



Identifying Roads to Be Inundated due to Relative Sea Level Rise (RSLR): A Case Study in Annapolis Maryland

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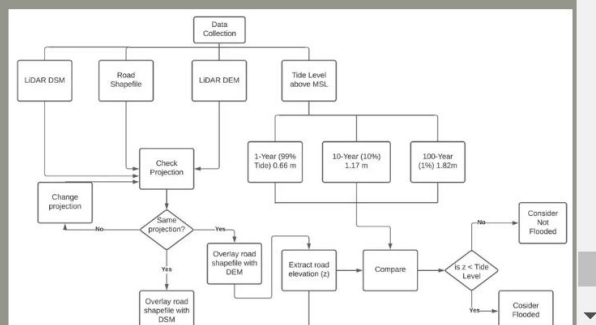


Introduction

Flooding has become more frequent along the U.S coast and as a result, the U.S coast is suffering many public inconveniences such as road closures, traffic disruptions, economic and social effect. According to the National Oceanic Administration (NOAA) among the top 10 cities that have experienced nuisance flooding in the east coast, Annapolis and Baltimore city leads the list with an increase in the number of flooding days of over 920%. Based on monthly mean sea level data from 1928 to 2020, there is a long term linear relative sea level rise trend of 3.71mm/year with a 95% confidence interval of ± 0.2

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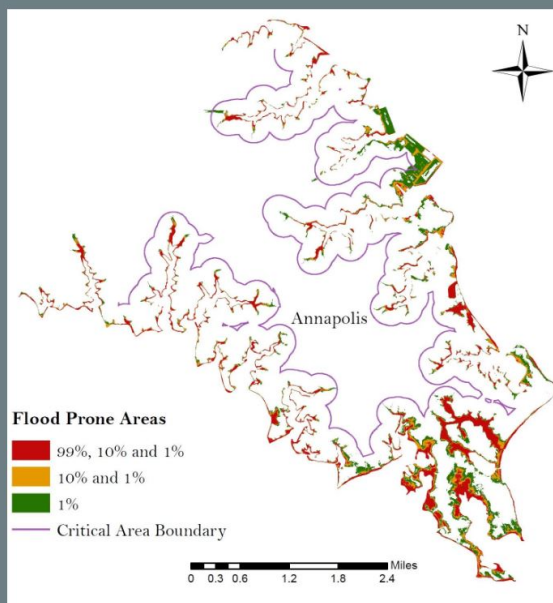
Methods



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Results

We identify Areas in annapolis that are subseptible to 99%, 10% and 1% tide level. In Fig. 8, The red areas are the most critical as they are most likely to be flooded at the 99%, 10% and 1% tide levels. The orange areas are most likely to be flooded at the 10% and 1% tide levels. While the green areas are most likely to be flooded at the 1% tide level.



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Conclusion

Results suggest that, out of 36 roadways examined (excluding local roads) :

- one minor arterial roadway segment may be flooded by a depth ranging from 0.075 inches to 7.22 inches, at a 99% tide level of 2.17 ft (0.66 m).
- Three minor arterial and one major collector roadway segments may be flooded by a depth ranging from 0.1 inches to 27.3 inches (2.27 ft), at a 10% tide level of 3.84 ft (1.17 m).
- Three minor arterial, four major collector, and two minor collector roadway segments may be flooded by a depth ranging from 0.002 inches to 52 inches (4.4 ft) at a 1% tide level of 5.97 ft (1.82 m).
- For the city's transportation network to become more resilient against sea-level rise, these roadway segments should be prioritized for future capital investment in response to seal level rise

Future Work

Future Work will ask the following research questions:

- What roads in Annapolis are most likely to be inundated based on predicted tide levels in 2050 and 2100?
- How will the depth of inundation based on current and futrue tide levels affect the speed, and travel time of motorist in Annapolis?
- Would rainfall/snowfall in conjunction with sea level rise relating to land subsidence lead to more flooding, both depth and frequency, perhaps even more affected segments?

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ABSTRACT

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