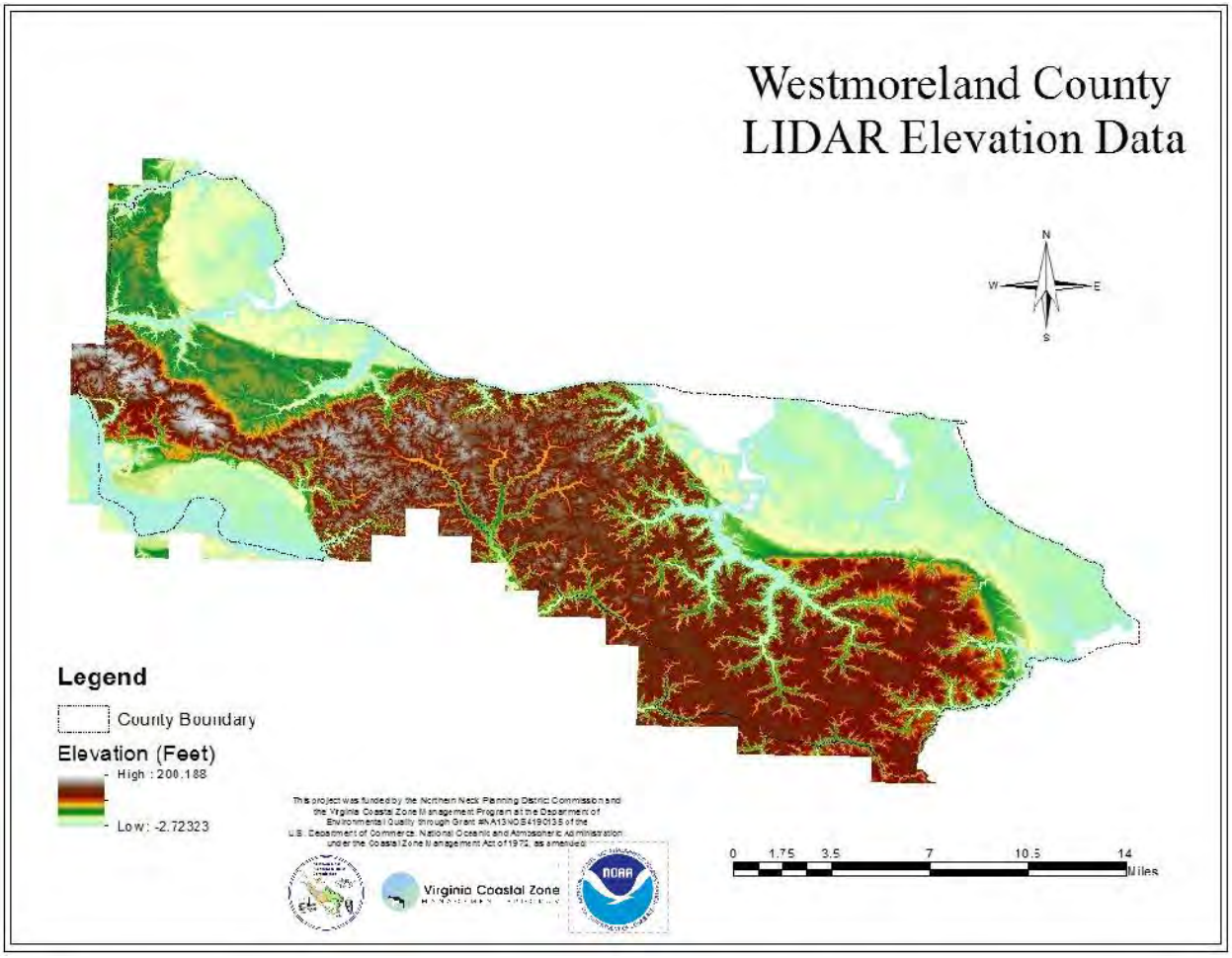
Northern Neck Planning District Commission
Virginia Coastal Zone Management Program
Technical Assistance Grant FY 13, Task 45
Final Report



This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA13NOS4190135 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

Northern Neck Planning District Commission
Technical Assistance Grant FY 13, Task 45
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I. Coastal Management Support

NNPDC staff creates maps using the PDC's Geographic Information System supporting its member counties, partner agencies, and non-profit organizations in managing coastal resources, on an as needed basis. The following report details the maps created for whom and the purposes behind the creation of the maps. The maps created are categorized by the requesting organization, and a brief description of each map is given along with an image of the map.

Lancaster County

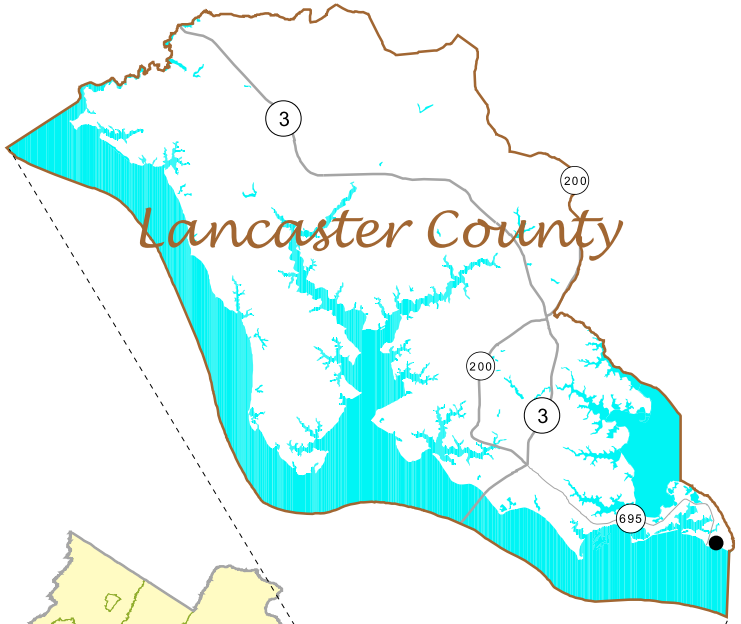
Lancaster County has the least amount of public access points of any of the four Northern Neck Counties. As stated in the Lancaster County Comprehensive plan, 97% of the 330 miles of shoreline in Lancaster County is privately owned, which makes obtaining public access sites difficult. There are only two public powerboat access sites in Lancaster County: one at Belle Isle State Park (which charges a fee for parking) and the other at Greenvale Creek Boat Ramp, which has problems with shoaling of the channel at the mouth of Greenvale Creek where it meets the Rappahannock River.

Lancaster County requested assistance from the NNPDC in preparing a grant application for the Virginia Department of Game and Inland Fisheries (VDGIF) Grants to Localities Program for Public Boating Access Facilities for a large power boat ramp at Windmill Point Marina in the lower part of the county. Windmill Point juts out into the middle Chesapeake Bay and is located at the mouth of the Rappahannock River and is an ideal location for sailing as well as fishing. Lancaster County staff had reached an agreement with the owner of Windmill Point Marina to sell a portion (approximately 1.38 acres) of the 8 acre marina property adjacent to the existing boat basin for a public boat ramp. Currently the marina does not have a boat ramp to access the boat basin.

NNPDC staff has experience in preparing the VDGIF grant application for power boating access, as last year the NNPDC assisted Lancaster County with another grant application for a power boat access site on nearby Dymer Creek. Lancaster County was awarded that grant, but the project was not built due to shallow water adjacent to the site and the associated costs of dredging and maintaining a channel to access the boat ramp.

NNPDC compiled and submitted the $150,000 Windmill Point grant application to construct a large power boating access site with parking for 25 vehicles with boat trailers, with two of the parking spaces handicapped accessible. The average depth of the Windmill Point boat basin is 6 feet, so water depth will not be an issue with this boating access project. Lancaster County proposes to build a 16 foot x 50 foot concrete boat ramp and a 40 foot x 25 foot L-head wood courtesy pier and locate a handicap accessible portable bathroom (in season) and a trash receptacle for refuse. NNPDC staff created a state location map, a local map showing the proposed Windmill Point Marina boat ramp project area as well as the Little Oyster Creek Canoe/Kayak Launch (previously funded by VACZM), as a site for overflow, and a conceptual plan of how the property would be developed into a large power boating access site. These maps follow.

Lancaster County
Windmill Point
Proposed Power Boat Access Site
State Location Map



N
W E
S

LEGEND

- County Boundary
- State Boundary
- Location of Proposed Power Boat Access Site (37 deg. 36.984' N, 076 deg. 17.334' W)

Chesapeake Bay

40 0 40 80 Miles

Virginia Coastal Zone MANAGEMENT PROGRAM

NOAA

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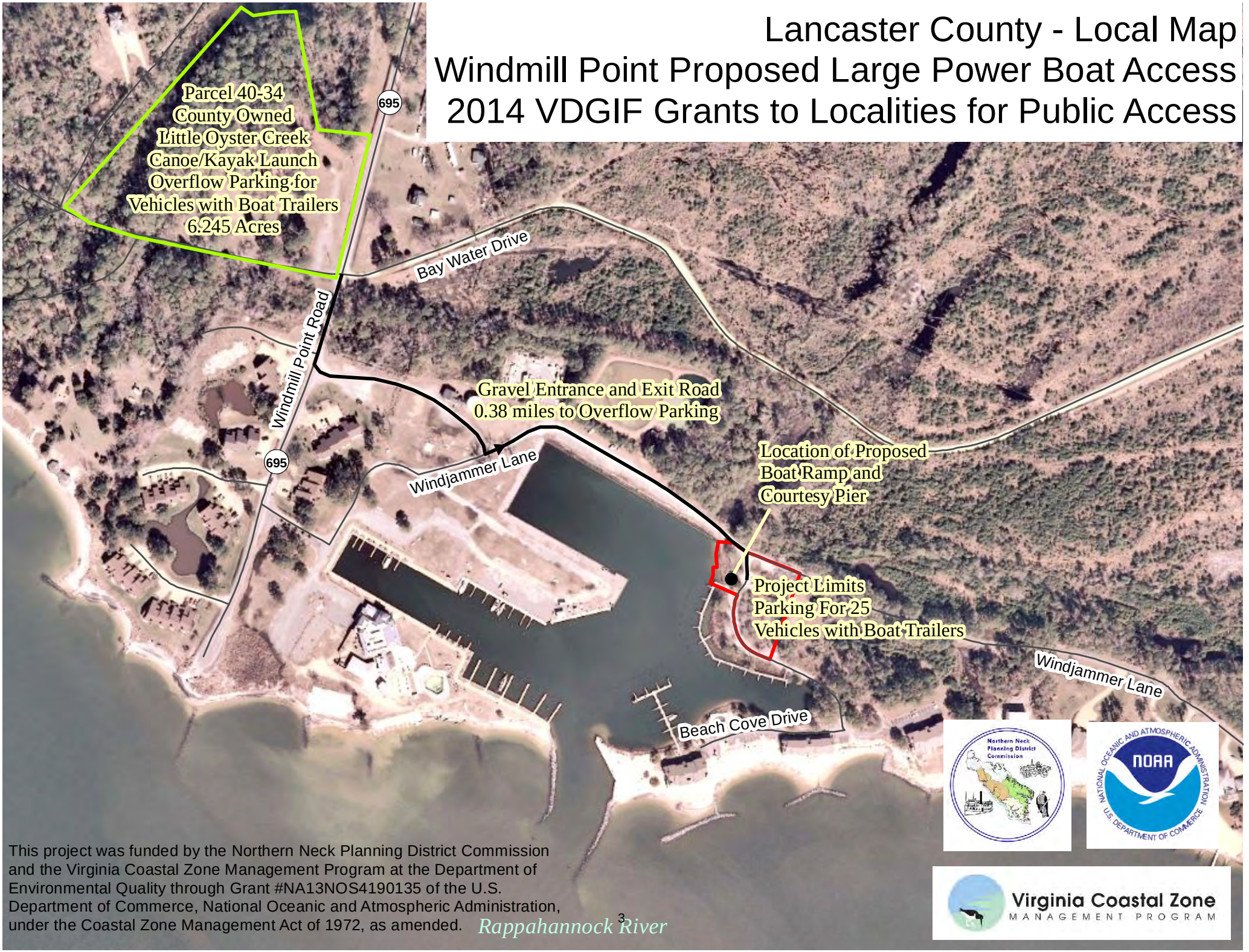
Lancaster County - Local Map
Windmill Point Proposed Large Power Boat Access
2014 VDGIF Grants to Localities for Public Access



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Rappahannock River

Lancaster County - Conceptual Plan
Windmill Point Proposed Large Power Boat Access
2014 VDGIF Grants to Localities for Public Access

Virginia Coastal Zone
MANAGEMENT PROGRAM

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Northern Neck Land Conservancy

The Northern Neck Planning District Commission supports voluntary land conservation in the Northern Neck region for private landowners who decide to protect their land from future development. Private land conservation is the ultimate exercise of private property rights in Virginia if a land owner makes the decision that conservation is best for the property that they own. Private land conservation also aligns well with each of the four county Comprehensive Plans which state the goal to protect the rural nature of the region, including open space, prime farm and forest land. In addition, private land conservation leads to less demand on county governments for services such as waste disposal, education, as well as fire and rescue services.

The Northern Neck Land Conservancy (NNLC) is the primary entity in the region involved in private land conservation, and the Northern Neck Planning District Commission has been involved with the NNLC since its beginning in 2006. NNPDC provides mapping assistance to the Northern Neck Land Conservancy, and this year assisted in producing maps to assist in the accreditation process with the national conservation organization the Land Trust Alliance. NNLC sought to demonstrate that their organization is in compliance with the Land Trust Alliance national standards and indicator practices. To that end, NNLC requested several maps of previously conserved land tracts in March 2014 to verify no development had taken place, and that the tracts of property described were, in fact, accurate. NNPDC staff created four maps of two properties, all in Northumberland County for the accreditation process, one map of each property showing the location in the county, and another map showing the 2013 Virginia Base Mapping Program's Aerial Photograph and the tax parcel outlines of the tracts. In order to minimize the file size of this report, not all of the maps created are shown.

In addition, in April 2014 the NNLC applied for a Chesapeake Bay Small Watershed Grant entitled "Protecting the Chesapeake Bay by Conserving Northern Neck Lands" for the western coastal Chesapeake Bay basins of Northumberland and Lancaster Counties. NNLC staff requested a map to show the general area that the Conservancy would be targeting. NNPDC created a location map for the NNLC which is located in this report following the two accreditation maps.

NNPDC staff also assisted NNLC staff throughout the grant year by creating maps of the property prior to an initial conference of prospective clients so both parties have a visual reference of the ecological values associated with the natural values of their land. NNPDC staff created ten maps for five properties for NNLC staff throughout this grant year. Maps created were for two properties in Lancaster County, one in Northumberland County, one in Richmond County and one in King George County. In order to minimize the file size of this report, only one set of the maps are included in this report; however, the other maps created for the other four properties follow the same format. These two property maps follow the grant focus area map mentioned above.

Northern Neck Land Conservancy
Map of Properties Conserved

This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA13NOS4190135 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

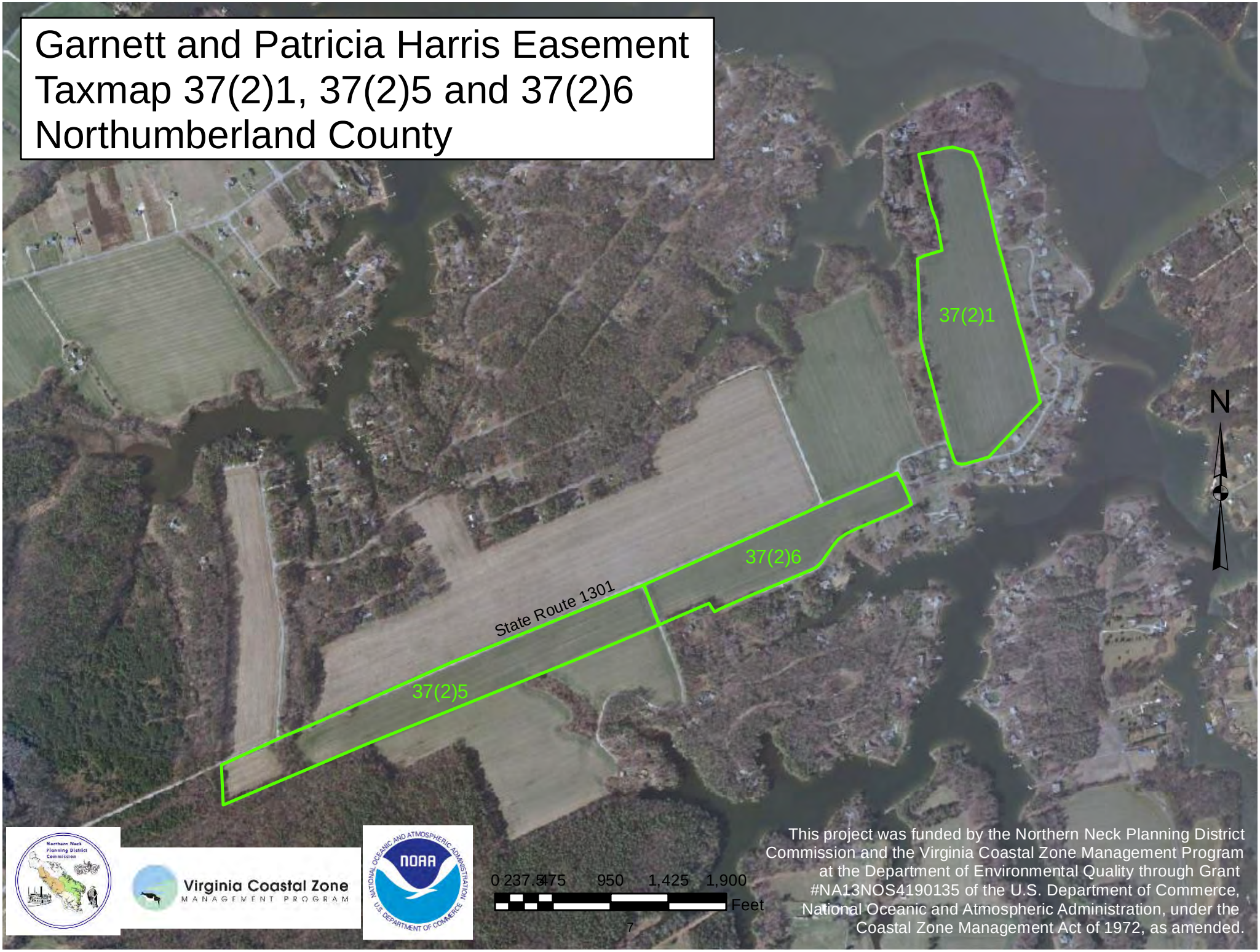
Map Prepared By:

Virginia Coastal Zone MANAGEMENT PROGRAM

NOAA

6 December 2013

Garnett and Patricia Harris Easement
Taxmap 37(2)1, 37(2)5 and 37(2)6
Northumberland County



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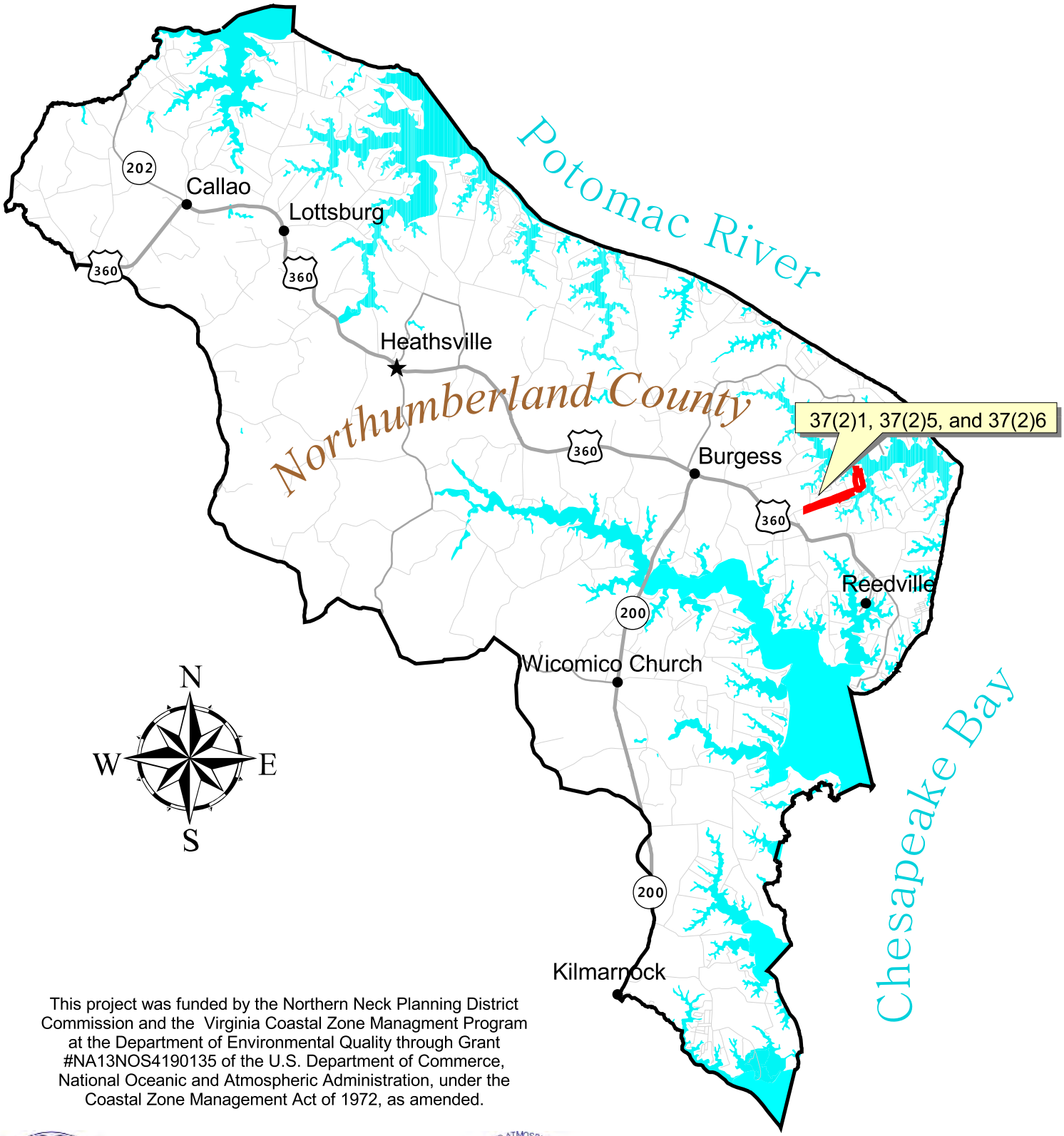
Garnett and Patricia Harris Easement
Taxmap 37(2)1, 37(2)5 and 37(2)6



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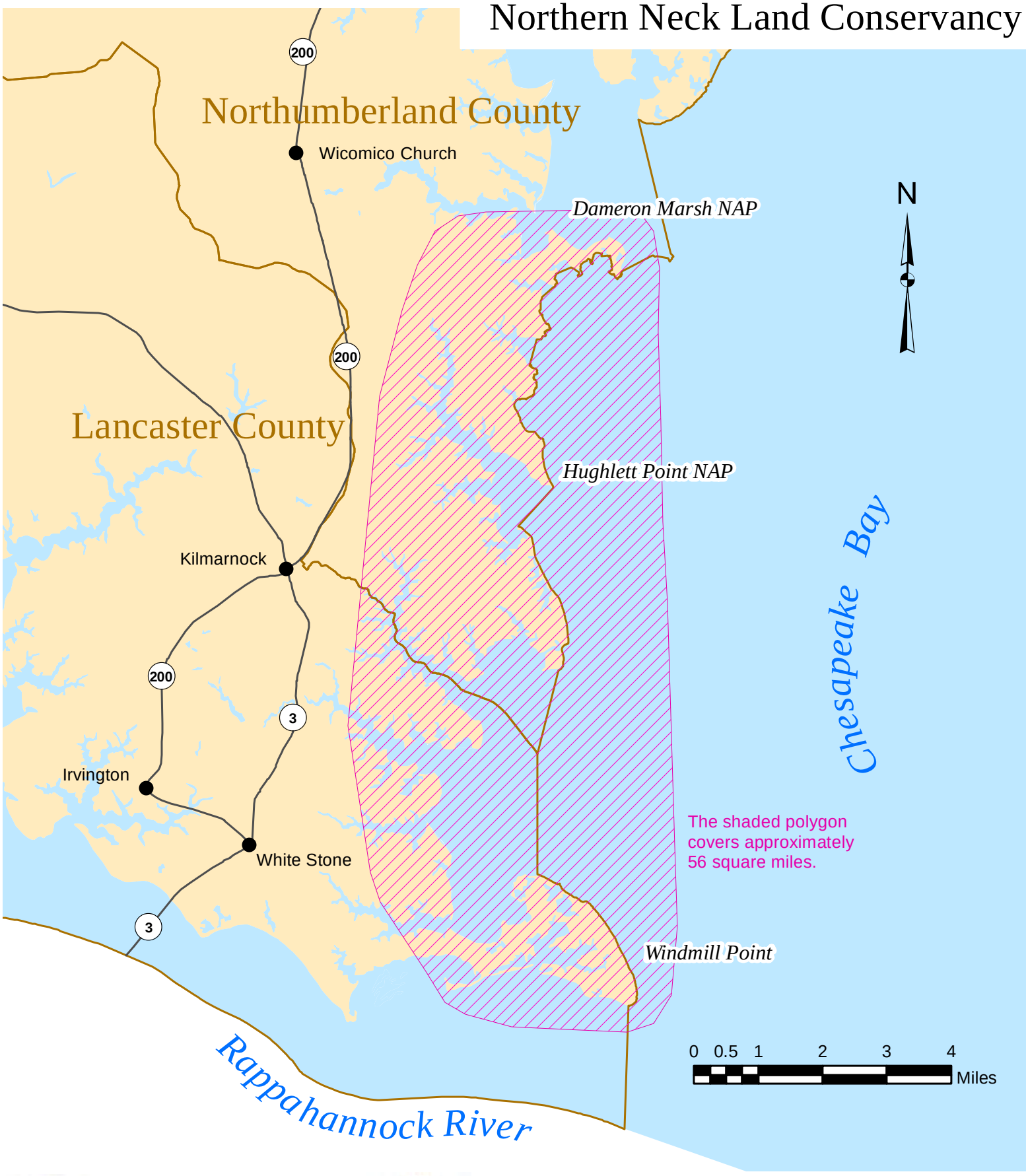
Virginia Coastal Zone MANAGEMENT PROGRAM

Protecting the Chesapeake by Conserving Northern Neck Land

Northern Neck Land Conservancy



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Richmond County

Richmond County staff requested assistance in updating the Future Land Use Map in their Comprehensive Plan to reflect a recent rezoning action. In previous years, NNPDC staff, through a previous VACZM PDC Technical Assistance grant, assisted Richmond County in updating the Comprehensive Plan, and created all maps that were included in the newly revised Comprehensive Plan. Therefore, NNPDC has all of the mapping projects digitally saved in the Geographic Information System, revising the map was a relatively easy task. The revised Richmond County Comprehensive Plan Future Land Use Map which NNPDC staff created follows.

Richmond County staff also requested assistance from NNPDC staff in creating a grant application to the Virginia Department of Game and Inland Fisheries (VDGIF) Grants to Localities Program for Public Boating Access Facilities for a grant to make improvements to Farnham Creek Landing in lower Richmond County. Farnham Creek Landing is a public water access site on Farnham Creek and is a site on the Virginia Wildlife and Birding Trail (Site CNN16: Route 608 Farnham Creek Public Landing). Farnham Creek Public Landing has been an access point since the early 1900s when VDOT removed the Rt. 608 bridge across Farnham Creek and replaced it with the present concrete bridge slightly upstream. The previous road alignment was straightened out when the new bridge was built, and the old bridge road is now the access road to Farnham Creek Public Landing. The current short boat ramp is a mud/gravel composite that has a three foot drop-off at the end of the ramp which often damages boat trailers. The Richmond County grant application, which NNPDC staff created maps to support and assisted in drafting the application, proposes to improve the site to a medium power boat access site with a 10 foot by 25 foot long concrete boat ramp, a 6 foot by 25 foot courtesy pier, running parallel to shore and to provide a gravel turnaround and a gravel parking lot for eleven vehicles with boat trailers. NNPDC staff created multiple maps for county staff for visualization and Board of Supervisors' briefings, and four of those maps were included in the VDGIF grant application. The conceptual plan map that showed the improvements to be made at the site were revised four times, reflecting feedback from VDGIF staff and Board of Supervisors' input on the design. The maps produced by NNPDC staff that were part of the VDGIF grant application were a State Location Map, a Local Map, a map showing private (fee charged) boat ramps within a 15 mile radius of Farnham Creek Landing, and a Conceptual Plan map. These maps follow the Richmond County Comprehensive Plan Future Land Use Map in this report.

