CHAPTER 6: SHORELINE EROSION & SEA LEVEL RISE

2022 PLAN UPDATE

Chapter 6: visual and thematic updates were included throughout the chapter, including updates to fonts, colors, and the addition of a cover page.
Page 6-1: Section 6.1 Included sea level rise estimates for 2000 to 2050 from the *Sea-Level Rise Projections for Maryland 2018* report.
Page 6-3: Table 6-2 has been updated to reflect the latest USDA soil survey data.
Page 6-4: Added a description of the Maryland Coastal Resilience Assessment, including which variables comprise the index and how each variable was utilized for Maps 6-2 through 6-5.
Page 6-5: Map 6-1: Expansive Soils in Somerset County has been updated based on the new soil data in Table 6-2.
Page 6-6: Map 6-2: Shoreline Hazard Index – Without Habitats has been added.
Page 6-7: Map 6-3: Shoreline Hazard Index – With Habitats has been added.
Page 6-8: Map 6-4: Shoreline Hazard Index – Erosion Rate has been added.
Page 6-9: Map 6-5: Shoreline Hazard Index: Sea Level Rise Hazard has been added.
Page 6-10: Section 6.2 County Perspective has been updated with rankings from the 2021 State Hazard Mitigation Plan and the Somerset County HMPC. The HMPC ranks shoreline erosion and sea level rise as “high” risk.
Page 6-11: Section 6.5 Essential Facilities has been updated to reflect changes to the County’s essential facilities. Tables 6-3 and 6-4 have been updated to reflect essential facilities at-risk to 2050 sea level rise projections and 2100 sea level rise projects, respectively. The sea level rise projections for 2050 and 2100 are from the MDOT SHA. Improvement values for these facilities have been modified based on the latest MdPropertyView data.
Page 6-13: Map 6-6 2050 Mean Sea Level Rise Projection and Communities has been updated.
Page 6-14: Map 6-7 2050 Mean Sea Level Rise Projection and Essential Facilities has been updated.
Page 6-15: Map 6-8 2100 Mean Sea Level Rise Projection and Communities has been added.
Page 6-16: Map 6-9 2100 Mean Sea Level Rise Projection and Essential Facilities has been added.
Page 6-17: Table 6-5 has been updated based on the 2050 projections depicted in Map 6-6 and updates made to the critical and public facility database.
Page 6-18: Section 6.8 Future Conditions has been added for this plan update.

Chapter 6: Shoreline Erosion & Sea Level Rise

6.1 Hazard Profile

On Maryland's Eastern Shore, particularly on the Chesapeake Bay side, storm surge is exacerbated by a combination of rising sea level and shoreline subsidence. Counties fronting on the east side of the Bay are facing shoreline submergence that has been ongoing since the last glacial period when sea level was approximately 400 feet lower than today. While the process has been continuing for approximately 10,000 years, sea level is still rising at a rate of one foot or so every century. As such, this rise in sea level will certainly affect the relative height of future storm surge events.

The report entitled *Sea-Level Rise Projections for Maryland 2018* states that the likely range (67% probability) of relative sea level rise expected for Maryland between 2000 and 2050 is 0.8 to 1.6 feet. Scientists predict that with climate change, sea levels may rise as much as 2-3 feet in the Chesapeake Bay by 2100. Ongoing research suggests that land subsidence, which occurs from large amounts of groundwater being excessively withdrawn from aquifers in the region, and post-glacial crust movement are contributing factors to the increased rate of sea level rise in Maryland.

"Living shorelines are the result of applying erosion control measures that include a suite of techniques which can be used to minimize coastal erosion and maintain coastal process. Techniques may include the use of fiber coir logs, sills, groins, breakwaters or other natural components used in combination with sand, other natural materials and/or marsh plantings. These techniques are used to protect, restore, enhance or create natural shoreline habitat."

Source: Maryland Department of Natural Resources

Characteristics of shoreline erosion in Maryland reflect a unique combination of natural and man-made conditions affecting the State's shorelines. The natural factors influencing erosion rates include: soil composition, weather, topography, water depth, fetch and surface and groundwater conditions. Regarding man-made structures, over 1,000 miles of man-made structures have been incorporated into Maryland's shorelines. Currently, the preferred method for erosion control is Living Shorelines; this is a method that provides habitat while offering shoreline protection. However, when necessary other man-made methods are utilized, such as: wooden or concrete bulkheads, stone revetment, beach replenishment and segmented breakwaters.

Approximately 260 acres of tidal shoreline are lost each year to shoreline erosion. This degrades water quality in the Bay by adding approximately 5.7 million pounds of nitrogen and 4.2 million pounds of phosphorus, as well as sediment, into Bay waters. Shoreline erosion rate information was requested from the U.S. Army Corps of Engineers (USACE), Baltimore District; shoreline erosion rates for Somerset County are presented in Table 6-1, following.

Table 6-1: Rate of Shoreline Erosion					
Somerset County			Maryland (16 coastal counties and Baltimore City, excluding Smith Island, South Marsh Island, Poplar Island, Bloodsworth Island, and several other large Bay Islands)		
Erosion Category	**Average Erosion Rate (ft/yr)**	**Shoreline Length (Miles)**	**Erosion Category**	**Average Erosion Rate (ft/yr)**	**Shoreline Length (Miles)**
Accretion	+0.5	18.33798	Accretion	+0.5	294
Protected	0	21.4271	Protected	0	978
No Change	0	646.4702	No Change	0	3,851
Slight	-1	93.14462	Slight	-1	1,157
Low	-3	26.24806	Low	-3	182
Moderate	-6	7.275717	Moderate	-6	59
High	-11	0.356062	High	-11	11
Unknown	0 or -1	0	Unknown	0 or -1	65
Total		**813.2595**	**Total**		**6,597**
Source: U.S. Army Corps of Engineers, 2016.					

According to the U.S. Army Corp of Engineers Planning Division, the erosion categories have been changed, and due to different mapping techniques, the measured shoreline has changed. The Virginia Institute of Marine Science (VIMS) produced the updated shoreline and erosion rates based on Maryland Geological Survey (MGS) data.

U.S. Fish & Wildlife Service Project: Fog Point Living Shoreline Stabilization

An example of shoreline erosion and mitigation efforts is a U.S, Fish and Wildlife Service project. In keeping with its mission to manage and protect sensitive habitats across the nation, the U.S. Fish and Wildlife Service initiated efforts to stabilize approximately 21,000 linear feet of shoreline, extending from Swan Island northward to Fog Point, then eastward to Fishing Point. The entire project area, except for two small areas in Fog Bay, has lost a large amount of shoreline. The total area lost is about 238 acres. The 1942 shoreline shows extensive sand spits and bars across Channel Gut with two small tidal channels present. Extensive spits occur off Fog Point and Fishing Point whose eastward morphology indicate net littoral sediment movement in that direction. From Fog Point to Swan Island sediment transport southward. By 1988 Channel Gut was very open to tidal flow while the spit off Fog Point was much reduced. Fishing Point spit was reduced and fragmented.

Shorelines consisting of very fine or unconsolidated silts and clays, or lighter organic materials, are particularly at risk. The risk is increased when conditions are exacerbated by severe weather, wave energy and soil drainage conditions.

Soil types have an important role in determining how flooding will affect the landscape, and whether erosion will be a significant risk. Soils that possess a K factor, the soil-erodibility factor, greater than 0.35 in the upper two feet of their profiles have an increased potential for erosion. Additionally, the soil types listed in Table 6-2 belong to Group D soils, which have a very slow infiltration rate (high runoff potential) when wet. These consist chiefly of clays that have a high shrink-swell potential (expansive soils), soils that have a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission. The soils highlighted in blue in Table 6-2 are soils that experience frequent flooding and are susceptible to the effects of sea level rise. The locations of these "expansive soils" are depicted on Map 6-1.

