

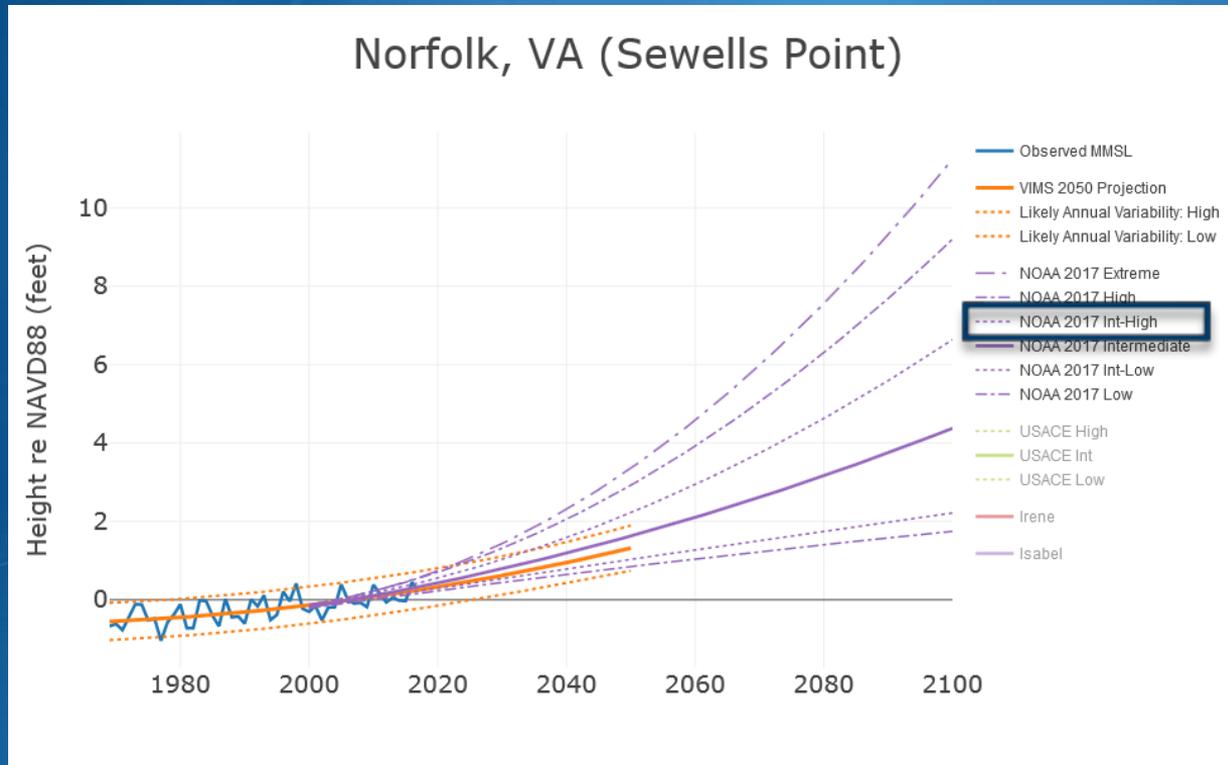
# VDOT/VIMS Partnership

In 2019 VDOT partnered with VIMS and DNR to initiate a study to begin to address recurrent flooding

Task 1) Assess climate vulnerability and adaptation of transportation infrastructure

Task 2) Assess ecosystem impacts of transportation infrastructure under rising sea levels

# Sea level rise planning rates



AdaptVA.org

# Task 1. Transportation Infrastructure Vulnerability

- Examine all roads with respect to FEMA Flood Hazard Zones
- Update recurrent road flooding maps
- Analyze road elevations and Return Flood Frequency (RFF) relative to the Best Available Tide Gauge data for the area;
- Road Network Analysis (RNA) to evaluate vulnerability of major VDOT infrastructure
- Interactive planning portal for VDOT.

