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Migration of the Tidal Marsh Range Under Sea Level Rise for Coastal Virginia, with Land Cover Data

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GEODATABASE INFORMATION

Abstract:
The layers in this geodatabase were intended to represent the land that is encompassed by the average tidal range as sea level rises in the Virginia coastal region, including Chesapeake Bay and tributaries, the Atlantic Ocean side of the Eastern Shore, and Virginia Beach. The data layers in this geodatabase represent each two-foot range of elevation incremented by 0.5 ft (e.g. 0-2 ft, 0.5-2.5 ft, 1-3 ft, etc.) with the current land cover that exists in that range.

Description:
Data are supplied in an ESRI geodatabase and consist of 21 polygon layers in horizontal datum and projection NAD83 UTM Zone 18N and referenced to vertical datum NAVD88.

The layers in this geodatabase were intended to represent the land that is encompassed by the average tidal range as sea level rises in the Virginia coastal region, including Chesapeake Bay and tributaries, the Atlantic Ocean side of the Eastern Shore, and Virginia Beach. Two feet was chosen as the average tidal range in Chesapeake Bay in Virginia based on tide station data and modeling output. The layers, or elevation steps, are based on elevation alone—a time (i.e. approximate year) for each step may be estimated depending upon the sea level rise scenario chosen; assume that the first step is 2020.
The elevation steps were created with GIS software (ESRI ArcMap) and mosaicked lidar DEMs using the most current available lidar data at the time the elevation layers were generated in 2016. Two-foot (0.61 m) elevation steps were extracted from the lidar data and then incremented by 0.5 ft (0.15 m). The area within each elevation range approximates the area of appropriate tidal elevations to support tidal marshes when Mean Sea Level is equal to the low elevation.

The following table shows the steps:

elevation range in feet (NAVD88)				elevation range in meters (NAVD88)		
step	low	high		step	low	high
1	0	2		1	0	0.61
2	0.5	2.5		2	0.15	0.76
3	1	3		3	0.30	0.91
4	1.5	3.5		4	0.46	1.07

5	2	4		5	0.61	1.22
6	2.5	4.5		6	0.76	1.37
7	3	5		7	0.91	1.52
8	3.5	5.5		8	1.07	1.68
9	4	6		9	1.22	1.83
10	4.5	6.5		10	1.37	1.98
11	5	7		11	1.52	2.13
12	5.5	7.5		12	1.68	2.29
13	6	8		13	1.83	2.44
14	6.5	8.5		14	1.98	2.59
15	7	9		15	2.13	2.74
16	7.5	9.5		16	2.29	2.90
17	8	10		17	2.44	3.05
18	8.5	10.5		18	2.59	3.20
19	9	11		19	2.74	3.35
20	9.5	11.5		20	2.90	3.51
21	10	12		21	3.05	3.66

The resulting raster layers were converted to polygons, which were then used to intersect with the VGIN High Resolution Land Cover layer (2016). Therefore, the data layers in this geodatabase represent each two-foot range of elevation (e.g. 0-2 ft, 0.5-2.5 ft, 1-3 ft, etc.) with the current land cover that exists in that range. There are 21 data layers corresponding to the 21 steps. Each data layer is called elev#_no_water (meaning there is no open water included in the land cover categories).
Note: After the final elevation layers were made an error was found in the mosaicked lidar DEMs for parts of the upper Middle Peninsula and Peninsula regions, resulting in some inaccuracies in elevation values. Errors ranged from about 3% in the steeper elevation areas (typically found in the higher elevation steps) to about 8% in the flatter elevation areas (typically found in the lower elevation steps). These are maximum errors as they are calculated by lidar tile area, not actual error area.

DATA AVAILABLE at : https://doi.org/10.25773/sz4n-k694