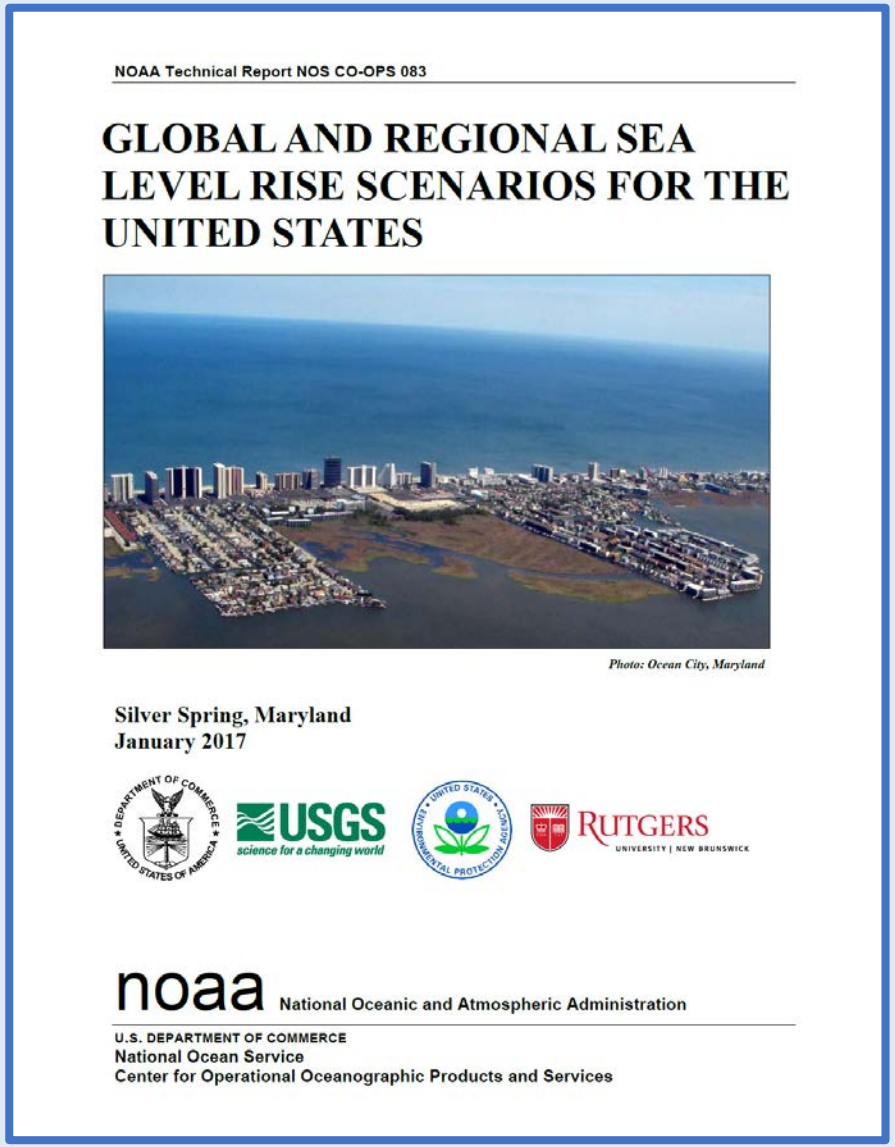
How Will Sea-Level Rise Impact Region 3?

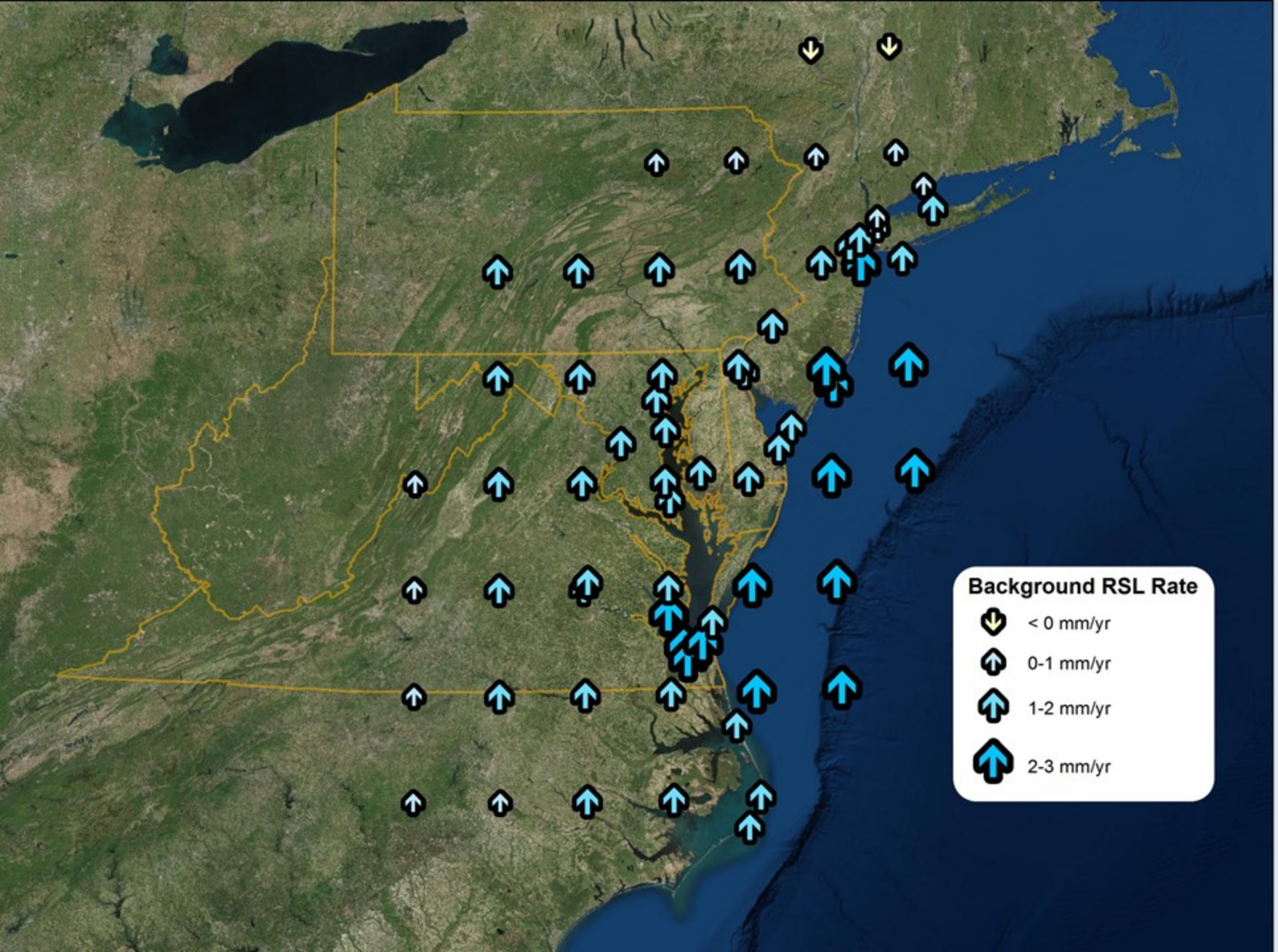
GIS Layers Derived from a 2017 NOAA Report

Holland Island, MD



Global and Regional Sea Level Rise Scenarios for the United States

RCPs	Scenarios	Year
RCP 8.5	2.5 m	2200
		2150
		2120
		2100
		2090
		2080
	2.0 m	2070
		2060
RCP 4.5	1.5 m	2050
		2040
	1.0 m	2030
	0.5 m	2020
RCP 2.6	0.3 m	2010



How is this report different from other sea-level-rise projections?

It includes vertical land movement in the projections…

Table 4. Probability of exceeding GMSL (median value) scenarios in 2100 based upon Kopp et al. (2014).

GMSL rise Scenario	RCP2.6	RCP4.5	RCP8.5
Low (0.3 m)	94%	98%	100%
Intermediate-Low (0.5 m)	49%	73%	96%
Intermediate (1.0 m)	2%	3%	17%
Intermediate-High (1.5 m)	0.4%	0.5%	1.3%
High (2.0 m)	0.1%	0.1%	0.3%
Extreme (2.5 m)	0.05%	0.05%	0.1%

How is this report different from other sea-level-rise projections?

...and it assigns a probability to each sea-level-rise scenario.

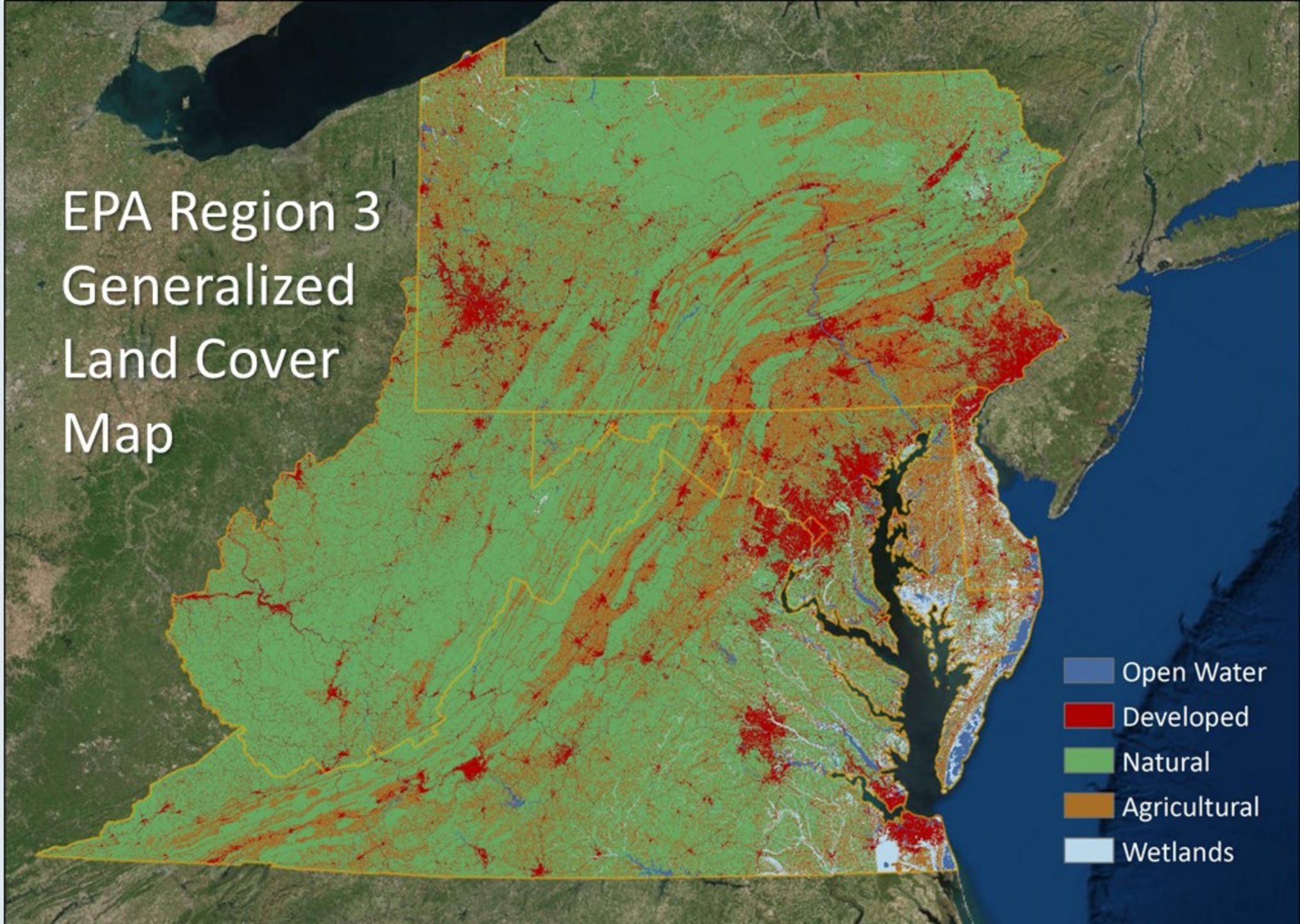
How can we make this information available and useful to Region 3 programs?

These layers are intended to answer three questions:

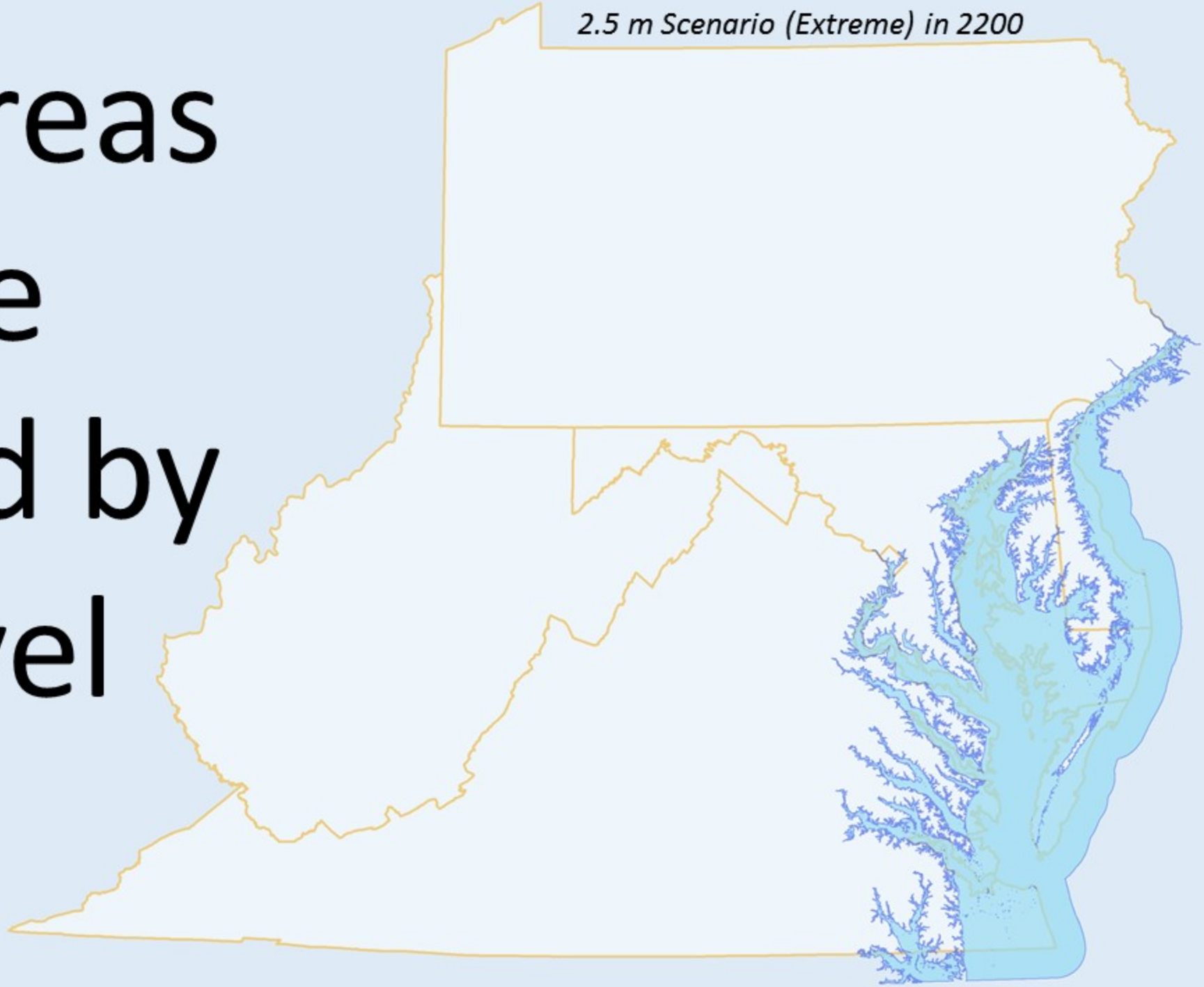
Which areas in Region 3 will be impacted by sea-level rise?

