Countywide Land Parcel Prioritization Strategy for Water Quality Enhancement

Currituck County, North Carolina

Prepared for:

North Carolina Clean Water Management Trust Fund
North Carolina Coastal Federation
North Carolina Coastal Land Trust

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EXECUTIVE SUMMARY

The North Carolina Coastal Federation (NCCF) and the North Carolina Coastal Land Trust (NCCLT) have obtained grant funds to complete a comprehensive plan to protect water quality in the Currituck Sound through land conservation and restoration. The purpose of this study is to help identify tracts of land that have a potential to enhance the water quality within Currituck County, North Carolina. This study consists of a focused, GIS-based land parcel prioritization analysis with subsequent conservation recommendations.

The NCCF and NCCLT conducted a land parcel prioritization strategy involving a two tier analysis whereby land parcels were selected based upon parameters that support water quality enhancement and conservation goals as defined by the NCCF and NCCLT. The first tier analysis selected land parcels within Currituck County based upon two baseline criteria; (1) parcel must be greater than 100 acres in size and (2) parcel cannot currently be under any type of land management that prohibits conservation goals. The result from the first tier analysis identified 236 parcels that were suitable for the second tier analysis. The second tier ranking scheme emphasizes water quality enhancement and protection of natural resource values. The second tier ranking scheme consists of 13 ranking criteria with 29 total water quality enhancement points. These ranking criteria were selected based on pertinent and available water quality, GIS, and natural resource data.

The results of this analysis identified four water quality enhancement priority classes (low, moderate, high, and highest). 137 parcels were classified as having low water quality significance; 56 parcels had moderate significance; 25 had high significance; and 18 were rated as having the highest potential for water quality enhancement.

In addition, five (5) regions throughout Currituck County were identified as having a high potential for water quality enhancement opportunities. These regions contained a majority of parcels that had scores within the highest water quality enhancement class. Conservation recommendations for each region include discussions of attributes specific to their physical, hydrological, and biological characteristics.

This study supports goals set forth by the NCCF and NCCLT concerning the enhancement of water quality in Currituck County. Both organizations stand strong in preserving the quality of North Carolina's freshwater systems.

PROJECT OBJECTIVES

Currituck County is coming under increasing pressure to develop its farmland and waterfront areas. This pressure is primarily originating from residents in the Tidewater region who are attracted to the agrarian nature of Currituck County. At present there are no strategies for ranking properties that might be placed in conservation to protect the county's creeks, rivers, and sounds. The North Carolina Coastal Federation (NCCF) and the North Carolina Coastal Land Trust (NCCLT) have obtained grant funds to complete a comprehensive plan to protect water quality in the Currituck Sound through land conservation and restoration.

This report is part of the larger comprehensive plan to protect water quality. It is being conducted in response to a request from the steering committee comprised of key community stakeholders assembled by the NCCF and NCCLT.

The primary objective of this report is to identify land parcels within Currituck County that may have a potential to improve water quality. Attention will be focused on areas that have the highest potential to improve water quality at the local level. In most instances, however, water quality issues transcend geo-political boundaries while the programs that address these issues are often restricted to defined anthropogenic areas. For example, defined Hydrologic Unit Code 14 (HUC-14) watersheds in Currituck County often encompass areas in Camden County (e.g. North River) and the State of Virginia (e.g. Northwest River, North Landing River, and Backs Bay). Thus, if a countywide program is developed to address water quality issues, water quality concerns in Camden County and the State of Virginia must also be addressed.

PROJECT AREA BACKGROUND

Currituck County is located in the extreme northeastern section of North Carolina (Figure 1). The county consists of a mainland peninsula, with Currituck Sound to the east and the North River to the west, and an offshore strand which is part of the Outer Banks barrier island chain. The mainland is drained by the North, Northwest, and North Landing Rivers and by Currituck Sound. At Coinjock, the mainland is traversed by the Intracoastal Waterway.

Currituck County is contained almost entirely within sub-basin 03-01-54 of the Pasquotank River Basin (NCDENR, 2002). Most of the county's land base is below 20 feet in elevation. Its hydrology and hydrogeomorphology primarily consists of river system termini, agricultural ditching, and low-lying wetland areas. Because of the low elevation and lack of topography, watersheds within Currituck County are often defined by roadbeds and irrigation systems.

Groundwater is the primary source of the county's water supply. The depth to freshwater is generally less than 100 feet (USDA-SCS, 1982). The freshwater is contained in sands and clays of the upper sandy aquifer (USDA-SCS, 1982).

Owing to its proximity to the Atlantic Ocean, Currituck County has mild winters. Slight freezes occur during the winter, but are of short duration. Seasonal temperature regimes are typical of the eastern North Carolina region with July temperatures averaging 79° Fahrenheit and January temperatures averaging 41° Fahrenheit (CCCC, 2005). Precipitation occurs throughout the year, being heavy at times, averaging 48 inches per year (CCCC, 2005).

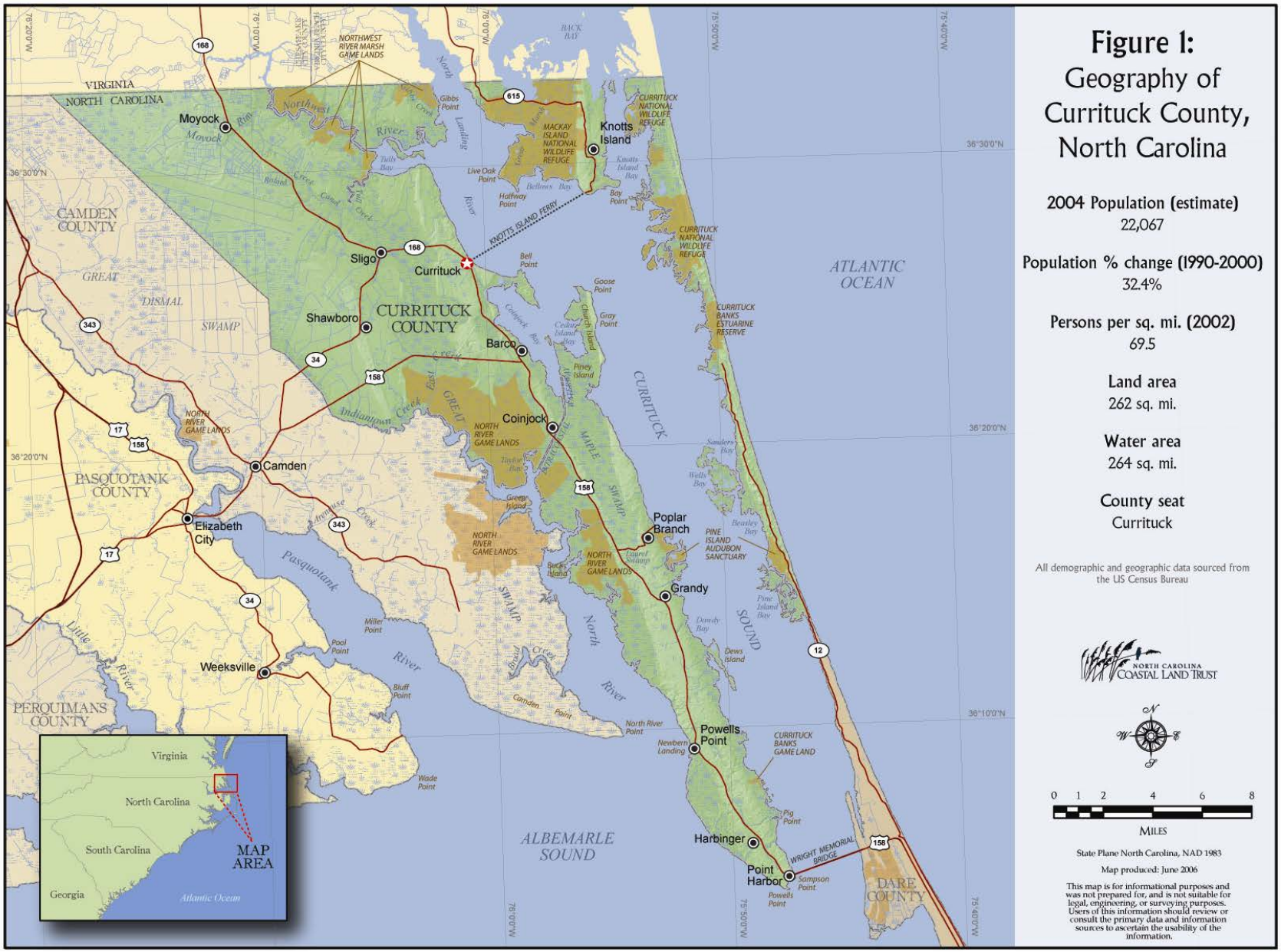


Figure 1:
Geography of Currituck County, North Carolina
2004 Population (estimate)
22,067
Population % change (1990-2000)
32.4%
Persons per sq. mi. (2002)
69.5
Land area
262 sq. mi.
Water area
264 sq. mi.
County seat
Currituck
All demographic and geographic data sourced from the US Census Bureau
NORTH CAROLINA COASTAL LAND TRUST
0 1 2 4 6 8
MILES
State Plane North Carolina, NAD 1983
Map produced: June 2006
This map is for informational purposes and was not prepared for, and is not suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.
VIRGINIA
NORTH CAROLINA
Moyock
Knotts Island
Sligo
Currituck
Shawboro
CURRITUCK COUNTY
Barco
Coinjock
Camden
Elizabeth City
Poplar Branch
Grandy
Powells Point
Harbinger
Point Harbor
Weeksville
CAMDEN COUNTY
PASQUOTANK COUNTY
PERQUIMANS COUNTY
DARE COUNTY
ATLANTIC OCEAN
ALBEMARLE SOUND
KNOTTS ISLAND FERRY
WRIGHT MEMORIAL BRIDGE
NORTHWEST RIVER MARSH GAME LANDS
NORTH RIVER GAME LANDS
CURRITUCK NATIONAL WILDLIFE REFUGE
MACKAY ISLAND NATIONAL WILDLIFE REFUGE
CURRITUCK BANKS ESTUARINE RESERVE
PINE ISLAND AUDUBON SANCTUARY
CURRITUCK BANKS GAME LAND
GREAT DISMAL SWAMP
MAPLE SWAMP
Virginia
North Carolina
South Carolina
Georgia
Atlantic Ocean
MAP AREA

METHODS

The North Carolina Coastal Land Trust (NCCLT) and the North Carolina Coastal Federation (NCCF) have worked with a stakeholder group of county residents to develop a multi-criteria parcel prioritization strategy to help identify and prioritize key land parcels that, if placed in conservation, would help protect the health and beauty of Currituck County's surface waters. The stakeholders group calls itself the Currituck Waters Preservation Committee (CWPC) and includes representatives from NCCLT and NCCF.

The project analysis was divided into two portions hereafter referred to as the first and second tier analyses. The goal of the first tier analysis was to identify parcels that satisfied baseline criteria standards developed by the NCCLT and NCCF. The first tier analysis included parcels within Currituck County that fulfilled the following criteria:

1. The parcel must be greater than 100 acres in size.
2. The parcel cannot currently be under any type of conservation management or management that would prohibit conservation easements or limit land use goals of Currituck County.

The study area (Currituck County) initially contained approximately 23,400 parcels. After employing criteria #1 from above, 295 parcels remained. After employing criteria #2, 236 parcels remained. The 236 parcels from the first tier analysis were used as the baseline data set for the second tier analysis. The second tier analysis utilized 13 parameters that were specifically chosen to reveal a parcel's potential for water quality enhancement. Weighted numeric scores were assigned to each water quality enhancement parameter depending upon its significance in potentially improving water quality. The 13 parameters had a total of 29 points possible. The following text outlines the rationale behind the methodology for each parameter (the parameters and their weighted scales are presented and defined).

Parcel Acreage (AREA)

The size of a parcel can influence its effectiveness in improving water quality. Larger parcels may increase the success of water quality management schemes by simply covering a larger area within a watershed. Therefore, it is beneficial to pursue conservation of larger parcels before applying valuable resources towards the acquisition of smaller, clustered, or fragmented parcels (Figure 2).

