RESILIENT INFRASTRUCTURE FOR NEW YORK STATE

Addresses **FLOODING**
+ FUTURE CLIMATE RISKS
Creates **JOBS**
Increases **ECONOMIC DEVELOPMENT**
Restores **ECOLOGY**
Promotes **SUSTAINABILITY**
Builds **EQUITY**
Improves **PUBLIC HEALTH**
Saves **MONEY**
Enhances **COMMUNITIES**

WE CANNOT WAIT ANY LONGER...

For more information, contact
info@rebuildbydesign.org

REBUILD BY DESIGN

REBUILD BY DESIGN'S RESILIENT INFRASTRUCTURE ADVISORY GROUP:

Associated General Contractors of New York State
Association of Towns of the State of New York
Building and Construction Trades Council of Greater New York
Construction Industry Council of Westchester and the Hudson Valley
Hudson Valley Economic Development Corporation
Environmental Advocates of New York
Long Island Builders Institute
Natural Resources Defense Council
New York Building Congress
New York League of Conservation Voters
Riverkeeper
Scenic Hudson
The Nature Conservancy
The Trust for Public Land

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PREPARED BY:

Amy Chester

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To confront the new reality of climate change and extreme weather, New York State will need to invest billions of dollars in flood control and reconstruction of existing infrastructure.

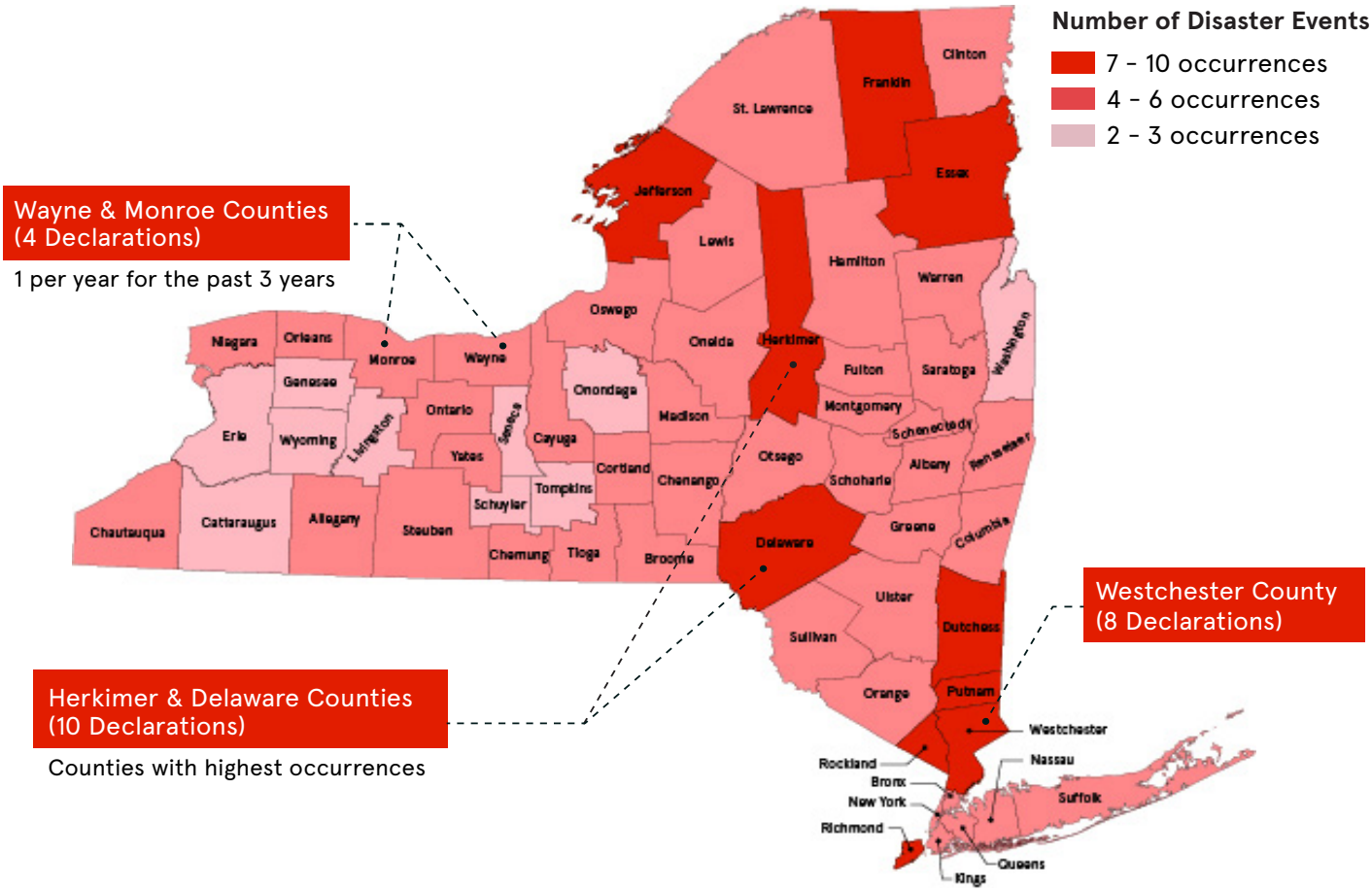
Over the last 10 years, every county in New York State was impacted by severe storms and flooding, tropical storms, or hurricanes. More than half were affected by 5 or more disaster events. The major federal disaster declarations for these counties totaled $37.3 billion in federal aid for recovery efforts, which represents one half to one third of total losses.

Scientists estimate the costs of climate change in New York State will rise to $10 billion annually by 2050,[1] while damage to property values will increase to $100 billion.[2]

1. ClimAid. 2. Union of Concerned Scientists.

THE CHALLENGE

DISASTER DECLARATION FREQUENCY, 2011 – 2019



NY STATE STATISTICS

$55 BILLION	PROJECTED COST FOR NEW YORK STATE BY 2029
90%	NY STATE'S POPULATION RESIDING IN WATERFRONT COMMUNITIES [1]
EVERY COUNTY	AT LEAST 2 FLOODING DISASTERS
60%	COUNTIES SUFFERED FROM 5 OR MORE DISASTERS
$37.3 BILLION	FEDERAL AND STATE ASSISTANCE PROVIDED
23.19% CHANCE	DAILY PROBABILITY FOR FLOODING EPISODE [1]
90%	PERCENT OF SMALLER COMPANIES FAIL WITHIN A YEAR FOLLOWING A DISASTER, UNLESS THEY CAN RESUME OPERATIONS WITHIN 5 DAYS [3]
$1.4 BILLION	TOTAL PROPERTY DAMAGE DUE TO ALL FLOODING SINCE 2001 [2]

1. DHSES: NEW YORK STATE HAZARD MITIGATION PLAN, 2019.
2. NOAA: NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION (NCEI) STORM EVENTS DATASET, 2011-2019.
3. FEMA: "MAKE YOUR BUSINESS RESILIENT" BUSINESS INFOGRAPHIC, 2015.

FEDERAL AND STATE DISASTER DECLARATIONS 2011–2019

Total:
$37.3 Billion
Federal & State assistance
Every county
has had multiple events
More than half
five or more disasters

	Total Occurrences Per County	2011 Severe Storms, Flooding**	2011 Hurricane Irene**	2011 Tropical Storm Lee	2011 Winter Storm Alfred	2012 Hurricane Sandy**	2013 Severe Storm, Tidal Surge	2013 Severe Storms, Flooding **	2014 Heavy Rain, Snow, Flooding	2014 Severe Storms, Flooding**	2014 Severe Storm, Flooding**	2016 Nor'easter, Winter Storm	2017 Winter Storm Stella**	2017 Lake Ontario, Flooding**	2018 Winter Storm, Flooding	2018 Nor'easter, Coastal Flooding	2018 Nor'easter, Flooding	2018 Severe Storms, Flooding **	2019 Lake Ontario, Flooding	2019 Halloween Flood
Albany	4		■		■	■							■								
Allegany	4	■				■		■		■											
Bronx	6		■			■	■					■			■		■				
Broome	6	■		■		■		■					■					■			
Cattaraugus	3					■				■	■										
Cayuga	4					■								■					■	■	
Chautauqua	5					■		■		■	■										■
Chemung	4	■		■		■												■			
Chenango	6	■		■		■		■					■					■			
Clinton	5	■	■			■		■					■								
Columbia	5		■		■	■	■						■								
Cortland	5					■		■					■					■			■
Delaware	10	■	■	■	■	■	■	■		■			■					■			
Dutchess	7		■		■	■	■						■			■					■
Erie	3					■					■										■
Essex	7	■	■			■		■	■				■								■
Franklin	7	■	■			■		■	■		■		■								
Fulton	4		■	■		■							■								
Genesee	2					■					■										
Greene	4		■		■	■	■														
Hamilton	5	■	■			■							■								■
Herkimer	10	■	■	■		■		■	■	■	■		■								■
Jefferson	7					■			■		■		■	■					■		■
Kings	5		■			■						■			■		■				
Lewis	5	■				■			■	■	■										
Livingston	3	■				■				■											
Madison	4	■				■		■					■								
Monroe	4					■								■				■	■		
Montgomery	6		■	■		■		■					■								■
Nassau	5		■			■						■			■		■				
New York	5		■			■						■			■		■				
Niagara	5	■				■		■						■					■		
Oneida	6	■		■		■		■					■								■
Onondaga	3	■				■												■			
Ontario	4	■				■				■								■			
Orange	6		■	■	■	■	■					■									
Orleans	5					■					■		■	■					■		
Oswego	4					■					■			■					■		
Otsego	6		■	■		■		■		■			■								
Putnam	7		■		■	■	■					■				■	■				
Queens	5		■			■						■			■		■				
Rensselaer	5		■		■	■	■						■								
Richmond	7		■		■	■	■					■			■		■				
Rockland	7		■		■	■	■					■			■		■				
Saratoga	4		■			■							■								■
Schenectady	4		■	■		■							■								
Schoharie	5		■	■		■		■					■								
Schuyler	2					■												■			
Seneca	2					■												■			
St. Lawrence	6					■		■	■		■			■					■		
Steuben	4	■				■				■								■			
Suffolk	6		■			■						■	■		■		■				
Sullivan	6		■		■	■	■						■			■					
Tioga	6	■		■		■		■					■					■			
Tompkins	3			■		■							■								
Ulster	6	■	■	■	■	■							■								
Warren	5	■	■			■		■													■
Washington	2		■			■															
Wayne	4					■								■				■	■		
Westchester	8		■		■	■	■					■			■	■	■				
Wyoming	3	■				■					■										
Yates	4	■				■				■								■			
FEMA Assistance *	**$16.7B**	**$35.7M**	**$651.7M**	**$377.8M**	**–**	**$15.4B**	**–**	**$63M**	**–**	**$29.9M**	**$32.3M**	**–**	**$26.7M**	**$21.1M**	**–**	**–**	**–**	**$2.6M**	**–**	**–**
Other Fed Asst. *	**$20B**	**–**	**–**	**$93.2M**	**–**	**$20B***	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
State Assistance *	**$548.3M**	**$10.7M**	**$46.7M**	**$47M**	**–**	**$7.3M**	**–**	**$16M**	**–**	**$6.3M**	**$6.4M**	**–**	**–**	**$95M**	**–**	**–**	**–**	**$13M**	**$300M**	**–**