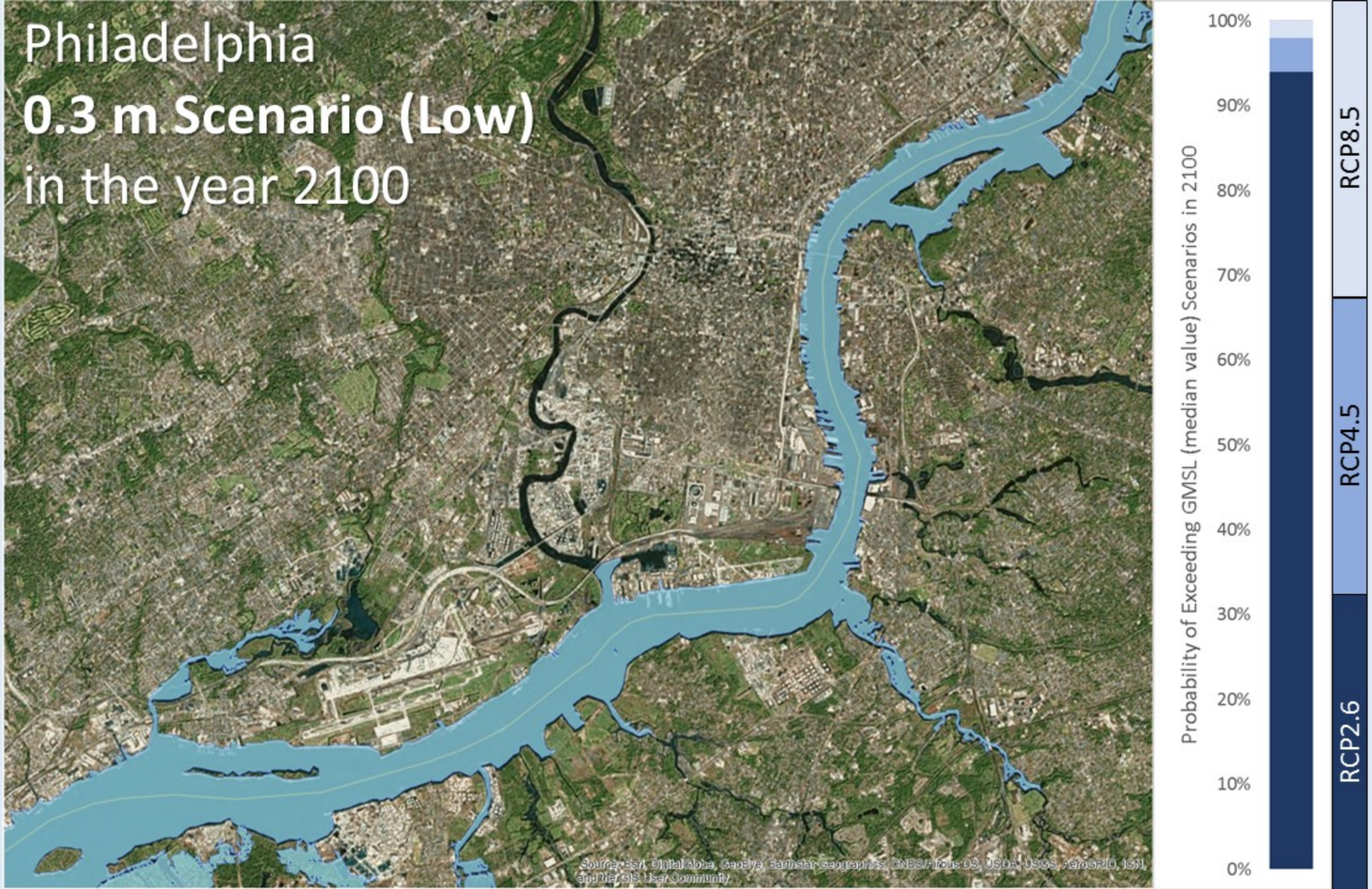
How deep will the water be?

What land cover types will see the biggest impacts?



Which areas will be impacted by sea-level rise?

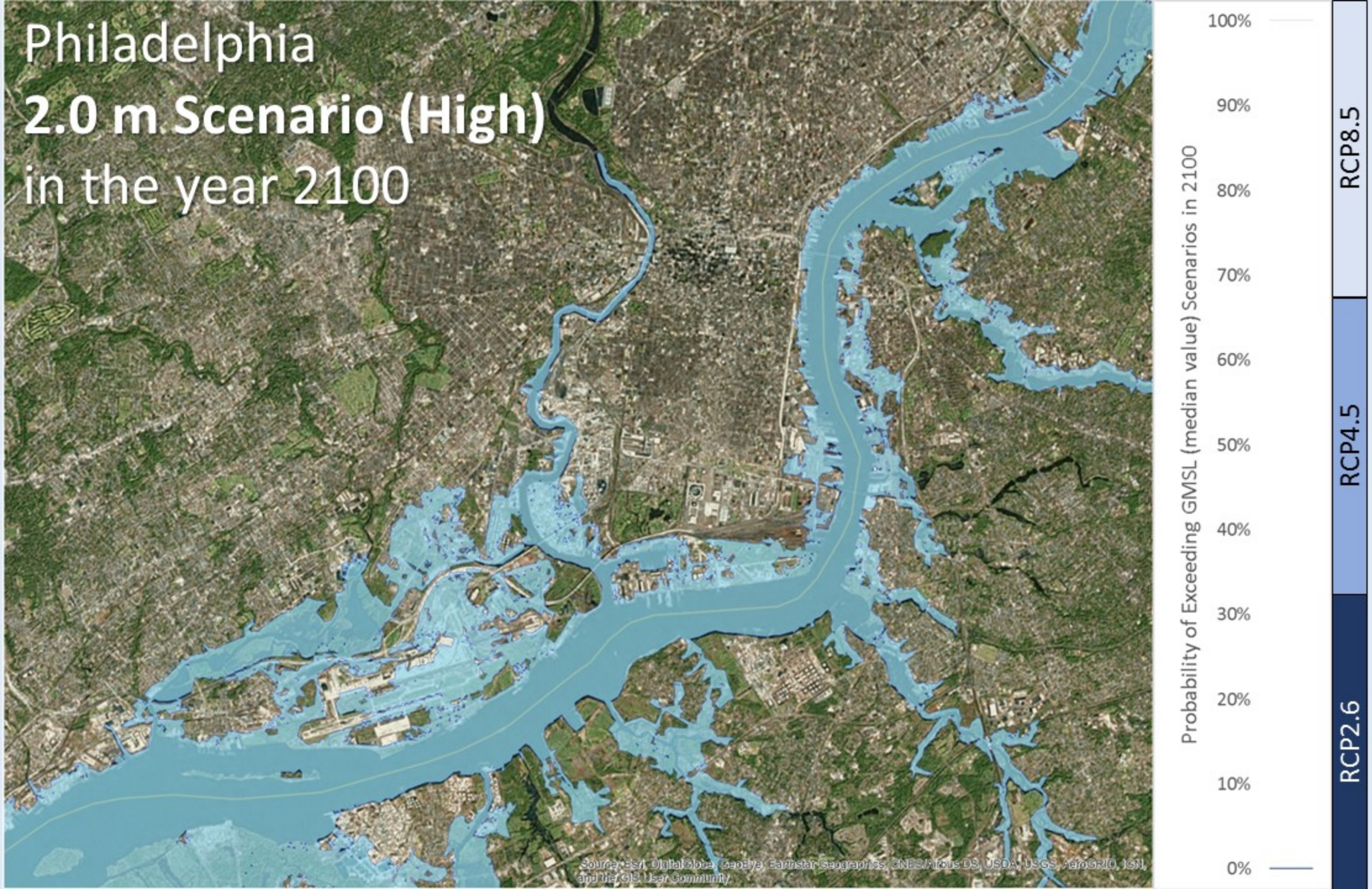


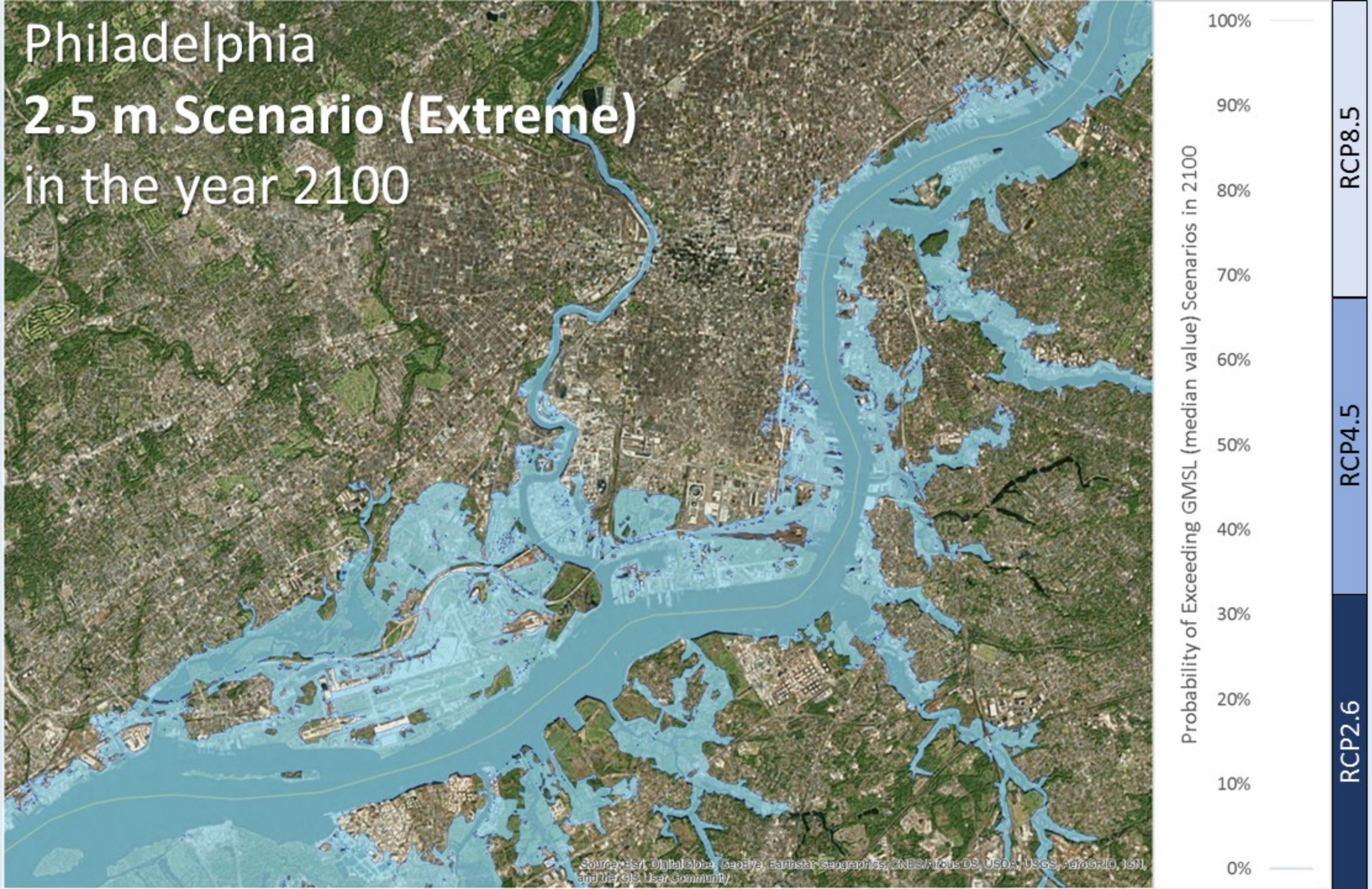

Philadelphia
0.3 m Scenario (Low)
in the year 2100
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
RCP8.5
RCP4.5
RCP2.6
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


Philadelphia
0.5 m Scenario (Intermediate-Low)
in the year 2100
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
RCP8.5
RCP4.5
RCP2.6