# Transportation in FEMA Flood Hazard Zones

VDOT RIVA  
ROAD INFRASTRUCTURE VULNERABILITY ASSESSMENT



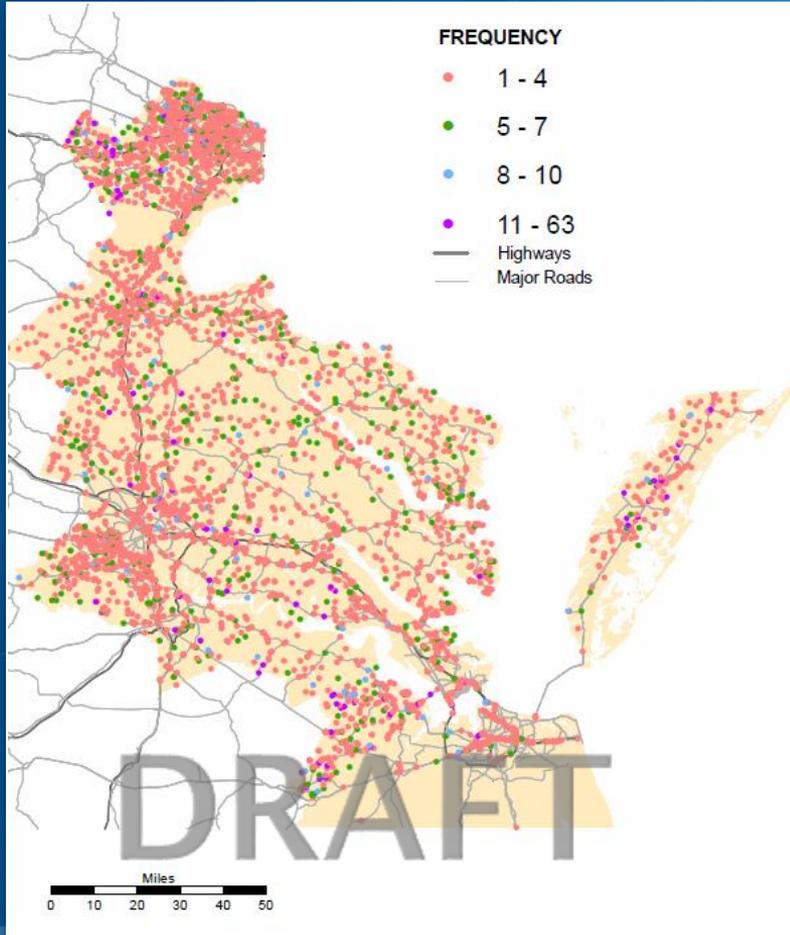
# Flood Zone Summary Tables

All road lengths are rounded to the nearest integer. Blank cells indicate no road segments in that category.

		Total Road Length (miles)	1% Annual Chance Flood Hazard (all A and V zones) (miles)	0.2% Annual Chance Flood Hazard (miles)	Area of Minimal Flood Hazard (miles)	Area of Undetermined Flood Hazard (zone D) (miles)
<b>Summary</b>	All Coastal Roads	58446	3048	1485	53863	50
	Road Type	Total Road Length (miles)	1% Annual Chance Flood Hazard (all A and V zones) (miles)	0.2% Annual Chance Flood Hazard (miles)	Area of Minimal Flood Hazard (miles)	
<b>Accomack County</b>	Local Main Arteries	153	21	14	118	
	Local Secondaries	1266	349	96	821	
	Ramp	<1			<1	
	US and VA Primary Highways	92	5	<1	88	
		<b>1512</b>	<b>375</b>	<b>109</b>	<b>1027</b>	
	Road Type	Total Road Length (miles)	1% Annual Chance Flood Hazard (all A and V zones) (miles)	0.2% Annual Chance Flood Hazard (miles)	Area of Minimal Flood Hazard (miles)	
<b>Alexandria City</b>	Alleys	2	<1	<1	2	
	HOV Lanes	4	<1	<1	4	
	Limited Access Highway	14	3	1	9	
	Local Main Arteries	53	4	3	47	
	Local Secondaries	382	13	18	352	
	Other	<1	<1	<1	<1	
	Parking Lot Roads	29	1	1	26	
	Ramp	19	4	3	12	
	US and VA Primary Highways	44	2	1	41	
		<b>547</b>	<b>27</b>	<b>27</b>	<b>493</b>	