*M = Millions. B = Billions. ** Both State and Federal declarations are included.
* Includes New York City and New York State

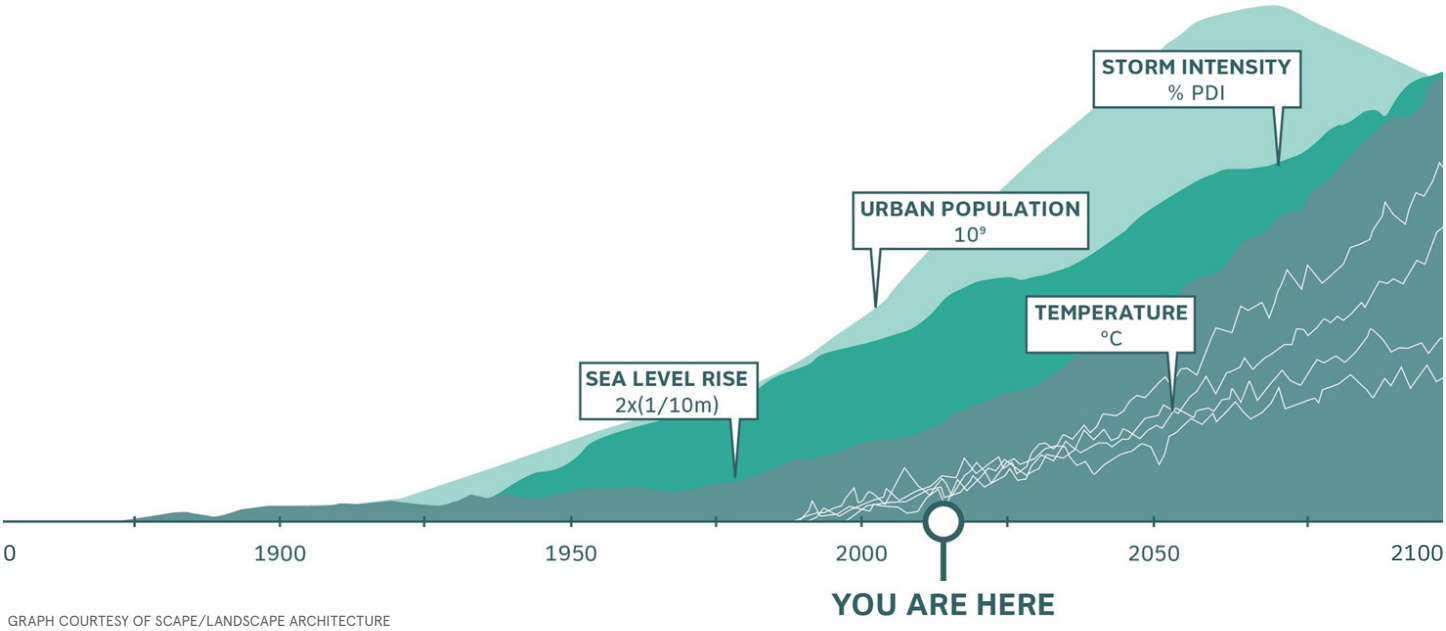
Data Sources: (CDBG-DR) Grant History Report, 2019. (FEMA) Major Disaster Declarations. (DHSES) DPC Annual Report, 2017. (GOSR) Governor's Office of Storm Recovery: Funding, 2019. NYC Recovery, Overview of Federal Funding, 2019.

NEW YORK NEEDS A COMPREHENSIVE APPROACH THAT HELPS VULNERABLE COMMUNITIES PREPARE THEIR BUILT INFRASTRUCTURE AND NATURAL SYSTEMS BEFORE THEY SUFFER ADDITIONAL DEVASTATING DAMAGE FROM CLIMATE CHANGE AND RELATED FLOOD EVENTS.

1. Fund green and grey infrastructure to lower communities' vulnerability to flooding and other environmental risks

2. Create the kind of infrastructure that can enhance communities' quality of life throughout the year and support New York's economy

3. Engage New Yorkers in a meaningful planning process to build trust and address communities' specific, local flood-related concerns.



GRAPH COURTESY OF SCAPE/LANDSCAPE ARCHITECTURE

PHOTO COURTESY OF THE NEW YORK TIMES

PHOTO COURTESY OF THE NEW YORK TIMES

WE PROPOSE TO ...

Create a Resilient Infrastructure Fund to build projects that will protect communities from flooding and address physical and social vunerabilities.

THIS DEDICATED FUND CAN ENHANCE RECREATION, HEALTH, AND SOCIAL RESILIENCE WHILE PROTECTING TRANSPORTATION AND OTHER CRITICAL INFRASTRUCTURE, HOUSING AND MAIN STREETS FROM FLOODING.

THIS INITIATIVE WILL CREATE THOUSANDS OF JOBS AND ALIGN DIVERSE INTERESTS- SUCH AS ENVIRONMENTAL GROUPS, BUSINESS, LABOR, AND GOVERNMENT-TO TAKE ACTION TO PREPARE FOR CLIMATE CHANGE WHILE ENHANCING COMMUNITIES' QUALITY OF LIFE ALL ACROSS NEW YORK STATE.

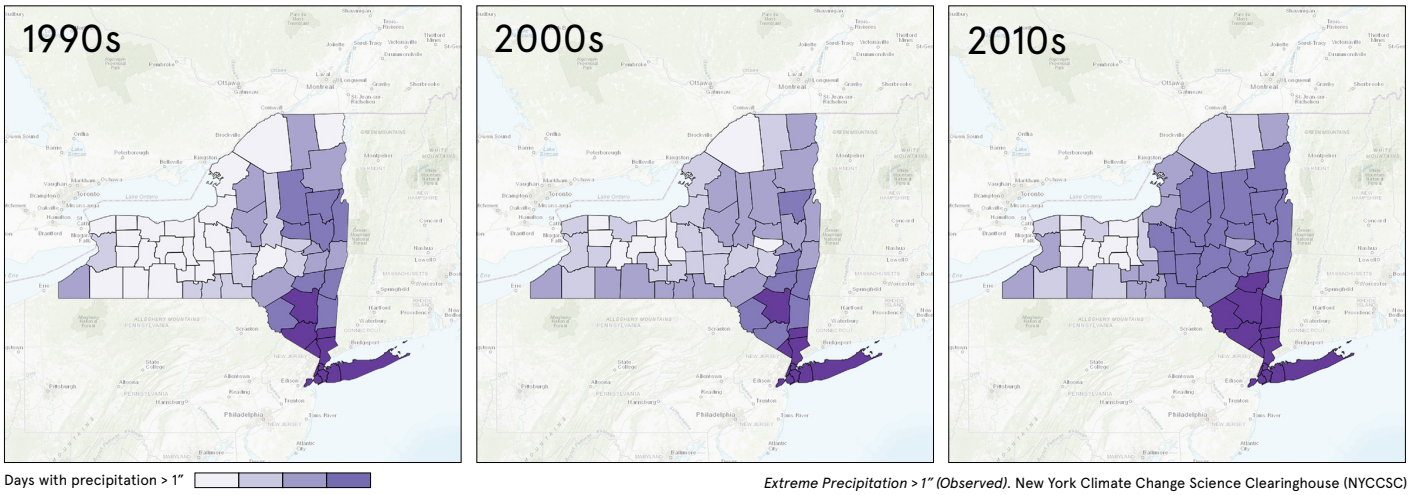
POTENTIAL PROJECTS CAN INCLUDE:

- IMPROVING SHORELINES AND STORM WATER MANAGEMENT SYSTEMS
- BUILDING BERMS, DIKES, AND LEVEES
- WIDENING CULVERTS AND ELEVATING STREETS AND RAILWAYS
- DAYLIGHTING RIVERS
- BUYING OUT HOMES AND BUSINESSES TO RELOCATE OUT OF HARM'S WAY
- ADAPTING SEWAGE TREATMENT PLANTS, WATER SUPPLY SYSTEMS, AND OTHER UTILITIES
- CREATING NEW PARKS OR ECOLOGICAL ENHANCEMENTS

PHOTO COURTESY OF EASTSIDE COASTAL RESILIENCE / NYC MAYOR'S OFFICE

BY ACTING NOW WE WILL ENSURE WE ARE READY FOR THE FUTURE

NEW YORK STATE HAS EXPERIENCED INCREASED RAINFALL OVER THE LAST THIRTY YEARS



Extreme Precipitation > 1” (Observed). New York Climate Change Science Clearinghouse (NYCCSC)

“CLIMATE CHANGE IS A REALITY, AND NOT TO ADDRESS IT IS GROSS NEGLIGENCE BY GOVERNMENT AND IRRESPONSIBLE AS CITIZENS.” – GOVERNOR CUOMO, OCTOBER 7, 2015

THE CONCEPT

To confront the reality of the flooding we already experience, New York State must take bold action. **The creation of a Resilient Infrastructure Fund will serve as a catalyst to support innovative, data-driven, and community-led approaches to address flooding throughout the State.** It will enable investment in priority projects from the regional/systems scale to individual and community actions, and marry social and physical resilience.

