

# **Waterfront Parcel Value Sensitivity Associated with Poor Water Quality and Algal Blooms**



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## Study Overview

After an absence of 35 years, significant algal blooms returned to Albemarle waters in 2015-2019 in the Chowan, Little, Perquimans, and Pasquotank rivers, and Albemarle Sound (**Figure 1**). Algal blooms are fed by warm temperatures, sunlight and too much nutrients in the water, mainly nitrogen (N) and phosphorus (P) carried by stormwater runoff.

Widespread and persistent algal blooms negatively impact regional economic growth including recreational boating, fishing, and nature tourism. Poor water quality and associated algal blooms may also negatively impact property values, especially waterfront properties. The decrease in property values and tax revenue associated with poor water quality and algal blooms has been estimated in other regions of the United States. A 2015 assessment of the economic value of clean water in Lake Champlain found that the phosphorous load associated with climate change resulted in a \$4,900 and \$53,000 price decrease per average single family dwelling and seasonal residence, respectively.<sup>1</sup>

A study published in 2017 on the effects of Harmful Algal Blooms (HABs) on property values in six Ohio counties showed capitalization losses associated with near lake homes between 11% and 17% rising to above 22% for lake adjacent homes. For properties on Grand Lake Saint Marys, the study showed one-time capitalization losses exceeding \$51 million for near lake homes.<sup>2</sup> A 2017 study of the impacts of toxic algal blooms on recreational fishing on Lake Erie showed \$5.6 million in lost fishing expenditures associated with a summer-long bloom.<sup>3</sup>

In the Albemarle-Pamlico Watershed, a 2016 study estimated the annual value of aesthetic and natural amenities between \$44 million and \$96 million for residents living in close proximity to the shorelines of the estuary and coastal waters.<sup>4</sup>

This study focuses on potential changes in waterfront parcel tax revenue in Chowan, Perquimans, and Pasquotank counties, which in the Albemarle region have experienced the most extensive and persistent algal blooms since 2015 (**Figure 1**).

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<sup>1</sup> B. Voigt, J. Lees, J. Erikson. 2015. *An Assessment of the Economic Value of Clean Water in Lake Champlain*. Technical Report 81. Prepared for The Lake Champlain Basin Program and New England Interstate Water Pollution Control Commission, p. 31