DRAFT

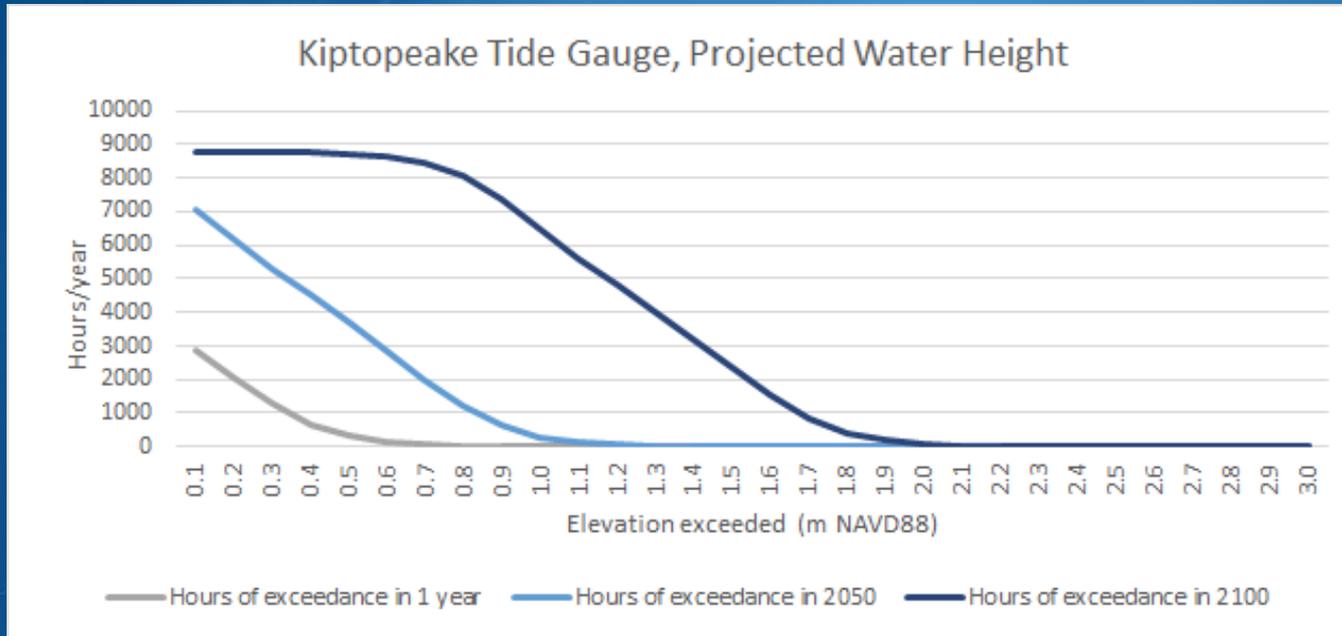
# Recurrent Road Flooding 2008-2019



## DATA SOURCES:

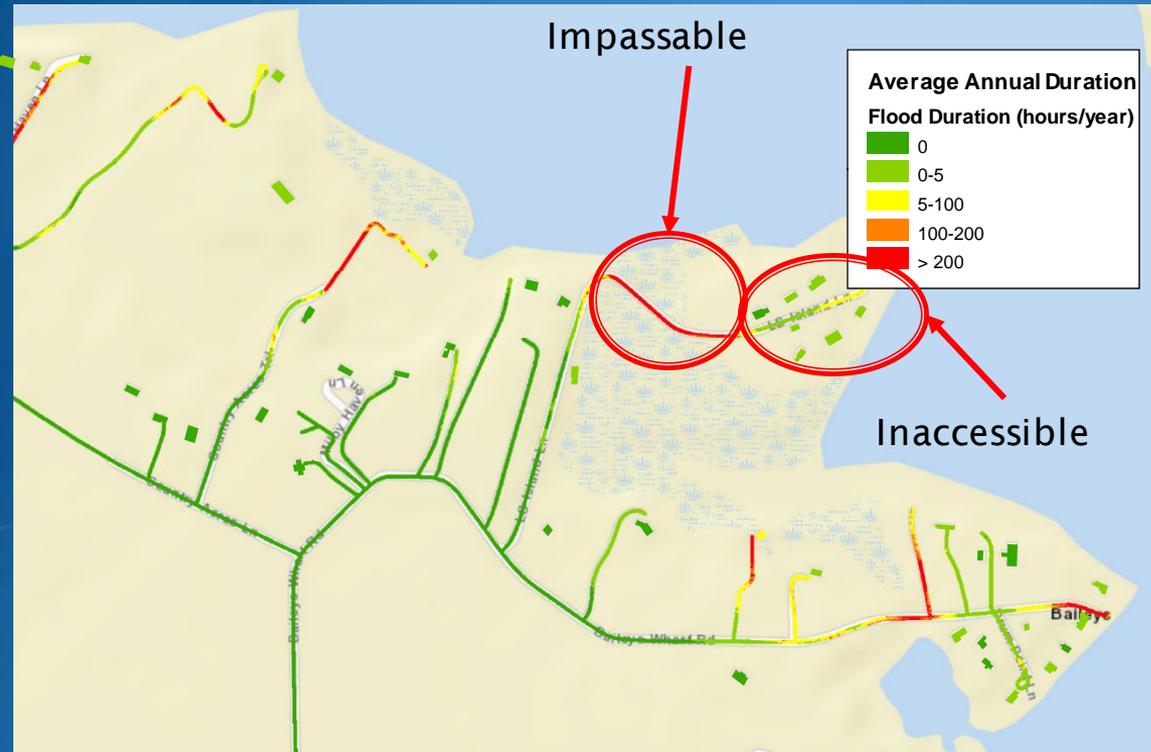
- VDOT 511
  - Available for the entire state
  - But does not include city-owned roads
- WAZE
  - Available for select areas and years

