



Vulnerability of Boston's Marginalized Communities to Rising Sea Levels

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Introduction

Across the United States, environmental racism¹ stems from systematic racism, the effects of segregation, and capitalist production practices.² In Boston, where the effects of redlining impact communities of color today,³ historically marginalized communities are more vulnerable to coastal flooding due to fewer protections, less secure infrastructure, and lack of political power.⁴

While there is a consensus that sea level rise (SLR) will impact marginalized communities, there is less certainty about how exposed marginalized communities will be to SLR in the future. In this study, projections for SLR are compared to community vulnerability to determine if Boston's most vulnerable communities also have a great exposure to SLR.

Methodology and Data

Spatial data on SLR and community vulnerability for the city of Boston were obtained from the NOAA sea level rise viewer⁵:

- SLR: projected SLR for intermediate-low (2 ft) and high (6 ft) scenario projections through 2100 (Fig 1).⁵
- Community vulnerability scores (low, medium, high) derived from Climate Ready Boston Social Vulnerability Index for populations defined as "Low to no Income" and "People of Color" (Fig 2).⁶

Community exposure to SLR evaluated for "low risk" (0), "low-lying" (1), and "inundated" (2) (Table 1).

Discussion and Conclusion

Waterfront towns were expected to be the most vulnerable, but the expected increase in exposure to SLR by more socially vulnerable inland towns did not occur. Despite the lack of direct exposure, historically marginalized and under-represented communities are often more vulnerable to indirect impacts.

For example, Massachusetts is within the top three states at risk for the number of affordable housing units directly exposed or vulnerable to SLR.⁴ Recent studies on the Carolinas indicate that while high-income and low-income communities are equally exposed to SLR, the impacts become disproportionate as the problem progresses.⁷

Boston's coastal resilience plan acknowledges the increased risk to SLR for vulnerable populations.⁸

Boston's plan includes:

- Modifications to critical infrastructure/relocation from vulnerable areas.
- Outreach for evacuation routes, flood zones, and response plans.

Results

Table 1: Exposure scores for 2 ft and 6 ft SLR by 2100 across the city of Boston, MA.^{5, 6}

Community	2 ft SLR	6 ft SLR
Mission Hill	1	2
Jamaica Plain	1	1
Roslindale	0	0
West Roxbury	0	0
Hyde Park	0	0
Mattapan	0	0
Longwood Medical	1	2
Roxbury	1	2
Leather District	1	2
Bay Village	1	2
Fenway	1	2
Back Bay	1	2
Allston	1	2
Brighton	1	2
Dorchester	2	2
East Boston	1	2
Charlestown	1	2
South Boston	2	2
Harbor Island	1	2
West End	1	2
South End	1	2

Table One displays the exposure scores of individual Boston communities.

- Only 2 communities, Dorchester (high vulnerability) and South Boston (medium vulnerability) were inundated by SLR under the intermediate-low scenario.
- Waterfront towns have greater exposure to SLR (Back Bay) but tend to have lower social vulnerability. (Back Bay has lower averages of low-income and people of color and had an exposure score of 1 when Dorchester reached 2.)
- Towns with higher averages of low-income and people of color (Hyde Park, West Roxbury, Mattapan) had lower exposure due to inland location.
- Inland towns may also be exposed for 6 ft of SLR (e.g., Roxbury).

References

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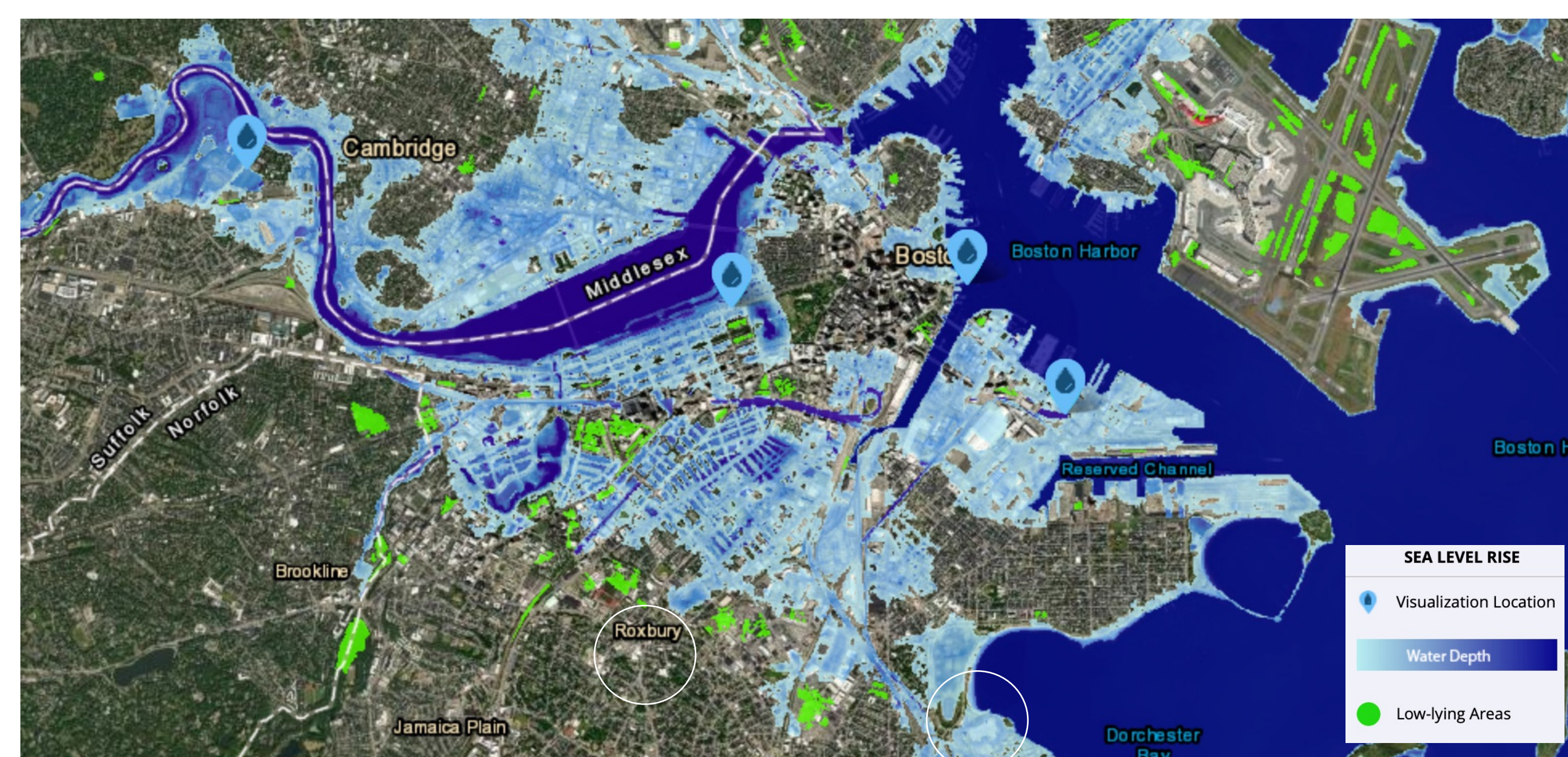


