidal pools, and shallow areas for foraging, and small to medium height trees for roosting and nesting. Eagles Island is in the Atlantic flyway – this corridor is used by approximately one billion birds per year; the Cape Fear River is an incredibly important corridor.

Fisheries

- **Atlantic sturgeon** - the Atlantic sturgeon is a long-lived, estuarine dependent, anadromous fish. Atlantic sturgeon can grow to approximately 14 feet (4.3 m) long and can weigh up to 800 pounds (370 kg). They are bluish-black or olive brown dorsally (on their back) with paler sides and a white belly. They have five major rows of dermal "scutes". Atlantic sturgeon are similar in appearance to shortnose sturgeon (*Acipenser brevirostrum*), but can be distinguished by their larger size, smaller mouth, different snout shape, and scutes. In 2012, NOAA's National Marine Fisheries Service listed the Carolina distinct population segment of Atlantic sturgeon as endangered under the Endangered Species Act, an action that triggers several additional conservation measures by federal and state agencies, private groups, and individuals.
- **Shortnose sturgeon –** the shortnose sturgeon was listed as endangered throughout its range in 1967 under the Endangered Species Preservation Act of 1966 (a predecessor to the Endangered Species Act). No harvest or bycatch of shortnose sturgeon is allowed in state or federal waters. A fishing moratorium has been in place in state waters since 1991 for shortnose sturgeon.
- **Striped bass and other anadromous species** – Anadromous fish spend their lives migrating throughout various surface waters; in the Cape Fear River basin, species such as American shad, striped bass, and sturgeon are born in the upper reaches of the river, and then swim downstream to the ocean where they spend several years before attempting to return upstream to spawn and begin the life cycle anew. Anadromous fish and their habitat provide innumerable benefits to the human communities surrounding the river; the river and its inhabitants are a large part of the community's heritage and culture. Evidence suggests that only a remnant population of striped bass remains in the Cape Fear River. Striped bass have been protected by NCDMF and NCWRC through a harvest moratorium in the Cape Fear River and its tributaries since 2008.

Aquatic Habitat

- **Lower Cape Fear River aquatic habitat** - includes the open, estuarine, tidal waters of the lower Cape Fear River and its tributaries. These waters support the Federal and State Endangered shortnose sturgeon (*Acipenser brevirostrum*), the Federal Endangered and State Special Concern Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), and Federal and State Endangered manatee (*Trichechus manatus*), as well as the State Threatened American alligator (*Alligator mississipiensis*). Five estuarine fish species that are considered Significantly Rare also occur here; spinycheek sleeper (*Elotris pisonis*), lyre goby (*Evorthodus lyricus*), spotfin killifish (*Fundulus luciae*) freckled blenny (*Hypsoblennius ionthas*), and sailfin molly (*Poecilia latipinna*). This habitat is classified as a t Natural Heritage Area (NHA) Macrosite by the state of North Carolina Natural Heritage Program, one of the rarest and most outstanding elements of natural diversity in the state. The Aquatic Habitat site is a critical corridor linking many natural areas along the Cape Fear River in both New Hanover and Brunswick counties. Together with the Bird Nesting Islands site, it forms the Lower Cape Fear River Macrosite within the Cape Fear

Megasite. In addition to the fish species, the site also provides important habitat for five other animal species that are rare in North Carolina, including Carolina diamondback terrapin (Malaclemys terrapin centrata).

- **Primary nursery area** - fragile inland waters which support embryonic, larval or juvenile populations of marine or estuarine fish or shellfish species. Nursery areas are necessary for the early growth and development of virtually all of North Carolina's important marine or estuarine fish or shellfish species. Nursery areas need to be maintained, as much as possible, in their natural state, and the fish and shellfish populations within them must be permitted to develop in a normal manner with as little disturbance from humans as possible.

Landscape Resources

- **Cypress-gum swamp habitat** – a habitat where the river bank is inundated almost all of the time. These habitats support swamp forests dominated by trees adapted to living in flooded soil. The seeds of trees characteristic of this habitat cannot germinate underwater, so the presence of mature trees tells us that the area in which they grow was once dry or dries periodically. One of the major adaptations of these species is obvious from a distance — the swollen lower trunks of both species. These features help spread the roots over a wider area than would otherwise be possible. A wide root base helps keep a tree anchored, especially in a swamp. Waterlogged soils provide much less resistance to root mass movement than do dry soils — a fact shown dramatically all across the southeast when the winds of hurricanes cause huge tree losses when they follow heavy rains. Thus there is an evolutionary advantage for swamp trees to start their root growth from as wide a base as possible.

Implementation Plan

The attached matrix provides general management strategies that should be used to guide future efforts on Eagles Island. Items below are over-arching steps that should be implemented alongside identified strategies:

- Do no harm to existing natural communities and cultural resource elements; keep disturbance to a minimum and maintain landscape connectivity
- Identify lead partners to support implementation of strategies included in attached matrix – seek volunteers from within the Eagles Island Coalition as a starting point
- Address and implement strategies in matrix by priority (high, medium, then low)
- Continue to fill out the matrix as more information becomes available
- Offer general support and grant writing support, where appropriate, for lead partners to implement strategies that are identified as priorities
- Implement annual stewardship monitoring and reporting for areas covered by Articles of Dedication – monitoring should seek to identify and address problematic issues related to access and public use
- Identify research priorities on Eagles Island and develop process for approving research requests and tracking collected data – establish a clearinghouse for current data on the EIC website – www.eaglesisland.org
- Develop a strategic recreational master plan – including elements of education and outreach where appropriate (e.g. historical and environmental education signage and kiosks)
- Develop a strategic outreach and education master plan – including elements of marketing and economic development where appropriate
- Continue to pursue public ownership of property from the Battleship to the Cape Fear Memorial Bridge
- Seek to engage all current landowners with EIC efforts
- Erect and maintain a permanent plaque or other appropriate marker at a prominent location with the following statement: “This Area is Dedicated as a State Nature Preserve”

Conservation Management Plan Comprehensive Matrix

The Conservation Planning Committee took the approach of distilling the management plan into a management matrix that can be used for easy reference and guidance rather than a long and laborious text-heavy narrative. This matrix is a work in progress, and it will be necessary to adjust it as more is learned and to identify champions and resources for its implementation.

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EAGLES ISLAND COALITION - CONSERVATION MANAGEMENT PLAN - MASTER MATRIX

SYSTEM	TARGET CLASS	TARGET EXAMPLE FEATURES	GOAL	DIRECT THREAT	CONTRIBUTING FACTORS	STRATEGY	PARTNERS	TIMELINE (SHORT / LONG)	PRIORITY (L / M / H)
CULTURAL RESOURCES	MARITIME-ARCHAEOLOGICAL RESOURCES	Shipwrecks Shipyard / dockyard remnants	The ultimate archaeological goal is to extract all information possible from the material remains of previous human activity. This goal can only be accomplished through archaeological investigation of the evidence prior to disturbance. Due to the complexity of the task, a necessarily slow and systematic approach is required.	Illegal activity	Unauthorized Salvage	Research to identify significant resources and monitor resources.	ECU, Underwater Archeology Branch, Cape Fear Museum, law enforcement	Long term	Medium
				Development	Road and bridge construction; Land clearing and cleanup; Utility installation; Parking lot and building construction; Channelization, dredging, dredging spoil storage; Hardened erosion control measures (bulkheads, rip-rap)	Recommend archaeological assessments as a condition for any State or Federal Permits. Review permit applications for development and dredging.	NC Department of Cultural Resources, NC Division of Coastal Management, USACOE	Ongoing	Medium
				Erosion	Boat wakes and surge; Storm events	Consider no-wake zone. Assess shoreline for erosion control practices and implement where needed.	Division of Marine Fisheries, local soil and water conservation district, Underwater Archeology, Cape Fear Museum, Coast Guard	Ongoing	Medium
	RICE CULTURE REMAINS	Water Control Structures Rice Fields - canals and remnant embankments	Long range goal: At least one representative rice culture field system conserved as a cultural resource for education and outreach (dikes, fields, canal systems, water gates, bulkheads), or if not practical, digital reconstruction of the rice field cultivation system Short-term goal: The status of the remaining rice agricultural system established with regard to threats and rates of change of threats	Erosion	Increased salinity leading to weakened soil structure	Inventory the remaining rice agricultural system and determine the spatial extent of the threats and their rates of change Applies to: Target, threats, and contributing factors	Jim Kapetsky, Cape Fear Museum, Underwater Archeology, UNCW	Long term	Medium
				Sedimentation	Increased sediment loads in rivers and creeks				
				Expansion of human activities (e.g., roadways, dredge spoil ponds and spoil "mounds" mainly in the past)	Maintenance of navigation				
	RAILWAY	Remnants of Rail Line	Long range goal for bridge foundations: The most extensive and best preserved bridge foundation on the Brunswick River incorporated into the Eagles Island cultural resources program; stabilization of the structure, if required Long range goal for the right of way: Use of parts of the right of way as an access or nature trail in conjunction with battleship trail development. The right of way begins at the battleship and passes near the spoil mounds by Meares Cut already earmarked for recreation or for nature study by the EIC	Natural deterioration of the wooden bridge foundations	Exposure to sun and air	Assess status and durability of bridge foundations	Jim Kapetsky, Cape Fear Museum, Underwater Archeology	Short term	Medium
				Loss of the right of way due to deposition and erosion along its northeastern course (western portion already gone)	Increased salinity leading to weakened soil structure and Increased sediment loads in rivers and creeks	Verify the right of way on the ground and determine its suitability as a trail - Applies to opportunities	Jim Kapetsky, Cape Fear Museum, Battleship	Short term	High
				Loss of a part of the right of way due to development of the nature walk way north of the battleship	The nature walk north of the battleship	Incorporate possible use of the right of way as a trail or as an exhibit along with planning for future development north of the battleship Applies to Battleship development	Jim Kapetsky, Cape Fear Museum, Battleship	Short term	High
	MARITIME INDUSTRIAL ARTIFACTS	Naval Stores Industry Carpentry shop Other artifact sites	To have a much better understanding of what remains on Eagles' Island in order to have the tools to decide on the best strategies for the future preservation, conservation and/or documentation of any historical evidence or artifacts. This is the first step, and is almost a "pre-goal." Once it's clear what is there, and once the coalition better understands its history and how the land has been used over time, the group can work toward a consensus on how to create concrete future goals.	Time	any remaining evidence of inhabitance will be degraded by the elements	analysis of GIS Data/Examination of Eagles Island by air	Cape Fear River Watch, Cape Fear Museum, UNC Wilmington, Land Management Group	Short term	High
				Theft	people might steal metals, wood, native American artifacts, or other items that could tell more about the region's past since it's unclear what is still there	comprehensive on- foot land survey	Cape Fear Museum, NC Department of Cultural Resources, UNC Wilmington, Land Management Group	Long term	Medium
				Increased use of site by humans	if the site is more heavily frequented, the remaining evidence of human activity will be eroded and diminished	archeological survey	Cape Fear Museum, NC Department of Cultural Resources, UNC Wilmington	Long term	Medium
				Lack of information about what evidence of historical and cultural artifacts remains on Eagles' Island	On the most basic level, we don't know what there is on Eagles Island that might tell us more about the history of the region. For example, evidence of enslaved peoples' experiences in the rice fields would be a particularly rare and valuable resource, and a great addition to our	additional historical research and research into any found material culture	Cape Fear Museum, NC Department of Cultural Resources, UNC Wilmington	Long term	Medium
	HISTORICAL ATTRACTION	Battleship	To manage Battleship NC in an environmentally sensitive way.	Human Influence - people and visitors (trash and recycling)	Battleship Success	Resource Allocation	Battleship	Ongoing	High
					Silt and Siltation - Applies to Dredging and up Stream conditions.	Coffer Dam	Battleship, USACOE	Short term	High
				Increase in Tidal Range	Dredging of the River / Sea Level Rise	Support Advocacy and Research	Battleship, USACOE	Ongoing	High
				Salt Level Increase	Dredging of the River				
				Invasive Species and Loss of Traditional Marsh	Changes in Salt, Tidal Range and Siltation				