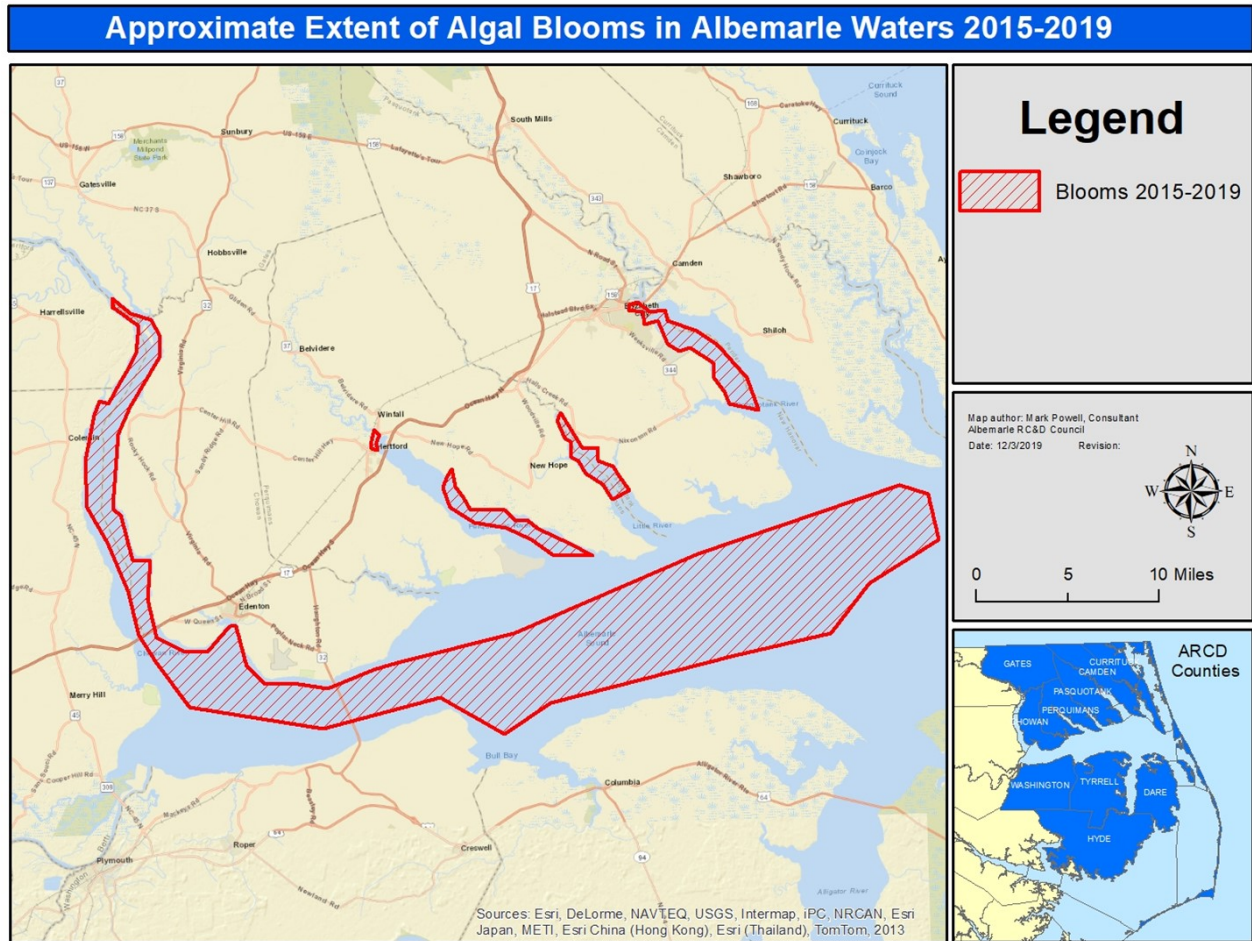
<sup>2</sup> David Wolf, H. Allen Klaiber. *Bloom and bust: Toxic algae's impact on nearby property values*. *Ecological Economics*, 2017; 135: 209 DOI: 10.1016/j.ecolecon.2016.12.007

<sup>3</sup> David Wolf, Will Georgic, H. Allen Klaiber. *Reeling in the damages: Harmful algal blooms' impact on Lake Erie's recreational fishing industry*. *Journal of Environmental Management*, 2017; 199: 148 DOI: 10.1016/j.jenvman.2017.05.031

<sup>4</sup> George Van Houtven, Christina Van Winkle, Maggie O'Neil, Kimberly Matthews, Paramita Sinha. 2016. *Economic Valuation of the Albemarle-Pamlico Watershed's Natural Resources*. RTI International. Report prepared for the Albemarle-Pamlico National Estuary Partnership.

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Figure 1. Approximate Extent of Algal Blooms 2015-2019.



## Study Methodology

This study was conducted using ArcMap 10.7.1, a professional Geographic Information System. The study steps for each county were:

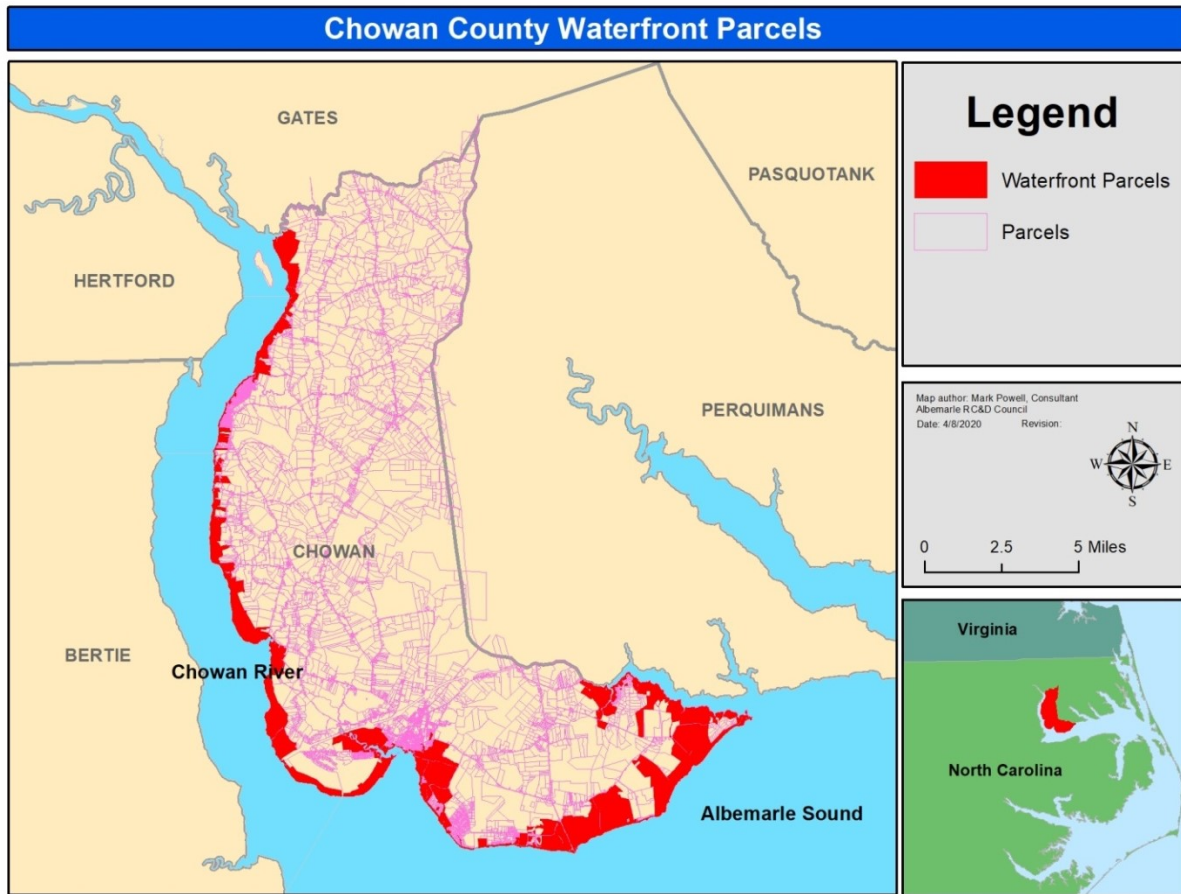
1. Download county parcel data from [NC OneMap](#).
2. Select parcels with a boundary along rivers and the Albemarle Sound.
3. Export the database of waterfront parcels to an Excel spreadsheet.
4. Export the database of all parcels to an Excel spreadsheet.
5. Sum the tax value of all parcels.
6. Sum the tax value of waterfront properties.
7. Use FY 2019-2020 [county tax values](#) to calculate the tax revenue per \$100 for all parcels, and for waterfront parcels.
8. Determine the reduction in waterfront parcel tax revenue at 5%, 7% and 10%.

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## Chowan County

The waterfront parcels in Chowan County (**Figure 2**) have a total assessed tax value of \$279,372,470, which is 19% of the total assessed parcel tax value. With a county tax rate of \$0.81 per \$100 value, the potential waterfront parcel tax revenue is \$2,262,917. A decrease in parcel tax revenue of 5%, 7% or 10%, would be \$113,146, \$158,404, and \$226,292, respectively (**Table 1**).

**Figure 2. Waterfront Parcels in Chowan County.**



**Table 1. Chowan County Waterfront Parcel Tax Values and Revenues**

<b>Waterfront Parcel Tax Value</b>	<b>\$ 279,372,470</b>	
<b>Per \$ 100</b>	<b>\$ 2,793,725</b>	
<b>Waterfront Parcel Tax Revenue</b>	<b>\$ 2,262,917</b>	
<b>Waterfront Parcel Tax Revenue</b>		
<b>5% Reduction</b>	<b>7% Reduction</b>	<b>10% Reduction</b>

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\$ 113,146	\$ 158,404	\$ 226,292
<b>FY 2019-2020</b>		
<b>Tax Rates per \$100</b>		<b>County Total</b>
<b>County</b>	<b>\$ 0.755</b>	<b>\$ 0.81</b>
<b>Fire</b>	<b>\$ 0.055</b>	

