NEW YORK RISING
COMMUNITY RECONSTRUCTION
JOINT COMMITTEE MEETING

December 10, 2013
Norman J Levy Lakeside Elementary School
21 Babylon Road, Merrick, NY

WELCOME AND INTRODUCTION


BALDWIN
FREEPORT
BELLMORE-MERRICK
SEAFORD-WANTAGH
THE MASSAPEQUAS

NEW YORK RISING
COMMUNITY CO-CHAIRS AND PLANNING TEAM

NYRCR BALDWIN
- Erik Mahler
- David Viana

NYRCR BELLMORE-MERRICK
- Joe Baker
- Lawrence Eisenstein

NYRCR FREEPORT
- Dewey Smalls
- Rob Weltner

NYRCR MASSAPEQUAS
- William Van Wagner

NYRCR SEAFORD-WANTAGH
- John Molloy

STATE OF NEW YORK
- Laura Munafo, Nassau County Region Lead, NYS Homes and Community Renewal
- David Ashton, CR State Planner, NYSDOS
- Nancy Rucks, CR State Planner, NYSDOS
- Phyllis Elgut, CR State Planner, NYSDOT
- Robb Smith, CR State Planner, NYSDOT
- Terra Sturn, CR State Planner, NYSDOS
- Tracey O'Malley, CR State Planner, NYSDOS
- Zachary Richner, Policy Directory, NYRCRP

CONSULTANTS
- Ove Arup & Partners, P.C.
- Sasaki Associates
- Urbanomics
- CAS Group
- ASA

MEETING AGENDA AND OBJECTIVES

1. Public Meetings #1 and #2: What did we hear?
2. Historic perspective
3. What causes flooding?
4. Approaches to increasing resiliency
5. Questions and Answers

Hard Infrastructure

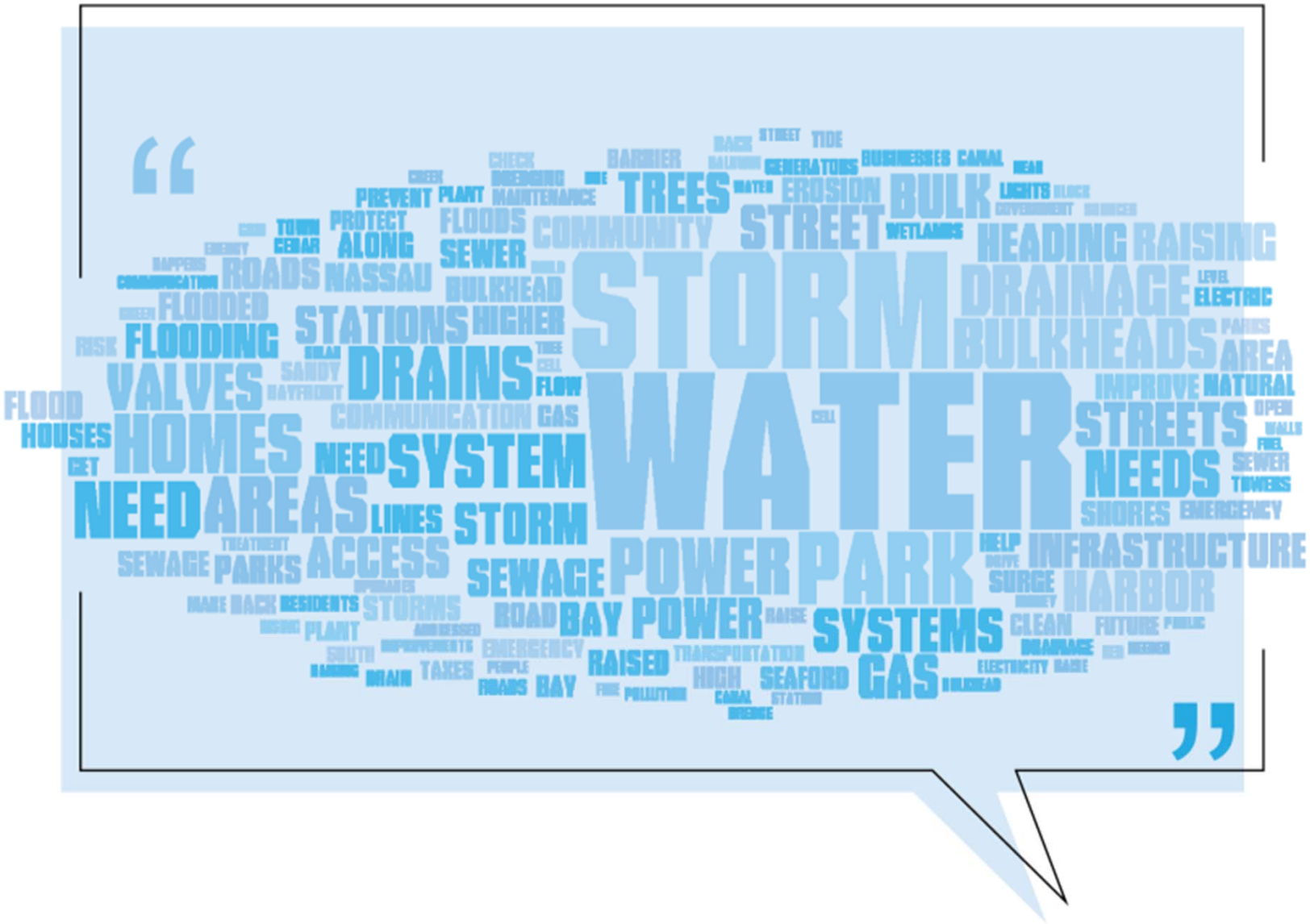
Green Infrastructure

Natural Systems

PUBLIC MEETINGS #1 AND #2

WHAT DID WE HEAR?

PUBLIC MEETINGS #1 AND #2



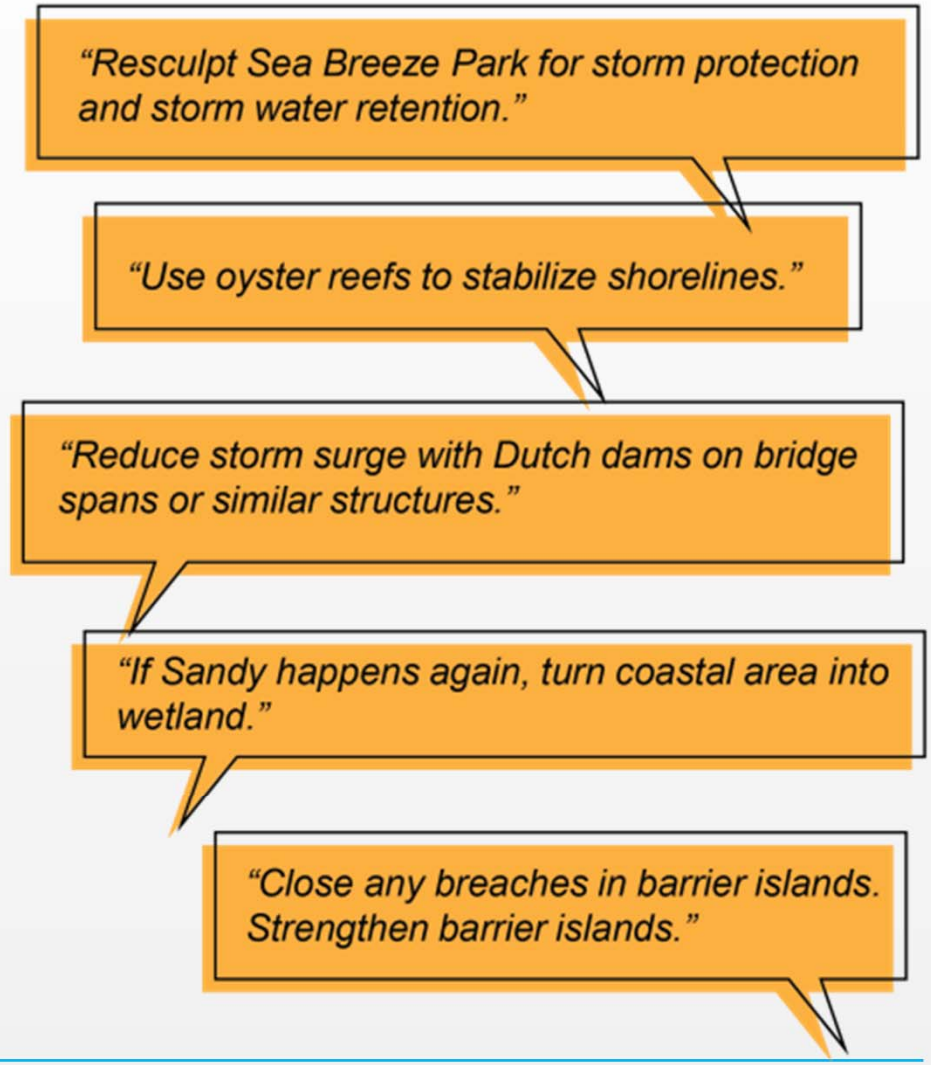
PUBLIC MEETING #2
TOP IDEAS

Top 3 natural resources ideas:

1. Limit waterfront erosion
2. Green systems to reduce storm runoff
3. Restore, repair or expand dunes

Top 3 infrastructure ideas:

1. Bulkheads and coastal barriers
2. Sanitary sewer upgrades and storm water drainage
3. Power/electric improvement

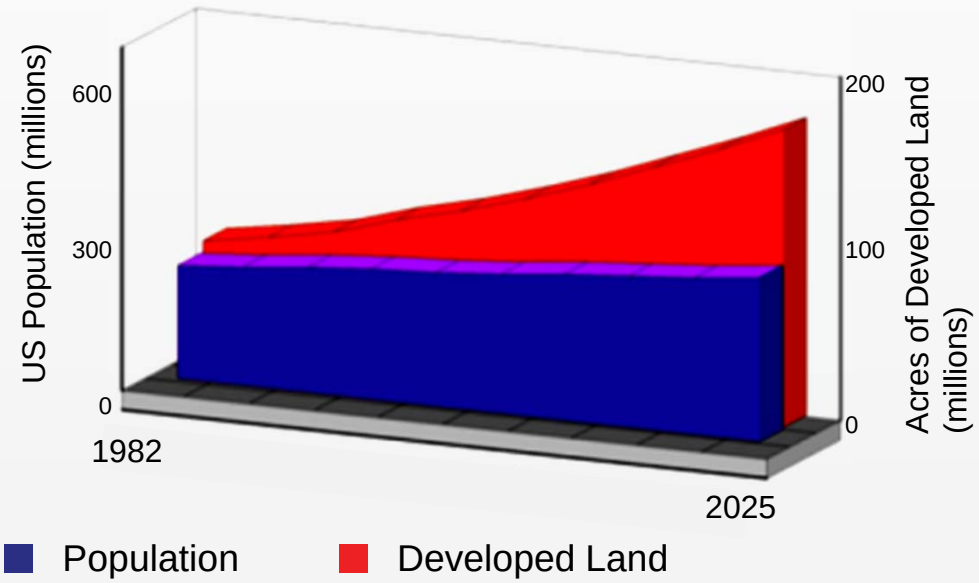


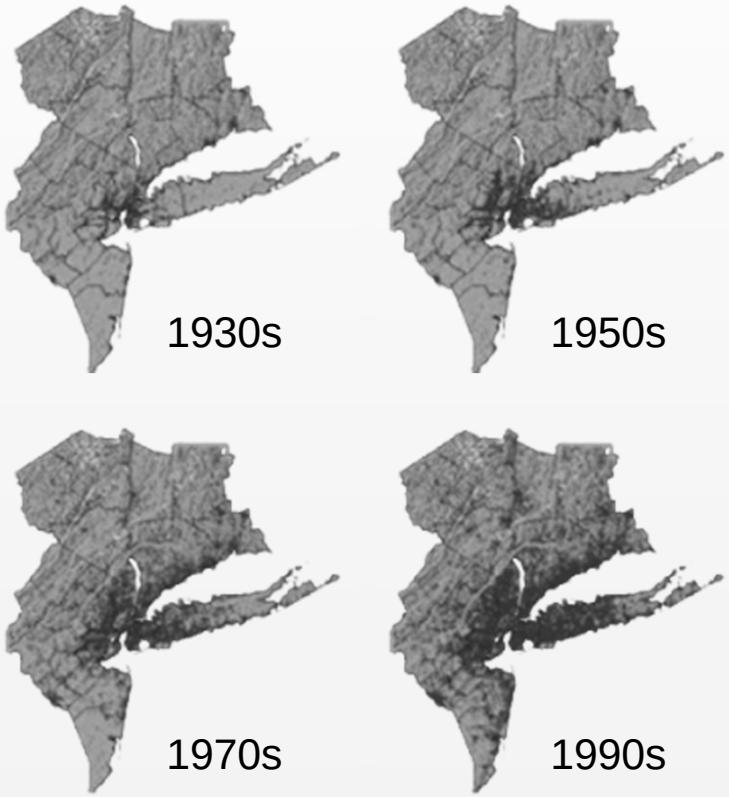
WATER AND ECOLOGY

EXISTING CONDITIONS AND CONTEXT

HISTORIC DEVELOPMENT

POPULATION AND LAND USE





HISTORIC DEVELOPMENT

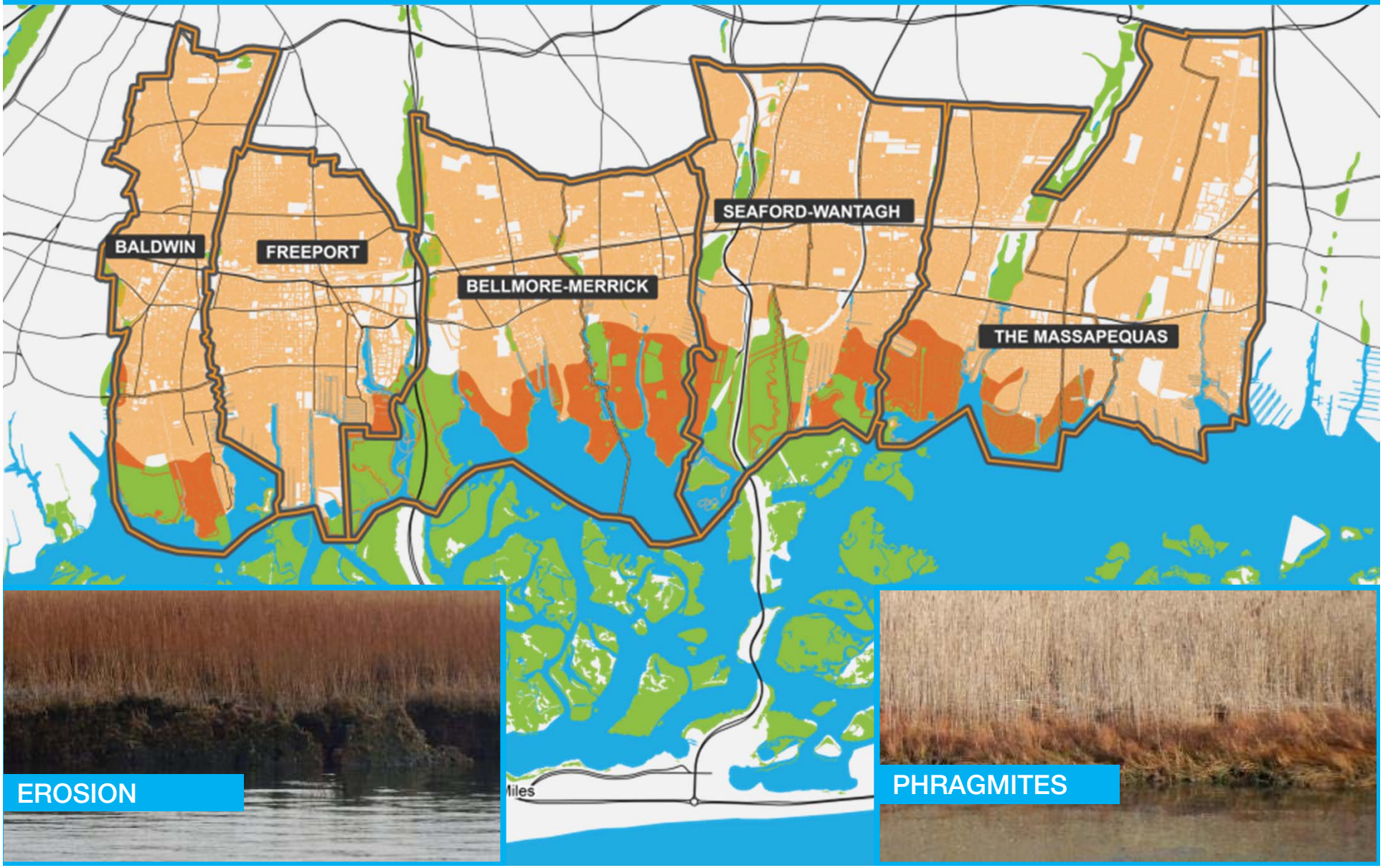
COASTAL WETLAND 1934

POPULATION: ~400,000

HISTORIC DEVELOPMENT