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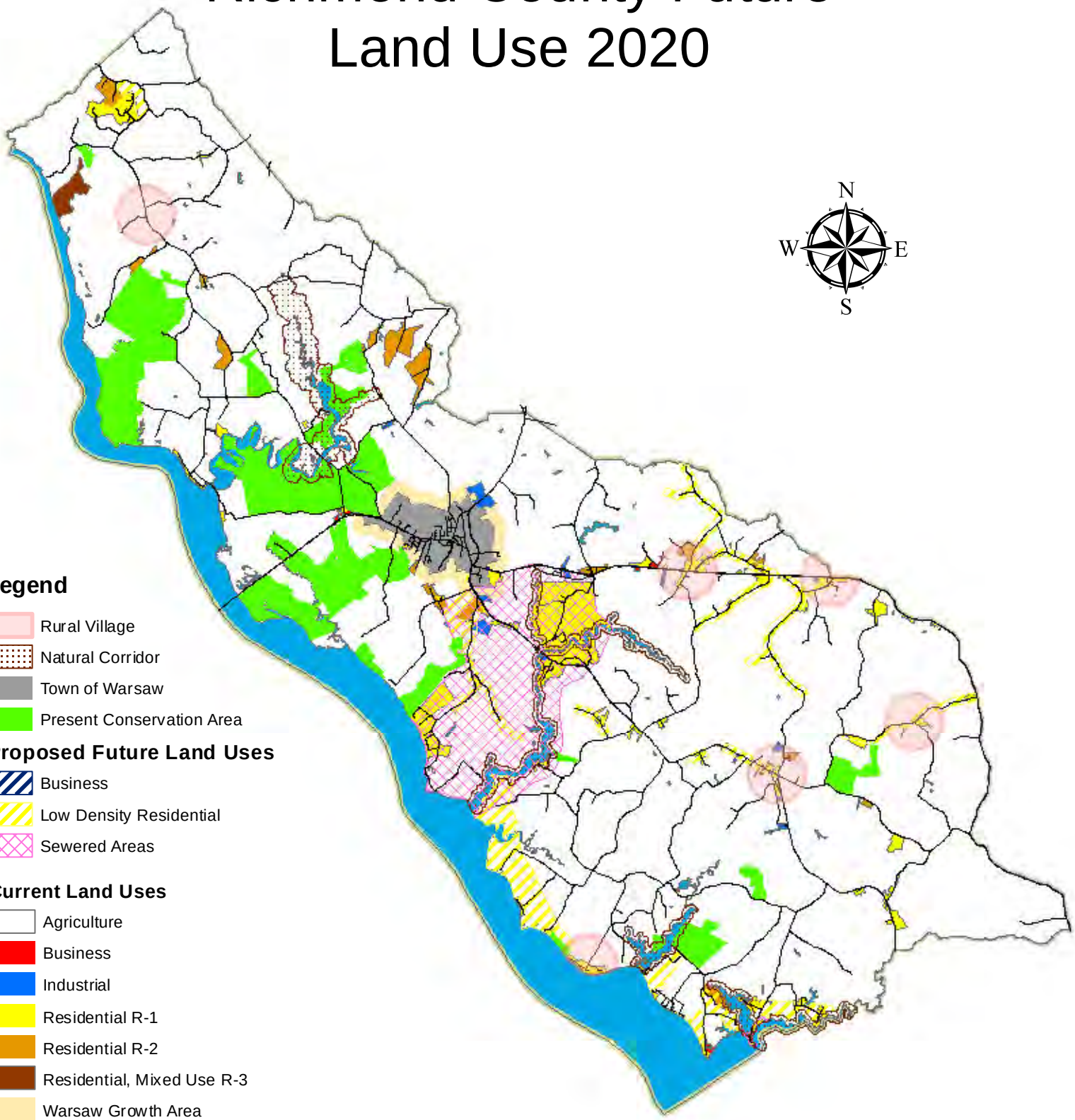
Richmond County Future Land Use 2020



Legend

- Rural Village
- Natural Corridor
- Town of Warsaw
- Present Conservation Area

Proposed Future Land Uses

- Business
- Low Density Residential
- Sewered Areas

Current Land Uses

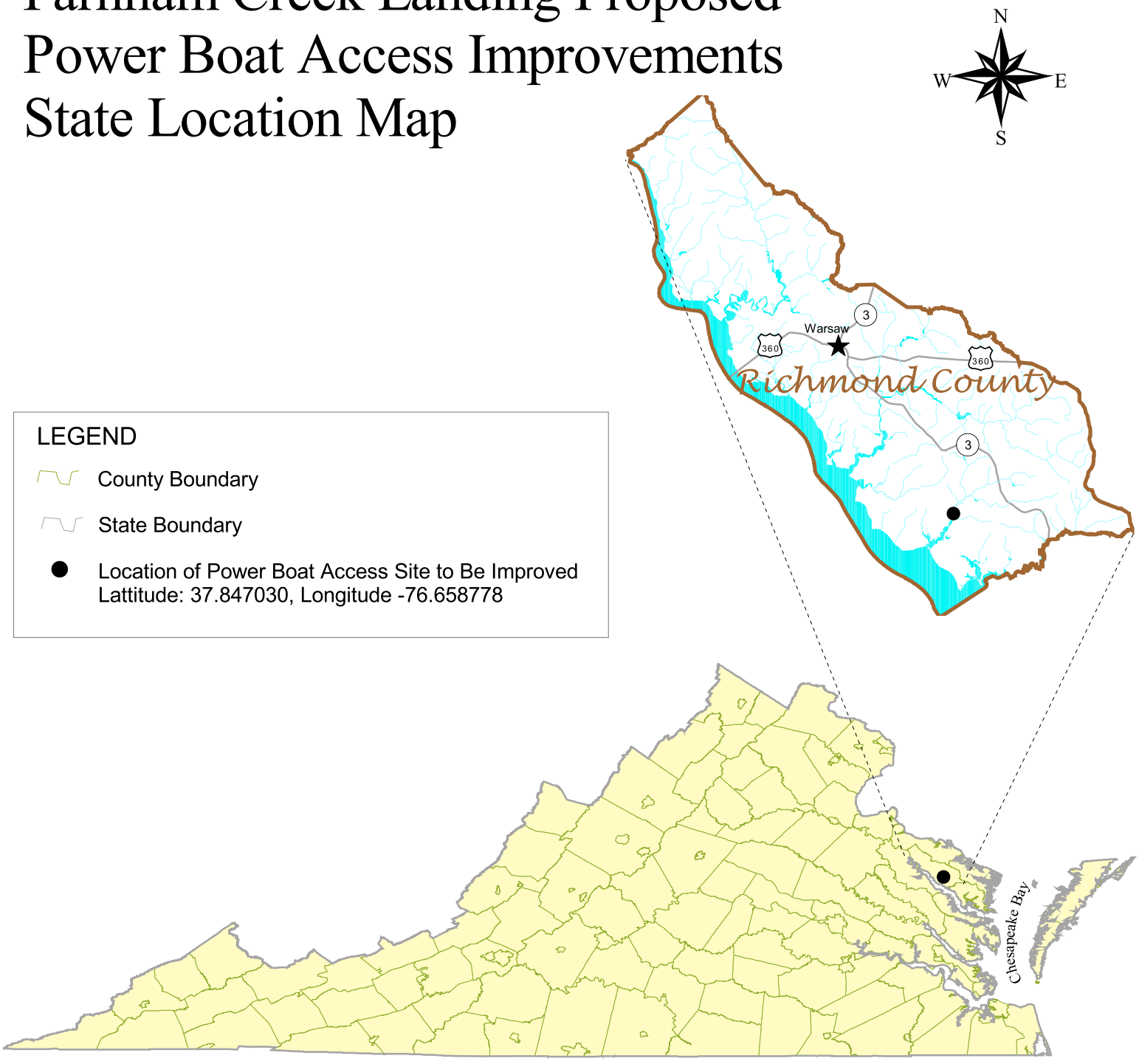
- Agriculture
- Business
- Industrial
- Residential R-1
- Residential R-2
- Residential, Mixed Use R-3
- Warsaw Growth Area

Revised: August 2013

This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA12NOS4190168 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

0 0.5 1 2 3 4 Miles

Richmond County
Farnham Creek Landing Proposed Power Boat Access Improvements
State Location Map



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Farnham Creek Landing, Richmond County Local Map

Prepared by:

August 2014

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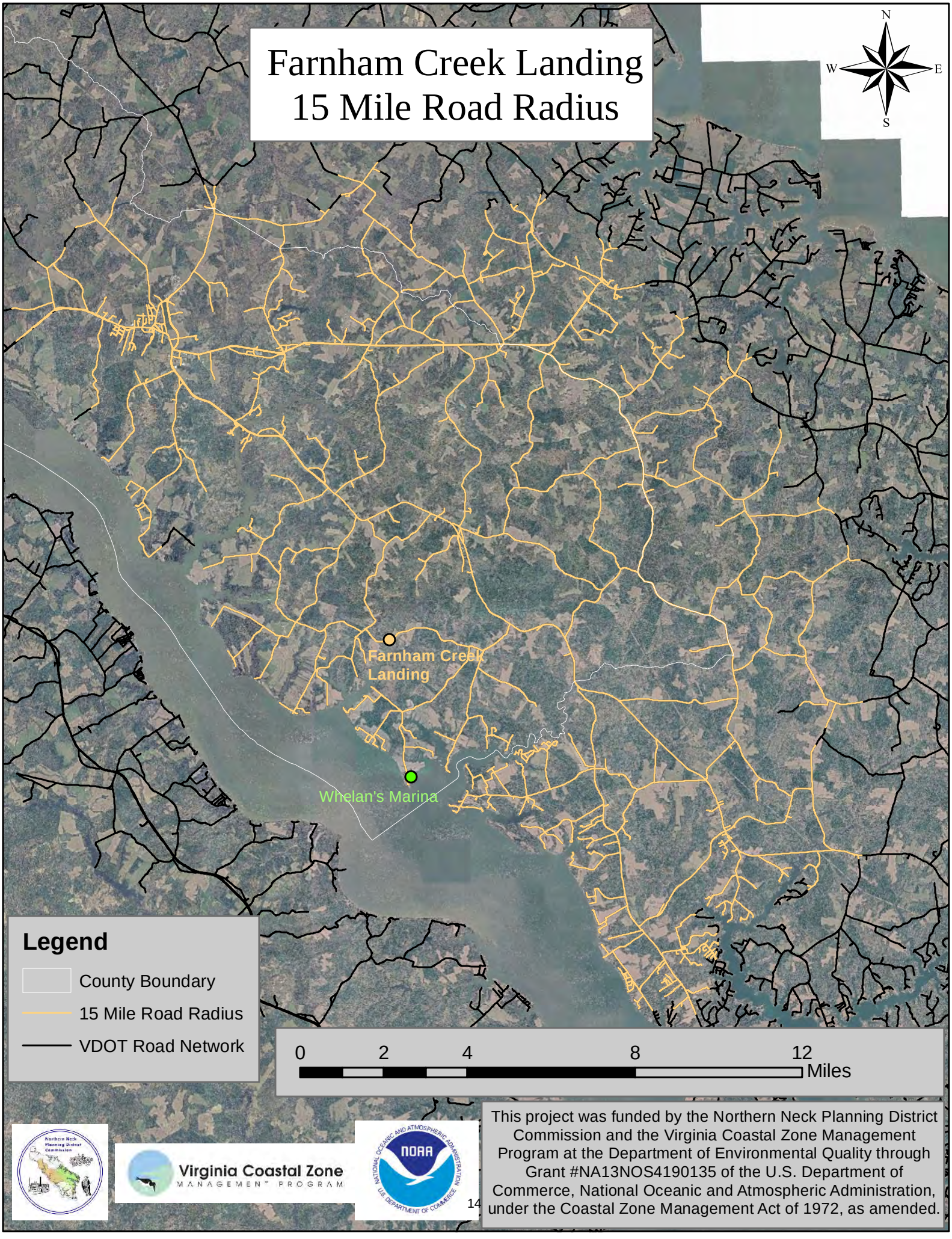

Virginia Coastal Zone MANAGEMENT PROGRAM

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Farnham Creek Landing Proposed Improvements

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Westmoreland County

On September 8, 2011, Tropical Storm Lee tore through Westmoreland County, Virginia dumping 21 inches of precipitation in less than 24 hours. Tropical Storm Lee hit Placid Bay Estates subdivision, outside Colonial Beach, especially hard. Two dams in the subdivision were breached by the overflowing stormwater and were washed out, along with the road across one of the dams, stranding families within the subdivision. Residents of the Placid Bay Estates did not have the financial resources to rebuild the dam and the road, so they turned to Westmoreland County for assistance in rebuilding the dam and road in the subdivision. There were several public meetings with residents of the subdivision and Westmoreland County administration discussing possible options on how to fund the repairs. After many months of discussion, residents agreed to a special road tax for repair of the road, and the formation of a flat rate sanitary district that is based on personal property value where those funds were earmarked to pay for the reconstruction of the dams that were destroyed by Tropical Storm Lee. Westmoreland County requested Census Data regarding race and total population within and near Placid Bay Subdivision, so that they could assess how much the taxes would generate over the years, and whether it would be advantageous to extend the special tax area outside the boundaries of the subdivision. The two census block informational maps for Placid Bay Estates follow this page of the report.

Westmoreland County requested maps for a parcel near the Town of Montross, in order to assess the viability of its use as a building site for a housing complex for elderly persons. Several years ago, Bay Aging built a complex of condominiums for elderly residents on an adjacent parcel (see the aerial photograph map to see the location of the housing complex for the elderly), and that complex has been very successful. The proximity of the complex to the grocery store made this site ideal for the elderly as they can walk to the grocery store and therefore do not require vehicles. Westmoreland County and Bay Aging were looking at building a similar complex of companion condominiums to build on the success of the first elderly housing complex. NNPDC staff advised Westmoreland County and Bay Aging staff that the parcel has a slope on the eastern side of the property which may reduce the amount of buildable area of the parcel of land. Two maps were created, one with the tax parcel outlines and the 2013 Virginia Base Mapping Program's Aerial Photography and another map with the USGS 1:24,000 Topographic Quadrangle map (to show topography). These maps follow the Placid Bay Estates Census maps in this report.

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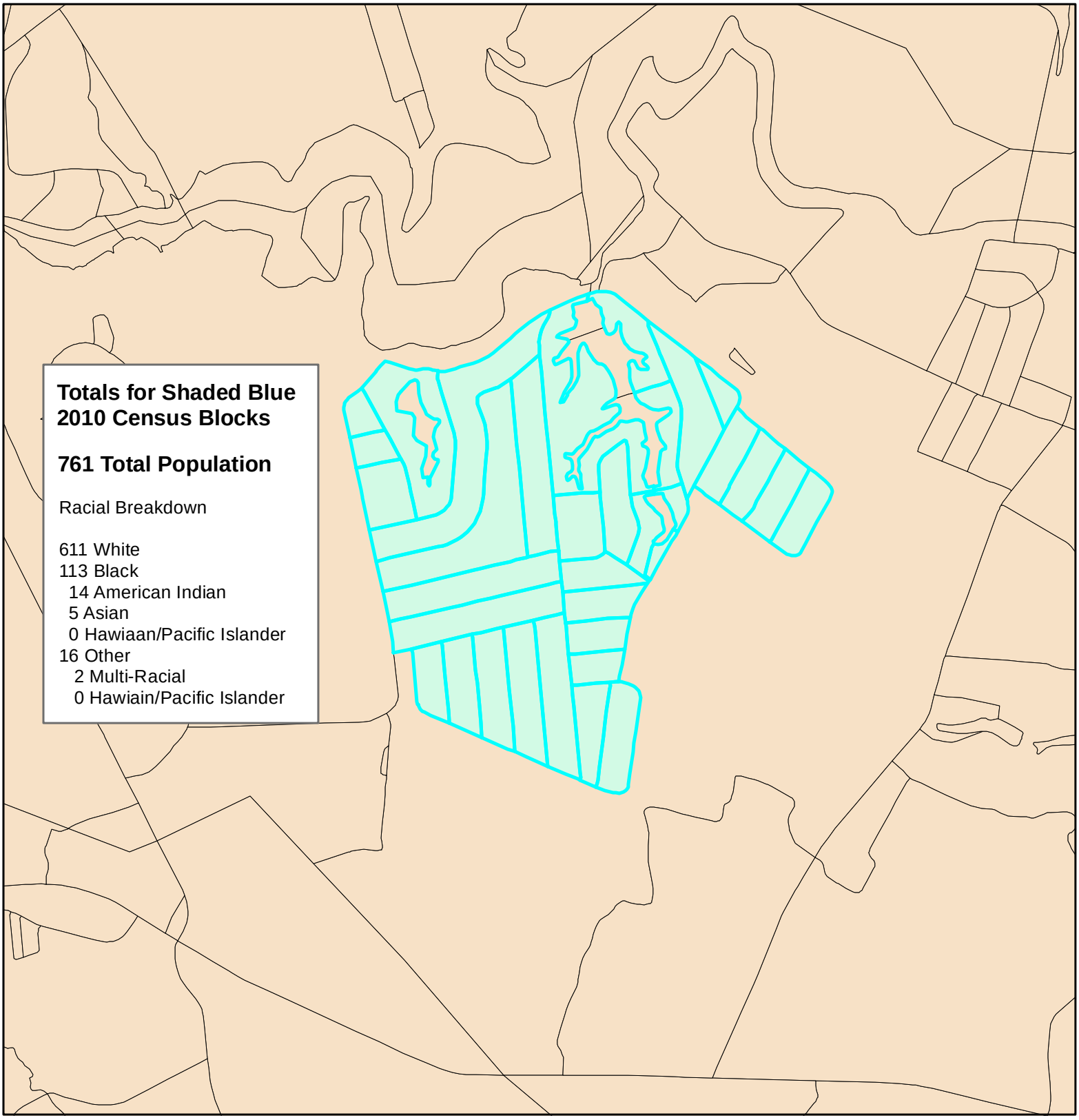
Westmoreland County Placid Bay Subdivision
2010 Census Population - Full Census Block Pop.



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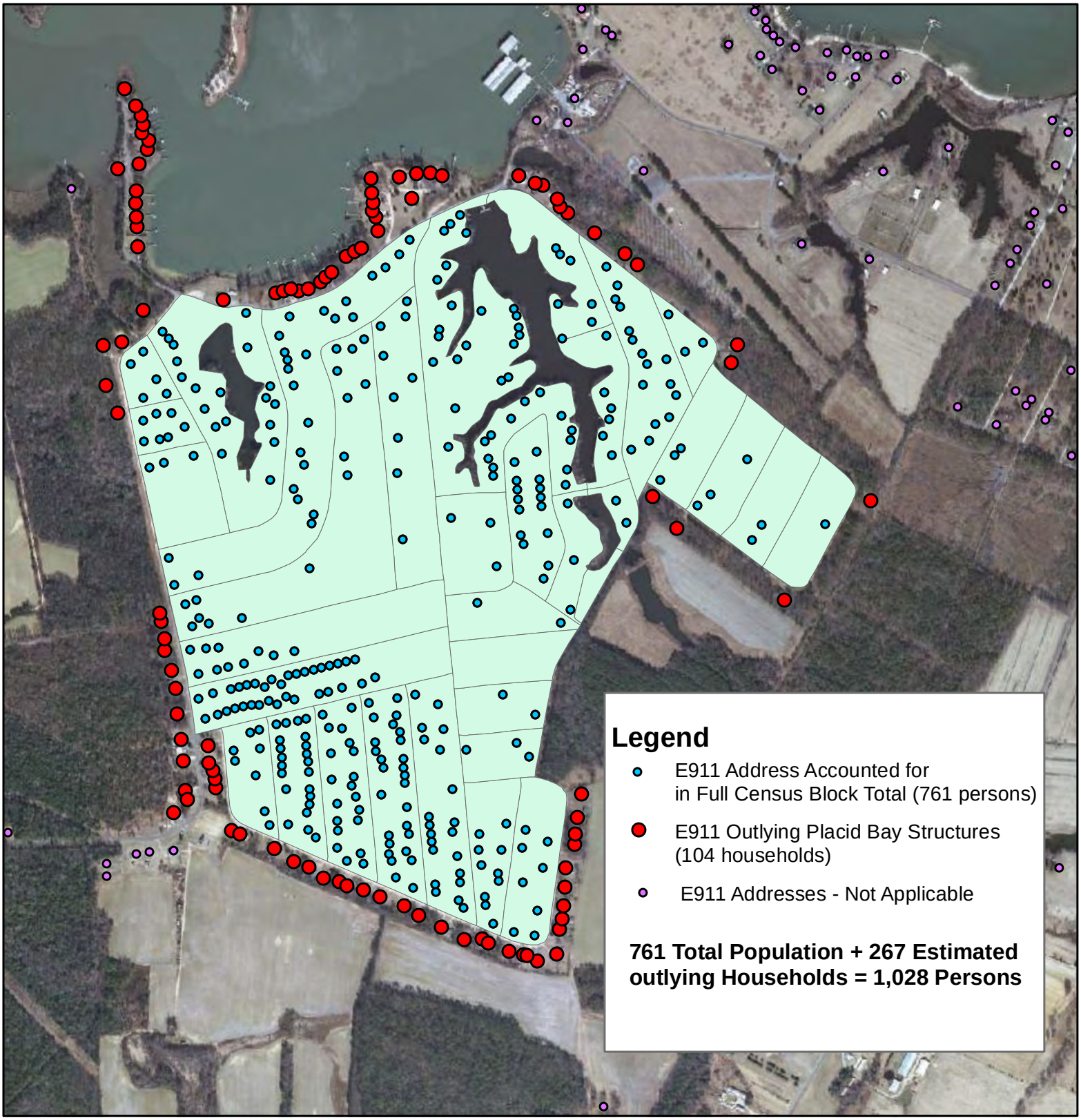
Westmoreland County Placid Bay Subdivision
2010 Census Population - Outside Full Census Blocks



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Westmoreland County Town of Montross: Parcel 34-104

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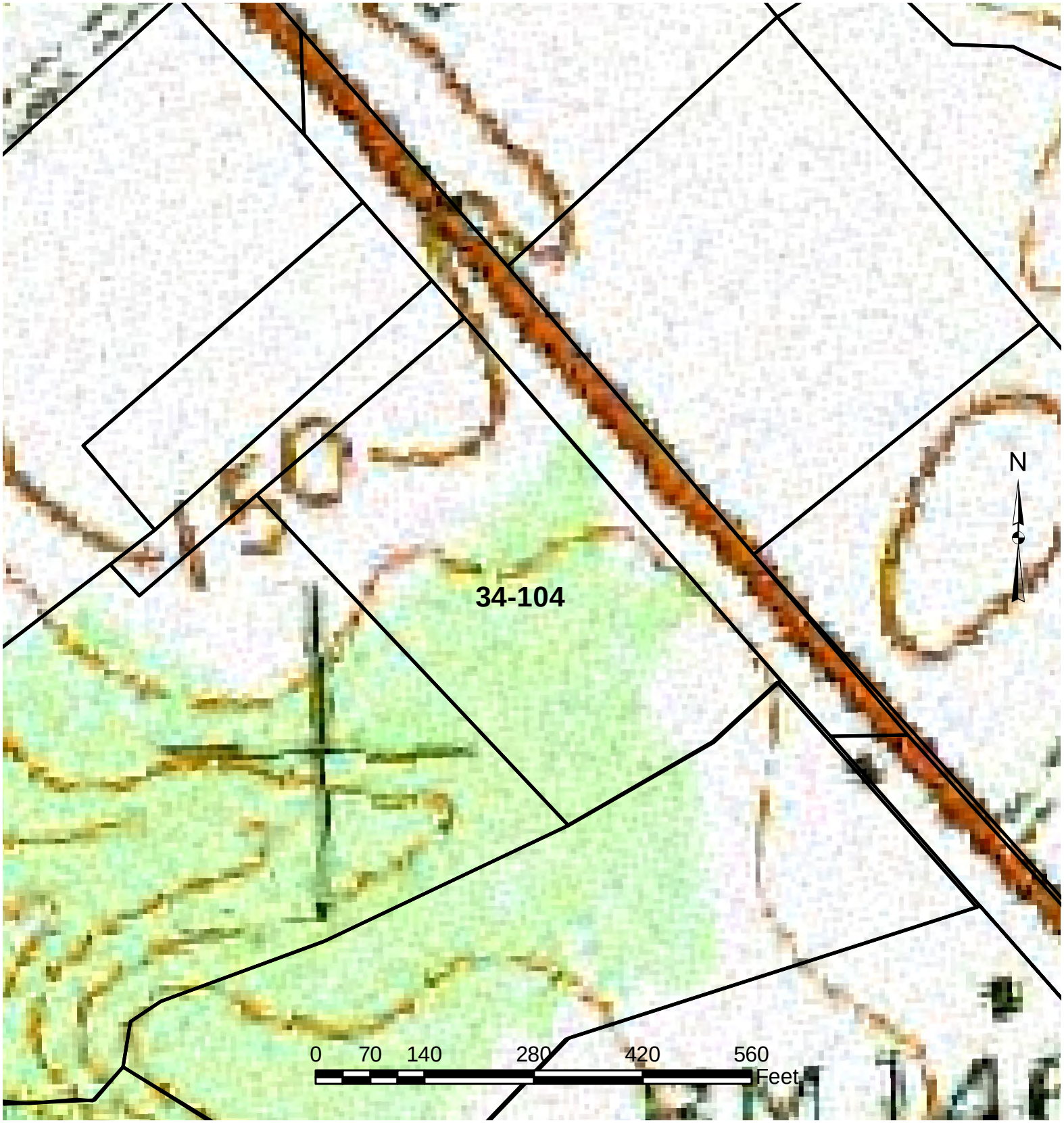
Westmoreland County Town of Montross: Parcel 34-104



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The Wetlands Project

The Wetlands Project is a newly formed not-for-profit organization that seeks to protect, restore and enhance wetlands, both tidal and non-tidal in the Northern Neck Region of Virginia. NNPDC staff partnered with The Wetlands Project to plan and conduct a Wetlands Summit for the Northern Neck on May 13, 2014 in Warsaw, VA. The Wetlands Summit was a resounding success, bringing many environmental organizations together with a common goal of protecting and restoring Northern Neck wetlands. More information on the Wetlands Summit is contained in the Local Government Coordination and Training section of this report.

Continuing the partnership, staff from the Wetlands Project requested information on wetlands and environmental information for a display booth at the Northern Neck Land Conservancy's Annual festival, Boots and Barbeque which was scheduled to be held on Sunday September 14, 2014 at Gascony in Northumberland County. NNPDC staff suggested United States Fish and Wildlife Service (USF&W) National Wetland Inventory (NWI) maps as a teaching tool for citizens at the event. NNPDC staff reasoned that the maps could be used to engage citizens to pinpoint the location where they live in the Northern Neck and relate to them the proximity of local wetlands to their residence. Wetlands Project staff agreed and NNPDC created NWI maps for all four Northern Neck Counties for use at the Wetlands Project Exhibit. In addition to the small (8.5' x 11") county National Wetland Inventory maps, NNPDC staff printed a large format D size (2 foot by 4 foot) regional National Wetland Inventory map that depicts all four Northern Neck County Wetlands suitable for display for the Wetlands Project booth. NNPDC also suggested to complement the National Wetland Inventory Maps, that NNPDC staff print out a map of the VACZM's Coastal Virginia Ecological Valuation Assessment (VEVA). By having this map and comparing it with the NWI maps, a discussion with interested citizens as to the ecological value of wetlands could be initiated, where staff could explain that some wetlands are more valuable than others. For example some wetlands may have higher water quality filtering capacity, and provide better habitat, than other nearby wetlands. The Wetlands Project staff agreed that would be useful in engaging citizens on wetlands values and that the Coastal VEVA maps could help citizens understand the various levels of ecosystem services that wetlands can provide. In order to minimize file size of this report, only two of the county NWI maps are shown, along with the regional NWI map and Coastal VEVA map. These maps follow.

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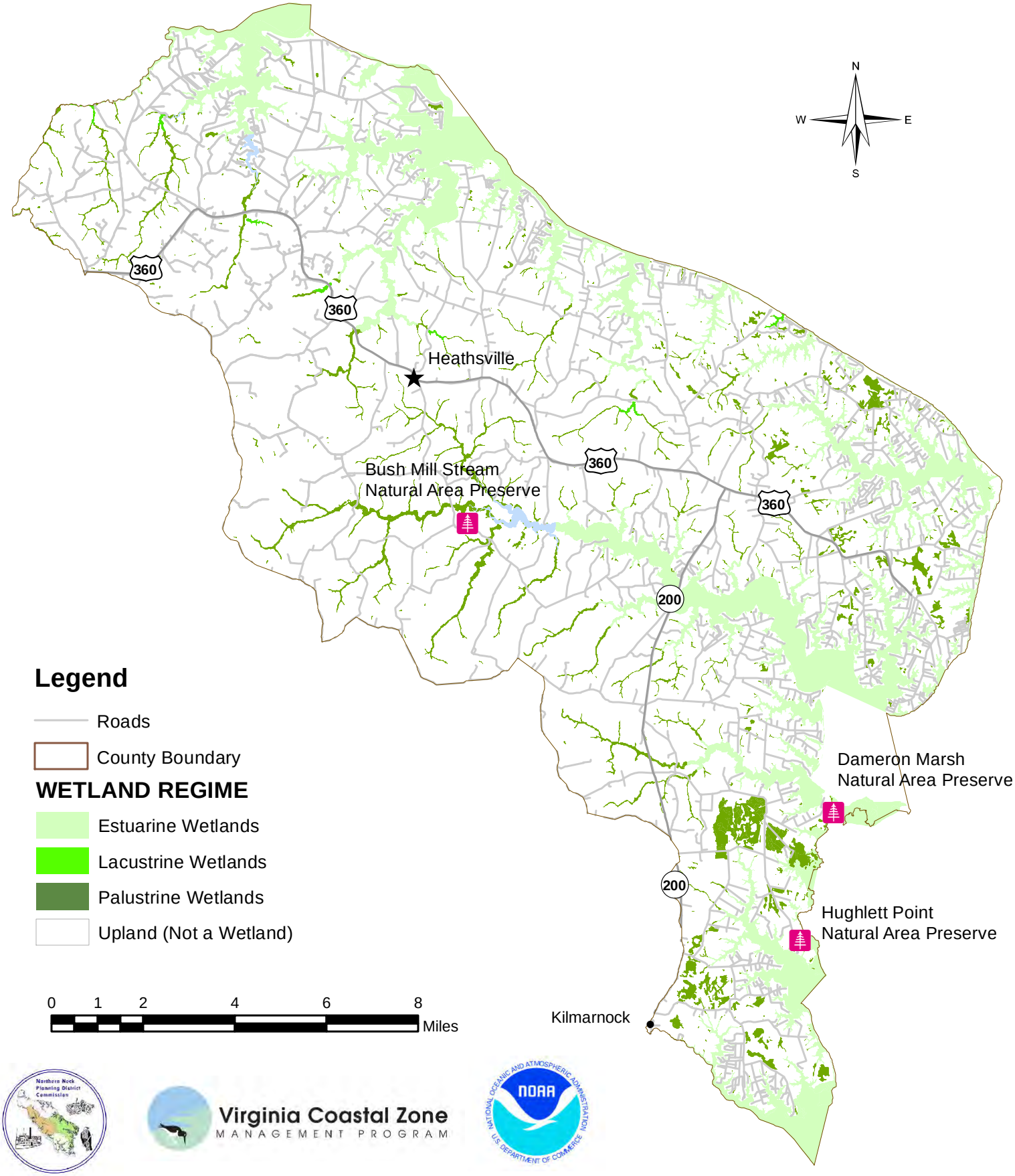
Northumberland County
National Wetlands Inventory Wetlands