**Total Parcel Value: \$ 1,484,960,067**

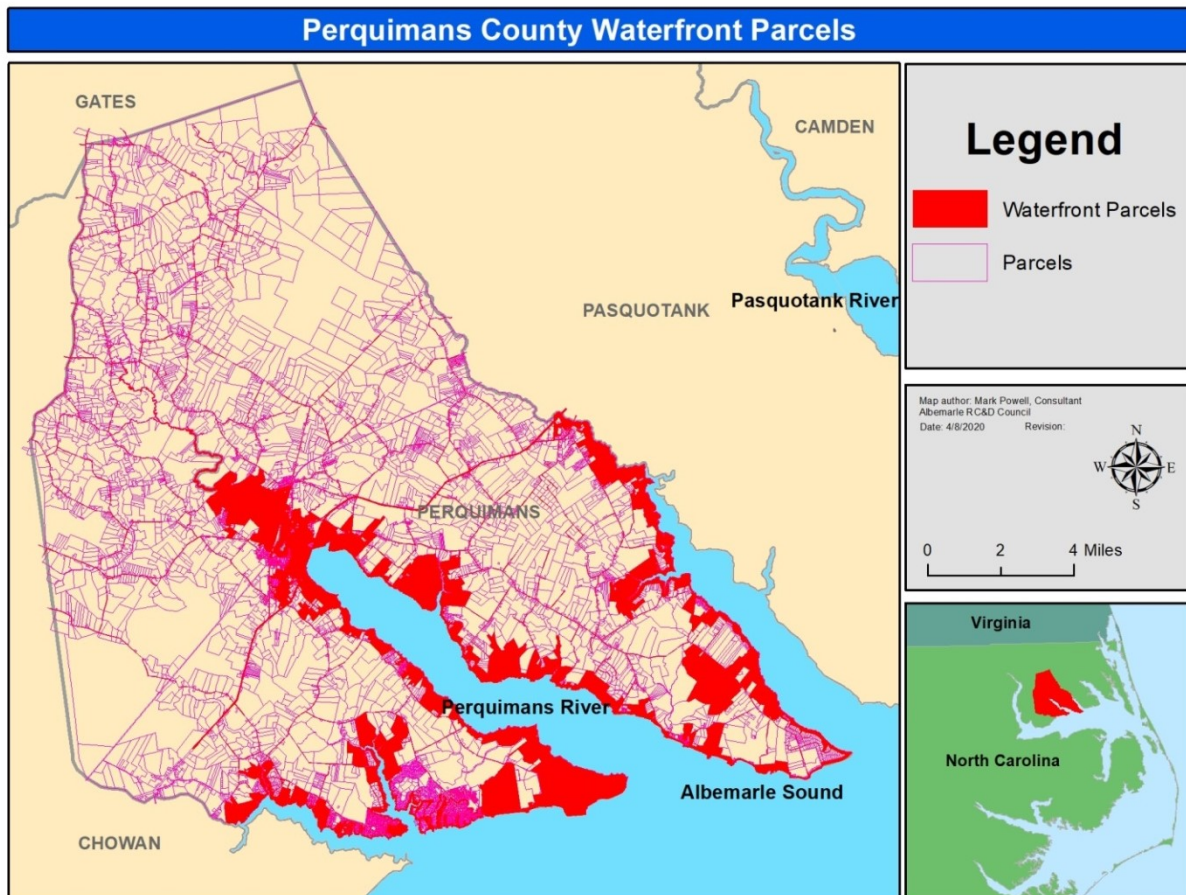
**Waterfront Parcel Value: \$ 279,372,470**

**Waterfront Parcel Value as Percentage of Total Parcel Value: 19%**

### Perquimans County

The waterfront parcels in Perquimans County (**Figure 3**) have a total assessed value of \$389,823,200, which is 26% of the total assessed parcel tax value. With a county tax rate of \$0.69 per \$100 value, the potential waterfront parcel tax revenue is \$2,299,957. A decrease in parcel tax revenue of 5%, 7% or 10%, would be \$114,998, \$160,997, and \$229,996, respectively (**Table 2**).