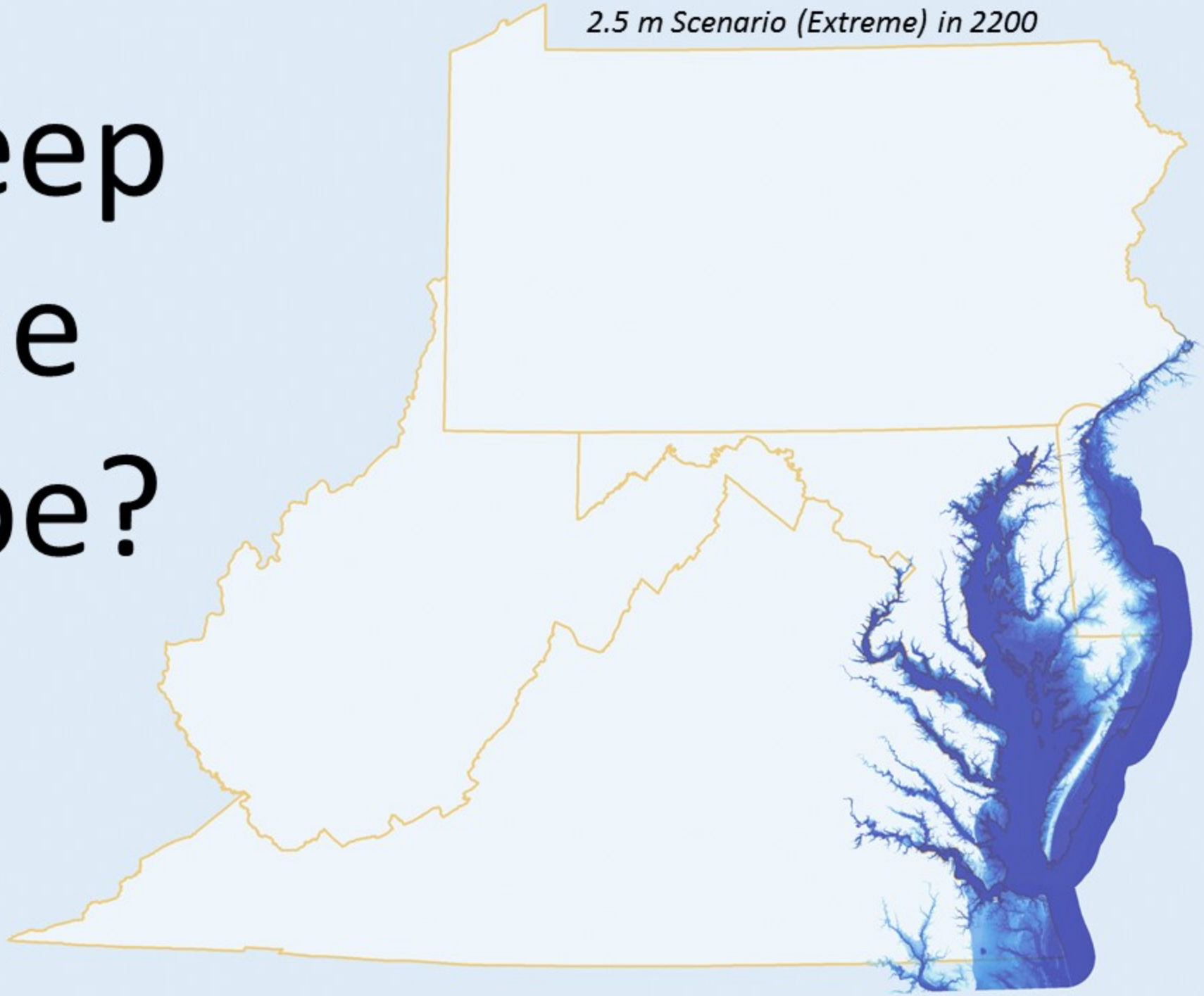

Philadelphia
1.0 m Scenario (Intermediate)
in the year 2100
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
RCP8.5
RCP4.5
RCP2.6

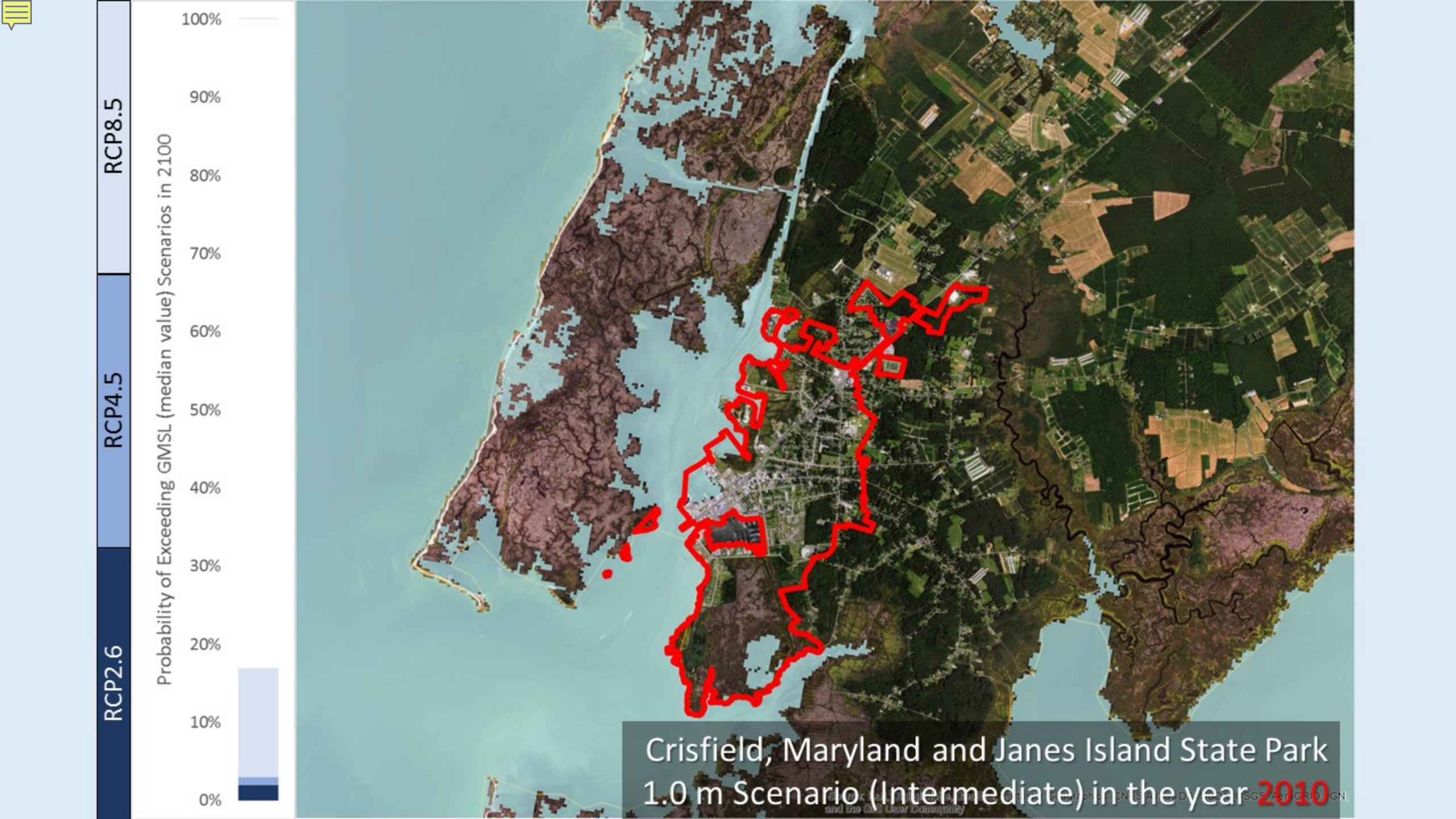

Philadelphia
1.5 m Scenario (Intermediate-High)
in the year 2100
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
RCP8.5
RCP4.5
RCP2.6
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

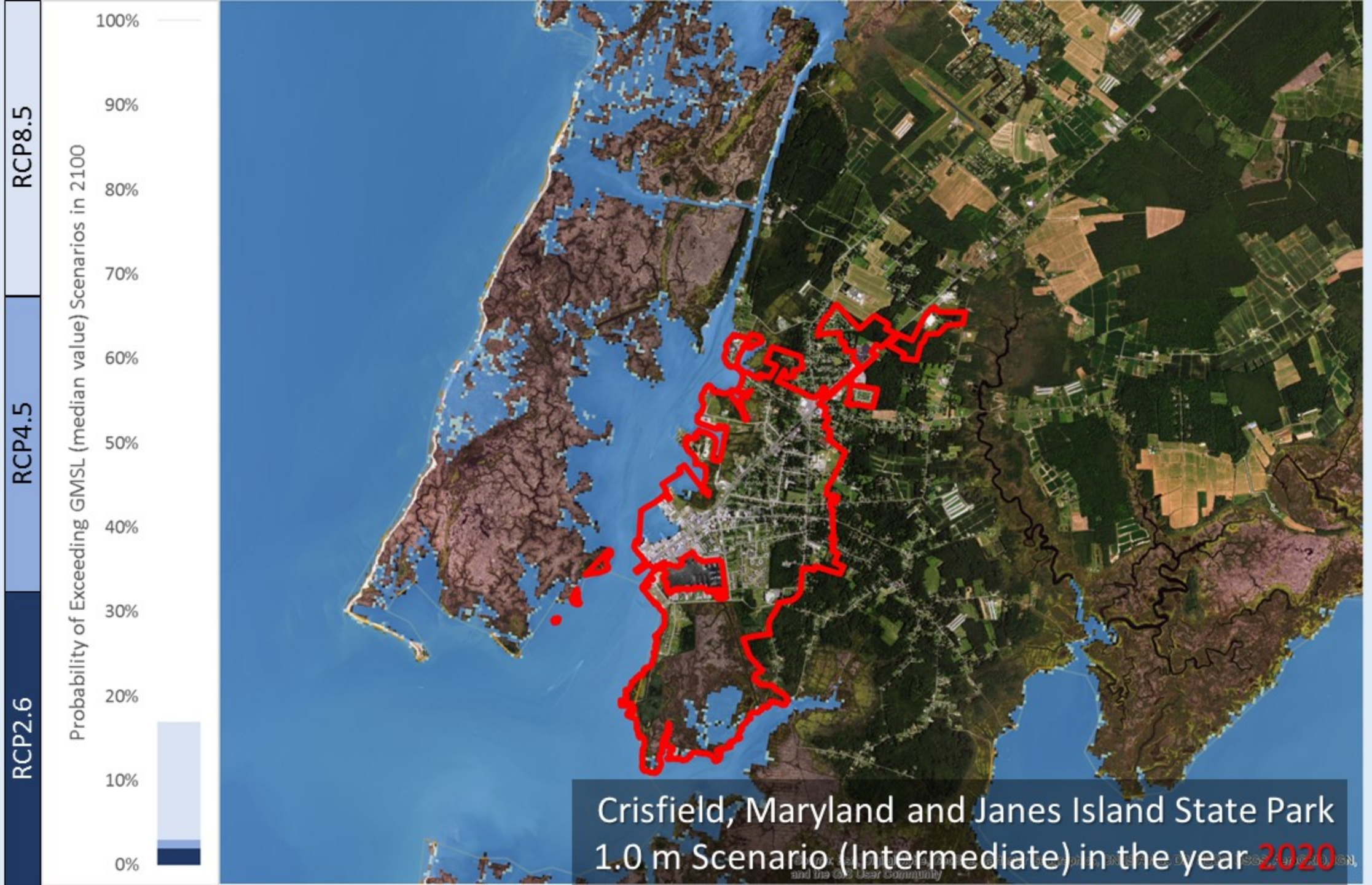

Philadelphia
2.0 m Scenario (High)
in the year 2100
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
RCP8.5
RCP4.5
RCP2.6

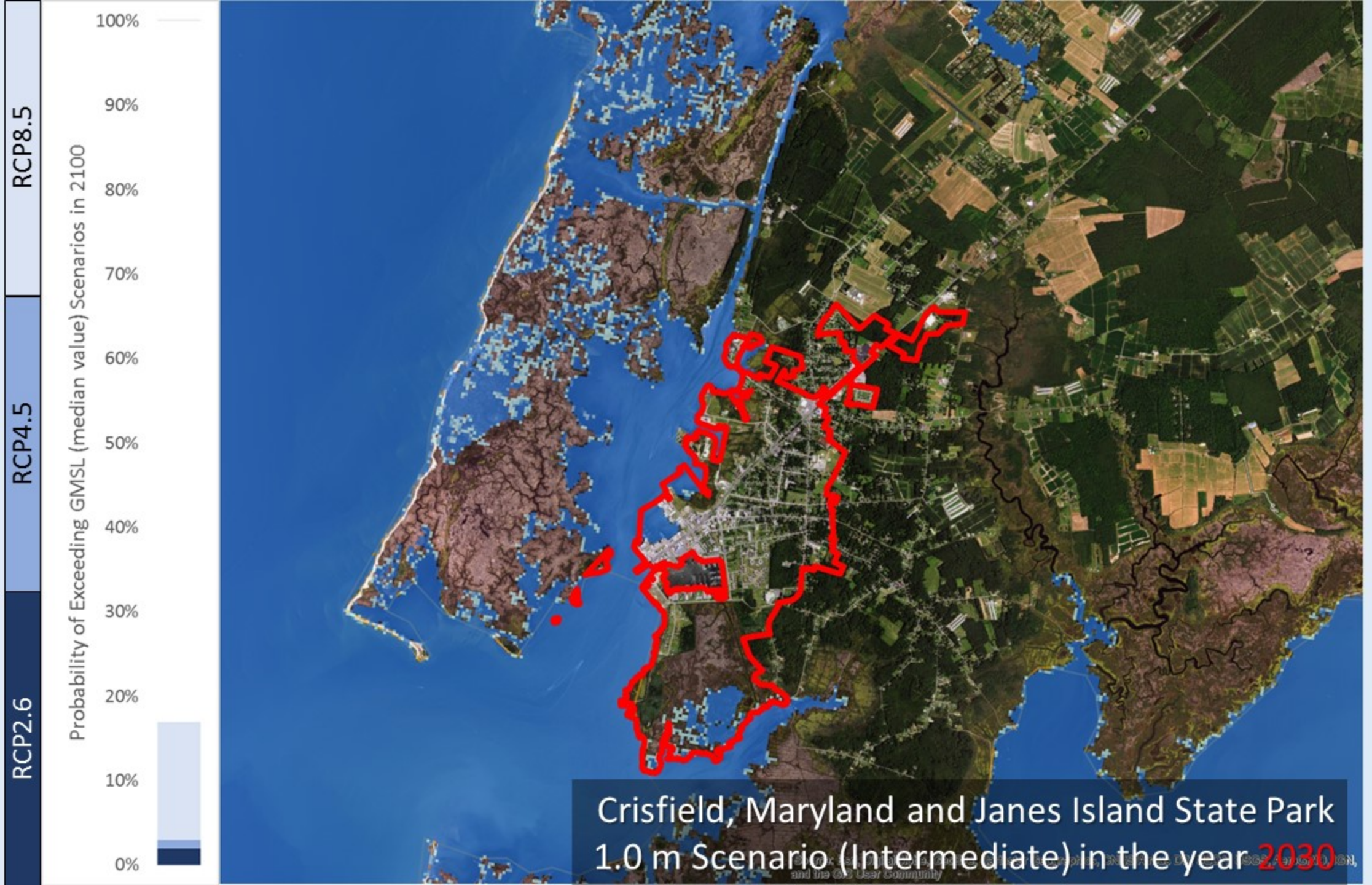

Philadelphia
2.5 m Scenario (Extreme)
in the year 2100
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
RCP8.5
RCP4.5
RCP2.6
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