4 points = greater than 600 acres
3 points = 301 - 600 acres
2 points = 151 - 300 acres

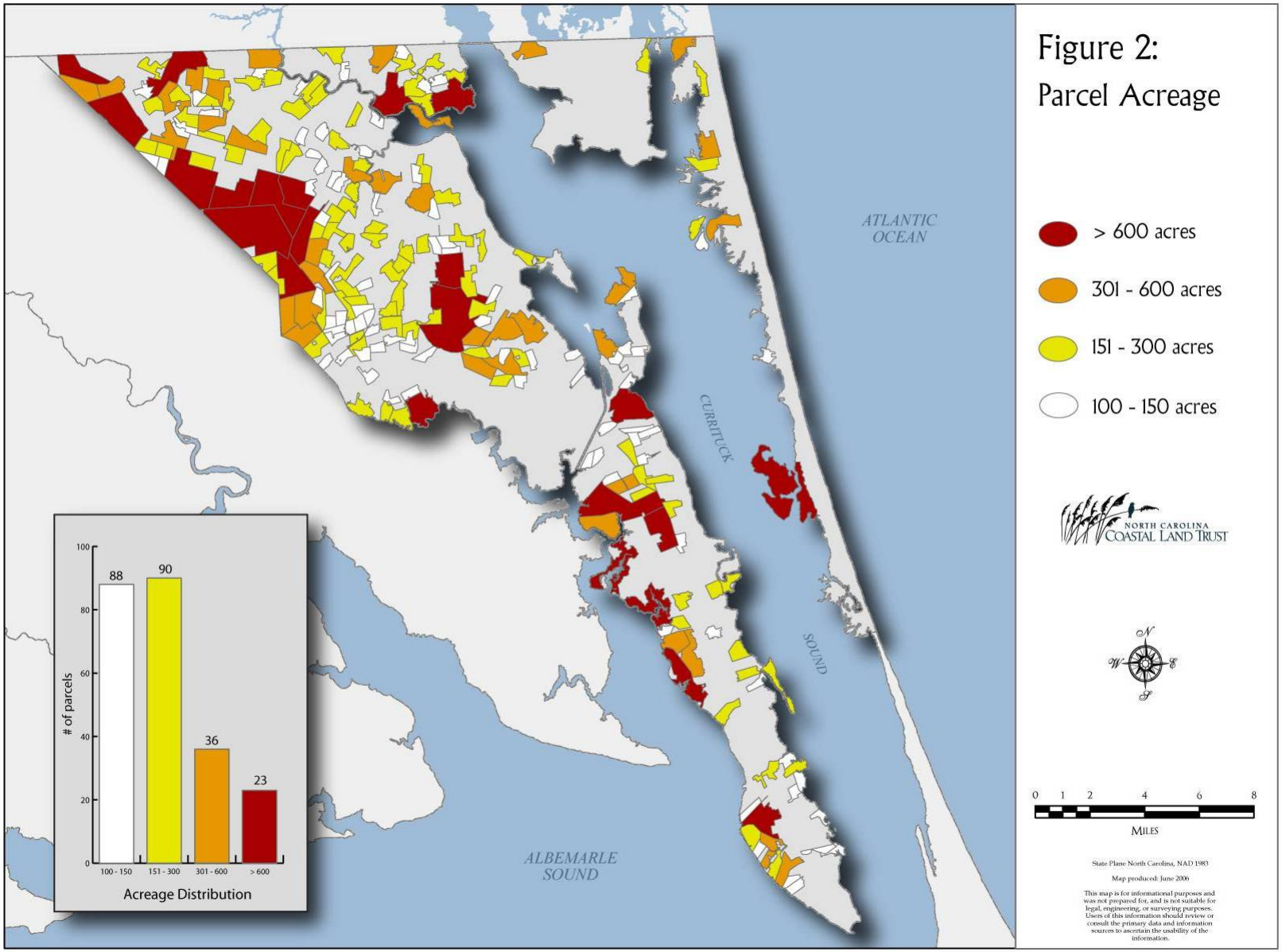


Figure 2:
Parcel Acreage
> 600 acres
301 - 600 acres
151 - 300 acres
100 - 150 acres
ATLANTIC OCEAN
CURRITUCK SOUND
ALBEMARLE SOUND
NORTH CAROLINA COASTAL LAND TRUST
N
W
E
S
0 1 2 4 6 8
MILES
State Plane North Carolina, NAD 1983
Map produced: June 2006
This map is for informational purposes and was not prepared for, and is not suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.
# of parcels
100
80
60
40
20
0
88
90
36
23
100 - 150
151 - 300
301 - 600
> 600
Acreage Distribution

1 point = 100 - 150 acres

Parcel acreage was calculated using ArcGIS.

Surface Water Frontage (SWF)
The amount of surface water frontage within a parcel can influence its importance in determining water quality values of downstream and surrounding water bodies. Parcels with large surface water frontage values can either be used as a tool to help improve water quality or act as potential sources of pollutants. Protection and restoration of lands adjacent to these surface water systems is crucial to the improvement of water quality.

4 points = greater than 25,000 linear feet
3 points = 10,001 - 25,000 linear feet
2 points = 5,001 - 10,000 linear feet
1 point = 1 - 5,000 linear feet
0 points = parcel contains no surface water frontage

Surface water frontage was determined by measuring all significant water courses in Currituck County using ArcGIS. Water courses that were included within the study include: streams, rivers, sounds, bays, ponds, lakes, irrigation ditches, and oceans. Irrigation ditches were included because of their potential influence in transporting potential non-point source pollutants from agricultural areas into natural water courses.

Surface Water to Area Ratio (SWAR)
The surface water to area ratio is an important factor to consider since larger parcels would be favored over smaller parcels even if surface water frontage values were similar (e.g. long and narrow parcels with a relatively small area, yet with high surface water frontage values, may be undervalued because of their small area) (Figure 3).

4 points = ratio greater than 100
3 points = ratio between 51 and 100
2 points = ratio between 26 and 50
1 point = ratio between 1 and 25
0 points = parcel contains no surface water frontage

Surface water to area ratio measurements were calculated in ArcGIS using acreage and surface water frontage measurements (SWF/AREA =

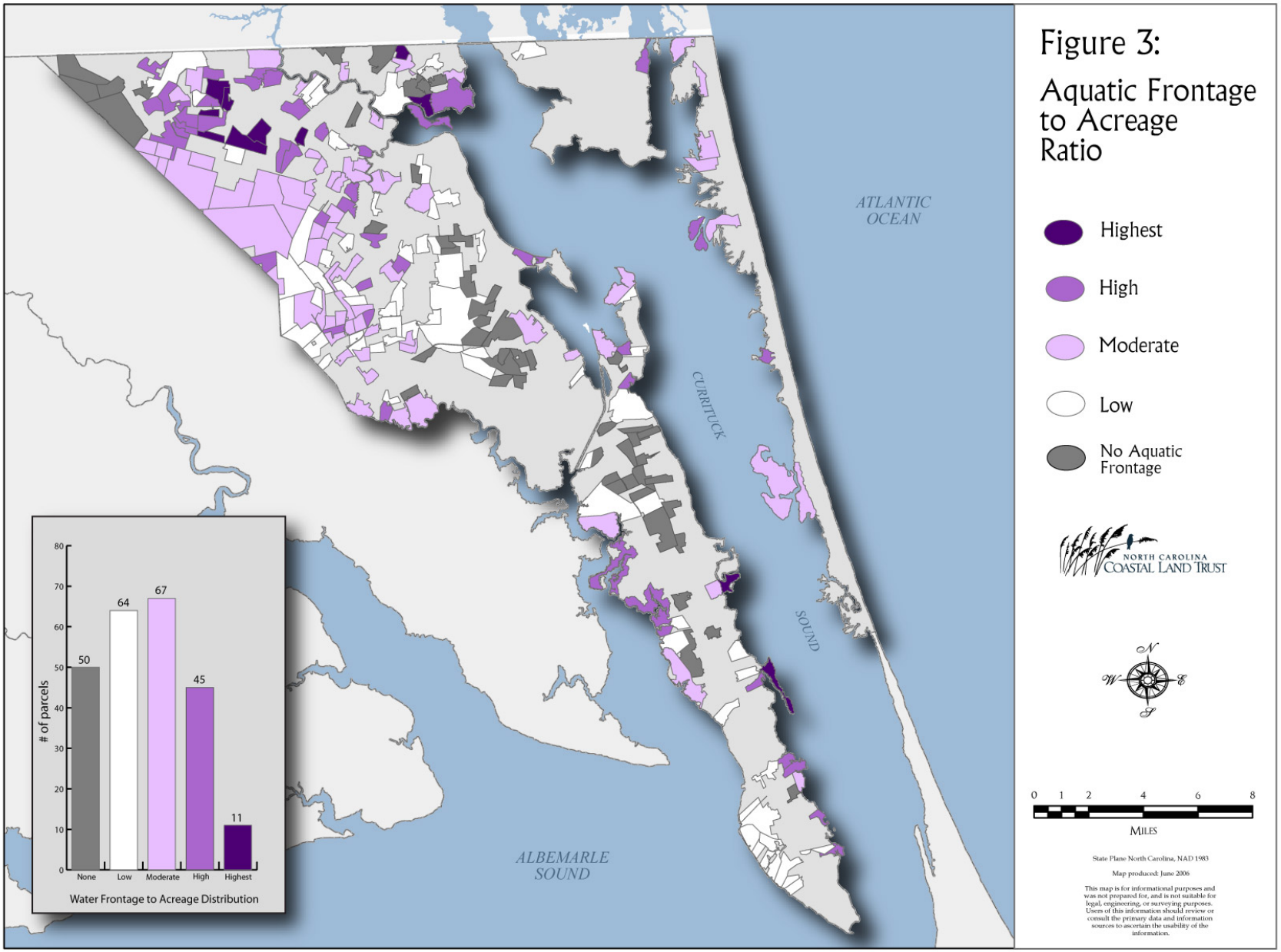


Figure 3:
Aquatic Frontage to Acreage Ratio
Highest
High
Moderate
Low
No Aquatic Frontage
ATLANTIC OCEAN
CURRITUCK SOUND
ALBEMARLE SOUND
NORTH CAROLINA COASTAL LAND TRUST
N
W
E
S
0 1 2 4 6 8
MILES
State Plane North Carolina, NAD 1983
Map produced: June 2006
This map is for informational purposes and was not prepared for, and is not suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.
# of parcels
80
70
60
50
40
30
20
10
0
50
64
67
45
11
None
Low
Moderate
High
Highest
Water Frontage to Acreage Distribution

Inclusion of Wetlands (WET)
Wetland areas are potentially valuable in improving water quality. Wetlands can prevent pollution of surface water systems by filtering sediments, excessive nutrients, and toxic compounds from stormwater and agricultural runoff. They also serve as high quality habitat areas for many plant and animal species. The North Carolina Division of Coastal Management developed a GIS functional assessment model commonly known as the North Carolina Coastal Region Evaluation of Wetland Significance or NC-CREWS. The NC-CREWS model assigns wetlands ratings of Beneficial Significance, Substantial Significance, or Exceptional Significance, depending on how well they perform as a function of water quality (Figure 4).

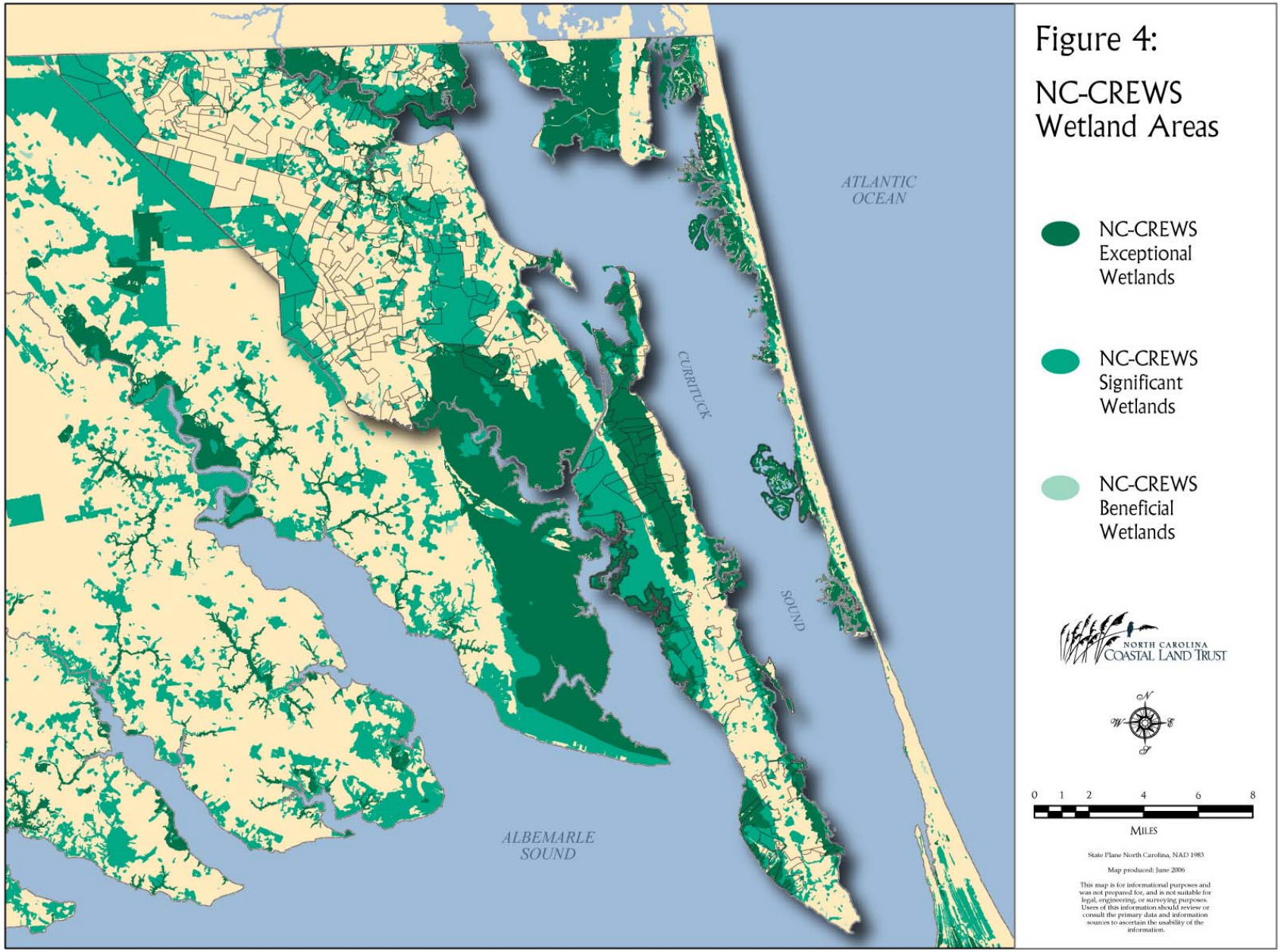
3 points = parcel contains NC-CREWS Exceptional wetlands
2 points = parcel contains NC-CREWS Significant wetlands
1 point = parcel contains NC-CREWS Beneficial wetlands
0 points = parcel contains no NC-CREWS wetlands