Table 6-2: Expansive Soils

Map Unit Symbol	Map Unit Name	Rating	Acres in County	Percent of County
Be	Beaches	D	687.0	0.2%
BX	Boxiron and Broadkill soils, very frequently flooded, tidal	D	112.2	0.0%
CRA	Corsica and Fallsington soils, 0 to 2 percent slopes	D	1,682.8	0.5%
EmA	Elkton silt loam, 0 to 2 percent slopes	D	818.4	0.2%
Ho	Honga peat, very frequently flooded, tidal	D	3,275.9	1.0%
LO	Longmarsh and Indiantown soils, frequently flooded	D	2,262.3	0.7%
Ma	Manahawkin muck, frequently flooded	D	58.6	0.0%
NM	Nanticoke and Mannington soils, very frequently flooded, tidal	D	175.5	0.1%
OKA	Othello and Kentuck soils, 0 to 2 percent slopes	D	13,546.4	4.0%
OoA	Othello silt loam, loamy substratum, 0 to 2 percent slopes	D	2,868.4	0.9%
OtA	Othello silt loam, 0 to 2 percent slopes	D	14,143.5	4.2%
Pk	Puckum muck, frequently flooded	D	2,241.8	0.7%
SuA	Sunken mucky silt loam, 0 to 2 percent slopes, occasionally flooded, tidal	D	3,327.8	1.0%
Ta	Tangier mucky peat, very frequently flooded, tidal	D	5,391.9	1.6%
TP	Transquaking and Mispillion soils, very frequently flooded, tidal	D	40,412.8	12.0%

Table 6-2: Expansive Soils				
Map Unit Symbol	Map Unit Name	Rating	Acres in County	Percent of County
UwB	Urban land-Udorthents complex, 0 to 5 percent slopes	D	1,273.0	0.4%
		Total:	92,278.3	27.5%
Source: USDA, Natural Resources Conservation Service, Web Soil Survey, 2021.				

The total amount of expansive soils in Somerset County as reported by the USDA, Natural Resources Conservation Service is 92,278.3 acres or 27.5% of the County.

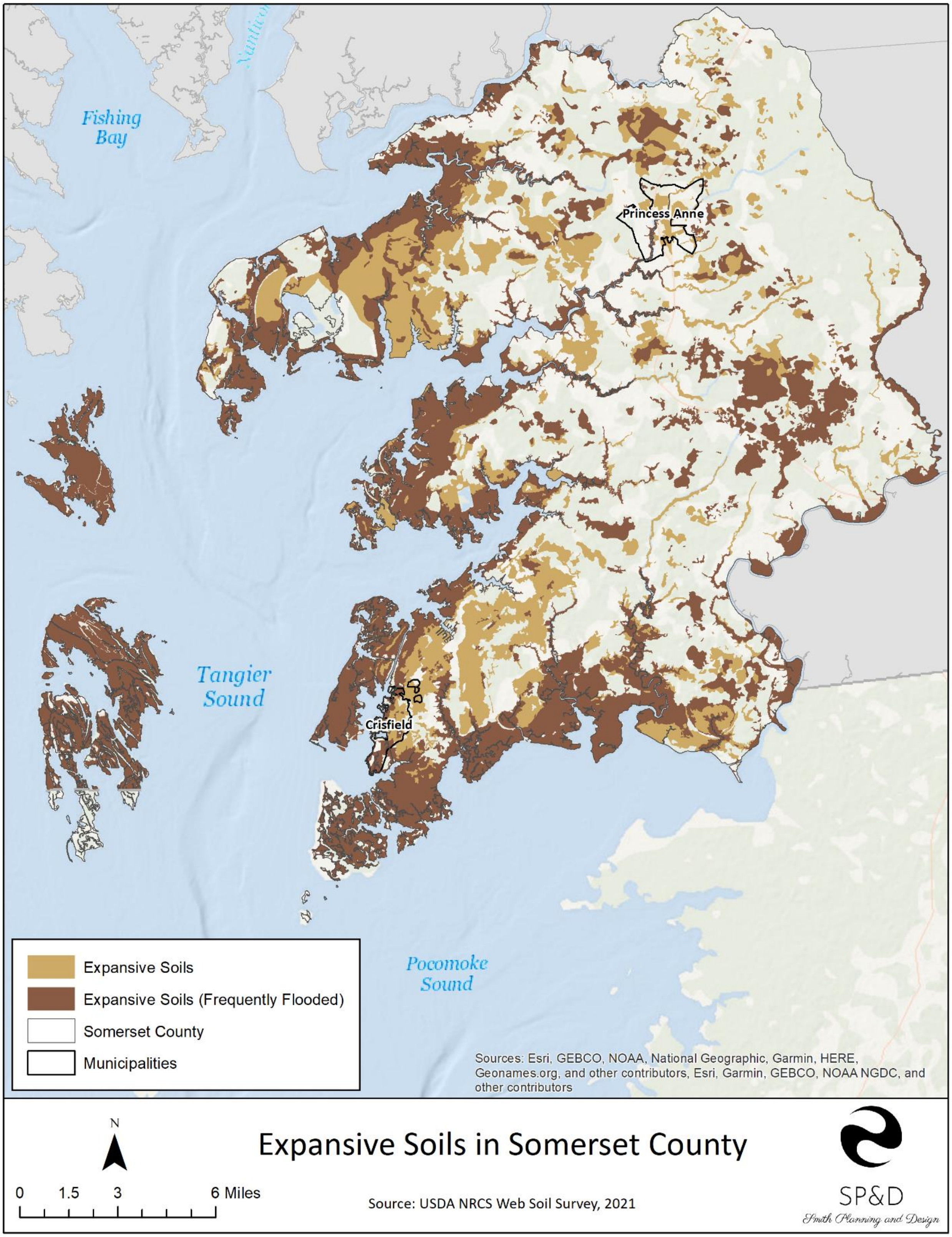
The Maryland Coastal Resiliency Assessment, produced by the Maryland DNR, is a landscape-level spatial analysis and modeling effort that identifies where natural habitats provide the greatest potential risk reduction for coastal communities. In part, this assessment includes a Shoreline Hazard Index, which identifies high, moderate, and low hazard shorelines based on six (6) variables: sediment type, historic erosion rates, elevation, localized sea level rise risk, wave power, and storm surge height. Shoreline segments are represented by points every 250 meters along the shoreline. The shoreline hazard index also takes into consideration how protection due to natural habitats may change the ranking of a section of shoreline. Map 6-2 shows the rankings without the presence of habitat and Map 6-3 depicts how these rankings change with natural habitat. Habitats include tidal wetlands, marshes, vegetated buffers, oyster reeds, submerged aquatic vegetation, bay island, beaches, and dunes.

This dataset is useful for a high-level examination of the overall health of Somerset County's shorelines. Most of Somerset County's shoreline, as depicted in Maps 6-2 and 6-3, is ranked as "high" hazard. It is important to note that all hazard rankings as part of the coastal resiliency assessment are in comparison to the entire State, meaning when considering the aforementioned six variables all at once, the County's shorelines, along with Dorchester County, are ranked as some of the highest hazards statewide.

