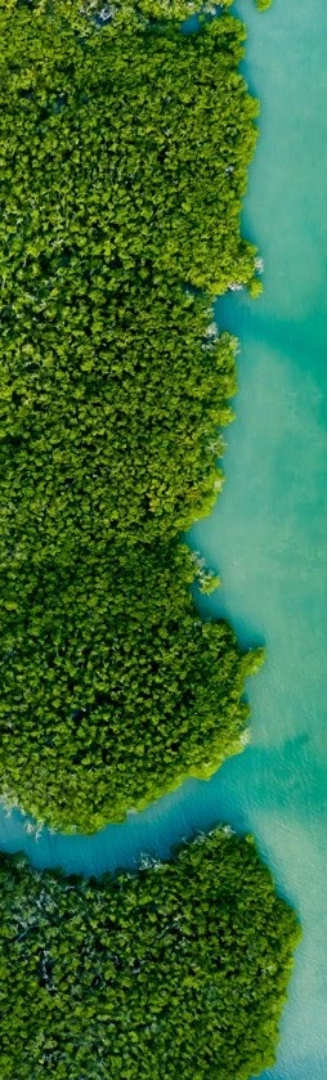


Measuring resilience

Developing community-informed and evidence-based resilience metrics for New York City and beyond

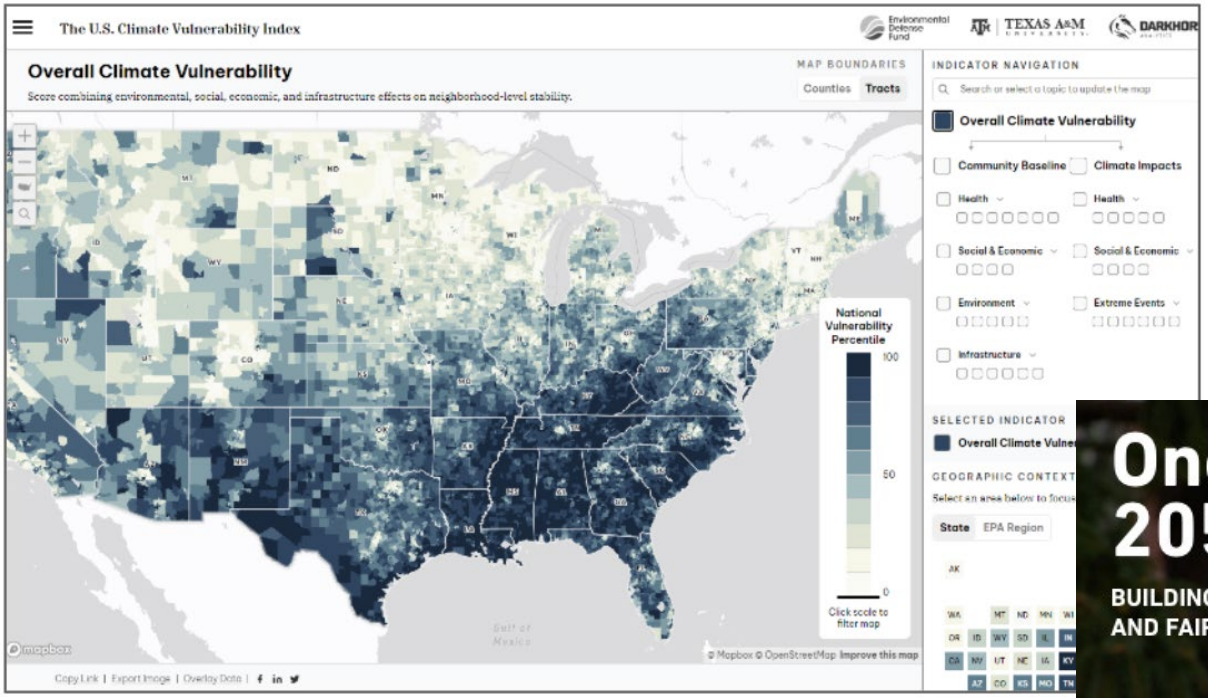
Kate Boicourt, Environmental Defense Fund
Anushi Garg, Environmental Defense Fund