Wetland scores were based upon the highest rated class of wetlands that occur within a parcel. For example, if a parcel contains all three classes of NC-CREWS wetlands, it received three points because of the inclusion of Exceptional wetlands. If a parcel contains Significant and Beneficial wetlands, it would receive two points since Significant wetlands were the highest rated wetland class in the parcel.

Urban Buffer Potential (URB)
The construction of impervious surfaces during urbanization alters runoff generation mechanisms by reducing the effective permeability of the soil (Moscrip and Montgomery, 1997). Where stormwater once soaked into the ground, it now must flow over hard surfaces, picking up sediments, petroleum products, (pet waste), chemicals, metals, and other pollutants (Klapproth and Johnson, 2000). Buffering these developed areas with vegetated tracts of land increases the probability of mitigating the effects of non-point source pollution within surrounding surface waters.

2 points = parcel is within 0.5 miles of significantly developed areas
1 point = parcel is between 0.5 and 1.0 miles of any significantly developed areas
0.5 points = parcel is between 1.0 and 2.0 miles of any significantly developed areas
0 points = parcel is more than 2.0 miles from any significantly developed areas

Developed areas within Currituck County were delineated in ArcGIS using 2005 aerial photography acquired from the US Department of Agriculture's National Aerial Imagery Program. A multiple ring buffer was then created around the


ATLANTIC OCEAN
CURRITUCK SOUND
ALBEMARLE SOUND
Figure 4:
NC-CREWS Wetland Areas
NC-CREWS Exceptional Wetlands
NC-CREWS Significant Wetlands
NC-CREWS Beneficial Wetlands
NORTH CAROLINA COASTAL LAND TRUST
N
W
E
S
0 1 2 4 6 8
MILES
State Plane North Carolina, NAD 1983
Map produced: June 2006
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developed areas in ArcGIS. Parcels that fell within the rings were given a value based upon their distance from the developed areas.

Surface Mining Buffer Potential (MINE)
Surface mining operations have the potential to impact fish and aquatic resources through erosion and sedimentation, dewatering of wetlands, diverting and channelizing of streams, and contaminating surface water and aquifers with toxic chemicals (Starnes and Gasper, 1996). As with urbanized areas, vegetated lands proximally located to surface mining operations have the potential to mitigate issues associated with non-point source pollution entering surface waters.

2 points = parcel is within 0.5 miles of a surface mining operation
1 point = parcel is between 0.5 and 1.0 miles of any surface mining operation
0.5 points = parcel is between 1.0 and 2.0 miles of any surface mining operation
0 points = parcel is more than 2.0 miles from any surface mining operation

Surface mining operations within Currituck County were delineated in ArcGIS using 2005 aerial photography acquired from the US Department of Agriculture's National Aerial Imagery Program. A multiple ring buffer was then created around the mining operations in ArcGIS. Parcels that fell within the rings were given a value based upon their distance from the mining operations

Adjacency to Conservation Lands (CONS)
Contiguity of lands managed to improve water quality is important to the regional success of any such program. Lands that are adjacent to pre-existing areas that have a conservation easement or managed as a preserve can further extend the linkages between protected lands thereby increasing the likelihood of successful water quality enhancement programs.

2 points = parcel is directly adjacent to existing conservation lands
0 points = parcel is not adjacent to any existing conservation lands

Parcels adjacent to conservation lands were identified using the visualization process in ArcGIS.

Land Cover (LAND)
Land cover is an important factor when developing local or regional natural resource management goals. Water quality is partially influenced by the type and extent of land cover within any watershed (Figure 5). Non-managed forested areas offer many water quality benefits to surface water systems including:

- acting as a filter for shallow groundwater flow by capturing or degrading harmful substances from surrounding land uses;
- holding topsoil in place through root systems and litterfall decreasing overland erosion and sedimentation of streams;
- improving aquatic and terrestrial wildlife habitat by providing microniches and ecological complexity;
- acting as a reservoir during flooding by absorbing more of the rainfall into the soil profile as opposed to direct overland runoff into surface water systems; and
- protecting areas from direct human impact through limiting easy access and by blocking or attenuating the conveyance of noise, light, odors, and debris (Castelle et al., 1994).

2 points = a majority (>50%) of the parcel consists of non-managed vegetative cover
0 points = a majority of the parcel contains urban, agricultural, or other types of managed land cover

Non-managed forested areas within Currituck County were identified using 2005 aerial photography acquired from the US Department of Agriculture's National Aerial Imagery Program.

Natural Heritage Values (NAT)
The North Carolina Natural Heritage Program is a part of the Office of Conservation and Community Affairs within the North Carolina Department of Environment and Natural Resources. The program inventories, catalogues and supports conservation of the rarest and the most outstanding elements of natural diversity of the state (NCNHP, 2006). The NC Natural Heritage Program has identified areas that are of ecological significance within the state. For this study, there are two identifiers which determine Natural Heritage Significance (1) Significant Natural Heritage Areas and (2) Element Occurrences. Parcels were assigned a score based upon whether or not they contained one of the aforementioned Natural Heritage characteristics (Figure 6).

1 point = parcel contains a SNHA and/or one or more Element Occurrences
0 points = parcel contains no Natural Heritage sites

Natural Heritage values were determined using the visualization process in ArcGIS.

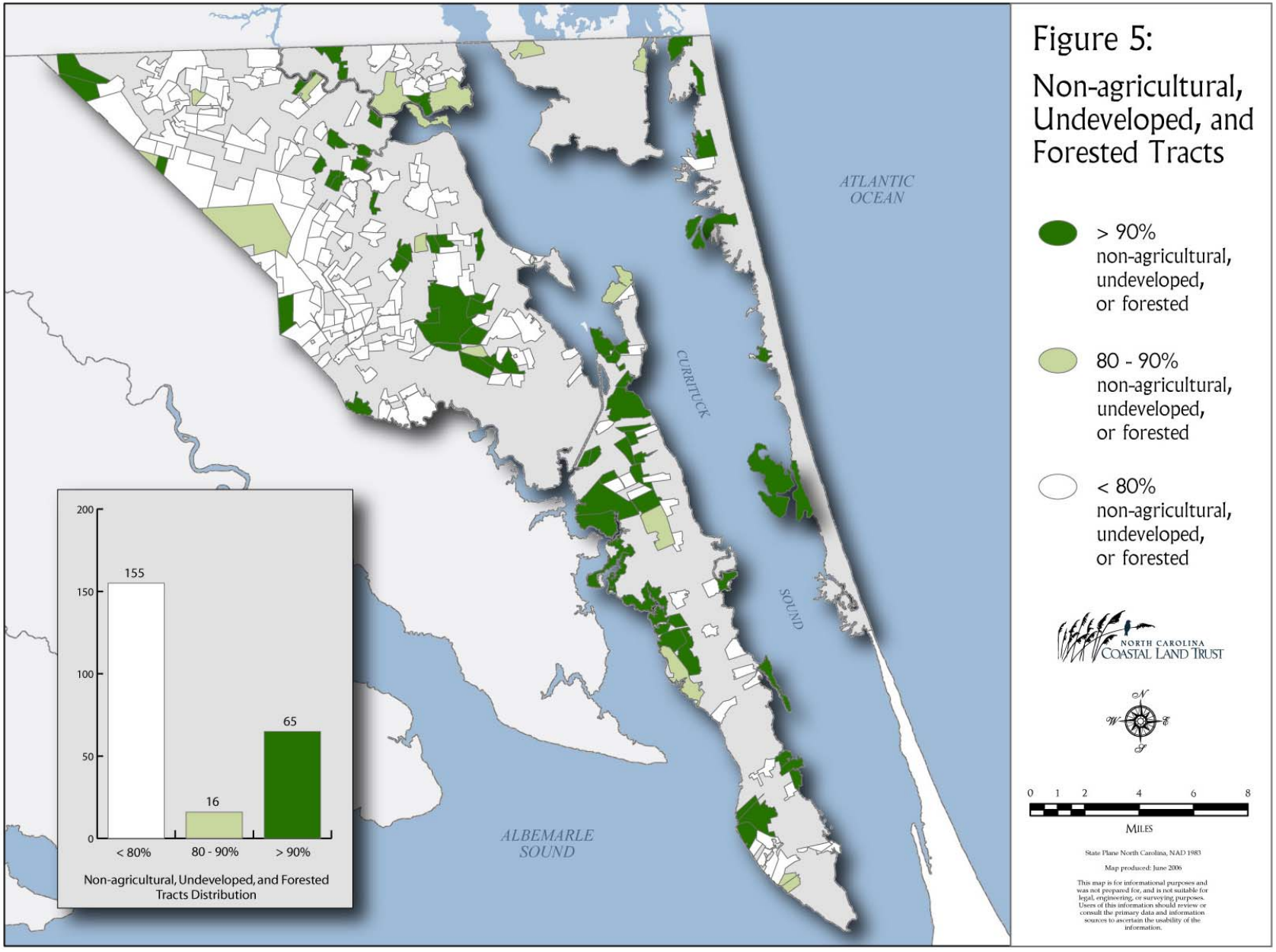
Figure 5:
Non-agricultural, Undeveloped, and Forested Tracts
> 90% non-agricultural, undeveloped, or forested
80 - 90% non-agricultural, undeveloped, or forested
< 80% non-agricultural, undeveloped, or forested
ATLANTIC OCEAN
CURRITUCK SOUND
ALBEMARLE SOUND
NORTH CAROLINA COASTAL LAND TRUST
0 1 2 4 6 8
MILES
State Plane North Carolina, NAD 1983
Map produced: June 2006
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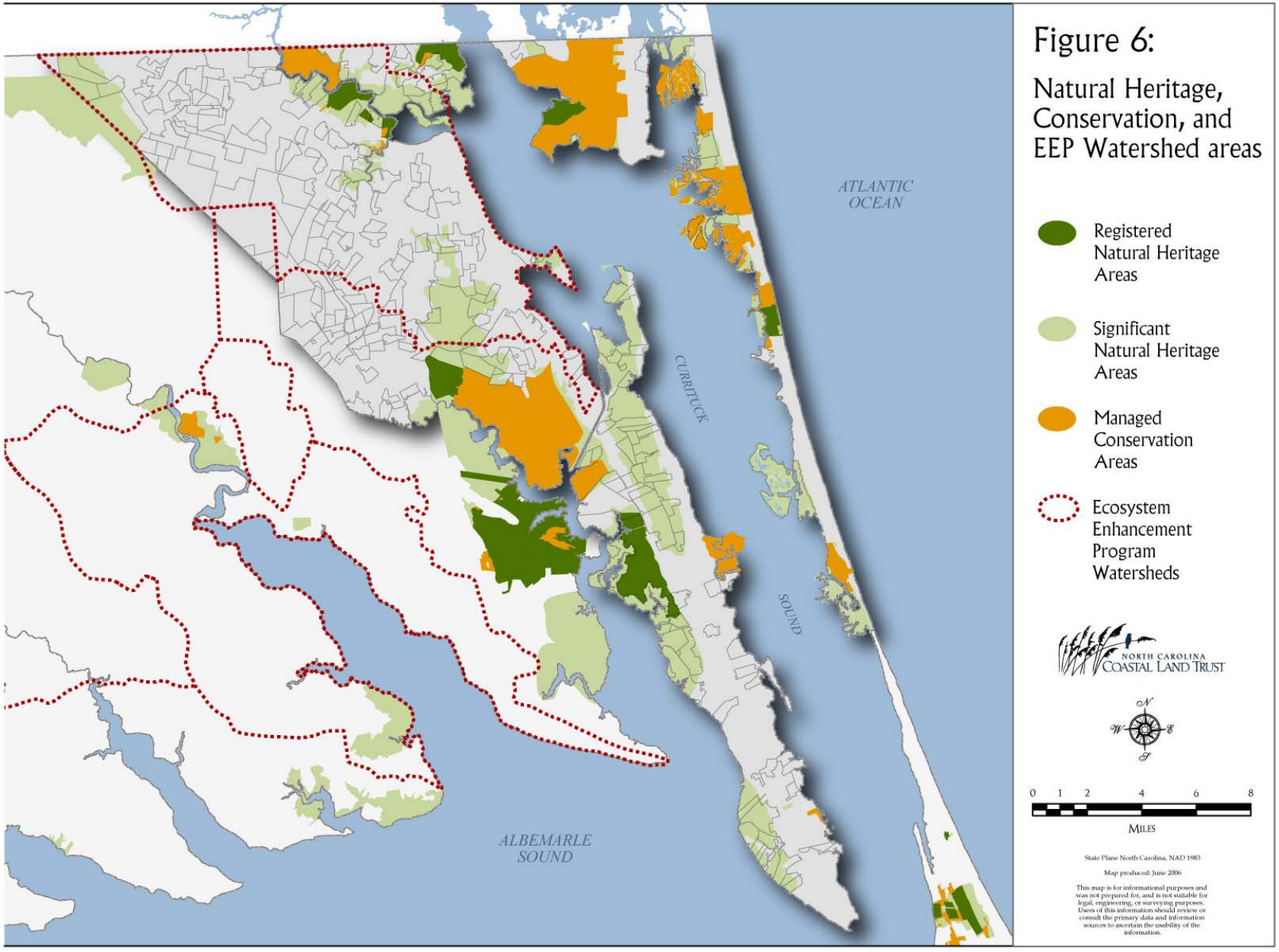
200
150
100
50
0
155
16
65
< 80%
80 - 90%
> 90%
Non-agricultural, Undeveloped, and Forested Tracts Distribution