EAGLES ISLAND COALITION - CONSERVATION MANAGEMENT PLAN - MASTER MATRIX

SYSTEM	TARGET CLASS	TARGET EXAMPLE FEATURES	GOAL	DIRECT THREAT	CONTRIBUTING FACTORS	STRATEGY	PARTNERS	TIMELINE (SHORT / LONG)	PRIORITY (L / M / H)
NATURAL RESOURCES	TIDAL FRESHWATER MARSH HABITAT	Brunswick River / Cape Fear River Marshes (SNHA) USACE Dredge Spoil Cells	Maintain high-quality, intact example of Tidal Freshwater Marsh natural community. Allow to adapt to changing climate conditions, and persist as long as it can as sea level rises to serve as a reservoir of Tidal Freshwater Marsh species to move upstream. Species of concern include Rare skipper (Problema bulenta), Duke's skipper (Euphyes dukesi dukesi); White doll's daisy (Boltonia asteroides); Carolina bishopweed (Ptilimnium ahlesii); Marsh Bird Habitat (particularly Least Bittern)	Sea Level Rise	Climate Change	Resist river channel modification that would increase salt water penetration	NC Natural Heritage Program, USACOE, Coastal Plain Conservation Group	Ongoing	Low
				Invasive Exotic Species	Disturbance of natural vegetation and placement of fill	Monitor and control invasive exotic species in ways that are not damaging to native vegetation	NC Natural Heritage Program, Coastal Plain Conservation Group, Battleship, UNCW	Ongoing	High
					Spread of Phragmites from established patches	Avoid artificial disturbance to intact natural communities	Landowners, NC Natural Heritage, UNCW	Ongoing	High
				Habitat changes may impact use of island by migratory and other birds	Lack of information related to the use of the island by migratory and other birds (species and numbers)	Comprehensive inventory of birds using the island, to include a year's worth of data collection and establish baseline	Audubon, Ducks Unlimited, Coastal Plain Conservation Group	Short term	High
				Incompatible management of dredge spoil cells that may disturb bird habitat	Lack of information related to current management measures used by USACOE	Collaborate with the USACOE on appropriate management strategies	USACOE, Coastal Plain Conservation Group, Audubon, NC Natural Heritage Program, Ducks Unlimited	Short term	High
				Changes in Salinity/River Channel Modification	River Channel Modification/Sea Level Rise	Seek protection of marsh and swamp areas upstream of Eagles Island; prepare for transition and protect seed source	CWMTF, NC Natural Heritage Program, Coastal Land Trust, The Nature Conservancy, local soil and water conservation districts, landowners, Cape Fear River Watch	Long term	Low
	FISHERIES	Atlantic Sturgeon Short nose Sturgeon Striped Bass and other anadromous species	Sustainable population of breeding Atlantic and Short nose sturgeon and other fish that formerly produced a thriving fishery in the Cape Fear	Sediment contamination	Industrial discharges, vessels	Remediate contaminated sediment through removal, capping	USACOE, Division of Water Resources, Cape Fear River Watch	Long term	Low
				Low Dissolved Oxygen	Excess nutrient concentrations and algal blooms	Work with agriculture and local government to assess where non-point source pollution is most problematic in the CFR and address appropriately.	Division of Water Resources, Cape Fear River Watch, local soil and water conservation districts, Cape Fear River Partnership	Ongoing	Medium
				Incidental catch, illegal harvest	Gill net fishing and lack of education and enforcement	Implement additional gill net fishing restrictions, enforce existing rules, support education efforts	Division of Marine Fisheries, NC Wildlife Resources Commission, Cape Fear River Watch	Long term	Low
				Ship strikes	Ships in channel	Educate the port authority about ship strikes and work toward solution	Cape Fear River Watch, NC Port Authority, Division of Marine Fisheries	Short term	Medium
				Migratory fish barriers	Dams	remove obstructions and/or provide navigational passageways	Cape Fear River Watch, NC Port Authority, Division of Marine Fisheries, Cape Fear River Partnership, USACOE	Long term	High
	AQUATIC HABITAT	Lower Cape Fear River Aquatic Habitat (SNHA) Primary Nursery Area	Adequate high quality nursery area to support juvenile fish in the Cape Fear River system	Dredging	Navigation for deep water access	Monitor plans and provide input on any future detrimental expansion of shipping channel dredging	Division of Marine Fisheries, USACOE, Cape Fear River Watch	Ongoing	Low
				Loss of wetlands and shallow tidal creeks	Development (filling, bulkheading)	Evaluate value related to creation of additional wetlands and/or shallow tidal creek habitat on Eagles Island 1) along the perimeter, 2) through removal of dredge fill or 3) modify ditches from rice fields in curvature and depth contours to enhance nursery function	Landowners, Coastal Land Trust, CWMTF, USACOE, Division of Marine Fisheries, NC Natural Heritage Program, NC Coastal Federation, Land Management Group	Long term	Low
					Rice farms				
				Contaminated sediment	Industrial discharge, vessels	Remediate contaminated sediment through removal, capping	USACOE, Division of Water Resources, Cape Fear River Watch, Coast Guard	Long term	Low
	LANDSCAPE RESOURCES	Cypress-gum swamp habitat	Given that Eagles Island cypress-gum swamp habitat is already impacted by saltwater intrusion, this imperiled habitat should be protected from logging and other short-term conversion activities. Seek protection for Cypress-Gum Swamp habitat, monitoring for and controlling invasive exotic species. Allow to adapt to changing climate conditions - including potential conversion to Tidal Freshwater Marsh - as sea level rises and salinity changes.	Changes in Salinity/River Channel Modification	River Channel Modification/Sea Level Rise	Resist river channel modification that would increase salt water penetration	USACOE, Coastal Plain Conservation Group	Ongoing	Low
				saltwater intrusion	Climate Change (Drought) or Increased Water Withdrawal	Avoid artificial disturbance to intact natural communities	Landowners, NC Natural Heritage, UNCW	Ongoing	High
				Invasive Exotic Species	Establishment of Chinese tallow in open areas	Monitor and control invasive exotic species in ways that are not damaging to native vegetation	NC Natural Heritage Program, Coastal Plain Conservation Group, Battleship, UNCW	Ongoing	High

Appendix A

Species and Habitat Occurrences
Vicinity of Eagles Island

1. Cover Letter from NC Natural Heritage Program
2. List of Species and Community Occurrences
3. Map of Natural Heritage Program Database Query

January 14, 2015

North Carolina Department of Environment and Natural Resources
Office of Land and Water Stewardship

Pat McCrory
Governor

Bryan Gossage
Director

John E. Skvarla, III
Secretary

NCNHDE-26

January 14, 2015

Scott Pohlman
NC Natural Heritage Program
1601 Mail Service Center
Raleigh, NC 27699-1601
scott.pohlman@ncdenr.gov

RE: Eagles Island -- Natural Heritage Data Explorer Info Request

Dear Scott Pohlman:

The North Carolina Natural Heritage Program (NCNHP) appreciates the opportunity to provide information about natural heritage resources from our database that have been compiled for the project referenced above.

A query of the NCNHP database indicates that there are records for rare species, important natural communities, natural areas, or conservation/managed areas within the proposed project boundary submitted with your request for information. These results are presented in the attached 'Documented Occurrences' table and map.

Also attached is a table summarizing rare species and natural communities that have been documented within a one-mile radius of the project boundary. The proximity of these records suggests that these natural heritage elements may potentially be present in the project area if suitable habitat exists and is included for reference. In the event that rare species are found within the project area, please contact the NCNHP so that we may update our records. Tables of natural areas and conservation/managed area within a one-mile radius, if any, are also included in this report.

Please note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NC Natural Heritage Program data may not be redistributed without permission from the NCNHP.

Also please note that the NC Natural Heritage Program may follow this letter with additional correspondence if a Dedicated Nature Preserve (DNP), Registered Heritage Area (RHA), or an occurrence of a Federally-listed species is documented within or near the project area.

Thank you for your inquiry. If you have questions regarding the information provided in this letter or need additional assistance, please contact Allison Schwarz Weakley at allison.weakley@ncdenr.gov or 919.707.8629.

Sincerely,
NC Natural Heritage Program

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Intersecting the Project Area
Eagles Island -- Natural Heritage Data Explorer Info Request
January 14, 2015
NCNHDE-26

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Status	Accuracy	Federal Status	State Status	Global Rank	State Rank
Butterfly	1425	Euphyes dukesi	Dukes' Skipper	2003-05-28	Current	3 - Medium	---	Significantly Rare	G3	S1S2
Moth	26278	Schinia septentrionalis	Northern Flower Moth		Current	3 - Medium	---	Significantly Rare	G3G4	SH
Natural Community	30742	Tidal Freshwater Marsh (Cattail Subtype)	---	2009-09-29	Current	3 - Medium	---	---	G4G5	S3
Natural Community	30745	Tidal Freshwater Marsh (Threesquare Subtype)	---	2009-09-29	Current	3 - Medium	---	---	G2G3	S2S3
Vascular Plant	26983	Boltonia asteroides var. glastifolia	White Doll's-daisy	2000-07-18	Current	3 - Medium	---	Significantly Rare Other	G5TNR	S2
Vascular Plant	26281	Boltonia asteroides var. glastifolia	White Doll's-daisy	1965-09-26	Historical	3 - Medium	---	Significantly Rare Other	G5TNR	S2
Vascular Plant	33259	Eleocharis vivipara	Viviparous Spikerush	2005-07-18	Current	3 - Medium	---	Endangered	G5	S1
Vascular Plant	28150	Oenothera riparia	Riverbank Evening-primrose	2005-08-10	Current	3 - Medium	---	Significantly Rare Limited	G2G3	S2S3
Vascular Plant	18333	Ptilimnium ahlesii	Carolina Bishop-weed	2004-06-10	Current	3 - Medium	Species of Concern	Significantly Rare Throughout	G1	S1

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Brunswick River/Cape Fear River Marshes	R1 (Exceptional)	C2 (Very High)
Lower Cape Fear River Aquatic Habitat	R? (Unranked)	C4 (Moderate)

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Brunswick County Open Space	Brunswick County: multiple local government	Local Government
Eagles Island Dredge Disposal Area	US Army Corps of Engineers	Federal
Eagles Island Spoil Area	NC State Ports Authority	State
USS North Carolina Battleship Memorial	NC Department of Cultural Resources	State

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
NC Ecosystem Enhancement Program Easement	NC DENR, Ecosystem Enhancement Program	State
Eagles Island Natural Area DNP	NC Department of Agriculture, Division of Soil and Water Conservation	State
Eagles Island Natural Area DNP	New Hanover Soil and Water Conservation District	Local Government

*NOTE: If the proposed project intersects with a conservation/managed area, please contact the landowner directly for additional information. If the project intersects with a Dedicated Nature Preserve (DNP), Registered Natural Heritage Area (RHA), or Federally-listed species, NCNHP staff may provide additional correspondence regarding the project.