New York State is already experiencing the impacts of climate change. Every county has had disaster declarations due to rain, riverine, and storm surge in the past ten years—60 percent of counties have been inundated more than five times. Climate change already makes the extremes more extreme, leaving behind the increased frequency of both nuisance flooding and catastrophic events. With ninety percent of New York State's population residing in waterfront communities,[1] we have an obligation to protect our State from the inevitable flooding and the social and physical disruptions that flooding leaves behind.

The Resilient Infrastructure Fund will foster local planning and community understanding of what is needed to address the current flooding events. The fund will be coupled with a program that leads communities through a process to uncover their specific vulnerabilities to address flooding as well as other climate hazards such as heat, wind, and drought. The program will include substantial citizen engagement to build trust and result in funded projects for multi-beneficial infrastructure that enhances communities every day of the year, not just during a storm. This will enable communities to take lessons from the process and apply them towards other vulnerabilities, further increasing the impact of this investment.

This initiative could create thousands of jobs, seed a new industry, and align diverse interests—such as environmental groups, business, labor, and government—to take action to prepare for increased flooding while enhancing communities' quality of life and economic outcomes across New York State. Moreover, AECOM estimates that inaction will cost our State $55 billion in ten years. Investing now is good for our economy and good for our communities—we cannot wait any longer.

OBJECTIVES

1. Create an inclusive program that will use funding to catalyze regional planning to design and build infrastructure with multiple benefits to address physical and social vulnerabilities;
2. Fully engage stakeholders to enable a better understanding of the risks, impacts, and tradeoffs that increased flooding brings;
3. Address the most physically and socially vulnerable first;
4. Create jobs and job-training opportunities, revitalize economies, build healthy communities, and increase social resilience;
5. Enable communities to take lessons from the process and apply them towards other vulnerabilities, further increasing the impact of this investment.

1. MitigateNY, 2018. https://mitigateny.availabs.org

I. THE CHALLENGE:

By 2050, economic impacts from climate change in New York state will cost $10 billion annually,[2] and by the end of the century, property value loss in NY State could be $100 billion,[3] resulting in $1.9 billion less in property tax revenue for localities.[4] The New York metropolitan area ranks #1 in regards to the negative impacts climate change will have on Gross Domestic Product (GDP).[5]

Additionally, the American Society of Civil Engineers gave NYS's existing infrastructure a C- rating in their latest annual review,[6] which will only get worse with increased climate stressors. Furthermore, Moody's has warned municipalities to prepare for climate change or risk credit downgrades,[7] which would make it more expensive for governments to borrow later.

Though there are many programs in New York State to address climate change through mitigation, there is not yet a comprehensive plan for how our communities will adapt to the flooding events which we are already experiencing. We know that the federal government will not be a leader on this issue and in most cases, localities do not have adequate funds to take significant action alone. Moreover, they do not have the capacity to comprehensively plan for the infrastructure needed, or jurisdiction over a regional asset that needs to be raised, hardened or moved.

From Hurricanes Sandy, Irene, and Lee–to ice jams and overtopping of lakes–increased water from storm surge and heavy rains continue to disrupt New Yorkers' lives, property, and businesses. New York State needs a funded program that works directly with communities to address flooding events before vulnerable communities suffer physically and socially. The State must couple its mitigation efforts with adaptation, create jobs and opportunities, and create a comprehensive plan to prepare our communities for the future.

II. THE PROGRAM:

The *Resilient Infrastructure Fund* will be an inclusive program that will use funding to incentivize regional planning to design and build infrastructure with multiple benefits to address physical and social vulnerabilities. This initiative is designed to create and fund a roadmap of unique interventions statewide—from the regional/system scale to the individual scale—that can be implemented through this program. This program builds on the successes of Rebuild by Design and the National Disaster Resilience Competition models, and incorporates the great work that has already been done in the State of New York while becoming a model for other states.

Who is eligible?

An applicant for funding can be an agency, a group of agencies, a municipality (or multiple), a tribal nation, a not-for-profit, or an authority. The private sector can apply if they have ownership over the project location and the project has a clear public benefit. Entities can apply by themselves or as co-applicants when the project crosses multiple jurisdictions or agencies. This will incentivize a comprehensive approach and unite varied interests.

What is the process?

Given the complexity of the challenge, significant capacity building may be required for some localities who have not already been a part of existing State programs. Therefore, like Rebuild by Design and the National Disaster Resilience Competition, there will be three stages: (1) research, risk assessment and planning; (2) design; (3) implementation. Communities will be supported through this process by technical experts if requested by the locality. Those technical experts should be screened and trained by the State and an appointed board of advisors to ensure they will address the goals of this initiative, and will create an inclusive and equitable, science-driven process.

(2) Leichenko, Major, Johnson, Patrick, & O'Grady, "An Economic Analysis of Climate Change Impacts and Adaptations in New York State," ClimAID, 2014. (3) Union of Concerned Scientists, "2.5 Million Homes, Businesses Totalling $1 Trillion Threatened by High Tide Flooding," 2018 (4) Union of Concerned Scientists, "New Study Finds 143,000 New York Homes Worth $98 Billion will be at risk from Tidal Flooding," 2018 (5) Black Rock Investment Institute, "Getting Physical" 2019 (6) American Society of Civil Engineers,"2015 New York Infrastructure Report Card" (7) "Moody's sets out approach to assessing the credit impact of physical climate change on sovereogms." 2016.

Stage One: Research, Risk Assessment, and Planning

Ensure a community understands their specific risks, as well as the interdependencies of infrastructural, ecological, and social systems that will be further affected by flooding. There are many successful models for inclusive planning, including: the Natural Resources Defense Council's Strong Prosperous and Resilient Communities Challenge; The Nature Conservancy's Community Resilience Building; 100 Resilient Cities; Louisiana's LA Safe and Comprehensive Protection and Restoration Authority Plan; New York City's PlaNYC; the San Francisco Bay Area's Resilient by Design; and the Rebuild by Design Hurricane Sandy Competition. In this phase, localities will:

- Define their community;
- Identify non-government partners such as a chamber of commerce, a university, or strong civic organizations. Funding from this program must be made available to support community organizations to ensure they can meaningfully participate. Municipalities, with State guidance, can determine an equitable process to select partner organizations;
- Identify unique hazards, by using tools such as those found on the NYS Climate Smart Communities website;
- Use the most up-to-date climate projections to understand different scenario levels;
- Ground the data with the community who may already be experiencing flooding events;
- Undertake a vulnerability assessment of buildings, hazardous materials, hazardous or polluting sites, utilities, healthcare, telecommunications, transportation, environmental protection and remediation, parks/recreation areas, water and wastewater, schools, shelters, police/fire facilities, and social and economic indicators (ex, income, asthma rates, elderly population), and any other critical operations such as vulnerable populations;
- Work with local and regional agency staff, residents, community organizations, activists, business leaders, experts, and government officials to form a comprehensive understanding of what assets are most valuable;
- Identify vulnerable areas as high-hazard areas and/or adaptation/retreat areas;
- Quantify economic impact to the system or locality for repeated loss, avoided loss, and flood insurance payments;
- Understand which other localities may be affected by the systems which affect your locality such as a watershed, a tributary, a railroad track, etc; and
- Hold public events to ensure all community members are a part of this process.

After understanding their vulnerabilities, communities will be encouraged to take a systems approach. For example: addressing all the issues that arise from a full watershed; by protecting a highway from flooding through a crucial corridor; or by creating a buy-out program that identifies places for new investment.

At the end of Stage One, applicants will identify the other municipalities needed to address the causes of flooding for that system, or the infrastructure or area(s) that are in need of funding, and become co-applicants with these neighboring municipalities who share the system. These municipalities move on to Stage Two together.

The State can waive localities from the required risk assessment in Stage One if a municipality demonstrates that they have undergone a comprehensive collaborative planning process with stakeholders that has resulted in an exhaustive plan to address those vulnerabilities. For instance, communities who have participated in NYS Climate Smart Communities, or Smart Growth Grant Program, or those who may have already completed significant resilience planning work can use their existing assessment to demonstrate capacity. Localities can form partnerships and move to Stage Two and apply to this fund to support projects within that plan.

In addition to technical assistance, communities will have access to an Expert Advisory Group, appointed by the State, that represents sectors such as climate science, hydrology, finance, design, community outreach, history, geography, geology, data processing, mapping, etc. Universities located around the State can play this crucial role.

Stage Two: Comprehensive Collaborative Adaptation Planning + Design

Applicants and co-applicants will create flood reduction projects that have multiple benefits such as health, recreation, ecological, economic development, and educational opportunities. They will expand their collaboration with the community institutions identified in Stage One to ensure their projects maintain the strong stakeholder engagement and support. Applicants should demonstrate how their projects have changed as a result of the stakeholder collaboration.

Applicants need to demonstrate project feasibility and effectiveness, and create a cost-benefit analysis that includes the valuation of ecosystem services, GHG emissions reduction, improved social and economic equity, safety, long-term monetary value that resilience creates such as future loss avoidance (insurance) and future cost avoidance (public and mental health). Applicants will also identify any local and federal funds which could be leveraged, and demonstrate how they will "share the risk" (i.e. have skin in the game) through matching funds, or other creative mechanisms for communities who do not have the local dollars to contribute, but have high need.