Virginia Coastal Zone
MANAGEMENT PROGRAM

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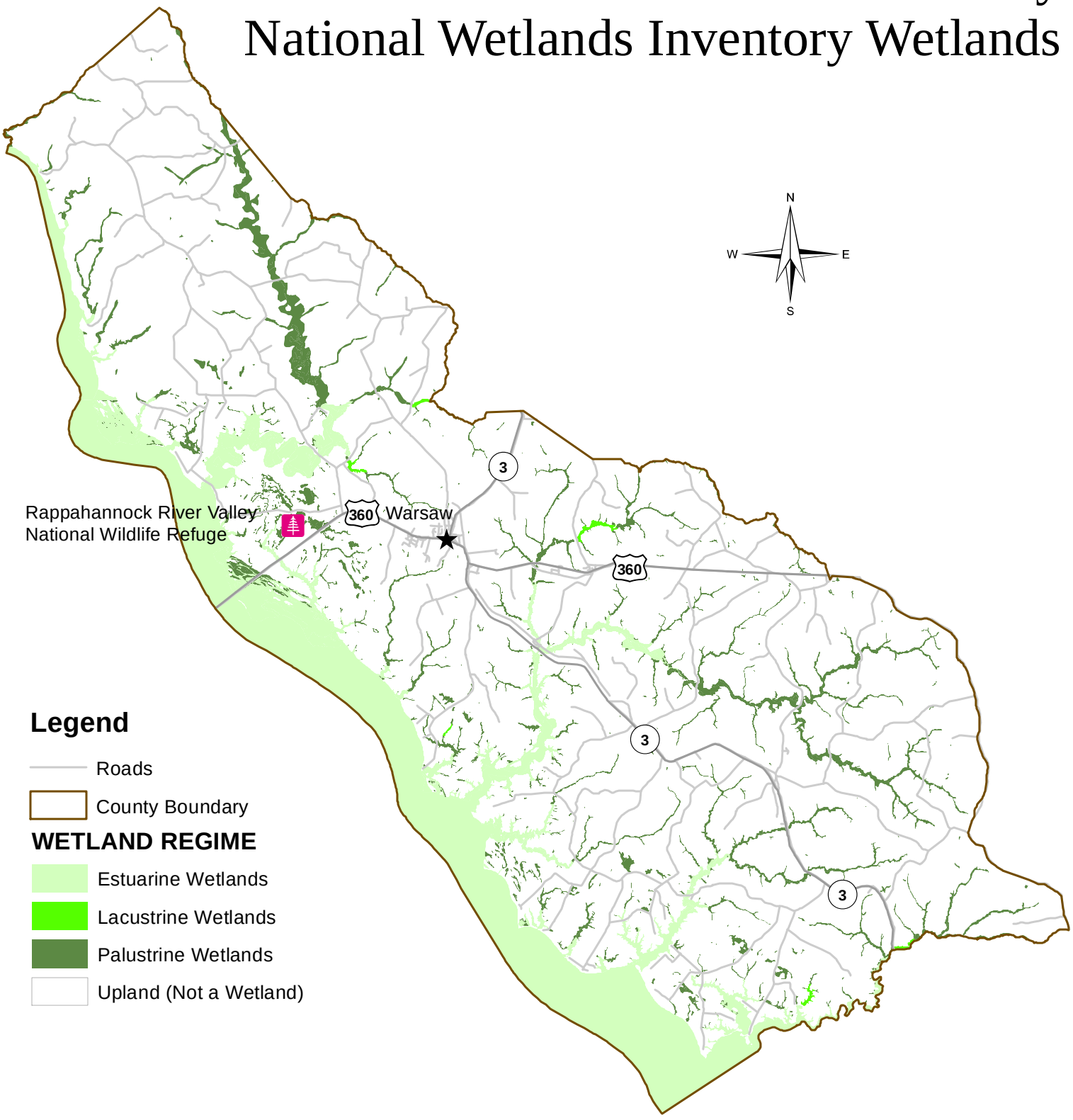
Richmond County
National Wetlands Inventory Wetlands



Virginia Coastal Zone
MANAGEMENT PROGRAM

0 1 2 4 6 8
Miles

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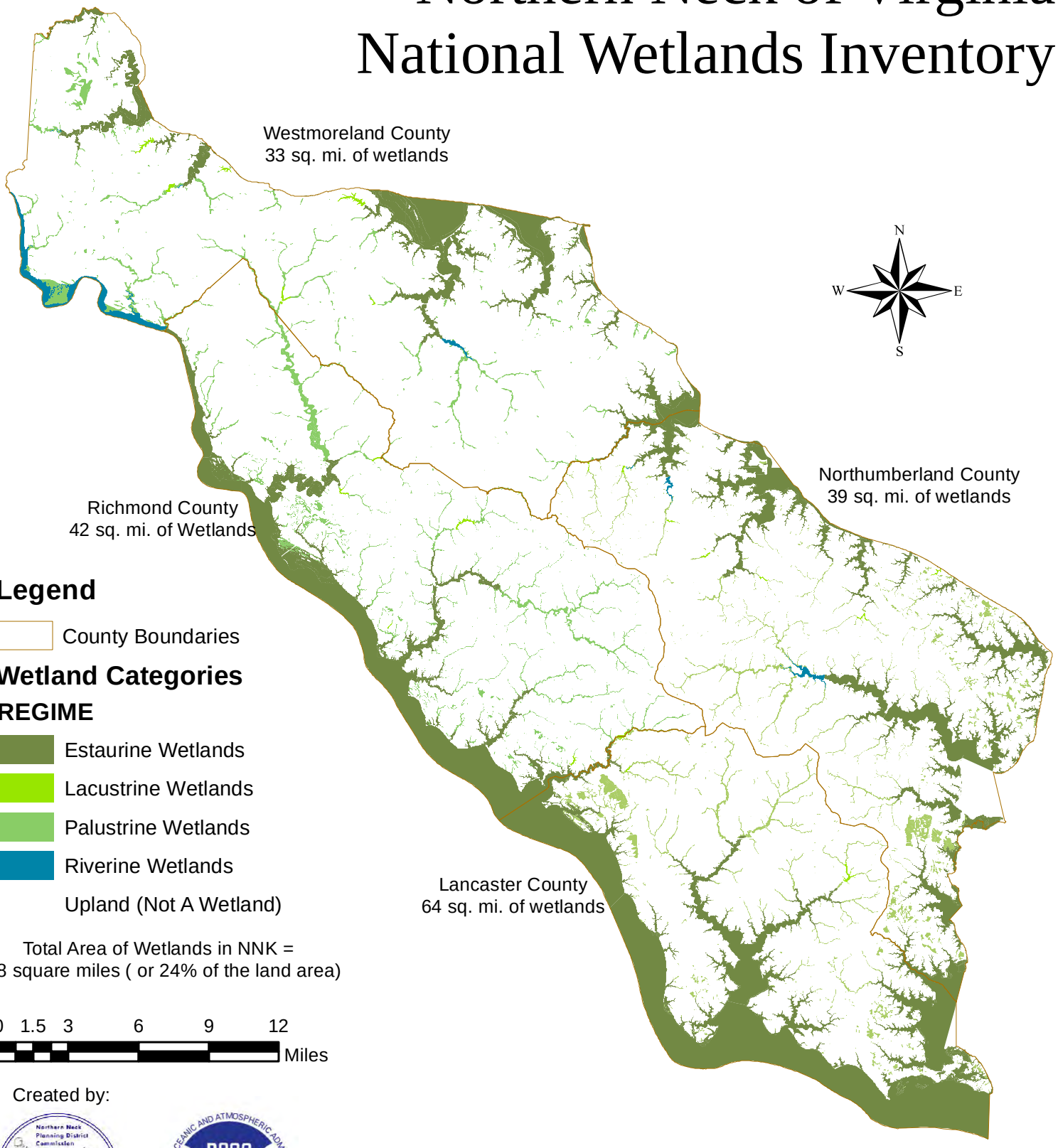
Northern Neck of Virginia National Wetlands Inventory



Legend

County Boundaries

Wetland Categories

REGIME

- Estaurine Wetlands
- Lacustrine Wetlands
- Palustrine Wetlands
- Riverine Wetlands
- Upland (Not A Wetland)

Total Area of Wetlands in NNK =
178 square miles (or 24% of the land area)

0 1.5 3 6 9 12
Miles

Created by:

June 2014

Data Source: USF&W National Wetlands Inventory, 1993.

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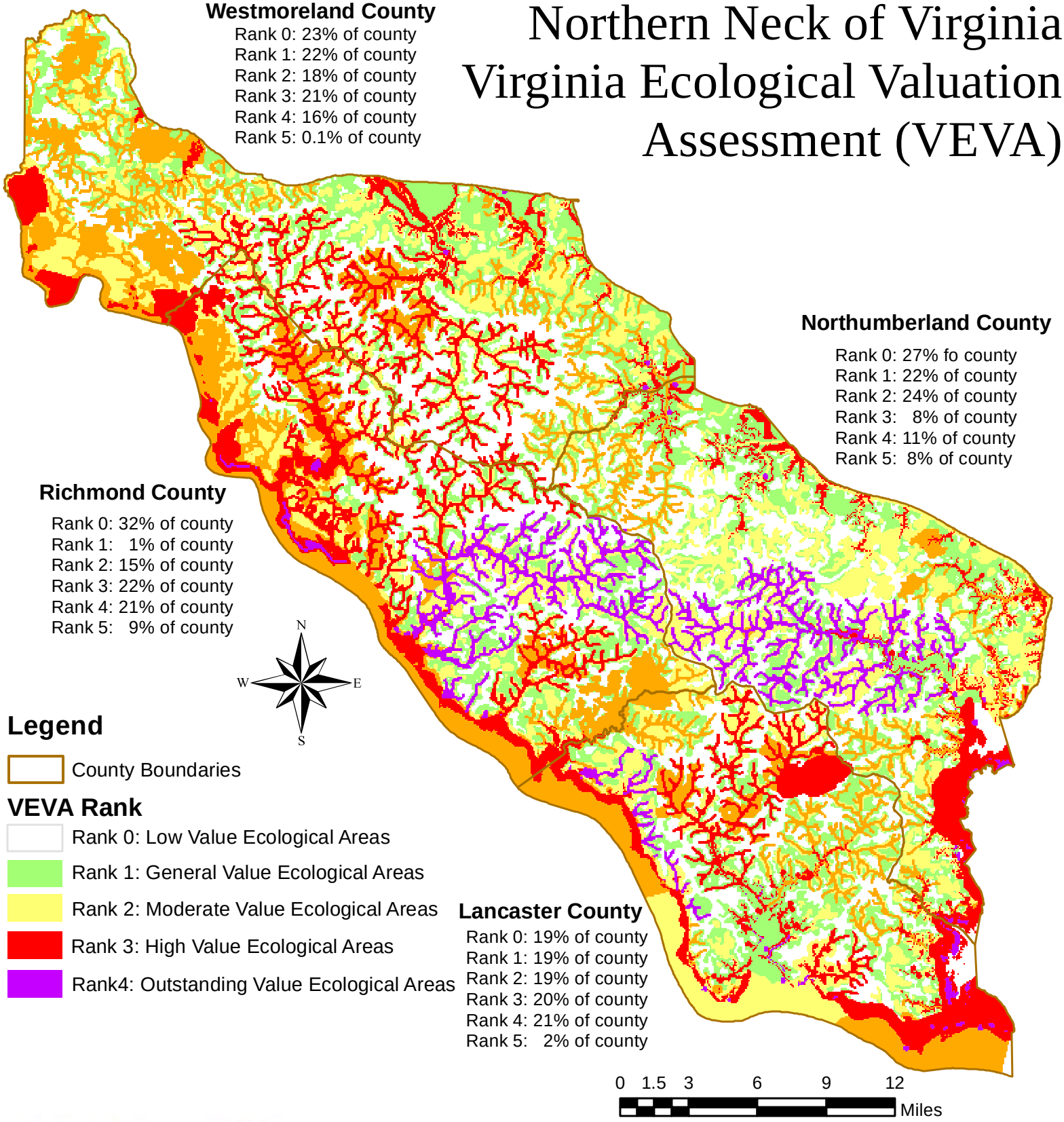
Northern Neck of Virginia Virginia Ecological Valuation Assessment (VEVA)



Data Source: Virginia Coastal Zone Management Program, downloaded June 2011.
Map Prepared:June 2014

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II. Local Planning Coordination and Training

NNPDC staff held the first Local Government Coordination Meeting and Training on December 10, 2013, and eight staff members attended the meeting from five localities. The localities represented were Lancaster County, Northumberland County, Westmoreland County, the Town of Colonial Beach, the Town of Montross, and Northern Neck PDC staff.

The meeting began with a training session, featuring Craig Nicol from the Virginia Department of Environmental Quality. Mr. Nicol is the Program Manager at the Groundwater Withdrawal Permitting Program. NNPDC staff invited Mr. Nicol to brief Northern Neck localities on the upcoming January 1, 2014, expansion of Virginia's Groundwater Management Area that includes the Northern Neck region and to outline the permitting application process for municipal groundwater withdrawal permits. Mr. Nicol began the training session explaining the reasons for the expansion of the Groundwater Management Area in Virginia, which were in order to protect groundwater volume, as well as protect the drinking water aquifers from saltwater intrusion. Mr. Nicol noted that groundwater levels are declining anywhere from 1 to 2 feet per year across the coastal plain, and it only makes sense to manage the aquifer across its entirety within the Commonwealth of Virginia. In addition to the expansion, a comprehensive review of the groundwater regulations was completed, as the old regulations lacked clarity. The groundwater regulations have now been streamlined in the State code. Mr. Nicol then explained situations that require a permit; an entity that withdraws more than 300,000 gallons of groundwater a month (or if they have withdrawn that much in a month in the past). To understand what constitutes the volume of 300,000 gallons of water, Mr. Nicol gave two analogies. 300,000 gallons of water is equal to 1' of precipitation over 11 acres of land, or the operation of a well at 125 gallon per minute for 40 hours. Mr. Nicol said new groundwater permit applicants in the expanded groundwater management area have, the benefit of applying at the level at which they have been withdrawing historically without any negotiation to reduce the amount of the applicants request (which may be the case with future renewals). The initial permit is less burdensome and less expensive to produce, Mr Nicol explained, and gave notice that applications for groundwater permits within the newly expanded groundwater management area must be received prior to June 30, 2013 (which is 6 months from the regulatory effective date).

Mr. Nicol then began detailing the information that a locality would need to gather in order to complete the initial (grandfathered) groundwater permit application. This data consists of water reporting values for the highest 12 month period over a span of five years, well construction information which includes the depth of the well, depth of the pump intake, depth of screens and any segment intervals in the well, as well as a copy of the Virginia Department of Health waterworks operation permit.

Mr. Nicol went on to explain there are additional information requirements that are needed in a groundwater withdrawal renewal application, including a mandatory pre-application meeting with DEQ, aquifer tests (well studies), in addition to the well construction information, geophysical investigations, aquifer modeling, a water

conservation and mitigation plan, local governing body approval, alternative sources of water analysis, and justification of future need. Further requirements of the groundwater management area are that the withdrawal facility does not affect existing wells and will not create more than 80% drawdown of adjacent cells in the DEQ groundwater management model.

Mr. Nicol training local government staff on the Virginia Groundwater Permitting.

Mr. Nicol then explained all groundwater withdrawal permits are for 10 years, and no extensions are allowed. He also noted that DEQ may attach special conditions to any permit as long as the conditions are reasonable. Mr. Nicol then reviewed the permit fees: for agricultural users, there is no fee associated with a groundwater permit; for historic (grandfathered) applications the fee is $1,200; for new or expanded applications, the fee is $6,000. Mr. Nicol also noted that there are fees associated with modification of permits: again agriculture has no fee, historic permits have a modification fee of $600, and new or expanded uses has a modification fee of $3,000. Mr. Nicol also noted that during review of any groundwater withdrawal permit, if the facility is not using at least 60% of the allocated use, then DEQ can reopen the permit process to reduce the allocated amount for the facility. If there are missing components to the groundwater permit application, Mr. Nicol explained that DEQ will allow 60 days to provide the missing information, and if not received within 120 days, DEQ may suspend the permit (which means no withdrawal is allowed). Mr. Nicol stated that this is a last resort action and that DEQ wants to work with its groundwater permittees so that this never happens.

Mr. Nicol wrapped up the training session by informing all present that DEQ groundwater permit reviewers are available to answer questions regarding preparation of the groundwater withdrawal permit applications. Ms. Brenda Brown is the DEQ groundwater permit reviewer for Richmond County, while Ms. Erin Tisdale is the groundwater permit reviewer for Lancaster, Northumberland, and Westmoreland Counties. Mr. Nicol then asked those present if it would be useful to have a workshop on preparing groundwater withdrawal permit applications at Rappahannock Community College in Warsaw, and all agreed that would be advantageous. Mr. Nicol noted that he would work to make that happen in early Spring 2014. All present thanked Mr. Nicol for taking the time to travel to the Northern Neck and train local staff on the requirements of the groundwater management program permit application process.

The local government coordination meeting began after the training session, and the main topic was Local Stormwater Program Implementation, as the Draft Virginia Stormwater Management Local Program Draft submittal was due on January 15, 2014. NNPDC staff discussed the status of each of the elements that were required for a complete Virginia Stormwater Management Program Local Authority draft submittal with the local government staff in attendance. One county had already provided all of the necessary components while the others still had some elements that needed work. NNPDC staff worked with county staff to establish a schedule to complete the remaining elements in order to meet the January 15, 2014, deadline. Next, NNPDC staff solicited comments on the stormwater outreach activities that the NNPDC, in conjunction with the NNSWCD was planning for citizens. Richmond County staff stated that they would like to have one of the two outreach meetings held before the local stormwater ordinance was considered by the Board of Supervisors. When NNPDC staff polled the remaining county staff present, they indicated that they were not sure of the changes that the Planning Commission or Boards of Supervisors might make, and until the final ordinance was passed in their respective county, county staff would not have detailed information for citizens regarding stormwater requirements, fees, etc., and therefore wanted to hold off conducting these meetings until their ordinance had been adopted. NNPDC staff noted it would be a challenge to hold eight meetings (two in each county) in less than two months but was willing to accommodate their timetable, if needed.

After the stormwater management discussion was finished, NNPDC staff discussed the recent VIMS report on local wetland boards' efficiency in locally administrating Virginia's Tidal Wetlands Program, entitled "Regulatory Fidelity to Guidance in Virginia Tidal Wetlands Program". NNPDC staff noted that the VIMS report was scathing to local wetland boards in Virginia. NNPDC staff noted that the conclusion of the report was that Virginia county wetland boards did not promote living shorelines as is current state policy, and instead allowed whatever structural shoreline stabilization technique that applicant requested. NNPDC staff noted that the local wetland boards implement the Virginia Marine Resource Commission's (VMRC) tidal wetland regulations, and VMRC is the State entity where the authority resides to regulate tidal wetlands. In the VMRC Tidal Wetland Program, the option exists for the VMRC to implement the Tidal Wetlands Program themselves, instead of relying on locally appointed wetlands board members to

implement the program, NNPDC staff noted that the VIMS report stated that VMRC should do exactly that, retake the Tidal Wetlands Program and administer the program through VMRC.

Local county staff defended their local wetlands boards and asked the rhetorical question that if VMRC was not pleased with the way local wetland boards were conducting business, then why didn't VMRC appeal some of the local tidal wetland decisions? Local county staff noted that there had been discussions in the past about trying to reduce county operating costs by giving the authority of implementing Virginia's Tidal Wetland Program back to VMRC, but have decided due local control of land use issues.

NNPDC staff held the second local coordination meeting on March 20, 2014, with six staff members from four localities and one regional organization (NNSWCD) attending. As was the case with the previous meeting, the Virginia Stormwater Management Program was discussed. Recent action in the General Assembly relating to the Virginia Stormwater Management Program was discussed at length, specifically House Bill 1173 which was recently passed. HB1173 made adopting of a local Virginia Stormwater Management Program optional, rather than mandatory, for Chesapeake Bay Preservation Act counties in Virginia. If a locality chose not to adopt a local Virginia Stormwater Management Program Authority, then the Virginia Department of Environmental Quality would operate the stormwater program for the county and would issue permits to local developers and contractors. Staff from the counties discussed the reaction of each of their respective county administrations on the news of the passage of HB1173. Quickly the discussion turned to the pros and cons of adopting a local stormwater management program. The consensus of those present was that the main advantage of running their own local stormwater program would result in a quicker turnaround for application processing, which would please local developers and contractors. Disadvantages cited were the cost of running a local stormwater management program, and the potential backlash from developers, contractors and citizens on the significant price increase in the cost of stormwater permits fees that accompanied the new stormwater management regulations. In addition, the cost of running a local stormwater program would likely increase over time because of stormwater inspections required by local staff three and five years after completion of the stormwater management practices on the ground. Local county staff noted that with the economic downturn, the number of building permits in every county is very low as compared to ten years ago. Local county staff reasoned that with such low numbers of building permits coming across their desks the workload would be relatively small at first for either county staff or the DEQ.

NNPDC staff noted that DEQ staff informed him that if a county chooses not to implement a local stormwater management program this year, the county could "opt-in" at a later date and create a local stormwater management program. NNPDC staff added that since this is a new program, here is an opportunity for counties to opt in at a later date, therefore it might be prudent to opt out and see if there are any problems with DEQ processing local stormwater permits, and how those problems are resolved. Several present reasoned that with the economic downturn, county revenues will likely also

decline, and instituting a new program at the time of a stagnant economy might not be the most prudent action to take.

NNPDC staff polled county staff present regarding the timing of the stormwater education and outreach meetings for citizens and the local development community. Richmond County staff reiterated that they would like a citizen stormwater education meeting before the Board of Supervisors met to consider creating a local stormwater management program, and May would be a good time to hold such a meeting. The remaining counties noted that with the possibility of their county opting out of creating a local stormwater program, they would like to delay the stormwater education and outreach meetings. NNPDC staff mentioned that whether the county or DEQ runs the Virginia Stormwater Management Program Authority, the stormwater program is still new to citizens and developers, and they would benefit from educational meetings so they can understand why the regulations were passed and how to comply with the regulations in the future.

NNPDC staff then began the discussion of the Virginia Coastal Zone Management Program's PDC Technical Assistance Grant program for next grant year. NNPDC staff asked each county staff member present if the counties needed assistance with any coastal management projects. Northumberland County staff mentioned that their digital zoning map layer was rather hard to manage as the zoning classifications were embedded in the county digital tax map layer. In addition to the tax map zoning problem, the county has allowed split zoning in the past, which allows a landowner to zone different parts of a tax parcel in one zoning class with the other part of the tax parcel in another zoning class. Since a digital tax map should only have polygon borders that are property boundaries in it, showing these supplemental zoned parcels required maintaining a separate GIS layer to depict these split-zoned parcels in addition to the tax map zoning layer. NNPDC staff responded that they could assist in creating a single GIS layer with only zoning classification polygons from the existing zoning information to make maintaining and printing zoning maps less cumbersome for Northumberland County staff. NNPDC staff queried other county staff and they did not have any projects forthcoming. NNPDC staff then reminded those present of the Northern Neck Chesapeake Bay Access Authority's efforts to create new public access sites in the Northern Neck. Local county staff stated that were not successful in making any progress in obtaining waterfront property to provide public access to their citizens.

NNPDC staff then recounted the current and previous VACZM PDC Technical Assistance grant products including the creation of several water trails throughout three counties of the Northern Neck that mostly utilized public boat landings. NNPDC staff noted that those trails were published on the Northern Neck Tourism Commission website, but there had been no press release or any other public announcement of the existence of those water trails. NNPDC staff suggested that a marketing effort to promote the local waterway trails in the Northern Neck would promote tourism in the Northern Neck while promoting environmental awareness of water quality at the same time. Local county staff agreed that marketing the previous grant deliverables to a wider audience

would likely benefit the region and approved the inclusion of the Northern Neck Water Trails marketing effort into the forthcoming VACZM grant application.

NNPDC staff noted that at this local coordination meeting there would be no training element, as the training session this quarter would be in partnership with the newly formed regional non-profit group, The Wetlands Project. NNPDC staff informed those at the meeting that the training session for local government and wetland board members and staff would be called "The Wetlands Summit" and would be held on May 13, 2014, at a location to be determined. NNPDC staff explained that The Wetlands Project hopes to raise awareness of the value of wetlands in protecting property, filtering out pollution and nutrients as well as providing habitat and food sources, as well as acting as the nursery for many fish and shellfish species in the Chesapeake Bay. NNPDC staff related that The Wetland Project's goal is to strengthen community-based programs that encourage wetlands conservation in the Northern Neck, and the organization's website is www.thewetlandproject.org. NNPDC staff informed those present that they had been working with the wetland summit planning committee, which included staff from the Virginia Institute of Marine Science, the Northern Neck Soil and Water Conservation District, the Northern Neck Land Conservancy, and others. NNPDC staff noted that the purpose of The Wetlands Summit was to focus attention on the valuable ecosystem services provided by tidal and non-tidal wetlands, and each of the four Northern Neck county land use administrators were invited and strongly encouraged to attend. In addition, NNPDC staff requested contact information for the chairperson's of each county wetland boards, so members of the wetland's boards could be personally invited, as the wetland board members are on the frontlines of wetland protection and preservation. Local county staff stated they would be glad to provide that information. Finally NNPDC staff queried local county staff regarding any local opportunities for wetland restoration in their county. NNPDC staff noted that there are several locations in the Northern Neck where agricultural fields have had drain tiles installed and ditches created in order to cultivate the land, which occurred before there were any laws protecting wetlands from conversion in the 1950's and 60's. NNPDC staff encouraged county staff, when engaged with local property owners, to ask if there are any areas on their property that do not drain properly and if the property owner might consider a wetland restoration project on their property. NNPDC staff noted that the Natural Resources Conservation Service as well as Ducks Unlimited has funds for voluntary wetland restoration, and these organizations might be able to potentially fund a local wetland restoration project to enhance water quality and/or wildlife habitat.

The second training session for local government staff, as mentioned above was The Wetlands Summit held at Cobham Baptist Church in Warsaw, VA, on May 13, 2014. Over 35 participants attended from 26 different organizations actively involved in wetland conservation in the Northern Neck. The following organizations participated in The Wetlands Summit :

Northern Neck Planning District Commission
Northern Neck Soil and Water Conservation District
Lancaster County Wetlands Board and County Staff

Richmond County Wetlands Board and County Staff
Westmoreland County Wetlands Board and County Staff
US Fish and Wildlife Service
Virginia Cooperative Extension Service
Town of Kilmarnock
Virginia Institute of Marine Science
Virginia Marine Resources Commission
Virginia Department of Environmental Quality
Belle Isle State Park
Westmoreland State Park
Northern Neck Master Gardeners
Northern Neck Master Naturalists
Northumberland Association for Progressive Stewardship
Virginia Native Plant Society, Northern Neck Chapter
Menokin
Northern Neck Land Conservancy
Friends of the Rappahannock
Tidewater Oyster Growers Association
Ducks Unlimited
Chesapeake Environmental Communications
Hull Springs Farm
St. Margaret's School
The Wetlands Project

NNPDC staff presented on Sea Level Rise and the Impacts on Green Infrastructure, which were grant products created under a previous VACZM FY10, Task 12.06 Northern Neck Blue Green Infrastructure Protection and Outreach Focal Area grant. NNPDC staff created and presented a MS Powerpoint Presentation using the maps from the GIS analysis from the previous grant showing natural areas from the Virginia Ecological Valuation Assessment (VEVA) that would be impacted from a 4 foot sea level rise. As summarized in that grant's final report, Richmond County had the highest number of acres inundated natural areas of all Northern Neck Counties, as well as the highest amount of high ecological value natural areas impacted. NNPDC staff related during the presentation that there is little we can do about the inundation of natural areas; however, we can assist transition of wetlands into uplands due to sea level rise with the widespread implementation of living shorelines as a shoreline stabilization technique as opposed to bulkhead and riprap. NNPDC staff explained that bulkheads and riprap do not allow any pathway for marshes to migrate upslope to counter sea level rise. NNPDC staff mentioned that while living shorelines are not appropriate in high wave energy shorelines like those adjacent to a major river or the Chesapeake Bay, most of the small creek shorelines in the Northern Neck lend themselves to living shoreline stabilization techniques.

A photo of the attendees at the May 13, 2014 Wetlands Summit.

To encourage participants in The Wetlands Summit to do some investigation into local sea level rise, NNPDC provide additional online resources which included; NOAA's National Sea Level Trends website, Sewells Point, Gloucester Point, and Lewisetta, Virginia, Long Term Tide Station Mean Sea Level Trend webpages. In addition, NOAA's Digital Coast Sea Level Rise and Coastal Impacts Viewer and the Climate Center Sea Level Rise website was detailed for visualization of sea level rise, as well as links to the Virginia Ecological Valuation Assessment (VEVA) and Northern Neck Conservation Corridor Planning Outreach final PDF reports on the VACZM website, which explains the data used in the NNPDC mapping analysis shown in the presentation.

In addition to presenting on Sea Level Rise, NNPDC also created a presentation on Environmental Mapping websites, which described eight interactive web mapping portals from five government agencies. NNPDC took screenshots of the various web mapping tools and explained the functionality of the site and whether users could save a map or print out a map once the user had found the information ne/she was interested in.

NNPDC staff described the US Fish and Wildlife Service (USF&WS) National Wetlands Inventory Wetlands Mapper, Virginia Department of Environmental Quality's What's In My Backyard pollution sources and impaired streams mapping tool, as well as the Virginia Coastal Zone Management Program's Coastal Geospatial and Education Mapping System (GEMS). On the USF&W site, NNPDC highlighted Farnham Creek

wetlands in Richmond County; on the DEQ What's In My Backyard site, NNPDC staff highlighted Virginal Pollution Discharge Elimination System (VPDES) permit sites as well as water quality monitoring sites; on the VACZM's Coastal GEMS site, NNPDC staff highlighted potential wetland restoration sites and tidal flushing rates of creeks on the Northern Neck.

NNPDC staff also described NOAA's Coastal Snapshots of Wetlands Benefits Land Cover ArcGIS website as well as the Virginia Institute of Marine Science's Coastal Resources Management Mapping Homepage which details VIMS Blue Infrastructure Mapper, the Shoreline Manager's Assessment Mapper, as well as the Wetlands Mitigation Targeting Tool mapping application. On the NOAA Coastal Snapshots of Wetlands Benefits, NNPDC highlighted the western coastal basins of the Chesapeake Bay on the Northern Neck, which showed wetland, agriculture, developed land, and other land cover types classified. On the VIMS Blue Infrastructure Mapper, NNPDC staff showed the extent of Submerged Aquatic Vegetation (SAV); on the Shoreline Manager's Assessment Mapper, NNPDC staff showed bank erosion rates and shoreline protection structures; and on the Wetlands Mitigation Targeting Mapping Tool, NNPDC staff showed areas that had good wetland mitigation possibilities on the western Coastal Basins of the Chesapeake Bay on the Northern Neck. Participants of the Wetland Summit remarked to NNPDC staff that they did not know that there were that many environmental web mapping sites that would help them recognize environmental resources nearby. NNPDC staff responded that the Northern Neck is replete with natural resources, and users don't have to go very far to locate areas of high natural value. NNPDC staff included his contact information in case any participant would like additional information of free web based environmental web mapping resources, or if they would like a personal training session on the web mapping sites presented. Feedback from attendees indicated that the environmental web mapping presentation was one of the most informative of the day.

Major challenges to wetlands conservation were identified at the summit. Education of the general public and lack of funding resources for conservation projects emerged as the key issues and are the primary focus moving forward. NNPDC staff have continued the partnership with The Wetlands Project and is participating with the Northern Neck Wetlands Project Advisory Board to help educate the general public on the value of local wetlands in coastal hazard protection, water quality filtering, and habitat values.