Definitions and an explanation of status designations and codes can be found at www.ncnhp.org. Data query generated on January 14, 2015; source: NCNHP, Q4 October 2014. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Within a One-mile Radius of the Project Area
Eagles Island -- Natural Heritage Data Explorer Info Request
January 14, 2015
NCNHDE-26

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Status	Accuracy	Federal Status	State Status	Global Rank	State Rank
Amphibian	9860	Ambystoma mabeei	Mabee's Salamander	1971-03	Historical	4 - Low	---	Significantly Rare	G4	S2
Amphibian	900	Lithobates capito	Carolina Gopher Frog	1969-07	Historical	4 - Low	Species of Concern	Threatened	G3	S1
Amphibian	4774	Lithobates capito	Carolina Gopher Frog	1966-02-12	Historical	3 - Medium	Species of Concern	Threatened	G3	S1
Amphibian	1912	Pseudacris ornata	Ornate Chorus Frog	1966-02	Historical	5 - Very Low	---	Significantly Rare	G5	S1S2
Bird	27956	Haliaeetus leucocephalus	Bald Eagle	2010	Current	3 - Medium	---	Threatened	G5	S3B,S3N
Bird	16864	Himantopus mexicanus	Black-necked Stilt	1987	Current	4 - Low	---	Significantly Rare	G5	S1B
Bird	25229	Ixobrychus exilis	Least Bittern	2002-08	Current	2 - High	---	Special Concern	G5	S2S3B
Butterfly	1425	Euphyes dukesi	Dukes' Skipper	2003-05-28	Current	3 - Medium	---	Significantly Rare	G3	S1S2
Butterfly	16102	Problema bulenta	Rare Skipper	1997-08-16	Historical	4 - Low	Species of Concern	Significantly Rare	G2G3	S1
Butterfly	6913	Problema bulenta	Rare Skipper	2007-08-12	Current	3 - Medium	Species of Concern	Significantly Rare	G2G3	S1
Dragonfly or Damselfly	24979	Gomphus australis	Clearlake Clubtail	1960-04-24	Historical	3 - Medium	---	Significantly Rare	G4	S1
Dragonfly or Damselfly	33738	Somatochlora georgiana	Coppery Emerald	2004-PRE	Historical	5 - Very Low	---	Significantly Rare	G3G4	S2?
Freshwater Bivalve	328	Anodonta couperiana	Barrel Floater	1990S	Historical	3 - Medium	---	Endangered	G4	S2?
Freshwater Fish	12176	Acipenser brevirostrum	Shortnose Sturgeon	1993	Current	5 - Very Low	Endangered	Endangered	G3	S1
Freshwater Fish	32417	Acipenser oxyrinchus	Atlantic Sturgeon	2012-04-04	Current	4 - Low	Endangered	Special Concern	G3	S3
Freshwater Fish	11031	Heterandria formosa	Least Killifish	1968-05-14	Obscure	3 - Medium	---	Special Concern	G5	S2

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Status	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater or Terrestrial Gastropod	13292	Helisoma eucosmium	Greenfield Rams-horn	1908	Historical	3 - Medium	Species of Concern	Endangered	G1Q	S1
Freshwater or Terrestrial Gastropod	10316	Planorbella magnifica	Magnificent Rams-horn	1908	Historical	3 - Medium	Candidate	Endangered	G1	S1
Mammal	24390	Corynorhinus rafinesquii macrotis	Rafinesque's Big-eared Bat - Coastal Plain subspecies	2006-PRE	Obscure	5 - Very Low	Species of Concern	Special Concern	G3G4T3	S3
Mammal	32126	Myotis septentrionalis	Northern Myotis	1994-POST	Current	5 - Very Low	PE	Significantly Rare	G2G3	S2S3
Mammal	17664	Trichechus manatus	West Indian Manatee	2012-08-18	Current	5 - Very Low	Endangered	Endangered	G2	S1M
Moth	26278	Schinia septentrionalis	Northern Flower Moth		Current	3 - Medium	---	Significantly Rare	G3G4	SH
Natural Community	30746	Brackish Marsh (Smooth Cordgrass Subtype)	---	2009-09-29	Current	4 - Low	---	---	G3G4	S1
Natural Community	15952	Pine/Scrub Oak Sandhill (Coastal Fringe Subtype)	---	1993-10-12	Current	4 - Low	---	---	G2	S2
Natural Community	19258	Sand Barren (Typic Subtype)	---	1993-10-12	Current	4 - Low	---	---	G2	S2
Natural Community	17973	Small Depression Drawdown Meadow (Typic Subtype)	---	1993-10-12	Current	6 - Unknown	---	---	G2?	S2S3
Natural Community	30742	Tidal Freshwater Marsh (Cattail Subtype)	---	2009-09-29	Current	3 - Medium	---	---	G4G5	S3
Natural Community	30781	Tidal Freshwater Marsh (Cattail Subtype)	---	2002-06-13	Current	3 - Medium	---	---	G4G5	S3
Natural Community	30762	Tidal Freshwater Marsh (Cattail Subtype)	---	1994-07-27	Current	6 - Unknown	---	---	G4G5	S3
Natural Community	18250	Tidal Freshwater Marsh (Giant Cordgrass Subtype)	---	2009-09-29	Current	4 - Low	---	---	G4	S4
Natural Community	12990	Tidal Freshwater Marsh (Giant Cordgrass Subtype)	---	2002-06-13	Current	3 - Medium	---	---	G4	S4

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Status	Accuracy	Federal Status	State Status	Global Rank	State Rank
Natural Community	30782	Tidal Freshwater Marsh (Mixed Freshwater Subtype)	---	2002-06-13	Current	4 - Low	---	---	G2?	S1
Natural Community	15433	Tidal Freshwater Marsh (Mixed Freshwater Subtype)	---	1994-07-27	Current	6 - Unknown	---	---	G2?	S1
Natural Community	30744	Tidal Freshwater Marsh (Sawgrass Subtype)	---	2009-09-29	Current	4 - Low	---	---	G4?	S4
Natural Community	30783	Tidal Freshwater Marsh (Shrub Subtype)	---	2002-06-13	Current	4 - Low	---	---	G4	S4
Natural Community	30780	Tidal Freshwater Marsh (Southern Wild Rice Subtype)	---	2002-06-13	Current	4 - Low	---	---	G3G5	S4
Natural Community	30745	Tidal Freshwater Marsh (Threesquare Subtype)	---	2009-09-29	Current	3 - Medium	---	---	G2G3	S2S3
Reptile	3970	Alligator mississippiensis	American Alligator	2005-10-17	Current	4 - Low	Threatened Similar Appearance	Threatened	G5	S3
Reptile	501	Deirochelys reticularia	Chicken Turtle	1963-06	Historical	4 - Low	---	Significantly Rare	G5	S3
Reptile	13589	Heterodon simus	Southern Hog-nosed Snake	2002-09-29	Current	4 - Low	Species of Concern	Special Concern	G2	S2
Reptile	7090	Heterodon simus	Southern Hog-nosed Snake	1977-06	Current	4 - Low	Species of Concern	Special Concern	G2	S2
Reptile	3796	Malaclemys terrapin	Diamondback Terrapin		Obscure	5 - Very Low	FSC, in part	Special Concern	G4	S3
Reptile	9291	Masticophis flagellum	Coachwhip	1964-10	Historical	4 - Low	---	Significantly Rare	G5	S3
Reptile	5838	Masticophis flagellum	Coachwhip	1968-09	Historical	5 - Very Low	---	Significantly Rare	G5	S3
Reptile	6998	Masticophis flagellum	Coachwhip	2002-06-09	Current	3 - Medium	---	Significantly Rare	G5	S3
Reptile	4132	Micrurus fulvius	Eastern Coralsnake	1979-04-26	Historical	4 - Low	---	Endangered	G5	S1
Reptile	12976	Ophisaurus mimicus	Mimic Glass Lizard	1967-06	Historical	4 - Low	Species of Concern	Special Concern	G3	S1

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Status	Accuracy	Federal Status	State Status	Global Rank	State Rank
Reptile	527	Regina rigida	Glossy Crayfish Snake	1962-07-15	Historical	2 - High	---	Significantly Rare	G5	S2S3
Reptile	16850	Seminatrix pygaea	Black Swampsnake	1963-06-29	Historical	4 - Low	---	Significantly Rare	G5	S2
Reptile	10990	Seminatrix pygaea	Black Swampsnake	1979-06-18	Historical	4 - Low	---	Significantly Rare	G5	S2
Vascular Plant	30852	Baccharis glomeruliflora	Silverling	1904-PRE	Historical	4 - Low	---	Special Concern Historical	G4	S1
Vascular Plant	26264	Boltonia asteroides var. glastifolia	White Doll's-daisy	2002-06-13	Current	4 - Low	---	Significantly Rare Other	G5TNR	S2
Vascular Plant	26983	Boltonia asteroides var. glastifolia	White Doll's-daisy	2000-07-18	Current	3 - Medium	---	Significantly Rare Other	G5TNR	S2
Vascular Plant	26281	Boltonia asteroides var. glastifolia	White Doll's-daisy	1965-09-26	Historical	3 - Medium	---	Significantly Rare Other	G5TNR	S2
Vascular Plant	5040	Carex decomposita	Cypress Knee Sedge	1938-06-29	Historical	3 - Medium	---	Special Concern Vulnerable	G3G4	S2
Vascular Plant	6571	Crinum americanum var. americanum	Swamp-lily	1975-06-15	Historical	3 - Medium	---	Special Concern Historical	G5T5	SH
Vascular Plant	1462	Crocanthemum carolinianum	Carolina Sunrose	1958-04-20	Historical	4 - Low	---	Endangered	G4	S1
Vascular Plant	22454	Dichanthelium cryptanthum	Hidden-flowered Witchgrass	1906-05-04	Historical	5 - Very Low	---	Significantly Rare Throughout	G2G3	S2
Vascular Plant	33259	Eleocharis vivipara	Viviparous Spikerush	2005-07-18	Current	3 - Medium	---	Endangered	G5	S1
Vascular Plant	544	Lilaeopsis carolinensis	Carolina Grasswort	1991-04-26	Historical	3 - Medium	---	Significantly Rare Other	G3G5	S2
Vascular Plant	28150	Oenothera riparia	Riverbank Evening-primrose	2005-08-10	Current	3 - Medium	---	Significantly Rare Limited	G2G3	S2S3
Vascular Plant	24757	Peltandra sagittifolia	Spoonflower	2006-10-25	Current	3 - Medium	---	Significantly Rare Peripheral	G3G4	S2S3
Vascular Plant	3676	Peltandra sagittifolia	Spoonflower	1986-09-19	Current	3 - Medium	---	Significantly Rare Peripheral	G3G4	S2S3