**Figure 3. Waterfront Parcels in Perquimans County.**



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**Table 2. Perquimans County Waterfront Parcel Tax Values and Revenues.**

<b>Waterfront Parcel Tax Value</b>	<b>\$ 389,823,200</b>	
<b>Per \$100</b>	<b>\$ 3,898,232</b>	
<b>Waterfront Parcel Tax Revenue</b>	<b>\$ 2,299,957</b>	
<b>Waterfront Parcel Tax Revenue</b>		
<b>5% Reduction</b>	<b>7% Reduction</b>	<b>10% Reduction</b>
<b>\$ 114,998</b>	<b>\$ 160,997</b>	<b>\$ 229,996</b>
<b>FY 2019-2020</b>		
<b>Tax Rate per \$100</b>		<b>County Total</b>
<b>County</b>	<b>\$ 0.59</b>	<b>\$ 0.69</b>
<b>Fire</b>	<b>\$ 0.10</b>	

**Total Parcel Value: \$ 1,522,284,200**

**Total Waterfront Parcel Value: \$ 389,823,200**

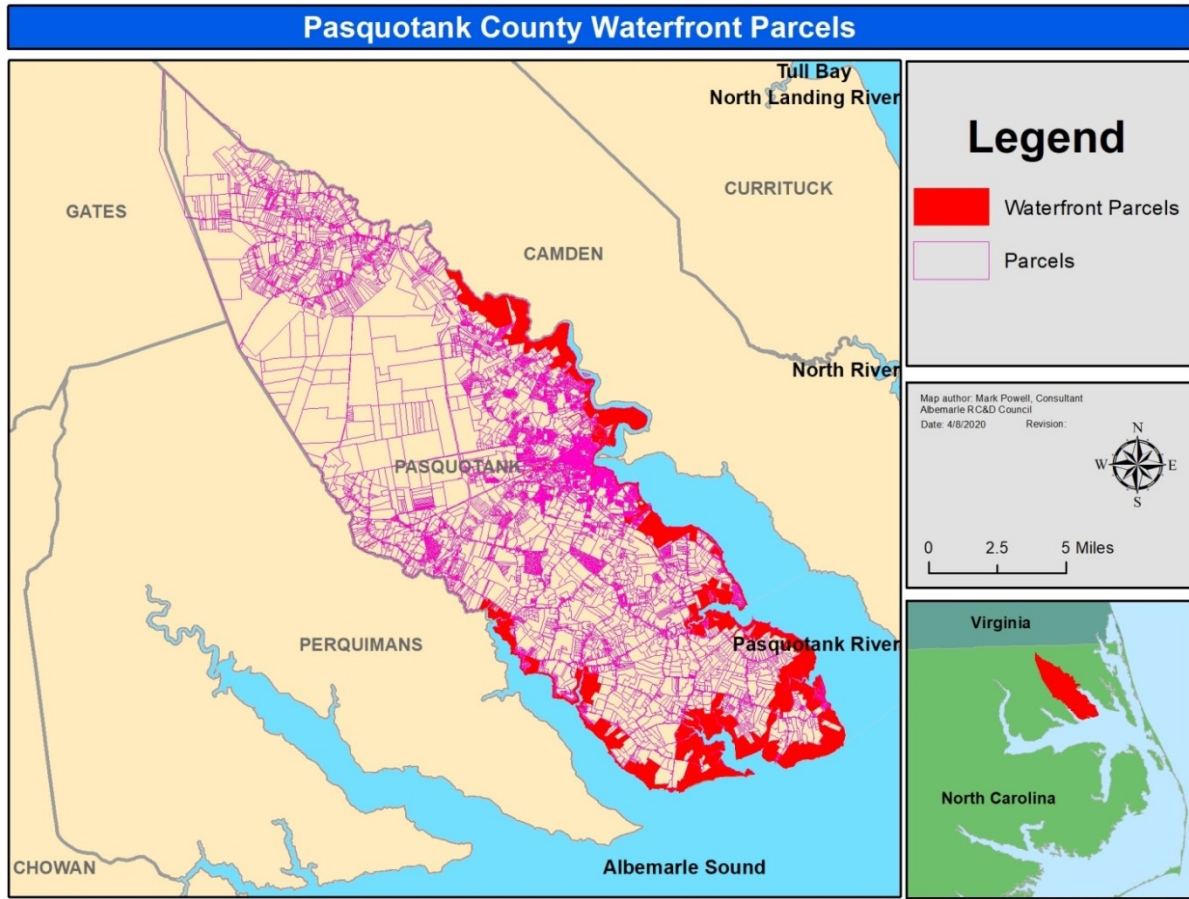
**Waterfront Value as Percentage of Total Parcel Value: 26%**

**Pasquotank County**

The waterfront parcels in Pasquotank County (**Figure 4**) have a total assessed value of \$470,026,928, which is 15% of the total assessed parcel value. With a county tax rate of \$0.83 per \$100 value, the potential waterfront parcel tax revenue is \$3,901,224. A decrease in waterfront parcel tax revenue of 5%, 7% or 10% would be \$195,061, \$273,086, and \$390,122, respectively (**Table 3**).