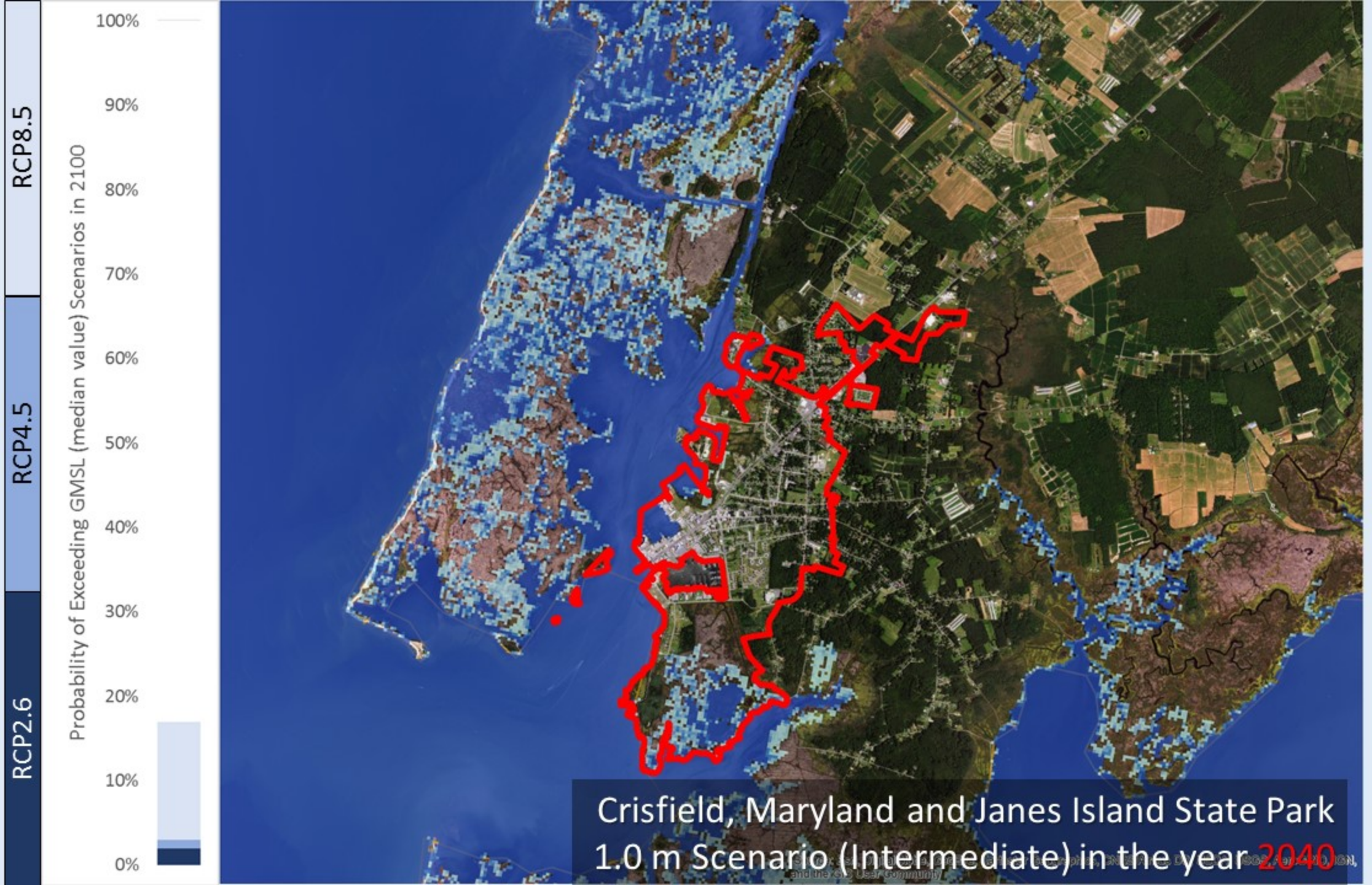
How deep will the water be?