The end result will be a comprehensive vision with specific fundable projects, policies, or initiatives that result from Stage One research, further refinement, and stakeholder inclusion. The end result should incorporate or reference all other planning documents, and where appropriate, must be integrated with the local municipality's Hazard Mitigation Plan. The State will provide a unique Benefit-Cost framework to ensure social attributes are counted equally. Through this process, the plan will identify additional available funding through regular federal, state, and local budgets, as well as proposed policy changes needed to fully realize its intended goals.

Localities, who have not had significant experience planning, will be paired with a "technical team" of experts that must be approved and trained by the State. The technical team will be trained and certified by the State and can be comprised of private companies, or not-for-profits that already have notable experience planning comprehensively with stakeholder collaboration. The technical team must bring knowledge in water management, waste infrastructure, social programming, ecology, etc. depending on the locality's actual needs, and have a strong background in community capacity building and collaboration.

Stage Three: Implementation

Localities, agencies, or other entities (as per "Who is eligible?") will be granted funding to build resilient infrastructure. As the infrastructure is built, metrics will be developed to monitor the physical projects and social benefits to ensure that changes could be made if needed, and communities around the State can learn from one another. An inclusive community collaboration process throughout implementation must be maintained and funded as part of the construction budget. Outcomes of resilience metrics should be reported to the State of New York for twenty years to ensure shared learning from this investment.

III. WHAT KIND OF PROJECTS ARE ELIGIBLE?

The goal is to fund multiple new green or gray infrastructure exemplar projects that can demonstrate effective interventions, which can be replicated in other areas of the state. The most socially and physically vulnerable geographies should be prioritized. Eligible projects will include improving shorelines and stormwater management systems; restoring wetlands and protecting migration pathways; building berms, dikes, and levees; removing dams; right-sizing culverts and

elevating streets and railways; daylighting rivers; adapting sewage treatment plants, water supply systems, and other utilities; buying out homes and businesses from harm's way; acquiring land that can remain protected; stabilizing soil for farmland; creating new parks or ecological enhancements such as re-vegetation to absorb water; slowing energy from storms; and providing grants or tax incentives to move infrastructure to higher ground.

While addressing flooding, this dedicated fund must support projects that also enhance ecology, recreation, health, and social resilience and fit into New York State's overall strategy of promoting carbon reduction, economic growth and Smart Growth principles. The applicant must be able to quantify the social, ecological, and public health benefits of the proposed project, and demonstrate that this approach is cost-effective for long-term (50 years or more) solutions such as buy-outs vs. investments in hardening shorelines.

Using this fund to support an enhanced resilience value for projects that are already "normal business" of an existing government agency program should be supported. For instance, as NYSERDA is upgrading infrastructure in single-family homes for energy efficiency, the cost differential for creating resilience upgrades at the same time, such as moving critical infrastructure to a higher floor, should be supported. Alternatively, the Department of Transportation could use this fund to install porous services or green infrastructure as an addition to a highway improvement project.

Non-capital projects that are part of an overall strategy should be encouraged and could include: public education and communication; updating local bylaws, ordinances, plans; creating a land-use strategy to enable retreat from harm's way; municipal restructuring or merging; or preparing accurate flood maps that predict risk (instead of FEMA maps which are created from data from previous events) and make the data publicly available to enable smart investment choices. Projects from this fund could count towards FEMA's Community Rating System certification to receive credit for risk reduction.

Innovative projects should be encouraged, such as creating local stormwater markets and credit trading that incentivize private property owners to invest in reducing stormwater runoff,[8] or designing city adaptation plans that combine district-scale revenues with incentives for private investment in ways that are fair and equitable. All data and plans from this process should be included in future Hazard Mitigation Plans.

IV. HOW WILL FUNDING BE AWARDED?

In order to build trust in the process, there needs to be a clearly defined and transparent method to determine which projects get funding. The following are options for determining investment:

1. Create a new board that represents expertise around the state that includes infrastructure knowledge, environmental, economic development, urban planning, financing, environemtnal justice, public health, climate scientists, community and advocacy organizations, municipal and county officials, and the private sector.
2. Create a committee of executives from State Agencies. These agencies could include the Departments of State, Environmental Conservation, Transportation, Storm Recovery, Empire State Development, Emergency Management, etc.
3. Expand the Environmental Facilities Corporation (EFC) purview through legislation.

8. Department of Energy and Environment, "Stormwater Retention Credit Trading Program."

V. REQUIREMENTS AND SCORING

A decision framework will determine which priority projects will receive funding to include:

- Quantifiable risk reduction;
- Will be in compliance with the goals of the Climate Leadership and Community Protection Act, including that proposed infrastructure will not contribute additional greenhouse gases and will not disproportionately burden disadvantaged communities;
- Demonstration that the municipality truly collaborated with frontline communities who will be most affected, and that they support the vision;
- Qualitative and quantitative ecological, social, and public health benefits as outcomes, that should address existing and expected social and physical vulnerabilities;
- Science-based and forward-looking risk approaches;
- Addresses the needs outlined in the municipality's own detailed vulnerability and risk assessment created in Phase One. If a municipality can demonstrate they have already done this step, a former, but up-to-date, assessment can be used;
- Prioritization of the needs of the most physically and socially vulnerable;
- Prioritization of protecting livelihoods (such as job centers), and healthcare facilities are open and operational in disasters such as hospitals and nursing homes (i.e. ensuring critical routes around the hospital do not flood, or back-up energy generation for a public health care facility);
- Proposed infrastructure is designed to address multi-benefits and include addressing multiple risks (such as heat, wind, etc.) when applicable;
- Prioritization of nature-based solutions, including conservation or restoration of existing natural features to enhance ecological value;
- Projects that can be replicated elsewhere in the state or beyond;
- Promotion of a full system approach;
- Will be included in future mandated Hazard Mitigation Plans;
- Eligibility for FEMA's Community Rating System to lower risk and flood insurance premiums.

VI. HOW SHOULD NEW YORK STATE PAY FOR PLANNING + IMPLEMNTATION?

Billions of dollars are needed in ten years to begin to address NYS's vulnerability. The National Institute of Building Sciences estimates every $1 spent on mitigation saves society an average of $6 –a figure that covers only physical avoided losses, not the economic disruption from future events, or their social impact. The social benefits of a comprehensive planning approach that addresses both physical and social infrastructure will lead to improved health, mental health, and social resilience, as well as saving money on flood insurance and avoided losses. Spending dollars on resilient infrastructure will pay off.

In addition, it will become more expensive to fund capital projects without these measures, as credit rating agencies are paying increased attention to these risks. Moody's warned in 2017 that climate change would have a growing negative impact on the creditworthiness of U.S. state and local issuers—particularly those without sufficient adaptation and mitigation strategies.

The responsibility to address climate change should be in the hands of those that created the problem; however, we cannot hold all carbon users accountable, and therefore need additional solutions. The following are options created to ensure we do not take away from existing transportation, environmental, or infrastructure revenue sources, and allow for both capital and expense disbursements to support the program. Regardless of the source, funding should be held in a new public benefits authority or protected fund to ensure that the money is safe from other competing future needs.

1 Create a surcharge* on property-casualty insurance (exempting workers comp and medical malpractice). Goldman Sachs estimates (according to 2017 data) that the capital capacity over 10 years would be ~$17.6 billion for two percent and ~$26.4 billion for three percent including "pay-go" capital.[9] This surcharge is progressive, because higher-income people insure more expensive items, and lower-income people insure less. Lower-income policyholders could further be exempted from this surcharge. Over time, property and casualty payouts will be lower for some insurers (such as those who write policies for commercial flood and basement backup riders), enabling a reduction in rates. Premiums could be lowered for those in the FEMA flood zones through the Community Rating System program which can reduce National Flood Insurance Premiums by five to 45 percent depending on the action a municipality takes.

A surcharge could be coupled with a slight relaxation of the regulations that guide investments into the state guaranty fund which is created to protect policyholders from insurance company insolvency. The money generated from a small relaxment of the regulations may make it possible for insurance companies to make up the difference, instead of passing the surcharge on to consumers.

* The concept of an insurance surcharge has been included in "Regional Resilience Trust Funds: An Exploratory Analysis for the New York Metropolitan Region" (2017) by Jesse Keenan, prepared for the Regional Plan Association's Fourth Regional Plan, in "Sustainable & Resilient Coastal Communities" (2017) by New Jersey Future, and the "Special Report for Recovery and Resilience (SIRR)" (2013) by the City of New York.

2 Create a Resilient Infrastructure Bond Act in 2020. Voters around the country have chosen to fund infrastructure measures that address resilience. Eighty-two percent of voters in San Francisco chose to fund an effort to stabilize and adapt the Embarcadero Sea Wall for Earthquakes and Sea Level Rise.[10] An initiative to fund wetlands and the restoration of natural habitat to address flooding and other issues passed in the entire San Francisco Bay by 70 percent.[11] The City of Houston voted to fund and build at least 230 resilient projects through a ballot measure which passed with 85 percent in favor.[12] The Miami Forever Bond Act passed with 55 percent of voters choosing to fund resilience and affordable housing.[13]

A campaign to pass a Resilient Infrastructure Bond Act would create a public conversation with voters on the need to prioritize flood infrastructure while also creating the support needed to justify this spending.

In order to achieve success, a Bond Act would require a substantial investment of private funding to educate voters to support the measure. The Bond Act should be on the ballot for the November 2020 general election giving it the best chance of passage in a high turn-out presidential election year. When passed, the funds would be held in a separate account to ensure its specific purpose.