COASTAL WETLAND LOSS

POPULATION: ~1,350,000

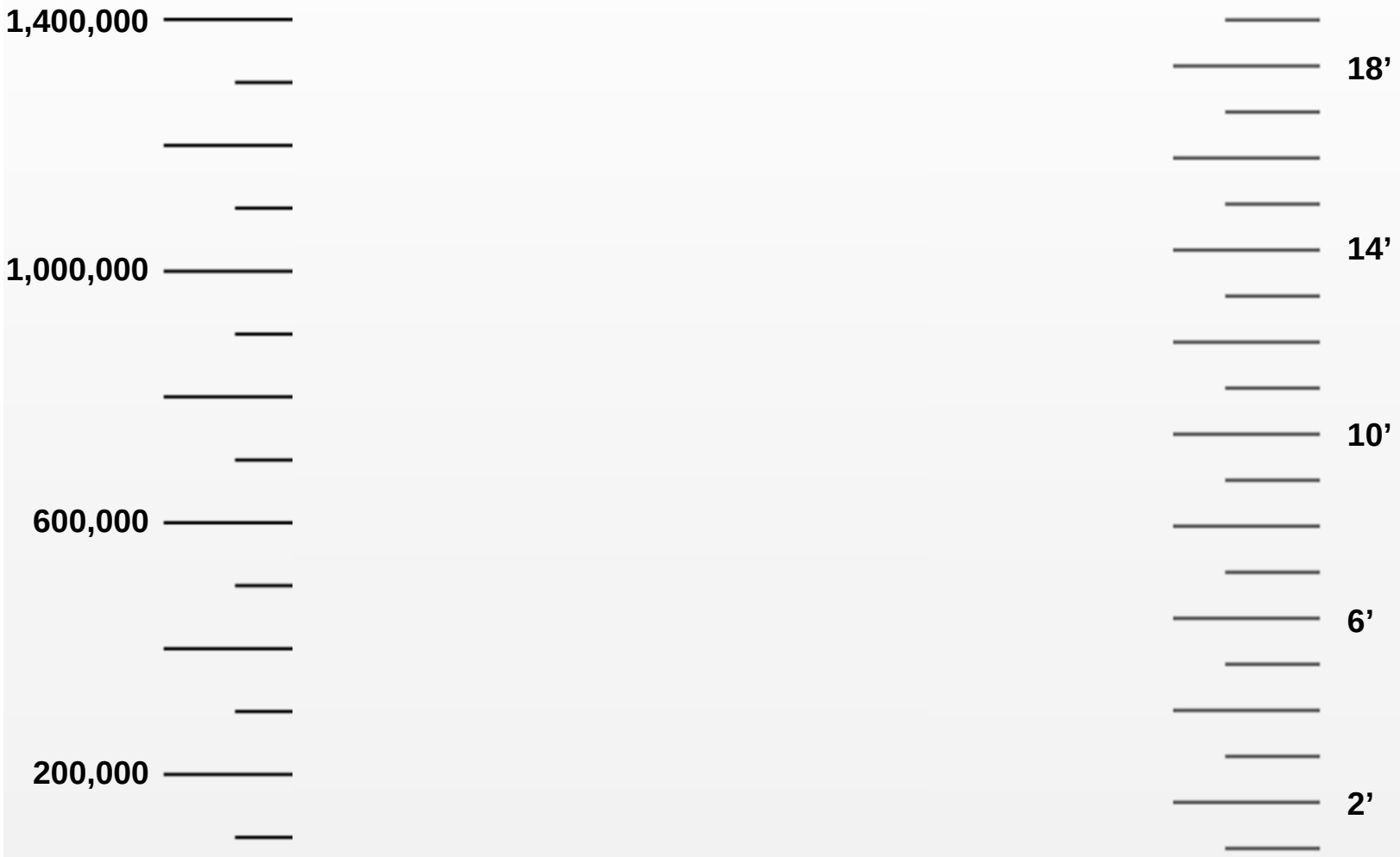


EROSION

PHRAGMITES

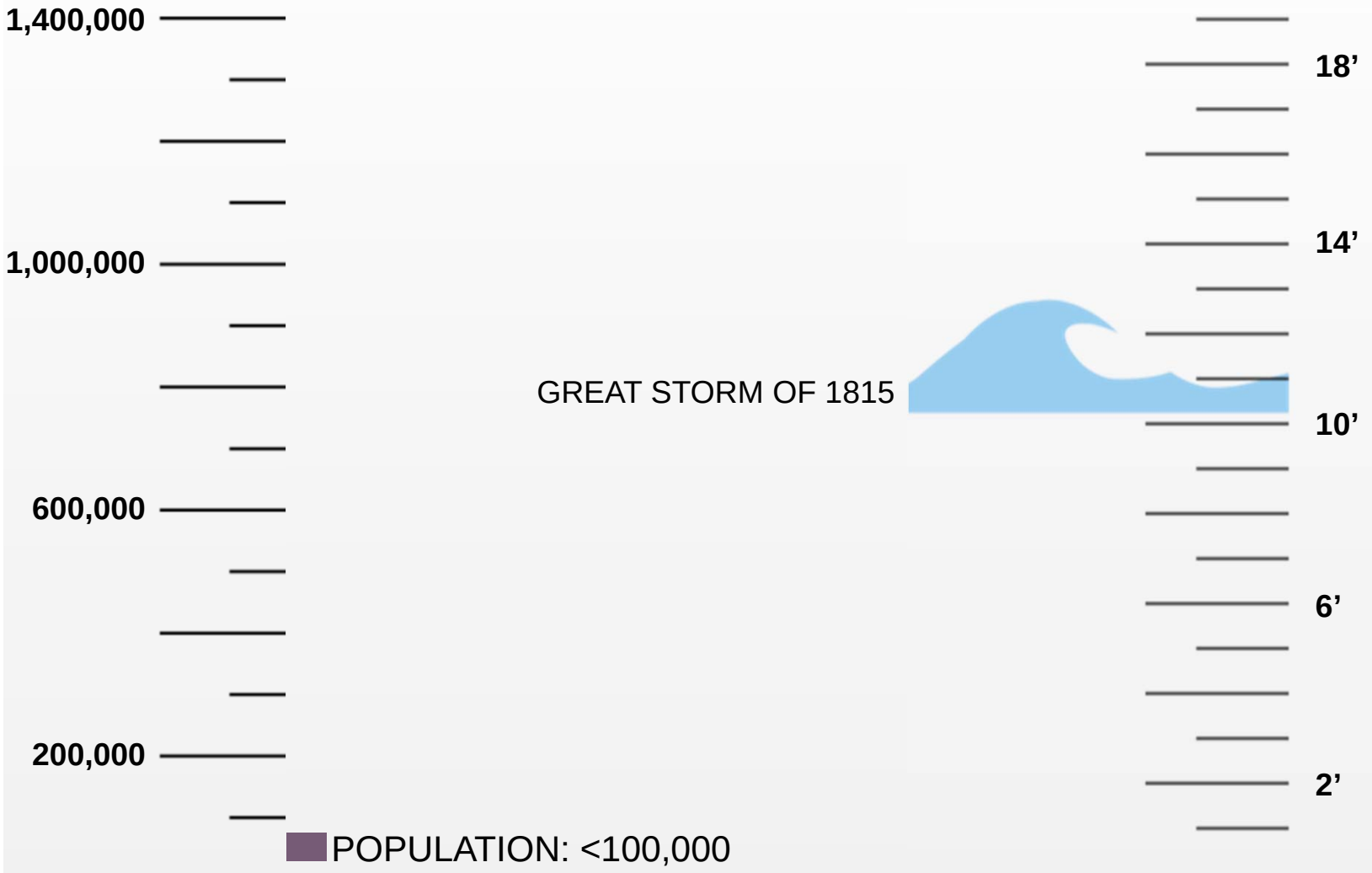
MAJOR STORM EVENTS

HOW DO RECENT STORMS MEASURE UP?



MAJOR STORM EVENTS

HOW DO RECENT STORMS MEASURE UP?



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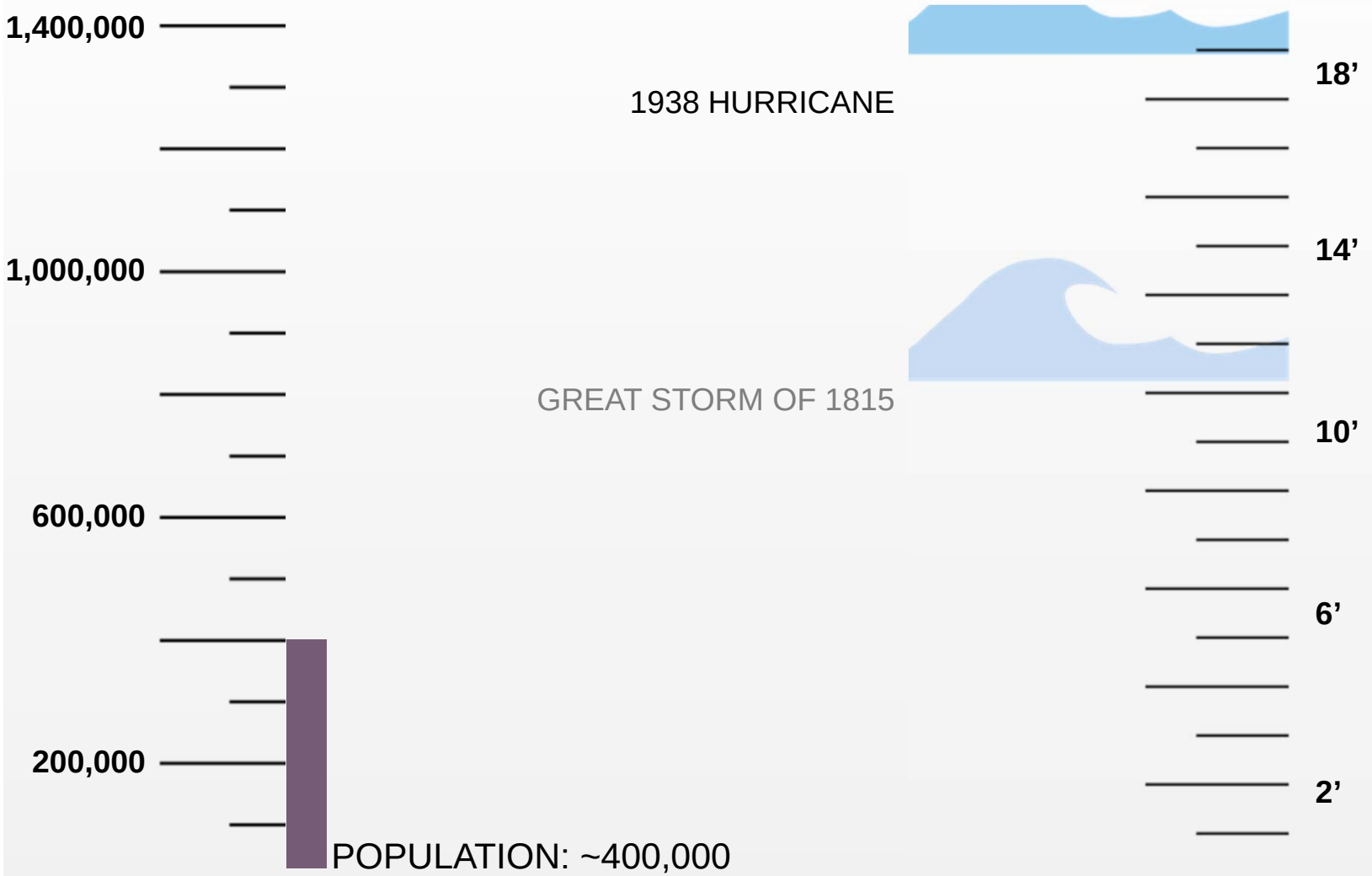

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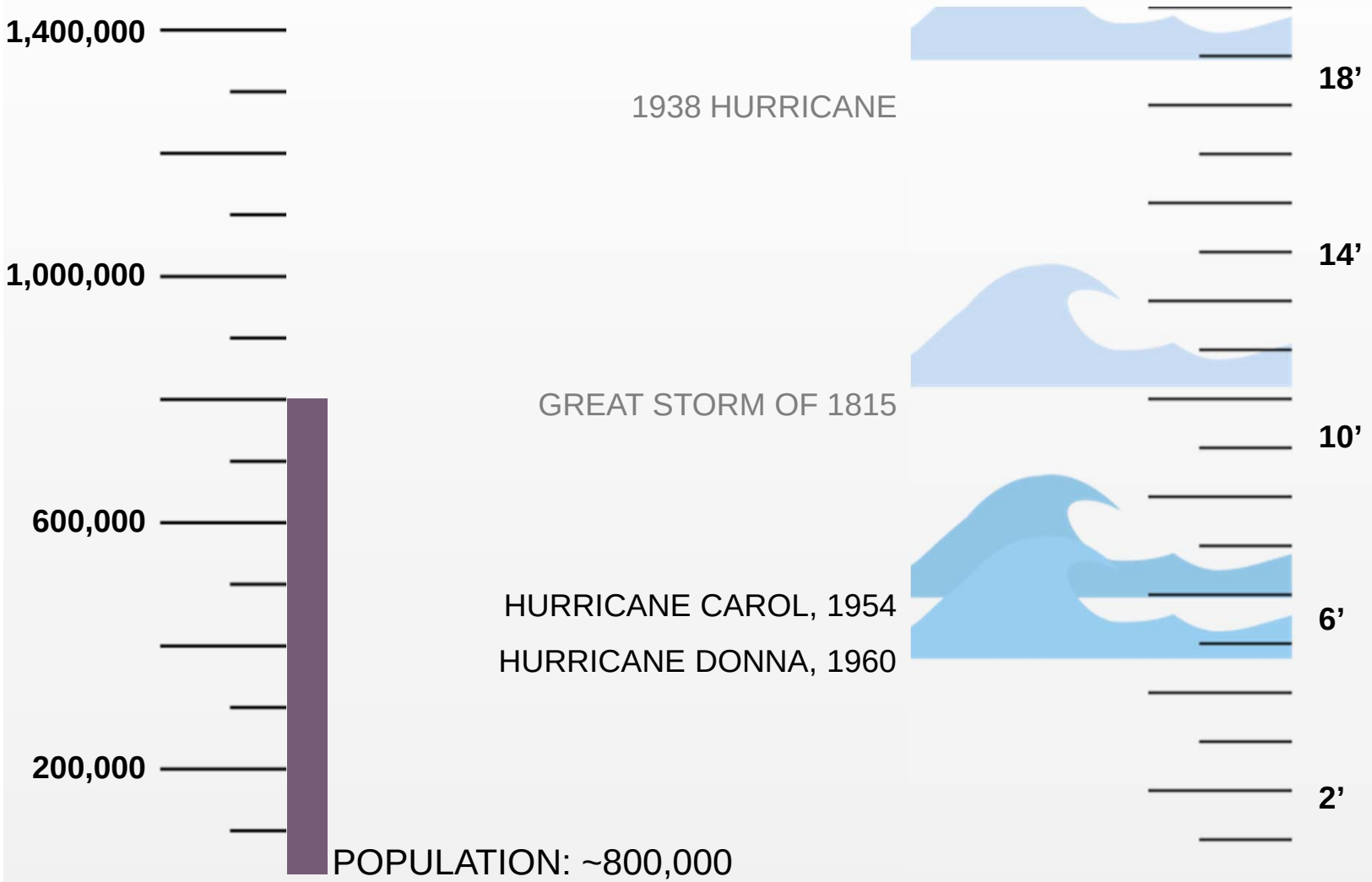