# Tide gauge water level analysis



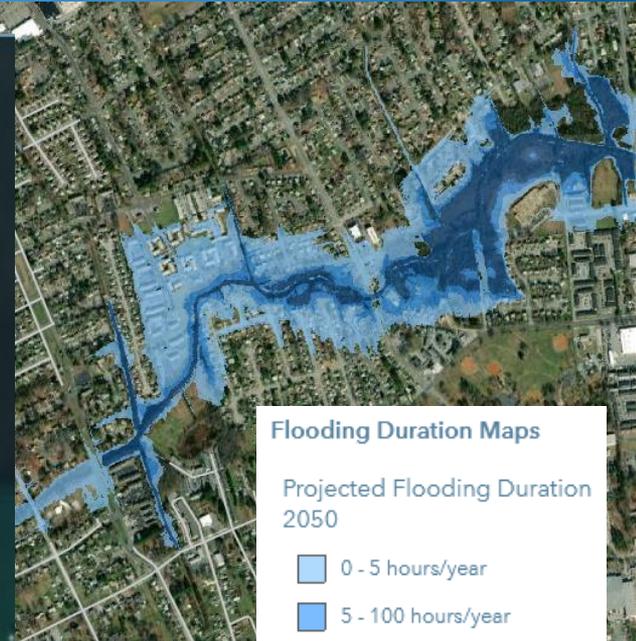
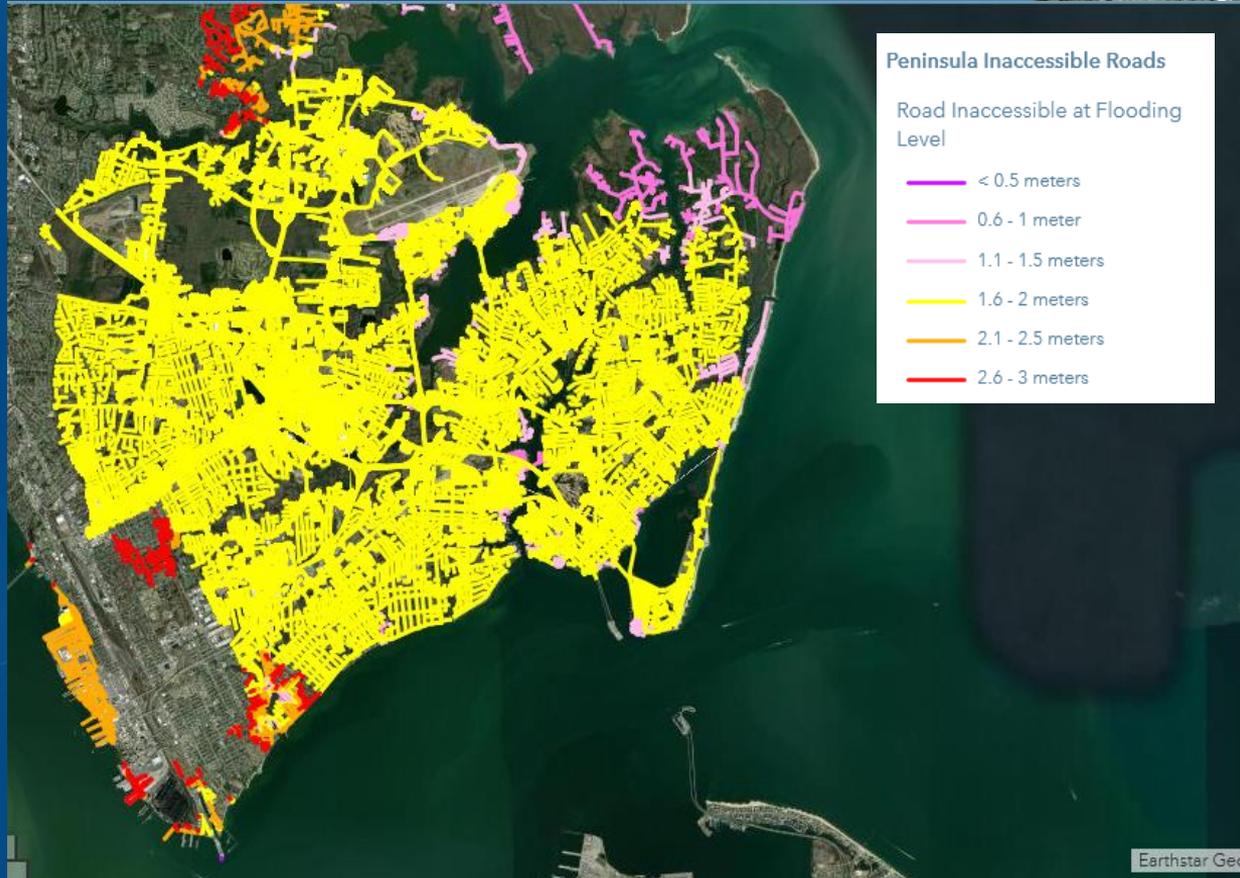
Example of water exceedances for different flood levels for flood frequency analysis