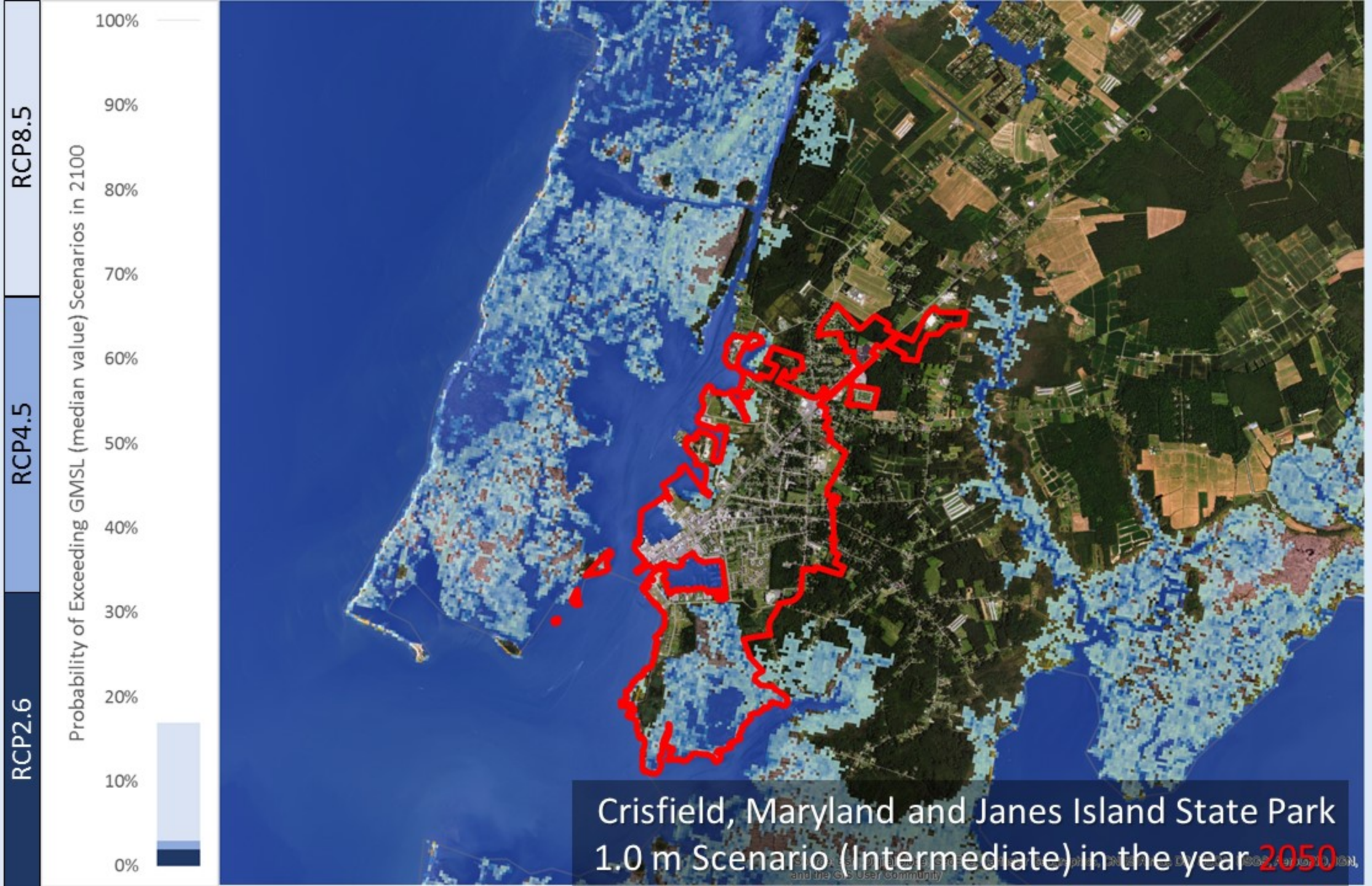


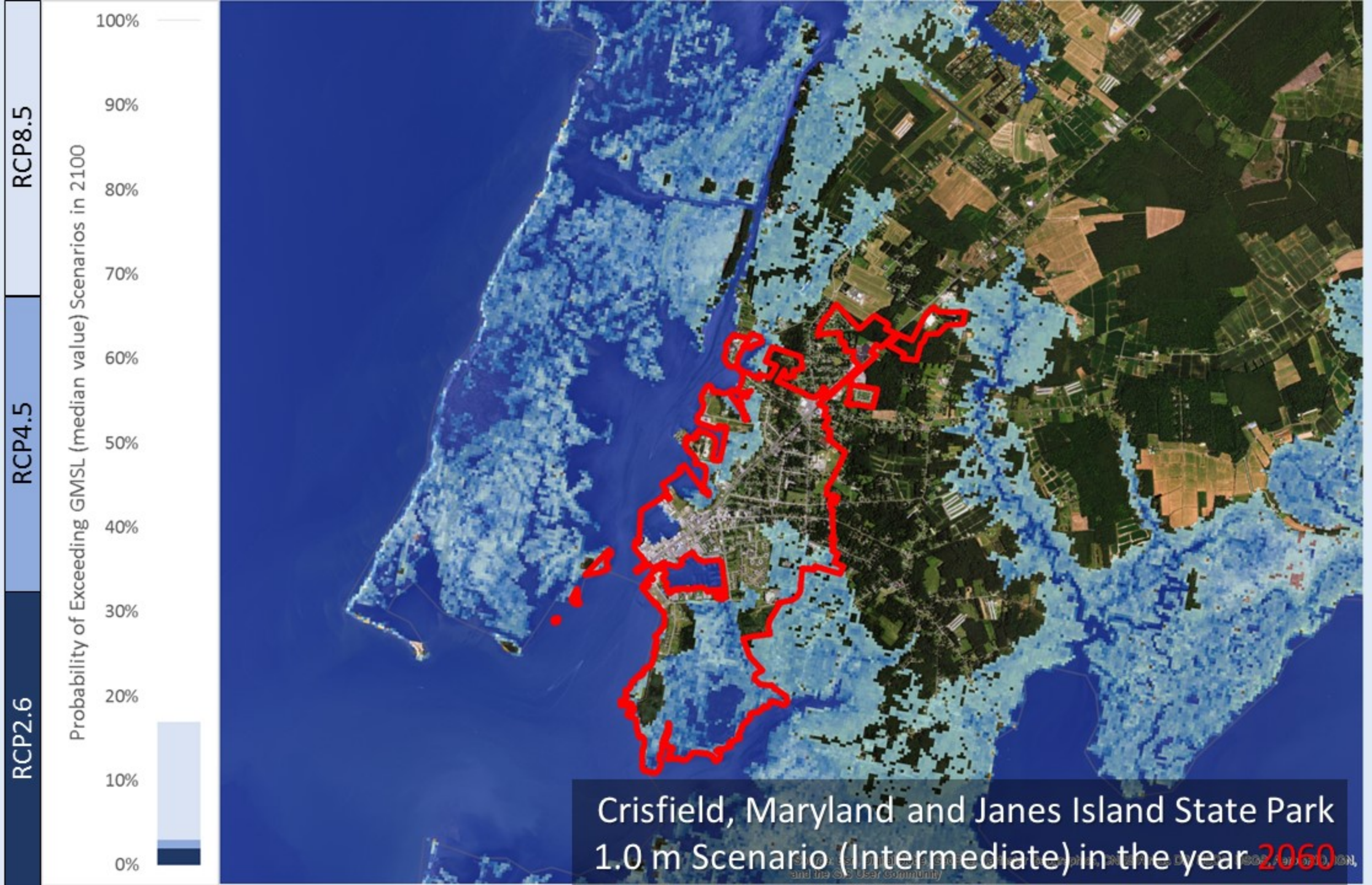

RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2010

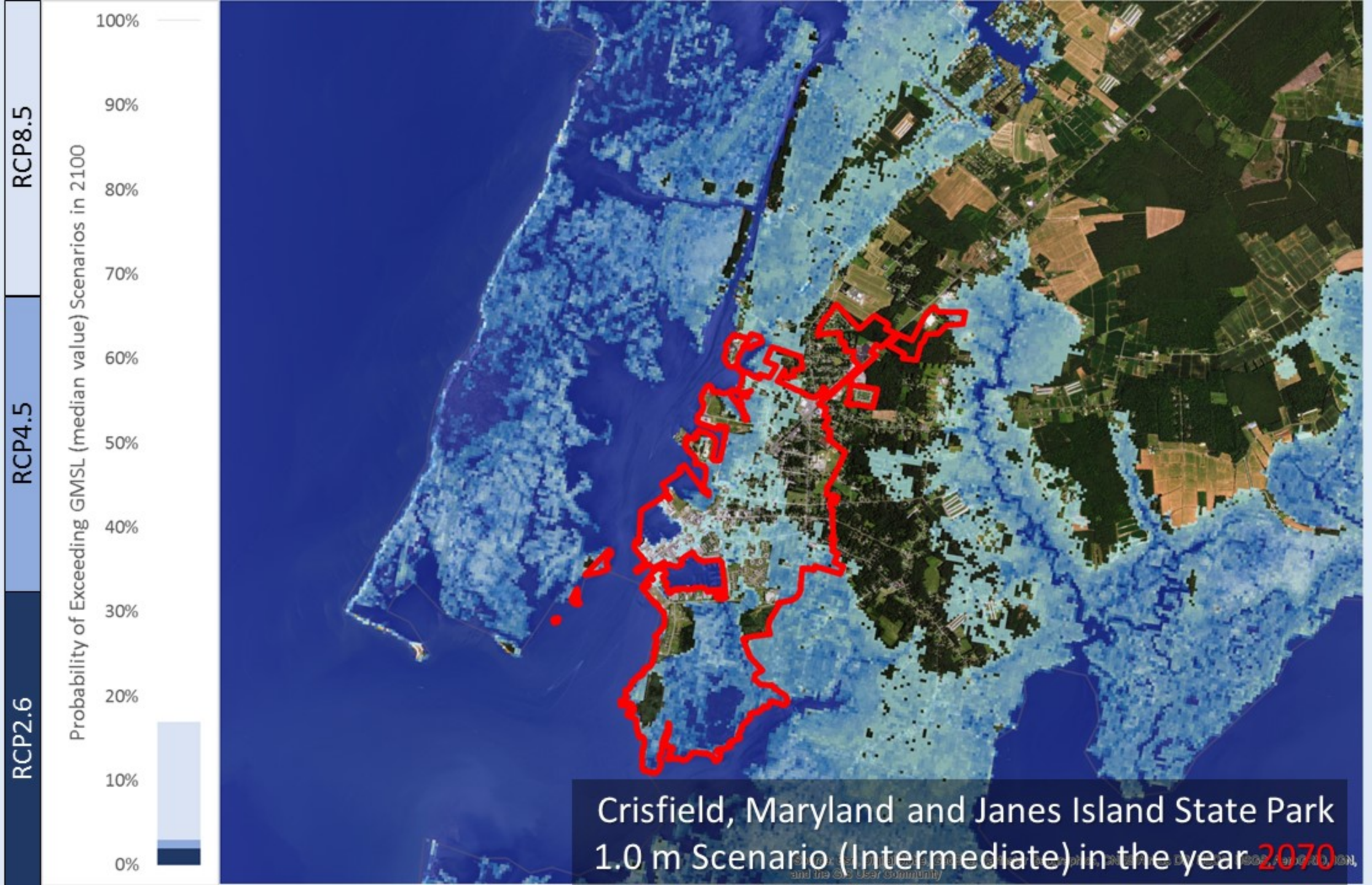

RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2020

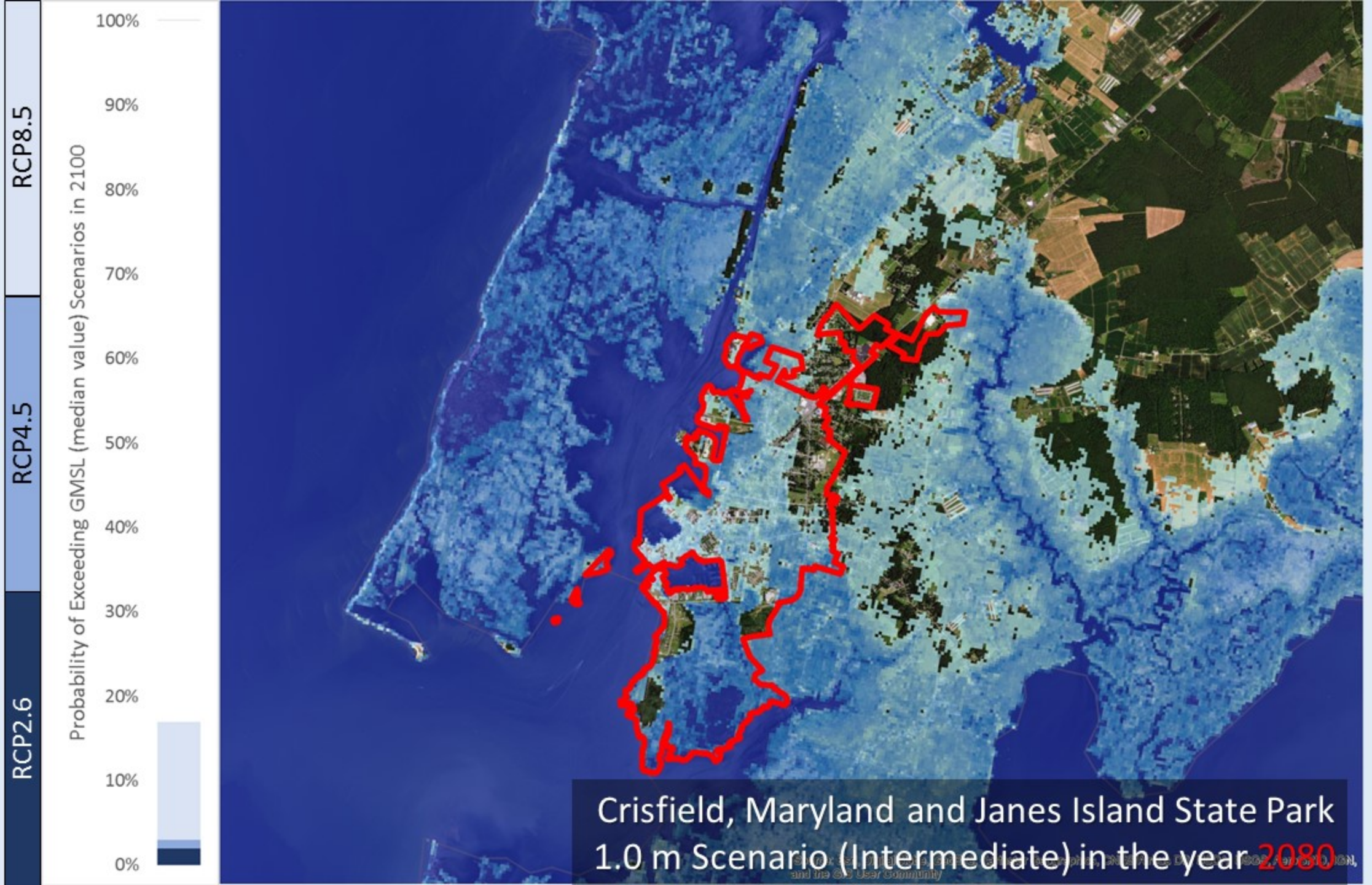

RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2030

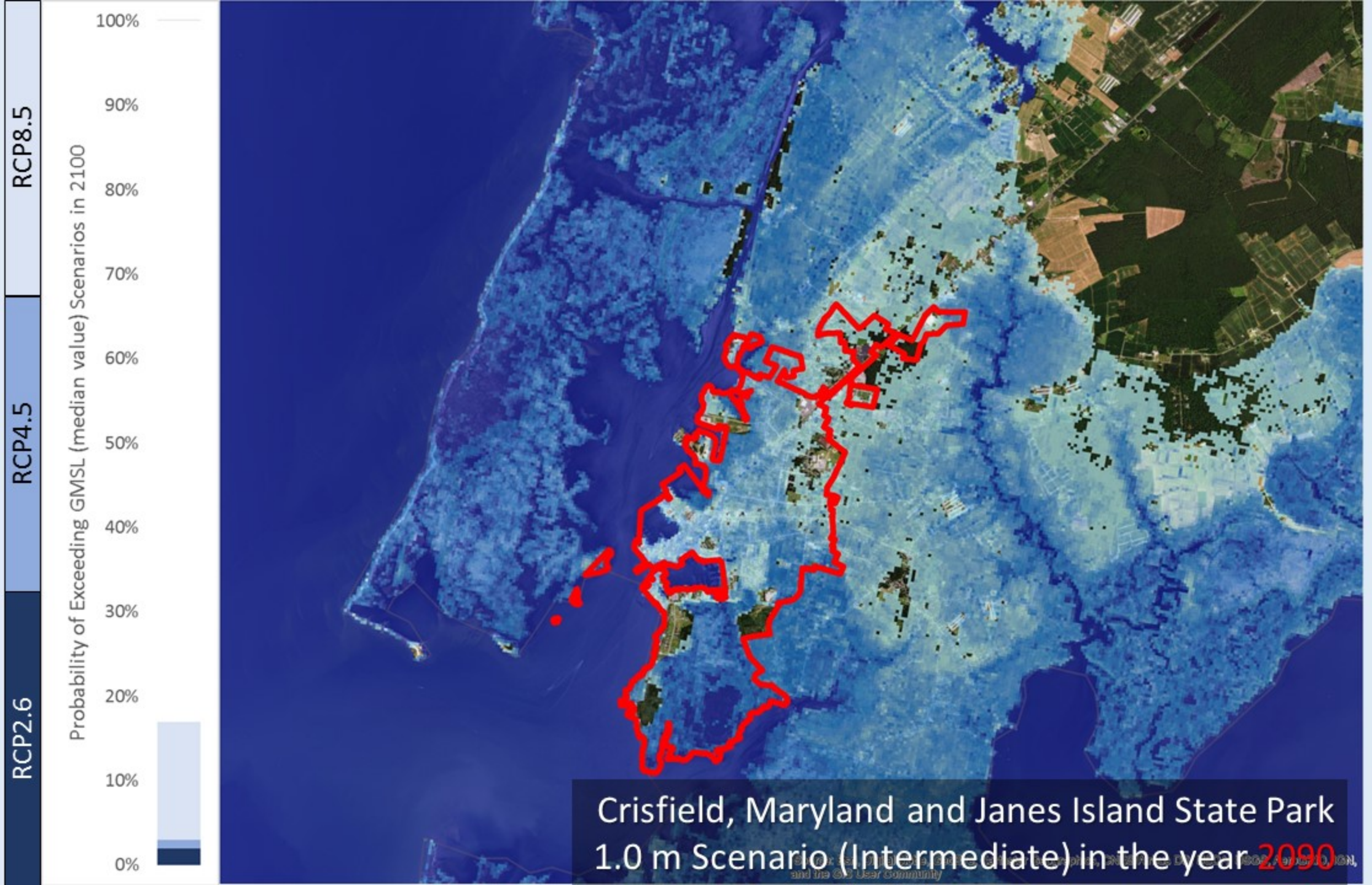

RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2040

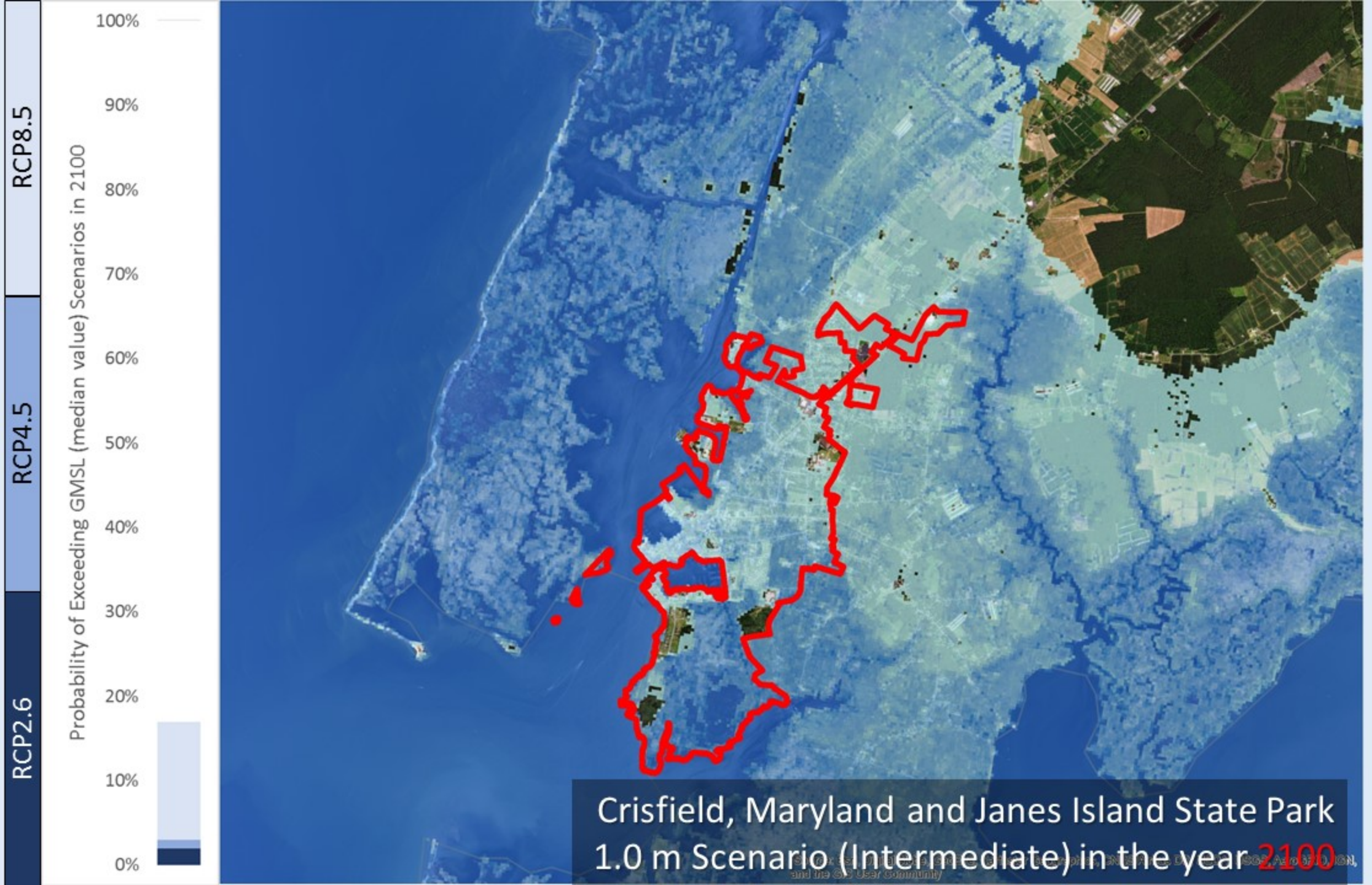

RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2050

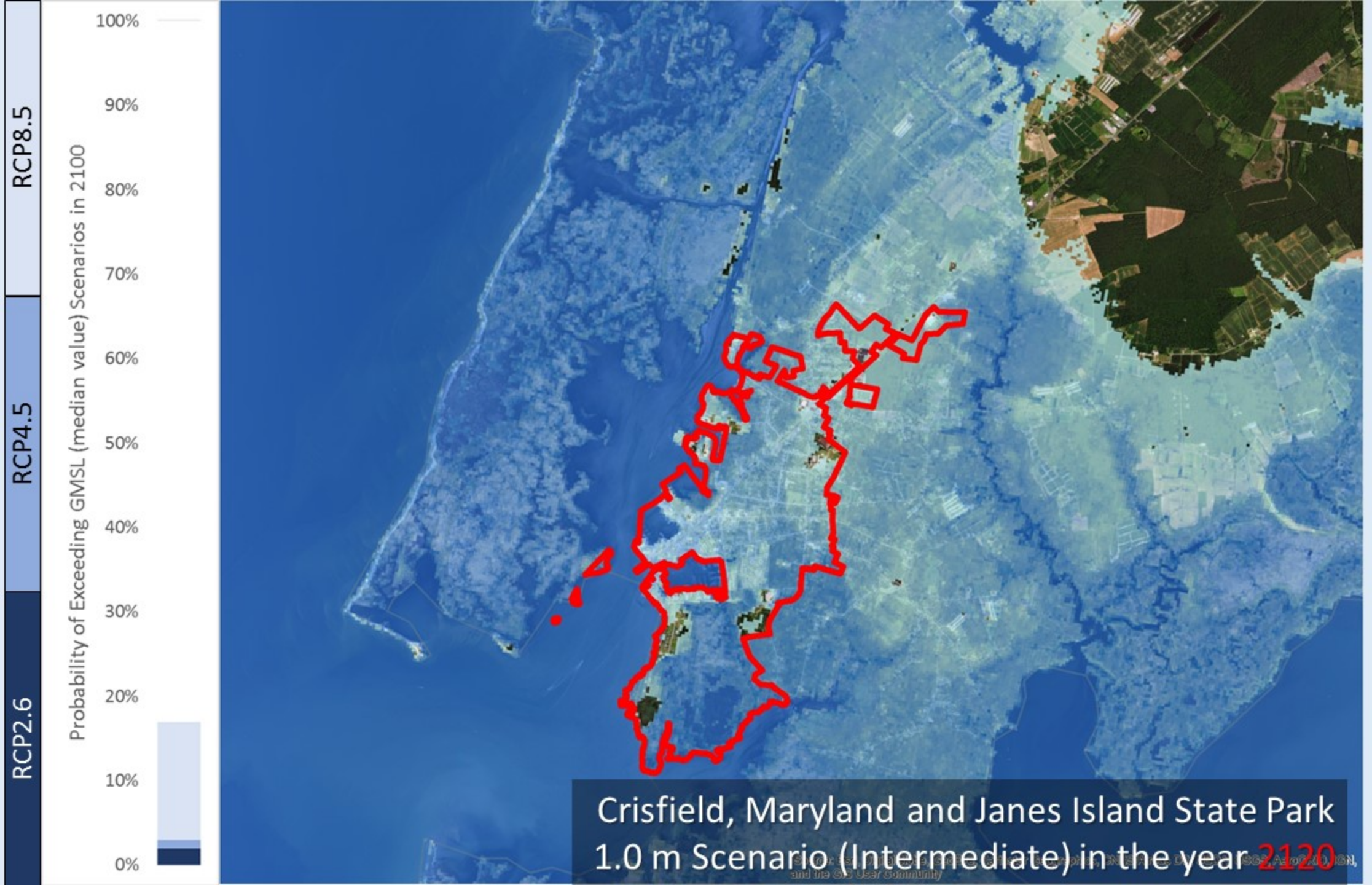

RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2060

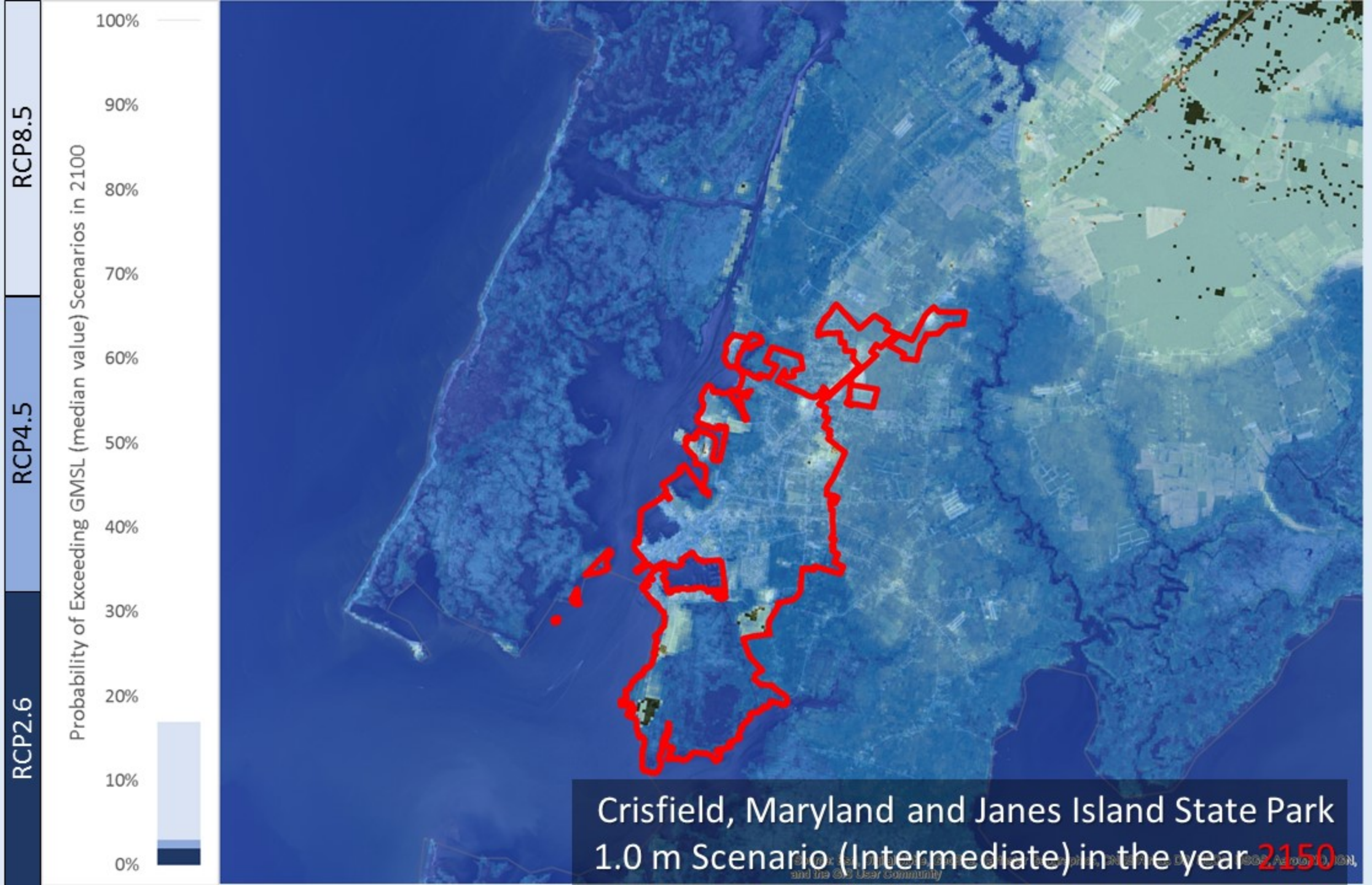

RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2070


RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2080


RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2090

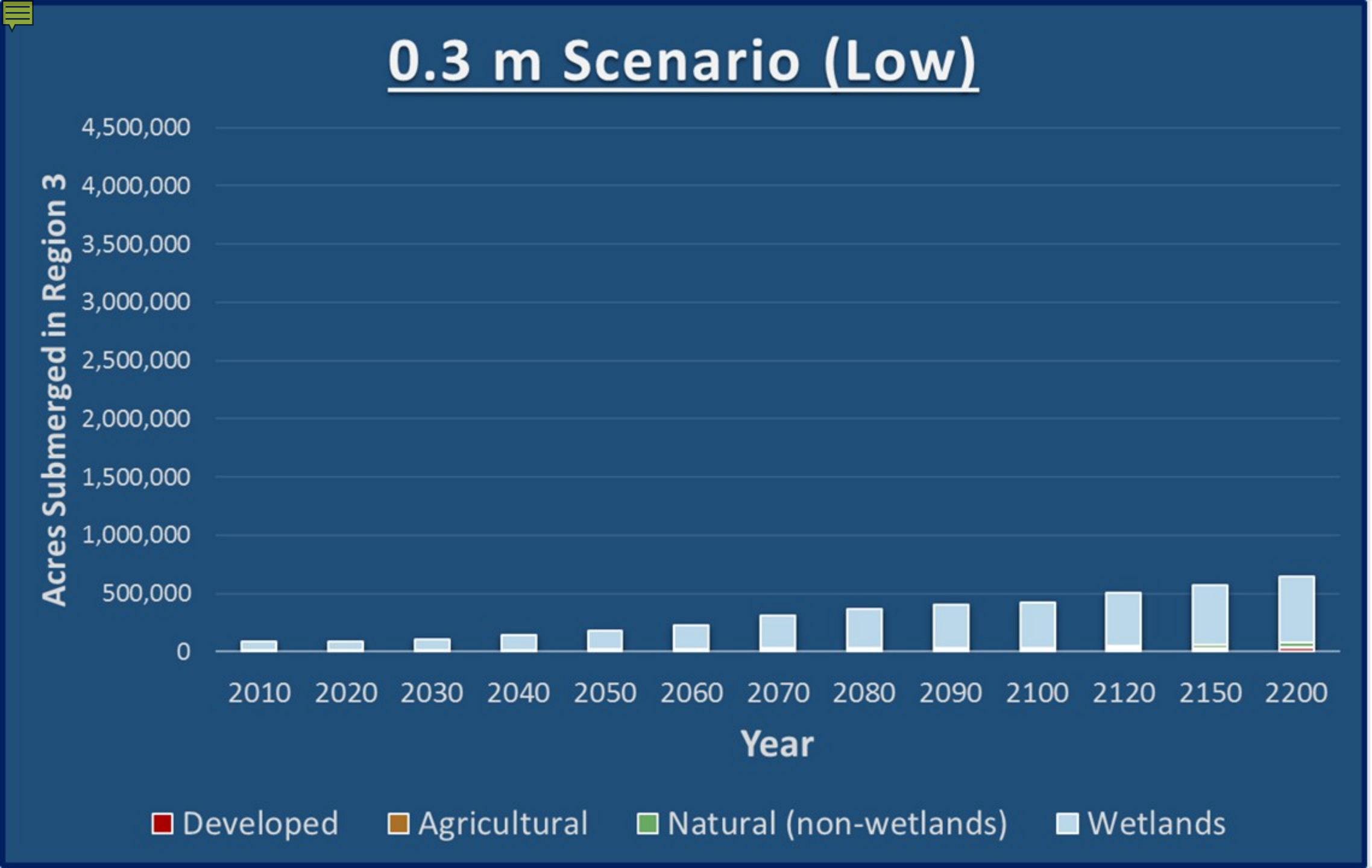

RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2100

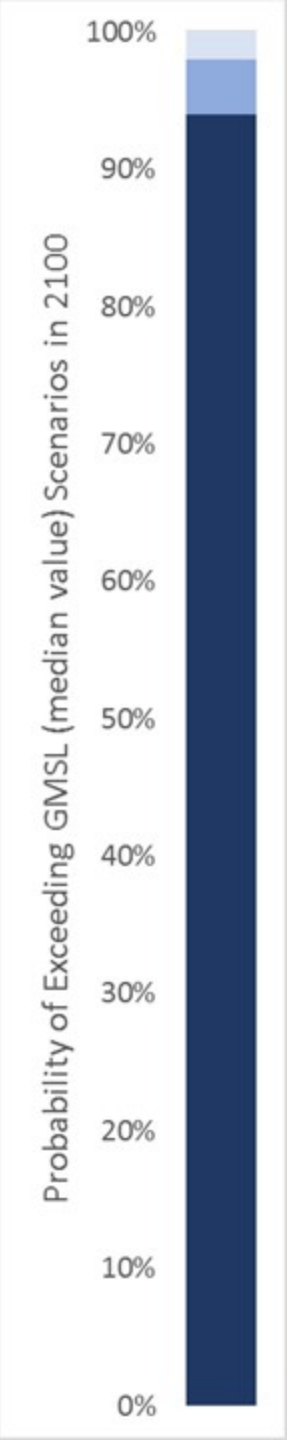

RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2120


RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2150

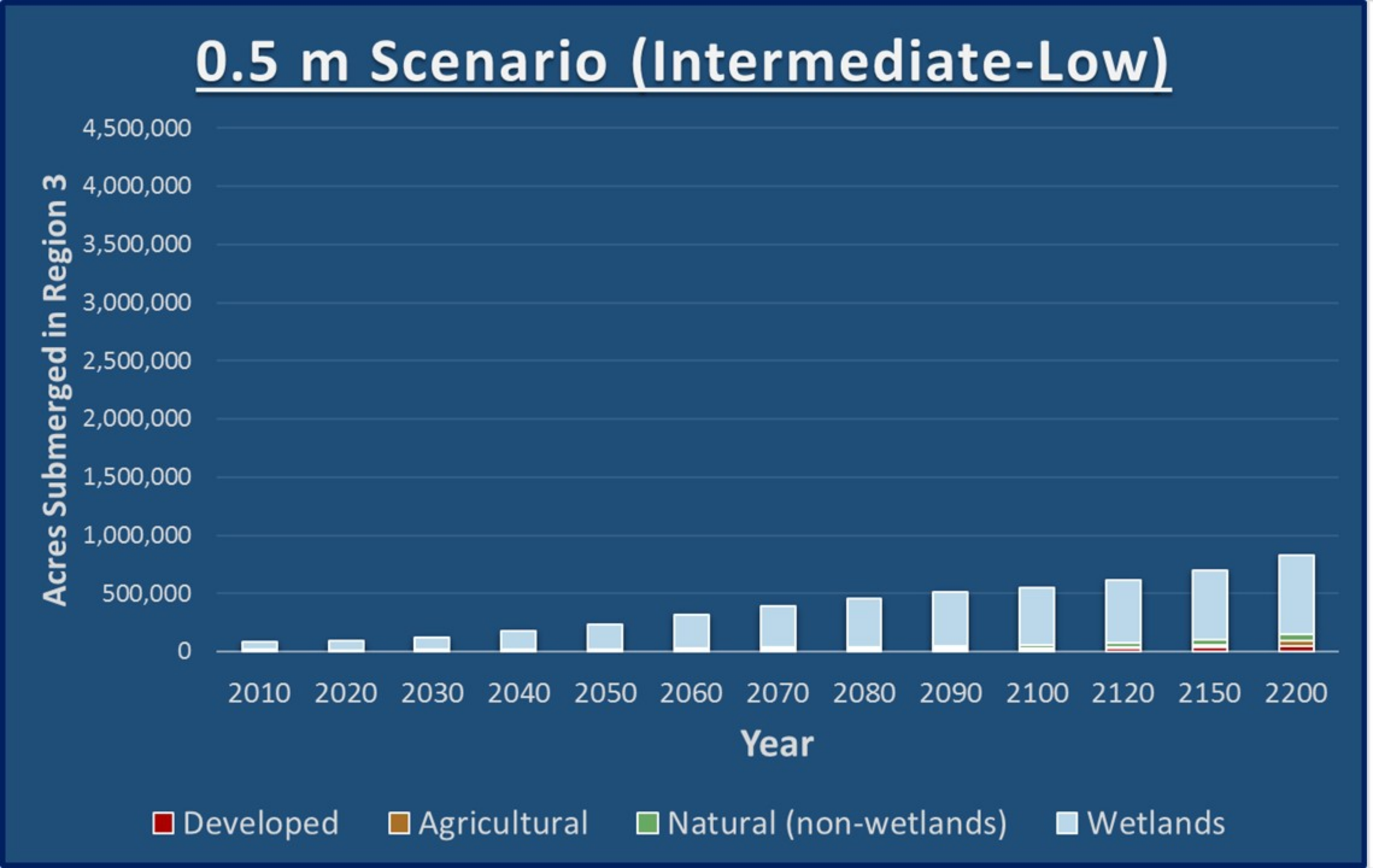

RCP8.5
RCP4.5
RCP2.6
Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Crisfield, Maryland and Janes Island State Park
1.0 m Scenario (Intermediate) in the year 2200

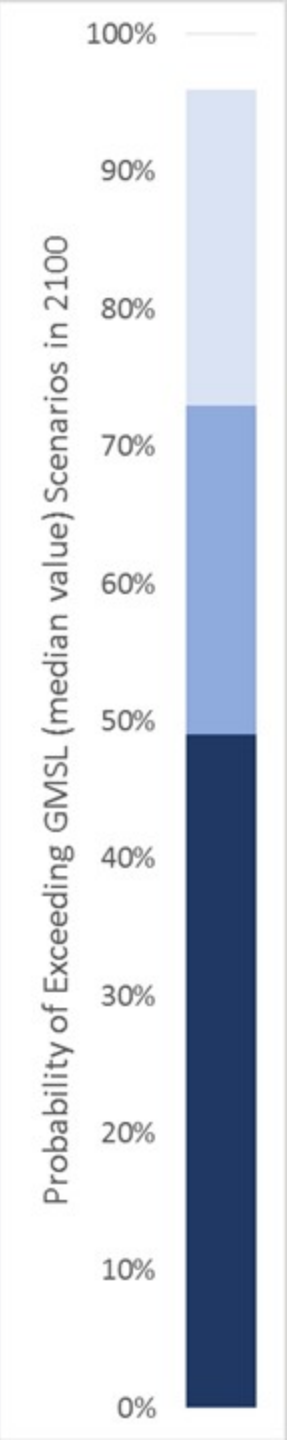
What land cover types will see the biggest impacts?