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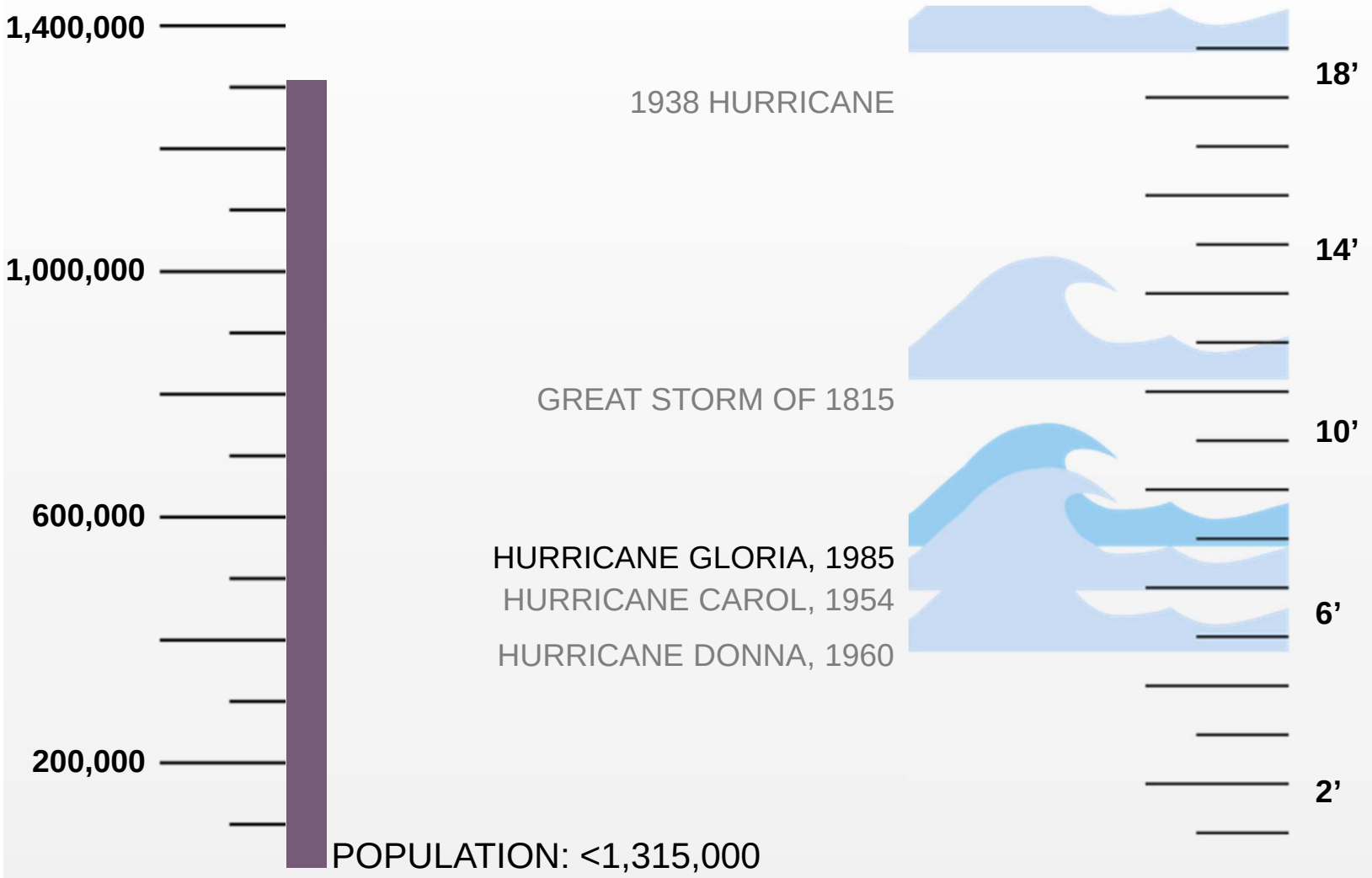

MAJOR STORM EVENTS

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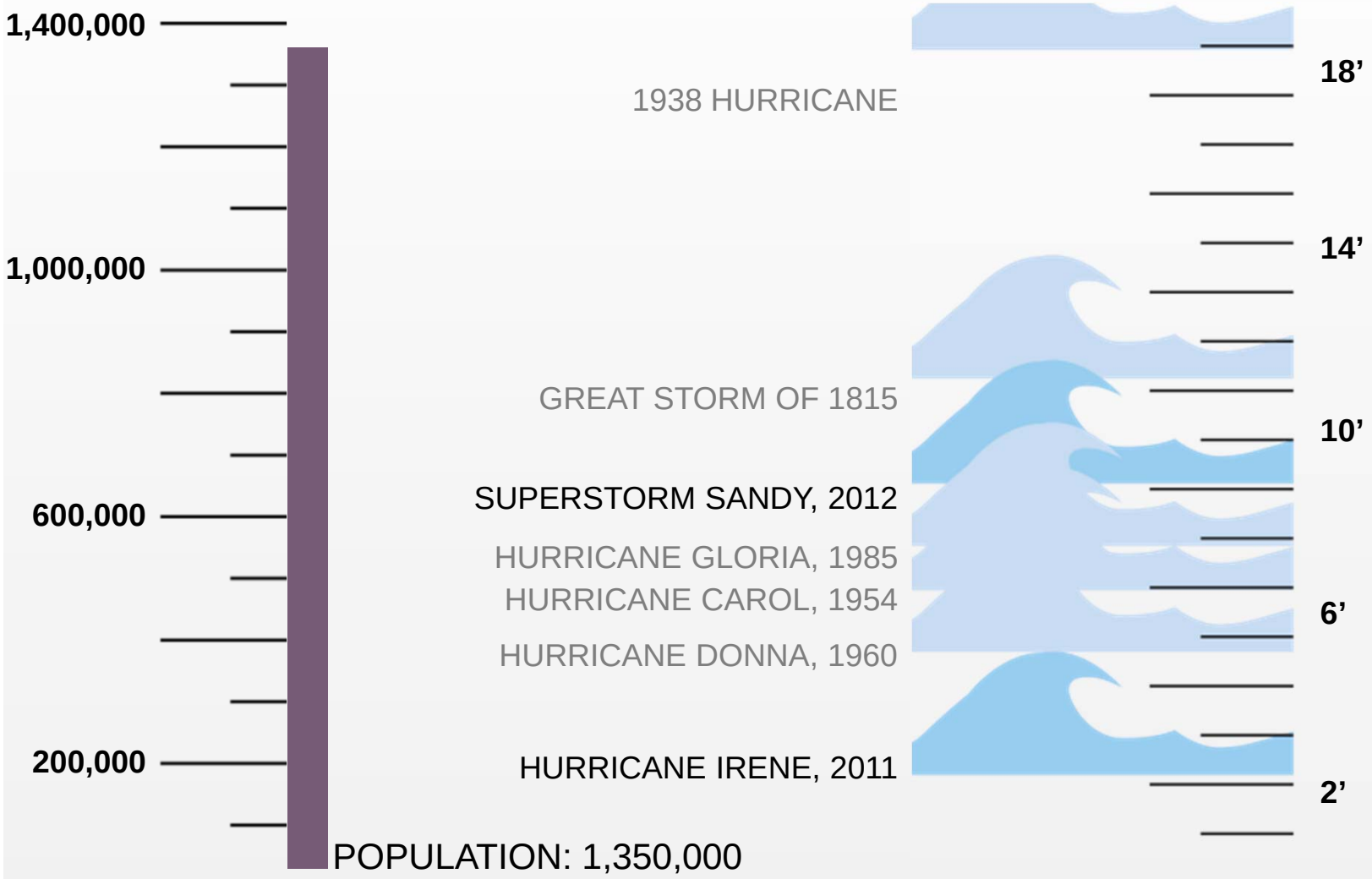
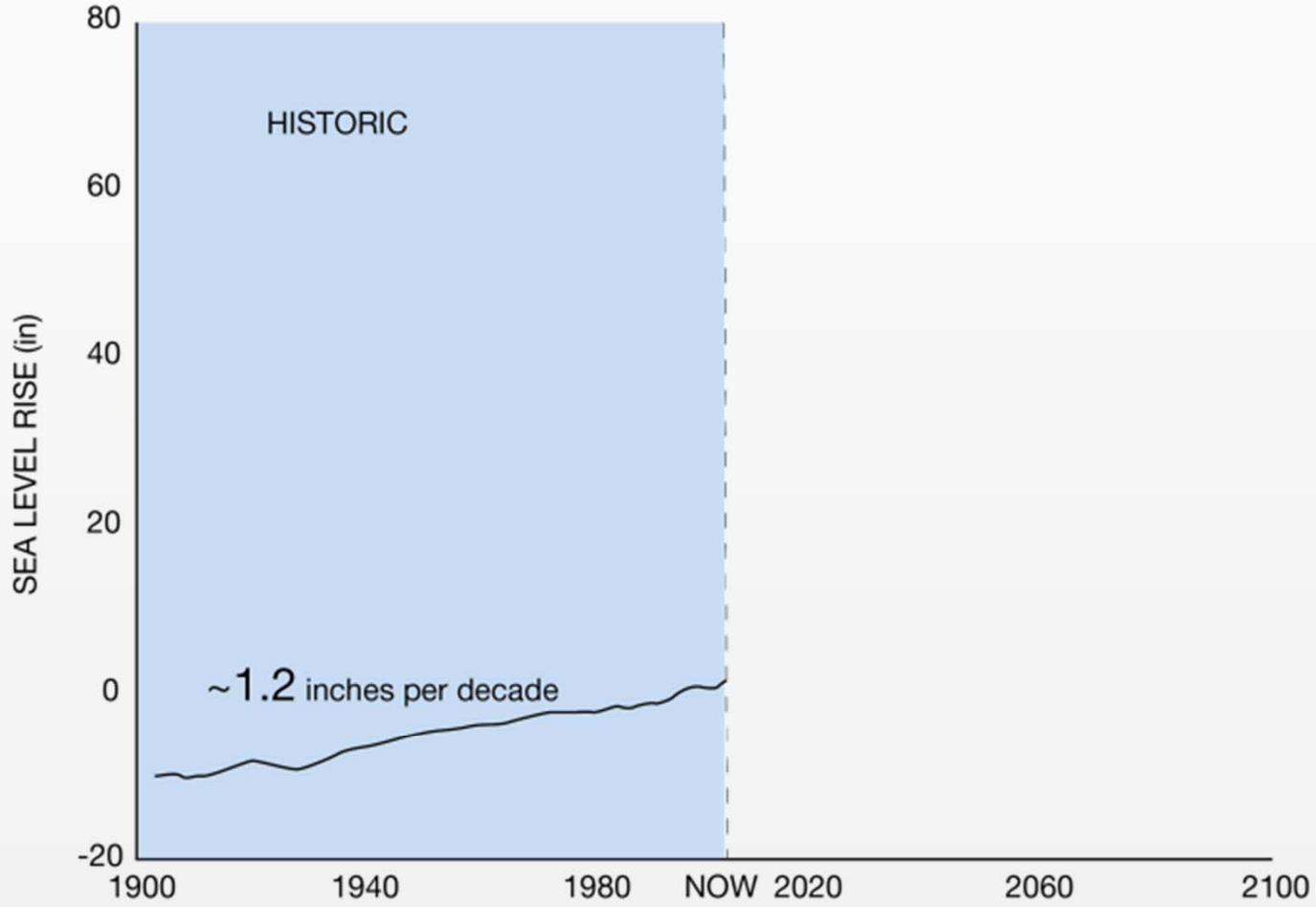
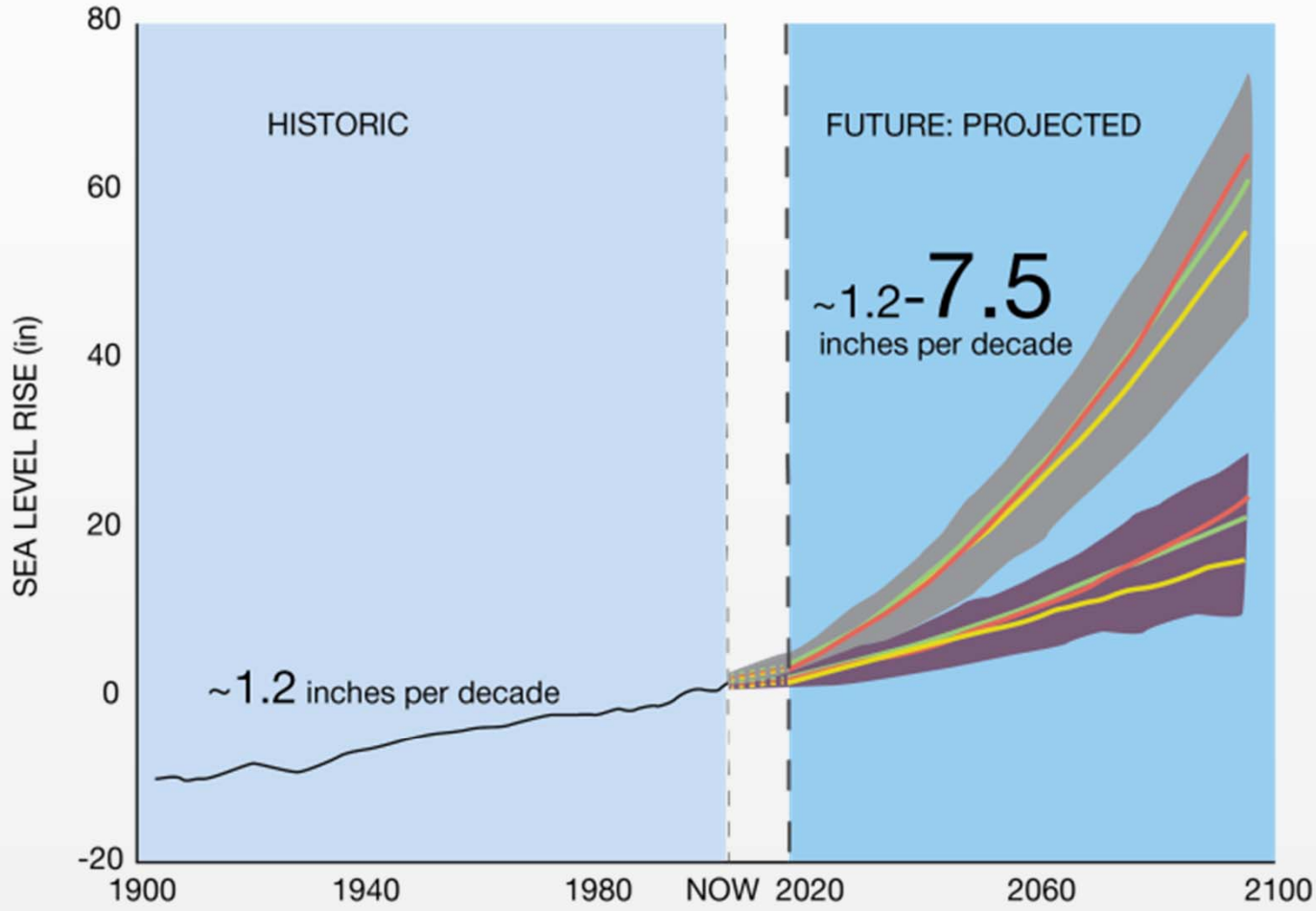


