Mapping Conservation Opportunities for Flood Mitigation

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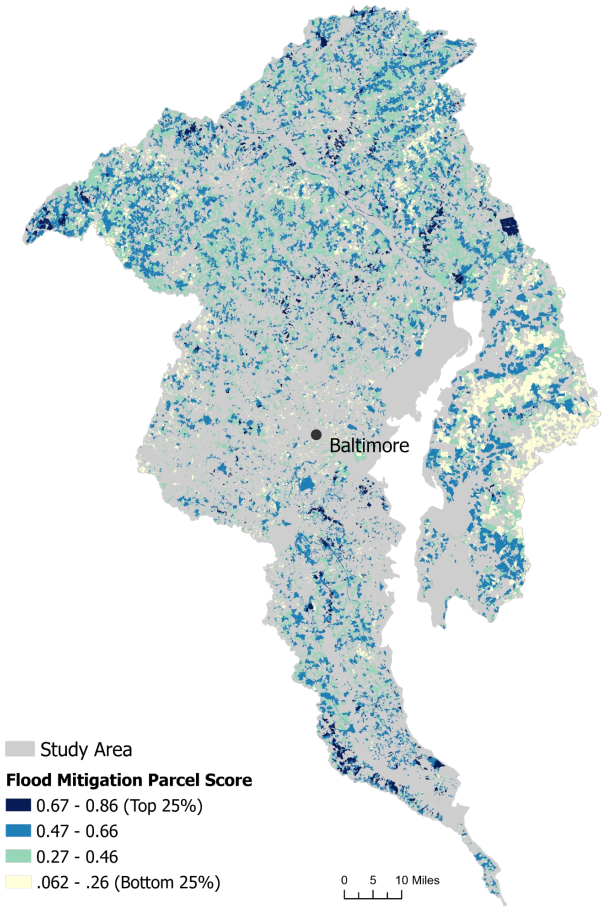
Flooding in the Chesapeake Bay Watershed

Flooding from heavy rainfall, sea level rise, and tropical storms is the most costly hazard in the Chesapeake Bay Watershed (CITE). These flood events are only becoming more frequent as climate change drives an increase in extreme rainfall events in the region, straining aging flood infrastructure (Wright et al. 2019). Ellicott City, Maryland has experienced three floods of at least 100-year intensity (1% annual chance storms) in the span of ten years: once in 2011, 2016, and 2018. The 2016 storm killed two people and caused $22 million in damages and $42 million in lost economic activity (Poon, 2019).

Flood waters engulf the town of Ellicott CIty, Maryland during a 2018 storm. Credit: Libby Solomon / The Baltimore Sun

The Role of Conservation in Flood Mitigation

Conserving and managing wetlands, riparian forests, and other lands that retain stormwater runoff can prevent damage to communities and infrastructure, yielding immediate and long-term economic benefits (Johnson et al., 2020). A recent report in Nature Sustainability found that by 2070, the cumulative avoided flood damages would exceed the costs of land acquisition for more than 1/3 of unprotected natural lands in the 100-year floodplain (Johnson et al., 2020). While cost effective nature-based approaches to flood mitigation are being adopted at many scales, land conservation and restoration for flood mitigation is most effective when planned and implemented at large spatial scales (The World Bank, 2017).



Spatial Analysis to Support Conservation of Flood-Mitigating Lands

In this analysis we used spatial datasets of floodplains, soils, precipitation, built infrastructure, and land cover to map the distribution of flood-mitigating lands. We assigned a final score, ranging from 0 to 1, to unprotected parcels greater than 10 acres to denote the flood mitigation capacity of a specific parcel. Parcels with high scores contain lands that are more effective at attenuating runoff, are within 100-year floodplains, and are within watersheds likely to sustain costly damages to buildings in the event of a 100-year flood.

References

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