ATLANTIC OCEAN
CURRITUCK SOUND
ALBEMARLE SOUND
Figure 6:
Natural Heritage, Conservation, and EEP Watershed areas
Registered Natural Heritage Areas
Significant Natural Heritage Areas
Managed Conservation Areas
Ecosystem Enhancement Program Watersheds
NORTH CAROLINA COASTAL LAND TRUST
N
W
E
S
0 1 2 4 6 8
MILES
State Plane North Carolina, NAD 1983
Map produced: June 2006
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Ecosystem Enhancement Program (EEP)
North Carolina's Ecosystem Enhancement Program (EEP) encourages conservation partnerships with public and private organizations throughout the state. EEP identifies Targeted Local Watersheds in each of the state's 17 river basins based on resource value, restoration need and opportunities for partnering with local agencies and communities (EEP, 2005). By acquiring or placing easements on lands within a targeted local watershed, opportunities can increase for diverse funding sources, valued partnerships and conservation success stories (Figure 6).

1 point = parcel is within an EEP Targeted Local Watershed
0 points = parcel is not within an EEP Targeted Local Watershed

Ecosystem Enhancement Program values were determined using the visualization process in ArcGIS.

Proximity to Animal Operations (ANOP)
Water quality concerns regarding animal operations may include contamination of surface water by animal waste and sedimentation through streambank erosion. Restricting animal access to surface waters and proper animal waste management can both minimize potential impacts upon water quality. Vegetated buffers that surround animal operations can also mitigate potential or unforeseen pollution events. Some minimum standards are applied to animal operations through NPDES permits. For example, buffers should exist around feedlots, manure storage areas, and land application areas. (Kohler, 2005).

1 point = parcel is within 0.25 miles of a registered animal operation
0.5 points = parcel is between 0.25 and 0.50 miles of a registered animal operation
0 points = parcel is greater than 0.5 miles from any registered animal operation

North Carolina state permitted animal operations were identified in ArcGIS and given a multiple-ring buffer. Scores were then based upon the parcel's proximity to the animal operations.

Ownership (OWN)
It is advantageous to acquire or place easements upon different lands that have the same owner. This strategy can help reduce the time, effort, and resources involved with land acquisition or conservation easement assignment strategies.

2 point = parcel is owned by an individual or organization that owns four or more second tier parcels

1 point = parcel is owned by an individual or organization that owns two or three second tier parcels
0 points = owner of parcel does not own any other second tier parcels

Ownership values were summarized in ArcGIS.

Submerged Aquatic Vegetation (SAV)*
Aquatic grasses are important primary producers. Using carbon dioxide and inorganic nutrients as raw materials, they can transform the sun's energy into carbohydrates and proteins. This process, called primary production, is of critical importance, since it forms the basis for food webs (Stevenson et. al, 1979). Beyond trophic and habitat values, these grasses also have water quality benefits as well. The grasses can reduce wave action and baffle currents resulting in decreased turbidity levels and can also assimilate nutrients such as nitrogen and phosphorous. The uptake of these nutrients can render them unavailable for algae, which often grows out of control in nutrient-rich waters.

1 point = parcel is directly adjacent to waters that contain submerged aquatic vegetation
0 points = parcel is not directly adjacent to waters that contain submerged aquatic vegetation

*Submerged aquatic vegetation GIS data was acquired from Liz Noble at East Carolina State University.

RESULTS

The results of this analysis successfully identified multiple individual parcels and clusters of parcels that may potentially improve water quality if acquired for conservation purposes. The water quality enhancement potential of all parcels was determined by summarizing individual parameter values and subsequently classifying the total value into four levels of potential water quality enhancement significance: low, moderate, high, and highest. 137 parcels were classified as having low water quality significance; 56 parcels had moderate significance; 25 had high significance; and 18 were rated as having the highest potential for water quality enhancement. The total possible score for water quality enhancement potential was 29 points. The maximum water quality enhancement score was 22 (one parcel), the minimum was 3 (four parcels), and the mean was 10.6. Figure 7 shows the location and distribution of water quality enhancement scores for all parcels (parcel numbers are depicted in Maps 1-5 in Appendix B, see recommendations section). Table 1 in Appendix A includes each parcel's individual parameter scores, including the total water quality enhancement potential score.

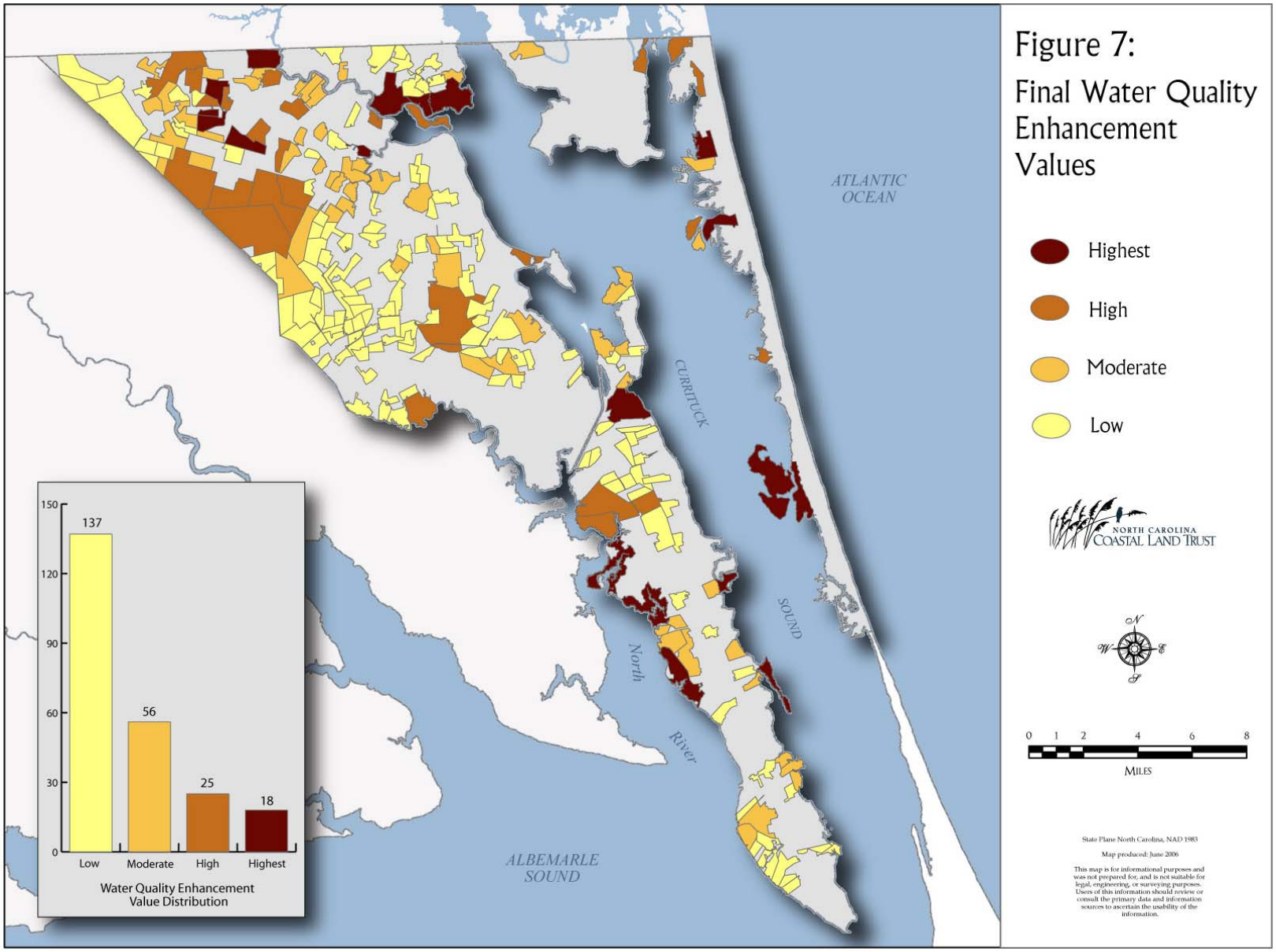
Figure 7:
Final Water Quality Enhancement Values
Highest
High
Moderate
Low
ATLANTIC OCEAN
CURRITUCK SOUND
North River
ALBEMARLE SOUND
NORTH CAROLINA COASTAL LAND TRUST
N
W
E
S
0 1 2 4 6 8
MILES
State Plane North Carolina, NAD 1983
Map produced: June 2006
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150
120
90
60
30
0
137
56
25
18
Low
Moderate
High
Highest
Water Quality Enhancement Value Distribution

RECOMMENDATIONS

The following recommendations are based upon the results of a focused GIS-based analysis restricted to the confines of Currituck County and do not consider cultural, economic, or other factors beyond the scope of this report. Therefore, any actions taken as a result of these recommendations should include field reconnaissance, multiple stakeholder input, organizational collaborations, economic feasibility studies, and other "on the ground" considerations.

From the results of this analysis it is apparent that parcels with the highest water quality enhancement scores were composed of three different land use/cover classes. One class includes undeveloped waterfront properties located along the North River, Currituck Sound, and the Tulls Bay/North Landing River area. The second class consists of agricultural areas surrounding western tributaries of the Northwest River and Tulls River in northwestern Currituck County. The third class consists of wetland areas in central Currituck County in the headwater areas of the North River.

The following recommendations take the form of water quality enhancement strategies that reflect the geographical, hydrological, and ecological characteristics of the regions of interest. The first strategy is based upon conservation of riparian and other waterfront buffer areas to help enhance water quality. The second strategy focuses on preserving existing farmlands and possibly restoring wetland areas to help mediate non-point source pollution from agricultural lands. The third strategy focuses on preserving existing wetland areas to retain and possibly improve water quality of downstream areas.

Five (5) distinct regions in the study area were identified. These regions contained the majority of parcels rated as having the highest potential for water quality enhancement (Maps 1-5, Appendix B). Region 1 consists of agrarian areas that may be best suited for wetland restoration. Regions 2, 4, and 5 consist of undeveloped riparian and waterfront areas. Region 3 consists of natural wetlands that are located within the headwater areas of the North River and Indiantown Creek. Descriptions of parcels with high water quality enhancement scores within each region and subsequent recommendations are given below.