0.3 m Scenario (Low)
Acres Submerged in Region 3
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
2120
2150
2200
Year
Developed
Agricultural
Natural (non-wetlands)
Wetlands

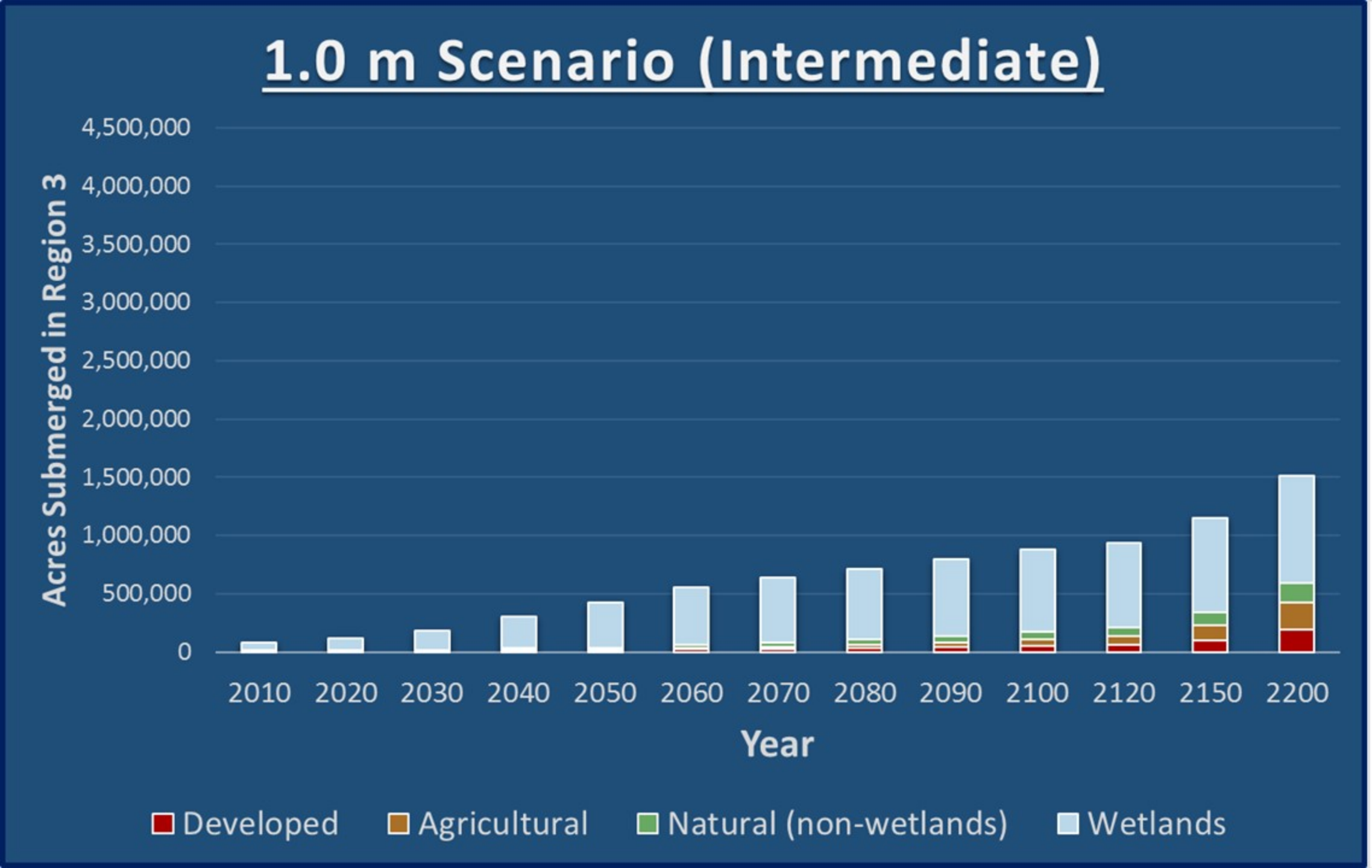

Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

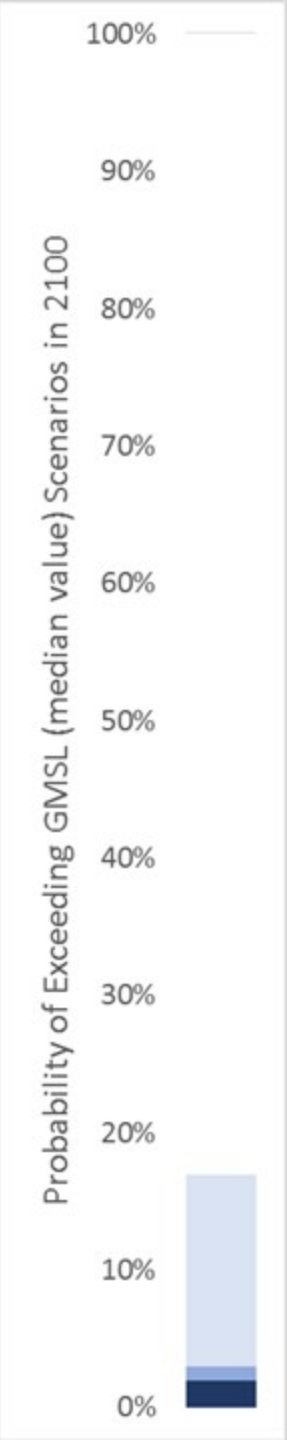
0.5 m Scenario (Intermediate-Low)



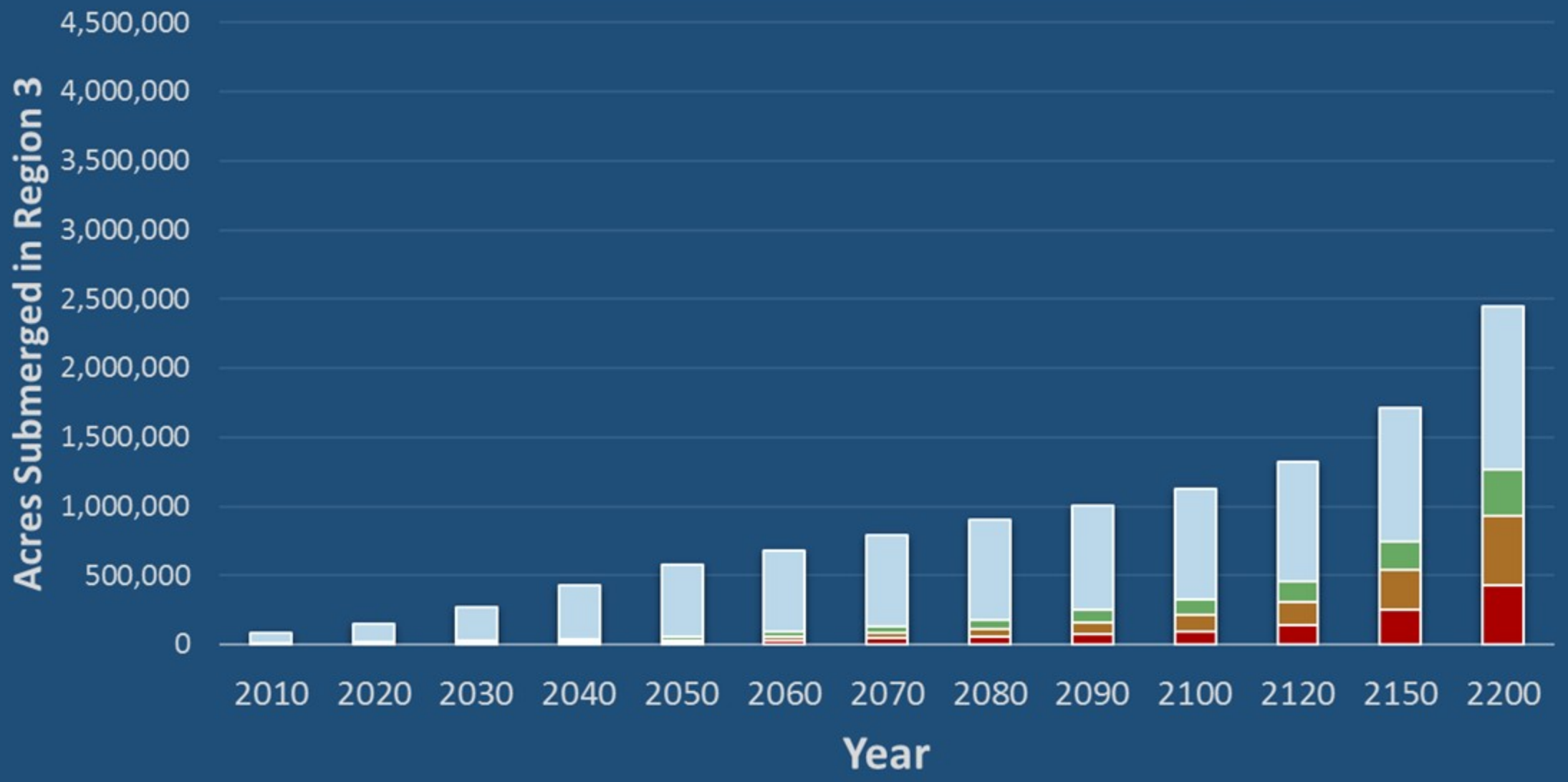


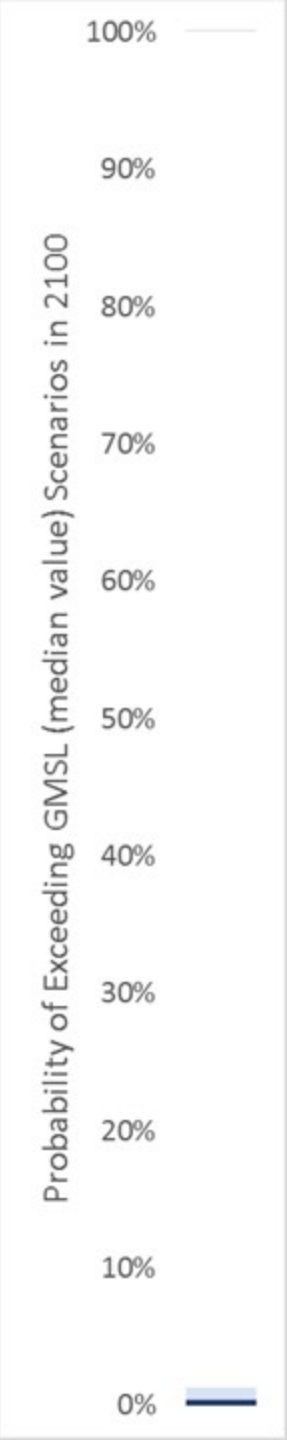
1.0 m Scenario (Intermediate)