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Status	Accuracy	Federal Status	State Status	Global Rank	State Rank
Vascular Plant	27810	Pinguicula lutea	Yellow Butterwort	1937-04-17	Historical	5 - Very Low	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	18345	Platanthera nivea	Snowy Orchid	1938-07-07	Historical	5 - Very Low	---	Threatened	G5	S1
Vascular Plant	19828	Ptilimnium ahlesii	Carolina Bishop-weed	1963-06-29	Historical	4 - Low	Species of Concern	Significantly Rare Throughout	G1	S1
Vascular Plant	18333	Ptilimnium ahlesii	Carolina Bishop-weed	2004-06-10	Current	3 - Medium	Species of Concern	Significantly Rare Throughout	G1	S1
Vascular Plant	8273	Ptilimnium costatum	Ribbed Bishop-weed	1940-10	Historical	4 - Low	---	Threatened	GNR	S1
Vascular Plant	13829	Ptilimnium costatum	Ribbed Bishop-weed	1992-08-07	Current	3 - Medium	---	Threatened	GNR	S1

Natural Areas Documented Within a One-mile Radius of the Project Area

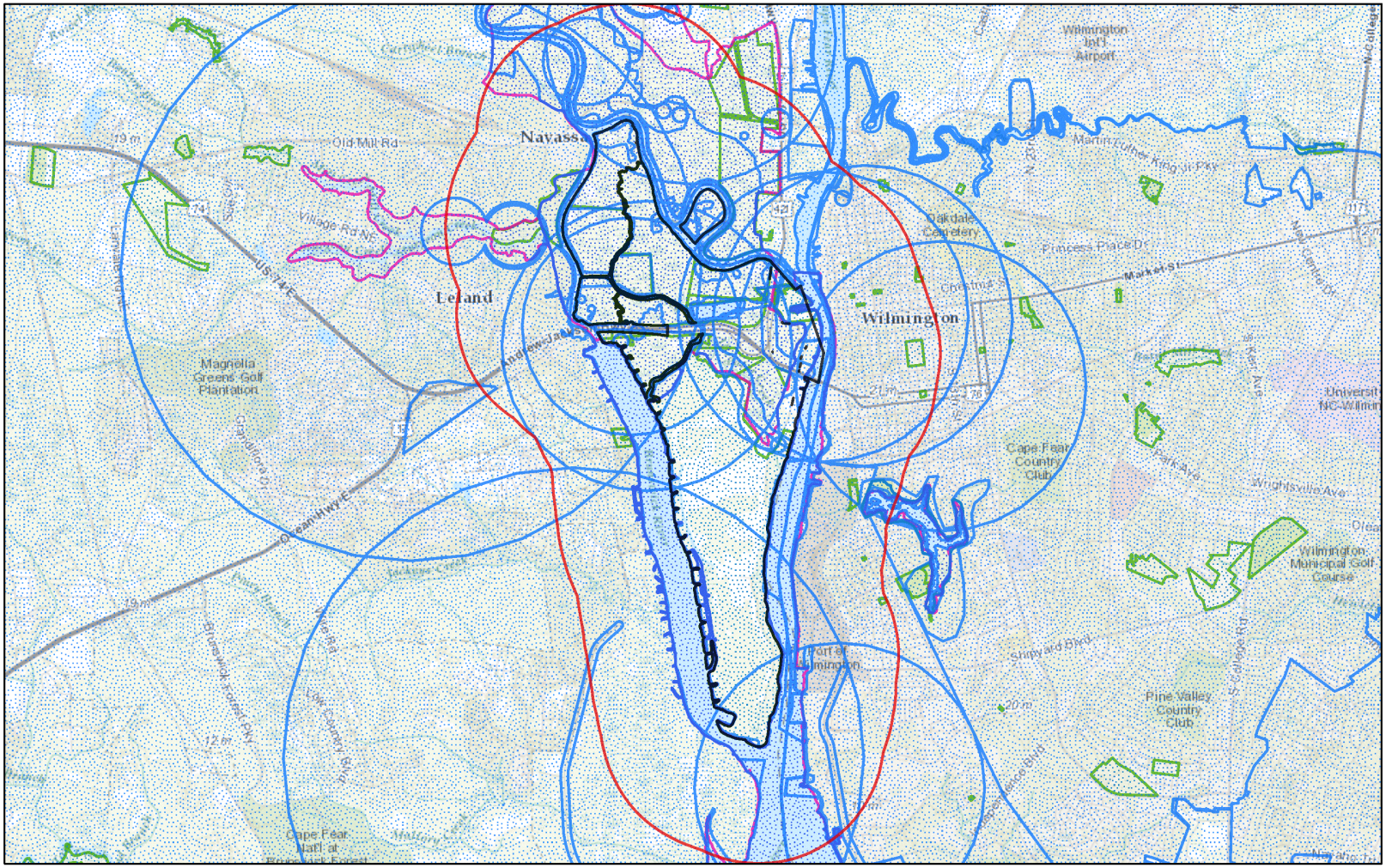
Site Name	Representational Rating	Collective Rating
421 Sand Ridge	R1 (Exceptional)	C1 (Exceptional)
Brunswick River/Cape Fear River Marshes	R1 (Exceptional)	C2 (Very High)
Greenfield Lake	R2 (Very High)	C4 (Moderate)
Sturgeon Creek Tidal Wetlands	R3 (High)	C4 (Moderate)
Lower Cape Fear River Aquatic Habitat	R? (Unranked)	C4 (Moderate)

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
Brunswick County Open Space	Brunswick County: multiple local government	Local Government
Brunswick River/Cape Fear River Marshes	NC DENR	State
Eagles Island Dredge Disposal Area	US Army Corps of Engineers	Federal
Eagles Island Spoil Area	NC State Ports Authority	State
New Hanover County Open Space	New Hanover County: multiple local government	Local Government
North Carolina Coastal Land Trust Preserve	North Carolina Coastal Land Trust	Private
USS North Carolina Battleship Memorial	NC Department of Cultural Resources	State
NC Ecosystem Enhancement Program Easement	NC DENR, Ecosystem Enhancement Program	State
North Carolina Coastal Land Trust Easement	North Carolina Coastal Land Trust	Private
Eagles Island Natural Area DNP	NC Department of Agriculture, Division of Soil and Water Conservation	State
Eagles Island Natural Area DNP	New Hanover Soil and Water Conservation District	Local Government

Definitions and an explanation of status designations and codes can be found at www.ncnhp.org. Data query generated on January 14, 2015; source: NCNHP, Q4 October 2014. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

NCNHDE-26: Eagles Island -- Natural Heritage Data Explorer Info Request



January 14, 2015

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0 1 2 4 km

- Project Boundary
- Buffered Project Boundary
- Natural Heritage Element Occurrence (NHEO)
- NHP Natural Area (NHNA)
- Managed Area (MAREA)

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL,

Appendix B

Maps

1. Aerial map of Eagles Island
2. 2012 Aerial map of Eagles Island showing parcel ownership and acreage
3. 2012 Aerial of USCOE dredge spoil cells
4. Eagles Island topo map ♣
5. Natural Heritage Areas (from a query of the NC Natural Heritage Program Database)
6. Soils map of Eagles Island
7. Eagles Island map of habitats ♣
8. Map of species / habitats occurrences ♣
9. Map of Shipwrecks along Eagles Island
10. 1948 map showing railroad ♣
11. Remains of rice canals on a 2013 Google Earth Satellite image (courtesy James Kapetsky)
12. Maximum extent of rice farming on Eagles Island from an 1888 chart (courtesy James Kapetsky)
13. Map showing the potential for land loss to sea level rise

♣ Maps extracted from the report - ***EAGLES ISLAND: A History of a Landscape*** **-** which was prepared in 2011 for the New Hanover Soil and Water Conservation District and the Cape Fear Resource Conservation and Development, Inc. For the full report, more maps and descriptive details, visit the Eagles Island website here: http://www.eaglesisland.org/EI2011Report.pdf