# A Road Network Analysis



**Average Annual Flooding: 2050**

# Inaccessible roads



# Task 2. Study ecosystem impacts of Transportation Infrastructure

- Model current habitat distribution for rare, threatened or endangered (RTE) and migratory bird species
- Forecast habitat distribution shifts for target species
- Assess the potential for existing and planned local land use changes and transportation infrastructure to become a detrimental impact on future RTE species habitats by virtue of changing proximities between 2020 and 2080
- Provide outcomes in *Interactive planning portal for VDOT*

# SLR Scenarios

## NOAA Intermediate-High Curve

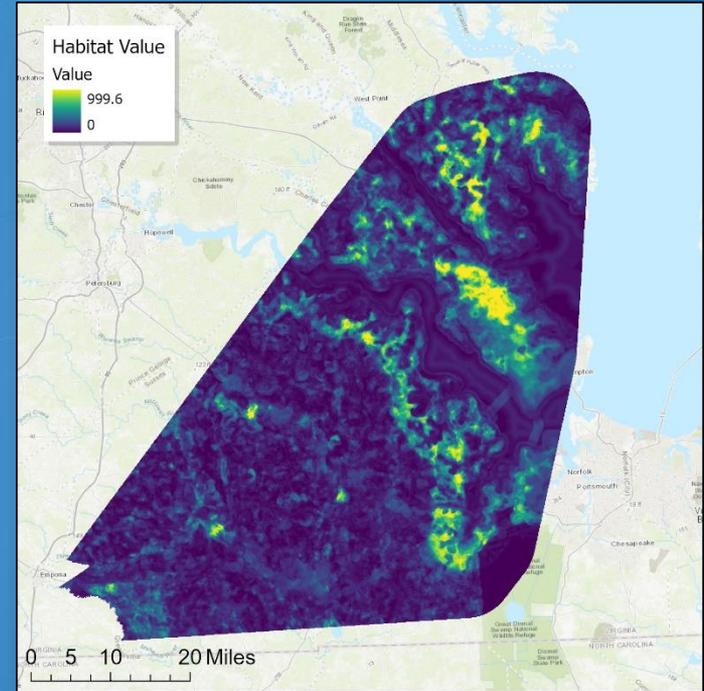
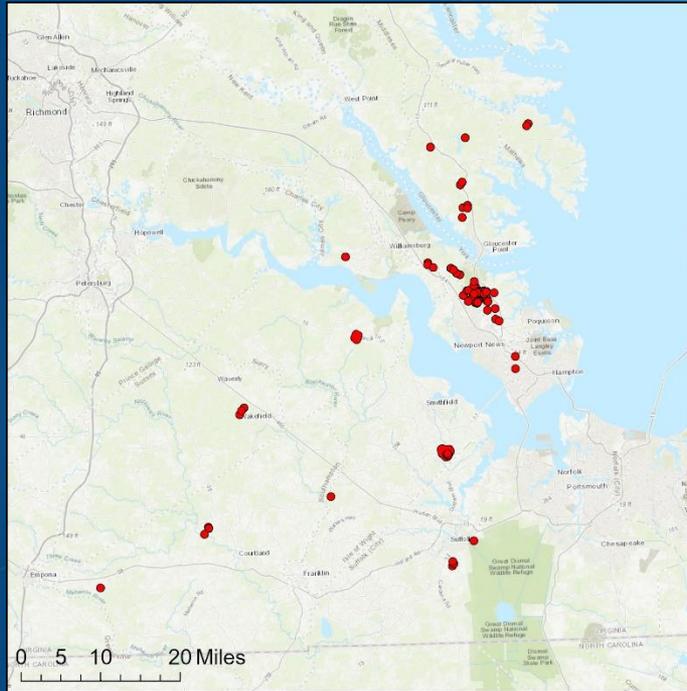
- 2040 – 1.68 ft NAVD88
- 2080 – 4.66 ft NAVD88

Shifts in species habitats from SLR will be modeled to identify potential use conflicts between species and VDOT infrastructure.

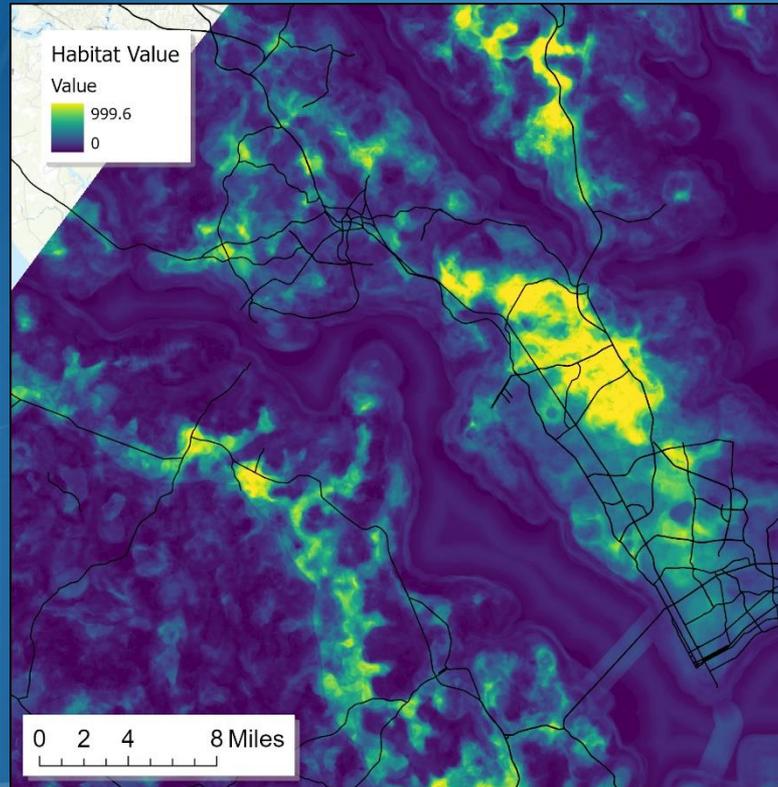
# Species Summary

Taxa	Count (Priority)
Insects	1 (0)
Fish	5 (4)
Amphibians	2 (1)
Reptiles	3 (1)
Birds	19 (10)
Mammals	2 (1)
Plants	11 (4)
<b>Total</b>	<b>43 (21)</b>