Fig 1: Projected inundation for 6 ft of SLR by 2100 for Boston, MA.⁵ Green – low lying to dark blue – most inundated.

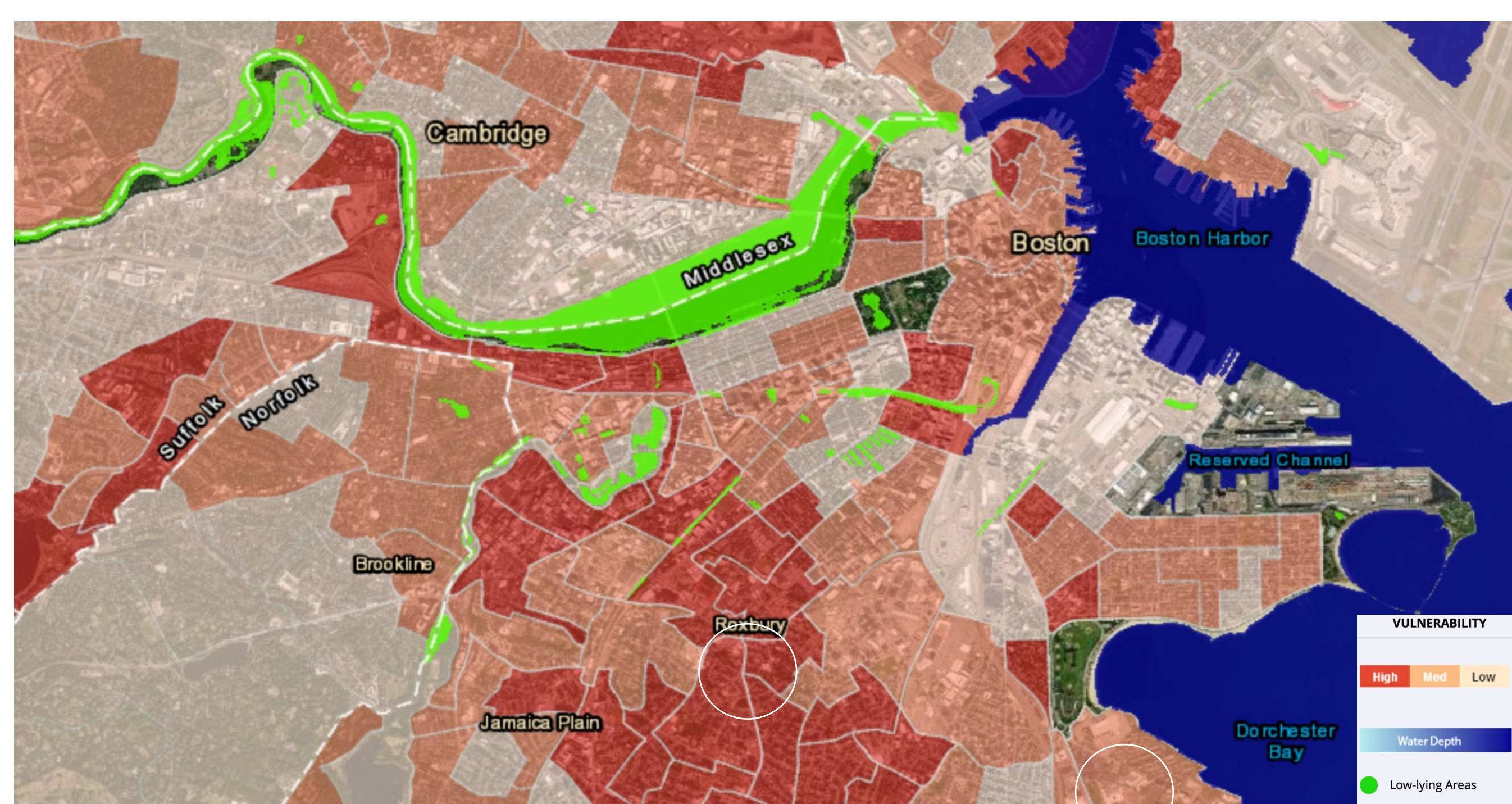


Fig 2: Community vulnerability ratings for Boston, MA.⁵ Clear – least vulnerable to dark red – most vulnerable.