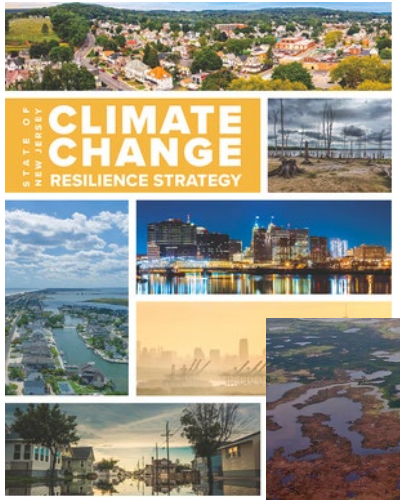
Overview

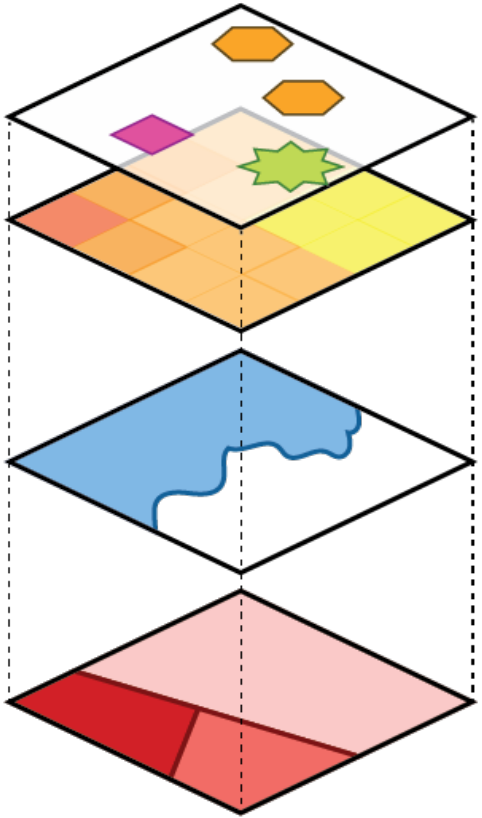
- Project background and goals
- Our process
- Analysis & results
- Applications
- Looking ahead

Project background and goals

"How resilient are we?"







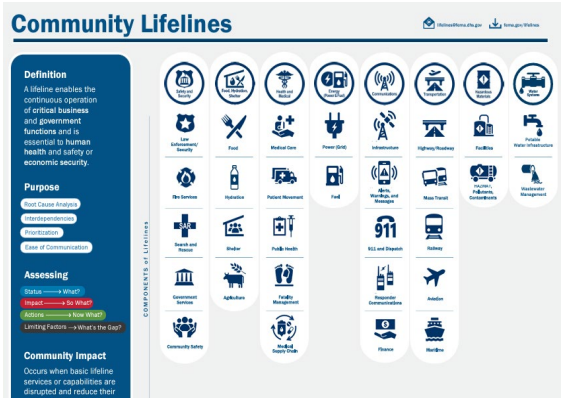
Resilience Metrics
e.g. Number of hazardous waste sites, Air quality concentration of PM 2.5

Hazard
ex. Flood zone

Vulnerability
ex. Social Vulnerability Index

Our (iterative) process

1



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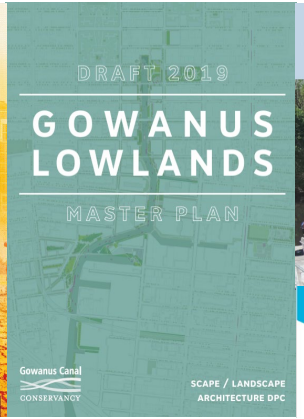
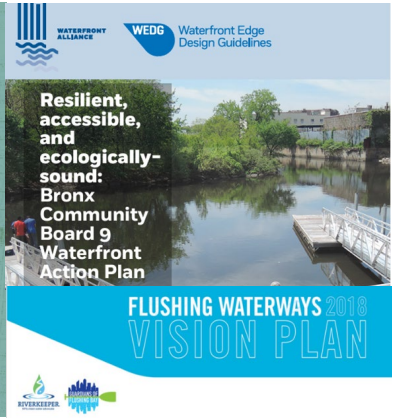




Collection of community-based plans

Welcome to the NYC Climate Resilience Plan Mapper!