Region 1

This region is primarily characterized by lands that have been ditched, drained, and converted from wetlands to agricultural areas (Map 1, Appendix B). The high water quality enhancement scores in this area were mostly due to large

acreages and extensive surface water frontage values due to the density of agricultural ditching.

The purpose of protection and potential restoration of this area to its relatively natural state is motivated by its influence upon water quality within north Currituck County. This region is one of the few localized headwater areas in the county with the Northwest River, Tulls Creek, and Currituck Sound as the recipients of its runoff. It is heavily ditched and intensely farmed making it a potential source of non-point source pollution. Restoration of wetlands, however, would be extremely expensive and require cooperation among several governmental and non-governmental organizations. Reverting these lands back to natural wetland areas may also have a significant economic impact on the county since large amounts of actively cultivated lands would be taken out of production.

- Parcel 13 has a combination of agricultural and forested lands with significant riparian frontage on Northwest River. This parcel is also adjacent to existing conservation lands in Virginia (Northwest River, Southwestern Marshes Complex);
- Parcels 29, 41, 43, and 45 received high scores because of high irrigation ditch density and high SWAR scores. Their importance individually is modest, but conserved as a group could offer a potential for water quality enhancement;
- Parcels 61, 68, 204, 220, and 223 cover approximately 6,763 acres of ditched agricultural complexes where wetland restoration of Great Dismal Swamp lands may be possible;
- Most of the parcels in this region are located within an EEP Targeted Local Watershed; and
- The hydrology of this area is linked to the Northwest River and Tull Creek riparian areas.

Region 2

This region is located at the confluence of the Northwest River and Tulls Creek where Tulls Bay and North Landing River also merge (Map 2, Appendix B). Parcels 21, 23, 27, 36, 39, 42 and 52 compose the tracts of interest within Region 2. There are multiple ecological, recreational, and water quality parameters contained within this region:

- The seven parcels have approximately 28 miles of frontage along the Northwest River, North Landing River, Tulls Creek and Tulls Bay;
- Their total area is approximately 2,465 acres which is largely composed of undeveloped forest and marsh areas;

- Virginia's North Landing River, Southern Marshes conservation area is just north of this region;
- The parcels contain Exceptionally Significant wetlands as defined by NC-CREWS;
- All of the parcels are within Nationally Significant Natural Heritage Areas (e.g. Nellie Bell Ponds and Marsh, Gibbs Woods/Tulls Bay Marshes, and Troublesome Point/Gibbs Point Forest);
- Parcels 21, 23, and 42 are immediately adjacent to lands that are within the Northwest River Marsh Game Lands;
- Parcel 52 is isolated, yet conservation of this parcel could be used to initiate protection of parcels along Tulls Creek; and
- Parcels 36 and 39 are owned by the same landowner which could decrease the amount of resources and effort during land acquisition phases.

Protection of these parcels would create a riparian conservation corridor along the North Landing River extending from the Pocat River in Virginia to Tulls Bay in North Carolina.

Region 3

This region includes an area of relatively natural wetland areas that are adjacent to the North River Game Lands (Map 3, Appendix B). As with Region 1, this region includes some unique headwater areas. These areas drain primarily into Currituck Sound, East Creek, and Indiantown Creek (the former two being tributaries of the North River). Parcels 92, 97, 102, 112, 125, 135, 146, 153, 154, and 205 make up this region's parcels of interest. The rationales behind inclusion of these parcels as potentially enhancing water quality include:

- All of the parcels are within significantly beneficial NC-CREWS wetland areas with parcel #154 in an exceptionally beneficial wetland area;
- Parcel #135 covers approximately 2,090 acres of wetlands;
- Parcel #154 covers approximately 600 acres of wetlands and has 3.7 miles of stream frontage;
- Parcel #153 is nearly 845 acres in size and is located in Maple Swamp, a relatively intact natural wetland area;
- Parcels 135, 146, and 154 are adjacent to the North River Game Lands; and
- All of the land parcels in this region (excluding #'s 92 and 154) are undeveloped.

Parcels 92, 135, 153 and 154 should be considered first for conservation since their large area and inclusion of wetlands may possibly have a greater impact on enhancement of water quality than the other smaller, peripheral parcels.

Region 4

This region includes undeveloped marsh and bottomland hardwood areas on the banks of the North River (Map 4, Appendix B). As with Region 2, this area is significant for its ecological values and preservation of a significant amount of riparian frontage and wetland areas. The parcels of interest in this region include parcels 170, 174, 175, 177, 178, 180, 181, 183, and 190. Water quality enhancement and ecological values include:

- The parcels have a total of approximately 32 miles of surface water frontage;
- The parcels are adjacent to the North River Game Lands as well as each other;
- The parcels cover approximately 5,160 acres of undeveloped lands;
- The parcels contain exceptional and significant NC-CREWS wetlands;
- Most of the parcels are within the North River/Deep Creek Significant Natural Heritage Area of State Significance; and
- Parcels 175, 177, 180, 181, and 183 are owned by a single landowner.

Region 5

Region 5 includes parcels located on the Outer Banks of Currituck County (Map 5, Appendix B). These parcels are located adjacent to other protected areas including the Currituck National Wildlife Refuge, the Currituck Banks Estuarine Preserve, and the Pine Island Audubon Sanctuary (Figure 1). Conservation of these parcels would create contiguous tracts of protected land along the Outer Banks. Conservation for purposes of water quality enhancement is not the primary motivation for pursuing protection of these lands. Since human population density is low and agriculture is non-existent, these parcels are not the most desirable tracts of land for improving water quality. Instead, they would be instrumental in protecting wildlife habitat and inhibiting further residential development, both of which are compatible for future efforts to preserve water quality.

CONCLUSION

This study successfully identified multiple land parcels within Currituck County that possess a potential to enhance surface water quality in Currituck Sound and the county's major river systems. This study, however, is only the first step in a long and complex process to improve water quality in Currituck County. Further work, including landowner contact, field reconnaissance, multi-jurisdictional cooperative efforts, and economic viability studies must occur in order to facilitate a successful and efficient water quality enhancement strategy.

From the recommendations, it is clear that there are many individual and groups of parcels that are potential candidates for conservation. Eventual conservation of these parcels is primarily dependent upon landowner cooperation and reliable project funding sources.

It is anticipated that this report will help facilitate an efficient and effective land conservation strategy that focuses on the enhancement of water quality in Currituck County. Along with potential improvements in water quality, citizens of the county and the region will also benefit from increased recreational opportunities, wildlife habitat areas, tourism revenues, landscape aesthetics, and local and regional planning compatibility. It is evident that improvements in water quality extend well beyond what comes out of our faucets. Clean and readily available water supplies are crucial to the livelihood and quality of life for all coastal North Carolina citizens.

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APPENDIX A (water quality enhancement scores)

Parcel #	AREA	SWF	SWAR	WET	CONS	LAND	NAT	EEP	OWN	ANOP	URB	MINE	SAV	**TOTAL**
177	4	4	3	3	2	2	1	0	2	0	0.5	0.0	0	**22**
175	4	4	3	3	2	2	1	0	2	0	0.0	0.0	0	**21**
23	4	3	1	3	2	1	1	1	0	1	2.0	0.0	0	**19**
43	3	4	3	3	0	0	0	1	2	0	2.0	1.0	0	**19**
45	3	4	4	2	0	0	0	1	2	0	2.0	1.0	0	**19**
145	4	4	2	3	0	2	1	0	0	0	2.0	0.0	1	**19**
176	2	3	4	3	2	2	0	0	0	0	2.0	0.0	1	**19**
13	3	3	2	3	2	0	1	1	1	0	1.0	0.5	0	**18**
27	4	4	3	3	0	1	1	1	0	0	1.0	0.0	0	**18**
29	3	4	4	2	0	0	0	1	0	0	2.0	2.0	0	**18**
36	2	4	4	3	0	2	1	1	0	0	1.0	0.0	0	**18**
48	3	3	2	3	2	2	1	0	1	0	0.0	0.0	1	**18**
183	4	4	2	3	0	1	1	0	2	0	0.5	0.5	0	**18**
41	1	3	4	2	0	0	0	1	2	0	2.0	2.0	0	**17**
52	1	2	3	3	2	2	1	1	0	0	2.0	0.0	0	**17**
75	3	3	2	3	2	2	1	0	0	0	0.0	0.0	1	**17**
153	4	3	1	3	0	2	1	0	0	0	2.0	0.0	1	**17**
184	2	4	4	3	0	2	0	0	0	0	0.5	0.5	1	**17**
1	3	2	2	3	2	2	1	0	0	0	0.0	0.0	1	**16**
12	2	3	4	2	0	0	0	1	0	0	2.0	2.0	0	**16**
14	4	3	1	3	0	0	0	1	0	0	2.0	2.0	0	**16**
22	2	3	3	3	2	0	0	1	0	0	1.0	0.5	0	**16**
61	4	4	2	2	0	0	0	1	0	0	1.0	2.0	0	**16**
68	4	4	2	2	0	0	0	1	0	0	1.0	2.0	0	**16**
139	1	2	3	3	2	2	0	0	0	0	2.0	0.0	1	**16**
170	4	2	1	3	2	2	1	0	0	0	0.5	0.0	0	**16**
174	3	3	2	3	2	2	1	0	0	0	0.0	0.0	0	**16**
204	4	4	2	2	0	0	0	1	1	0	2.0	0.5	0	**16**
220	4	3	2	2	0	0	0	1	1	0	2.0	0.5	0	**16**
223	4	4	2	2	0	1	0	1	0	0	0.5	2.0	0	**16**
2	2	3	3	3	2	1	0	0	0	0	0.0	0.0	1	**15**
7	2	2	2	3	2	2	1	0	0	0	0.0	0.0	1	**15**
19	3	3	2	2	0	0	0	1	0	0	2.0	2.0	0	**15**
35	2	3	3	2	0	0	1	1	0	0	1.0	2.0	0	**15**
39	3	4	3	0	0	1	1	1	0	0	2.0	0.0	0	**15**
42	1	1	2	3	2	2	1	1	0	0	2.0	0.0	0	**15**
76	2	3	3	0	2	2	1	0	1	0	0.0	0.0	1	**15**
89	2	3	3	3	0	0	1	1	0	0	1.0	0.0	1	**15**
135	4	3	1	3	0	2	1	1	0	0	0.0	0.0	0	**15**
154	4	3	2	3	2	0	1	0	0	0	0.0	0.0	0	**15**
216	2	3	3	2	0	0	0	1	0	0	2.0	2.0	0	**15**
219	2	3	3	2	0	0	0	1	0	0	2.0	2.0	0	**15**
231	2	4	4	0	0	0	0	1	0	0	2.0	2.0	0	**15**
8	2	1	1	3	2	1	1	1	0	0	0.5	1.0	0	**14**
10	3	4	3	2	0	0	0	1	0	0	0.5	1.0	0	**14**
17	1	2	2	3	2	2	1	1	0	0	0.5	0.0	0	**14**
20	1	2	3	3	2	0	0	1	1	0	1.0	0.5	0	**14**
24	1	1	2	3	2	2	1	1	0	0	0.5	1.0	0	**14**
47	2	3	4	0	0	0	0	1	2	0	1.0	0.5	0	**14**