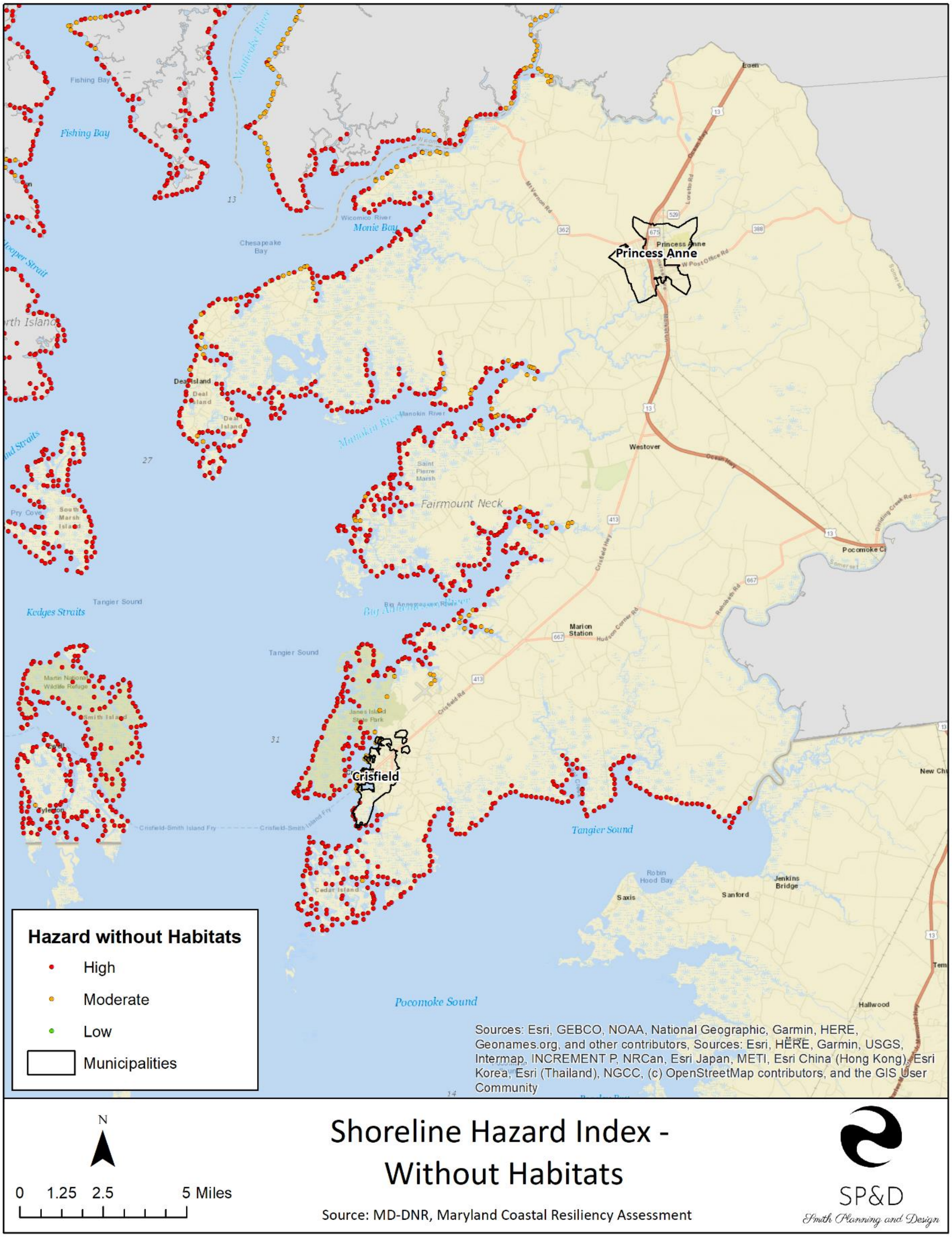
Map 6-4 depicts "erosion rates" for locations along Somerset County's coast, which is derived from the aforementioned historic erosion rates for Maryland and makes up one factor of the overall shoreline hazard index. Generally, most of the coastline in the County is ranked "low" for erosion rate. Some areas are ranked as moderate and high, including Janes Island State Park, just West of Crisfield, and coastlines in the southernmost areas of the County. Areas with very high erosion rates include Smith Island, Martin National Wildlife Refuge, and South Marsh Island.

Finally, Map 6-5 depicts the "localized sea level rise risk" component of the shoreline hazard index. This factor indicates that nearly the entirety of shoreline in Somerset County is highly at-risk to sea level rise in comparison to the rest of the State.

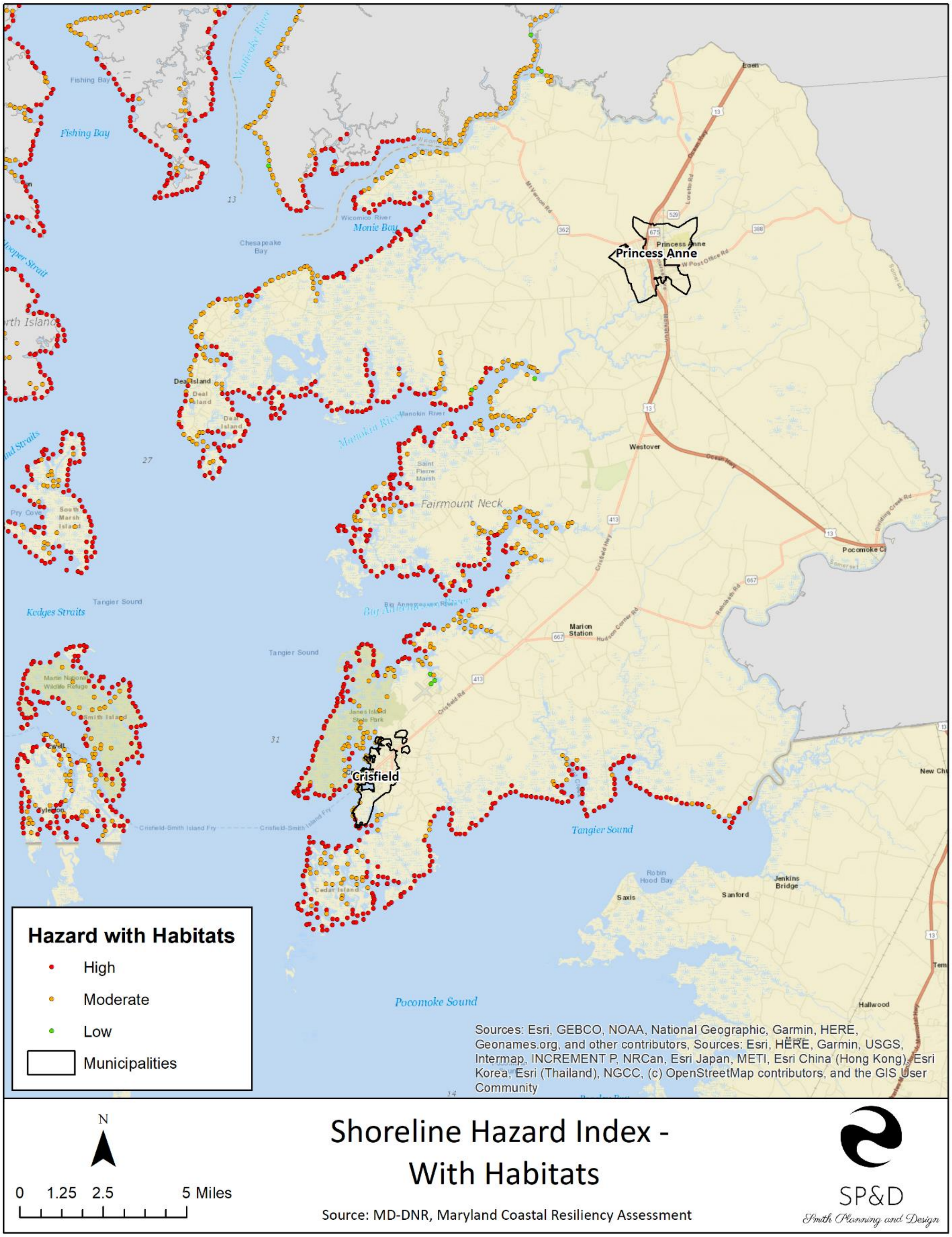
Map 6-1: Expansive Soils in Somerset County