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EAGLES ISLAND
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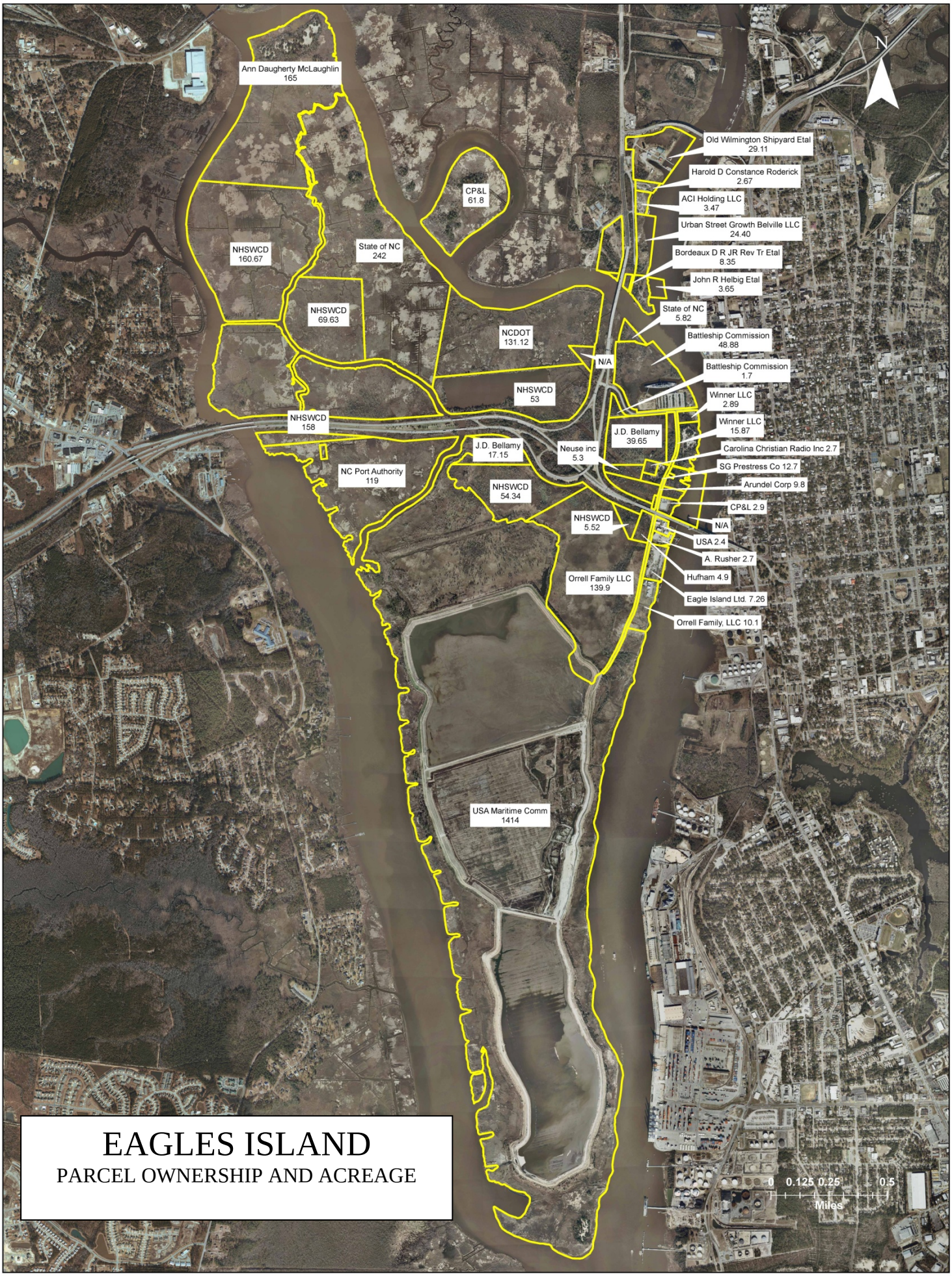
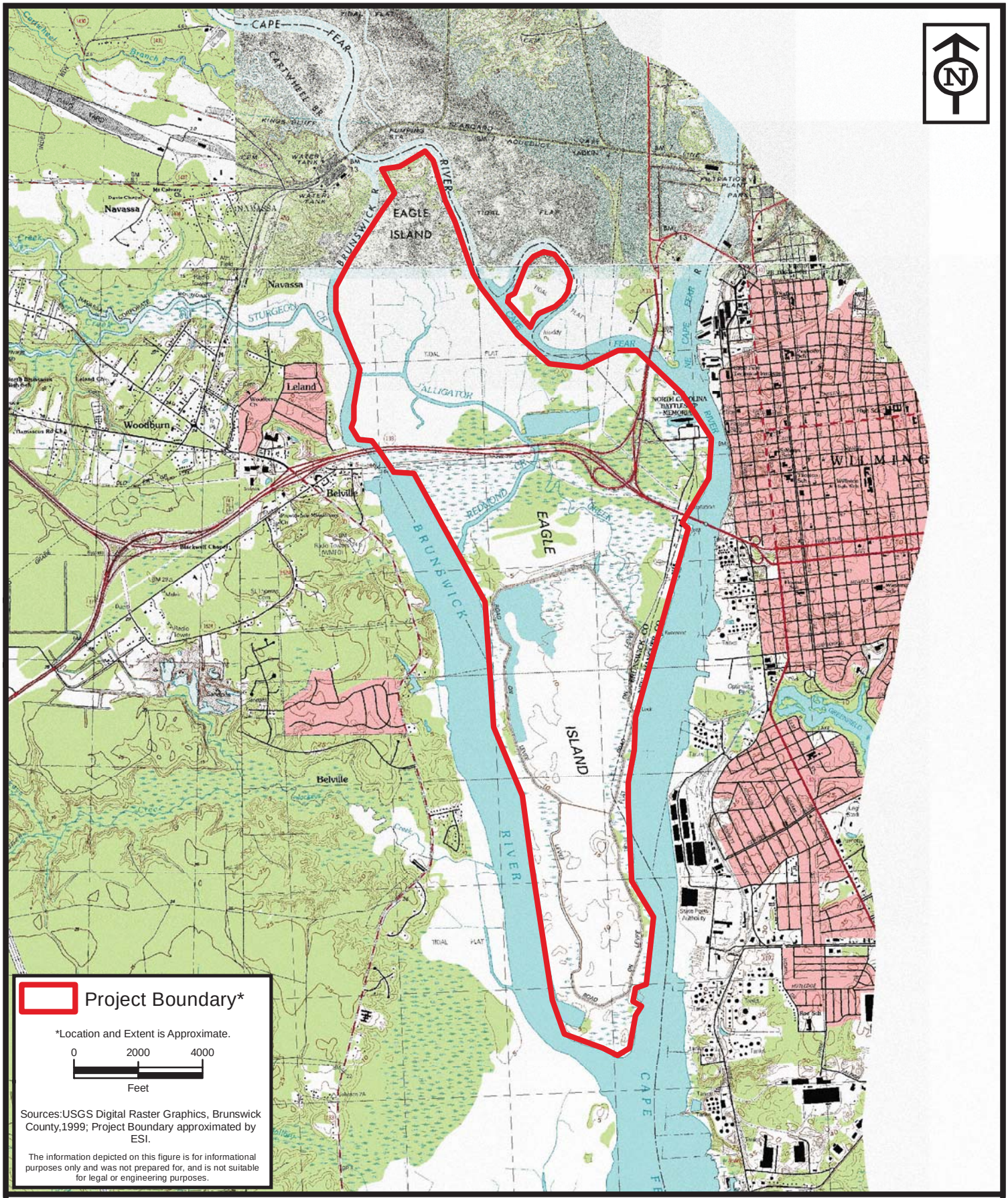


EAGLES ISLAND

PARCEL OWNERSHIP AND ACREAGE

EAGLES ISLAND
Army Corps Dredge Spoil Cells



NEW HANOVER SOIL & WATER CONSERVATION

Project Location Map

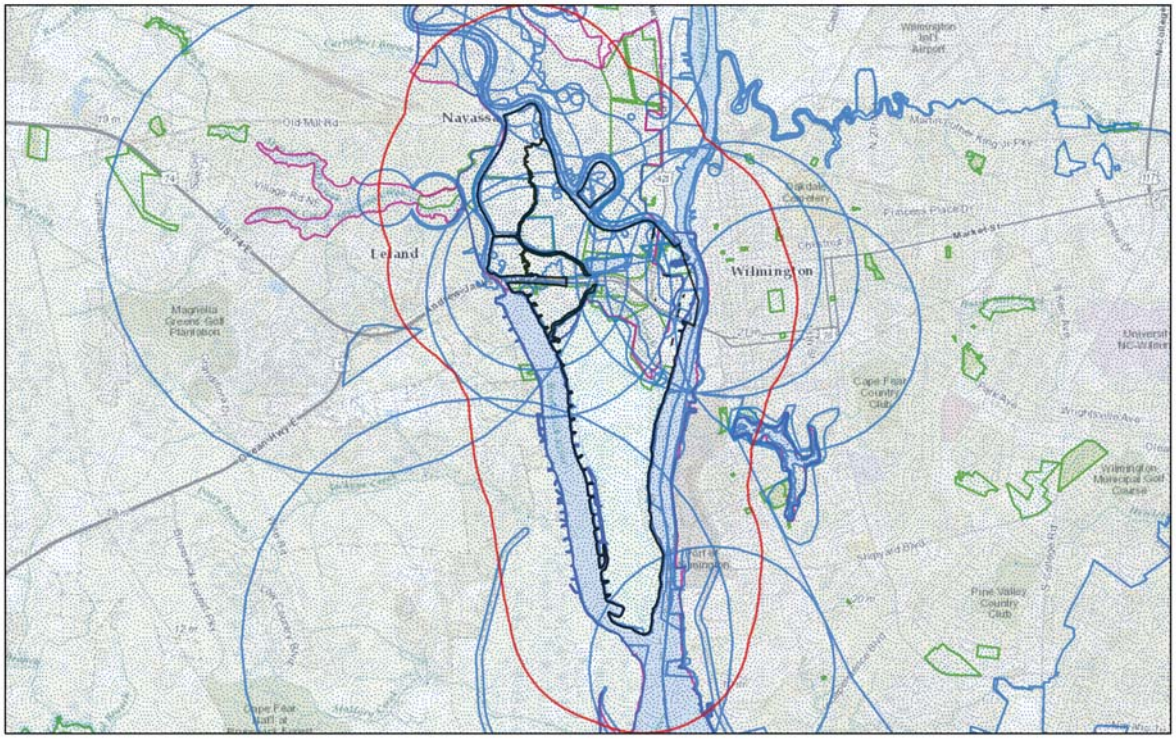
Eagles Island

New Hanover County, North Carolina

Project:	LEL09018.00
Date:	July 2011
Drwn/Chkd:	KT/MS
Figure:	**1.1**

Path: P:\GeoGra\Projects\Offices\LEL\2009\018\GIS\loc..mxd Date: 7/1/2011 11:44:20 AM