A Bond Act is a good first step, however the funds will not be recurring; therefore, when the money is spent, the program ends. A sustainable ongoing funding stream, such as an insurance surcharge, is necessary to ensure the Fund's longevity. It would also need to be coupled with a non-capital budget allocation to ensure a transparent and equitable process for distribution to projects that achieve the goals of this program.

In addition to this new fund, every infrastructure dollar that New York State spends should provide multiple benefits to ensure that our investments go further, and that they do not create any additional harm to our environment. Every new infrastructure project should be built to address the future needs of our state by requiring that the project goes through a rigorous and enforceable checklist to ensure that every agency incorporates climate change projects into all planning and investment, including planning for increased heat, drought, flash floods and sea level rise. New York State should fund capital projects that provide the greatest physical and social benefit to contribute to a more resilient New York, and derive other benefits such as economic development opportunities, ecological enhancements and social resilience.

(9) Goldman Sachs, "Financing Investments in Resiliency in New York State," 2019. (10) King, J., "SF's Embarcadero seawall measure wins easily," San Francisco Chronicle, 2018. (11) Callahan, M., "Bay Area wetland restoration tax passes," The Press Democrat, 2016. (12) Despart, Z., "Harris County voters pass $2. billion flood bond one year after Harvey,"2018. (13) Smiley, D. "Miami gets $200 million to spend on sea rise as voters pass Miami Forever bond,"2017.

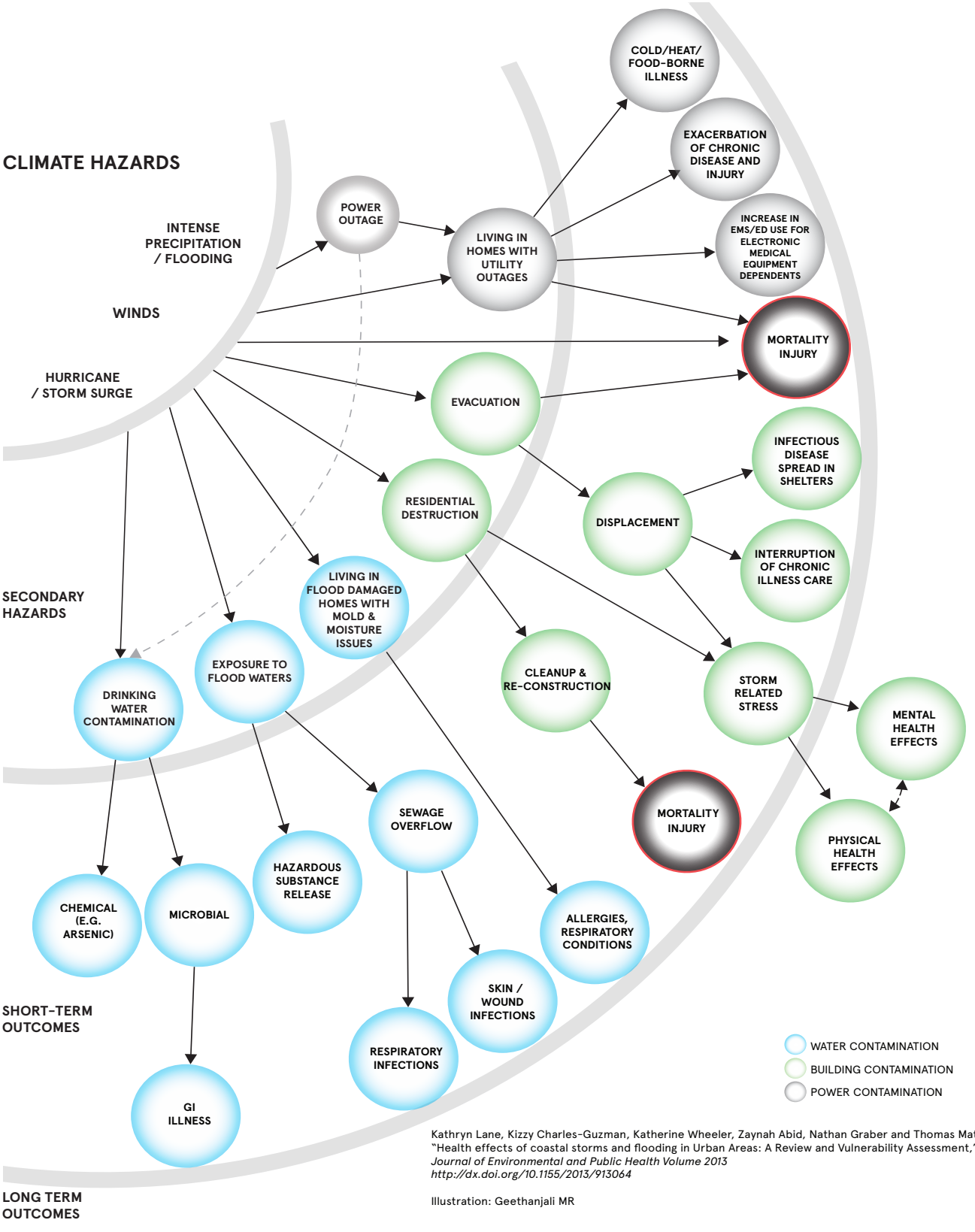
VII. HOW DOES THIS PROGRAM BUILD ON THE NEW YORK STATE COMMUNITY RECONSTRUCTION PROGRAM AND THE LAKE ONTARIO RESILIENCY AND ECONOMIC DEVELOPMENT INITIATIVE (REDI)?

There are many similarities between the two programs since they both have an open process to choose and fund projects to address disruptive events. However, this program is designed to learn from those programs and enhance them by:

- Conducting a comprehensive vulnerability, risk, and implementation requirements assessment as projects are designed and before selected; identifying implementation partners, including ensuring they have the capacity to perform construction in the planning process;
- Taking a systems approach;
- Prioritizing nature-based solutions where applicable, including conserving or restoring existing natural features to enhance ecological value;
- Ensuring that there are champions within local municipalities and community members to see the projects through;
- Identifying projects before funding is allocated to maximize cost-to-benefit ratios;
- Incentivizing that the most physically and socially vulnerable be addressed first;
- Using different tracks for planning: such as one for capital improvements, one for public service programs, one for planning projects such as amending zoning or building codes, etc.
- Utilizing non-profits and local academic institutions to understand vulnerabilities;
- Funding community organizations in order to ensure meaningful participation in this process;
- Proposing infrastructure that is designed to address multiple risks (such as heat, wind, etc.) when applicable;
- Designing for a longer horizon to identify trade-offs, such as building vs retreat, and maximize impact;
- Integrating with the local municipality's Hazard Mitigation Plan;
- Developing projects with an eye towards FEMA's Community Rating System that could reduce flood insurance by five to 45 percent.

IMAGE SOURCE: STATE OF NEW YORK

HEALTH EFFECTS OF HURRICANES, STORMS, AND FLOODS



Kathryn Lane, Kizzy Charles-Guzman, Katherine Wheeler, Zaynah Abid, Nathan Graber and Thomas Matte, "Health effects of coastal storms and flooding in Urban Areas: A Review and Vulnerability Assessment," *Journal of Environmental and Public Health Volume 2013* *http://dx.doi.org/10.1155/2013/913064*

Illustration: Geethanjali MR

CLIMATE CHANGE INCREASES INEQUITIES

The impacts of storms and flooding disproportionately affect the most vulnerable people. Disasters are not created by natural events alone; rather, they are the product of natural events and a combination of social, political, and economic stressors. Therefore, as climate change increases the frequency of flooding, it will further reinforce underlying vulnerabilities and systemic inequality.

DURING A FLOOD

Low-income communities experience greater challenges evacuating due to the cost of transportation and relocation, placing them at a greater risk of injury, disease, or death.

Residents who do not leave during a storm have increased health risks, such as exposure to contaminated water, interrupted acces to medical care, and difficulty acquiring food.

Low-income and minority populations, as well as elderly nursing home residents are more likely to have chronic health problems, increasing their vulnerabiity to other storm hazards.[1]

AFTER A FLOOD

A medium-sized natural disaster leads to a 5% increase in the share of people with debt collections after one year, which doubles to 10% after four years.[2]

People in poverty are less likely to have flood insurance or to maintain flood insurance payments.

The Urban Institute has found that after 4 years, a medium-sized disaster has caused an average 31-point decline in credit scores for people living in communities of color, whereas people living in majority white communities experienced a 4-point decline.[3]

FEMA funding largely focuses on homeowners, meanwhile renters typically face rent hikes and mass evictions.

Lower income households may not have the financial and educational resources to advocate for fair buyouts, repair damages, and afford temporary housing.

After federal aid has been distributed to communities that have experienced a disaster, predominantly white, well-educated home-owners experience a significant increase in wealth. Conversely, communities of color, particularly those who are less educated renters, experience a decline in wealth.[4]

1. Lane et. al, "Health Effects of Coastal Storms and Flooding in Urban Areas: A Review and Vulnerability Assessment," 2013.
2. Urban Institute, "Insult to Injury: Natural Diasasters and Residents' Financial Health," 2019.
3. Urban Institute, 2019.
4. Howell & Elliott, "Damages done, the Longitudinal Impacts of Natural Hazards on Wealth Inequality in the United States," 2018; Muñoz & Tate, " Unequal Recovery? Federal Resourcee Distribution after Midwest Flood Disaster," 2016.

VIII. ARE THERE NEW FUNDING TOOLS WE SHOULD EXPLORE?

New York State **does not need** a new financing tool for this program as traditional approaches are more than adequate. Though it remains unclear if they would bring any benefit for its use, there is a market under development for a new suite of tools that could be investigated as part of this initiative:

Environmental Impact Bond (EIB) - or "Pay For Performance." The borrower will pay back their bond investors, contingent on performance of the adaptation measures, such as green infrastructure.

Green Bonds - Bonds that are specifically earmarked to be used for climate and environmental projects. These bonds are typically asset-linked and backed by the issuer's balance sheet, and are also referred to as climate bonds. Green bonds come with tax incentives such as tax exemption and tax credits.