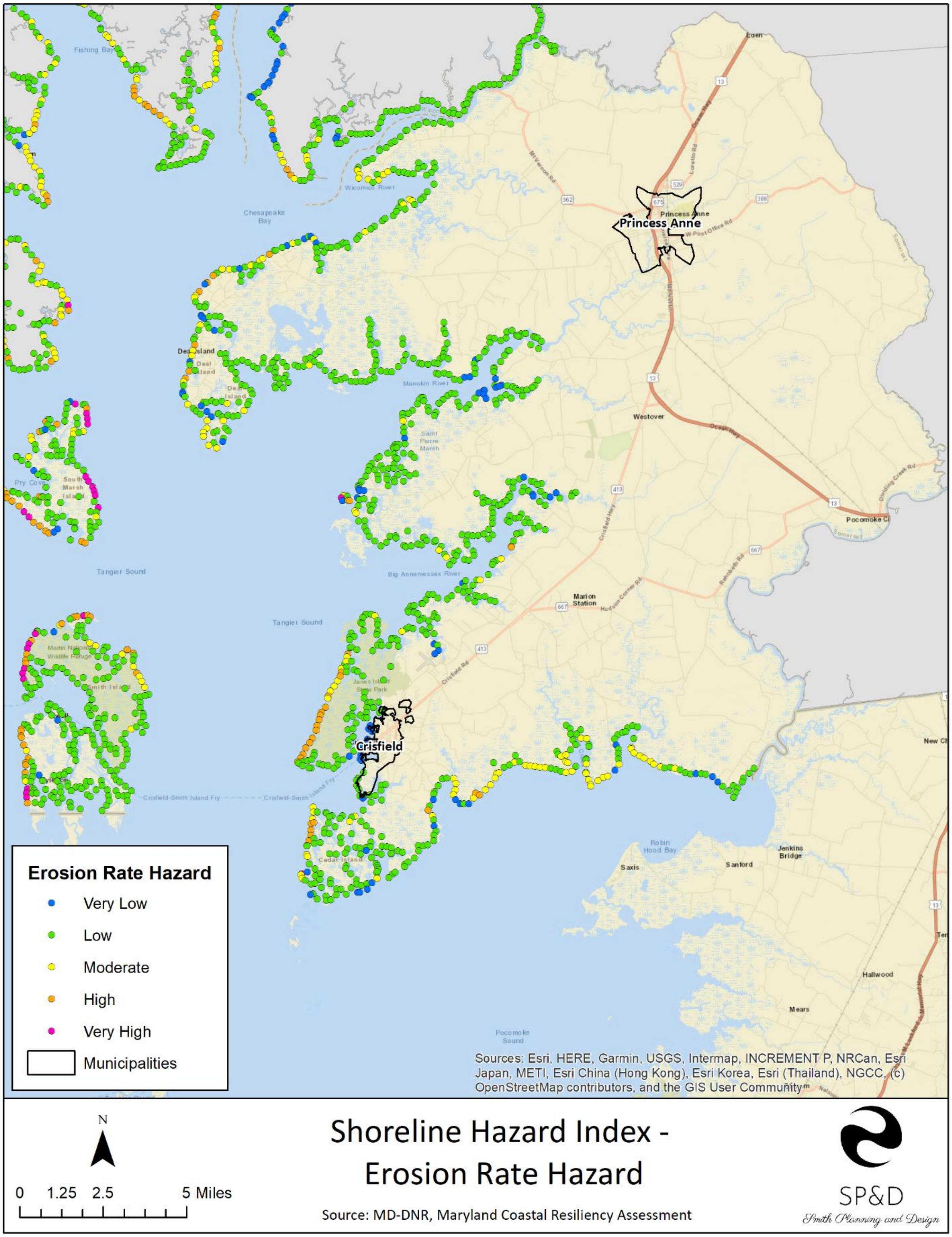
Map 6-2: Shoreline Hazard Index – Without Habitats



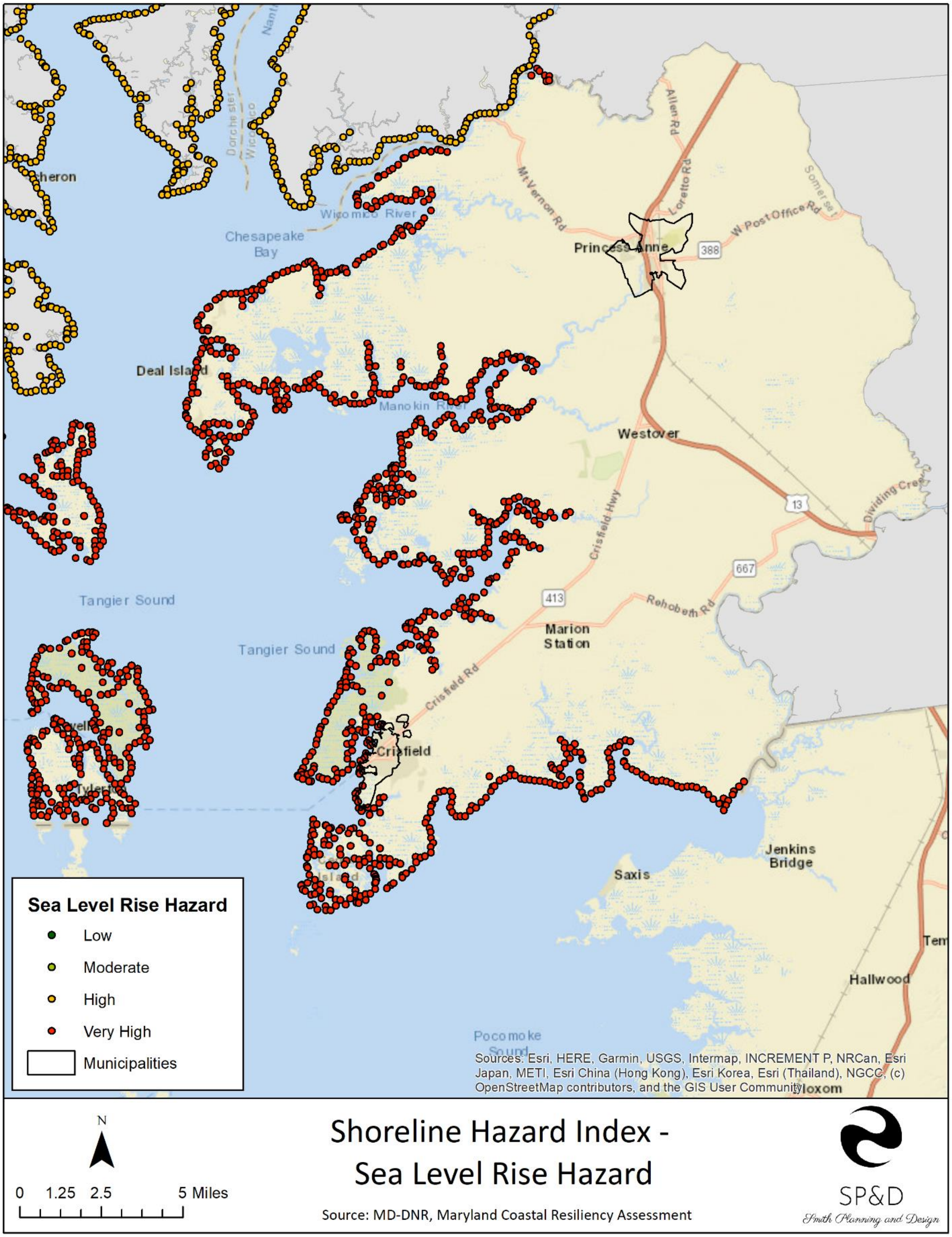
Map 6-3: Shoreline Hazard Index – With Habitats



Map 6-4: Shoreline Hazard Index – Erosion Rate



Map 6-5: Shoreline Hazard Index – Sea Level Rise Hazard



6.2 History

According to the *2008 Somerset County, Maryland Rising Sea Level Guidance*, over the last 50 years, the County has experienced conditions that are now associated with the dynamic nature of coastal regions. Low-lying areas can change in response to the potentially dramatic influence of storms. These changes may be subtle in the short-term, but more obvious when a long-term view is taken. These changes may be caused by erosion and, increasingly, small, but significant, increases in the water level in the Chesapeake Bay. Historical maps of Somerset County reveal these trends. Several Bay-front communities once thriving in the early 1900's were abandoned and several of those areas are now under water.