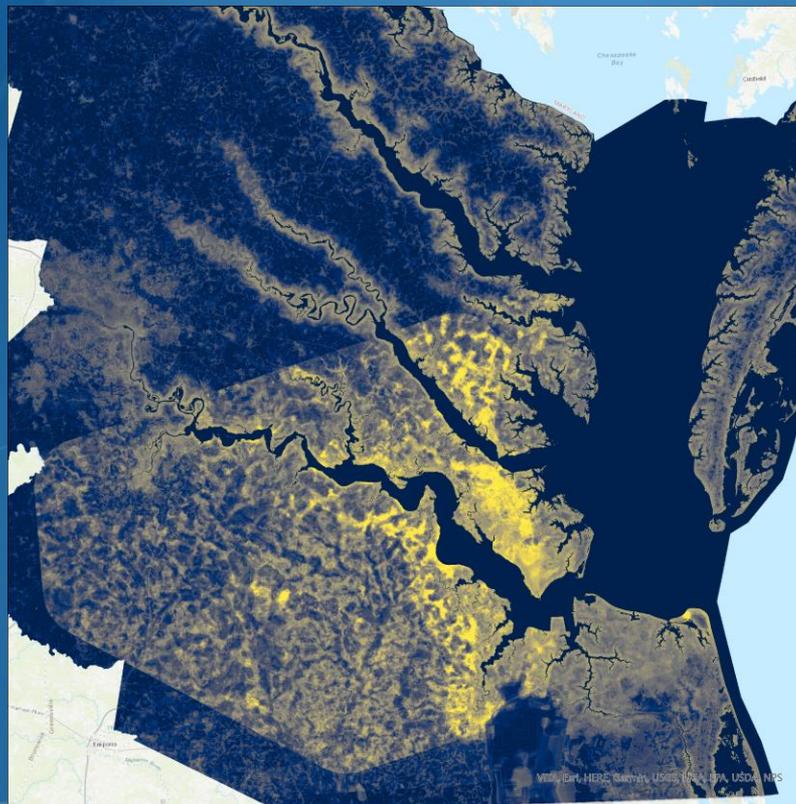
# Species Distribution Models



# Potential Use Conflicts



# High-value Habitats



# Legal/ Policy Review - Key points:

- Determining which entity has responsibility for a given road is necessary because it has the duty to maintain or abandon the road, and to start the abandonment process.
- The entity with authority over a road has a legal duty to keep and maintain the roads in safe condition.
- While sovereign immunity may protect the Commonwealth and counties from most tort claims, it does not protect them when they are grossly negligent or when they act beyond their legitimate power.
- Sovereign immunity does not protect governmental actors from legal claims of inverse Condemnation. Losing access, which Virginia statute defines as a material impairment of direct access to property, because of a flooded road or a property damaged by a flooded road, could lead to a lawsuit.
- Localities may find that lawfully abandoning roads is a safer or more economic option than continuing to maintain them.
- VDOT has the ability to discontinue a road or stretch of highway, shifting authority over the road back to the county, city, or town that the road lies in.
- Road abandonment entails its own legal risks, particularly inverse condemnation claims from property owners who relied on the road in question to access their properties.
- Virginia's Constitution explicitly requires the government to provide compensation for "lost access" to property.



## Tools

Evidence-based planning for changing climate



**TOOLS** are available to help assess risk and vulnerability to climate impacts, build community resiliency against extreme events, and provide guidance to prepare and respond to a changing environment.



### FLOOD RISK

**Floods** are among the most frequent and costly natural disasters in terms of human hardship and economic loss. Learn more about flooding and floodplains in maps, models, documents and websites.

[Virginia's Flood Risk Information System](#)



### SHORELINE MANAGEMENT

**What is the best management strategy for your shoreline?**

[Learn more](#)



### ADAPTVA INTERACTIVE MAP

**View water levels, social vulnerability, infrastructure and natural capital in one viewer.**

[Launch Viewer](#)