FUTURE RISKS
SEA LEVEL RISE

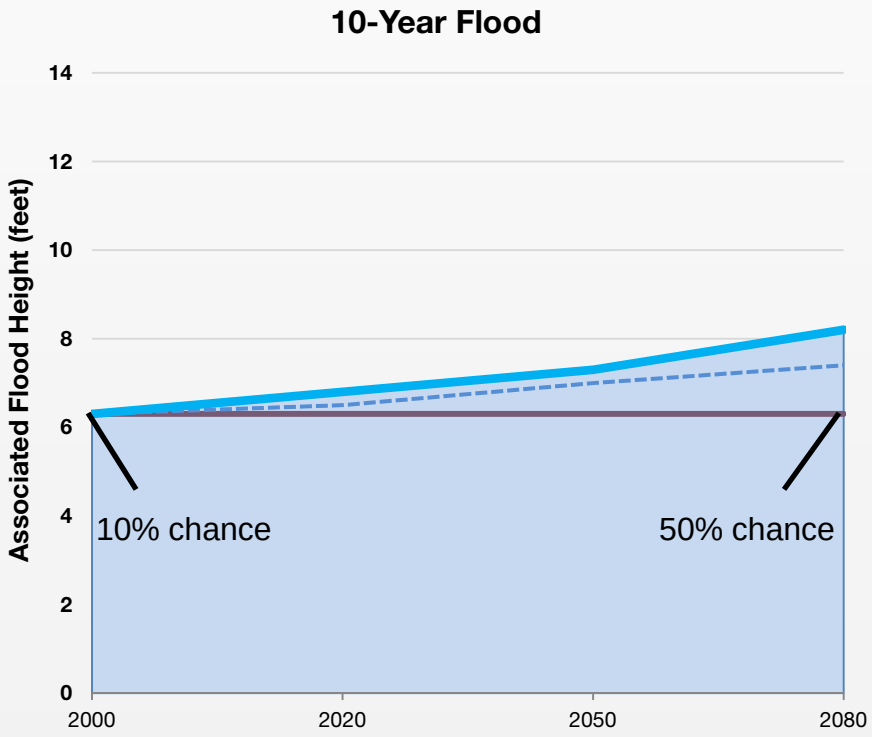


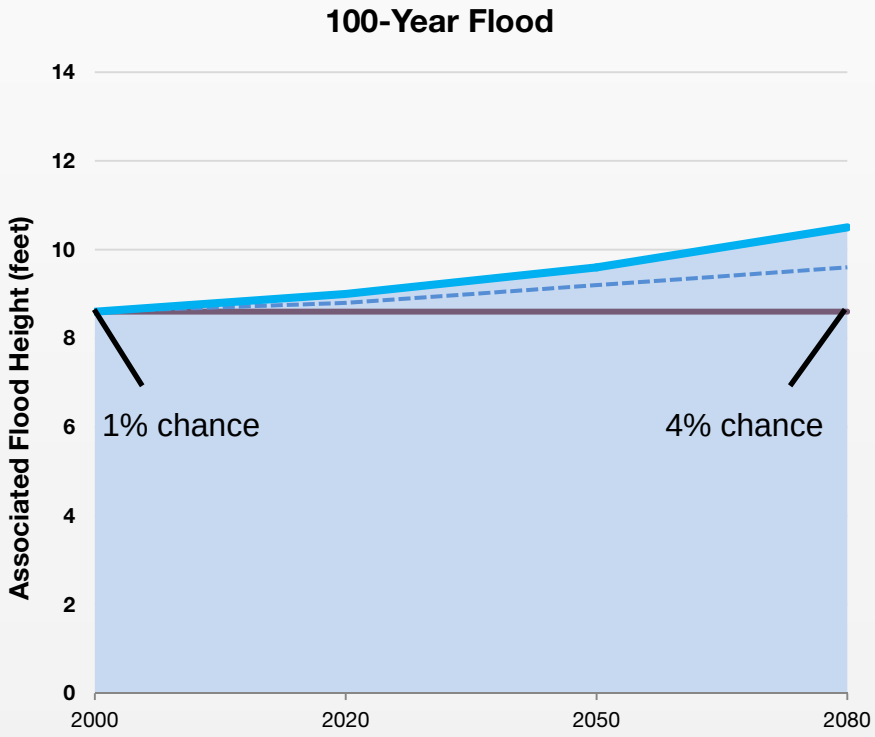
FUTURE RISKS
SEA LEVEL RISE



MAJOR STORM EVENTS

FREQUENCY AND HEIGHT OF SURGES



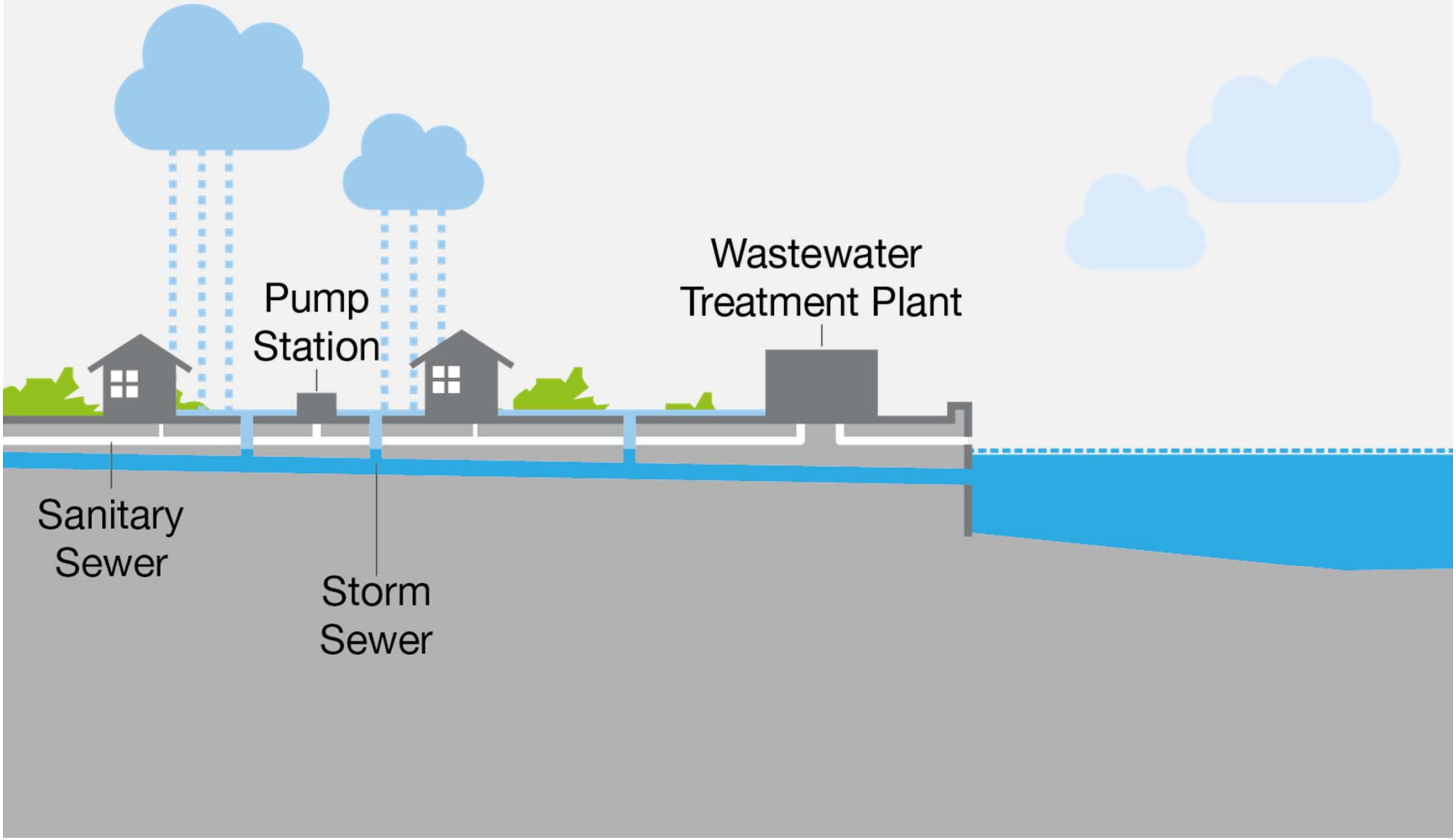


WATER AND ECOLOGY

STORM AND SANITARY SEWER INFRASTRUCTURE

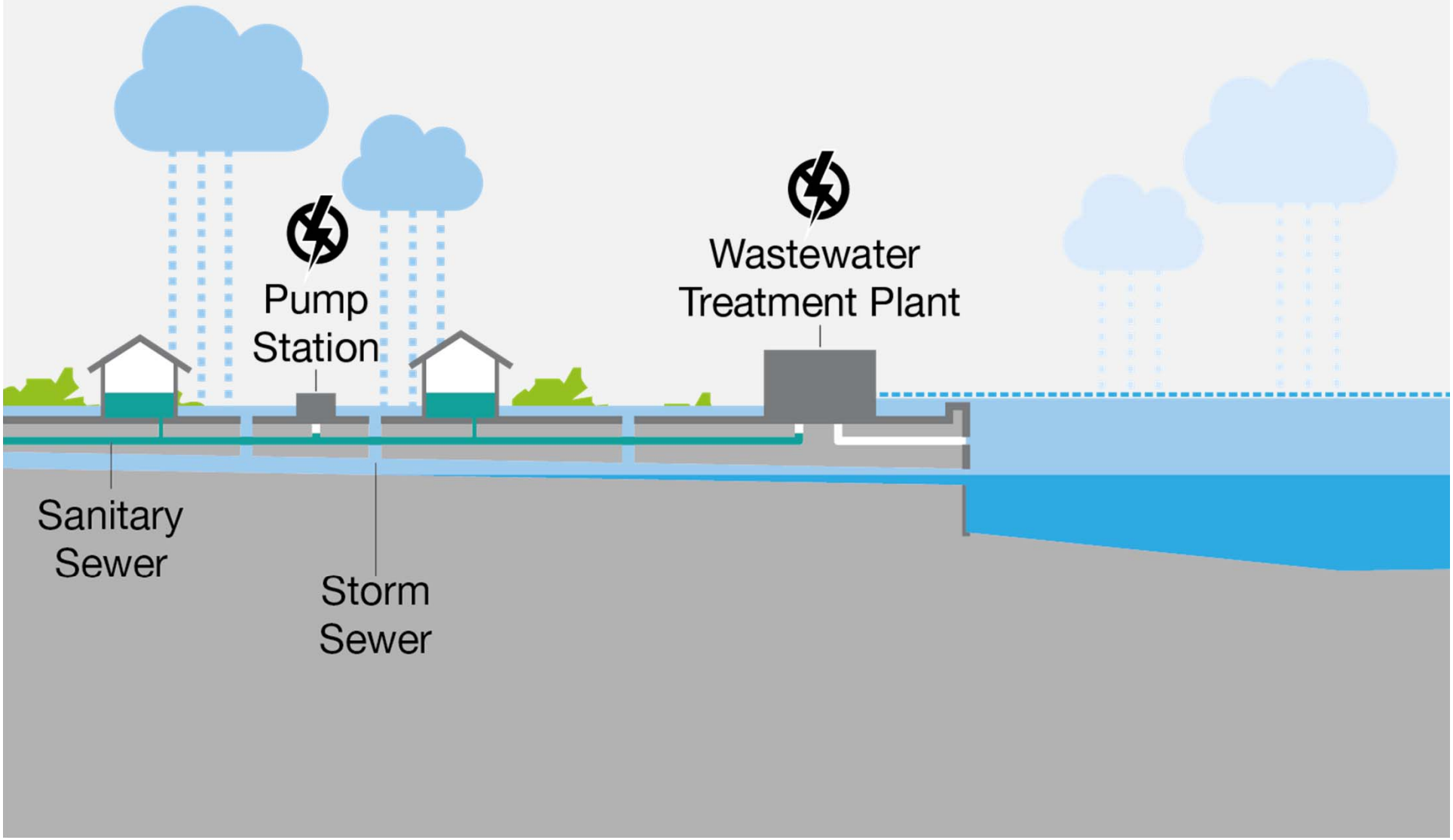
SEWER INFRASTRUCTURE

SEPARATED STORM AND SANITARY SEWERS