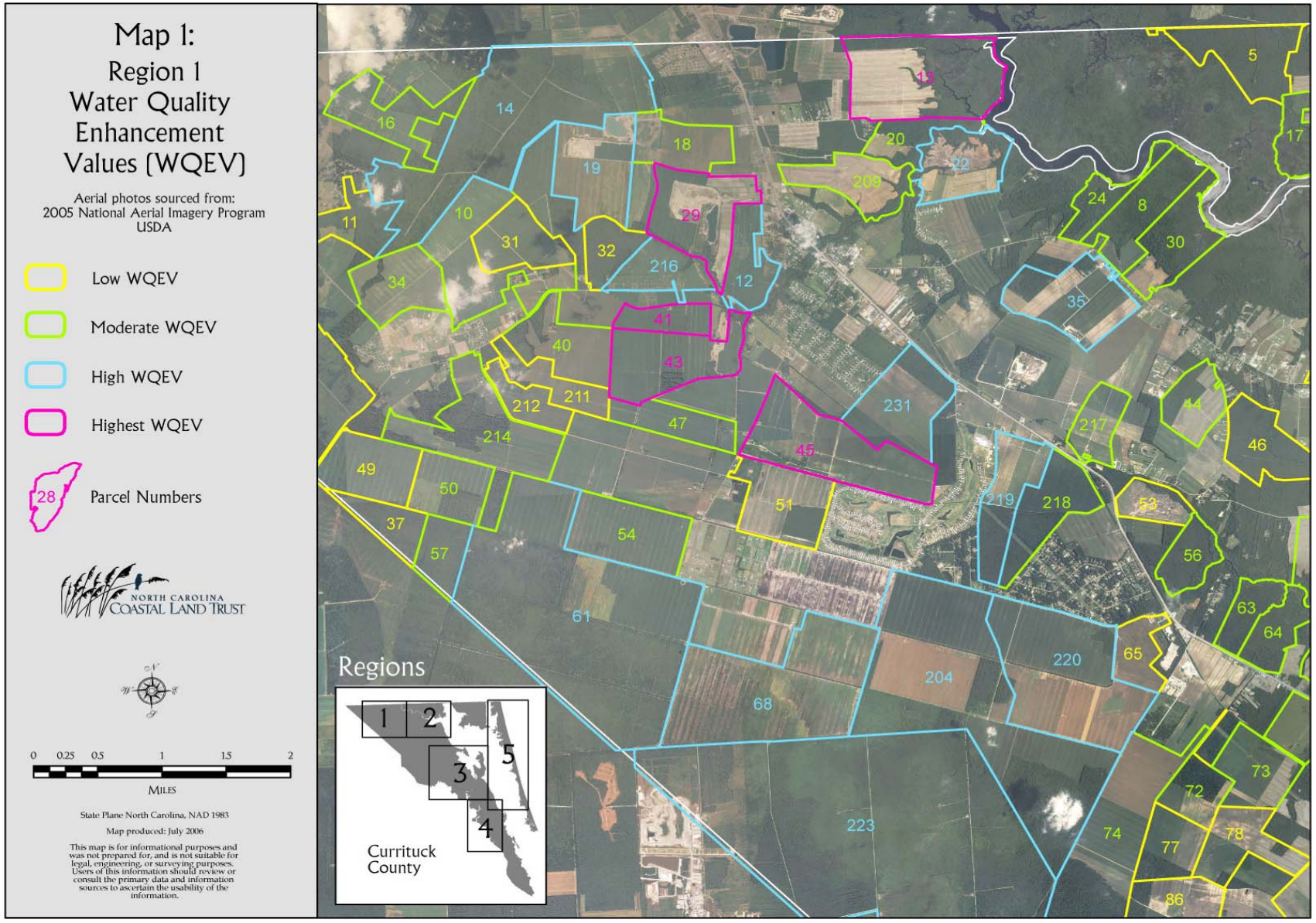
Parcel #	AREA	SWF	SWAR	WET	CONS	LAND	NAT	EEP	OWN	ANOP	URB	MINE	SAV	**TOTAL**
58	3	2	2	3	0	0	1	1	2	0	0.5	0.0	0	**14**
62	3	3	2	3	0	0	1	1	0	0	0.5	0.0	0	**14**
82	1	3	3	0	2	2	1	0	1	0	0.0	0.0	1	**14**
93	2	2	3	3	0	2	1	1	0	0	0.0	0.0	0	**14**
101	3	3	2	3	0	1	1	0	0	0	0.5	0.0	1	**14**
126	3	3	2	3	0	2	1	0	0	0	0.5	0.0	0	**14**
150	1	2	3	3	0	2	1	0	0	0	0.5	0.0	1	**14**
181	3	2	1	3	0	2	1	0	2	0	0.5	0.0	0	**14**
190	1	2	3	3	0	2	1	0	1	0	0.5	0.0	0	**14**
191	2	3	3	3	0	2	0	0	0	0	0.5	0.0	1	**14**
209	2	3	3	2	0	0	0	1	0	0	2.0	1.0	0	**14**
214	3	4	3	2	0	0	0	1	0	0	0.5	0.5	0	**14**
218	2	3	3	2	0	0	0	1	0	0	2.0	1.0	0	**14**
226	4	1	1	3	0	2	1	0	0	0	2.0	0.0	0	**14**
230	2	3	3	3	0	0	0	1	1	0	0.5	0.0	0	**14**
18	2	3	3	0	0	0	0	1	0	0	2.0	2.0	0	**13**
59	2	1	2	3	0	2	1	1	0	0	1.0	0.0	0	**13**
67	3	3	2	3	0	0	0	1	0	0	1.0	0.0	0	**13**
146	3	1	1	3	2	2	1	0	0	0	0.0	0.0	0	**13**
178	2	1	1	3	2	2	1	0	0	0	1.0	0.0	0	**13**
208	2	2	2	3	2	0	0	0	0	0	2.0	0.0	0	**13**
215	2	2	2	3	2	0	1	0	0	0	0.0	0.0	1	**13**
3	3	1	1	3	2	1	1	0	0	0	0.0	0.0	0	**12**
16	2	3	3	2	0	0	0	1	0	0	0.5	1.0	0	**12**
21	2	2	2	3	2	0	1	0	0	0	0.5	0.0	0	**12**
30	2	1	1	3	2	0	1	1	0	0	0.5	1.0	0	**12**
34	2	3	3	2	0	0	0	1	0	0	0.0	0.5	0	**12**
40	2	3	3	2	0	0	0	1	0	0	0.5	1.0	0	**12**
44	1	3	3	2	0	0	0	1	0	0	0.5	1.0	0	**12**
54	2	2	2	1	0	0	0	1	2	0	1.0	0.5	0	**12**
56	1	2	2	2	0	2	0	1	0	0	2.0	0.5	0	**12**
57	1	2	2	2	0	2	1	1	0	0	0.0	0.5	0	**12**
63	1	1	2	3	0	2	0	1	1	0	1.0	0.0	0	**12**
64	1	1	2	3	0	2	1	1	0	0	1.0	0.0	0	**12**
66	2	2	3	3	0	0	1	1	0	0	0.5	0.0	0	**12**
73	2	2	2	3	0	0	0	1	1	0	0.5	0.0	0	**12**
74	4	3	1	2	0	0	0	1	0	0	1.0	0.0	0	**12**
85	1	1	1	2	0	2	1	1	2	0	0.5	0.0	0	**12**
91	4	3	1	2	0	0	0	1	0	0	0.0	0.5	0	**12**
92	4	1	1	2	0	0	1	1	2	0	0.5	0.0	0	**12**
133	1	2	3	3	0	2	1	0	0	0	0.0	0.0	0	**12**
142	3	0	0	3	2	2	1	0	1	0	0.0	0.0	0	**12**
180	3	0	0	3	0	2	1	0	2	0	1.0	0.5	0	**12**
182	2	2	1	3	0	0	0	0	0	0	2.0	0.5	1	**12**
186	1	2	3	3	0	0	0	0	0	0	0.5	2.0	1	**12**
188	1	2	3	3	0	2	0	0	0	0	0.5	0.0	1	**12**
193	1	2	2	3	0	2	0	0	0	0	0.5	0.0	1	**12**
195	2	2	1	3	0	2	1	0	0	0	1.0	0.0	0	**12**
217	1	3	4	0	0	0	0	1	0	0	1.0	2.0	0	**12**
227	3	3	2	3	0	0	0	1	0	0	0.5	0.0	0	**12**
5	2	0	0	3	2	2	1	1	0	0	0.0	0.0	0	**11**
6	4	0	0	2	0	2	1	1	1	0	0.0	0.0	0	**11**

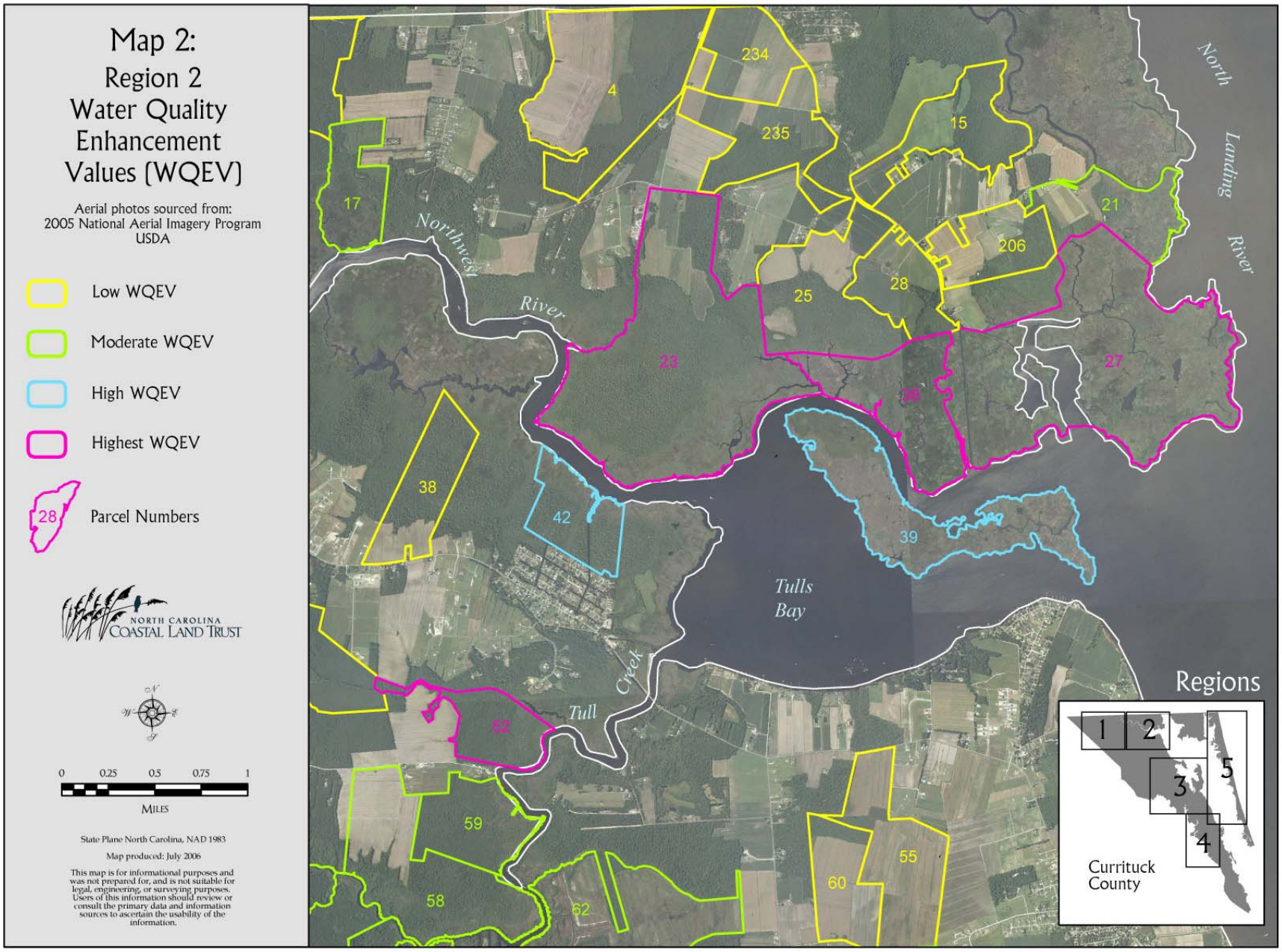
Parcel #	AREA	SWF	SWAR	WET	CONS	LAND	NAT	EEP	OWN	ANOP	URB	MINE	SAV	**TOTAL**
38	2	0	0	3	2	0	1	1	0	0	2.0	0.0	0	**11**
86	3	3	2	2	0	0	0	1	0	0	0.0	0.0	0	**11**
110	3	3	1	2	0	2	0	0	0	0	0.0	0.0	0	**11**
125	3	0	0	3	0	2	1	1	1	0	0.0	0.0	0	**11**
163	1	1	1	2	2	2	1	0	0	0	1.0	0.0	0	**11**
173	4	0	0	3	2	1	1	0	0	0	0.0	0.0	0	**11**
197	1	2	3	3	0	0	0	0	0	0	1.0	0.0	1	**11**
200	3	1	1	3	0	0	1	0	0	0	2.0	0.0	0	**11**
201	3	1	1	3	0	0	1	0	0	0	2.0	0.0	0	**11**
210	2	1	1	2	0	2	0	1	0	0	2.0	0.0	0	**11**
211	1	3	3	2	0	0	0	1	0	0	0.5	0.5	0	**11**
224	2	3	3	2	0	0	0	0	0	0	0.0	1.0	0	**11**
228	2	3	3	2	0	0	0	1	0	0	0.0	0.0	0	**11**
15	2	1	1	3	2	0	1	0	0	0	0.0	0.0	0	**10**
31	2	2	2	2	0	0	0	1	0	0	0.5	1.0	0	**10**
32	1	1	1	2	0	1	0	1	0	0	0.5	2.0	0	**10**
46	2	1	1	2	0	2	0	1	0	0	1.0	0.5	0	**10**
51	2	2	1	2	0	0	0	1	0	0	2.0	0.5	0	**10**
53	1	1	2	3	0	0	0	1	0	0	2.0	0.5	0	**10**
65	1	1	2	2	0	0	0	1	1	0	2.0	0.0	0	**10**
72	1	2	3	2	0	0	0	1	0	0	0.5	0.0	0	**10**
77	2	2	2	2	0	0	0	1	0	0	0.5	0.0	0	**10**
78	2	2	2	3	0	0	0	1	0	0	0.5	0.0	0	**10**
79	2	0	0	2	0	0	1	1	2	0	2.0	0.0	0	**10**
80	2	2	2	2	0	0	0	1	0	0	0.0	0.5	0	**10**
81	1	0	0	2	0	2	1	1	2	0	0.5	0.0	0	**10**
84	2	1	1	2	0	1	1	1	0	0	0.5	0.0	0	**10**
87	2	1	1	3	0	2	0	1	0	0	0.0	0.0	0	**10**
102	2	1	1	2	0	2	1	1	0	0	0.0	0.0	0	**10**
108	3	3	2	2	0	0	0	0	0	0	0.0	0.0	0	**10**
155	2	2	2	2	0	2	0	0	0	0	0.0	0.0	0	**10**
166	1	0	0	2	2	2	1	0	1	0	0.5	0.0	0	**10**
185	2	1	1	3	0	0	0	0	1	0	0.5	1.0	0	**10**
194	1	1	1	3	0	2	1	0	0	0	0.5	0.0	0	**10**
199	2	1	1	3	0	0	1	0	0	0	2.0	0.0	0	**10**
202	1	1	1	3	0	1	1	0	0	0	2.0	0.0	0	**10**
235	2	2	2	2	0	0	1	0	0	1	0.0	0.0	0	**10**
236	1	1	1	3	0	1	1	0	0	0	2.0	0.0	0	**10**
9	3	0	0	2	0	2	1	1	0	0	0.0	0.0	0	**9**
37	1	1	2	2	0	1	1	1	0	0	0.0	0.0	0	**9**
50	2	2	2	0	0	0	0	1	2	0	0.0	0.0	0	**9**
69	2	1	1	2	0	0	0	1	0	0	2.0	0.0	0	**9**
70	1	1	1	3	0	2	0	1	0	0	0.0	0.0	0	**9**
94	2	2	2	2	0	0	0	1	0	0	0.0	0.0	0	**9**
98	1	2	3	2	0	0	0	1	0	0	0.0	0.0	0	**9**
107	2	2	2	2	0	0	0	0	1	0	0.0	0.0	0	**9**
122	3	3	1	2	0	0	0	0	0	0	0.0	0.0	0	**9**
151	2	0	0	3	2	0	1	0	1	0	0.0	0.0	0	**9**
156	2	2	3	2	0	0	0	0	0	0	0.0	0.0	0	**9**
157	2	3	2	2	0	0	0	0	0	0	0.0	0.0	0	**9**
161	2	0	0	3	0	2	1	0	0	0	1.0	0.0	0	**9**
162	1	0	0	2	2	2	1	0	0	0	1.0	0.0	0	**9**