NNPDC staff held the next local coordination and training meeting on August 19, 2014, with nine local staff from seven organizations and three of the four Northern Neck Counties represented. Ms. Rebekah Martin, Deputy Refuge Manager, updated local county staff on developments at the Rappahannock River National Wildlife Refuge (RRNWR). Ms. Martin noted that in 2011, the RRNWR acquired the Laurel Grove Tract on the shore of Farnham Creek in Richmond County. Ms. Martin detailed the amenities of the site, which have a short hiking trail, a freshwater pond for fishing, and sports an observation blind for wildlife watching. Ms. Martin highlighted work done on the RRNWR Hutchinson Tract in Essex County by the Youth Conservation Corps where young high school students are hired to "learn while you earn" where they built a kiosk and worked on improving walking trails. Ms. Martin stated that the refuge is planning on

expanding the public deer hunt on several of its tracts as wildlife biologists have noted an increase in the local deer population. Ms. Martin also informed local county staff that there is public turkey hunting as well as waterfront hunting opportunities. Ms. Martin explained that all hunts are done by a lottery system, where the public can sign up to hunt and are randomly chosen until the recommended number of hunters is reached. Ms. Martin said hunters can sign up online or call the Refuge to register for the public hunts. Ms. Martin noted that many locals have a hard time finding the units of the RRNWR and that the USF&WS is working on efforts to expand signage to make it easier for citizens to navigate to publicly accessible areas of the refuge. Ms. Martin concluded her training session by focusing on the Wellford Tract on Route 360 in Richmond County, stating that they had already built a hiking trail and are waiting for approval for a kiosk near the trail. NNPDC staff queried if there was going to be any public water access to Cat Point Creek from that site as he had discussed that possibility with the previous Refuge Manager. Ms. Martin replied that they are hoping to create a bank fishing spot on the tract but was not sure if or when that would occur. NNPDC staff thanked Ms. Martin for informing local government land use staff on the refuge's initiatives, and hoped that, perhaps in the future, there might be some opportunities to collaborate on public water access and recreation projects in Westmoreland, Richmond, or Lancaster Counties. NNPDC staff noted that Richmond County was applying for grant funds to improve Farnham Creek Landing, which is very near the Laurel Grove Tract, and there might be some opportunities to collaborate on enhancing public water access in that area.

NNPDC staff updated local governments on the State Water Supply Plan effort that has been underway for several years. NNPDC staff attended the June 18, 2014, Rappahannock River Basin Commission (RRBC) Meeting where Scott Kudlas, Director of the Office of Water Supply at the Virginia Department of Environmental Quality, presented the status of the State Water Supply Plan. NNPDC staff reminded those present of the Northern Neck Regional Water Supply Plan in which all four counties cooperated to comply with the Virginia General Assembly action in response to the 2002 Drought. NNPDC staff summarized the major findings of the Northern Neck Water Supply plan; the amount of water that the Northern Neck withdraws pales in comparison to the amount of water used to the north (Maryland) and south (West Point Paper Mill) of the region, and according to geologists, the recharge area for our aquifers lies to the west of the Northern Neck along the I-95 corridor. These two findings means that the main determinants of the Northern Neck water supply fall outside of the region and are thus out of the Northern Neck localities control.

NNPDC staff recounted Mr. Kudlas' presentation to the RRBC regarding the State Water Supply Plan, where Mr. Kudlas stated that by the year 2040, there may be several counties in the state where water demand exceeds supply. Mr. Kudlas stated plainly that in the coastal plain of Virginia there is not enough groundwater to meet the needs. Mr. Kudlas noted the coastal plain will be an area that DEQ needs to focus on and work with the localities and other groundwater users to manage effectively. Mr. Kudlas went on to say that there are several locations in the state where shortages may occur, such as along the fall line, in the Harrisonburg area, as well as the Roanoke/Salem area. Mr. Kudlas stated that DEQ is currently in negotiation with the eleven highest groundwater users in

the groundwater management area to reduce the volume of their withdrawals, as their permits are up for renewal. A representative of Middlesex County questioned Mr. Kudlas on the West Point paper mill industrial groundwater use, as Middlesex County had recently passed a resolution to recommend that the paper mill use waste water from the Hampton Roads Sanitation District instead of using precious coastal plain groundwater. Mr. Kudlas noted that they are currently in negotiations with that entity, and he feels they are making progress. Mr. Kudlas went on the explain that the recharge of the coastal plain aquifer is in inches, while the drawdowns are in feet. Clearly, this is not sustainable, Mr. Kudlas explained, and DEQ must change how we operate if the state is going to have groundwater to use into the future.

NNPDC staff noted that most of the areas where groundwater will be scarce is near the fall line where the aquifer is not as deep as it is here in the Northern Neck. NNPDC staff followed that comment by remarking that studies have shown that some of the water in the deeper Northern Neck aquifers is more than 10,000 years old, therefore we may already have depleted a majority of the groundwater and not know it.

Other projects that the Rappahannock River Basin Commission's Technical Committee is also working on, NNPDC staff explained, are to answer a question the RRBC members had "What can localities do to help meet the Chesapeake Bay Total Maximum Daily Load nutrient reduction for their jurisdiction?" NNPDC staff noted that the Technical Committee has been working on this question for some time. Nutrient reduction practices that have been brought up were to make sure that any county capital improvement projects be designed from the beginning to have the least amount of environmental impact. By considering energy usage, stormwater runoff and site location at the design stage, elements of environmental site design can be incorporated to minimize the disturbance of natural vegetation, retention of natural hydrologic flow and maximization of infiltration of stormwater runoff after the facility is built. NNPDC staff also noted another low cost nutrient reduction strategy was to have nutrient management plans written on all local government lands, such as courthouse lawns, schoolyard lawns and other county owned property. NNPDC staff noted that while this seems like a good idea, if the managed turf is not currently receiving nutrients (e.g. maintenance personnel are not applying fertilizer), then a nutrient management plan is not necessary. NNPDC staff related a story from another local county staff member of the RRBC Technical Committee that they did have nutrient management plans written for several schools in their county and found out a few months later that grounds maintenance staff had begun applying fertilizer to school lawn areas that were never fertilized in the past because the nutrient management plan stated that nitrogen was required. Obviously, this is counterintuitive and does not actually achieve nutrient reduction; in fact, it increases nutrients instead of reducing them. It is the opinion of NNPDC staff that if turf areas are not having fertilizer applied, then there is no need for a nutrient management plan for those areas. However, other areas that are fertilized, such as playing fields, could definitively benefit from a nutrient management plan to make sure fertilizer is being applied at a rate that the grass can uptake, and no more than that amount, in order to reduce nutrient runoff.

The final Northern Neck local government training and coordination meeting was held on September 24, 2014 with five local government staff persons representing four Northern Neck localities. Continuing on the groundwater management topic that was the focus of two of the previous three local government training sessions, this training session dealt with artificial aquifer recharge.

The meeting began with a presentation on Artificial Aquifer Recharge (AR) by Jason Early and Michael Alter from Clear Creek Associates, a groundwater consulting firm. They explained that Clear Creek Associates has been in business for 30 years, and that they design and repair wells, work in groundwater remediation and with mining companies and are also interested in Artificial Aquifer Recharge as a way to help replenish aquifers in the Coastal Plain.

Mr. Alter stated that Coastal Plain Sediments, east of the fall line in Virginia, are all part of a single system aquifer that extends into Maryland and North Carolina. He also noted that groundwater withdrawal volume in Virginia has increased 4 times the amount withdrawn back in 1940. Mr. Alter also noted that in the 1960s and 70s, when one drilled an artesian well in coastal Virginia, the water pressure would raise above the land surface. He stated that groundwater levels have been dropping steadily since then, and now water levels are often hundreds of feet below the land surface in Eastern Virginia.

Recounting the history of groundwater management in Virginia, Mr. Alter noted that the Commonwealth instituted two groundwater management areas around the Hampton Roads region and the Eastern Shore in the 1990s. Mr. Alter said that the groundwater management area on mainland Virginia was expanded to include all of Eastern Virginia, as of July 1st of this year (2014). He noted that another 100 applications for permits to withdraw groundwater were received from the expanded groundwater area, which includes Northern Neck and the Middle Peninsula municipal as well as industrial water suppliers.

Mr. Alter stated that he was informed by Virginia DEQ that they are currently in discussion with the top 14 groundwater volume users in the groundwater management area, and DEQ is requesting each user reduce their groundwater use by 1/2 (one-half) over the next five years. Mr. Alter indicated he thought that about 1/2 were industrial water users with the other 1/2 being municipal water suppliers. Mr. Alter noted that their company has obtained a copy of the computer groundwater model that Virginia DEQ uses, and they ran a computer simulation with all withdrawals in the groundwater management area suspended. The DEQ groundwater model showed that water levels in the aquifer would continue to drop for an additional hundred years. He stated that the withdrawals from the coastal plain aquifer in Virginia are not sustainable. (DEQ staff has reinforced this fact by stating that within 50 years, the demand for water may exceed the supply of water in several places within the Commonwealth, most areas are located along the fall line, where the coastal plain aquifer is the thinnest.)

Question: What is the size and location of the groundwater recharge area for Virginia's Coastal Plain Aquifer?

Answer: The layers of the coastal plain aquifer "pinches out" to the land surface at the fall line in Virginia, roughly the I-95 corridor, and it is a thin ribbon of an area that recharges the entire aquifer.

Mr. Alter stated that the level of the water in aquifer was, in many places, below sea level, and in those cases, saltwater intrusion was occurring. Mr. Alter mentioned that some communities near the ocean were using Artificial Aquifer Storage and Recharge to combat saltwater intrusion. He mentioned in Wildwood, NJ, as well as Chesapeake, Virginia, were injecting water into the aquifers during the winter months to replenish the aquifer and keep the ocean saltwater at bay (as groundwater generally travels from west to east), so during the summer when the tourist population swelled, they would have enough freshwater to supply the increased demand. Mr. Alter went on to say that Artificial Aquifer Recharge has been used successfully in the Southwest US, CA, OR, NJ, PF, DE, FL, GA and some international coastal communities.

Question: Is there a problem with the Potomac Aquifer in the Northern Neck losing its capacity?
Answer: The Potomac Aquifer in the Northern Neck is not thought to be dewatered (pumped to a point that it is losing capacity, and the sand grains start to compact, therefore losing the space to hold water into the future), rather it is only losing pressure. However, south of the Northern Neck, there is some dewatering that may be occurring, and that is usually evidenced by land subsidence. Mr. Alter noted that he comes from Arizona, where aquifers were overpumped and the land subsided up to 20 feet, which can cause tremendous infrastructure problems by cracking foundations of buildings, as well as highways, pipelines, and bridges.

Mr. Alter posed a question, why would a locality want to investigate Artificial Aquifer Recharge?
1. If the locality is denied an increase in permitted groundwater withdrawal, the locality might not be able to grow at all (either residences or industry) into the future.
2. In order to reduce nutrients entering the Chesapeake Bay, due to the requirements of the BAY TMDL nutrient reduction plan, a locality may find it more cost effective to inject their wastewater into the aquifer to recharge it instead of releasing the waste water to surface streams that drain into the Chesapeake Bay. This could lead to cost savings if waste water treatment standards for surface water becomes tougher (more expensive) in the future.
3. In order to recharge areas of the aquifer that have low storage capacity. Examples include those counties that are close to the fall line where the depth of the water bearing sediments are thin and shallow, where total water capacity of the aquifer is low. By pumping water into the aquifer west of the problem aquifer area, the natural groundwater flow would move eastward, recharging areas of the aquifer that may be in danger of dewatering.

Question: Regarding the 14 largest volume groundwater users that Virginia DEQ is asking to reduce their withdrawals by one-half, where are they located?, in the old groundwater management area or the new groundwater management area?

Answer: All applications for the new groundwater area are still being processed, so the 14 largest groundwater users are in the old groundwater management area (either Hampton Roads or the Eastern Shore).

Question: Your DEQ groundwater computer model showed that Artificial Aquifer Recharge helps to recharge groundwater areas to the east of where the injection of water occurred, but what about benefits west of such injection sites?
Answer: There is not much benefit west of the water injection sites, as the general groundwater flow in the Coastal Plain Aquifer is from west to east.

Discussion ensued regarding other ways to reduce dependence on groundwater, as opposed to the rather radical effort of Artificial Aquifer Recharge. NNPDC staff suggested that using drinking water to flush toilets is very wasteful and that state of Virginia should look toward reusing graywater or other non-potable water, such as cisterns to flush lavatories, as well as for fire fighting. This could save millions of gallons of drinking water each day. The discussion continued that using rainwater from a cistern, for example, for flushing toilets would also need an backup system of water (most likely potable water), so in cases of drought, there would still be water available to conduct waste outside of the building. This interface between potable and non potable water is where the Virginia Department of Health has concerns NNPDC staff related, the possibility of non potable water contaminating the potable water supply. There are valves that can do this job, but everything mechanical has a chance of failure, and this possibility of contamination concerns the Virginia Department of Health.

The consensus of those present was that groundwater is a resource that must be conserved and managed wisely as the condition of the aquifer could already be compromised, which has been alluded to previously in this report.

NNPDC staff then reviewed the current NNPDC VACZM Technical Assistance Grant that was ending on September 30th. NNPDC staff assisted Richmond County with the Chesapeake Bay Preservation Act five year septic pumpout notification program by helping to update and merge landbook and septic pumpout databases in order to create a septic pumpout notification letter to one of Richmond County's magisterial districts. NNPDC staff noted that there were some septic pumpout tracking tasks written into the grant for Northumberland County as well, but that staff from Northumberland County accomplished the work before the grant contract was signed, therefore there was not product in this year's VACZM PDC Technical Assistance grant for Northumberland County. NNPDC staff also outlined the work that was done for Westmoreland County this grant year, specifically a digital and hard copy E911 county road map with all roads labeled with the name and route number. Also NNPDC downloaded and compiled and created map projects for LIDAR data for inclusion in Westmoreland County's Geographic Information System. Finally, NNPDC described the grant products for Lancaster County, which was investigation into three road endings in Lancaster County for possible public water access sites. NNPDC staff noted that no evidence was uncovered through its investigation of land records or through the Virginia Department of Transportation that there was any public right of way on the road endings examined.

NNPDC staff next outlined the upcoming VACZM PDC Technical Assistance Grant projects that would be beginning on October 1, 2014. NNPDC staff explained that Northumberland County's digital zoning file was in need of updating and the county staff had suggested creating a standalone zoning layer that would be easier to display and maintain as opposed to the parcel-based zoning layer that is currently in use. Also, NNPDC will produce two water trail guides for Northumberland County to add to ten water trails in Lancaster, Richmond, and Westmoreland counties that NNPDC staff created over the previous two grant years. NNPDC also plans a marketing effort for all water trails in the Northern Neck with assistance from the Northern Neck Tourism Commission. Narratives about paddling trips, along with photos and other information will be sent to local newspapers, as well as posted to Facebook, Twitter, and Pinterest in this multimedia water trail marketing campaign.

NNPDC staff told local county staff that the PDC Technical Assistance Grant is available for projects involving water quality, cumulative and secondary impacts from development, public water access, habitat preservation and restoration as well as coastal hazards management issues, and NNPDC staff is available to discuss any potential project with county staff for the next grant cycle.

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III. Richmond County Septic System Pumpout Tracking Program Update

Richmond County requested assistance from NNPDC staff in regards to updating the Richmond County Chesapeake Bay Preservation Act Five Year Septic Pumpout tracking database. NNPDC staff met with Richmond County staff to determine the extent of assistance and to determine which tasks needed to be accomplished before the septic pumpout tracking database was current and up-to-date. NNPDC staff noted that the original database was several years old and asked Richmond County staff whether newly constructed houses had been added to the database since it was originally created. Richmond County staff stated that there had been no updates to the number of database entries, the only updates were those made to existing data records when citizens provided the county with receipts of septic tank pumpouts. NNPDC staff then discussed with Richmond County staff the best method to capture the newly built structures. Discussion regarding using application for a building permit as a proxy for a new structure resulted in the realization that with today's economic conditions, even though someone has paid the fee for a building permit, often construction may not start for some time. Further discussion with county staff involved using inspections, such as the foundation (footer) inspection, plumbing, and electrical inspections. After discussion, county staff determined that the final building inspection would be the best trigger to indicate that a structure was built and inhabited, and when that occurred, the tax map parcel information would be entered into the septic pumpout database. Richmond County staff indicated they had to go through all of the final building inspections for the last four years to update the database. NNPDC staff offered to assist in this endeavor and Richmond County staff indicated that staff would work on this in between other job tasks and by having someone assist that is not familiar with the filing system would take more time than accomplishing the task by themselves.

Further discussion on the methodology for updating the Richmond County Septic Database ensued, this time regarding the changes to property ownership since the last time the septic pumpout database was used to generate septic pumpout notification letters. The Richmond County Technology Director indicated that after the end of July or at the latest early August, the county would have the newly complied 2014 Landbook data from the Richmond County Commissioner of Revenue, which would contain the current owners of the tax parcels within the county. Richmond County staff noted that the 2014 Landbook database could used to provide the the Richmond County Septic Pumpout Database with current owners mailing addresses so that a another septic pumpout notification letter could be created to be sent to citizens of Richmond County.

In the past Richmond County had mailed out septic tank pumpout notification letters to citizens of all its magisterial districts. Richmond county staff determined that they needed to begin anew and send out septic pumpout letters to the first magisterial district that they had notified in the past, which was Farnham Magisterial District, as they had started the notification process in alphabetical order. Richmond County staff stated that the end product that they needed from NNPDC staff was an MS Word file of the Richmond County septic notification letter (which had been previously composed) that had been mail merged with the landbook and septic pumpout database to have the addresses of landowners in the Farnham Magisterial District.

NNPDC staff received the updated Richmond County Septic Pumpout Tracking Database and 2014 Richmond County Landbook data a couple of months after the initial strategy meeting. Using Microsoft Access, a new database was created by NNPDC staff and both the Septic Tracking table and the 2014 Landbook table was loaded. NNPDC staff then joined the two tables on the Tax Parcel ID data field, which created a new table that was relationally joined together within MS Access which loaded the current land owners mailing addresses by linking them to the septic pumpout information. The Richmond County Septic Database has 7,141 records of tax parcels in it; NNPDC staff then created a query that filtered out data from citizens from all other magisterial districts than Farnham (from the landbook database) which resulted in 1,497 tax parcel records. Then NNPDC staff filtered out those that had indicated on previous forms that the tax parcel did not have a septic system installed which resulted in the number of records to be reduced to 863. NNPDC added another filter that eliminated those tax parcels that had shown proof of septic pumpout to county staff within the last five years which resulted in 836 records, and finally added a filter that eliminated those that had proof of installation of a septic effluent filter, which according to the Chesapeake Bay Preservation Act, exempts those landowners from the five year septic pumpout requirement, as the effluent filter is self regulating and backs up when the tank needs pumping, which left a total of 826 tax records. Therefore, there are 826 citizens in Farnham Magisterial District that have a septic tank on their tax parcel that have not notified the county that they had their septic tank pumped out in the last five years and have not notified the county that they had a septic effluent filter installed on their septic system.

NNPDC staff edited the Richmond County Septic Pumpout Notification letter to include the mail merge fields, "FullName", "Address" and "Zip" for the address as well as "FullName" on the salutation to prepare it for the mail merge. Richmond County staff had previously formatted the letter so that when folded properly, the address portion of the letter could be inserted into a window envelope, bypassing the need for printing of separate address labels for each citizen septic pumpout notification letter. NNPDC performed the mail merge and created 836 septic pumpout notification letters for citizens in the Farnham Magisterial District. NNPDC staff delivered the digital MS Access database containing the two tables, the completed digital MS Word mail merged septic pumpout notification letters file, containing the 836 uniquely addressed septic pumpout letters to Richmond County staff.

NNPDC staff informed Richmond County staff that the Northern Neck Planning District Commission had applied to DEQ Chesapeake Bay Implementation Grant funding to reinstitute the Low Income Septic Pumpout Assistance Grant, which had been discontinued in 2012 due to lack of state funding. NNPDC staff stated they were reasonably sure that they would receive some funding for septic pumpout assistance for low income households in the Northern Neck region, but the grant was not scheduled to begin until January 2015. NNPDC staff proposed that Richmond County staff consider waiting until 2015 to send out notices, so there would posibly be money available to assist low income households in Richmond County to comply with the requirements of the Chesapeake Bay Preservation Act. Richmond County staff agreed and NNPDC offered to rerun the mail merge with the appropriate date when notified by Richmond County.

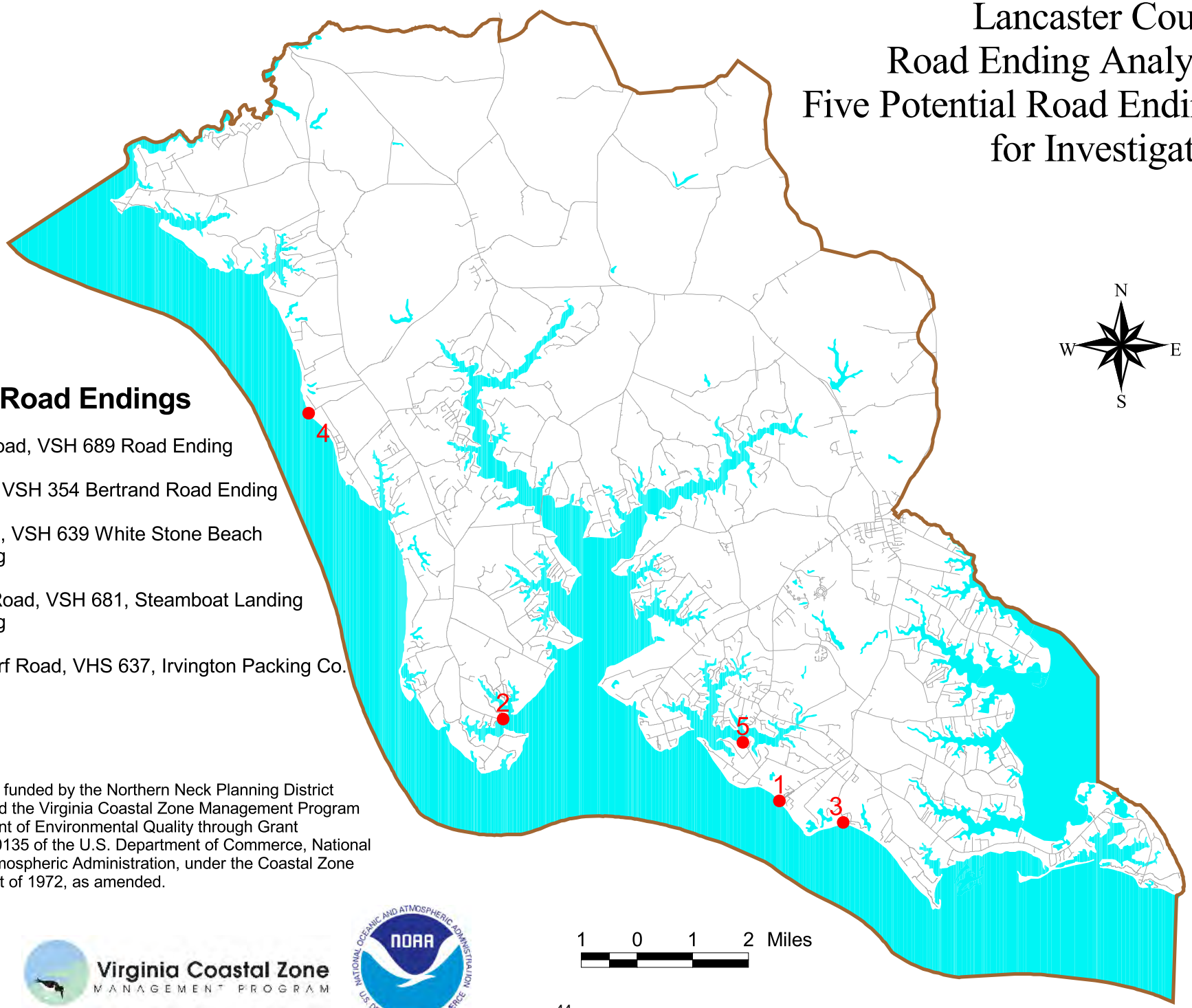
VI. Lancaster County VDOT Road Ending Analysis

Lancaster County's Planning Commission, after a joint presentation by the Middle Peninsula Chesapeake Bay Public Access Authority (MPCBPAA) and Northern Neck Chesapeake Bay Public Access Authority (NNCBPAA) in 2012 requested that the NNPDC investigate road endings in Lancaster County for conversion to public access sites, using the Road Ending protocol developed by the MPCBPAA (a previous VACZM FY 05, Task 92.02 grant product). Lancaster County has four public water access sites, the least number of public water access sites of the four Northern Neck counties. The four public water access sites in Lancaster are at Belle Isle State Park (where there is a parking fee for using the boat ramp), Greenvale Creek Public Boat Landing, Little Oyster Creek Canoe and Kayak Launch (built with funds from Lancaster County and VACZM FY00) and Westland Beach in the Windmill Point area.

NNPDC staff contacted Lancaster County staff for a list of five road ending sites to be examined. NNPDC staff explained to county staff that the technical assistance grant stipulated that the NNPDC would analyze up to five road endings for possible public access, and depending on the complexity of the research involved with each site, there might be fewer than five sites examined by the end of the grant period. NNPDC therefore requested that Lancaster County staff prioritize the sites so that the sites deemed more important to the county would be sure to be analyzed. NNPDC created a map of the five road ending sites that Lancaster County selected which are, in order of priority: 1) Old Ferry Road, the end of State Route F689, 2) River Road, the end of Route 354, 3) Beach Road, the end of State Route 639, 4) Monaskon Road, State Route 681, and 5) James Wharf Road, the end of State Route 637. The Lancaster County Five Potential Road Ending Sites for Investigating map is found at the end of this page.

NNPDC staff contacted staff from the Virginia Institute of Marine Science (VIMS) as NNPDC staff was aware of a recent shoreline evolution study that VIMS staff had undertaken that utilized historic aerial photographs. NNPDC staff reasoned that historic aerial photographs might provide useful information in proving that there was public water access to the sites in the past, and requested digital copies of any historic aerial photographs from VIMS for the five road ending sites chosen by Lancaster County staff. VIMS staff responded with digital historic aerial photographs for each of the five sites for the years 1937, 1969, 1982. NNPDC staff, using the NNPDC Geographic Information Systems, created maps of each of the five sites for the historical aerial photograph as well as one with the current aerial photographs (2013) provided by the Virginia Base Mapping Program. The maps showed the current Lancaster County tax parcel maps overlain with the historical and current aerial photographs. One site, Monaskon, experienced significant erosion over the time period of the photographs, while another site, Old Ferry Road experienced significant accretion to the shoreline, from the newly completed State Route 3 bridge abutment of the Robert O. Norris bridge. Before NNPDC staff had received the historical aerial photographs, he interpreted the current 2013 aerial photograph for Monaskon and hypothesized that there had been significant erosion at Monaskon, as an old groinfield was visible in the shallow water off the shoreline there. After receiving the historical aerial photographs, NNPDC staff noted that his earlier interpretation was verified. The historical aerial photographs and current aerial photographs along with property ownership maps for all three sites are shown on maps that follow each site analysis text section.

Lancaster County Road Ending Analysis: Five Potential Road Endings for Investigation



Potential Road Endings

1: Old Ferry Road, VSH 689 Road Ending

2: River Road, VSH 354 Bertrand Road Ending

3: Beach Road, VSH 639 White Stone Beach Road Ending

4. Monsakon Road, VSH 681, Steamboat Landing Road Ending

5. James Wharf Road, VHS 637, Irvington Packing Co. Road Ending

This project was funded by the Northern Neck Planning District Commission, and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA13NOS4190135 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

Virginia Coastal Zone MANAGEMENT PROGRAM

NNPDC staff printed out maps that indicated the tax parcel numbers of properties on both sides of the VDOT road right of way for each road ending site. NNPDC staff took that information to the Lancaster County Courthouse to research the properties through old deed books to trace the line of ownership of each of the parcels. It was hoped that one of the deeds would mention public right of way to the water, or that land was given to the Virginia highway system. NNPDC staff spent several weeks at the Lancaster County courthouse researching deeds of ownership, and will books of previous owners. NNPDC staff worked on the first three of the five road endings, researching most properties back to the 1920s. Around 1920 to 1930, the deed books are in a handwritten format, with very few of the deeds have drawing of the land parcels. The property descriptions in these older deed books have metes and bounds descriptions, which makes it very hard to determine which property the deed is describing. The descriptions detail such ephemeral landmarks such as a gum tree with three marks on it, previous deceased landowners, wooden fence posts and named swamp edges. Therefore, most research ended when the property was traced to these older deed books. NNPDC staff researched and completed three road ending analyses. Information on the analysis of each of these three road endings follows, in Lancaster County's order of priority.

Old Ferry Road, State Route F689

As the name suggests, this road was the terminus on the northern side of the Rappahannock River for the Grey's Point Ferry which was a private ferry operation that carried vehicles and people from Lancaster across the Rappahannock River to Middlesex County before the State Route 3 bridge was built. The right of way (pavement end) terminates approximately 140 feet from the MLW shoreline of the Rappahannock River. There is currently a 500 foot pier located at the end of the road, owned by the subdivision to the west of the right of way, according to the county property records. No portion of the land other than the 80 feet right of way to the terminus of the pavement is owned by the Virginia Department of Transportation, according to the Northern Neck VDOT Residence District Manager, David Brown.

Currently, there are two parcels next to the right of way. On the west side of the right of way, which extends to the 140 foot area between the end of the pavement and the shoreline is a common area [tax parcel 34J(1)3, 10.26 acres] that is part of the River's Landing Subdivision, and owned by the Property Owners Association of River's Landing, and on the east side, a parcel (tax parcel 34-209, 0.81 acres) with a restaurant named Willaby's that is owned by Sundowner Partnership.

Tax Parcel 34J(1)3 (Rivers Landing Subdivision Common Area)
The current deed for the parcel was found in **Deed Book 371, page 168**, and details that Fair Harbor Properties (a Connecticut corporation) sold on March 29, 1995, the real property shown as Parcels B, C, D on Plat "Resubdivision and Vacation of a portion of Phase One and Phase Two, River Landing", dated 12-2-1994 to the Property Owners Association of River's Landing (a non-stock corporation). As shown on the Plat, Parcel D is the same width of State Route F689 and extends from the edge of the pavement 140 feet to the shoreline of the Rappahannock River. This deed references the previous deed that is located on Deed Book 355, page 609. This deed details formation of the River's Landing Property Association, made up of ten parties, all named and which parcels that each of the ten parties owns within the subdivision. This deed references

Plat Book 1, page 3 which has multiple parcel references of all the nine parcels of land that comprise the combined parcel that makes up the Rivers Landing subdivision. Of those nine parcel references three were previous electrical service easements, two were for telephone line easements, one was for exclusive heating oil contract for ten years, one was for drainage, and two were parcels of land.

NNPDC could not find a deed that referenced the sale of the property from Herbert W. Stover, III (see below) to the Fair Harbor Properties owners (which were the owners before the Property Owners Association of River Landing). This break in the chain of title was researched extensively, without any results.

One parcel referenced that contains the property this analysis is devoted to is in **Deed Book 216, page 233**, dated November 14, 1979, which references the sale of the property to Herbert W. Stover, III from Joseph M. Sinclair and describes two parcels.