Aerial photographs indicate loss of marsh lands and visual observations from the ground suggest that woodland areas are showing the signs of stress from rising water levels, more frequent storm events, and intolerance to saline conditions. County farmers, with land near shorelines, report loss of farmland from erosion and loss of productivity as salinity increases due to higher water tables and more frequent coastal flood events. The County's Roads Department reports that more frequent road flooding is experienced not only during coastal storms, but during above average high tides. These local observations contribute to the growing body of evidence that supports the trend of rising sea levels. This trend is expected to continue.

6.3 County Perspective

The *2021 State Hazard Mitigation Plan* includes "coastal erosion" as part of its "soil movement" hazard. This hazard also includes landslide and sinkhole. The State plan ranks soil movement as "Medium-Low" risk for Somerset County; the State plan does not include a hazard ranking for sea level rise.

Somerset County's 2022 HMPC ranked Shoreline Erosion & Sea Level Rise as "High" risk. To date, no structures have been affected by shoreline erosion; however, the Maryland Department of Natural Resources conducted a study on how sea level rise might affect the County.

According to the *2008 Rising Sea Level Guidance* for Somerset County – the most recent County-level report of its kind – Dames Quarters, Janes Island State Park and Smith Island are predicted to be almost completely under water by 2100 as the Bay's average surface elevation increases nearly one-foot. In addition, the Health Department estimates that over 5,072 homes utilize septic tanks, with 1.5% of these residents requesting replacement systems annually. As shoreline erosion increases causing above average high tides, the number of septic tanks failing will increase. Furthermore, groundwater is Somerset County's sole source for drinking water. Two primary aquifers are utilized for public water and private wells: Manokin Aquifer and Patapsco Aquifer. Increasing sea level rise and shoreline erosion could affect these aquifers by causing intrusion of salt water, therefore limiting the water that can be utilized.

Finally, approximately 67% of the houses in Somerset County were constructed prior to 1981 which is the date when the County adopted floodplain maps and began administering the floodplain ordinance. A high percentage of those homes were constructed near the water. Therefore, those structures could be more susceptible to the effects of shoreline erosion. Moreover, within the low-lying areas closer to the shores, the infrastructure located in these areas could be significantly damaged. With shorelines eroding further inland, flooding could also extend further inland and cause damage to roads, bridges, railroads, septic systems, water distribution systems and electric, cable and telephone distribution systems.

6.4 Municipal Perspective

Shoreline erosion impacts to the City of Crisfield may be increased in the future, particularly as sea level rise worsens and warming temperatures create the conditions necessary for more severe coastal flooding and storms. Several areas throughout the City's shorelines are at higher risk for erosion. In areas where development and critical facilities are located, methods for erosion control should be undertaken.

6.5 Essential Facilities

While no structures have been impacted to date by shoreline erosion, essential facilities are at-risk to sea level rise. Essential facilities are those facilities that must continue to operate for a community to effectively respond to, and recover from, a hazard incident. Essential facilities include: Emergency Operation Center(s), Fire and Rescue Stations, Police, Schools, and Medical facilities.

Map 6-6 (page 6-13) shows the 2050 Mean Sea Level Rise Projection in relation to Somerset County's communities. The maximum projected inundation amount for the 2050 scenario is 2.21 feet. The medium projected inundation amount for the 2050 scenario is 1.09 feet, which is in line with most 2050 projections. Map 6-7 (page 6-14) depicts the locations of essential facilities relative to the 2050 sea level rise projection. Additionally, the 2100 Mean Sea Level Rise Projection has been mapped in relation to the County's communities on Map 6-8 (page 6-15). Essential facilities have been mapped alongside the 2100 Mean Sea Level Rise Projection and are depicted on Map 6-9 (page 6-16).

As listed in Table 6-3, six (6) essential facilities located within the unincorporated area of the County will be impacted by the 2050 Mean Sea Level Rise Projection. Three (3) essential facilities located in Crisfield are projected to be impacted, as well. Improvement value of all essential facilities that are projected to be impacted by 2050 Mean Sea Level Rise is $20,995,200. It is important to keep in mind, the 2050 Mean Sea Level Rise Projection does not include high tide flood events, coastal storms and/or hurricanes.

Table 6-3: Essential Facilities Within 2050 Mean Sea Level Rise

Location	Facility Type	Facility Name	Improvement Value
County	Fire	Ewell Fire Dept.	$350,600
County	Fire	Tylerton Fire Dept.	$85,000
County	Fire	Deal Island/Chance Fire Dept.*	$149,600
County	School	Ewell E.S.	$220,000
County	School	Deal Island E.S.*	$916,900
Crisfield	School	Woodson E.S.*	$4,240,000

Table 6-3: Essential Facilities Within 2050 Mean Sea Level Rise

Location	Facility Type	Facility Name	Improvement Value
Crisfield	Medical	TidalHealth*	$14,934,200
Crisfield	Medical	Crisfield Pharmacy	$98,900
		Total:	$20,995,200

Source: 2022 Somerset County Critical and Public Database and Improvement Values from 2017 Maryland Property View (last updated July 2020). Note: Essential Facilities with an asterisk (*) are not directly impacted by the projected 2050 Mean Sea Level Rise, however, these facilities would be isolated due to surrounding roads being impacted.