Resilience Bonds - Generate risk reduction rebates from a city's catastrophe insurance premiums to pay for resilience projects. Resilience Bonds create incentives for cities to invest in resilience so as to reduce the human and financial cost of catastrophes when they strike.

Catastrophe Bonds - or "cat bonds." Financial instruments designed to help manage the financial risks associated with extreme natural disasters. These bonds kick in after a disaster and do not raise money for resilience planning.

IX. HOW ARE OTHER STATES RAISING FUNDS TO ADAPT TO CLIMATE RISK?

While a NYS Resilient Infrastructure Fund has the opportunity to be the most comprehensive, other states and cities have introduced or implemented programs to address this issue:

California: $4 billion for "Proposition 68"-a Parks, Environment, and Water Bond to protect California's water, parks, and natural resources, while bolstering climate adaptation, resilience, and social equity statewide.

Massachusetts: $2.4 billion environmental bond bill for adapting to climate change, protecting environmental resources, and creating green space across the state.

Houston, TX: $2.5 billion bond will allow Harris County Flood Control District to afford over 230 projects in the next 10 to 15 years, including channel modifications, stormwater retention basins, buyouts of properties, wetland mitigation banks, drainage system improvements, and major repairs and upgrades to damaged drainage infrastructure.

San Francisco Bay Area: $450 million for "Measure A," a bond for the seismic strengthening and flood protection projects for the hundred-year-old Embarcadero seawall and other critical infrastructure associated with it; and $500 million for "Measure AA" for wetlands restoration to address clean water, pollution prevention, and habitat restoration.

Miami, FL: $400 million "Miami Forever Bond" act addresses alleviating existing and future risks to residents, the economy, tourism, and the city's legacy. The Bond will fund a series of projects in five key categories, which align with the City's most pressing needs: Sea-Level Rise and Flood Prevention, Roadways, Parks and Cultural Facilities, Public Safety, and Affordable Housing.

Florida: Florida Hurricane Catastrophe Fund Assessment (insurance surcharge) - An emergency assessment that can be levied to restore the capacity of the Florida Hurricane Catastrophe Fund (FHCF) if the revenue generated from premiums is insufficient. This assessment is paid by all Florida insurers. Note: This is post-disaster, not for resilience planning.

Additional examples can be found at: https://bit.ly/2Kx8ygv

X. DEMONSTRATIVE PROJECT EXAMPLES ACROSS NEW YORK STATE

The following unfunded projects are examples of resilient infrastructure that would protect from flooding, create jobs, and enhance communities throughout New York State:

Hunts Point, The Bronx[14] - Protect the hub for food supply for 22 million people in the Northeast U.S. by funding "Hunts Point Lifelines," which includes flood protection integrated with a waterfront greenway which will give the adjacent community access to the waterfront, new pier infrastructure on the site of a marine transfer station to create marine highways for delivering vital goods and supplies to East Coast waterfront communities when roads are impassable. A vision plan, "Hunts Point Lifelines" already has strong community support and has been vetted through many stakeholders.

Hudson Valley - Natural/nature-based features and green infrastructure, such as stormwater retrofits, to benefit water quality and habitat, provide urban green space, and mitigate extreme heat; remove obsolete dams and install properly designed culverts, especially at locations which could support movement of estuarine species such as river herring and American eel; where feasible, combine with municipal flood resilience measures, and lastly identify and protect riparian corridors and wetlands.

Suffolk County, Long Island - Build flood infrastructure that will lower cost of flood insurance through FEMA's Community Rating System by implementing floodplain management activities that exceed the National Flood Insurance minimum standards and support emergency response equipment including installing a permanent generator at the 911 backup center, the aviation east hanger, the police academy emergency work shelter, the special patrol bureau, and at the marine bureau.

New Rochelle, Westchester - Fund the implementation of flood hazard mitigation alternatives, recommended by a prior vulnerability assessment study, in order to strategically harden its wastewater infrastructure using cost effective upgrades that target critical treatment plant infrastructure at the New Rochelle Water Resource Recovery Facility (WRRF) in the New Rochelle Sanitary Sewer District. Provide flood hazard mitigation alternatives, including new flood walls, reinforcement or expansion of existing building or bulkhead walls, new pumping systems, or revisions to existing pumping systems. Building hardening measures may include the removal, relocation, raising, or sealing of equipment, windows, doors, louvers, and penetrations. This project would create an estimated 42 full time equivalent jobs, per federal guidelines of $92,000 of appropriations per job; perform flood mitigation work now to avoid potential costly emergency response and repairs when there is a flooding incident; protect the Hudson River, Long Island Sound, and its tributaries from pollution that would disrupt recreation use; improve health and wellness; protect and improve water quality; protect habitat and ecosystem; reduce flood risk; prepare for sea level rise. (There are multiple similar projects in Westchester county.)

Erie County - The lack of sufficient riparian buffers is a common living infrastructure issue found across many areas of the watershed and directly related to many water quality issues, including erosion and sedimentation, nutrient loading, and thermal pollution. Riparian lands are the lands directly adjacent to waterways and serve as a transition between aquatic and upland habitats - a link between land and water. When this riparian area is designed in such a way to protect the waterway from negative impacts of adjacent land uses, it acts as a buffer. With additional funding, Erie county can increase the length and width of riparian vegetated buffers along stream banks within the subwatershed. This will provide, protection during flood events; mitigate stormwater run-off and sewer overflow; filter pollutants from the air, water, and soil; moderate temperatures and reduce energy use; provide wildlife habitat; store carbon; provide food, wood, and other natural resources; increase property values; and provide recreational opportunities.

14. Rebuild By Design, http://rebuildbydesign.org/our-work/all-proposals/winning-projects/hunts-point-lifelines.

Manhattan, NYC - Fund the portion of the The BIG U, a protective system consisting of separate but coordinated plans for the neighborhoods which remain in the Manhattan floodplain. Currently there is funding and designs from E. 25th Street to Chambers Street, however the next phase of the project will need to be constructed atop Route 9 (aka the West Side Highway) or within Hudson River Park. Thousands of residents, many cultural institutions, and government institutions would be protected from future storm surge events. Depending on the design chosen, this could create new recreation opportunities, increase economic development, and improve neighborhood connectivity.

Lake Champlain Basin, Adirondacks - Fund the engineering of 40–60 flood-resilient and complete upgrades of 2–8 culverts. Road-stream crossings, which include culverts and bridges, are an essential element of transportation networks, allowing roads to pass over rivers and streams. Culverts, the structures that carry streams underneath roads, are often at the epicenter of flooding and infrastructure failure. Right-sizing these structures bolsters community resilience to climate change while saving money, and improving habitat for fish and wildlife. Culvert upgrades improve the safety and reliability of the road network, mitigate future flooding, and improve water quality. Upgrading culverts is imperative as flows increase with occurrence and size as a result of climate change. Concentrating work to upgrade culverts in strategic locations with multiple benefits can then help direct limited resources to places with the greatest expected return on investment. An investment would provide much needed financial resources for New York communities to improve their infrastructure resilience in the face of climate change, which will also reduce the taxpayer burden of paying for emergency responses and stop-gap measures.

Westchester County Dam Removal Study, Westchester County - While funding is available through the Westchester County capital program for three projects involving the rehabilitation of County-owned dams, grant funding is sought to analyze the benefits of dam removal or retrofit to remove barriers and enhance habitat quality as well as provide additional flood storage capacity. It is anticipated that if the results of such analysis are positive, projects can be redesigned and constructed with minimal impact to existing capital budgets.

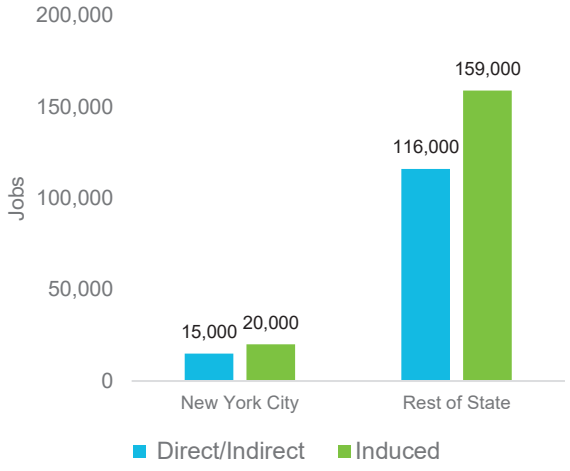
The analysis will evaluate and prioritize dams for ecological habitat and also potential flood mitigation value, with more detailed analysis performed on higher priority dams. The study will focus on three to five County-owned dams for site-level analysis to identify the costs and benefits of dam removal or retrofit and the preparation of conceptual plans. The economic benefits include economic opportunities during design and construction and increased recreational and educational opportunities once the project is completed, which will support tourism and encourage additional investment. The environmental benefits will be dramatically improved fish passage and ecological habitat as well as flood mitigation through increased flood storage potential. This will be accomplished through the restoration and enhancement of natural systems and their associated habitats, which will be explained in the design report and accompanying education and outreach materials. The project will be used to educate municipal officials and the general public about the benefits of dam removal and ecological restoration. Stormwater-related benefits will be used to enhance education and outreach for flood mitigation and resilience to natural hazards.

Mohawk Valley - Understand and predict the hazards associated with ice jams through monitoring, investigation, and assessment of events. Using monitoring data and developing predictive models, enable emergency responders to provide reasonable warning of where ice jam flooding might occur. Work with the local municipalities along the Mohawk River to identify locations where the river can be widened in order to lower flood risk.

AN INVESTMENT IN RESILIENT INFRASTRUCTURE WILL CREATE THOUSANDS OF JOBS

The following information was prepared by AECOM to demonstrate how $10 billion would create jobs.