Tax Parcel 34-209 (Sundowner Partnership – Willaby's Restaurant)
The first piece of property called Parcel One, a triangular piece of property bounded on the Southwest by the Rappahannock River, on the Northwest by Parcel Two, and a highway right of way which formerly lead to the now abandoned White Stone Grey's Point Ferry Wharf and easterly by Virginia State Highway 3 (NNPDC interprets this property to be the Willaby's Restaurant, current parcel 34-209). This deed references that this property is identical to the property conveyed to Sinclair by Thelma Spencer a deed dated November 29, 1972, in **Deed Book 173, page 367**. This deed book page references the property transfer from Thelma L. Spencer to Joseph M. Sinclair, and describes the property again as being roughly triangular in shape, but states "with the addition of the wharf of the aforesaid ferry, now used as a fishing pier." This statement in the deed, dated in 1972 seems to attach the land area between the VDOT Route F689 right of way and the Rappahannock River to this parcel (current parcel 34-209). Today, the parcel is attached to the property on the other side of the right of way. The description of the property continues, saying the property is identical to the property conveyed to Ralph W. Spencer and Thelma L. Spencer from Mary J. Clayton and George E. Clayton as a common law deed dated September 26, 1958. Further along in the deed, there is a statement saying that there is an appurtenance to Parcel One to two small parcels acquired by Mary J. Clayton from the Commonwealth of Virginia, together with buildings, wharves, and other improvements thereon, more completely described in deeds dated August 23, 1957, duly recoded in **Deed Book 115, page 415 and 421**, respectively. NNPDC staff researched these deeds, the first deed, page 415 references a small triangular portion of right of way containing 800 square feet outside and West of the normal 110 feet of right of way shown on Sheet No. 3, plant for State Highway Project 3459-01, Route 200 approved September 1, 1953, and outlined in RED. The problem with this description, NNPDC staff discovered, is that VDOT Sheet No. 3 is a negative print, with a black background and white lines and lettering. While there is a thicker white line that outlines the right of way of the current State Highway F689 to the Rappahannock River, which may be the red ink, it is impossible to tell if that is the outline referenced, and the entire sheet is difficult to read, since it is a negative in white and black (as opposed to black and white). This was as far as NNPDC staff could research this parcel, Parcel One, described in **Deed Book 216, page 233** as this last deed book entry had no previous deed book reference.

Tax Parcel 34J(1)3 (Rivers Landing Subdivision Common Area)
The second piece of property referenced by **Deed Book 216, page 233** is called Parcel Two, and is described as a tract containing 24 acres +/- as described in the plat named "Boundary Survey of the Land of Joseph Sinclair". Since this parcel is large and to the west of the State Road F689, NNPDC staff reasoned that this land is the Rivers Landing Common Property Parcel [34J(1)3]. The deed states that Parcel Two was conveyed to Joseph M. Sinclair from Robert K. Whaley (**Deed Book 126, page 446**, dated September 24, 1961) and is bound on the Northeast by the right of way to the old ferry road and by Parcel One. NNPDC staff noted that this larger parcel doesn't include the right of way to the old ferry wharf, since the boundary of this property is the right of way. However, the current parcel, 34J(1)3, has portion of the right of way, between the pavement end and the water included as part of that parcel. NNPDC staff could not find any evidence as to why the eastern parcel (Parcel One) lost the right of way near the water and western Parcel Two gained that waterfront right of way. NNPDC staff cannot find any record of that portion of waterfront access right of way land being conveyed between the properties. Further research into Parcel Two revealed that Robert K. Whaley received the property from his mother, Clara B. Whaley (who is R.K. Whaley's widow) from **Deed Book 73, page 86**, dated December 27, 1938, and at that time the property consisted of 34 acres. Going further back in property ownership of Parcel Two, NNPDC staff learned that the property was sold to R.K. Whaley from Susan E. Sanders from **Deed Book 52, page 448**, dated March 21, 1936.

NNPDC staff is unable explain why the right of way to the water was transferred from Parcel One (34-209) to Parcel Two (34J(1)3).NNPDC staff asked the Lancaster County Circuit Court staff how to find out about that piece of property, and they stated that often there are no references to previous deeds are omitted with no traceable leads to investigate. When staff at the Virginia Department of Transportation was contacted regarding the road ending of State Route F689, the Northern Neck Residency Administrator, Dave Brown, stated that VDOT has no property other than the right of way of the road to the end state maintenance sign. Therefore, NNPDC staff did not analyze the site's potential for potential public water access, as Rivers Landing Property Owners Association owns the site.

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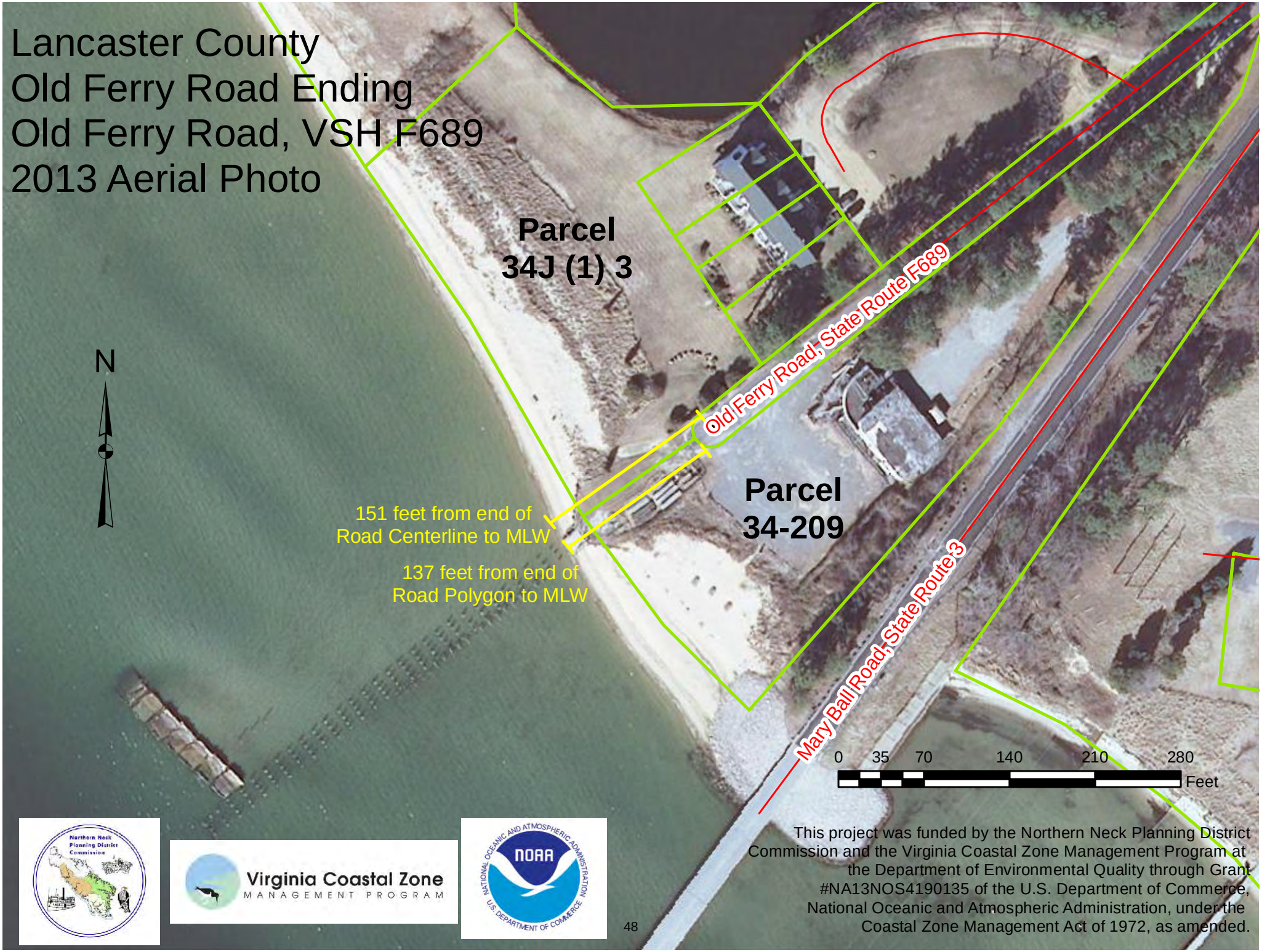

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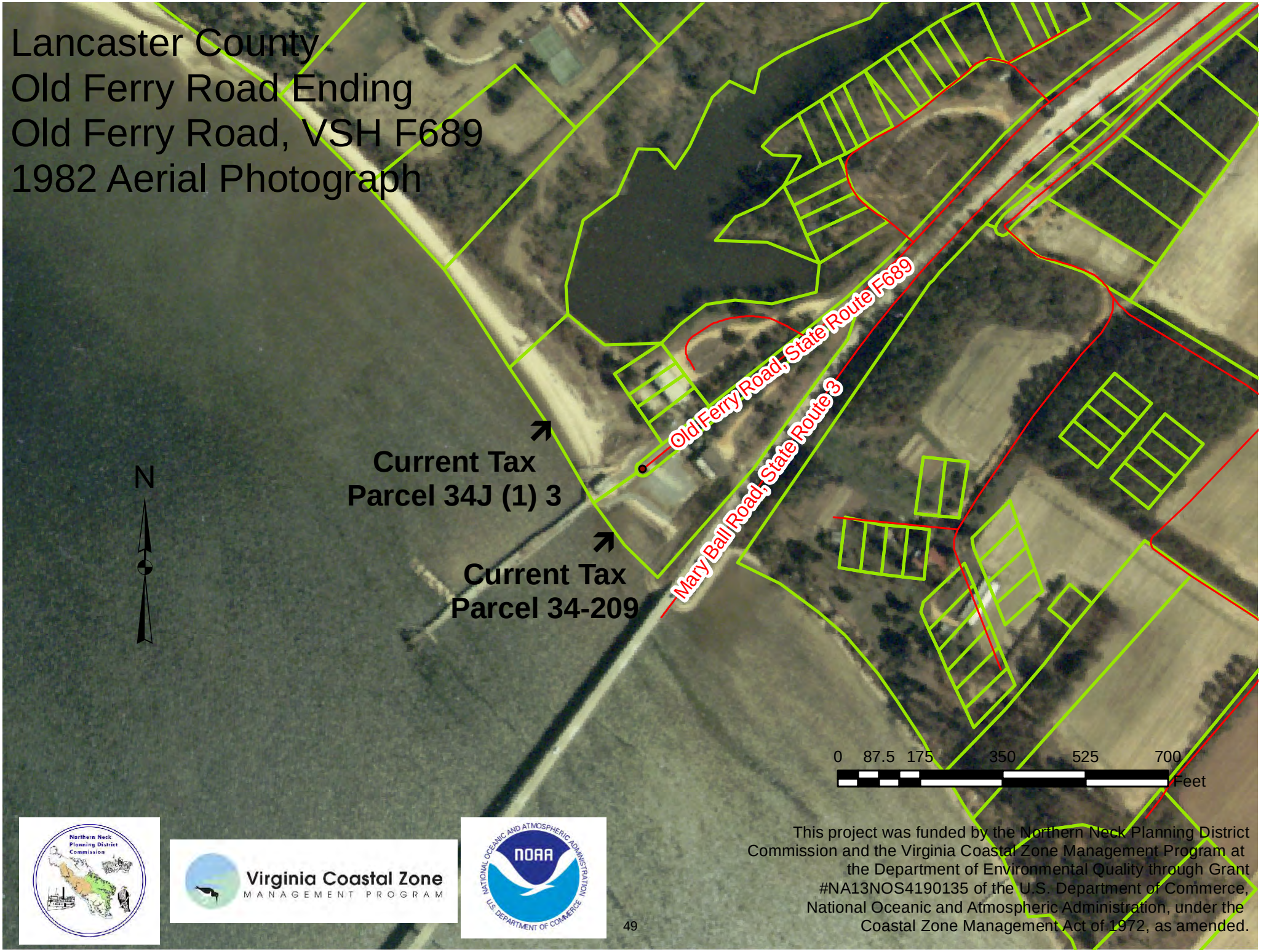

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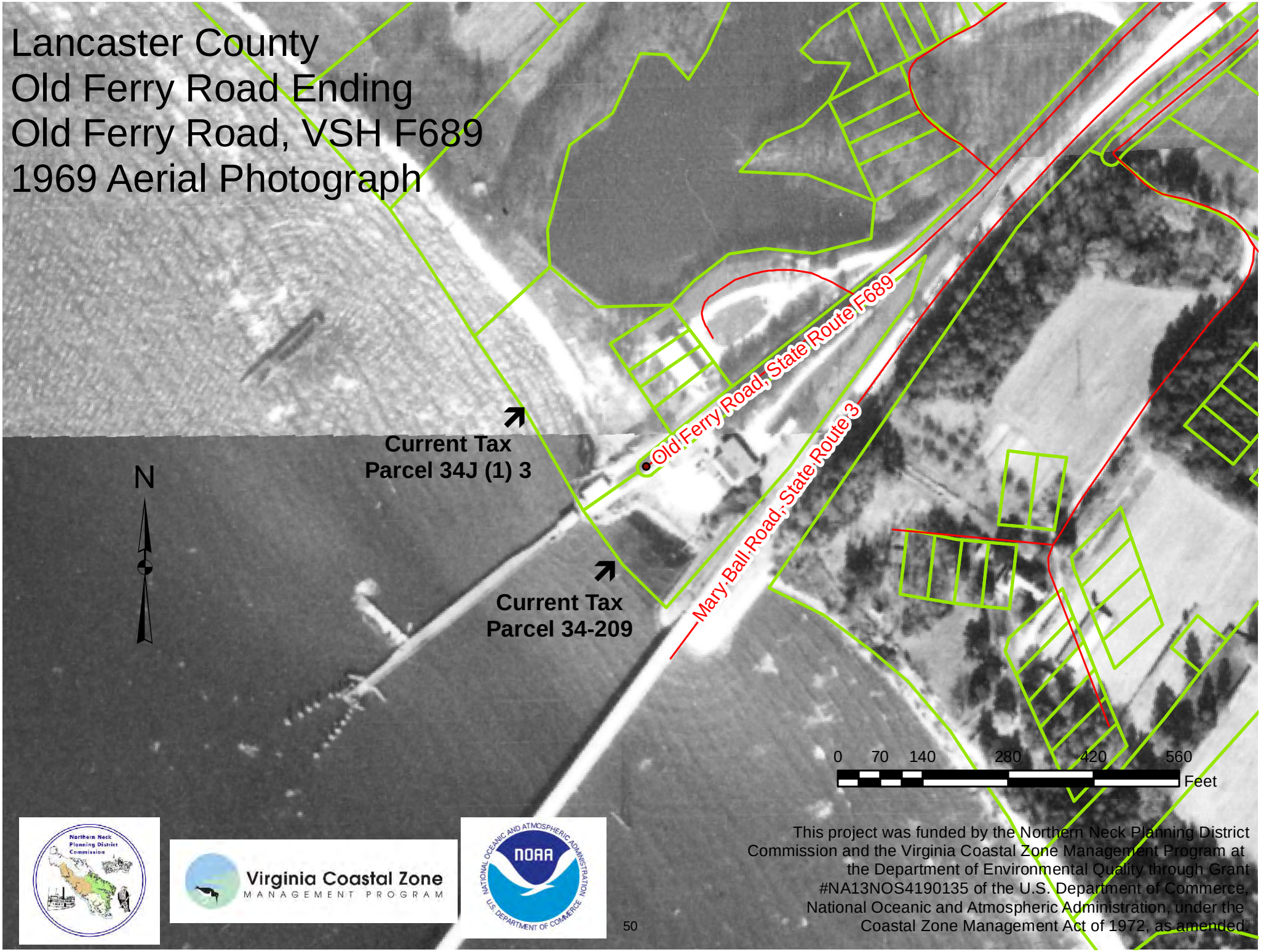

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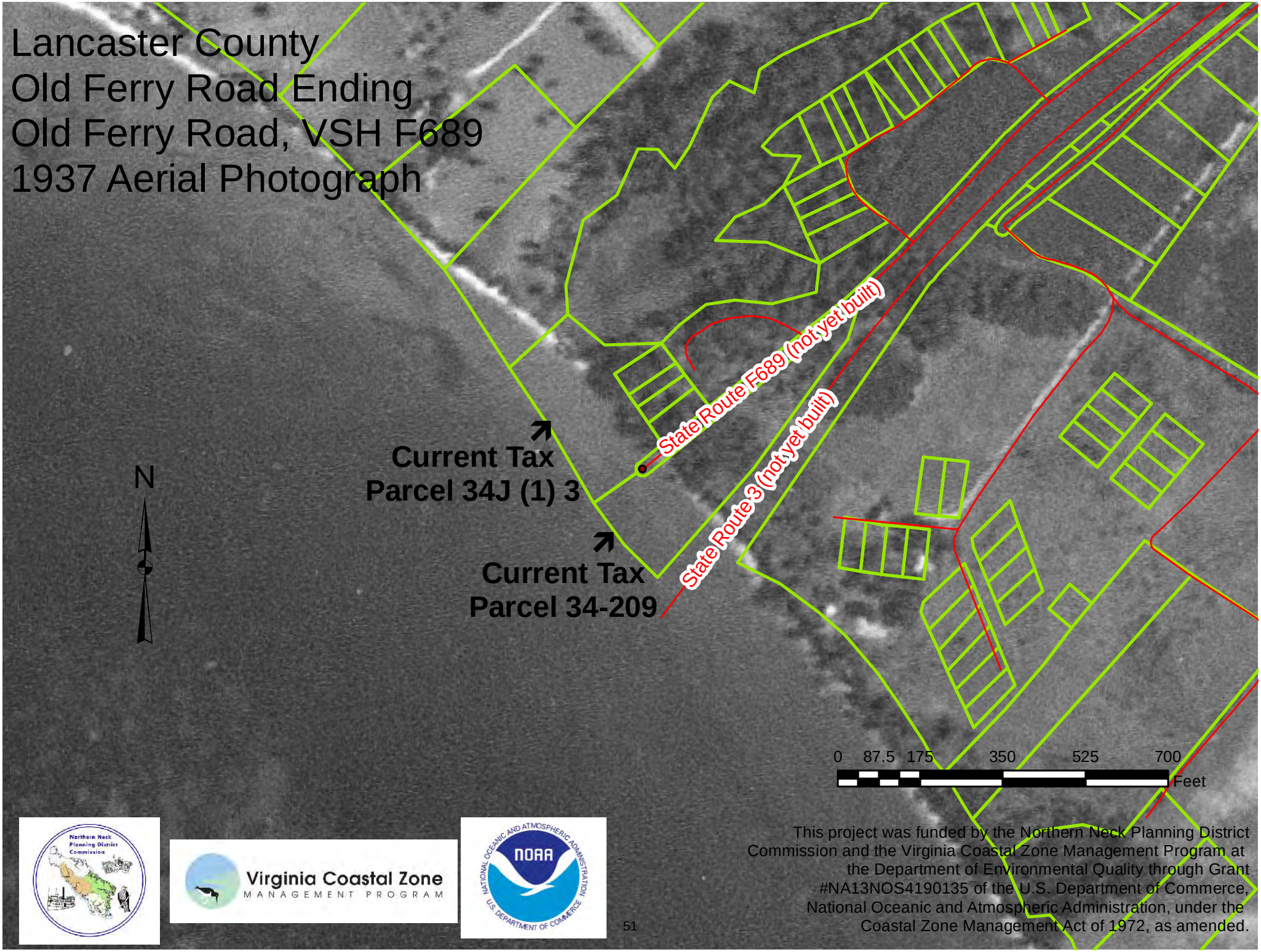

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River Road, (Bertrand), State Route 354

The River Road Ending, State Route 354, has a small cul-de-sac at the end of the road, which according to the Lancaster County digital tax maps, is on private property. The general area of this part of Lancaster County near the River Road Ending is called Bertrand. As shown on the current aerial photograph, there is a 130 foot dock that extends from the southern shore next to the road into Whitehouse Creek, a tributary to the Corrotoman River. The dock has several finger piers and at the time of the current (2013) aerial photograph, there was one boat moored to the pier. There are two tax parcels that surround the road ending, tax parcel 31E(1)39 is larger (1.3 acres) and lies to the north and east of the road ending, while tax parcel 31E(1)40 is smaller (0.5 acres) and lies to the south of the road and Whitehouse Creek. Neither Lot 39 nor Lot 40 has any buildings, however, the pier is attached to Lot 40. Examining the historical aerial photographs for this site, the 1982 and 1969 photos show essentially the same conditions: no buildings were located on either parcel and the pier attached to Lot 40. The 1982 photo shows three boats moored at the dock and the 1969 photo shows one boat moored at the dock. The 1937 aerial photograph does not show evidence of the dock, however there is a building at the tip of land the is attached to Lot 39, possibly extending over the water. NNPDC staff guesses that this building may be an oyster or seafood house, although there is no tangible evidence found in the records to substantiate this. In order to ascertain the diversity of property ownership in the area around the road ending, NNPDC staff used Lancaster County digital tax maps to create a thematic map showing each unique owner of each tax parcel in a different color around the ending of State Route 354, River Road. From the Land Ownership map, both Lot 39 and 40, as well as 13 other contiguous inland tax parcels are owned by the same entity. NNPDC staff hypothesized that this commonality of property ownership is centered on the River Road ending, and could possibly be a part of a subdivision plan with common subdivision area access rights through a common waterfront parcel.

Tax Parcel 31E(1)39, 31E(1)40
NNPDC staff began the property owner research by examining the deed book reference to the current parcel Lot 39. NNPDC noted the current deed book reference for the property was **Deed Book 380, page 205** dated March 29, 2006. This deed book references lots 36 B (0.956 acres), 38 (0.8 acres) and 39 (1.3 acres) with the owners, Raymond E. Watson, unmarried and Deborah W. Watson, unmarried, formerly married conveying the property to R. E. Watson & Associates, Inc. The deed also has several clauses for each of the parcels that detail arrangements involving other tax parcels nearby. For instance, Lot 39 has the right of ingress and egress over Lot 40 in order to gain access to the water adjacent to Lot 40 as well as the right to use the boat dock attached to Lot 40, as well as a boat slip on the dock for use of the owners of Lot 39. In addition, the owners of Lot 39 have the right to maintain, repair and replace said boat slip, if necessary. Also, Lot 39 property owners have a non-exclusive easement for ingress and egress 20 feet in width across Lots 36A and 36B, said easement running along the eastern line of Lot36B and along the northern lines of Lots 36B and 36A. Also, Lot 39 property owners have the right to locate a septic drain field on Lot 36B as described above at the grantee's expense. The other two lots described in this deed have similar clauses attached to the property, Lot 38, 36A, and 36B has the right of ingress and egress over Lot 40, as well as access to the pier/dock attached to Lot 40, and the right for each property owner to expand the dock by one slip, provided they get the permits and bear the cost of the additions to the existing pier. There are other clauses in the deed

that do not directly address the water access component, such as the right to connect to a neighboring property's water supply, that are not germane to this analysis and therefore not mentioned. NNPDC staff noted that the abundance of clauses in these properties deeds link the access rights of many properties to Lot 40, the most accessible parcel of land proximate to the River Road Ending, Rt. 354. Therefore, any transfer of this property into the public ownership domain would be problematic at best. This deed also references the previous ownership deed, **Deed Book 243, page 514,** dated June 22, 1984. This deed covers lots 38, 39, and 40, and states that Read F. Goode conveys the property to Raymond E. and Deborah W. Watson. The deed outlines the clauses mentioned above, as well as additional clauses for Lot 40. Lot 40 clauses include; 1) the existing recorded deed restrictions affecting the subject property and the existing lease with local watermen that states that the existing lease will be honored by the grantee; 2) that the grantee shall apply annually with the State Department of Health for any variances required for maintaining the existing boat dock and shall apply for and maintain all other necessary permits related to said dock; 3) that the grantee acknowledge and grant the rights of others to the continued use of the boat dock and their access to the water adjacent to Lot 40; 4) the rights of owners of Lots 37 and 38 to extend the existing boat dock and access to the water; and the rights of ingress and egress over Lot 40 through the boat dock and to the water for owners of Lots 36A and 36B. As before, NNPDC staff noted concern about the numerous encumbrances attached to Lot 40 and the implications it has regarding potential public water access to the lot. In the previous owner references in this deed, **Deed Book 235, page 277** was cited. NNPDC staff researched this deed book and found that this deed referenced James P. Maguire as releasing his 1/2 interest in the properties to Read F. Goode. Other references to the previous property owners were **Deed Book 214, page 602,** dated July 2, 1977. This deed book reference stated that Goode, Maguire, Gruber & Associates conveys the property to Read F. Goode and James P. Maguire. This deed covers five tracts of land, Lots 32, 33, 32, 35 and reserved area "A" (which, in the future is divided into Lot 39 and Lot 40). This deed also dissolves the cul-de-sac of one of the subdivision's planned roads, Youcomico Drive, and allocates the land to the adjacent parcels. This deed references the previous owners of the land from **Deed Book 198, page 205**, dated February 2, 1977. This deed covers the five tracts of land listed above, and the property was conveyed by Millenbeck Associates to Goode, Maguire & Associates. On page 198, page 207, bottom of the second paragraph of this deed states that "it is the express intention of the party of the first part (Millenbeck Associates).....to convey the Reserved Area (present day lots 39 & 40) to the Virginia public highway system." This deed states the intention of the seller to give the Reserved Area to VDOT, however there is no documentation that shows that this was carried out. While the intention is stated in the deed, there is no legal obligation for the purchaser to follow through with the sellers wishes. If this land was actually given to VDOT, then it would have become a public landing already. As noted, this reserved area was subdivided into two parcels, Lot 39 and Lot 40 by subsequent owners, and various encumbrances were added to Lot 40 to provide water access to other contiguous property owners, thus the property is private and not available for use by the general public. NNPDC staff further researched a subdivision plat with the name of Millenbeck, that was mentioned in this deed, that of Deed Book 194, page 363, from March 11, 1976. This plat showed the subdivision with the Reserved Area A occupying the area where the present day Lot 39 and Lot 40 exist.

NNPDC staff contacted the Northern Neck VDOT Residence District Manager, David Brown, to inquire if any of the land at the terminus of Route 354 had ever been given to the Virginia

Department of Transportation. Mr. Brown responded that the only land that VDOT owns is the right of way of the highway to pavement end. As a result of Lot 40 being privately owned and the numerous other neighboring properties with water access privileges over Lot 40, NNPDC has determined that this site does not have the potential for water access for the general public.

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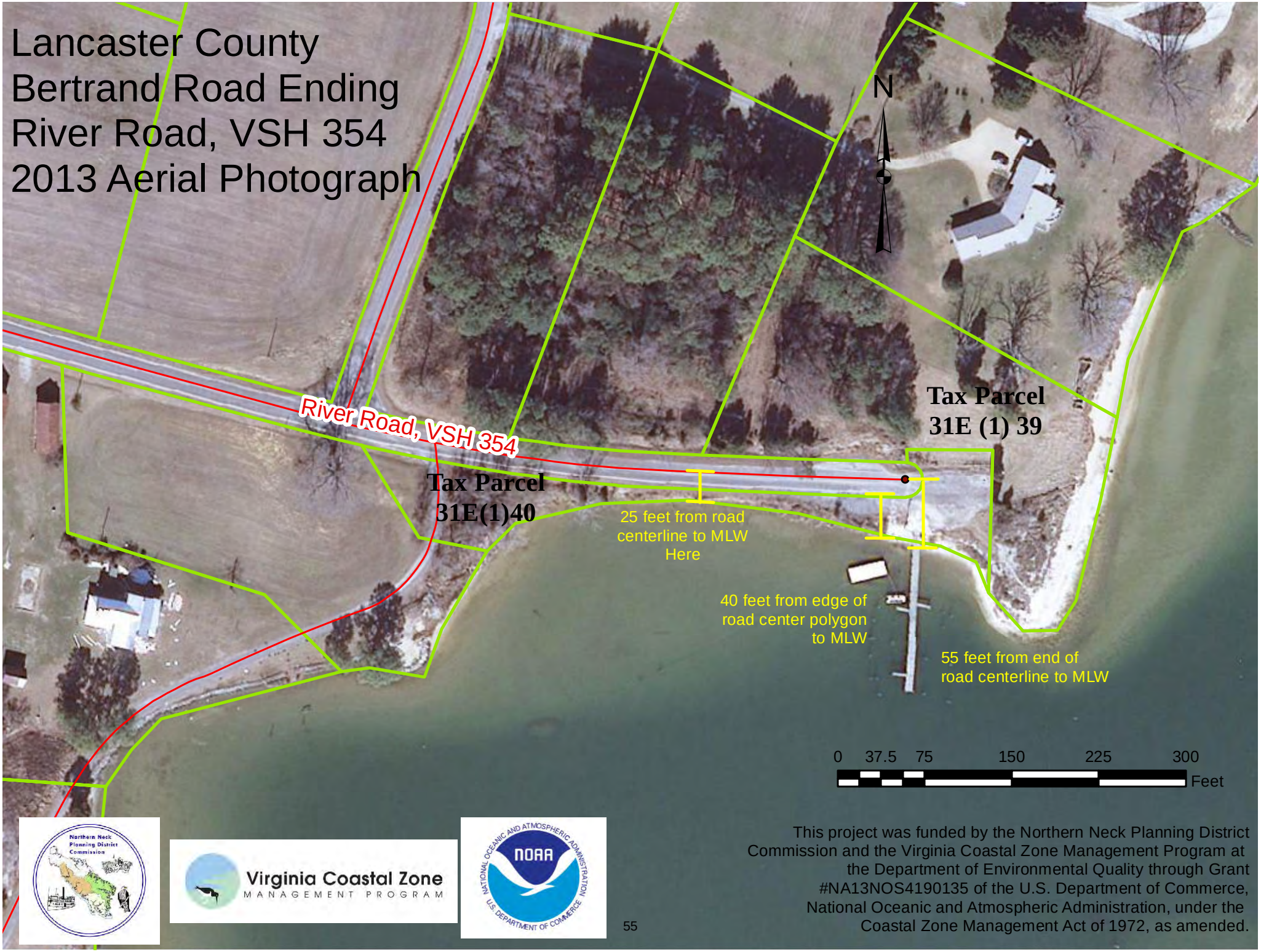