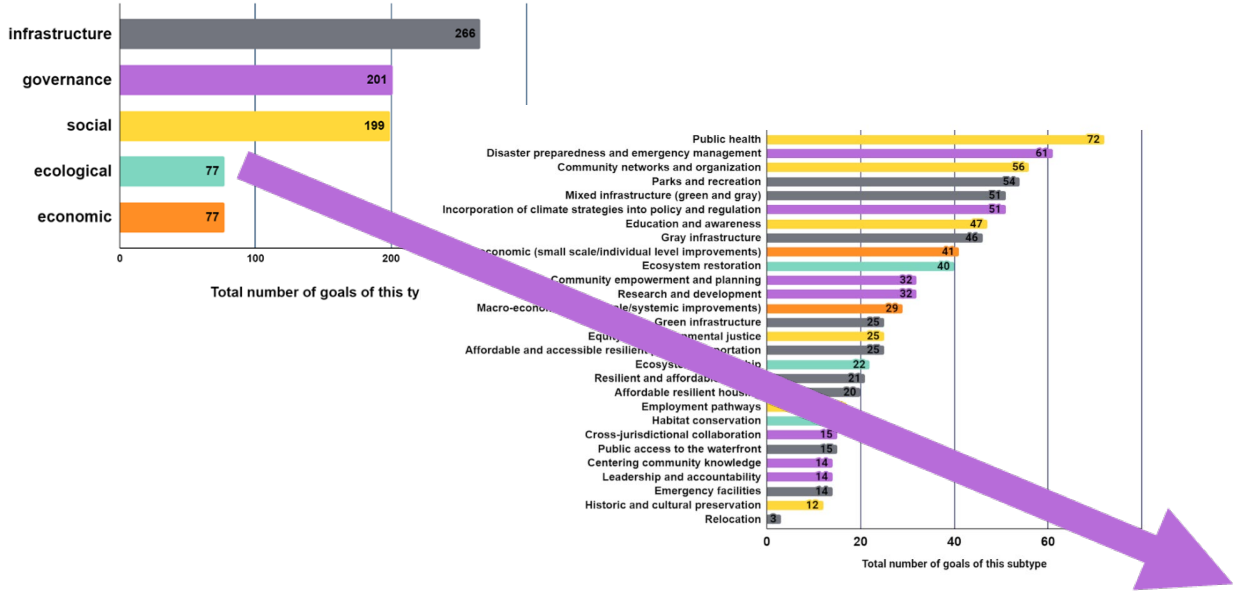
October 29, 2022 marked the 10-year anniversary of Hurricane Sandy. This map is intended to highlight the amazing community-led climate resilience work undertaken by organizations across New York City. Mapping these plans, along with government-led place-based plans and those from academic institutions, lets us visualize the community-level response to risks like storm surge, extreme rainfall, and urban heat island effect. This map can also serve as a tool for community groups to see how other communities are rising to the challenges brought on by climate change.

This map is currently in beta, and we plan to update it regularly. If you'd like to provide any feedback or add a resilience plan we're missing, please use this form.

This map is a project of the Regional Plan Association, Rebuild by Design, and Environmental Defense Fund.Special thanks to all of the organizations that shared their plans with us and to Columbia University's Center for Resilient Cities and Landscapes for sharing additional research.