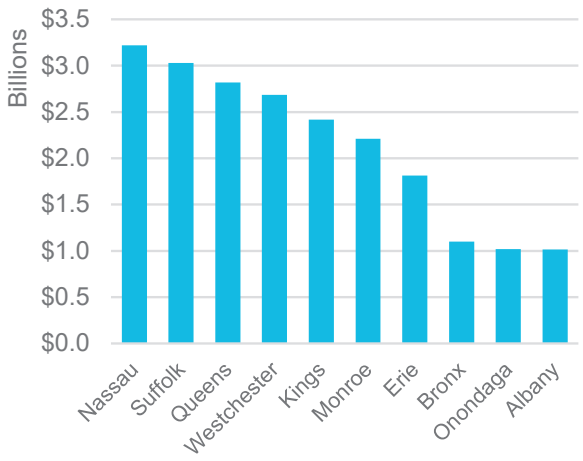
Job Impacts by Region



The creation of a $10 billion infrastructure fund would create an estimated 131,000 direct jobs, and 180,000 indirect jobs. A large marjoity will be created outside New York City.

GRAPH SOURCE: AECOM

Cost of Inaction 2011-2019



AECOM conservately estimates that the cost of inaction (doing nothing) will be $55 billion in the next decade for coastal storm and flood-event-related damages. The highest affected would be New York City. The image represents the following ten counties.

THIS FUND SHOULD SUPPORT GREEN INFRASTRUCTURE, GREY INFRASTRUCTURE, AND A PROGRAM TO BUY-OUT PROPERTY IN HARM'S WAY

Project types range from green infrastructure, such as wetlands restoration or bioswales for stormwater management, to grey infrastructure, such as right-sizing a dam or bridge.

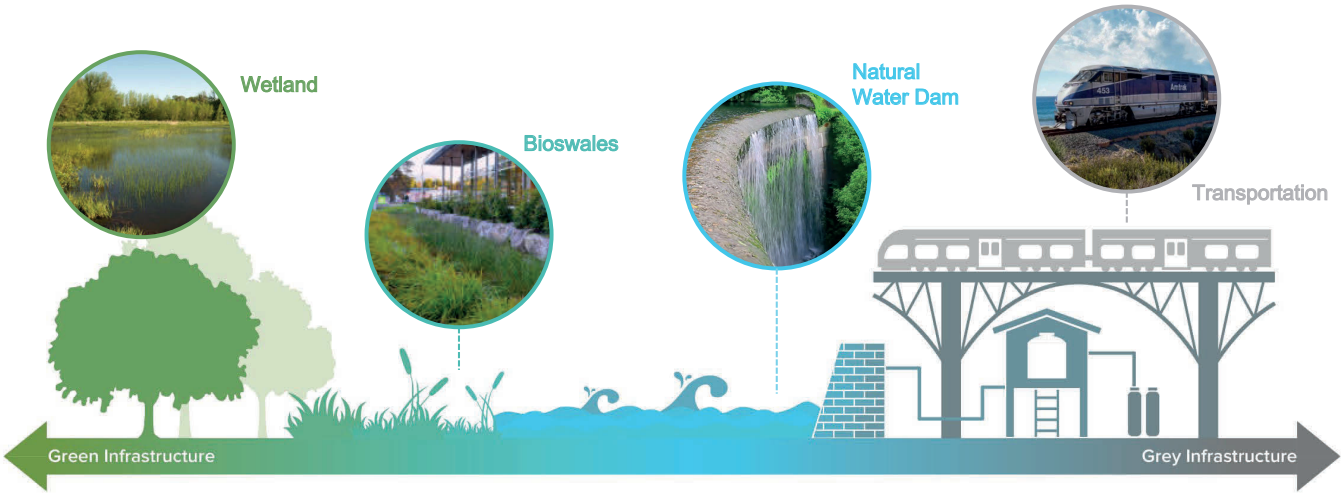


IMAGE SOURCE: BURO HAPPOLD

RESILIENT INFRASTRUCTURE FUND Q + A

Why should New York State create a fund for Resilient Infrastructure to address flooding events?

New York State has endured billions of dollars of non recuperated costs and in the aftermath of hurricanes, flash floods and storm surge. The state has had at least sixteen disaster declarations for flooding totaling over $37.3 billion in assistance, since Governor Cuomo took office nine years ago. New York State has also faced increased rainfall and flash floods – so called "nuisance events" – which in the past few weeks have closed highways and roadways, infiltrated homes and businesses, and caused disruptions to our lives and economies from Erie to Staten Island. In a study prepared for Rebuild by Design, AECOM found that New York State has only recuperated one-third to one-half of the costs of severe storms in the past decade. That calculation does not include the impact from nuisance events which would make the loss even greater.

The costs of not being prepared for future storm surge and rain events are massive and increasing. The same study estimates that the cost of inaction in the next decade will be at least $55 billion to New York State. Preparedness can prevent these escalating losses. Smart investment can create additional benefits for the economy by creating over 36,800 direct and indirect jobs per $1 billion invested, increasing opportunities for recreation, and new economic development. By planning ahead, efficiency and effectiveness increase as it costs less in a non-disaster environment to build. Moreover, a longer-term planning approach, with a funding guarantee by the government, incentivizes private co-financing and innovation, as payback and benefits can be measured on a longer horizon, thus mitigating flood risks and creating a further opportunity to address the problem of climate change by cutting carbon, which helps the state reach its goals.

The fund can be created in many ways. One is to use all new revenue from a surcharge on insurance. This would allow New York State to raise billions of dollars from a new flexible source and create a comprehensive program that helps municipalities understand their vulnerabilities, work regionally to create a system-wide approach, and create projects that will address current and future flooding and multiple other physical and social benefits.

If we create this fund, will this preclude New York State from getting federal funds after a disaster?

No, this fund will not preclude New York State from getting federal funds after a disaster. After a disaster (which is considered a singular event), any state that deems there is more damage than the state can handle, can ask the federal government for funds under the Federal Disaster Relief Act (Public Law 81-875), which authorizes the President to provide supplementary federal assistance. The federal government will examine the damage assessment submitted by the state government to determine the level of aid needed to rebuild. The federal government does not look at the actual money in the State's coffers, such as this proposed fund, which would likely already be budgeted for another purpose.

Furthermore, this fund could actually help leverage federal disaster dollars. FEMA programs often have a cost-share component. These funds could enable the state to provide that non-federal match on behalf of communities leveraging the initial investment for a larger payoff.

Better protection from storms and disasters means less disaster aid money needed to address the damage (including emergency personnel, degradation of infrastructure, loss to the economy, less casualties etc.) which means less money would be needed from the federal government to build back. Many states have capital programs and infrastructure banks, this would be similar, though earmarked to specifically address flooding, lowering the overall risk that communities face.

Can't localities build this infrastructure on their own?

Local mayors state that they are unable to access capital dollars to pay for much needed infrastructure. Many local governments are not able to raise dollars needed to pay their share of matching funds and in many cases are not able to pay back any low or no interest loans which the state and federal government offer. This leaves a tremendous gap between the need for new resilient infrastructure and communities' ability to plan and build.

Doesn't NYS already have programs that can pay for this?

New York State has numerous planning grants, but very few dollars for implementation. DEC's Hudson River Estuary Program approximates that there is **only $150 million in assistance from State and Federal agencies** to municipalities and non-profit organizations.

Existing programs include:

- NYS Department of Environmental Conservation (DEC): Hudson River Estuary Stewardship Planning Grants, Climate Smart Communities Grants, Water Quality Improvements Program, NonAgricultural Nonpoint Source Planning Grant and Trees for Tribs
- Department of State (DOS): Local Waterfront Revitalization Program and Brownfield Opportunity Area
- Environmental Facilities Corporation (EFC): Green Innovation Grant Program, Wastewater Infrastructure Engineering Planning, Clean Water and Drinking Water Revolving State Funds
- Federal Emergency Management Agency (FEMA): Hazard Mitigation Assistance, Public Assistance, Pre-Disaster Mitigation/BRIC Grants, and Flood Mitigation Assistance Grants.
- Other programs that may be able to be used to address flooding in addition to the primary purpose of the funding. These include: The New York State Energy Research and Development Authority (NYSERDA) Clean Energy Communities Program; NYS Office of Parks, Recreation and Historic Preservation (OPRHP) Parks, Preservation and Heritage Grants and Recreational Trails Grants; US Housing and Urban Development (HUD) Community Block Grant Program; Empire State Development (ESD) Grant Program Hudson River Greenway Communities Grant Program and Open Space Grants.

Specific program information can be found at http://www.dec.ny.gov/docs/remediation_hudson_pdf/financewr2019.pdf

Is a surcharge on insurance just another fee for a state that already has high fees?

This surcharge is 1) progressive, ensuring that those with more income will pay more, and 2) has a direct policy correlation as property is at risk from flood inundation. Moreover, this charge will save money and lives over time. The National Institute for Buildings states that one dollar spent on disaster mitigation has a payback of six dollars (and for some flood projects eleven dollars)– largely in terms of avoided losses. That statistic excludes the social and health costs.

Taxpayers and businesses shoulder the costs every time we allow our communities to flood. AECOM estimates that after a major disaster, a state is paid back only one half to one third of their actual costs from the damage. That does not include the additional expected costs from nuisance flooding around the state which regularly closes highways and roads, and floods homeowners, many of whom are not insured.

A two percent surcharge on Property and Casualty insurance will cost $2 per month per the average policy-holder of auto or homeowners insurance, yet the benefits could save billions of dollars in further deterioration of infrastructure and roadways, environmental degradation, and public health costs.

Is there a precedent for surcharges to support a public purpose?

Yes, many of our regulated businesses have surcharges that are earmarked for public benefits such as:

- PSC's approved "system benefits charge" on electricity bills to fund energy savings programs
- 911 surcharge on telecommunications to operate an emergency service line
- Fire insurance fee on NYS P&C insurance policies
- Motor Vehicle law enforcement fee for local law enforcement

This proposed surcharge will be earmarked for programs and projects that address flooding, which in some cases can lower property and casualty insurance premiums.