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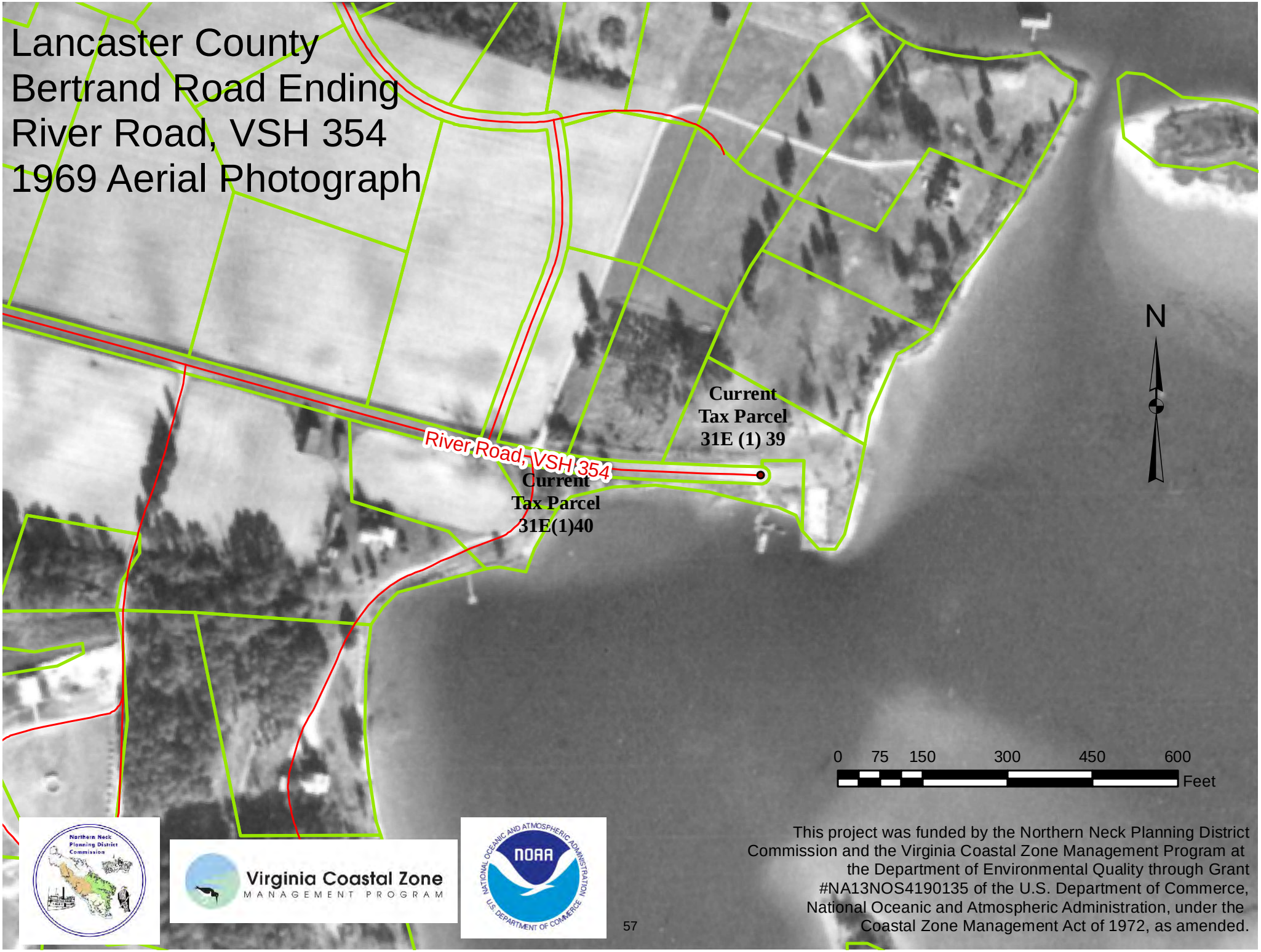

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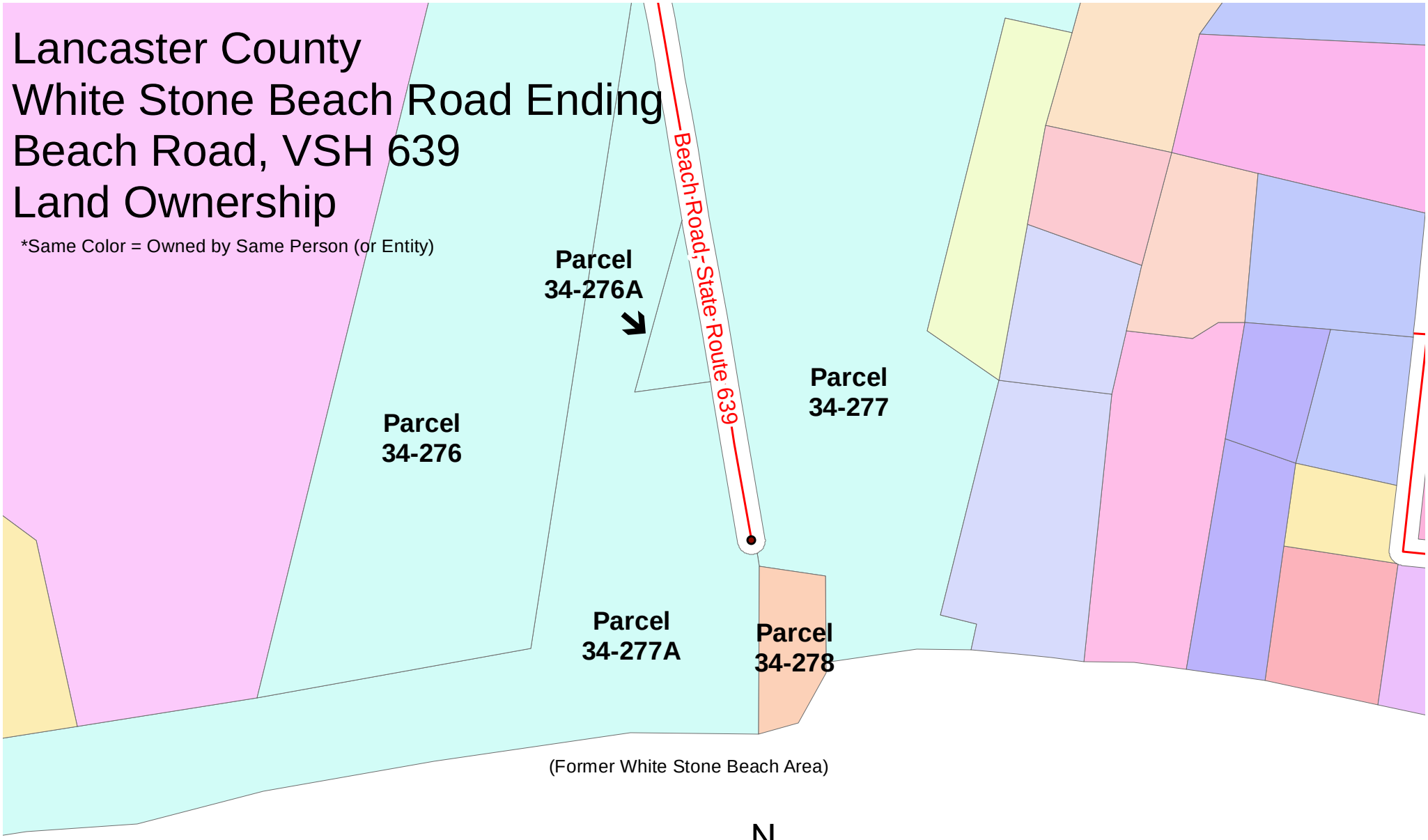
Lancaster County
White Stone Beach Road Ending
Beach Road, VSH 639
Land Ownership

*Same Color = Owned by Same Person (or Entity)



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Northern Neck Planning District Commission

Virginia Coastal Zone MANAGEMENT PROGRAM

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

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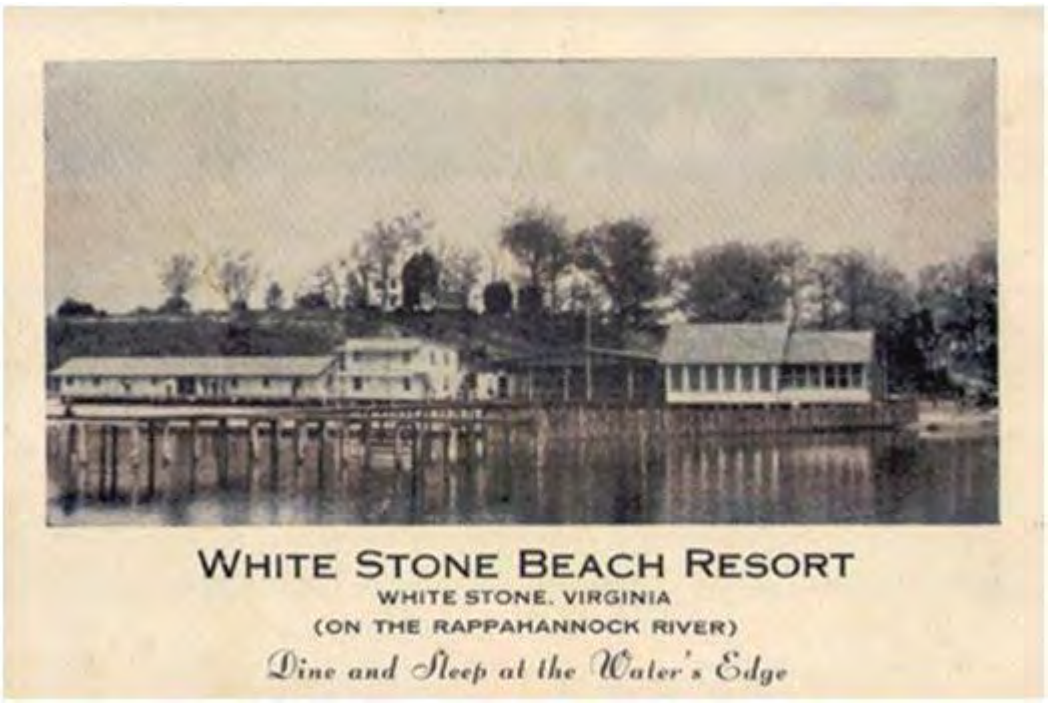
Beach Road, State Route 354

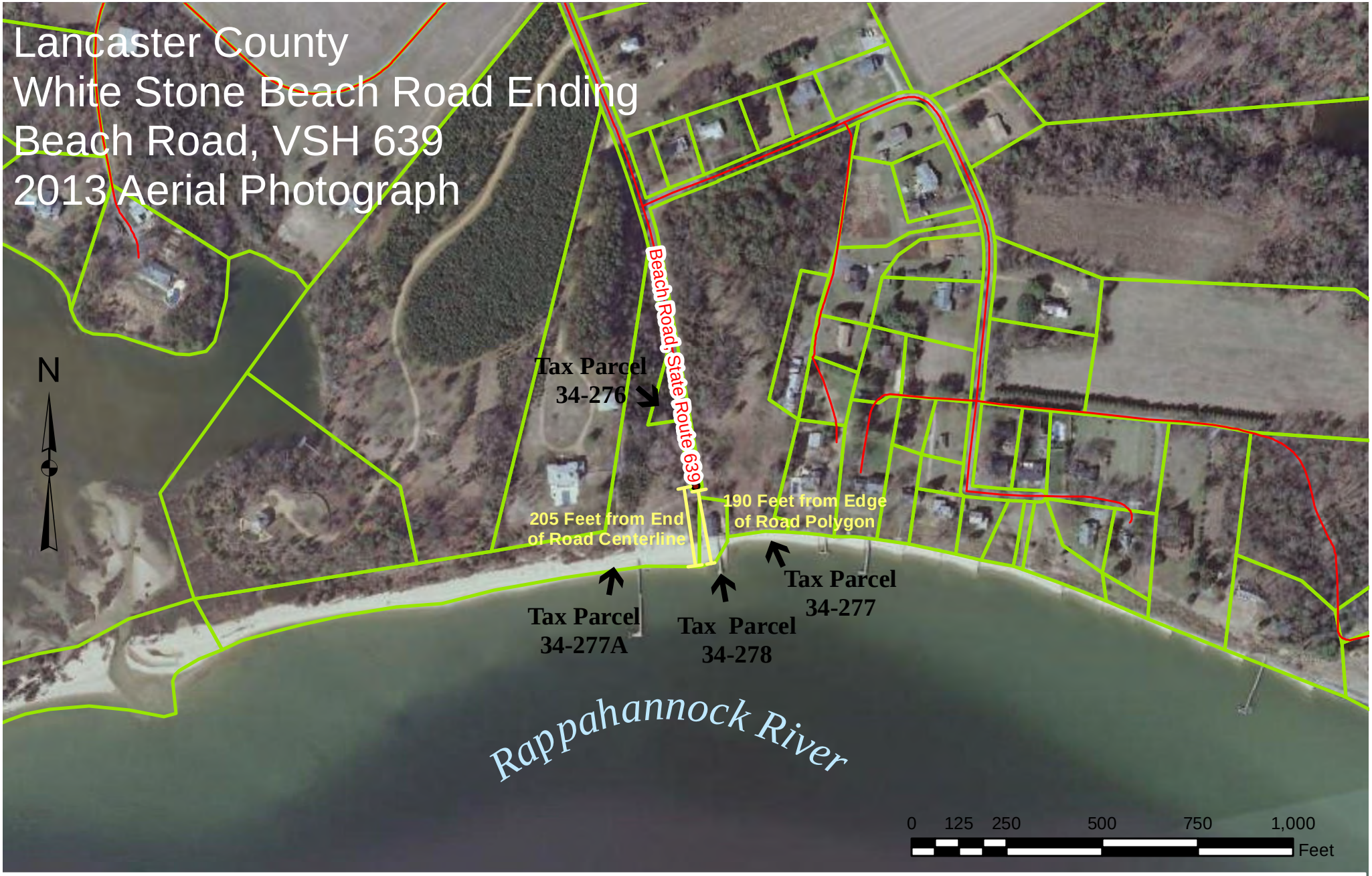
The Beach Road Ending, State Route 639, is the location of the former White Stone Beach Resort. In the 1920's there was a hotel, multiple cabins, a dance hall and beach that was available for use by patrons. Examining the current and historical aerial photographs, there is currently only one building in the area around the Beach Road ending, and that is the old store house with an attached small dock. The 1969 aerial photograph shows a large, roughly square, building with an attached 200 ft. L-head pier to the west of the store house. From historical accounts, NNPDC staff learned that that larger building was once a tomato cannery, and was converted to a dance hall in the mid-1920's. There is another building in the 1969 aerial photo to the west of the dance hall that has the shape of an elongated rectangle, which is oriented with its long side along the shoreline. NNPDC staff has reasoned that this building is either rental cabins or a bathhouse for beachgoers. NNPDC researched the White Stone Beach Resort and found this image of an old postcard that showed the buildings and pier at the site.



The 1937 aerial photograph shows essentially the same configuration of buildings and piers. NNPDC staff did notice that the width of the beach in the 1937 aerial photograph is significantly wider than it currently is, which shows that erosion from Rappahannock River waves have claimed some of the shoreline over the past 75 years. In an effort to ascertain the diversity of land ownership around the Beach Road ending, NNPDC staff used Lancaster County digital tax maps to create a thematic map showing each unique owner of each tax parcel in a different color. The resulting property ownership map shows that one owner owns all of the property surrounding the road ending except for the tax parcel directly at the end of Beach Road. Since this smaller parcel of land is located in the area between the pavement end and the Rappahannock River shoreline, NNPDC staff decided to focus the research of this road ending on this tax parcel, tax map number 34-278.

The current owner of 34-278 is listed in the Lancaster County 2013 Landbook as Ruth G. Micklem & Carr, Suzanne East & Carr, Susan East Trust, according to instrument number **LR 2009 0000285**, dated February 4, 2009. This circuit court record is a Transfer Gift of ownership from Suzanne East Carr to the Suzanne East Revocable Trust. This document references another document, instrument number **02002163**, dated June 17, 2007, which is a deed of gift from Elizabeth W. East, AKA Betsy or Betty W. East, to Suzanne East Carr, who is one of the current property owners. There is a reference in this deed of gift to another instrument number, **01000252**, dated May 29, 2001, which is also a deed of gift where Jean W. Micklem gave her partial ownership of the property to Ruth Garland Micklem, who is one of the present day part owners. In the 2002 instrument document there are deed book references to the previous owner in **Deed Book 244, page 212**, dated June 13, 1984. This deed states that Sarah W. and John Lisanick conveys the property to Jean W. Micklem, Elizabeth (Betsy) W. East and Lucy W. Schultz. In this deed, the previous deed in the chain of property ownership, **Deed Book 205, page 451**, dated March 7, 1978 was cited. This deed states that Edward A. and Ruth Garland Wilson conveys the property to Jean W. Micklem, Betsy (Elizabeth) W. East, Lucy W. Schultz and Sally W. Lisanick. Following the chain of title, the previous deed referenced **Deed Book 114, page 13**, dated April 9, 1958 which showed Katherine C. and Harman C. Treakle sold the property to Ruth Garland and E. A. Wilson. This deed stated that the property is identical to the property conveyed in the previous chain of title in **Deed Book 94, page 304**, dated June 21, 1952. This deed recorded that W. Collins and Katherine Kamps Chilton sold the property to Katherine Chilton Treakle. This deed stated that the property was identical to the property previously conveyed in March 19, 1945, in **Deed Book 78, page 246**. In this deed, the Lancaster Land Corporation conveyed the property to W. Collin Chilton. The description of the parcel of land noted the land contained the location of the store house that was once operated as a retail store on White Stone Wharf. The deed further states that the property is a portion of the property detailed in Deed Book 65, page 482, dated July 15, 1927. This deed stated that the property was sold by the Taft Fish Company, Incorporated, to R. O. Norris, Jr. and B. H. B. Hubbard, Jr.. This larger parcel of property convey in 1927 is described as being " all that portion of the farm known as Pleasant Banks, purchased by the Taft Fish Company, approximately 100 acres +/- including a road twenty feet wide, belonging to Taft Fish Company, including the steamboat wharf, hotel, storehouse, summer resort leased by W.H. Culver, all waterfront, riparian right and easements. The Taft Fish Company continues to operate the steamboat wharf at its own expense and all profits go to the holder of the mortgage note. There is a handwritten note by the Lancaster County Circuit Court Clerk in the margin of this deed that noted that this Trust Deed was foreclosed. See **Deed Book 67, page 464**, dated March 10, 1931. R.O. Norris, Jr. and B. H. B. Hubbard, Jr. were in default, an auction was held and Lancaster Land Corporation was the highest bidder.

Since the 1927 deed specifically states that the road on the property was a private road owned by the Taft Fish Company, NNPDC reasoned that this was the portion of Beach Road that accessed the steamboat wharf (also owned by Taft Fish Company) and the waterfront and no further chain of title was researched. Discussions with the Northern Neck VDOT Residence District Manager, David Brown, revealed that VDOT did not own any right of way past the end of the pavement of Route 639. From the ownership research NNPDC staff conducted there appears to be no opportunity for public water access at this site, as the road that connected the wharf to the land was privately owned and maintained.



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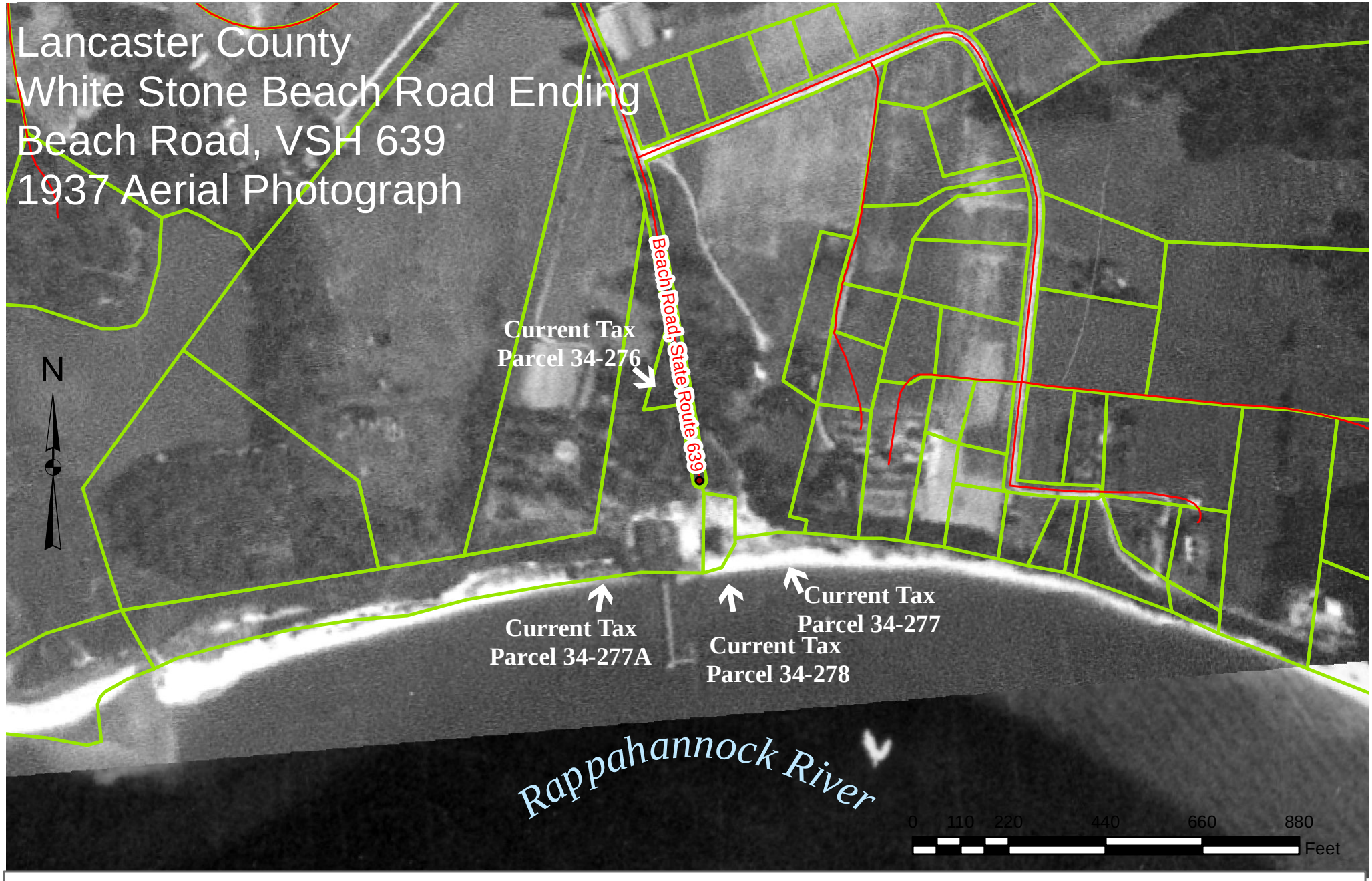

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Lancaster County
White Stone Beach Road Ending
Beach Road, VSH 639
Land Ownership

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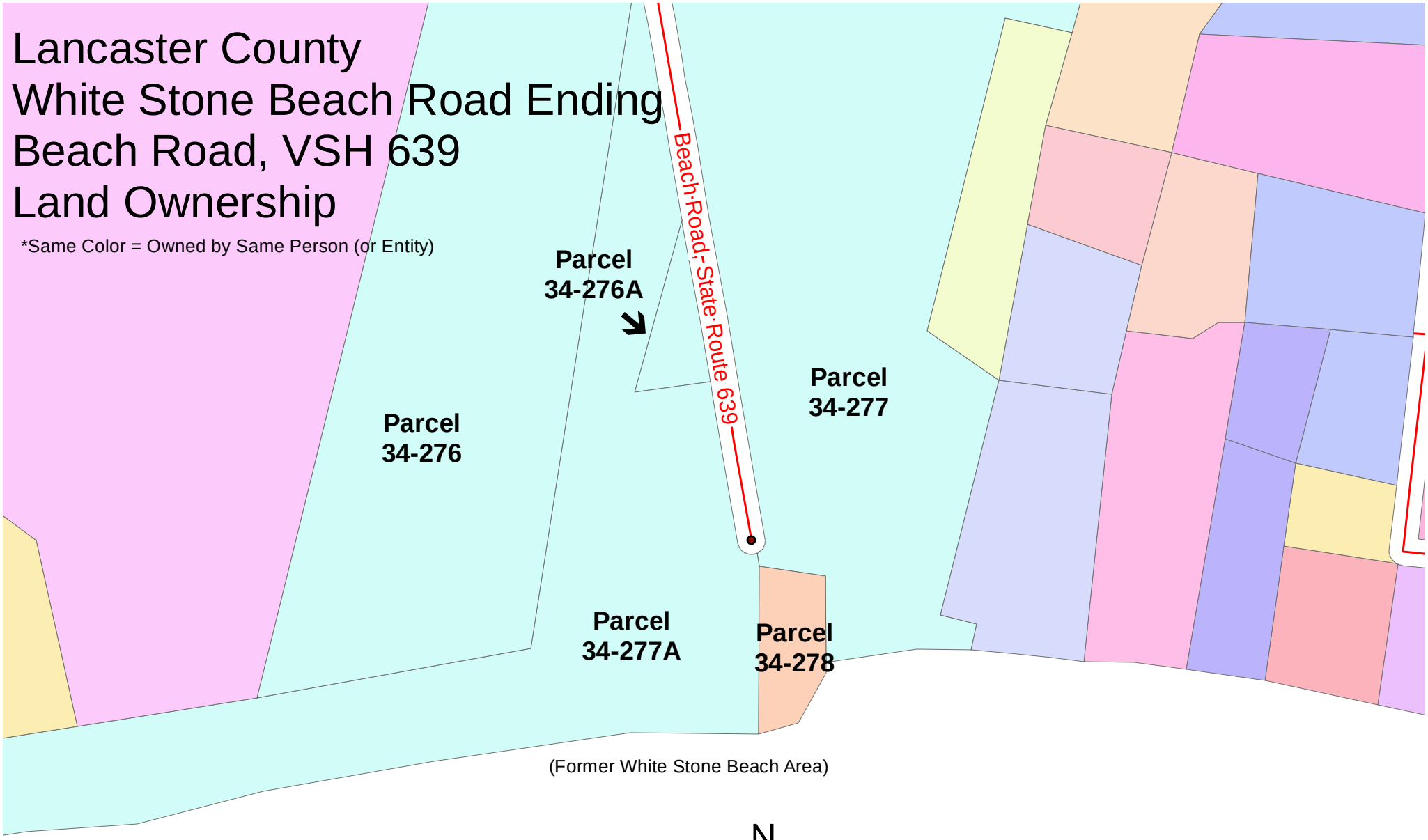

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Virginia Coastal Zone MANAGEMENT PROGRAM

This project was funded by the Northern Neck Planning District Commission and the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA13NOS4190135 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

V. Westmoreland County Geographic Information System Enhancement

Westmoreland County staff requested the NNPDC help in enhancing the Westmoreland County Geographic Information System. The county had been using a 2001 county road wall map, which lacked information on changes to road alignment, abandonments, and newly built subdivision roads. The Land Use Department uses the countywide labeled road wall map for locating properties and determining the best route to sites for building, wetland and stormwater inspections. Westmoreland County staff need to create maps for various land use decisions, such as development proposals and rezoning actions, requested by citizens, the county administration, Planning Commission, as well as the Board of Supervisors. Westmoreland County staff will be able to use the labeled countywide road map digital ArcMap project to zoom into the site in question and create maps quickly without having to spend the time labeling the road layer in maps each time a map is requested. Therefore this product serves two purposes: 1) easy wall road map printing; 2) mapping sites when needed by county staff.

NNPDC staff contacted Westmoreland County staff for the latest copy of the digital E911 county road GIS map layer. Westmoreland County maintains its own E911 digital road map, adding new roads when built and modifying alignment when roads are altered by the Virginia Department of Transportation. NNPDC staff began creating the labeled county road map by experimenting with different labeling techniques within the ArcMap GIS platform. First, NNPDC staff tried automatic labeling using the Westmoreland County E911 road shapefile but found that the automatic labeling in ArcMap has several built in features that were too cumbersome for the map that needed to be created. The ArcMap autolabeling function prevents overlapping labels, so when labeling is attempted, a majority of the roads fail to be labeled, due to the overlaps that ArcMap detects. This is especially problematic for areas of the county where the road network is dense, such as the many subdivisions that are located within the county. The overlap autolabeling feature of ArcMap is dependent on label font size, so the larger the font size, the fewer roads are labeled due to overlaps. In order to get a majority of the roads labeled, the font size needed to be reduced. NNPDC staff tried font size 6, but there were still many roads without labels. In order to get close to 100% of the roads labeled, NNPDC staff had to reduce the font size to 2 point, which, of course, is unreadable from any distance from the map. The other complication with ArcMap labeling of shapefiles is that the labels cannot be manipulated, for example moved, rotated, or font size increased or reduced. Therefore NNPDC staff determined this type of labeling would not work for the countywide labeled road map.

NNPDC staff researched different methods of labeling in ArcMap and learned that ArcMap has the option of using an annotation layer, similar to the annotation layers that the engineering drawing software AutoCAD uses. The annotation layer can be modified, labels can be moved, rotated, the font size increased or decreased, and most importantly labels can be copied and pasted into the layer. An annotation layer in ArcMap cannot be generated by a layer in shapefile format, ArcMap specifies that annotation layers can only be generated by personal geodatabases. Utilizing the conversion program, NNPDC staff created a Westmoreland County E911 road geodatabase from the road shapefile.

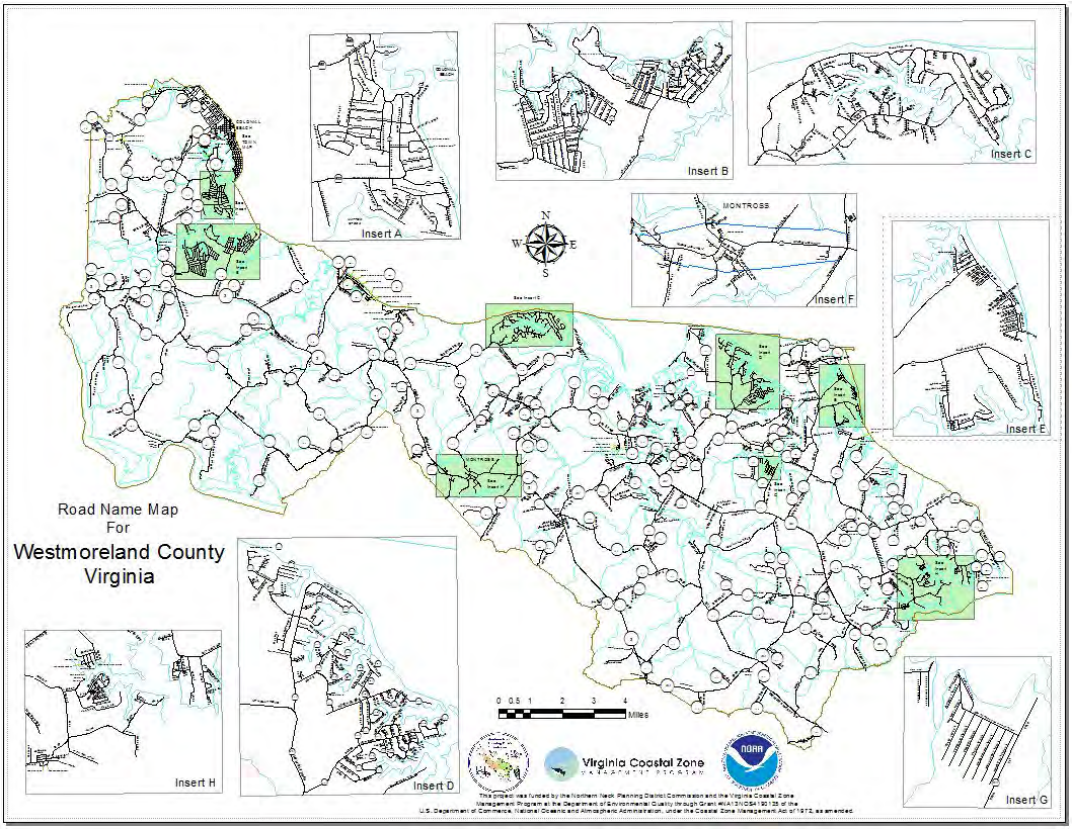
Once the geodatabase was created, NNPDC experimented with labeling the E911 road map geodatabase. As was the case with labeling of shapefiles, the ArcMap built-in label overlap prevention feature prohibited all roads being labeled at a legible font size. NNPDC conducted additional research, learning that ArcMap can save the overlapping labels in an unlabeled file, where a user can use that file to reinsert each overlapping label so the label will be visible and legible. NNPDC staff experimented with using the overlap file to reinsert labels, but the method was tedious and results were less than optimal. The font size would often need to be changed in order to fit the overlapping label, resulting in a variety of font sizes, which is visually confusing. NNPDC staff decided to avoid the ArcMap overlapping label file method and chose to auto label the E911 roads at the smallest font size, 2 point, in order to get all road labels generated, then created an annotation layer from this set of labels. While this solution allowed for consistency in label sizes, NNPDC staff had to manipulate each road label to increase the font size, often rotating the road label to match the road angle because the larger the font size, the longer the label length. The longer label covers a larger section of the road, which due to curves in the road often changes the angle of the label. Once NNPDC staff had tested the method, NNPDC staff began the process of modifying the labels to a consistent and legible font size, which took several weeks of work.