© Mapbox © OpenStreetMap **Improve this map**

Goal consolidation



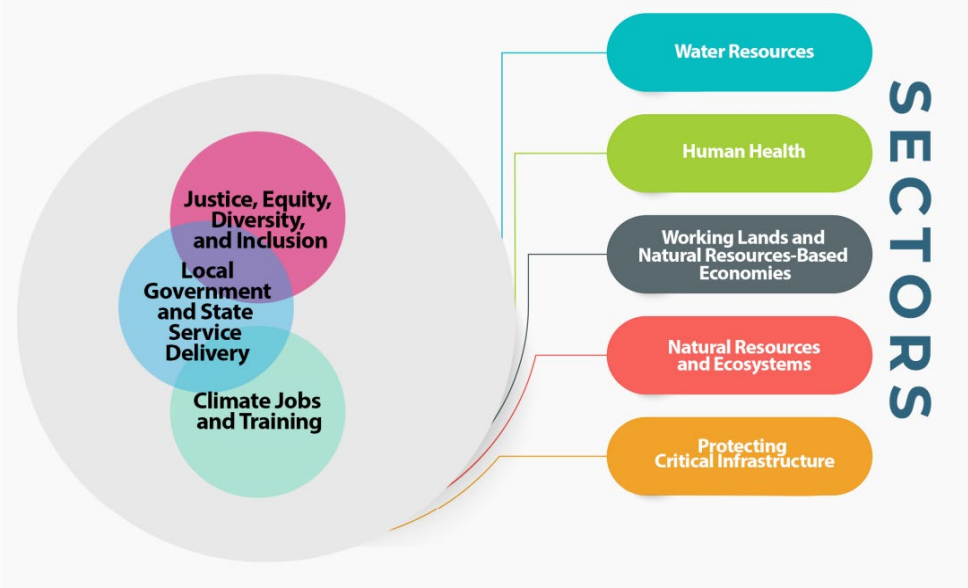
Consolidated goal themes

1. Education and empowerment
2. Economically and Socially Restorative
3. Healthy Communities
4. Governance
5. Built Infrastructure
6. Shelter
7. Green and Natural Infrastructure
8. Emergency Preparedness and Response

Final Goal Themes

1. Education and Empowerment
2. Economically and Socially Restorative
3. Healthy Communities
4. Governance
5. Built Infrastructure
6. Shelter
7. Green and Natural Infrastructure
8. Emergency Preparedness and Response

MD's Focus Areas & Sectors



Definitions

	Theme	Goal	Indicator	Metric	Target
Definition	A category reflecting commonalities or patterns in the language of multiple goals.	Visions or objectives developed by communities for the core attributes of resilience that support function despite the acute shocks and chronic stressors associated with climate change.	A variable that reflects the degree to which a goal is being addressed.	A specific quantitative or qualitative data stream used to measure the indicator.	A measurable, long-term commitment towards a goal, referencing a specific desired performance level.
Example	Green and Natural Infrastructure	Urban tree canopy is maximized, monitored, and healthy	Condition of urban tree canopy	Number of street trees per acre	Every neighborhood should have a healthy and well monitored tree canopy coverage of over XX%

Green and Natural Infrastructure

Goal: Natural resources and habitats are healthy and maximized, combat urban heat, flooding and other climate impacts, and benefit health

Indicator	Metric	Potential data source
Stormwater is absorbed by natural/green infrastructure	% of local green infrastructure target met Gallons of stormwater captured annually by green infrastructure *See also Healthy Communities goal 4.1*	NYC DEP Green infrastructure data *not all data sets may be readily available. NYC is also looking at "greened acres" as a measure of amount of stormwater managed by green infrastructure annually
Tree canopy and biomass are healthy, widespread and equitably distributed, providing habitat, carbon storage and cooling	% of trees rated as healthy % of tree canopy coverage Pounds of air pollutants removed annually	New York City Tree Map Forestry tree points in NYC including "forestry work orders," "forestry inspections" and "forestry planting spaces" NYC land cover raster data USFS Tree Canopy Cover Dataset

Built Infrastructure

Goal: Climate safe emergency shelters are accessible to all and serve as multipurpose community centers

Indicator	Metric	Potential data source
All residents are within a 15-minute walk or transit trip of a shelter that provides safety from flood and heat exposure	Analysis demonstrates that shelters that provide cooling and safety from flood risks (e.g., elevated out of the floodplain and with unobstructed access to safe egress/transit routes) cover all neighborhoods across the region	TIGER/Line analysis of NYC cooling center location coverage New York State Department of Health Cooling Center Application
	Locations of shelters and distributional equity across the region	NYC hurricane safe evacuation centers NYC homeless shelter locations
	See also Emergency Preparedness Goal 8.2	

Economically and socially restorative

Goal: Climate resilience investments are prioritized and flow to communities most vulnerable to the impacts of climate change

Indicator	Metric	Potential data source
Government funding for climate resilience flows equitably	% of climate resilience funding (resilient infrastructure, retrofits and buyouts) annually flowing to designated disadvantaged communities	State and local resilience project budgets and locations Disadvantaged communities maps