SEWER INFRASTRUCTURE

SANITARY SEWERS – WASTEWATER TREATMENT PLANT AND POWER DISRUPTION



WATER AND ECOLOGY

TYPES OF FLOODING ON THE SOUTH SHORE

FUTURE RISKS
TYPES OF FLOODING

Tidal
Flooding due to regular fluctuations in sea level

Sea Level Rise
A gradual and permanent change in sea level

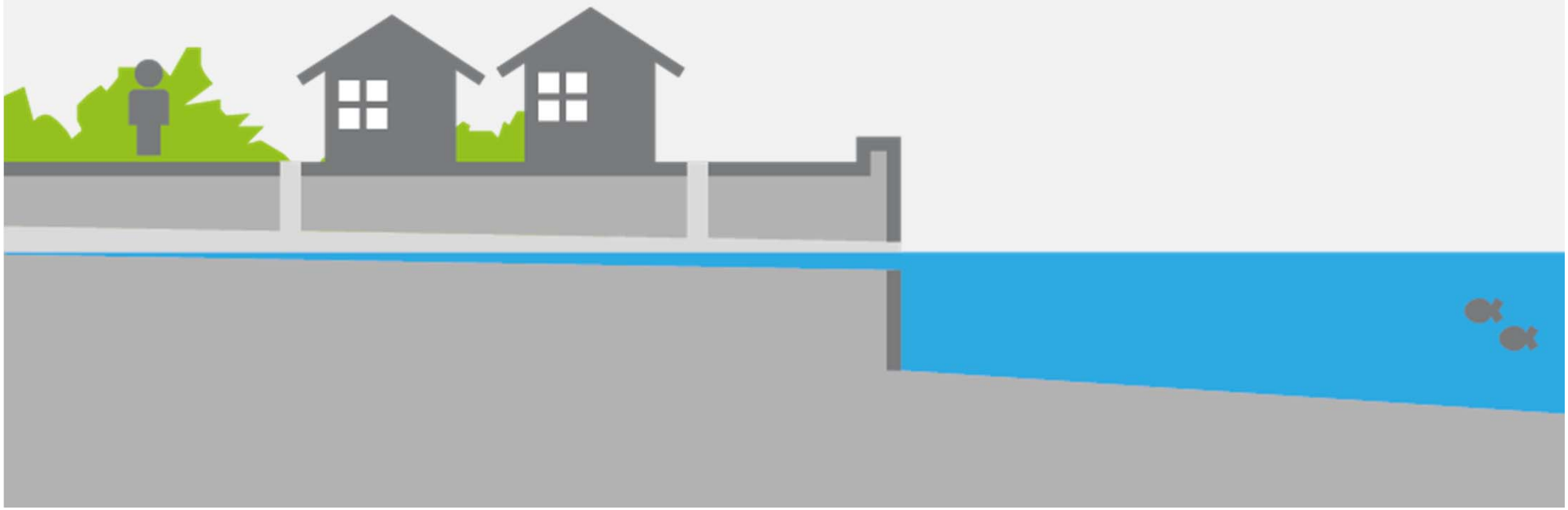
Surface Runoff
Flooding due to intense periods of rainfall