NCNHDE-26: Eagles Island -- Natural Heritage Data Explorer Info Request



January 14, 2015

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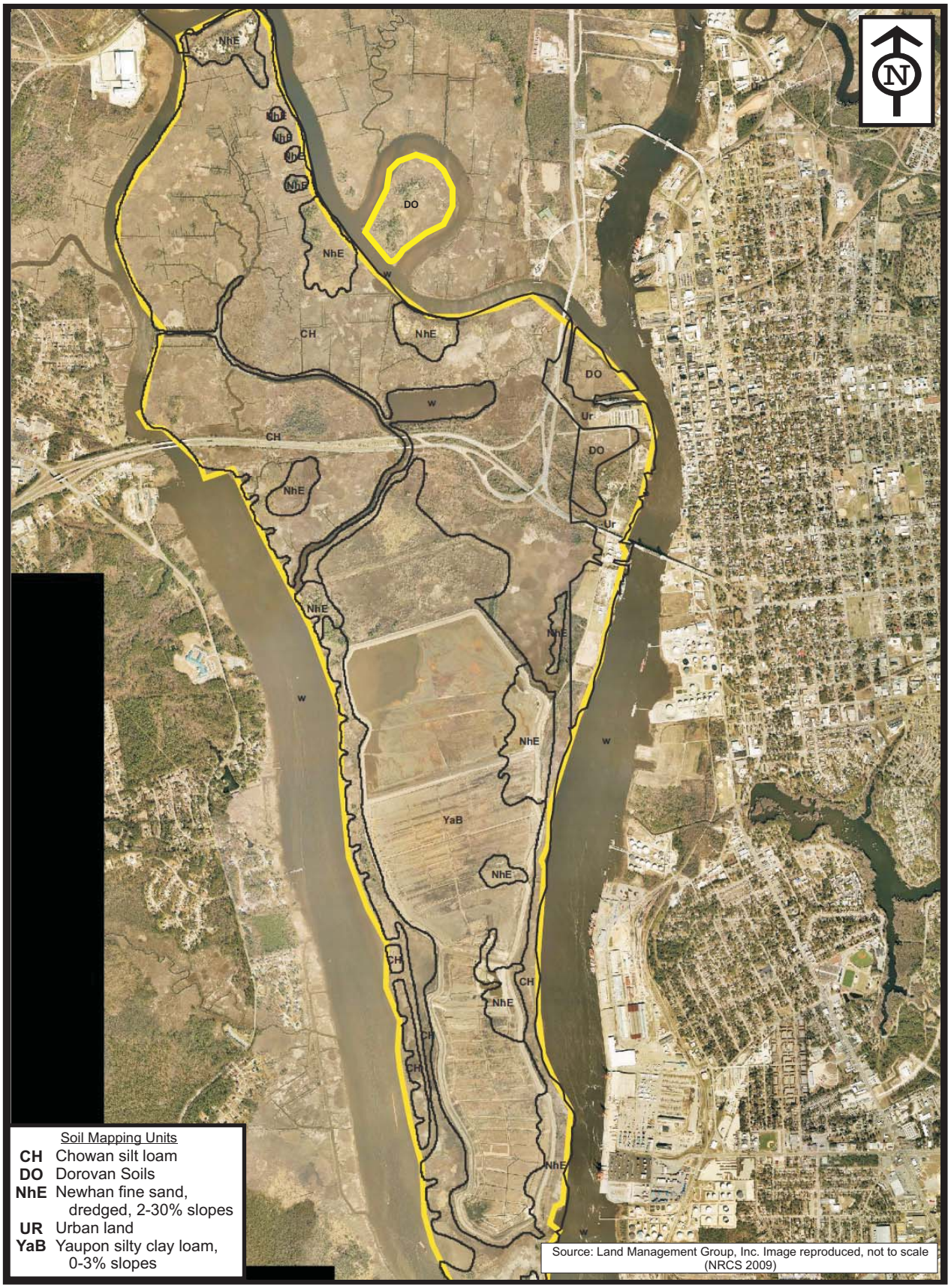
- Project Boundary
- Buffered Project Boundary
- Natural Heritage Element Occurrence (NHEO)
- NHP Natural Area (NHNA)
- Managed Area (MAREA)

0 0.5 1 2 mi

0 1 2 4 km

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL,



Soil Mapping Units

CH Chowan silt loam
DO Dorovan Soils
NhE Newhan fine sand, dredged, 2-30% slopes
UR Urban land
YaB Yaupon silty clay loam, 0-3% slopes

Source: Land Management Group, Inc. Image reproduced, not to scale (NRCS 2009)

NEW HANOVER SOIL & WATER CONSERVATION

NRCS Soils

Eagles Island

New Hanover County, North Carolina

Project:	LEL09018.00
Date:	July 2011
Drwn/Chkd:	SS/MS
Figure:	**6.1**

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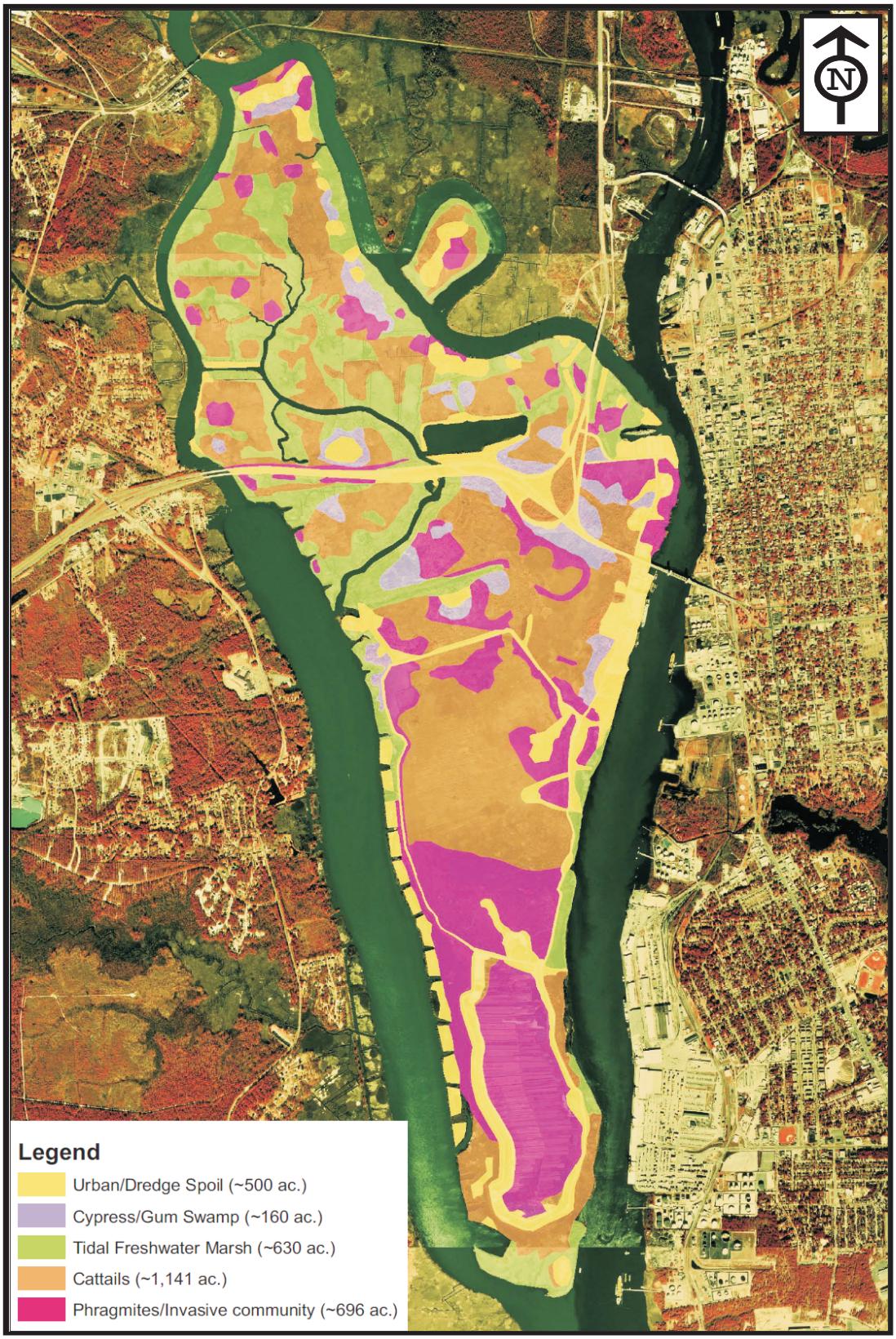

Source: Land Management Group, Inc. Image reproduced, not to scale.

NEW HANOVER SOIL & WATER CONSERVATION

Habitat Mapping

Eagles Island

New Hanover County, North Carolina

Project:	LEL09018.00
Date:	July 2011
Drwn/Chkd:	SS/MS
Figure:	**6.5**

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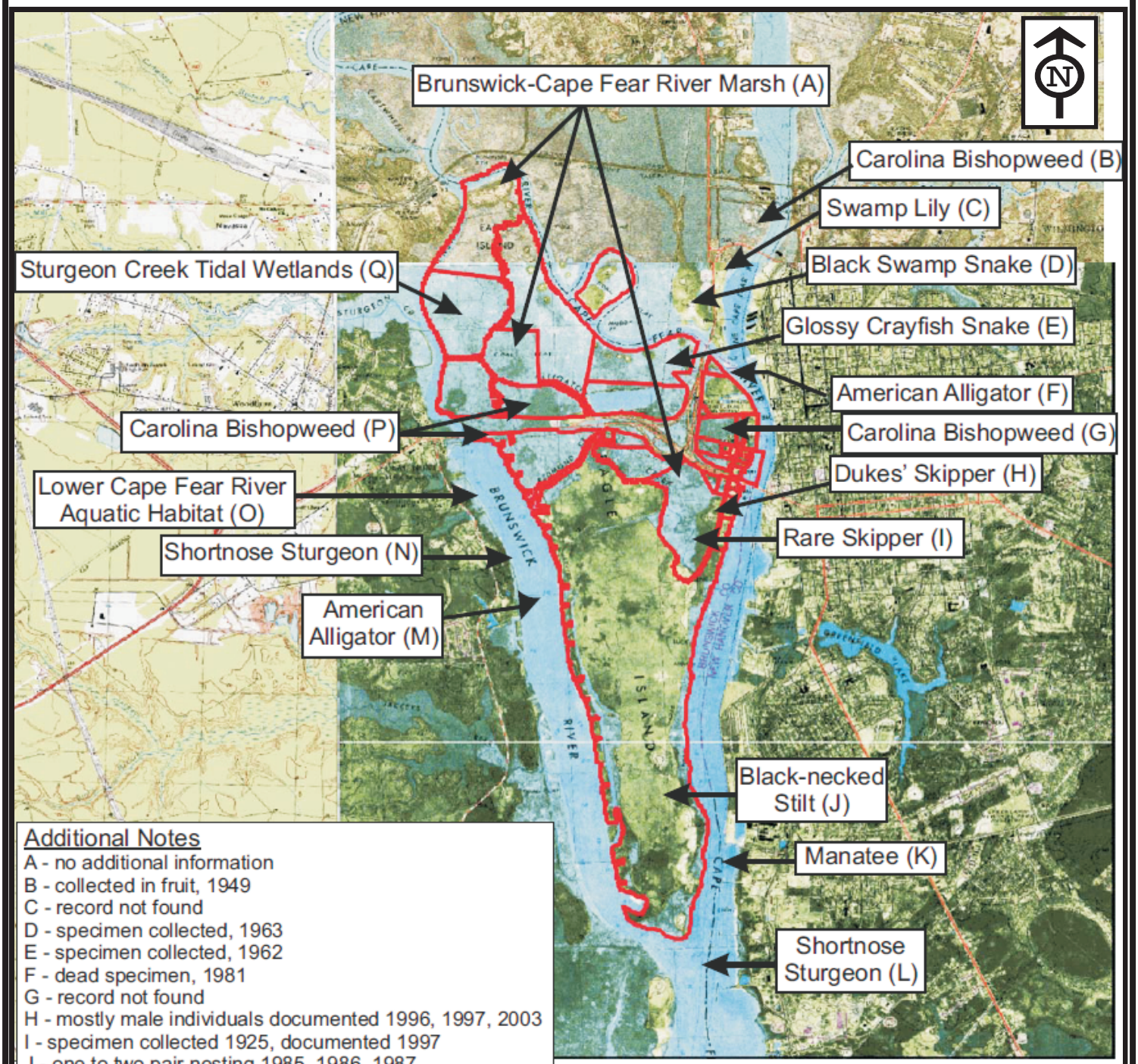