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**Figure 4. Waterfront Parcels in Pasquotank County.**



**Table 3. Pasquotank County Waterfront Parcel Tax Values and Revenues.**

<b>Waterfront Parcel Tax Value</b>	<b>\$ 470,026,928</b>	
<b>Per \$100</b>	<b>\$ 4,700,268</b>	
<b>Waterfront Parcel Tax Revenue</b>	<b>\$ 3,901,224</b>	
<b>Waterfront Parcel Tax Revenue</b>		
<b>5% Reduction</b>	<b>7% Reduction</b>	<b>10% Reduction</b>
<b>\$ 195,061</b>	<b>\$ 273,086</b>	<b>\$ 390,122</b>
<b>FY 2019-2020</b>		
<b>Tax Rate Per \$100</b>		<b>County Total</b>
<b>County</b>	<b>\$ 0.83</b>	<b>\$ 0.83</b>



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**Total Parcel Value: \$ 3,218,897,531**

**Waterfront Parcel Value: \$ 470,026,928**

**Waterfront Parcel Value as Percentage of Total Parcel Value: 15%**

### **Summary**

Pasquotank County has the highest waterfront parcel value of the three counties studied, but it has the lowest waterfront parcel value as a percentage of the total parcel value at 15%. Pasquotank also has the highest tax rate at \$0.83 per \$100 parcel value. Perquimans County had the second highest waterfront parcel value as a percentage of total parcel value at 26%, but its tax rate of \$0.69 was the lowest of the three counties. A county comparison of tax revenue sensitivity from waterfront properties is presented in the table below.

**Table 4. County Parcel Tax Revenue Comparison.**

<b>County</b>	<b>Waterfront Parcel Tax Revenue Per \$100 Value</b>	<b>5% Reduction in Tax Revenue</b>	<b>7% Reduction in Tax Revenue</b>	<b>10% Reduction in Tax Revenue</b>
<b>Chowan</b>	\$ 2,262,917	\$ 113,146	\$ 158,404	\$ 226,292
<b>Perquimans</b>	\$ 2,299,957	\$ 114,998	\$ 160,997	\$ 229,996
<b>Pasquotank</b>	\$ 3,901,224	\$ 195,061	\$ 273,086	\$ 390,122

Poor water quality and associated algal blooms could have a significant impact on the three counties in this study even at the low end 5% reduction in tax revenue from waterfront properties. Such an economic impact would most likely result in cuts to basic services such as schools and emergency services.