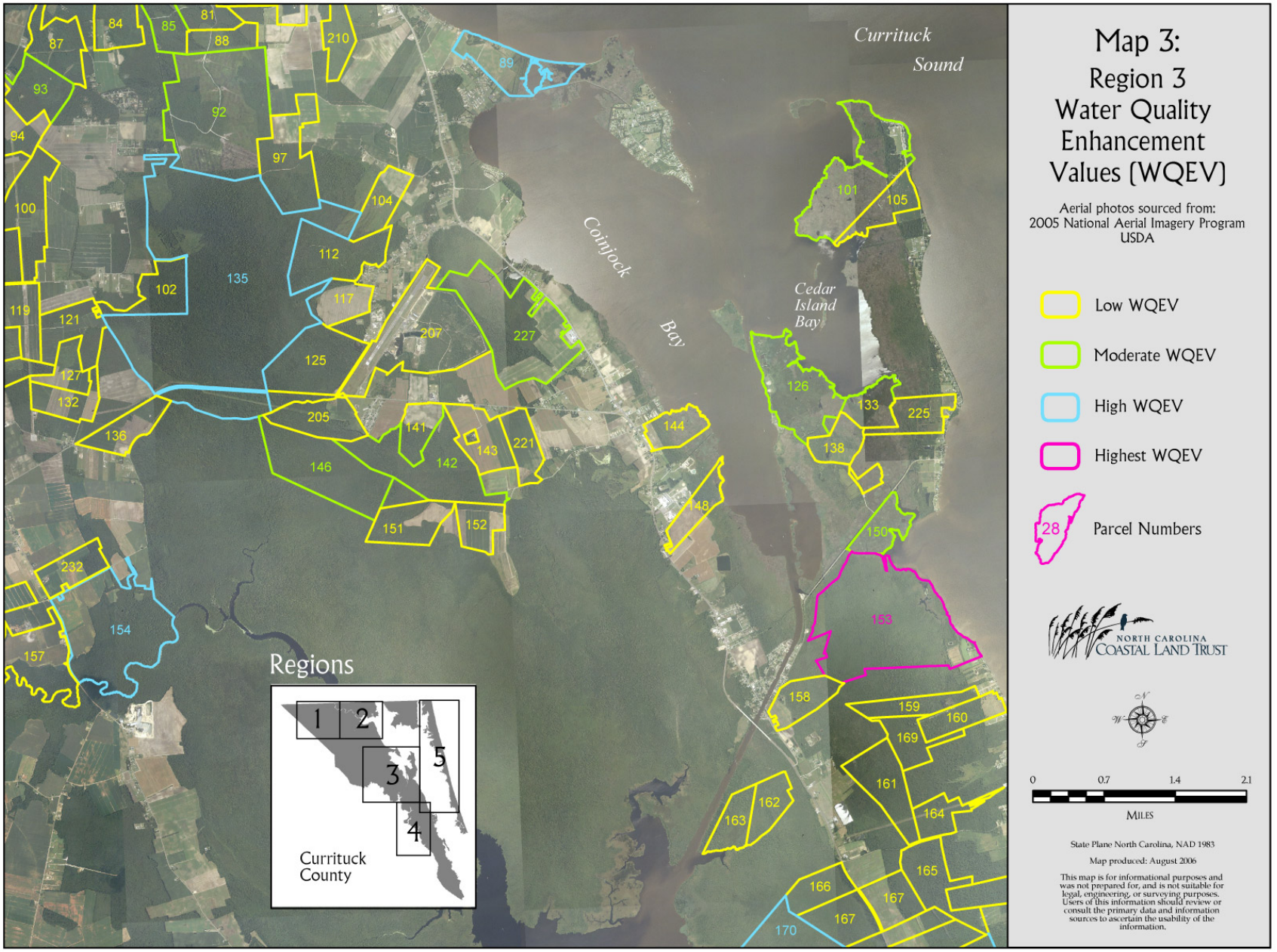
Parcel #	AREA	SWF	SWAR	WET	CONS	LAND	NAT	EEP	OWN	ANOP	URB	MINE	SAV	**TOTAL**
169	1	0	0	3	0	2	1	0	1	0	1.0	0.0	0	**9**
189	2	0	0	2	2	0	1	0	1	0	1.0	0.0	0	**9**
205	2	1	1	3	0	1	1	0	0	0	0.0	0.0	0	**9**
212	1	3	3	0	0	0	0	1	0	0	0.5	0.5	0	**9**
234	1	4	4	0	0	0	0	0	0	0	0.0	0.0	0	**9**
4	3	0	0	2	0	0	1	1	0	1	0.5	0.0	0	**8**
25	2	0	0	3	0	0	1	1	0	0	0.5	0.0	0	**8**
33	4	0	0	2	0	0	1	1	0	0	0.0	0.0	0	**8**
55	2	1	1	2	0	0	0	1	0	0	1.0	0.0	0	**8**
88	1	0	0	2	0	0	1	1	2	0	0.5	0.0	0	**8**
95	3	1	1	2	0	0	0	1	0	0	0.0	0.0	0	**8**
99	2	1	1	2	0	0	0	1	1	0	0.0	0.0	0	**8**
100	2	2	1	2	0	0	0	1	0	0	0.0	0.0	0	**8**
105	1	1	1	3	0	0	1	0	0	0	0.5	0.0	0	**8**
112	2	0	0	2	0	2	1	1	0	0	0.0	0.0	0	**8**
136	1	0	0	3	2	0	1	1	0	0	0.0	0.0	0	**8**
138	1	0	0	3	0	2	1	0	0	0	0.5	0.0	0	**8**
144	1	1	2	3	0	0	0	1	0	0	0.5	0.0	0	**8**
148	1	1	1	3	0	0	0	1	0	0	1.0	0.0	0	**8**
159	1	0	0	3	0	2	1	0	0	0	1.0	0.0	0	**8**
164	1	0	0	3	0	2	1	0	0	0	0.5	0.0	0	**8**
165	2	0	0	3	0	2	1	0	0	0	0.5	0.0	0	**8**
167	3	0	0	3	0	0	1	0	0	0	0.5	0.0	0	**8**
187	2	1	1	2	0	0	0	0	0	0	0.5	2.0	0	**8**
192	2	1	1	3	0	0	0	0	0	0	1.0	0.0	0	**8**
196	1	1	1	3	0	0	1	0	0	0	1.0	0.0	0	**8**
198	1	1	1	3	0	0	0	0	0	0	2.0	0.0	0	**8**
225	1	1	1	3	0	0	1	0	0	0	0.0	0.0	1	**8**
26	3	0	0	2	0	0	1	1	0	0	0.0	0.0	0	**7**
49	2	2	2	0	0	0	0	1	0	0	0.0	0.0	0	**7**
71	1	1	1	2	0	0	0	1	0	0	1.0	0.0	0	**7**
113	2	1	1	2	0	0	0	1	0	0	0.0	0.0	0	**7**
121	2	1	1	2	0	0	0	1	0	0	0.0	0.0	0	**7**
127	1	1	2	2	0	0	0	1	0	0	0.0	0.0	0	**7**
128	1	1	2	2	0	0	0	0	1	0	0.0	0.0	0	**7**
129	2	2	1	2	0	0	0	0	0	0	0.0	0.0	0	**7**
130	2	1	1	2	0	0	0	0	1	0	0.0	0.0	0	**7**
132	1	1	2	2	0	0	0	1	0	0	0.0	0.0	0	**7**
149	1	1	2	3	0	0	0	0	0	0	0.0	0.0	0	**7**
158	1	0	0	3	0	0	1	0	0	0	2.0	0.0	0	**7**
171	2	0	0	3	0	0	1	0	1	0	0.0	0.0	0	**7**
233	2	2	2	0	0	0	0	1	0	0	0.0	0.0	0	**7**
28	1	0	0	3	0	0	1	1	0	0	0.5	0.0	0	**6**
96	1	2	2	0	0	0	0	1	0	0	0.0	0.0	0	**6**
97	2	0	0	2	0	0	1	1	0	0	0.5	0.0	0	**6**
103	1	2	3	0	0	0	0	0	0	0	0.0	0.0	0	**6**
104	1	0	0	2	0	0	1	1	1	0	0.5	0.0	0	**6**
106	1	1	1	2	0	0	0	0	1	0	0.0	0.0	0	**6**
109	2	2	2	0	0	0	0	0	0	0	0.0	0.0	0	**6**
118	1	2	2	0	0	0	0	0	1	0	0.0	0.0	0	**6**
119	2	1	1	2	0	0	0	0	0	0	0.0	0.0	0	**6**
124	1	2	3	0	0	0	0	0	0	0	0.0	0.0	0	**6**