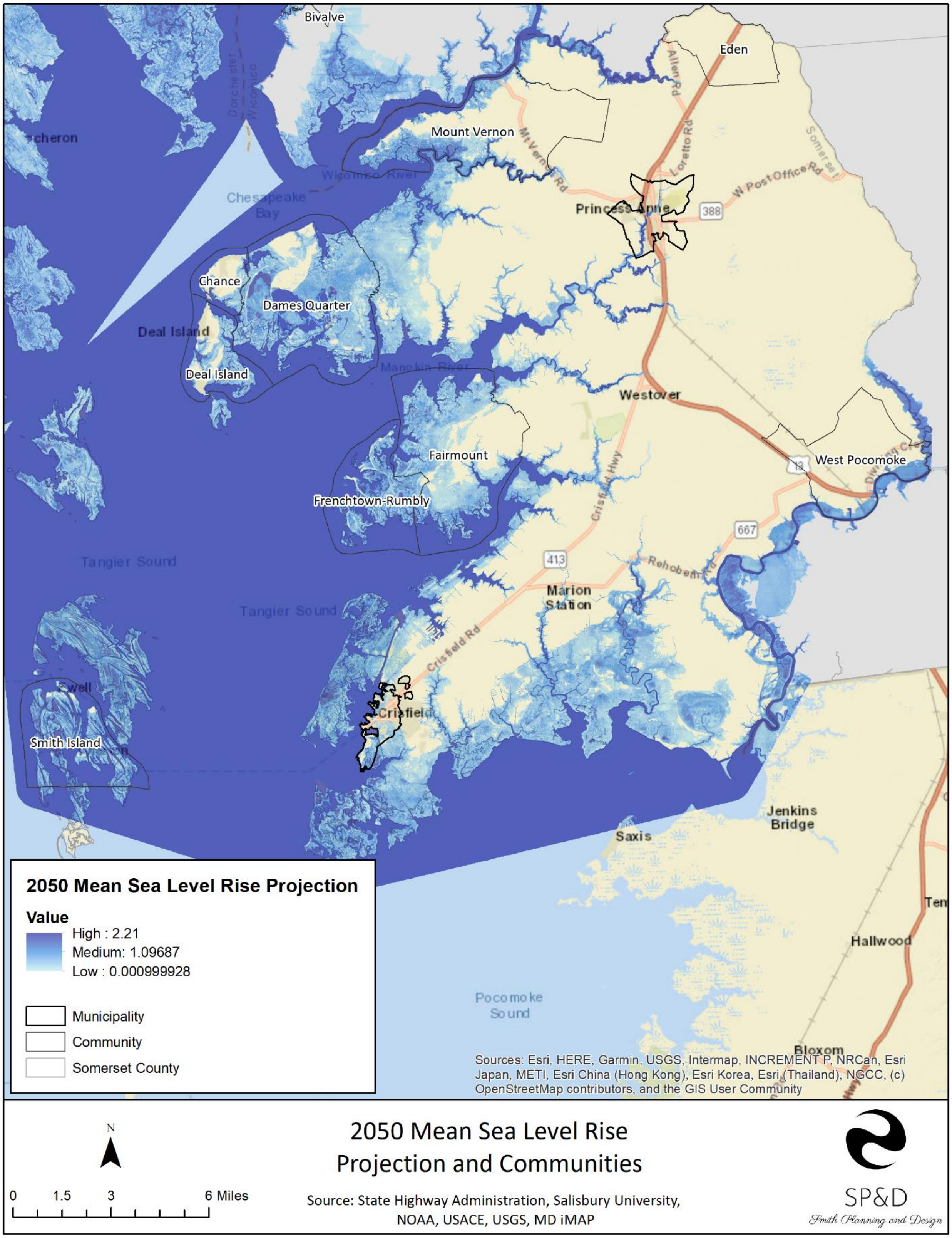
As listed in Table 6-4, six (6) essential facilities located within the City of Crisfield will be impacted by 2100 Sea Level Rise. Total improvement value for these facilities is $4,669,900. It is important to keep in mind that the 2100 Mean Sea Level Rise Projection does not include high tide flood events, coastal storms and/or hurricanes. Another important note is that all essential facilities impacted by 2050 Mean Sea Level Rise Projections would also be impacted by the 2100 Projections.

Table 6-4: Essential Facilities Within 2100 Mean Sea Level Rise

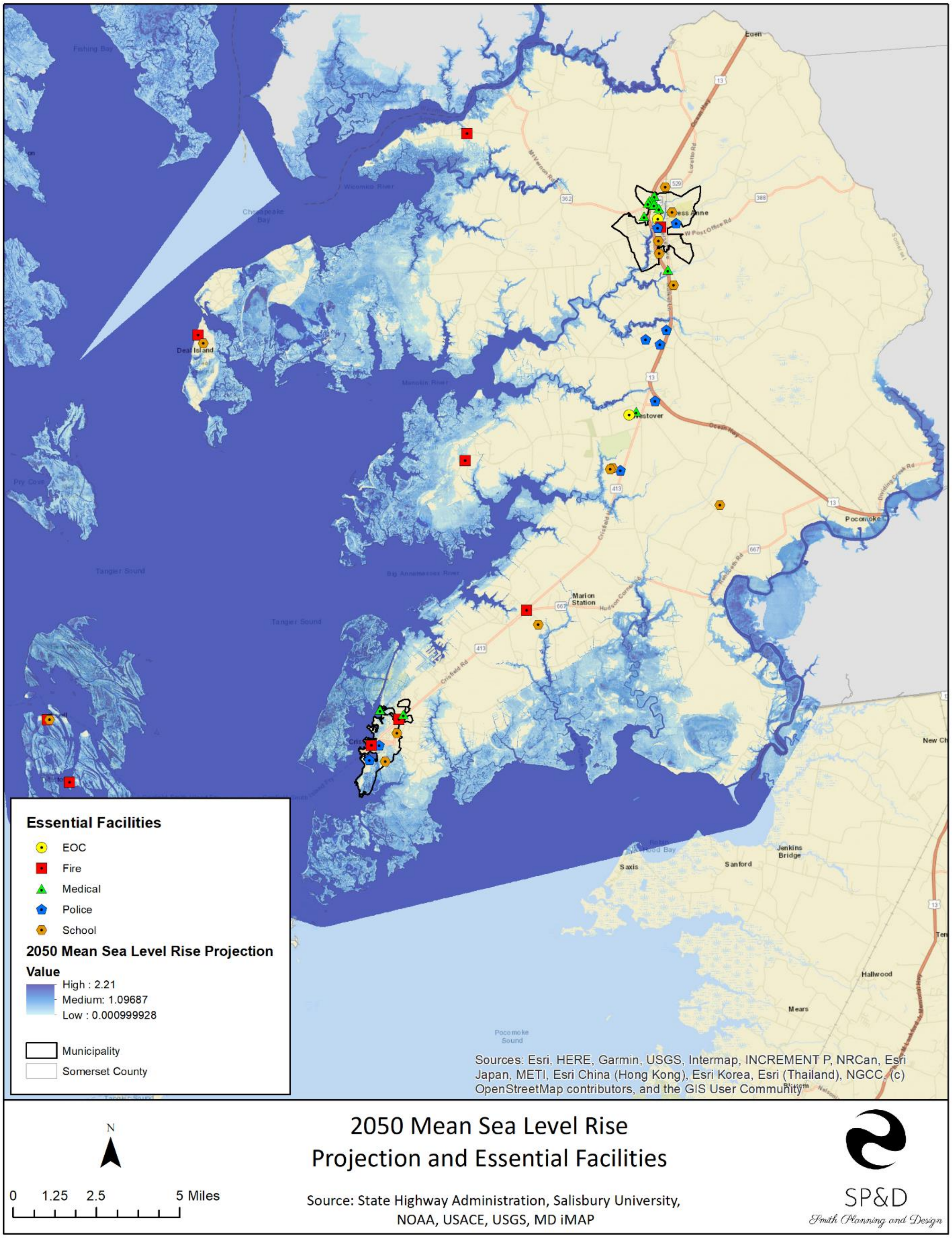
Location	Facility Type	Facility Name	Improvement Value
Crisfield	Fire	Crisfield Fire Dept.	$262,100
Crisfield	Police	Crisfield Police	$151,400
Crisfield	Police	DNR Police	$77,800
Crisfield	Fire	Lower Somerset Ambulance and Rescue Squad	$110,600
Crisfield	Medical	Marion Pharmacy	$153,300
Crisfield	School	Crisfield H.S.	$3,992,500
		Total:	$4,747,700

Source: 2022 Somerset County Critical and Public Database and Improvement Values from 2017 Maryland Property View (last updated July 2020). *Indicates potential inundation depths higher SLR scenarios.

