



Framework for Implementing Sustainable Shorelines

Summary of Social Science Investigations: Virginia Shoreline Characteristics, Marsh Vulnerability, and Management Options

Project Activity: Shoreline Characteristics, Vulnerability, and Management Options for Tidewater Virginia Localities

Objective: Create GIS shoreline layers for each locality in Tidewater Virginia (as defined by the Commonwealth of Virginia) with attributes to include CCRM Shoreline Management Model (SMM), CCRM shoreline inventory, and marsh vulnerability score data. In addition, add Parcel ID data to the Gloucester County and City of Norfolk shoreline layers. Generate database with resultant shoreline attribute data of each locality for use in creating two different shoreline management decision-making simulations:

- Prediction of future shoreline modification decisions using the shoreline characteristic attributes and expected neighbor and contractor influence. This simulation is of various scenarios of how to influence decision making on broad scales.
- For Gloucester and Norfolk, simulate future interactions among contractor-property owners and neighbors-property owners based on shoreline characteristics for the parcels using an Agent-Based Model.

Methods: Using ArcGIS Pro 2.6 geographic information system software, we integrated the latest CCRM shoreline management model, shoreline inventory, and marsh vulnerability data to the latest shoreline layer for each Tidewater locality. In addition, Parcel ID data were incorporated into the Gloucester County and City of Norfolk shoreline geospatial layers.

Visuals:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF			
OBJECTID	HEIGHT	COVER	BEACH	bathyme	marsh	all_bnk	hcol	canal	SandSpit	forestabl	STRUCTUI	offshores	roads	PermStru	defendec	WideBea	Tree	Trin SAV	County	Exposure	Riparian	Barrier	rd	struc	lowBnkSt	SHType	HModAr	StrucList	SMMVSD	SMMVSD	Combo2C	Combo2I	Shape	Len
1	>30 feet	Bare	No	Deep	Marsh pri>30				Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	3	3	16.44849		
2	>30 feet	Bare	No	Deep	Marsh pri>30				Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	3	3	17.37948		
3	>30 feet	Partial	No	Deep	Marsh pri>30				Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	3	3	24.02449		
4	>30 feet	Partial	No	Deep	Marsh pri>30				Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	3	3	18.78558		
5	>30 feet	Bare	No	Deep	No	>30			Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	0	0	99.19617		
6	>30 feet	Bare	No	Deep	No	>30			Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	0	0	22.61033		
7	>30 feet	Bare	No	Deep	No	>30			Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	0	0	15.16025		
8	>30 feet	Partial	No	Deep	No	>30			Yes								No	Richmond	High	Forested						Undefenc		Land Use	Shoreline	0	0	23.18602		
9	>30 feet	Partial	No	Deep	No	>30			Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	0	0	235.9668		
10	>30 feet	Partial	No	Deep	No	>30			Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	0	0	54.80123		
11	>30 feet	Partial	No	Deep	No	>30			Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	0	0	44.68617		
12	>30 feet	Partial	No	Deep	No	>30			Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	0	0	38.67731		
13	>30 feet	Partial	No	Deep	No	>30			Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	0	0	164.4314		
14	>30 feet	Partial	No	Deep	No	>30			Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	0	0	14.12753		
15	>30 feet	Total	No	Deep	No	>30			Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	0	0	16.71653		
16	>30 feet	Total	No	Deep	No	>30			Yes								No	Richmond	Moderate	Forested						Undefenc		Land Use	Shoreline	0	0	32.62301		
17	0-5 feet	Partial	No	Deep	Marsh pri 0-5							Roads					No	Richmond	High	Bare			Yes	Yes	Undefenc		Plant Mai	In moder	1	1	1.928796			
18	0-5 feet	Total	No	Deep	Marsh pri 0-5												No	Richmond	Moderate	Agricultur						Undefenc		Plant Mai	In moder	3	3	18.96241		
19	0-5 feet	Total	No	Deep	Marsh pri 0-5												No	Richmond	Moderate	Grass						Undefenc		Plant Mai	In moder	3	3	4.662278		
20	0-5 feet	Total	No	Deep	Marsh pri 0-5						Groin			Yes			No	Richmond	Moderate	Agricultur						Defendec		Groins	Plant Mai	In moder	3	3	3.839640	
21	0-5 feet	Total	No	Deep	No	0-5											No	Richmond	Moderate	Agricultur						Undefenc		Revetmer	Remove c	0	0	51.11030		
22	0-5 feet	Total	No	Deep	No	0-5											No	Richmond	Moderate	Agricultur						Undefenc		Revetmer	Remove c	0	0	11.94878		
23	0-5 feet	Total	No	Deep	No	0-5											No	Richmond	Moderate	Grass						Undefenc		Revetmer	Remove c	0	0	28.66208		
24	0-5 feet	Total	No	Deep	No	0-5							Roads				No	Richmond	Moderate	Residenc			Yes	Yes	Undefenc	Highly M	Highly M	Management	0	0	14.95312			
25	0-5 feet	Total	No	Deep	No	0-5						Bulkhead		Yes			No	Richmond	High	Residenc						Defendec		Bulkhead	Revetmer	If grading	0	0	67.68378	

Excerpt from Richmond County, Virginia shoreline attribute table.



**Richmond County, Virginia Shoreline Characteristic layer
(Symbology: marsh vulnerability score)**

Localities Completed:

- Accomack
- Alexandria
- Arlington
- Caroline County
- Chesterfield County
- Charles City County
- Essex County
- Fairfax County
- Gloucester County
- City of Hampton
- Hanover County
- Henrico County
- City of Hopewell
- Isle of Wight County
- James City County
- King George County
- Lancaster County
- Mathews County
- Middlesex County
- New Kent County
- City of Newport News
- City of Norfolk
- Northampton County
- Northumberland County
- City of Petersburg
- City of Poquoson
- City of Portsmouth
- Prince George County
- Prince William County
- Richmond County
- Spotsylvania County
- Stafford County
- City of Suffolk
- Surry County
- City of Virginia Beach
- Westmoreland County
- City of Williamsburg
- York County