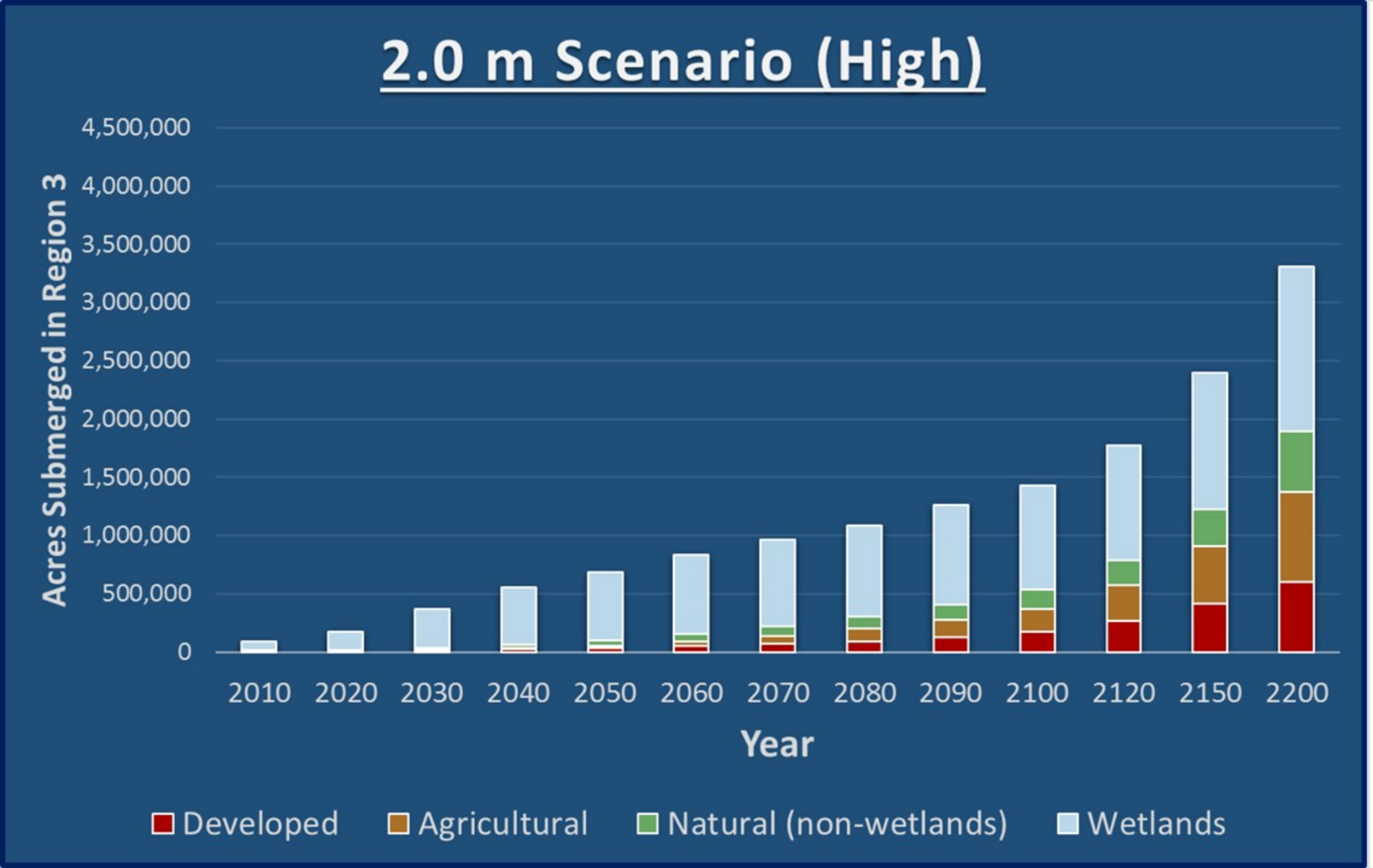


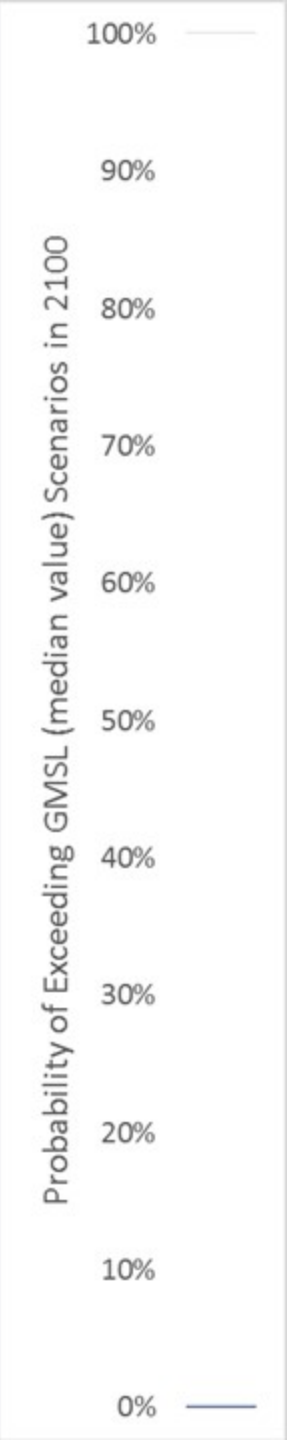


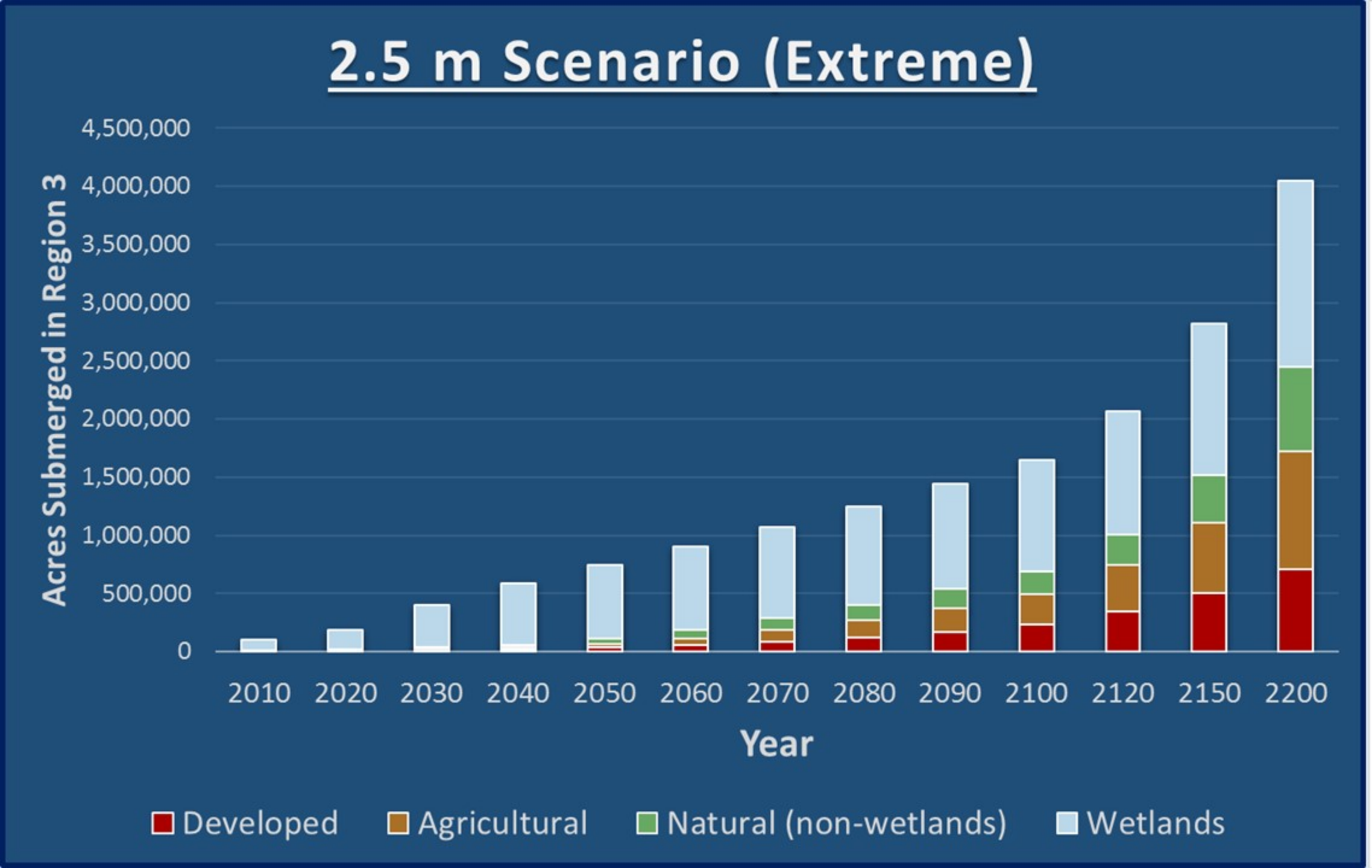
1.5 m Scenario (Intermediate-High)

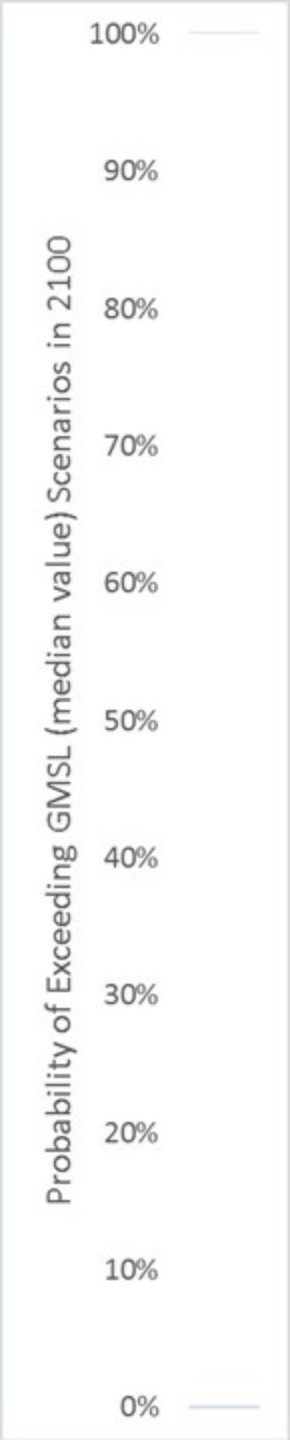





2.0 m Scenario (High)
Acres Submerged in Region 3
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
2120
2150
2200
Year
Developed
Agricultural
Natural (non-wetlands)
Wetlands

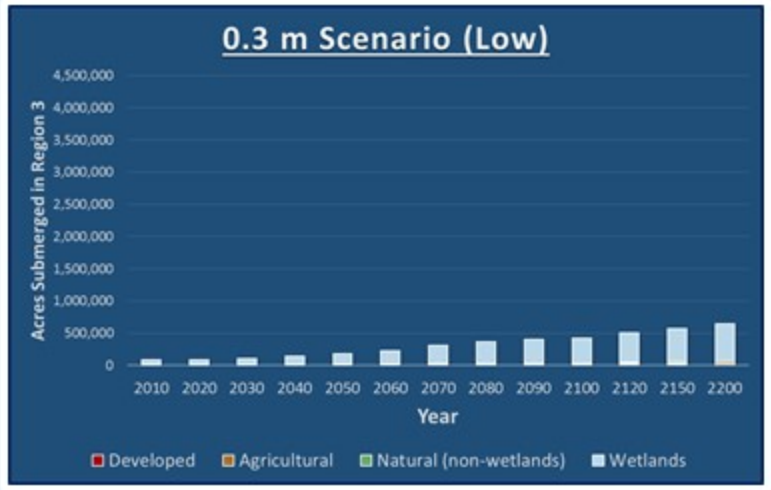

Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

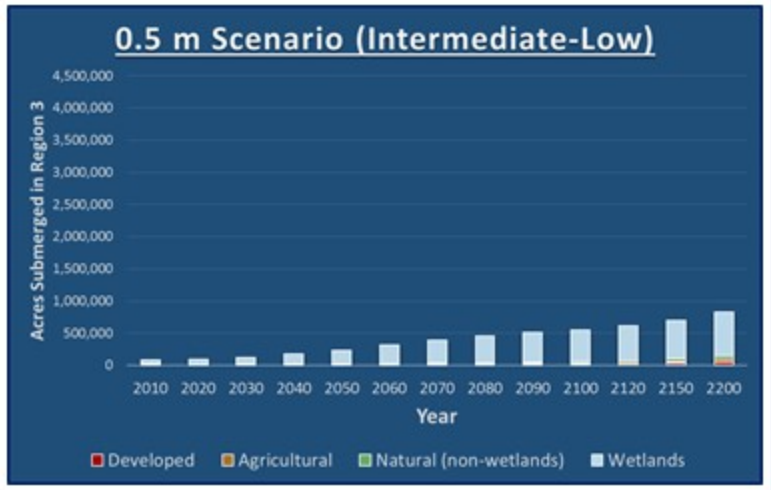

2.5 m Scenario (Extreme)
Acres Submerged in Region 3
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
2120
2150
2200
Year
Developed
Agricultural
Natural (non-wetlands)
Wetlands

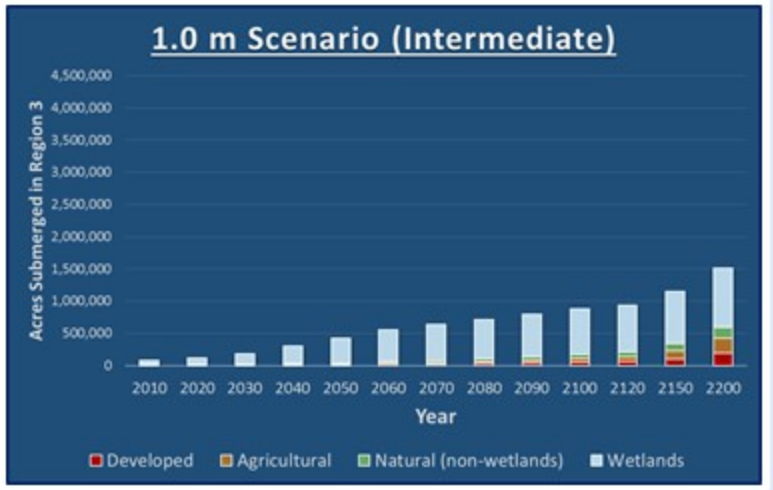

Probability of Exceeding GMSL (median value) Scenarios in 2100
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

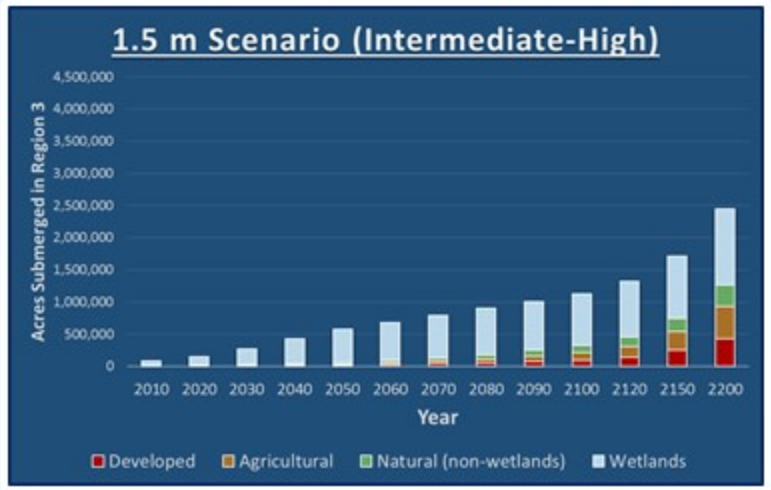
Within Region 3, wetlands consistently have the greatest area impacted by sea-level rise.

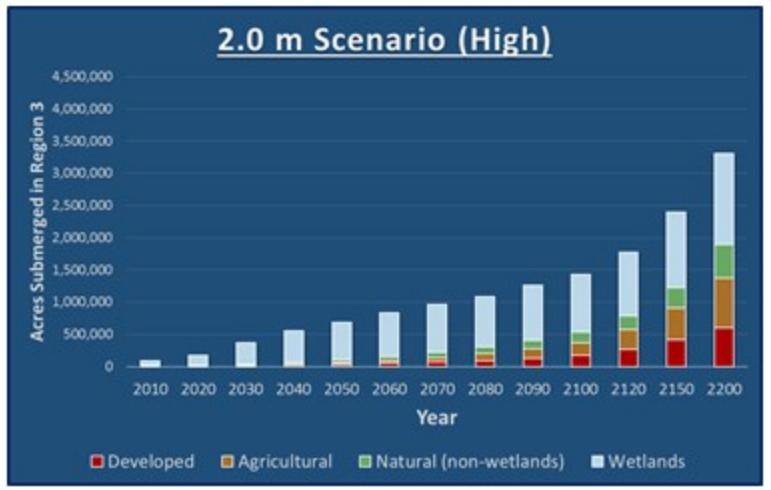
Impacts to the human environment become increasingly severe at more extreme scenarios.

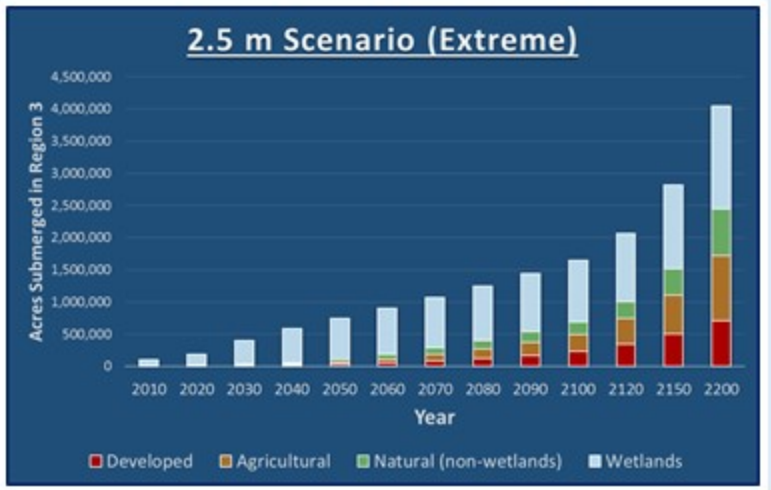












All GIS layers are available on the EPA GeoPlatform under:
NOAA 2017 Sea-Level-Rise Projections for EPA Region 3.

234 layers include:

3 layer types (inundated area, water depth, and land cover impacts)
6 scenarios (0.3-2.5 m of global mean sea level rise)
13 date horizons (2010-2200)

Holland Island, MD