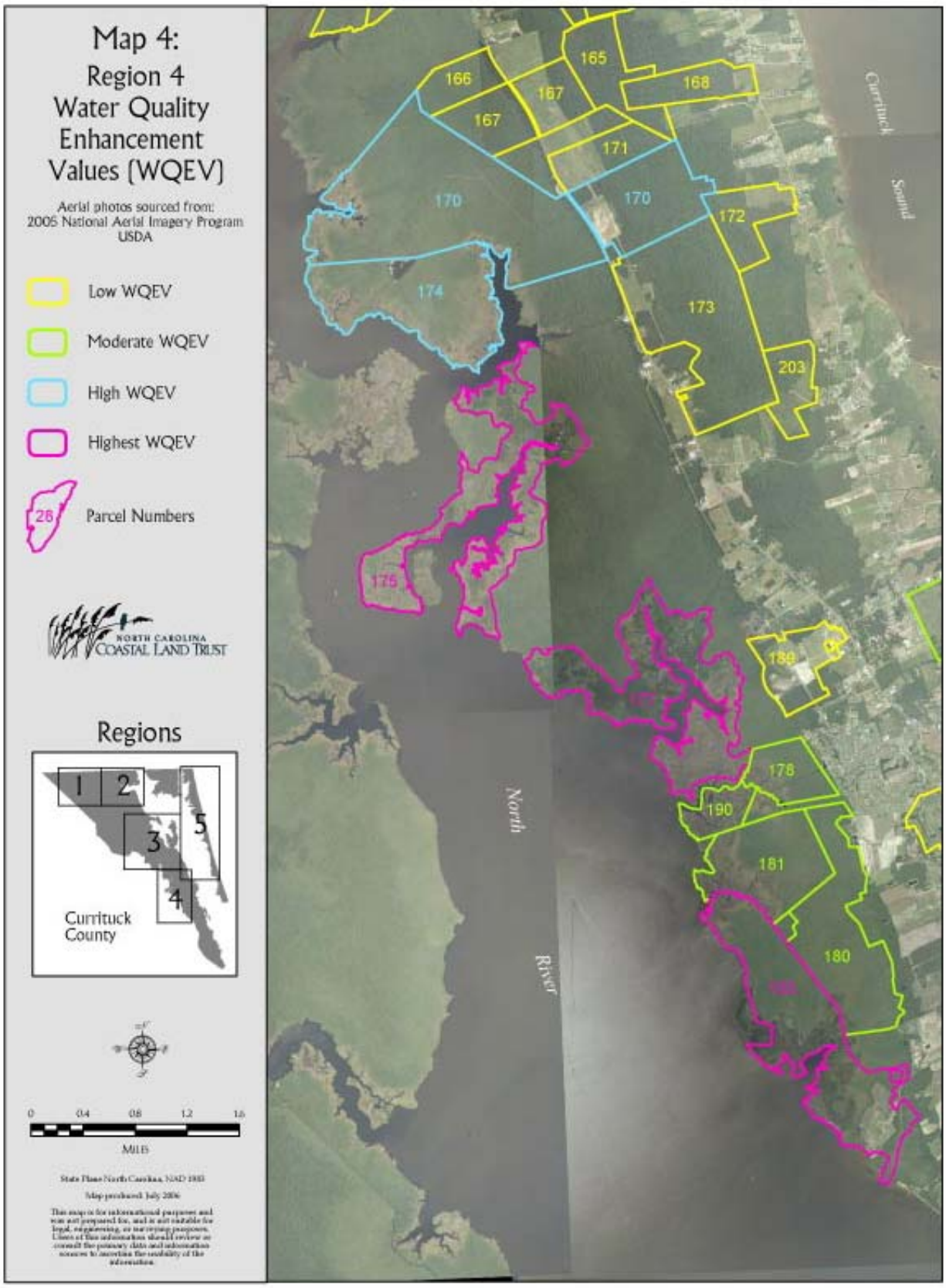
Parcel #	AREA	SWF	SWAR	WET	CONS	LAND	NAT	EEP	OWN	ANOP	URB	MINE	SAV	**TOTAL**
140	1	1	2	2	0	0	0	0	0	0	0.0	0.0	0	**6**
160	1	0	0	3	0	0	1	0	0	0	0.5	0.0	0	**6**
168	2	0	0	3	0	0	1	0	0	0	0.0	0.0	0	**6**
172	2	0	0	3	0	0	1	0	0	0	0.0	0.0	0	**6**
206	1	0	0	3	0	0	1	0	0	0	0.5	0.0	0	**6**
207	3	0	0	2	0	0	0	1	0	0	0.0	0.0	0	**6**
60	1	0	0	2	0	0	0	1	0	0	1.0	0.0	0	**5**
83	2	1	1	0	0	0	0	1	0	0	0.0	0.0	0	**5**
90	2	1	1	0	0	0	0	1	0	0	0.0	0.0	0	**5**
114	1	2	2	0	0	0	0	0	0	0	0.0	0.0	0	**5**
117	1	0	0	2	0	0	1	1	0	0	0.0	0.0	0	**5**
131	1	1	1	2	0	0	0	0	0	0	0.0	0.0	0	**5**
137	1	2	2	0	0	0	0	0	0	0	0.0	0.0	0	**5**
141	1	0	0	3	0	0	1	0	0	0	0.0	0.0	0	**5**
147	1	1	1	2	0	0	0	0	0	0	0.0	0.0	0	**5**
152	1	0	0	2	2	0	0	0	0	0	0.0	0.0	0	**5**
179	1	0	0	2	0	0	0	0	0	0	2.0	0.0	0	**5**
203	1	0	0	3	0	0	1	0	0	0	0.0	0.0	0	**5**
213	1	0	0	3	0	0	0	0	0	0	1.0	0.0	0	**5**
221	1	0	0	3	0	0	0	0	1	0	0.0	0.0	0	**5**
222	1	1	1	2	0	0	0	0	0	0	0.0	0.0	0	**5**
11	1	0	0	2	0	0	0	1	0	0	0.0	0.5	0	**4**
111	2	1	1	0	0	0	0	0	0	0	0.0	0.0	0	**4**
115	1	1	2	0	0	0	0	0	0	0	0.0	0.0	0	**4**
116	1	1	2	0	0	0	0	0	0	0	0.0	0.0	0	**4**
120	1	1	2	0	0	0	0	0	0	0	0.0	0.0	0	**4**
123	1	1	2	0	0	0	0	0	0	0	0.0	0.0	0	**4**
134	1	1	1	0	0	0	0	0	0	0	0.0	0.0	0	**3**
143	2	0	0	0	0	0	0	0	1	0	0.0	0.0	0	**3**
229	2	0	0	0	0	0	0	1	0	0	0.0	0.0	0	**3**
232	1	0	0	2	0	0	0	0	0	0	0.0	0.0	0	**3**

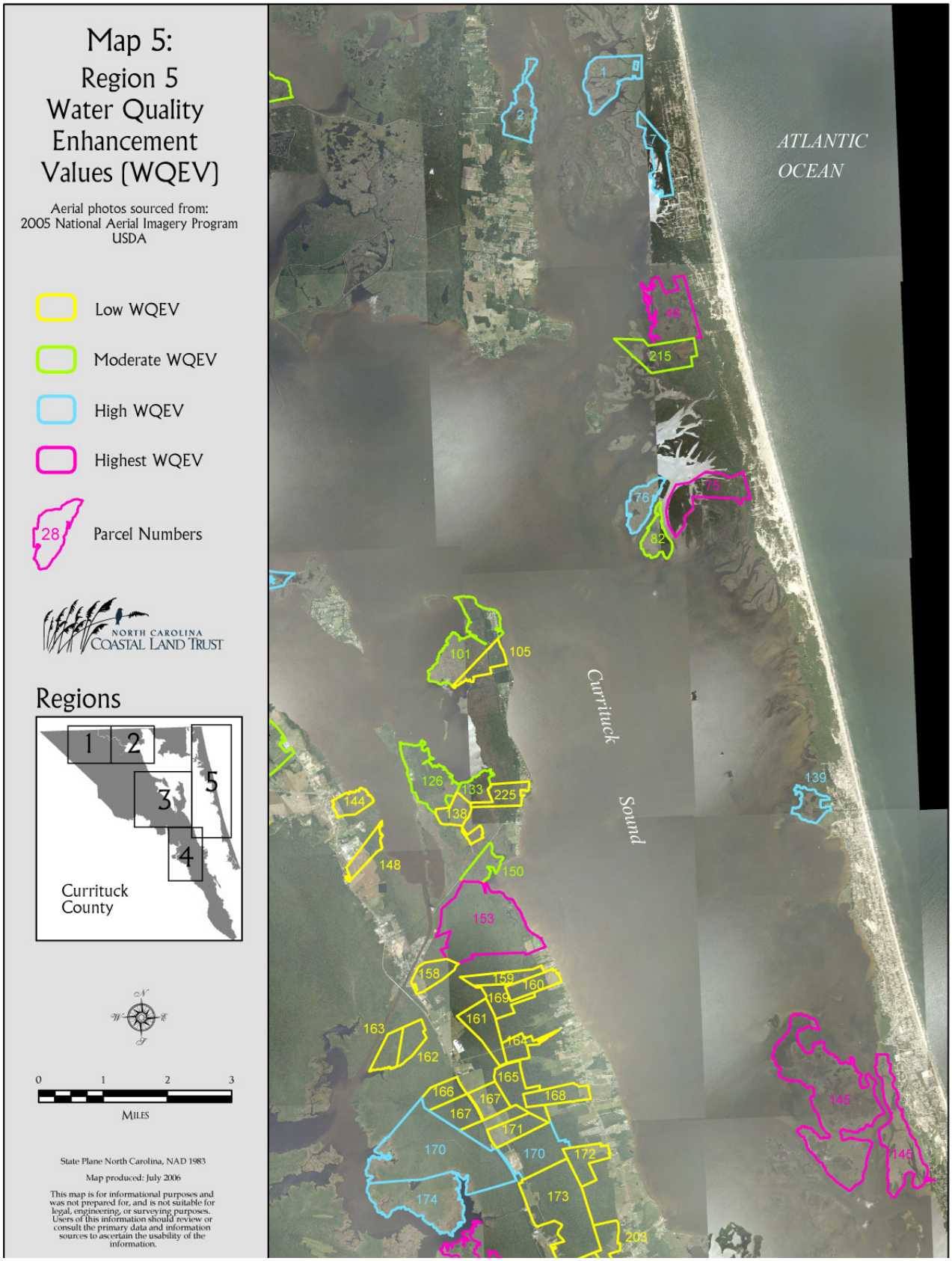
APPENDIX B (maps)


Map 1:
Region 1
Water Quality
Enhancement
Values (WQEV)
Aerial photos sourced from:
2005 National Aerial Imagery Program
USDA
Low WQEV
Moderate WQEV
High WQEV
Highest WQEV
28
Parcel Numbers
NORTH CAROLINA
COASTAL LAND TRUST
0 0.25 0.5 1 1.5 2
MILES
State Plane North Carolina, NAD 1983
Map produced: July 2006
This map is for informational purposes and was not prepared for, and is not suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.
Regions
1
2
3
4
5
Currituck
County


Map 2:
Region 2
Water Quality
Enhancement
Values (WQEV)
Aerial photos sourced from:
2005 National Aerial Imagery Program
USDA
Low WQEV
Moderate WQEV
High WQEV
Highest WQEV
28
Parcel Numbers
NORTH CAROLINA
COASTAL LAND TRUST
0 0.25 0.5 0.75 1
MILES
State Plane North Carolina, NAD 1983
Map produced: July 2006
This map is for informational purposes and was not prepared for, and is not suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.
234
4
235
15
17
21
206
Northwest River
North Landing River
25
28
23
27
38
42
39
Tulls Bay
Tull Creek
52
59
58
62
60
55
Regions
1
2
3
4
5
Currituck County


Map 3:
Region 3
Water Quality
Enhancement
Values (WQEV)
Aerial photos sourced from:
2005 National Aerial Imagery Program
USDA
Low WQEV
Moderate WQEV
High WQEV
Highest WQEV
28
Parcel Numbers
NORTH CAROLINA
COASTAL LAND TRUST
0
0.7
1.4
2.1
MILES
State Plane North Carolina, NAD 1983
Map produced: August 2006
This map is for informational purposes and was not prepared for, and is not suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.
Currituck
Sound
Coinjock
Bay
Cedar
Island
Bay
Regions
1
2
3
4
5
Currituck
County


Map 4:
Region 4
Water Quality
Enhancement
Values (WQEV)
Aerial photos sourced from:
2005 National Aerial Imagery Program
USDA
Low WQEV
Moderate WQEV
High WQEV
Highest WQEV
26
Parcel Numbers
NORTH CAROLINA
COASTAL LAND TRUST
Regions
1
2
3
4
5
Currituck
County
0
0.4
0.8
1.2
1.6
MILES
165
166
167
167
168
171
170
170
172
174
173
203
175
189
178
190
181
180
Currituck
Sound
North
River


Map 5:
Region 5
Water Quality
Enhancement
Values (WQEV)
Aerial photos sourced from:
2005 National Aerial Imagery Program
USDA
Low WQEV
Moderate WQEV
High WQEV
Highest WQEV
28
Parcel Numbers
NORTH CAROLINA
COASTAL LAND TRUST
Regions
1
2
3
4
5
Currituck
County
0
1
2
3
MILES
State Plane North Carolina, NAD 1983
Map produced: July 2006
This map is for informational purposes and was not prepared for, and is not suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.
ATLANTIC
OCEAN
Currituck
Sound
1
2
7
48
215
75
76
82
101
105
126
133
225
138
139
144
148
150
153
158
159
160
169
161
163
164
162
165
166
167
168
167
171
170
170
172
174
173
209
145
146