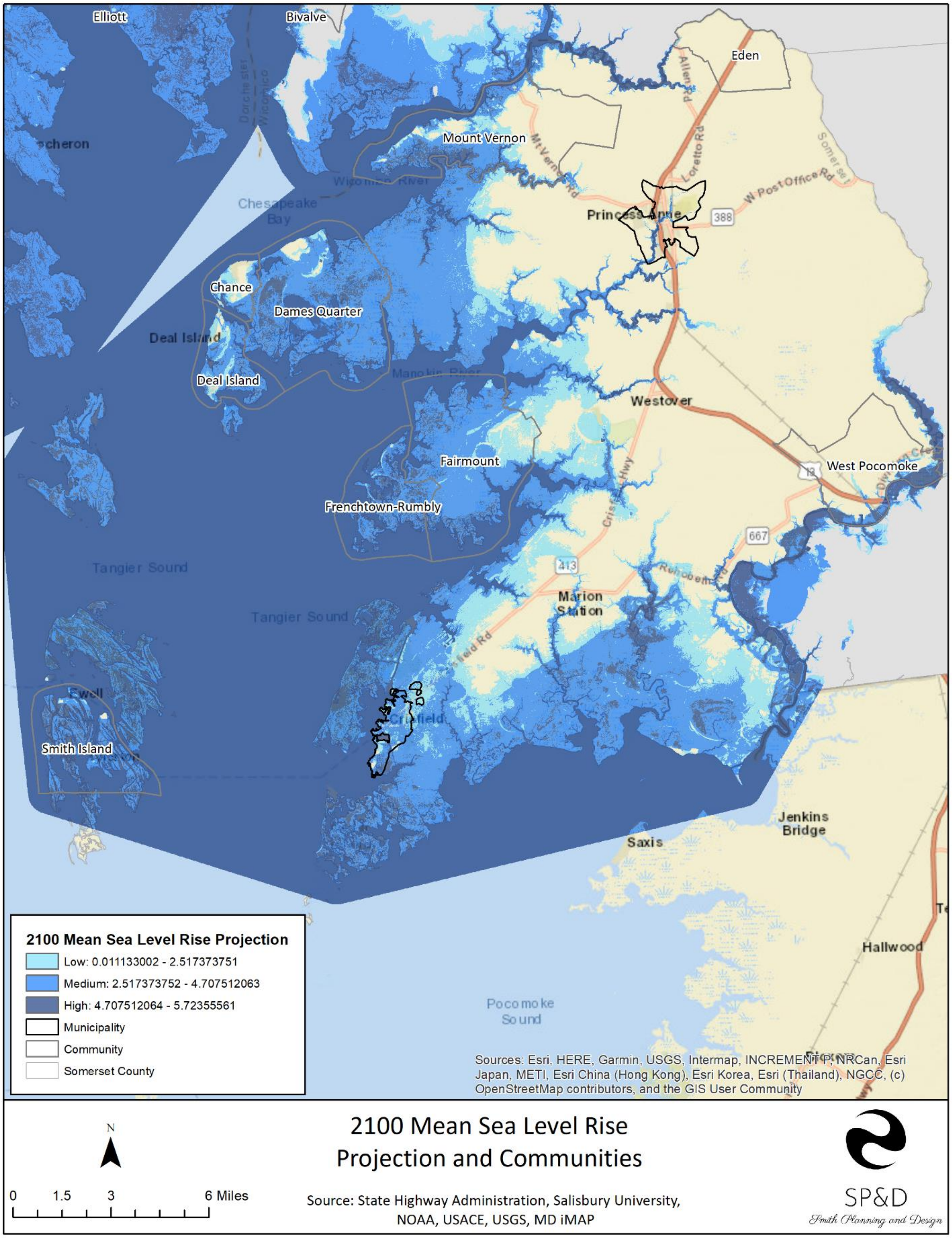
Map 6-6: 2050 Mean Sea Level Rise Projection and Communities



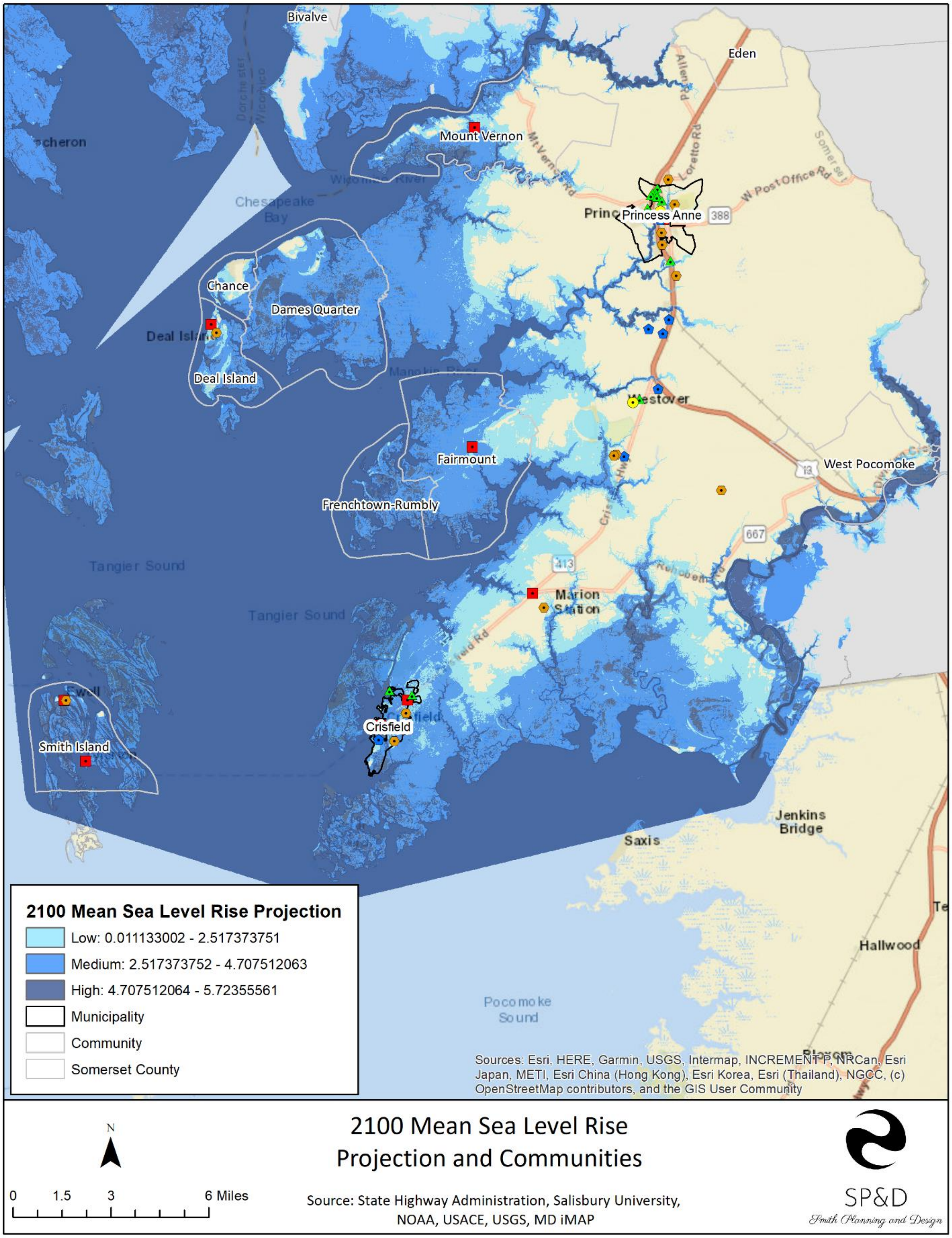
Map 6-7: 2050 Mean Sea Level Rise Projection and Essential Facilities



Map 6-8: 2100 Mean Sea Level Rise Projection and Communities



Map 6-9: 2100 Mean Sea Level Rise Projection and Essential Facilities



6.6 Critical and Public Facilities

Critical and public facilities are potentially at-risk to sea level rise. These facilities are important to keep operational during a hazard event because they sometimes provide vital needs to the community. Critical and public facilities include: transportation (e.g., bridges, roads, and heliports), government buildings, utilities (e.g., communication towers and electric substations), and miscellaneous facilities (e.g., marinas and public spaces). As included in Table 6-5, thirty-six (36) critical and public facilities located within the unincorporated areas of the County will be impacted by the 2050 Mean Sea Level Rise. One (1) critical and public facility located in Crisfield is projected to be impacted, as well. It is important to keep in mind, 2050 Mean Sea Level Rise does not include high tide flood events, coastal storms and/or hurricanes.