Storm Surge
A rise in water levels caused by major storm events

BAU

FUTURE RISKS

BUSINESS AS USUAL

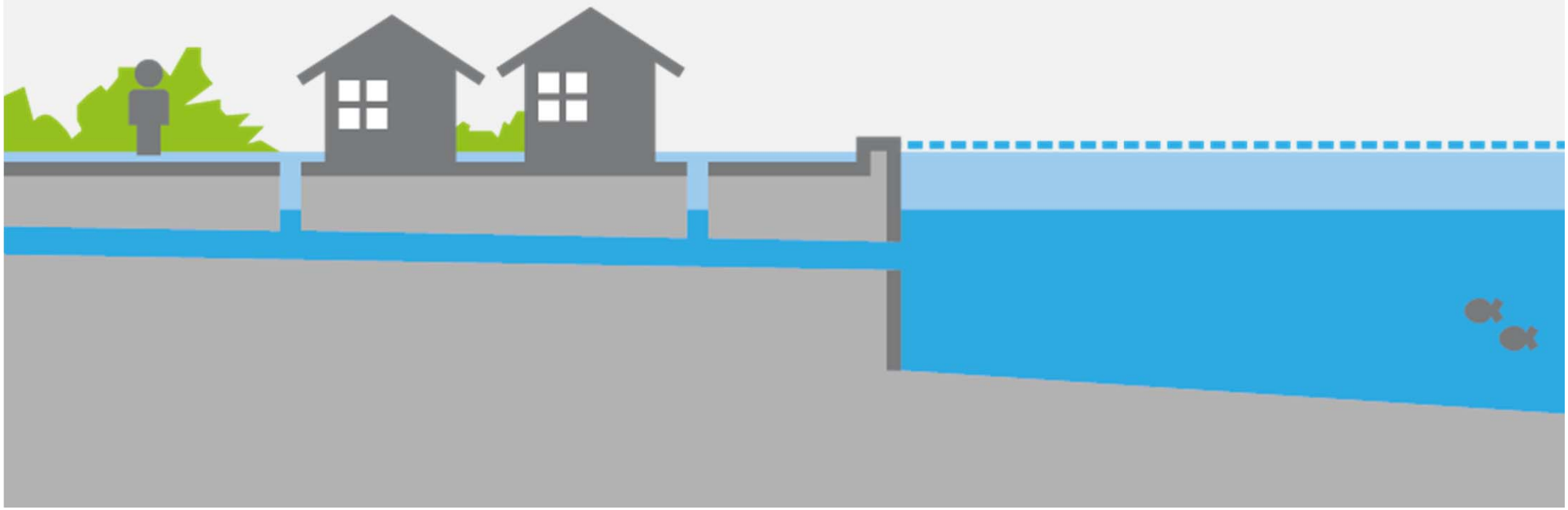


FUTURE RISKS
TIDAL FLOODING

SLR

FUTURE RISKS

SEA LEVEL RISE FLOODING



FUTURE RISKS

SURFACE RUNOFF FLOODING

FUTURE RISKS

STORM SURGE FLOODING

FUTURE RISKS
CUMULATIVE FLOOD IMPACTS

Different types of flooding can occur simultaneously

Flooding during Sandy was a combination of all four flood types

- Storm surge was almost **10 feet**
- Tide accounted for an additional **5 feet**
- Sea level rise contributed to high water levels
- Surface flooding and lack of drainage exacerbated flooding

WATER AND ECOLOGY

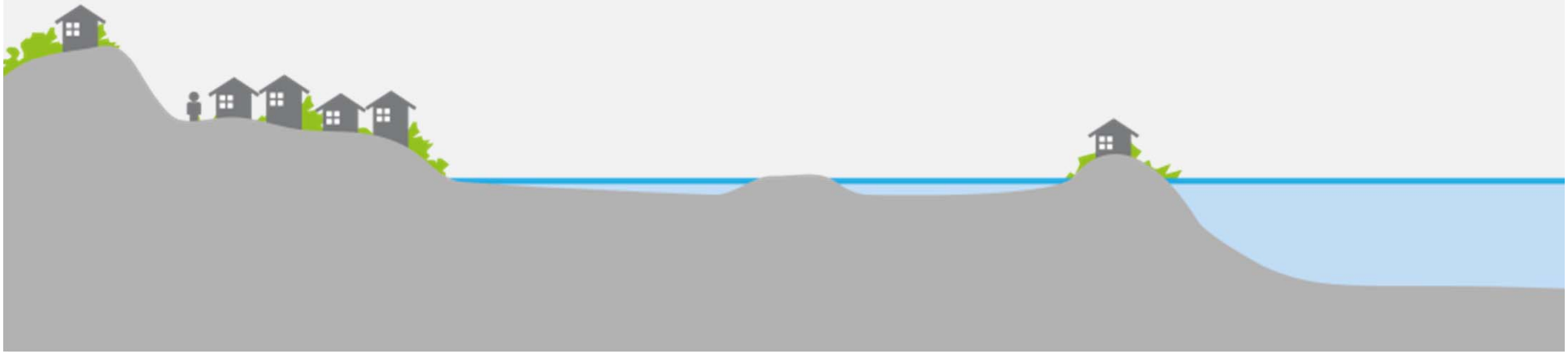
APPROACHES FOR RESILIENCE

APPROACHES
CATEGORIES

HARD INFRASTRUCTURE

GREEN INFRASTRUCTURE

NATURAL SYSTEMS



APPROACH
METHODOLOGY

Scale
- Extent of implementation necessary for flood mitigation

Costs
- Combined construction and ongoing maintenance costs

Timeframe
- Duration of preliminary planning and study, design, and construction

Effectiveness
- Ability to mitigate the following types of flooding:
  - Tidal
  - Sea level rise
  - Surface Runoff
  - Storm surge

EVALUATION CRITERIA

Scale	Local	Regional
Costs	Low	High
Timeframe	Short	Long
Effectiveness		
Tidal	Low	High
Sea Level	Low	High
Runoff	Low	High
Storm Surge	Low	High

HARD INFRASTRUCTURE

APPROACHES FOR RESILIENCE

HARD INFRASTRUCTURE
APPROACHES, COSTS AND BENEFITS

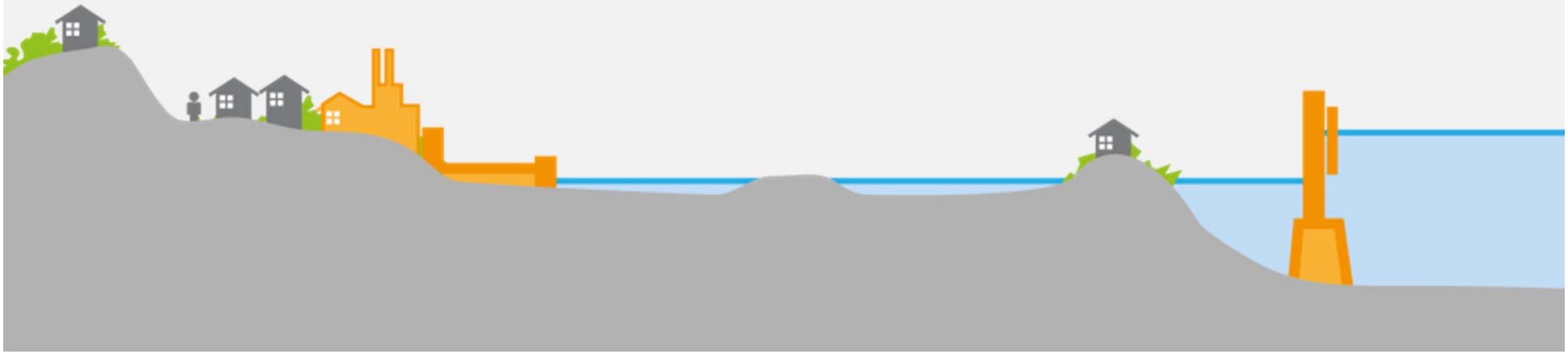
Hard Infrastructure approaches for resilience through traditional engineered systems

Benefits

- Can be more effective than other approaches, especially for major storm events

Challenges

- Potential long term implementation schedule
- More capital cost intensive than other solutions
- Large projects may require regional participation
- Potential for significant environmental impacts

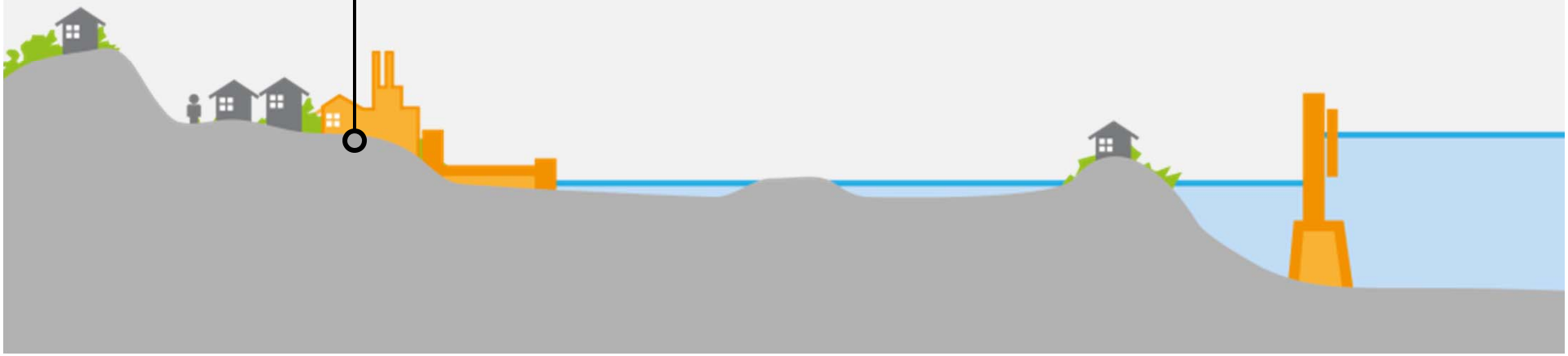


HARD INFRASTRUCTURE

APPROACHES, COSTS AND BENEFITS

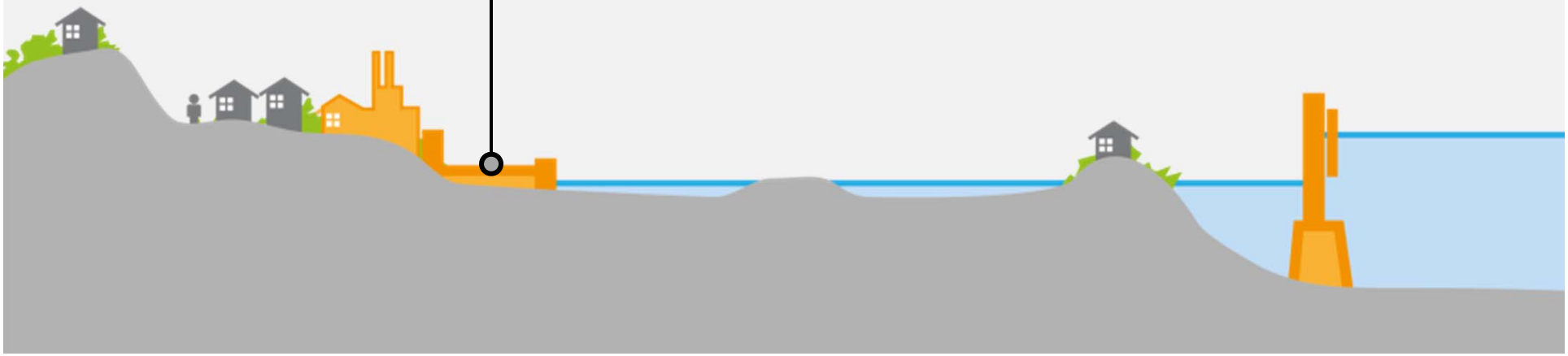
Storm Sewer Upgrades

Floodproofing measures such as tide gates or check-valves to alleviate backflow, additional capacity for retention and conveyance