NNPDC staff, when trying to label subdivision roads, quickly learned that at legible label font sizes, the roads labels would overlap, making them unreadable. The solution to these dense road network subdivisions was to create map inserts. NNPDC staff made a GIS shapefile polygon layer of the eight insert boxes needed to legibly label all of the dense subdivision roads at a readable font size. After creating the insert boxes ArcMap shapefile, NNPDC staff clipped the E911 road layer and shoreline file to the border of the insert box. NNPDC staff then created geodatabases for the insert road layers, then labeled both the road names and route number shields. Next NNPDC staff created annotation layers for the inserts at a small font size, then proceeded to manipulate the annotation layer map road names to fit the subdivision roads in the insert.

When NNPDC staff finished labeling every road in the county map as well as the insert boxes, NNPDC staff arranged all of the elements into a map layout at a page size of 34 inches by 44 inches, which is the standard large format “E” size. NNPDC printed out the Westmoreland County Road wall map and checked for any unlabeled roads, inconsistent font sizes, labels that did not follow the angle of the road, and any long sections of roads that might need more than one label (or the road label stretched out with more space between the elements of the label to cover the entire road segment). Those corrections were marked on the hard copy map by Westmoreland County staff and NNPDC staff revised the digital ArcMap project to reflect the changes.

When NNPDC staff finished the labeled road map, NNPDC staff set up a meeting with Westmoreland County staff to review the map with their input. At that meeting Westmoreland County staff liked the map but had a few suggestions to make the map better suit their needs. In one area of the county, near the village of Kinsale, there were roads that were dense enough that the road labels were bunched together and somewhat hard to read. Westmoreland County staff suggested that the insert box for the village of Kinsale be enlarged to cover that area, so the roads could be shown at a larger scale, allowing for more space between labels.

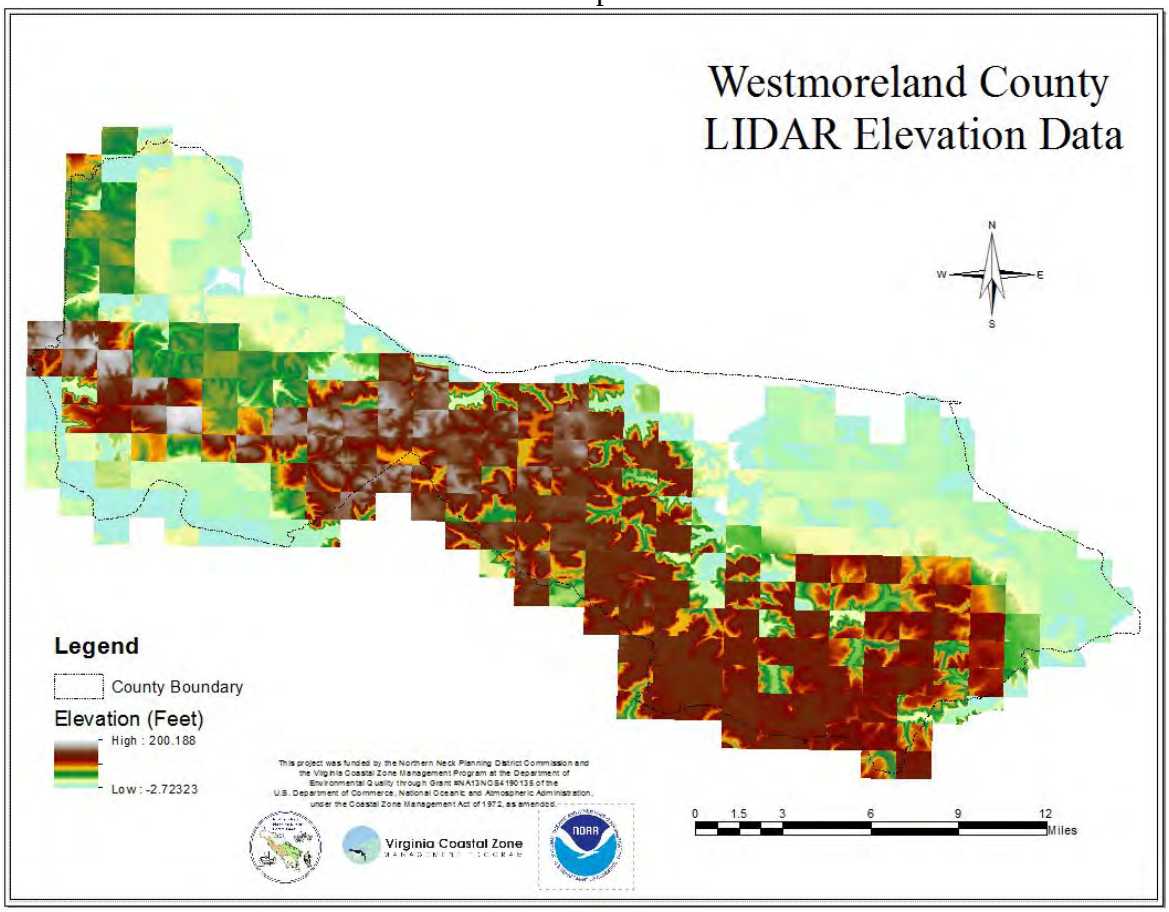
In addition, Westmoreland County staff noted that some roads in certain subdivisions did not actually exist, and were termed “ghost roads”. NNPDC staff asked why those roads were present in the E911 road layer if they did not exist. Westmoreland County staff explained that the rights of ways of the roads are recorded in the subdivision deed, but since no properties were sold in these mainly interior sections of waterfront subdivisions, the roads have never been built. NNPDC staff requested that Westmoreland County provide a list of the ghost roads that they wished to remove, and NNPDC staff would remove them from the map. Ultimately Westmoreland County staff decided to leave those ghost roads in the map. Westmoreland County staff had a final recommendation to improve the map, and that was to make the primary roads in the county a thicker width than the local roads. NNPDC staff discussed with Westmoreland County staff which primary roads they wanted to be depicted at a greater width and suggested the thicker roads would be State Route 3, 202, 203, and 205. Westmoreland County staff queried NNPDC staff regarding State Route 204. NNPDC staff noted that while State Route 204 was a “200” series road, it was the road to the George Washington’s Birthplace National Monument, and therefore was a dead end and not a through road. NNPDC staff explained that in their opinion, the road did not serve the function as a primary road, thus would not make the line as thick as a primary road. Westmoreland County staff agreed, and State Route 204 was not represented as a thicker line. The final Westmoreland County E911 label county road map NNPDC staff revised is shown below.



NNPDC staff printed out five Westmoreland County E911 Labeled Road Wall Maps for Westmoreland County staff with additional maps available on an as needed basis. NNPDC staff installed the E911 labeled road map products onto the Westmoreland County GIS computer and

retained a backup copy on the NNPDC computer for future wall map printing and as an offsite backup.

NNPDC staff researched LIDAR data for inclusion into Westmoreland County's Geographic Information System and located a complete set of LIDAR image data for Westmoreland County that was used by the Federal Emergency Management Agency for the newly created FEMA floodplain maps for Westmoreland County at www.validar.com. NNPDC staff downloaded all 337 individual LIDAR image tiles that covered Westmoreland County; each tile was approximately 16 Mb, and all 337 LIDAR tiles together comprised 4.96 Gb of information. Once NNPDC staff loaded all of the Westmoreland County LIDAR image tiles into an ArcMap map project, the image tiles had distinct edges where one tile began and another tile ended. NNPDC staff investigated the edge problem and determined that when each LIDAR tile was loaded, the ArcMap software automatically loaded a legend color ramp for each tile, based on the elevation range of that individual tile. NNPDC staff noted that the low value of the elevation of the LIDAR tiles was not zero (which NNPDC staff would interpret as sea level), but instead a negative number which ranged from -1.2187 to -2.72323, which NNPDC reasoned was the result of different tide levels when the LIDAR data was captured.



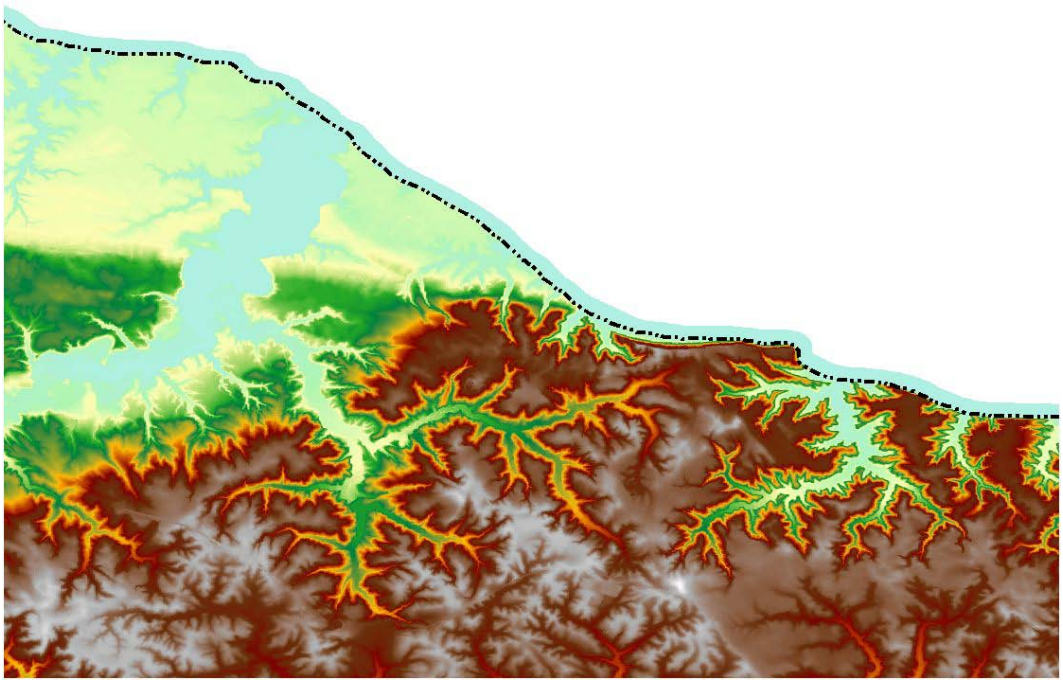
This image shows the mismatched legends for the individual LIDAR image tiles.

NNPDC staff devised a way to show a seamless image of all the LIDAR data tiles, which would be to have a common legend numerical scale for each and every tile. The colors assigned to each tile would match the values of the neighboring tile and every other tile in the county, since they shared the same legend. NNPDC staff examined all Westmoreland County LIDAR image tiles

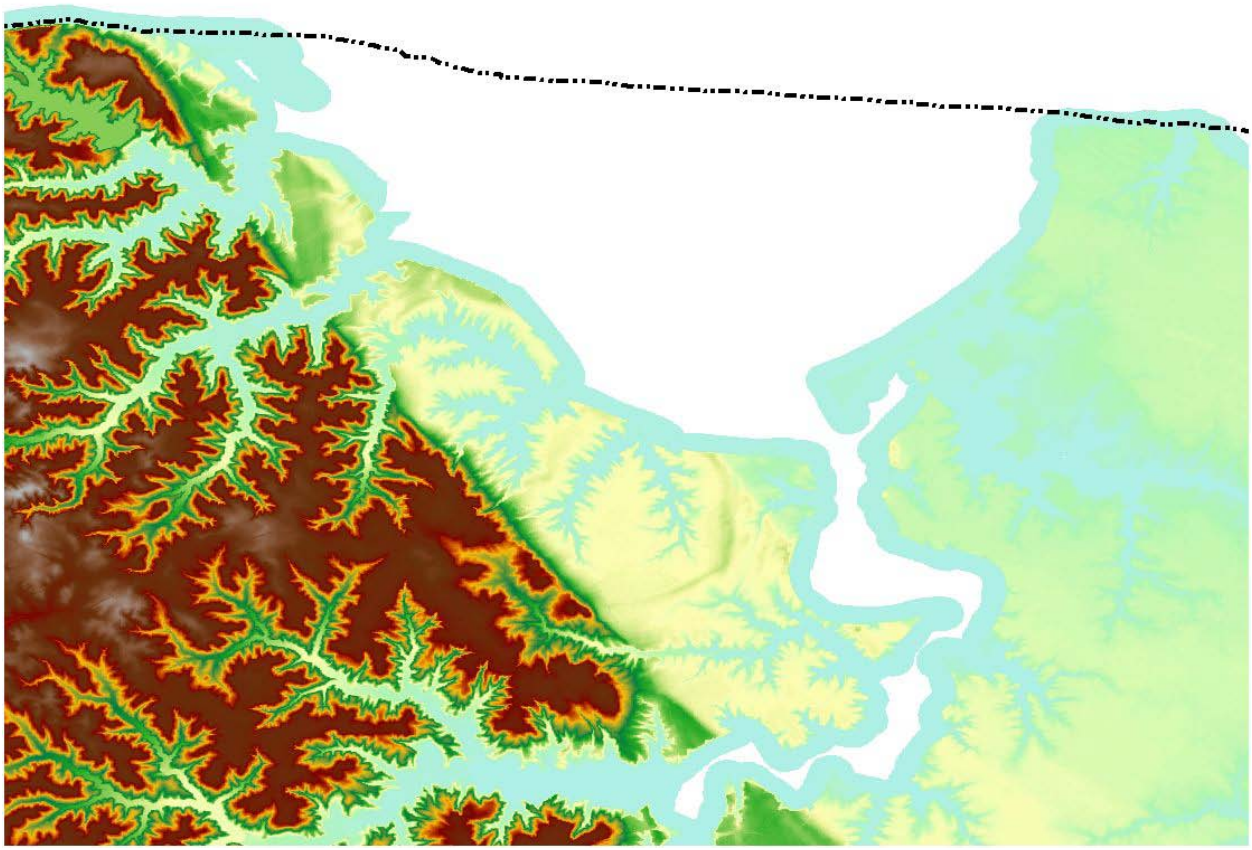
and found that the highest point in Westmoreland County is 200.188 feet and the lowest point (in the water off the coast of Westmoreland County) was -2.72323 feet. Therefore, NNPDC staff went into the legend file of each and every of the 337 LIDAR image tiles and edited each legend so that the range was from a high of 200.188 to a low of -2.72323.

After NNPDC staff completed modifying all Westmoreland County LIDAR image tiles, NNPDC staff zoomed out to a scale that displayed the entire county and noticed that there were still edge problems between tiles shown on the computer display screen. NNPDC staff then re-checked each LIDAR image tile and verified that the legends were the same. NNPDC staff deduced that due to the extremely large amount of digital data being displayed the computer graphic memory was not able to show the smooth transition between image tiles. To test the theory, NNPDC staff printed out a copy of the countywide LIDAR imagery, but the image tile edge problem persisted. NNPDC staff then tested the Westmoreland County LIDAR data at various zoom levels and discovered that when the map display was zoomed down to 1:50,000, the image suddenly was depicted as seamless. NNPDC staff concluded that it was either a software glitch in the ArcMap software or a NNPDC computer graphic memory issue.

Once NNPDC staff explained the map display problem, an examination of the LIDAR data throughout the county was initiated at a scale less than 50,000 as noted above. NNPDC staff noted that the Suffolk Scarp is well depicted in the western part of the ounty, and then curved northwards to the Potomac River, and intersecting the edge of the Potomac, where the cliffs along the Potomac begin. The Suffolk Scarp divides the coastal lowlands (light and medium greens) and the higher uplands (orange to brown), and is clearly shown on the LIDAR Map image below.

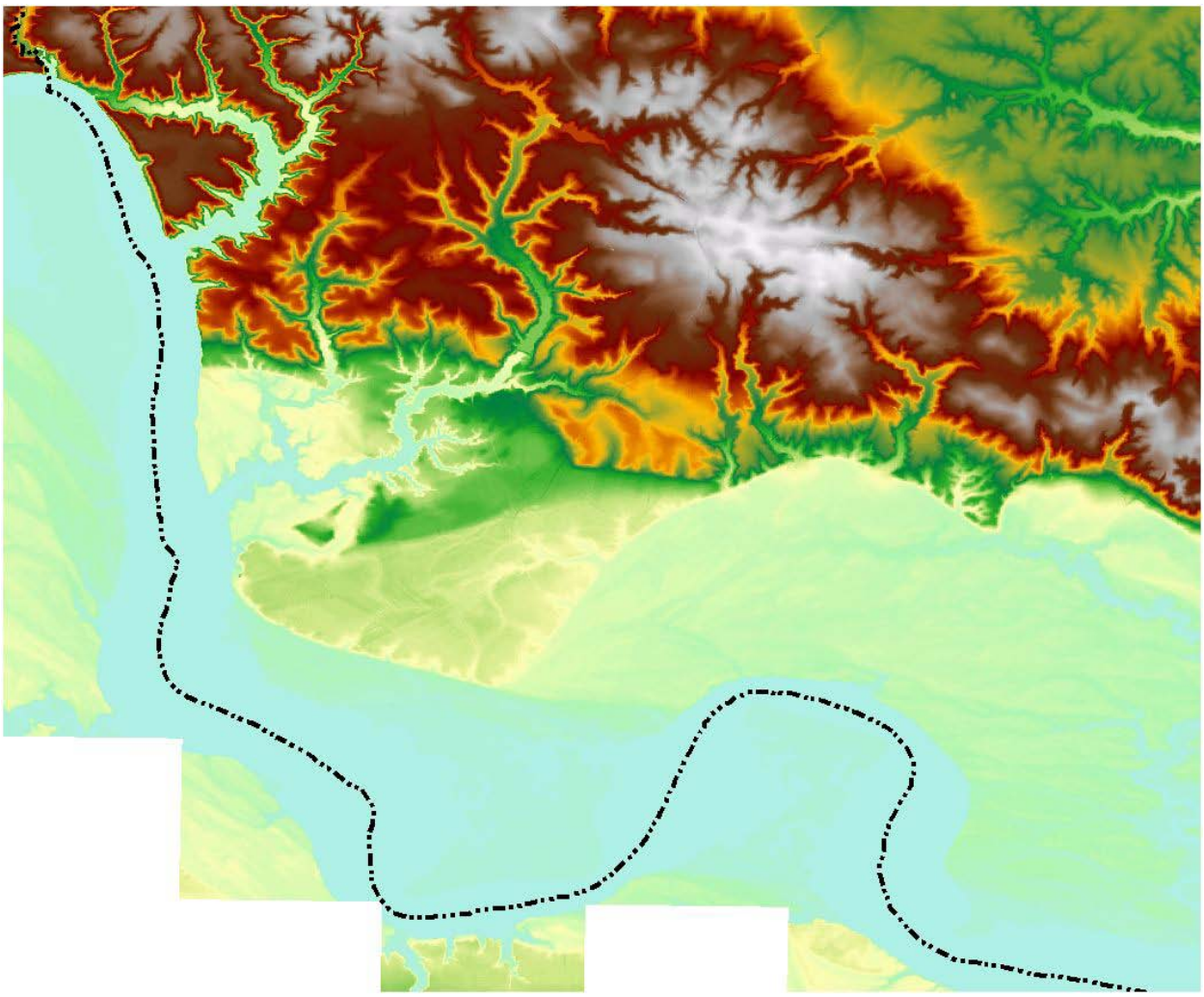


The Suffolk Scarp is the most prominent feature that shows on the LIDAR elevation map, in addition to the dendritic pattern of the many river basins. The Suffolk Scarp in the Northern Neck rises approximately 40-50 feet from the coastal lowland shelf of both Westmoreland and Northumberland County. In Westmoreland County, the Suffolk Scarp after pinching out along the Potomac shoreline cliffs curves back inland before it reaches the Nomini Creek. An image of the Suffolk Scarp in the vicinity of the mouth of the Nomini Creek is shown below.

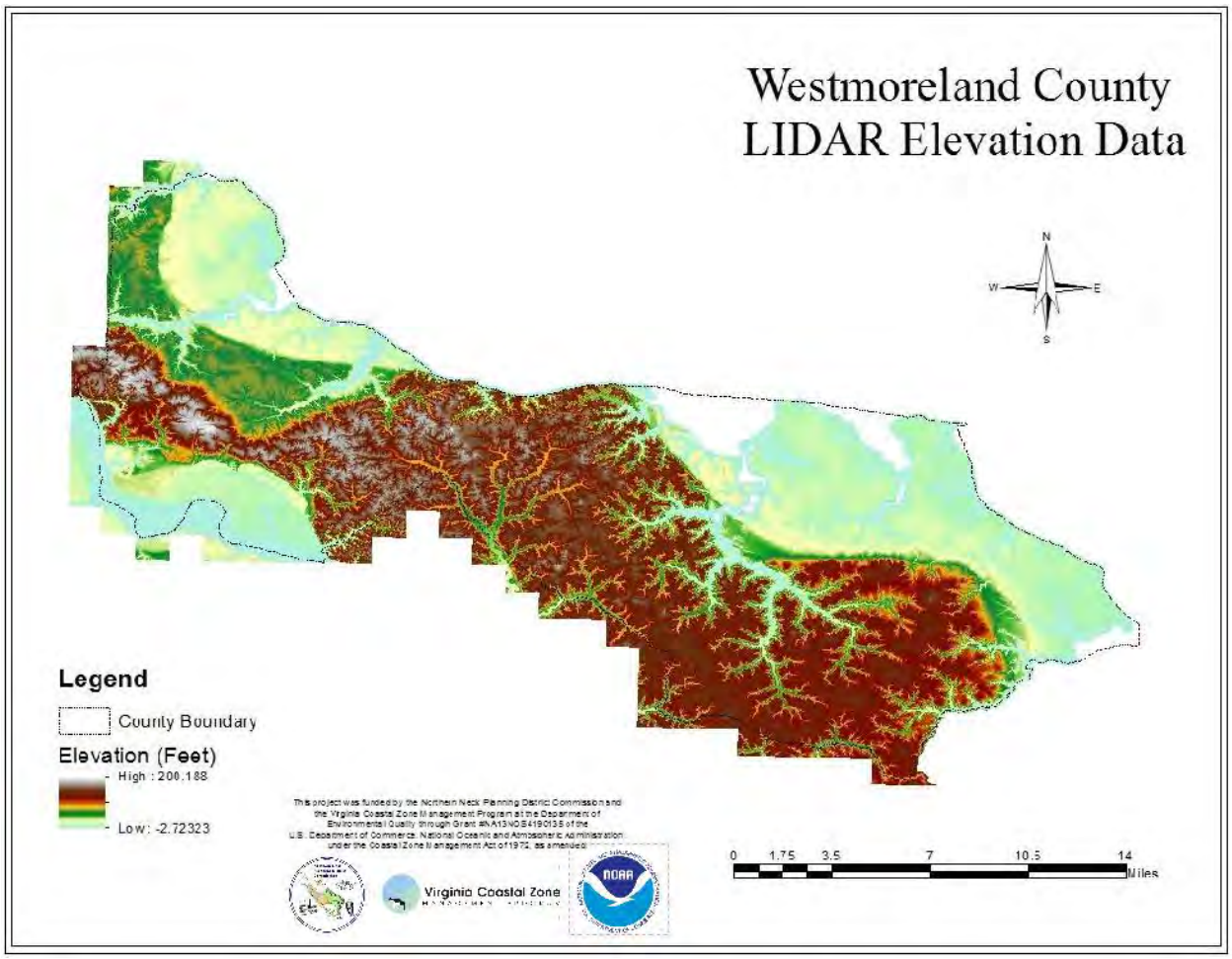


The highest point in Westmoreland County at slightly more than 200 feet in elevation, according to the LIDAR data, is located in the southwestern portion of the county, very near the Rappahannock River, North of the area known as Leedstown. The extensive marshes along the Rappahannock River are also shown in the map image below.

(This space intentionally left blank so the map image below can be depicted at a large size.)



Due to the large size of the LIDAR files (4.96 Gb), NNPDC staff was unable to send the data to Westmoreland County digitally through the internet or through a flash drive or DVD-ROM, so NNPDC staff took the NNPDC environmental computer to the Westmoreland County Government office and tired to connect it to the GIS Computer network. Unfortunately the network would not properly connect so NNPDC staff used a portable hard drive to transfer both the LIDAR data, the LIDAR data ArcMap project, as well as the Westmoreland County E911 Road Map ArcMap project to the Westmoreland County GIS Computer. NNPDC staff then configured each map project to work with the new mapped drive digital pathways of the Westmoreland County GIS Computer, since they were different from those on the NNPDC environmental computer. NNPDC staff tested both ArcMap projects for correct operation before leaving the Westmoreland County government office. NNPDC staff noted that on the Westmoreland GIS computer, which is newer than the NNPDC GIS computer, that the entire county LIDAR image displayed correctly on the computer screen. NNPDC staff asked Westmoreland County staff to take a screenshot of the entire map and copy the image to the external hard drive for inclusion in this report. The image of the entire map that was depicted on the Westmoreland GIS computer is shown on the next page.



NNPDC staff, at the meeting with Westmoreland County staff when the draft E911 Road Map was reviewed, took part of the meeting time to demonstrate the VACZM Coastal GEMS interactive web mapping portal. NNPDC went through each and every data layer included on the GEMS mapping website and asked the Westmoreland County Director of Planning and Land Use if he would like NNPDC staff to obtain any of the GEMS data layers, so they could be added to the Westmoreland County GIS system as that was one of the tasks outlined in the grant contract. NNPDC staff explained that the data originator could be contacted and the GIS data displayed in GEMS could be downloaded for use in a local GIS by contacting the publisher of the data. Westmoreland County staff inquired as to how up-to-date the data was in GEMS. NNPDC staff queried the meta-data for several layers with some GIS layers being years old and others recently updated. Westmoreland County staff stated that since the data was online, it would be easier to view the data online than download it for the Westmoreland County GIS. Westmoreland County staff added that if it was downloaded, the data would need to be updated from time to time, and it would be easier to access Coastal GEMS online because Westmoreland County staff would know that the most up-to-date information would be displayed in GEMS. Finally Westmoreland County staff noted that they only had three copies of ArcMap software; therefore, only three County Land Use staff members could view the data if downloaded on the county GIS. More Westmoreland County land use staff members could access the Coastal

GEMS data through the internet than through the county's GIS. NNPDC staff agreed, and noted that while the task was included in the grant contract, Westmoreland County Staff preferred to access the Coastal GEMS GIS data online. The important point to note is that Westmoreland County planning and land use department staff know of the existence of the VACZM Coastal GEMS interactive website, know all of the layers that are present on the mapping site and can access that data in the future, when needed.

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VI. Northern Neck Regional Stormwater Educational Brochures

Northern Neck local governments had requested assistance in producing educational brochures for the newly enacted Virginia Stormwater Management Regulations to assist citizens that want to build single family residences within their jurisdiction. The new stormwater regulations have significant changes from the old regulations specifically, the new stormwater calculations that are tied to the regulation count managed turf as a stormwater generating area, effectively increasing the amount of stormwater volume a development site must manage. Another new requirement of the new stormwater regulations is to reduce 50% of the volume of stormwater that leaves a developed site, which is required because peak stormwater flows often cause significant downstream erosion since existing drainage channels cannot handle the increased volume of runoff from numerous development. A developer, in addition to reducing volume, must also reduce nitrogen and phosphorous content of the remaining stormwater runoff, which is usually done by filtration by rain gardens or bio-retention basins. Finally there new increases stormwater permit fees when developments disturb more than one acre of land, and these fees are meant to allow the stormwater management permit program to fund itself fully, requiring no additional government subsidy to operate. Under Virginia Stormwater Management regulations, citizens interested in building a single family residence, with under one acre of land disturbance, can enter into an in lieu stormwater agreement with the local government, instead of having to get a stormwater permit from the Virginia Department of Environmental Quality. The single family residence stormwater in lieu agreement with local county government does not involve a fee, only compliance with the stormwater management regulation guidelines. A stormwater permit for disturbances more than one acre does have a fee, and that fee is indexed to the amount of land disturbance (the more area disturbed, the more expensive the fee.) Northern Neck local government staff were concerned about citizens building single family homes in their counties and looked to the NNPDC to provide stormwater education brochures, so an individual building a single family residence could comply with the new stormwater management regulations without having to incur the additional cost of hiring an engineer to perform stormwater management design and calculations.

NNPDC staff created four new stormwater brochures to distribute to county land use staff, each formatted as a tri-fold brochure with information on the front and back pages. The first two brochures were more general in nature, explaining the stormwater management program and ways designing to make compliance with the stormwater regulations easier. The second two stormwater brochures describe specific stormwater best management practices that can be installed on site to help comply with the stormwater regulations.

The first stormwater education brochure NNPDC staff created was entitled "Guide to Virginia's New Stormwater Regulations". This first in a series of stormwater brochures created by NNPDC staff contains generalized stormwater educational information to set the stage as to why the new stormwater regulations were needed. Explanations of what is non point source pollution, the Chesapeake Bay Total Maximum Daily Load regulatory action, as well as the effects of increasing impervious areas in a watershed were explained in detail. Recognized failings of previous attempts at stormwater management within the Commonwealth highlighted the need for new approaches to managing stormwater, and strong evidence for the problems with the old stormwater controls were illustrated by photographs included in the brochure of erosion in the

Town of Kilmarnock. The significant changes from the old stormwater regulations to the new stormwater regulations were also outlined. In addition, a web address for the Virginia Department of Environmental Quality's stormwater management web page is included near the end of the brochure. It is hoped that the end user of this brochure would go to the DEQ website to learn more about the requirements of the stormwater management regulations, as this brochure only briefly mentions the major changes. The Guide to Virginia's New Stormwater Regulations brochure follows the text explanations of the brochures in this report.
The second stormwater brochure in the series created by NNPDC staff was entitled "Environmental Site Design - The Key to Virginia's New Stormwater Management Regulations". The calculations used by stormwater management plan reviewers to determine if developers have met the requirements of volume and nutrient reduction now calculates managed turf (lawns) as stormwater runoff generators. Therefore, the more turfgrass a developer has in a development, the more stormwater volume the developer will have to reduce and treat for nutrients. This makes it advantageous for developers to minimize lawn area and leave natural vegetation in place wherever practical, as this will lower the cost of stormwater management for the development. This concept is embodied in Environmental Site Design (ESD) and is explained in this brochure. ESD is a more holistic approach than Low Impact Development (LID), which preceded it. Environmental Site Design seeks to look at the entire development site as a whole and seeks to reduce land disturbance, which leaves the natural hydrology and vegetation in place for a majority of the site, while building only on the footprint necessary for the building and accessory structures (such as septic systems and driveways). The stormwater education brochure on Environmental Site Design explains the concept, including mapping the environmental features of the development site, such as drainageways, forested areas and any topography present on the site, and preserving these areas before, during, and after development. Reducing compaction of the soil by heavy equipment during construction is emphasized as is disconnecting flows from impervious cover in order to slow runoff velocity and promote infiltration of stormwater runoff generated by the building and other impervious areas. Several images included in the brochure help illustrate the Environmental Site Design Concept, showing a fictional development site and how ESD can be used to design with natural constraints in mind. The Environmental Site Design brochure follows the text descriptions of the remaining two stormwater educational brochures.