Table 6-5: Critical & Public Facilities within 2050 Mean Sea Level Rise

Location	Facility Type	Facility Name	2050 Mean Sea Level Rise
County	Miscellaneous	Dames Quarter Dock & Ramp	Yes
County	Miscellaneous	Ewell Ramp/Wharf	Yes
County	Miscellaneous	Rhodes Point Dock	Yes
County	Miscellaneous	Rumbly Point Boat Ramp	Yes
County	Miscellaneous	Smith Island Cultural Center	Yes
County	Miscellaneous	Smith Island Library	Yes
County	Miscellaneous	St. Peters Creek Marina	Yes
County	Miscellaneous	Tylerton Marina	Yes
County	Miscellaneous	Tylerton Wharf	Yes
County	Miscellaneous	Webster Cove Marina	Yes
County	Transportation	Bridge @ Bryan Hall Road/Marumsco Creek	Yes
County	Transportation	Bridge @ Calvary Road/Jenkins Creek	Yes
County	Transportation	Bridge @ Cash Corner Rd/Johnson Creek	Yes
County	Transportation	Bridge @ Coventry Parish Road/Rehobeth Branch	Yes
County	Transportation	Bridge @ Deal Island Road/Upper Thorofare	Yes
County	Transportation	Bridge @ Frenchtown Road/Goose Creek	Yes
County	Transportation	Bridge @ Frenchtown Road/Mine Creek	Yes
County	Transportation	Bridge @ Hall Highway/Trib Little Annemessex River	Yes
County	Transportation	Bridge @ Hanes Point Road/Scotts Cove	Yes
County	Transportation	Bridge @ Lq Powell Road/East Creek	Yes
County	Transportation	Bridge @ Marsh Road/Shanks Creek	Yes
County	Transportation	Bridge @ Marumsco Road/Marumsco Creek	Yes
County	Transportation	Bridge @ Millard Long Road/Back Creek	Yes
County	Transportation	Bridge @ Old Princess Anne Rd/Kings Creek	Yes
County	Transportation	Bridge @ River Road/Big Annemessex River	Yes
County	Transportation	Bridge @ Rumbley Road/Teague Creek	Yes
County	Transportation	Bridge @ Sign Post Road/Back Creek	Yes
County	Transportation	Bridge @ Smith Island Road/Ewell	Yes
County	Transportation	Bridge @ Stewart Neck Road/Jones Creek	Yes
County	Transportation	Bridge @ Stewart Neck Road/Kings Creek	Yes
County	Transportation	Bridge @ Whitehaven Ferry Road/Waukaki Creek	Yes
County	Transportation	Smith Island Heliport	Yes
County	Utility	Ewell WWTP	Yes
County	Utility	Pumping Station	Yes

Table 6-5: Critical & Public Facilities within 2050 Mean Sea Level Rise			
Location	Facility Type	Facility Name	2050 Mean Sea Level Rise
County	Utility	Tylerton Transfer Station	Yes
County	Utility	WWTP	Yes
Crisfield	Utility	Telephone	Yes
Source: 2022 Somerset County Critical and Public Database.			

6.7 Mitigation Efforts

Currently, Somerset County utilizes the State Critical Area Law and has adopted a local program, Local Critical Area Program, which requires the first 100-300 feet from tidal wetlands be managed to protect aquatic and shoreline environments from man-made disturbances. The program also states that existing vegetation is to be protected and planting of un-vegetated areas is strongly encouraged.

Additionally, the County's Planning and Zoning Office, the Department of Technical and Community Services provides sources of information as to the Critical Area Law, how it is applicable in Somerset County and how it may affect a given property. The Department has printed brochures and information on the One Hundred Foot Buffer and tree plantings, as well as developing and providing mapping products that depict these areas.

Recently, the Deal Island Shoreline Project was completed. The shoreline adjacent to Crowell Road in the area known as Hunt's Hill has been rapidly eroding since the 1970's with dramatic changes to the shoreline and the dunes that were once there. The Maryland Department of Natural Resources in partnership with Somerset County, the private landowner, and members of the Deal Island Peninsula Partnership utilized the Maryland Coastal Resiliency Grant Program to design and construct a shoreline project that increases resilience of the Deal Island community and habitats to coastal storms, flooding, erosion and sea-level rise. More information about this project can be found here: www.dealislandpeninsulapartners.org/deal-island-shoreline-project.

The Deal Island Thin-Layer Placement Project, which is related to the dredging of the Wicomico River is also underway and near completion, and had two primary goals: (1) provide a site to place dredged sediments from the lower Wicomico River which the USACE dredges on a 2-3 year cycle to maintain the channel for the Port of Salisbury; maintaining this channel is important for sustaining the Eastern Shore's economy, and (2) the project will help elevate sections of declining marshes in the Deal Island Wildlife Management Area that are beginning to fragment and drown from rising waters. More information regarding this project can be found here: https://www.dealislandpeninsulapartners.org/dealislandtlp.

6.8 Future Conditions

The *2021 State Hazard Mitigation Plan* indicates that climate change and sea level rise over the next 25 to 100 years will increase the frequency and severity of coastal hazard events such as hurricanes, tropical storms, storm surge, nuisance flooding, and storm surge. According to the

Fourth National Climate Assessment (NCA4) the strongest hurricanes are expected to "become both more frequent and more intense," and result in more rainfall.

Nuisance flooding is typically unrelated to particular storm events, though it may be exacerbated by long-duration wind events or passing storm systems and the astrological position of the sun and moon. Over time, as a changing climate drives sea levels higher and precipitation events to greater severity, repeated nuisance flooding impacts will become more significant stressors on local infrastructure, emergency services, public health, and the community in general.

According to *Sea-level Rise Projections for Maryland 2018*, in the Northeast region of the United States, including Somerset County, sea level rise is anticipated to exceed global mean sea rise with an increase of 1.2 feet by 2050 (Central Estimate, 50% probability SLR meets or exceeds) or up to 1.6 feet by 2050 (Likely Range, 67% probability SLR is between 0.8 and 1.6 feet). The most extreme sea level rise scenario within the 2018 report estimates 6.9 feet of sea level rise by 2100 under the "growing" emissions pathway. By 2150, under the same pathway, the highest estimate is 12.4 feet of sea level rise.

The NOAA report *Global and Regional Sea Level Rise Scenarios for the United States* (2022) indicates that sea level rise values for the Northeast region under an "intermediate" scenario are 0.43 meters or 1.4 feet by 2050 (relative to a baseline of year 2000). Likewise, under a "high" scenario sea level rise values are projected to be 0.54 meters or 1.77 feet by 2050 (relative to a baseline of 2000).

In the longer term, the NOAA report projects sea level rise values for the Northeast for 2100 and 2150 relative to a baseline of the year 2000. The intermediate projected sea level rise value for the Northeast in 2100 is 1.3 meters or 4.2 feet. The high projected value for this same time period is 2.1 meters or 6.8 feet. By 2150, the report projects an intermediate sea level rise value of 2.3 meters or 7.5 feet. The high projected value for the 2150 time period is 3.7 meters or 12.1 feet. The projections from the 2022 NOAA technical report are very similar to the sea level rise projections within the *Sea-level Rise Projections for Maryland 2018* report.

Over the next century, coastal communities all over the world will need to contend with the challenges brought upon by climate change and sea level rise. This includes the permanent inundation of previously dry land, increased frequency and intensity of coastal storm events, increased rate of shoreline erosion, loss of natural habitat, potential destruction of important critical and public facilities, and changing land use patterns.