Applications

Government managers

- Measure progress, triage resources

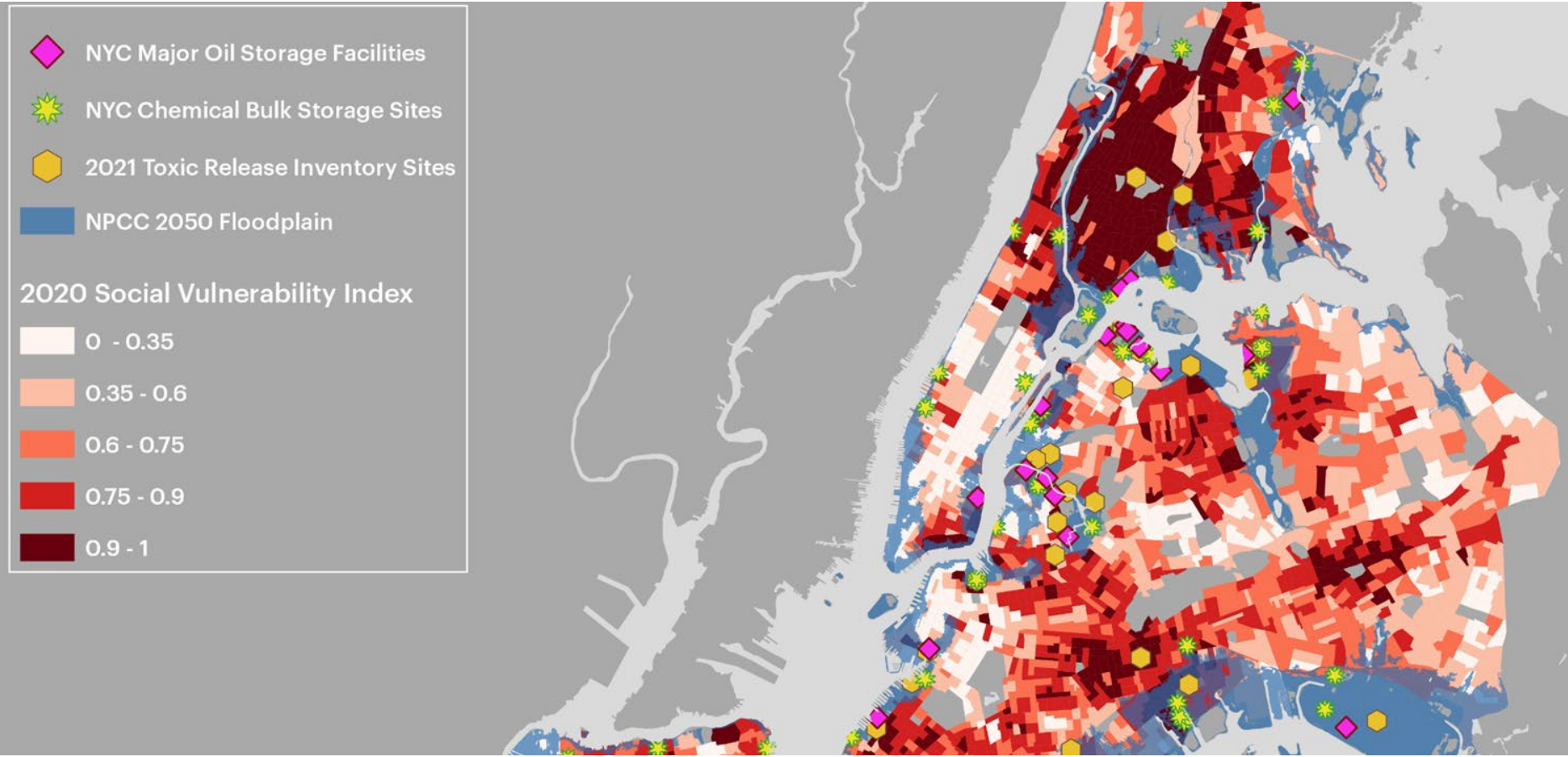
Advocates

- As a report card to hold policymakers accountable

Community-based organizations

- Self-assess community and leverage financial support

Mapping the indicators: toxic sites in the floodplain



Thank you!

Environmental Defense Fund