How can we be assured that this money will go to the intended purpose?

We can be assured that the funds will go to its intended purpose by:

- Determining in legislation the sole purpose for these fees in the creation of the surcharge
- Creating a public benefit corporation
- Leveraging these revenues through bonding, which gives the state additional capital and ensures that bondholders would hold the state accountable that the funds are used for the intended purposes

Could this lower the cost of insurance in NYS?

As we have experienced with previous hurricanes in the state, the cascading effects of the storm led to property loss from water and fire damage, and loss of life which in many cases led to insurance payouts. This program will reduce the underlying exposure to insurance and reinsurance by mitigating future risk. Therefore, this program could lower certain payouts over time for flood insurance (both public policies underwritten by the National Flood Insurance Program and a growing number of private policies underwritten by insurance companies), homeowners insurance for non-flood damages (i.e. wind, fire, etc.), basement backup riders (for basement flooding not covered by flood insurance), auto insurance, etc., which will lead to lower actuarial rates, or a lower increase of escalating rates.

Can you provide a cost benefit analysis?

The State is already paying deeply for costs associated with flooding: there is an estimated $15 billion "unmet need" after insurance and federal payouts from Hurricanes Lee, Irene, and Sandy alone. That does not include funding to prepare our communities for the increasing amount and intensity of rainfall, or for future sea level rise, which could be as much as 6 feet in the next 75 years.[1] New York State is already paying:

- For Disasters: Loss of Life; Loss of Property; Business interruption and loss of productivity; Costs of temporary shelter; Costs of emergency services; Costs of permanent relocation; Public and essential facility loss of service; Physical and mental health costs
- For nuisance flooding and future sea level rise: Degradation of ecosystems that buffer against floods and provide habitat for important species; Erosion of beaches and bluffs; Saltwater infiltration of aquifers; Compromised sewage, wastewater, transportation, communication, and energy infrastructure and systems.

The National Buildings Institute sites a 6:1 payback on investment for infrastructure that address flooding. Benefits include: avoided property losses; avoided business & education interruption; ecosystem benefits; avoided loss of critical infrastructure; economic development; increased tourism; revitalization of neighborhoods; improved public spaces; enhanced public safety; and increased competitiveness for the community. Additionally, every $1 billion invested in resilient infrastructure is expected to create approximately 15,500 direct jobs and 21,300 indirect jobs, and would seed a new industry for construction professionals, creating the demand for resilient infrastructure knowledge and experience.

We have already seen some of the physical and social benefits from existing resilient public and private infrastructure projects which are underway. For flood resilient infrastructure built between 1996-2016 in New York State, the Economist Intelligence Unit has found that the average return on investment for $1.7 billion in flood mitigations actions is 69% with a 1.69 cost-benefit ratio. With better planning, as this program proposes, those statistics will dramatically increase, making the payback much higher.

Why is a buy-out program included in the proposed program?

New York State cannot create an effective program to build community resilience without focusing on strategic buy-outs, which provides assistance for people to relocate to higher ground and allows communities to relocate vulnerable public facilities and assets. Strategic buy-outs are the most fiscally effective and sustainable long-term resilience strategy for building communities in areas less prone to recurrent inundation. It is a shared responsibility to reduce risk and part of that shared responsibility is to acknowledge that infrastructure can only do so much. A buy-out program is one option that should be made available for people living in high risk areas who are dealing with repetitive damage and loss from flooding. Personal safety, psychological and mental health, monetary loss, and disruption of services are perpetual concerns for people living in these flood-vulnerable areas.

Multiple socio-economic goals can be integrated into a buy-out program. For example, when combined with a plan for redevelopment and development of safe destination sites, a buy-out program can be an important economic opportunity for local communities. People stay in the community, in lower risk areas, maintaining the tax base while fewer government funds are spent on emergency services and repetitive repair of damaged roads, utilities, and other public infrastructure. Restoration of the properties bought out can be done in such a way that a natural buffer between

1. Department of Environmental Conservation, "Sea Level Rise: What is Expected for New York."
2. The Economist Intelligence Unit, "State mitigation analysis: Flood mitigation across the US."

water and people is created, which provides additional benefits such as flood control, open space for recreation, improvements in air quality in more urban areas, and a creation of wildlife habitat. New York State ranks third in the United States for most homes at risk from sea level rise. By 2045, 15,500 homes (42,000 people) will be at risk of chronic flooding. This escalates to 143,000 homes (366,000 people) by 2100. The issue facing New York State is not whether retreat will happen from certain areas, but how. Our state must have a strategic approach to ensure that communities benefit rather than suffer from this impact. Policymakers need to get ahead of the projected increases in flooding, and proactively work to integrate buy-out opportunities into long-term land use decisions that are anticipatory (not reacting to existing conditions) so that retreat will not be unmanaged. A buy-out program for willing sellers should be leveraged as part of New York State's community and economic development programs, while fully integrating into programs to address risk reduction, emergency management, and environmental conservation.

The permanent creation of a managed retreat program does not mean the state would force anyone to move. It provides an option where homeowners and communities can choose to move as they realize they are increasingly vulnerable and have multiple losses. Communities can plan comprehensively for the future if a program is provided in advance of a disaster.

How much does NYS need in total to become resilient?

According to Responding to Climate Change in New York State (ClimAID), a NYSERDA publication, climate change costs in New York State for the sectors analyzed in this report may approach $10 billion annually by midcentury. Without adaptation, "An Economic Analysis of Climate Change Impacts and Adaptations in New York State," also from NYSERDA, provides a cost-benefit analysis for water resources, ocean and coastal zones, ecosystems, agriculture, energy, transportation, communications, and public health. The summary is beow:

Table 1.1 Available Estimated Annual Incremental Impact and Adaptation Costs of Climate Change at Mid-century for specified components of the ClimAID sectors. (Values in $2010 US.)

Sector	Component	Cost of annual incremental climate change impacts at mid-century for selected components, without adaptation	Costs and benefits of annual incremental climate change adaptations at mid-century for selected components
Water Resources	Flooding at Coastal Wastewater Treatment	$116-203 million	Costs: $47 million Benefits: $186 million
Coastal Zones	Insured losses	$44-77 million	Costs: $29 million Benefits: $116 million
Ecosystems	Recreation, tourism, and ecosystem service losses	$375-525 million	Costs: $32 million Benefits: $127 million
Agriculture	Dairy and crop losses	$140-289 million	Costs: $78 million Benefits: $347 million
Energy	Outages	$36-73 million	Costs: $19 million Benefits: $76 million
Transportation	Damage from 100 year storm	$100-170 million	Costs: $290 million Benefits: $1.16 billion
Communications	Damage from 100 year storm	$15-30 million	Costs: $12 million Benefits: $47 million
Public Health	Heat mortality and asthma hospitalization	$2.99-6.10 billion	Costs: $6 million Benefits: $1.64 billion
All Sectors	Total of Available Estimated Components	$3.8 – 7.5 billion/yr	Costs: $513 million/yr Benefits: $3.7 billion/yr

Note: see chapters for definitions of the selected components, and details of the estimation methods used. All values in $2010 US. The figures are not strictly additive because of the different methods used in each case

CHART SOURCE: NYSERDA, "RESPONDING TO CLIMATE CHANGE IN NEW YORK STATE."

Will additional staff be needed to administer the planning needed to a pipeline of comprehensive multi-benefit projects? Where would the project be housed?

Creating a statewide program will entail staff to ensure the program is effective. However, if this program is paid by an insurance surcharge it could be supported entirely with new revenues. The State can set aside a certain percentage for administration, while leveraging a large portion through the sale of bonds, giving the state flexible money for administration costs.

The planning portion of the program could be housed in either DOS (coastal program), DHSES (State Hazard Mitigation Plan and FEMA grants), and/or GOSR. The capital projects could get development assistance from agencies who will ordinarily be responsible for building and maintaining this infrastructure, or they could be administered through the Environmental Facilities Corporation with a legislative change.

How does this differ from other Environmental Facilities Corporation Funding (EFC) programs for water?

EFC's funding programs are specifically earmarked for wastewater and drinking water. While there could be an overlap with wastewater projects, these represent only a small portion of the resilience projects needed to protect NYS from flooding. Moreover, EFC offers a mix between loans and grants; however, in order to comprehensively address the challenge that NYS already faces from flooding, a grant program that incentivizes comprehensive planning is needed to catalyze these infrastructure projects.

What if New York State does nothing to address increased rainfall and severe storms?

In a study prepared for Rebuild by Design, AECOM conservatively calculates that the cost of inaction for the next ten years to be at least $55 billion from major disasters. That figure does not include the softer costs such as environmental degradation and health impacts, nor does it include the so-called "nuisance events" from lakes overtopping, heavy rainfall and flash floods that regularly close our streets and businesses and innodate homes. Doing nothing would mean that taxpayers would be shouldering the increased costs and would experience increasing losses.

Additionally, the cost of borrowing will increase: The Moodys rating agency recently bought a majority share in a company that tracks climate risk and has indicated that climate change could threaten the credit worthiness of governments and private companies.

By 2045, more than $8.5 billion of residential properties (based on today's values) in New York State would be at risk of chronic flooding. By the turn of the century, that increases to about $98 billion, which will leave $1.9 Billion of Annual Property Tax Revenue in jeopardy just from tidal flooding alone.

New York has the opportunity to create an inclusive program to address the economic and human loss from flooding by using funding to catalyze regional planning in order to design and build infrastructure that address physical and social vulnerabilities, while also creating hundreds of thousands of jobs, revitalize economies, and "future-proof" communities. New Yorkers already face the impacts of flooding, and it will only get worse. The best way to prepare ourselves for the future is by acting now.