Source: Land Management Group, Inc. Image reproduced, not to scale
(North Carolina Natural Heritage Program 2009)

Additional Notes

A - no additional information
B - collected in fruit, 1949
C - record not found
D - specimen collected, 1963
E - specimen collected, 1962
F - dead specimen, 1981
G - record not found
H - mostly male individuals documented 1996, 1997, 2003
I - specimen collected 1925, documented 1997
J - one to two pair nesting 1985, 1986, 1987
K - noted alive, 1994
L - species captured/observed 1990-1993
M - 13 species observed in 2 hrs, 1978
N - species captured/observed 1990-1993
O - no additional information
P - 10 individuals observed, 1994
Q - no additional information

NEW HANOVER SOIL & WATER CONSERVATION

Rare Species and Natural Communities
Eagles Island
New Hanover County, North Carolina

Project:	LEL09018.00
Date:	July 2011
Drwn/Chkd:	SS/MS
Figure:	**6.6**

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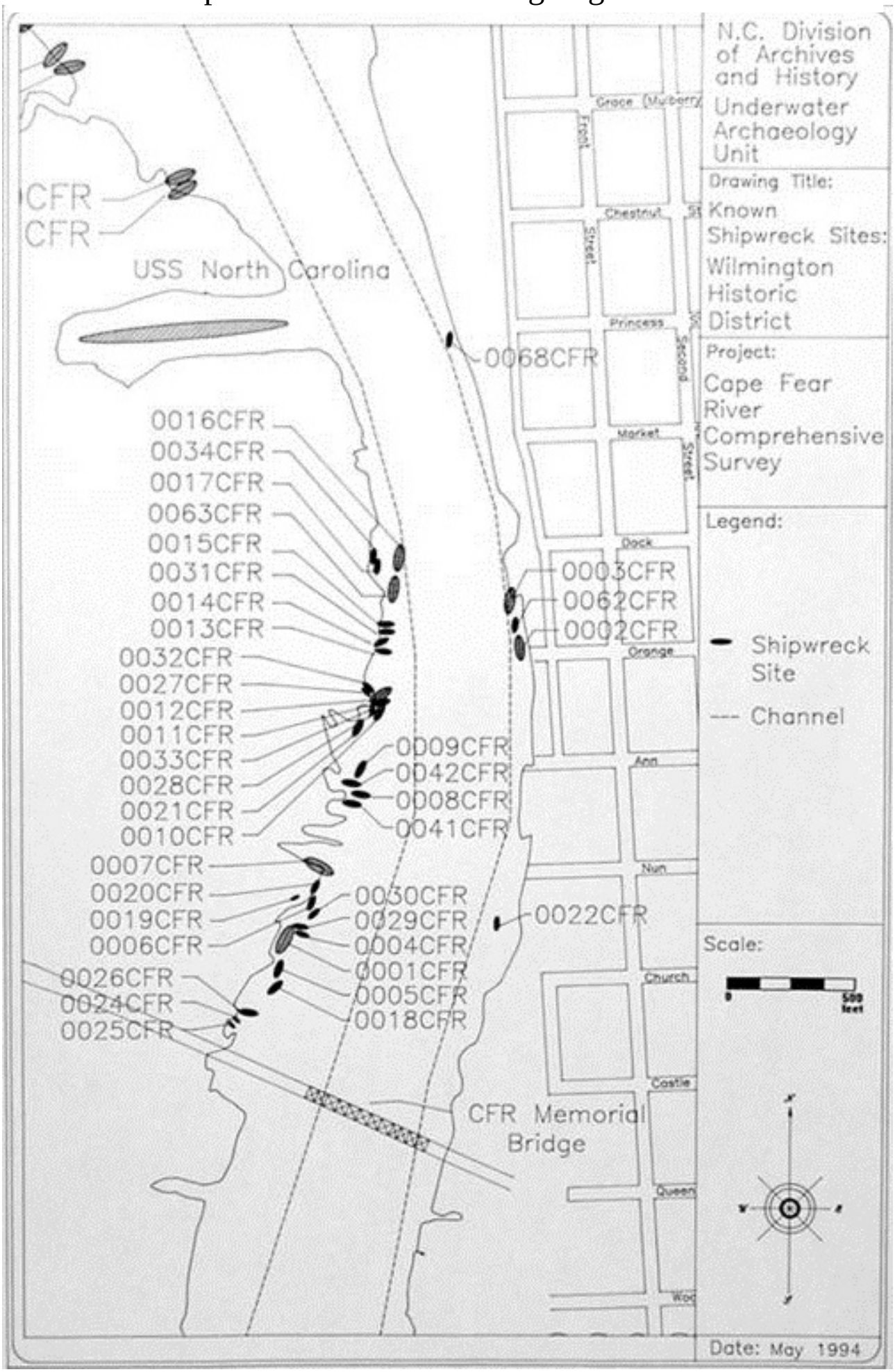
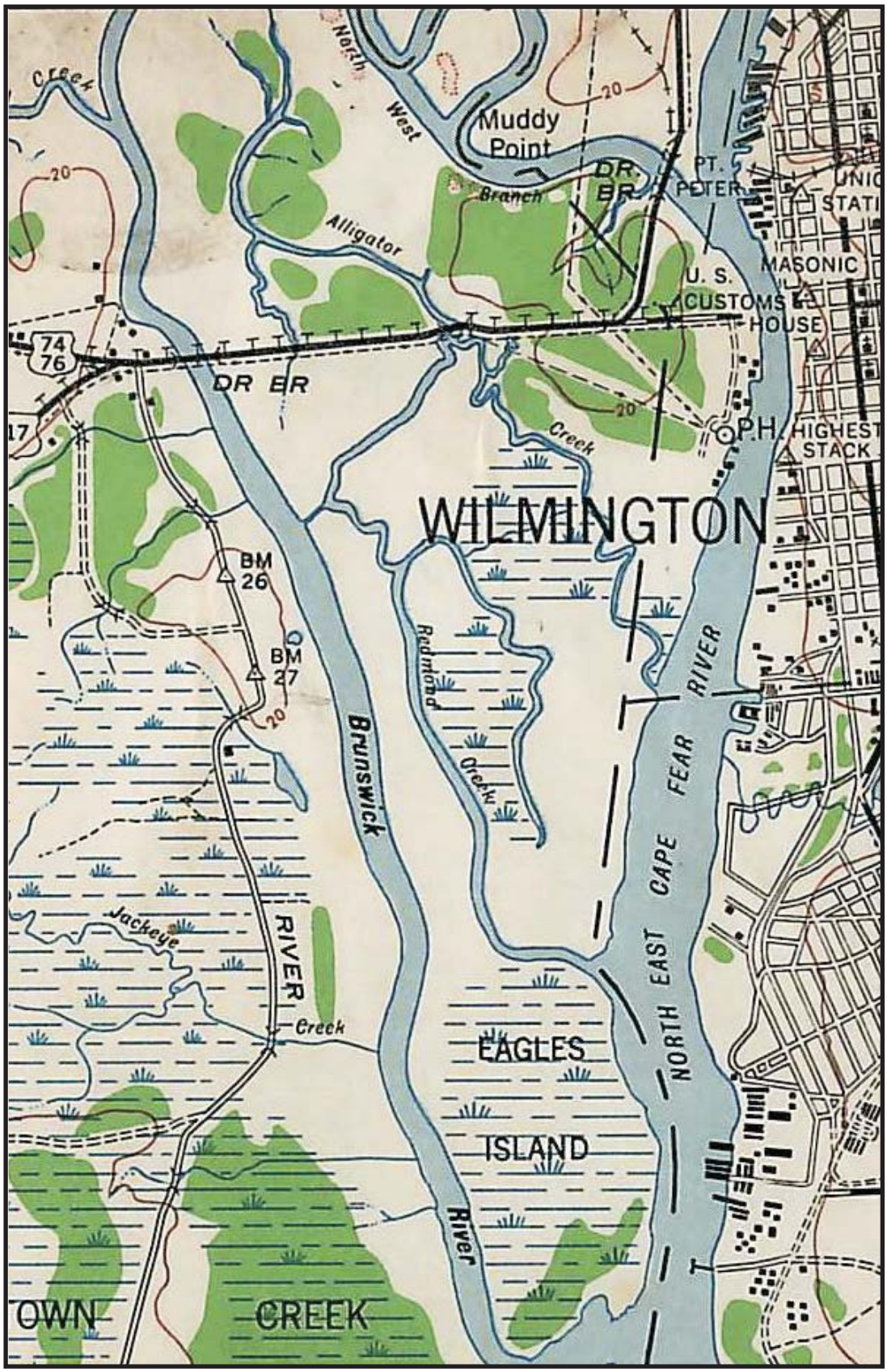
Shipwrecks Identified Along Eagles Island