The next two stormwater brochures that NNPDC created detail two Virginia approved stormwater best management practices (BMPs). Stormwater BMPs either help reduce stormwater volume by intercepting, infiltrating, reusing water, or reducing the nutrient load of the stormwater by filtering or treating the water to help remove sediment, nitrogen and/or phosphorous. Some BMPs only reduce volume, while others reduce volume and nutrients. There are fourteen stormwater best management practices that are approved by Virginia which are outlined at the Virginia Stormwater BMP Clearinghouse website (http://www.vwrrc.vt.edu/swc/). NNPDC staff utilized the Virginia Stormwater BMP Clearinghouse for most of the reference source material for the creation of the two stormwater BMP brochures; although other sources such as the EPA and Center for Watershed Protection were also consulted as well.

The first stormwater BMP specific brochure NNPDC staff created was entitled "Virginia Stormwater Management Best Management Practice : Grassed Channels". Grassed channels are

stormwater conveyance structures that can provide a modest amount of stormwater runoff filtering and volume reduction, especially when compared to traditional concrete curb and gutter stormwater conveyances. The brochure goes on to state that grassed channels are most appropriate in medium density rural residential subdivisions to drain roadways and driveways, but can be used in commercial developments to drain small to medium parking lots. Design specifications regarding the width and slope of the grassed channels aimed at reducing the chance of soil erosion are also discussed in the brochure. The brochure contains two photographs of grassed swales, including one with stone check dams to slow runoff velocity due to a greater than 5% slope of the grassed channel. These check dams are built to be water resistant and serve to slow the velocity of the water travelling downslope in the grassed channel. There are two design drawings in the brochure that show level spreader construction used to even out the stormwater flow over the grassed channel slope, as well as a cross section drawing of how to properly construct a grass channel. The brochure also has the internet addresses of the Virginia Stormwater BMP Clearinghouse design sheet on grassed channels, as well as a weblink to a more layperson's overview of grassed channels on the Virginia Tech Water Central Website. The grassed channel stormwater BMP brochure follows the text portion of this section of the report.

The final NNPDC stormwater educational brochure entitled "Virginia Stormwater Best Management Practice: Rooftop Disconnection", details the concepts involved in rooftop disconnection, which is one of the principles of Environmental Site Design and Low Impact Development. The concept, explained in the stormwater brochure, is to interrupt the flow path of water that runs off building rooftops before it reaches the curb and gutter, receiving channel, or stream. By flowing rooftop runoff that has been spread out into sheet flow over vegetated areas (either lawns or natural vegetation), the velocity of the runoff will be slowed, while at the same time promoting some infiltration of the water into the soil, which can reduce the volume of the runoff. As the brochure explains, this is termed simple rooftop disconnection. The brochure continues to explain that there is another type of rooftop disconnection that directs runoff to an additional stormwater BMP, such as a rain barrel for storage and reuse of the water, as well as french drains, infiltration trenches, and rain gardens (bio-retention basins). Most of the BMPs work mainly as water volume reducers, but when rooftop flow is directed to rain gardens and bio-retention basins, there is also some reduction in nutrients such as nitrogen, phosphorous and sediment. At the end of the brochure, NNPDC staff included web addresses to the more technical Virginia Stormwater Best Management Practice design sheet as well as the more generalized Virginia Tech Water Central fact sheet on rooftop disconnection. The rooftop disconnection stormwater education brochure follows the other stormwater brochures after the text section.

NNPDC staff printed out 25 color copies of each of the four stormwater educational brochures and gave to county land use staff. NNPDC staff informed county staff that if they need additional copies of the stormwater brochures, and the NNPDC could provide addition color copies of the brochures on an as needed basis. NNPDC staff also provided each of the four county land use staff with digital copies of the brochures, so they could email or place the brochures on their respective county websites.

The new Virginia Stormwater Management Regulations seek to reduce damage to downstream properties and water bodies by requiring that a majority of stormwater from a development site is infiltrated on site with the remaining runoff filtered to reduce nutrients contained within that flow. Environmental Site Design (ESD), also referred to as Low Impact Development (LID), is used in the beginning of the design process to conserve natural vegetated areas on the site, preserve buffers to water bodies, minimize soil disturbance, maintain natural flow paths, as well as disconnect impervious cover to reduce runoff velocities and promote water infiltration. ESD and LID help to accomplish the required 50% runoff volume reduction that is required under the new state stormwater regulations. Infiltration into the soil and biological processes help to remove nutrients from the remainder of the stormwater that is generated by impervious surfaces within the development. Fifteen Best Management Practices have been developed and approved by the State of Virginia to treat and infiltrate stormwater runoff. Of these, the bioretention basin, which is a planted shallow depression designed to retain stormwater so that a majority of the water is infiltrated into the ground, is a popular technique to reduce flows and treat polluted stormwater.

Above is a picture of a small rain garden, or bioretention basin. This basin takes water flowing along the curb into the rain garden to treat and infiltrate runoff.

For more information go to:
http://www.deq.virginia.gov/Programs/Water/StormwaterManagement.aspx

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Northern Neck Planning District Commission

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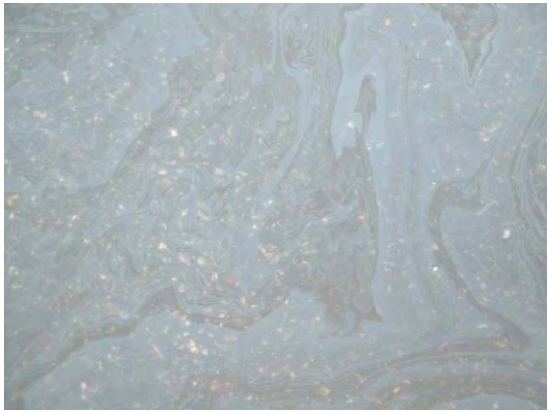
Virginia Coastal Zone Management Program

Guide to Virginia's New Stormwater Regulations

Stormwater puddle in a parking lot



Closeup of surface of above puddle

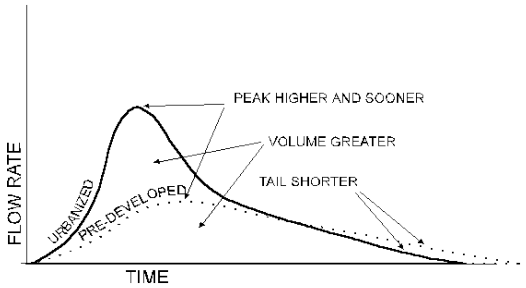
Virginia's new Stormwater Management Program seeks to reduce the volume of stormwater runoff, while reducing pollution contained in that runoff.

Rainfall switches from a natural resource to a pathway for pollution when it hits the ground and picks up fertilizers, bacteria, herbicides, heavy metals, and toxic chemicals and flows across the landscape to surface waters, eventually making its way to the Chesapeake Bay.

Fertilizer chemicals, nitrogen from septic tanks, animal waste from pets, livestock, and wildlife get flushed into streams during rainfall events. These inputs to the local estuarine streams, creeks, and rivers can cause shellfish closures and oxygen robbing algal blooms.

The Chesapeake Bay Total Maximum Daily Load (TMDL) seeks to reduce nutrients and sediment entering the Bay, essentially putting the Bay on a pollution "diet" so that it meets the swimmable, fishable, and resource habitat goals of the Clean Water Act. The new Virginia Stormwater Management Regulations are designed to cause no further degradation of creeks from stormwater runoff from new development.

When a watershed is developed, more and more of the vegetated area is covered with roofs, parking lots, sidewalks, driveways, and roads. While these impervious surfaces make life easier for us to keep dry and move about when it rains, they do not allow rainwater to enter (infiltrate) the soil, thus more water runs off the surface at a faster rate than before the area was developed. See the hydrograph below to see how runoff in a watershed changes when development (impervious areas increase) occurs.



Peak rates of stormwater flow increase as vegetation is removed and the natural landscape is altered, replacing slow draining wetlands, depressions, meanders and gullies with rapidly draining urban curbs, gutters, pipes, and straight channels.

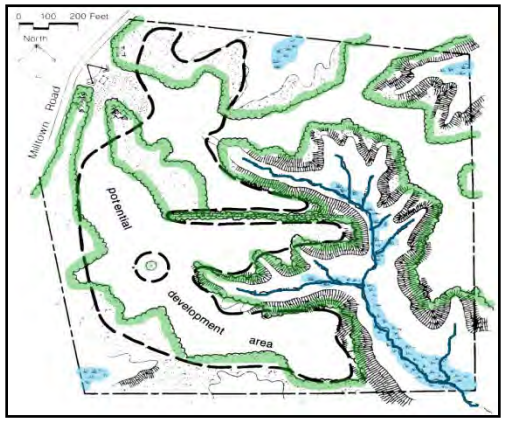
In the past, before stormwater management regulations were required, a developer would design his development to drain water towards the nearest curb and gutter, road ditch, or nearby stream to conduct stormwater runoff away from his development quickly as possible. This approach worked for the development, but downstream problems continued to multiply. Wherever flows increased, the high velocity and sustained flows gouged out existing natural streambeds that are not designed to pass that much water so quickly. A local example of stormwater flows that have gouged out natural receiving channels is the photo below that was taken in the Town of Kilmarnock last year.

Note the person and tripod for scale!

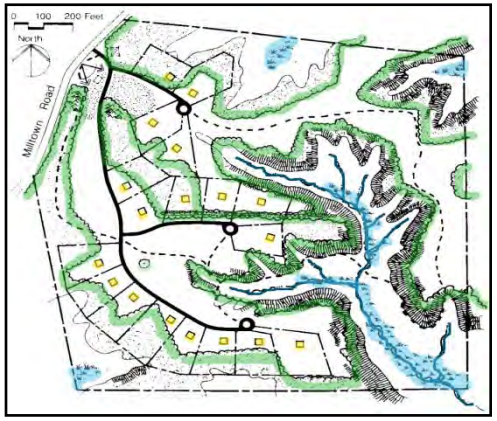
When streams are eroded by peak stormwater flows, sediment flows downstream, with the heavier particles falling out relatively quickly. Smaller suspended soil particles and nutrients can travel many miles downstream, eventually ending up in the tributaries to the Chesapeake Bay. Below is a photo downstream from the above photo.

In order to comply cost-effectively with Virginia's new Stormwater Management Regulations, Environmental Site Design (ESD) must be considered at the very beginning of the design process. If ESD is not used, it may be possible to comply with the new stormwater regulations, but more best management practices (BMPs) will have to be constructed on site to reduce volume and treat the stormwater runoff. Constructing multiple BMPs on a site costs more than allowing nature to treat some of the stormwater volume. The value of Environmental Site Design is that, theoretically, fewer man made BMPs will need to be constructed, as there will be less impervious area that produces concentrated stormwater runoff.

Below is an example of environmental mapping of a site to illustrate where the natural drainage and vegetation exist.



After the environmental mapping is completed, a developer can begin to arrange the parcels by clustering them in the buildable areas, away from wetlands and natural vegetation as much as possible.



The same environmental mapping process can be used at micro scale of an individual lot to lay out the buildings on a lot.

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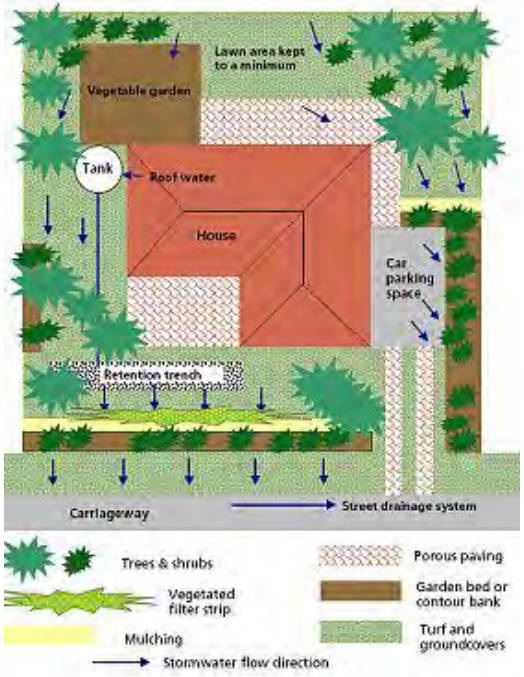
Virginia Coastal Zone MANAGEMENT PROGRAM

Environmental Site Design - the Key to Virginia's New Stormwater Management Regulations



The illustration above shows ways to help comply with Virginia's Stormwater Regulations to reduce and treat stormwater runoff from your residential lot.

Virginia's new Stormwater Management Program seeks to reduce the volume of stormwater runoff while also reducing pollution contained in that runoff.

To comply with Virginia's new stormwater management rules, a developer must reduce the volume of runoff from the entire development site by at least 50%. Prior stormwater regulations did not require any reduction in runoff, only detention of the runoff to slow the flow of the stormwater going downstream.

In order to achieve reduction in the volume of runoff of the entire site, careful site planning needs to be done BEFORE any land is cleared for the development. Environmental Site Design (ESD), also referred to as Low Impact Development (LID), is a stormwater management approach that minimizes the hydrological impact of development by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source. In order to minimize impacts, ESD (and LID) seeks to reduce the amount of impervious surfaces by retaining as much natural vegetation present on the site as possible. By designing the development to fit the terrain and applying decisions that have the effect of maintaining the natural site hydrology, a developer can prevent storm water problems and avoid having to mitigate them later in the process.

Follow these four steps to comply with Virginia's New Stormwater Regulations:

1. Use Environmental Site Design (ESD) to minimize impervious area and preserve forest and open space.

2. Apply runoff reduction practices.

3. Add pollutant removal practices to meet water quality goals if necessary.

4. Add additional BMP's to meet channel protection and flood control requirements.

While there are many components to Environmental Site Design, below is a list of some of the concepts to consider when incorporating Environmental Site Design into the layout of your development:

- before attempting to layout the buildings on the site plan, conduct environmental mapping, which shows the existing topography and natural vegetation present on the site;

- preserve stream, wetland, and shoreline buffers (If present);

-minimize the disturbance of permeable soils (compaction from heavy equipment makes permeable soils incapable of infiltration, making them act as impervious surfaces);

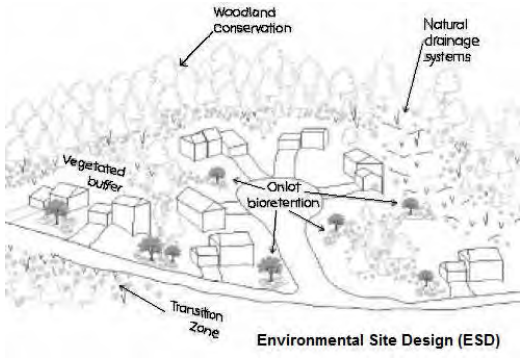
-maintain natural flow paths across site (keep natural hydrography in place instead of altering it);

-lay out buildings to reduce clearing and grading on the site (less land disturbance = greater infiltration);

-grade site to promote sheet flow from impervious to pervious areas (promotes infiltration into the soil);

-reduce impervious area (consider the use of permeable pavers or permeable asphalt for driveways and parking areas to increase stormwater infiltration);

-disconnect flows from impervious cover to slow runoff velocity and promote infiltration.

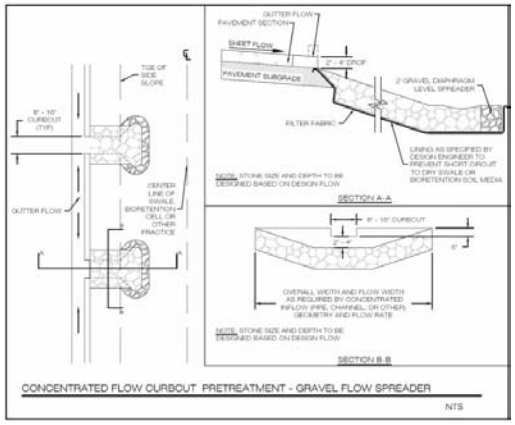


In the drawing above, elements of Environmental Site Design are shown incorporated into a development of single family houses.

Constructed grassed stormwater channels should have pretreatment stormwater BMPs that help dissipate energy, slow runoff velocity, and help filter out sediments . Where sheet flow runoff occurs, grass filter strips are the most common form of pretreatment for grassed channels. In cases where the sheet flow comes off of pavement at higher velocities, a gravel or stone diaphragm along the entire edge of the pavement with a 2 to 4 inch drop can slow the velocity of runoff to transmit to a grassed filter strip for additional pretreatment.

Where concentrated flow occurs from pavement, due to curb and gutter, the stormwater flow will need to be spread out in order to prevent erosion. The most common practice is to create level spreaders consisting of filter cloth covered with gravel to slow and spread the runoff into sheet flow.

Below is a typical design of at gravel level spreader.



Most stormwater BMPs are designed by volume based criteria, but grassed channels are designed based on flow-rate-criteria. The use of Manning's Equation and others allows grass channels to be designed to handle the flow without erosion to the channel bed.

For more information on Grassed Channels for treating and conveying stormwater, visit these websites:

http://water.epa.gov/polwaste/npdes/swbmp/Grass-Lined-Channels.cfm

http://www.pubs.ext.vt.edu/426/426-122/426-122_pdf.pdf

http://www.vwrrc.vt.edu/swc/documents/2013/DEQ%20BMP%20Spec%20No%203_GRASS%20CHANNELS_Final%20Draft_v1-9_03012011.pdf

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Virginia Coastal Zone MANAGEMENT PROGRAM

Virginia Stormwater Management Best Management Practice: Grassed Channels

The photo above shows a grassed channel that receives water from the lot and the road to help comply with Virginia's Stormwater Regulations to reduce and treat stormwater.

Grassed channels can provide a modest amount of runoff filtering and volume reduction compared to traditional curb, gutter and storm drain inlets and pipes.

Grassed channels help to convey stormwater runoff away from impervious areas or areas of managed turf (such as yards and playing fields). Runoff volume reduction is relatively low, from 10% to 20%. The nutrient removal function of grassed swales ranges from 15% to 36%,

depending on the soil type at the development site. Both runoff volume reduction and nutrient removal can be increased on certain soils. Soils with lower permeability ratings (Hydrologic Group C and D), can be treated by adding soil compost amendment, another stormwater BMP, to increase infiltration and nutrient removal. With the addition of soil compost amendment on qualifying soils, the runoff volume reduction can be increased to a maximum of 30% and nutrient removal to a maximum of 44%.

Grassed Channel Design Parameters:

- the bottom width of the channel should be between 4 to 8 foot wide,

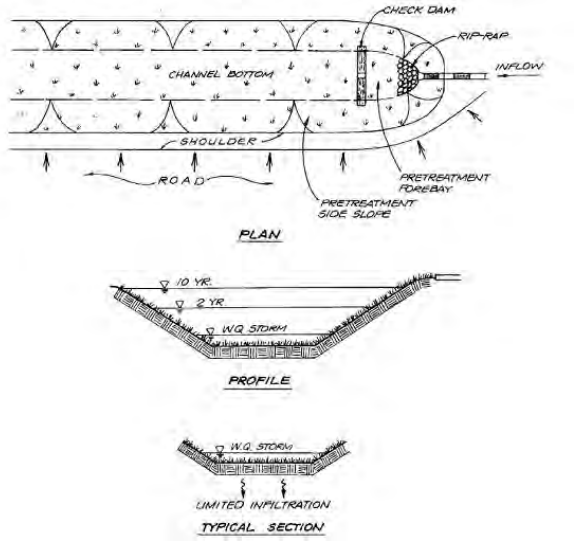
-the channel side slopes should be 3:1 (Height : Vertical) or flatter,

- the maximum total contributing drainage area to any individual grass channel is 5 acres,

- the longitudinal slope of the channel should be no greater than 4% (check dams may be employed to reduce the effective slope in order to meet the limiting flow velocity requirements),

- The maximum flow velocity of the channel must be less than 1 foot per second during a 1 inch storm event

-the dimensions of the channel should ensure that flow velocity is non-erosive during the 2 year and 10 year design storm events and the 10 year design flow is contained within the channel with a minimum of 6 inches of freeboard.



The drawing above is a typical cross section of a grass channel, which illustrates that the channel must be capable of containing the flow from a 10 year storm within the channel with 6 inches of freeboard.

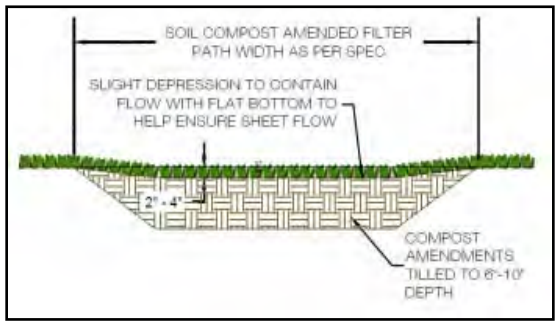
In order to properly design a grassed swale there needs to be adequate area to construct the designed channel. Grassed channels are more suitable for low to medium density residential road and yard runoff (if there is adequate right of way width and distance between driveways). Grassed channels should be applied only in linear configurations parallel to the contributing impervious cover, such as roads, driveways and small parking areas. In order for a grassed channel to maximize its effectiveness, runoff needs to be spread out to sheet flow before entering the side of the grassed channel. The maximum contributing drainage area for an individual grassed channel should be 5 acres and preferably less, as any drainage area over 5 acres, the velocity and flow through the channel become too great to treat runoff and prevent erosion from occurring. Longitudinal slope should be less than 4%, but in order to meet the limiting velocity requirements, a slope near 4% will likely need check dams to slow the flow to the specified standards.

In the photo above, a grassed channel with a stone diaphragm (filter) on the edge of a parking lot with check dams installed in the channel to slow runoff velocity.

Slopes less than 2% are ideal for grassed channel, but care must be taken so that the grade is continuous and no flat spots occur that would cause pockets of standing water.

Rooftop disconnection leading to another best management practice is often an effective approach to meeting Virginia's Stormwater Management Regulations. Adding a soil composted amended filter path (Virginia Stormwater Design BMP #4) requires a 10 foot wide strip that is at least 20 feet in length between the disconnect and the street or conveyance system. The filter path should have a trapezoidal shape to contain the flow, but a flat bottom so that flow is not concentrated in the middle. The soil must be amended by using 2 to 4 inches of compost, tilled to a depth of 6 to 10 inches within the filter path.

Below is a cross section design view of a properly constructed soil compost amended filter path, showing the design parameters detailed above. Note the slight depression in the center that helps to contain the stormwater flow.



Micro infiltration practices can be installed to disconnect flow from rooftop sources. The most common type of these practices are dry wells or French drains with a maximum depth of 3 feet below grade that have a surface area of approximately 3% of the contributing roof area. Care should be taken when designing either of these practices on a building that has a basement, or avoided altogether.

For more information, visit:

http://www.vwrrc.vt.edu/swc/documents/2013/DEQ%20BMP%20Spec%20No%201_DISCONNECTION_Final%20Draft_v1-9_03012011.pdf

http://pubs.ext.vt.edu/426/426-120/426-120_pdf.pdf

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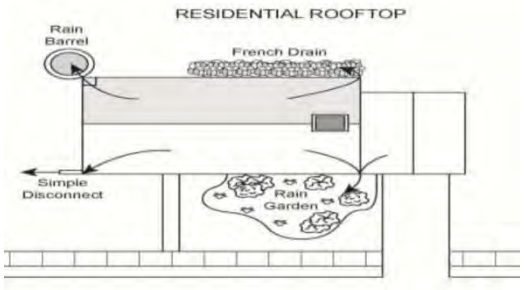
Virginia Coastal Zone MANAGEMENT PROGRAM

Virginia Stormwater Best Management Practice: Rooftop Disconnection



The photo above shows simple rooftop disconnection and disconnection to alternative runoff reduction practices adjacent to the residence.

Rooftop disconnection reduces runoff volume and when paired with alternative runoff reduction practices may assist in nutrient reduction as well.

Runoff reduction of 50% of the stormwater flow generated by a development site is required by the new Virginia Stormwater Management Regulations. Rooftop disconnection is one of the easiest and most cost effective Best Management Practices to achieve runoff reduction on residential sites.

Rooftop disconnection involves slowing down stormwater runoff from roof downspouts by directing flow through vegetated areas or engineered drains before it gets to receiving waterways . In the past, a downspout would often be designed to drain onto a paved driveway and thus have a direct path to the drainage system. This means that essentially 100% of the stormwater runoff volume is conveyed downstream, which has lead to downstream channel erosion due to high stormwater runoff flows.

With the new Virginia Stormwater Management Regulations, this is not recommended as each development site is required to reduce the volume of runoff by 50%. Simple rooftop disconnection allows for runoff to infiltrate, reducing some of the stormwater volume. Simple Rooftop disconnection is accomplished by directing downspout flow across vegetated areas (either turfgrass or natural vegetation) to slow velocity and increase infiltration before the stormwater reaches the curb and gutter system or roadside drainage ditch. Simple rooftop disconnection can provide relatively high runoff reduction rates, although no credit is given for nutrient removal, which is also required by the new stormwater management regulations.

Another type of rooftop disconnection directs downspout runoff to alternative runoff reduction practices, which can reduce the volume even more, with some practices providing some nutrient removal as well. Examples of alternative runoff reduction practices to be coupled with rooftop disconnection include:

-soil composted amended filter paths

- infiltration by dry wells or French drains

-filtration by rain gardens or micro retention basins

- stormwater reuse with a cistern or rain barrel (reduction calculated by vessel volume and water reuse rate)

- storage and release in a stormwater planter (usually used in commercial applications)

In the drawing above, disconnection to a rain garden is shown.

There are some design parameters that must be considered when utilizing rooftop disconnection. There must be a leve In order to have adequate room for infiltration. Simple rooftop disconnection is not advisable for residential lots less than 6,000 square feet in area; although, it may be possible to employ one of the alternative runoff reduction practices on these lots (e.g. cisterns, infiltration, etc.). The maximum rooftop area treated by a simple disconnection is 1,000 square feet per disconnection. Therefore, a 2,000 square foot roof would need at least two simple disconnections. The longest stormwater flow path over vegetated surfaces recommended is 75 feet, but should never be less than 40 feet. The slope of the vegetated area away from the building should be less than 2% but can be up to 5% with turf reinforcement to preclude erosion of the turf soil. Downspouts should be extended 5 feet from a simple foundation (crawl space) to reduce the chance of moisture from stormwater runoff deteriorating the structure. In addition, a pea gravel or river stone diaphragm should be installed at the downspout termination in order to spread the stormwater flow level across the vegetated surface forming sheet flow. This is necessary as to distribute flows evenly across the vegetated surface, avoiding concentrated flow that could cause soil erosion.

VII. Benefits Accrued From Prior CZM Grants

NNPDC staff used a grant product from the Virginia Coastal Zone Management Program's Grant Program, the final product of the Middle Peninsula Planning District Commission's FY05, Task 92.02 grant, a Protocol for Landing and Road Acquisitions. The protocol illustrated how an entity would examine existing public boat landings or road endings to determine if the public has a right to access the water at the site. The Protocol further outlines the process to have VDOT abandon a road, and then give the abandoned roadway to the local government (or Public Access Authority) for public water access. NNPDC staff perused the protocol and used the procedures developed by the MPPDC to research several road endings in Lancaster County during this grant period. Unfortunately, NNPDC staff did not find that any public money was spent from the end of the right of way (pavement end) to the shoreline. If this could be proven, according to the Protocol, a case could be made that the land has had public tax dollars spent on improving the land, and thus, the general public would have the right to access the water at that site in perpetuity. The NNPDC is still interested in creating new public water access points, and may, in the future, examine other road endings in the region with the hope that the sites can be used by the public to access state waters.

NNPDC staff used the final products of a previous grant, VACZM FY10 Task 12.06 - Northern Neck Blue Green Infrastructure Protection and Outreach for a local government training session for a presentation given at the Northern Neck Wetlands Summit held on March 20, 2014. The presentation given by NNPDC staff was entitled "Northern Neck Sea Level Rise: Possible Impacts to Green Infrastructure". Attendees at the Wetlands Summit included members from three Northern Neck County Wetland Boards, and numerous Northern Neck non-profit environmental organization staff (see the list of organizations that attended in the Local Planning Coordination and Training section of this report). Specific products use in the presentation given by NNPDC staff included portions of presentations given to local county Planning Commission's during the FY10 grant year, as well as maps created for the Planning Commission presentations. Maps of the Coastal Zone Management Program's Virginia Ecologic Value Assessment (VEVA) which in and of itself is a previous VACZM FY10 Task 11 grant that was a cooperative project with the Virginia Coastal Zone Management Program, the Virginia Commonwealth University, Center for Environmental Studies; the Virginia Department of Conservation and Recreation, Division of Natural Heritage; the Virginia Department of Game and Inland Fisheries; and the Virginia Institute of Marine Science, Center for Coastal Resource Management were shown. VEVA maps for each of the four Northern Neck Counties were created by NNPDC staff back in FY10 and were included in the presentation, as the VEVA map data was used for input into the analysis of green infrastructure that could potentially be impacted by a rise in sea level of 4 feet. The results of the four county analysis of sea level rise impacts to green infrastructure were presented to the attendees of the Wetland Summit. NNPDC staff related that at the time (FY10), they had predicted that the county with the most impact on green infrastructure from sea level rise would be one of the counties that borders the Chesapeake Bay. In fact, the county that had the largest area of ecologically valued natural areas potentially impacted was Richmond County, which is inland from the Chesapeake Bay on the Rappahannock River, with 5,275 acres. More importantly, NNPDC staff informed those present, was that Richmond County was also the county with the highest ecologically valued categories of natural areas impacted, with 50% of the impacted natural areas being classified with the value of "very high" on the VEVA ecological

value scale. Attendees of the Wetlands Summit were very interested in the impact of sea level on natural areas, and asked whether these natural areas could be protected from sea level rise. NNPDC staff noted that a good portion of the natural areas were in private ownership, and likely the owners would not be able to afford any shoreline protection measures to reduce inundation impacts. However, NNPDC staff noted that by encouraging the use of living shorelines for shoreline stabilization in the future, there was optimism about coastal marshes being able to migrate up the gradual slope as sea level rises.