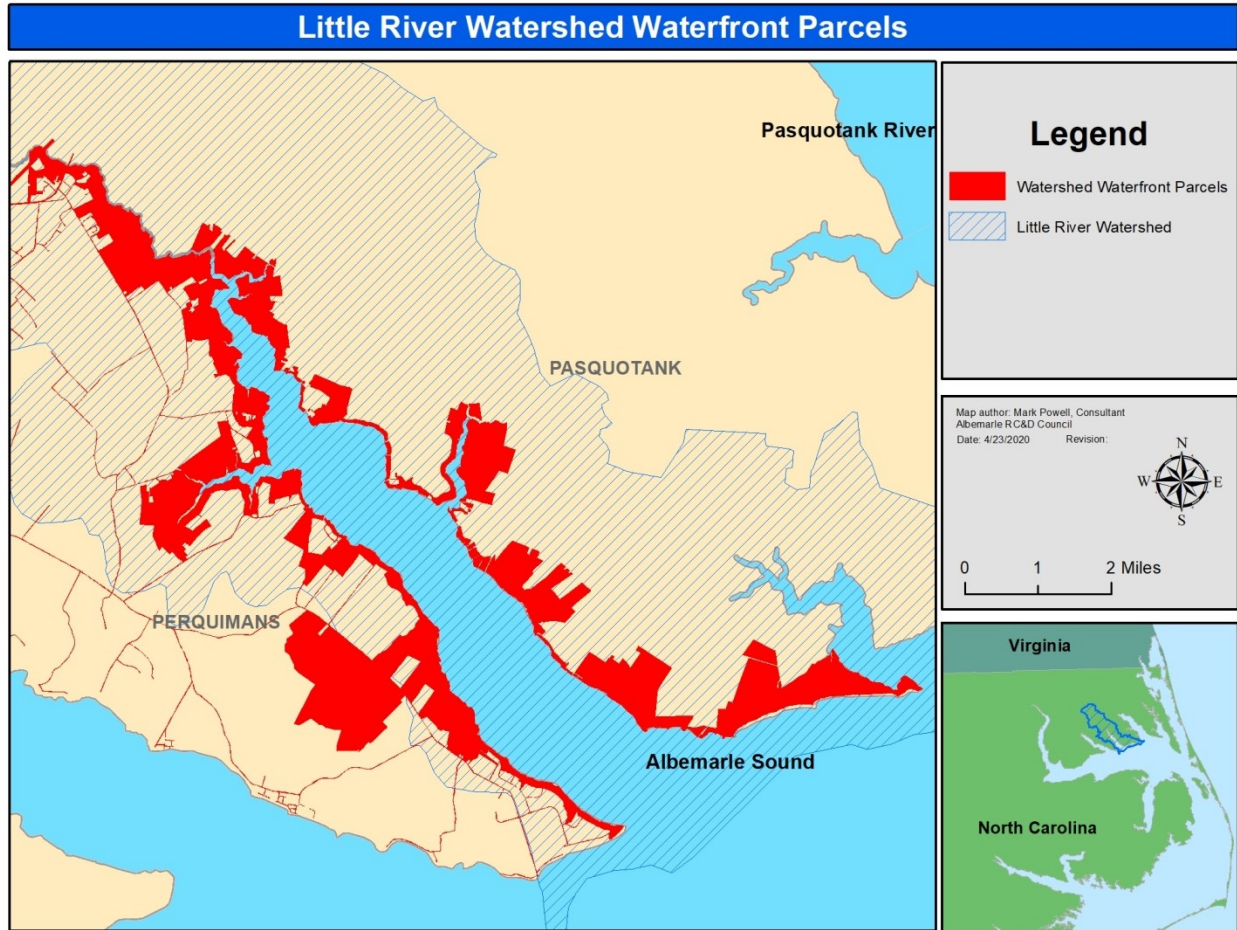
### **Little River Watershed**

The Little River is the dividing line between Perquimans and Pasquotank Counties. The river has an eight-mile section listed as impaired by the state for Chlorophyll *a*, which indicates the river is receiving too much nitrogen, phosphorus, and/or sediment. The Albemarle RC&D Council (ARCD) has been working with a broad partnership over the past 5 years to improve and protect water quality in the Little River watershed. The middle section of the watershed around Dance's Bay has experienced extensive algal blooms since 2017, which according to long-time residents were the first blooms ever seen in the river. Residents in the watershed, in particular ones on the water, are concerned about the effects of annual algal blooms on water recreation, health, and declining property values. This study looked at potential reductions in waterfront property values in the watershed in Perquimans and Pasquotank counties.

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The waterfront parcels in the Little River watershed are shown in **Figure 5**. The total potential waterfront parcel tax revenue is \$940,068. A decrease in waterfront parcel tax revenue of 5%, 10% or 20% would be \$47,004, \$94,007, and \$188,014, respectively (**Table 5**).

**Figure 5. Waterfront Parcels in the Little River Watershed.**



**Table 5. Watershed Waterfront Parcel Tax Revenue Comparison.**

County	Waterfront Parcel Tax Revenue Per \$100 Value	5% Reduction in Tax Revenue	10% Reduction in Tax Revenue	20% Reduction in Tax Revenue
Perquimans	\$ 451,933	\$ 22,597	\$ 45,193	\$ 90,387
Pasquotank	\$ 488,135	\$ 24,407	\$ 48,814	\$ 97,627
<b>TOTAL</b>	<b>\$940,068</b>	<b>\$47,004</b>	<b>\$94,007</b>	<b>\$188,014</b>