1948 Wilmington USGS Quadrangle Map.

NEW HANOVER SOIL & WATER CONSERVATION

1948 USGS Map of Wilmington

Eagles Island

New Hanover County, North Carolina

Project:	LEL09018.00
Date:	July 2011
Drwn/Chkd:	MP/SS
Figure:	**5.15**

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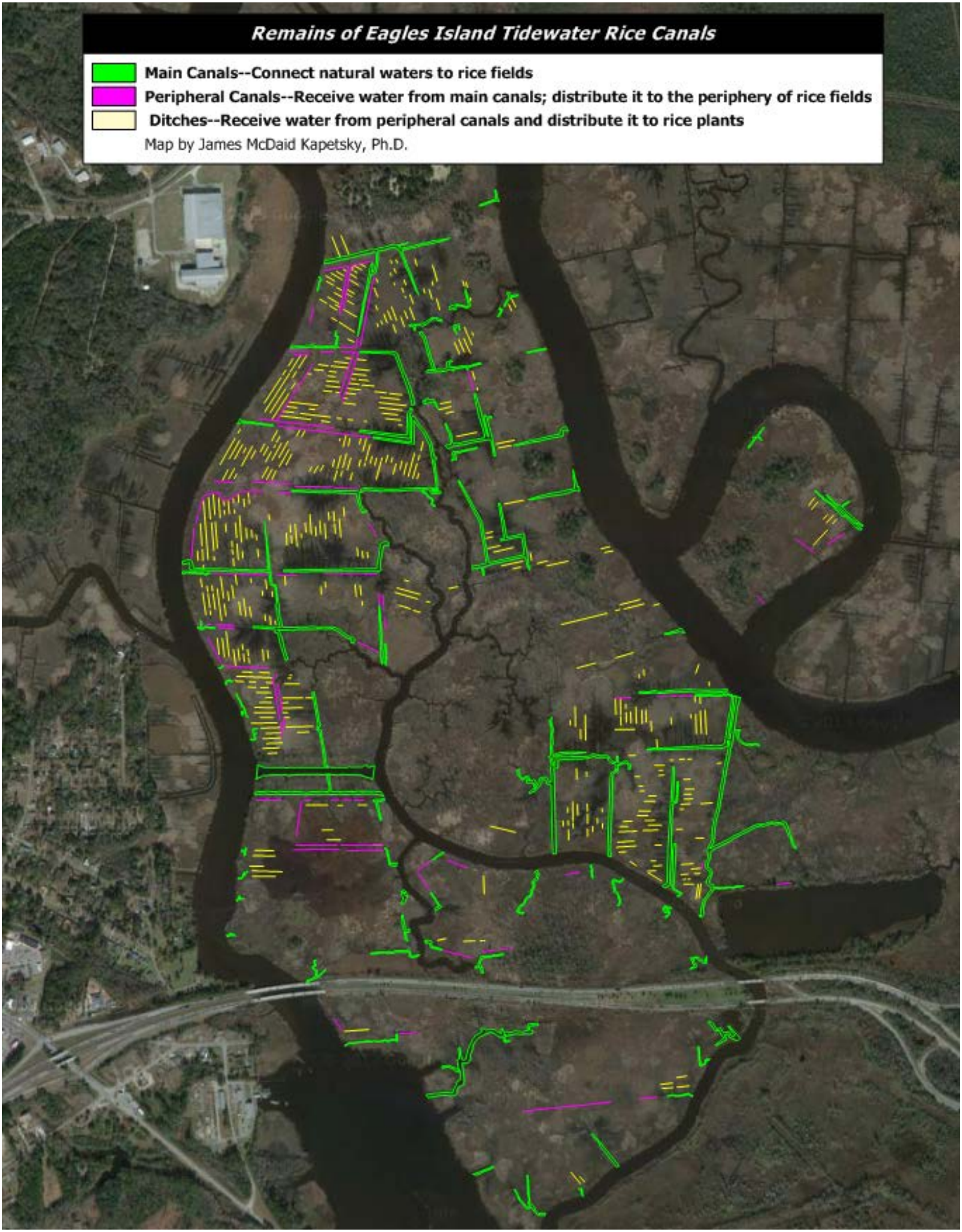
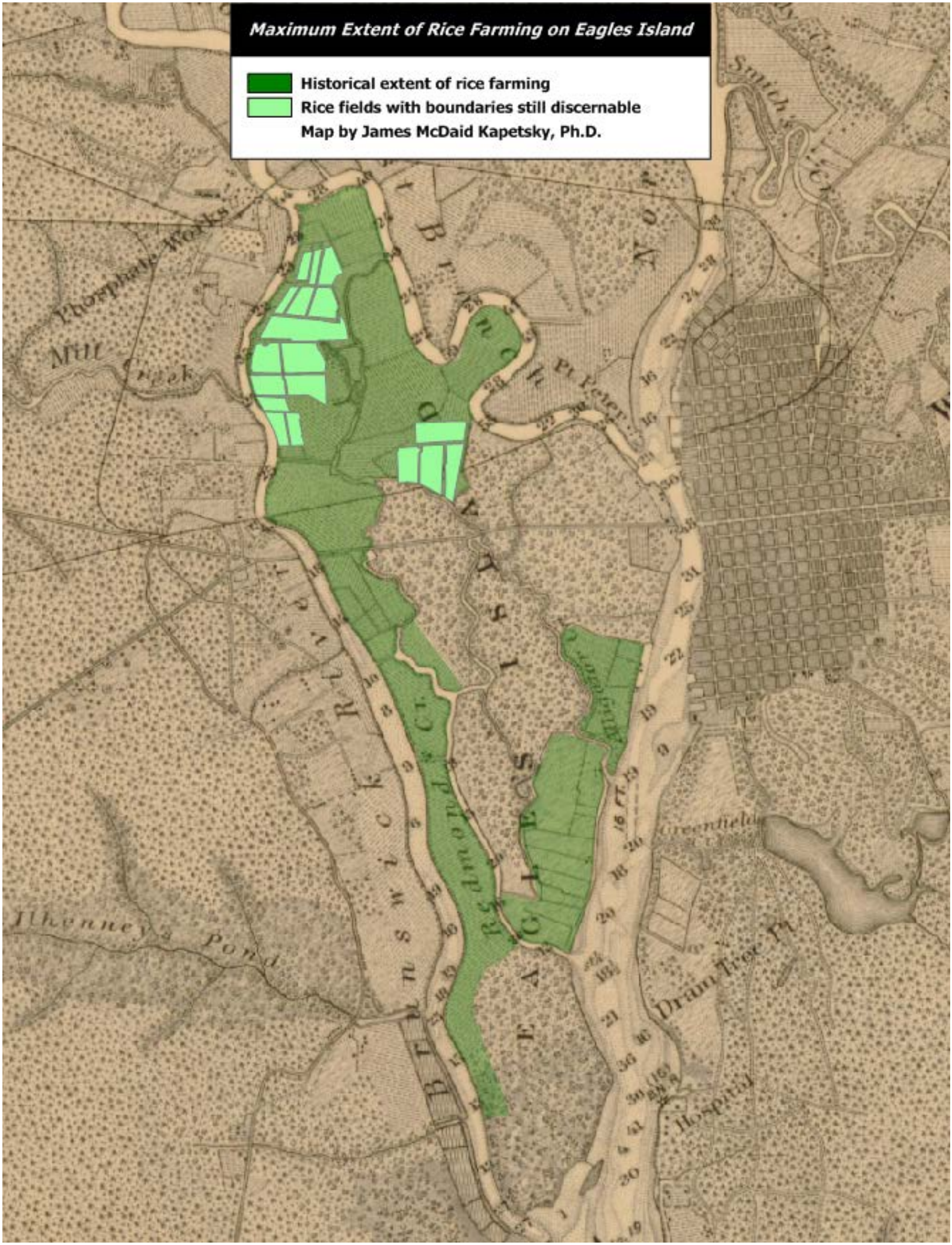
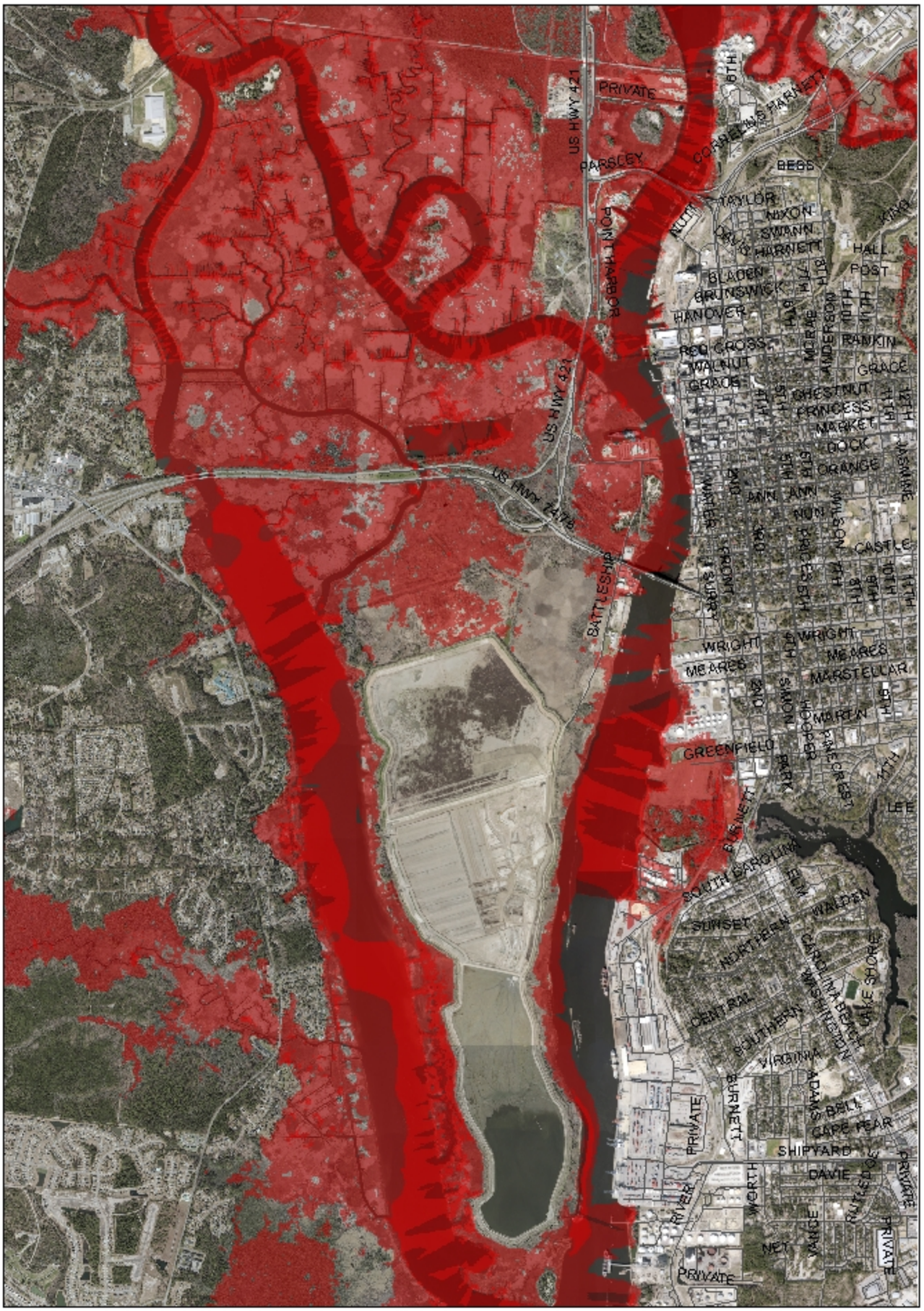

Remains of Eagles Island Tidewater Rice Canals
Main Canals--Connect natural waters to rice fields
Peripheral Canals--Receive water from main canals; distribute it to the periphery of rice fields
Ditches--Receive water from peripheral canals and distribute it to rice plants
Map by James McDaid Kapetsky, Ph.D.


Maximum Extent of Rice Farming on Eagles Island
Historical extent of rice farming
Rice fields with boundaries still discernable
Map by James McDaid Kapetsky, Ph.D.
Phosphate Works
Mill Creek
Pt Peter
Smith's Creek
Drum Tree Pt
Hospital
Greenfield
Ilhenney's Pond

EAGLES ISLAND

Potential Extent of Future Inundation Due to Sea Level Rise
Moderately High Scenario - 100 cm (36.4 in) by End of Century (2100)



Miles

0 0.175 0.35 0.7 1.05 1.4