HARD INFRASTRUCTURE
APPROACHES, COSTS AND BENEFITS

Bulkheads
Bulkheads and seawalls prevent erosion along the section of shoreline they protect

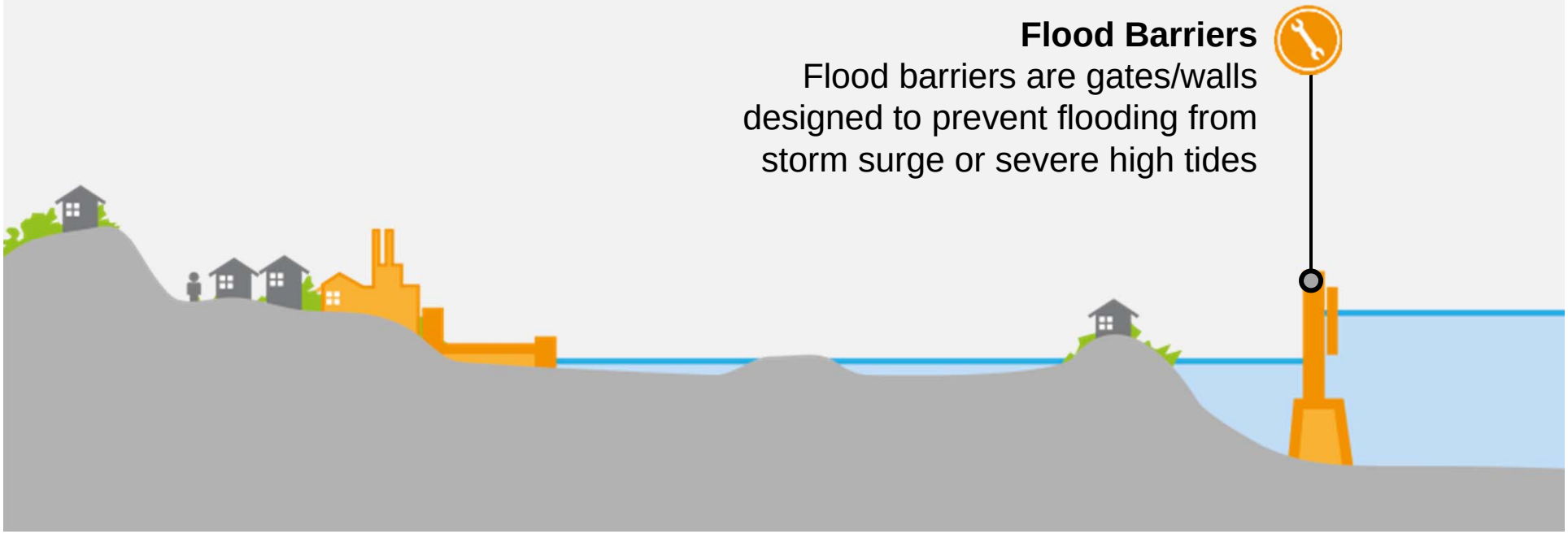


HARD INFRASTRUCTURE

APPROACHES, COSTS AND BENEFITS

Flood Barriers

Flood barriers are gates/walls designed to prevent flooding from storm surge or severe high tides



HARD INFRASTRUCTURE
STORM SEWER UPGRADES

- Tidal flooding impacts capacity of storm sewers
- Check-valves and/or tide gates can alleviate backflow
- Regular inspection and maintenance is required


Gowanus Canal COnservancy


North Sound Baykeeper

Scale	Local	■■□□□	Regional
Costs	Low	■■□□□	High
Timeframe	Short	■■□□□	Long
Effectiveness			
Tidal	Low	■■■■□	High
Sea Level	Low	■□□□□	High
Runoff	Low	■■■□□	High
Storm Surge	Low	■□□□□	High

HARD INFRASTRUCTURE
BULKHEADS

- Bulkheads and seawalls are designed to prevent coastal erosion
- Older bulkheads with gaps can cause erosion land-side, and sediment deposition sea-side
- Bulkheads along a continuous waterfront must all reach a minimum height to provide flood protection

Scale	Local	■■□□□	Regional
Costs	Low	■■■□□	High
Timeframe	Short	■■■□□	Long
Effectiveness			
Tidal	Low	■■■■□	High
Sea Level	Low	■■□□□	High
Runoff	Low	□□□□□	High
Storm Surge	Low	■■□□□	High

HARD INFRASTRUCTURE
BULKHEADS

- The combined coastline of the five CR communities is **108 miles**
- **88 miles** have bulkheads, and **20 miles** are soft edges
- Town of Hempstead Conservation and Waterways is supporting a **7.2' bulkhead height**


HudsonRiverKeeper – Flickr.com


USACE – Flickr.com

HARD INFRASTRUCTURE
FLOOD BARRIERS

- Flood barriers would need to be constructed strategically to potentially stop storm surge
- If not designed and managed properly, flood barriers can significantly impact the coastal ecosystem

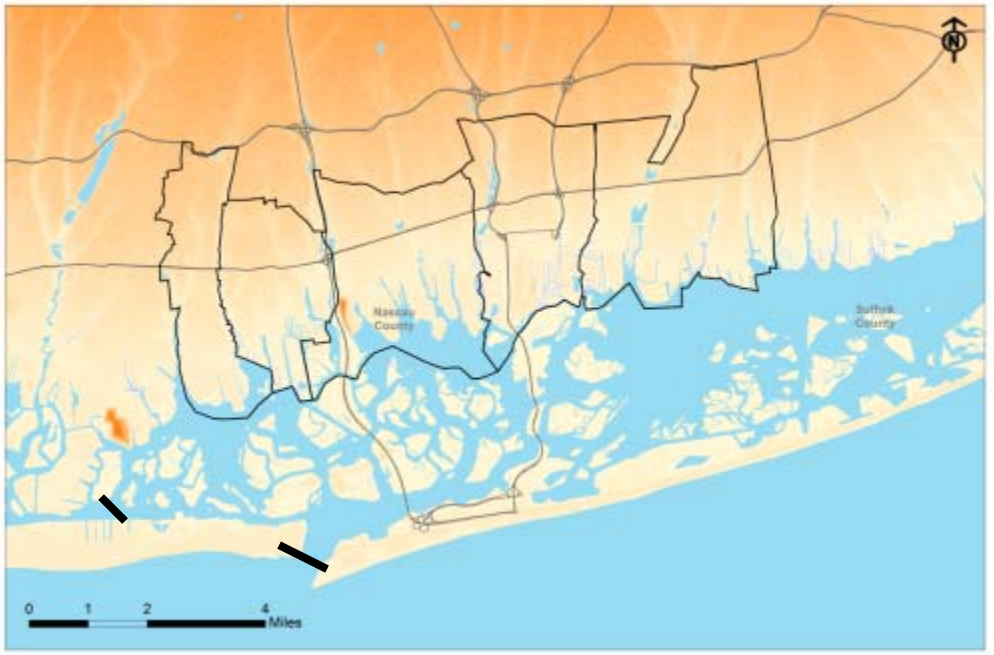
Scale	Local	Regional
Costs	Low	High
Timeframe	Short	Long

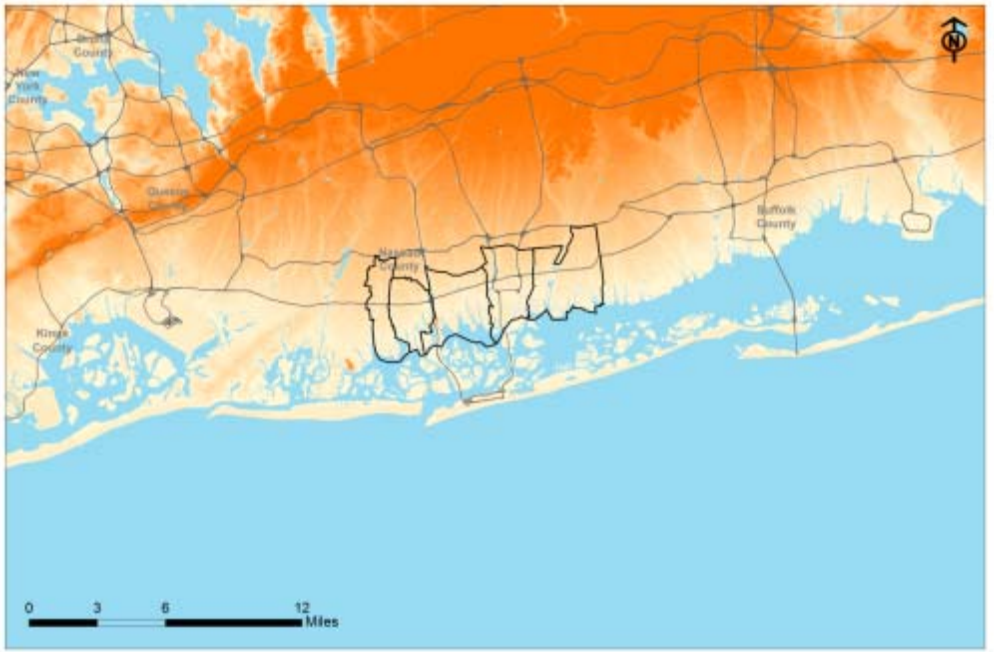
Effectiveness

Tidal	Low	High
Sea Level	Low	High
Runoff	Low	High
Storm Surge	Low	High

HARD INFRASTRUCTURE
FLOOD BARRIERS

- Flood gates located along state parkways can create a barrier
- Flood gates would need to be constructed on the multiple inlets between barrier islands
- Existing coastal barrier islands are not continuous





GREEN INFRASTRUCTURE

APPROACHES FOR RESILIENCE

GREEN INFRASTRUCTURE
SOLUTIONS, COSTS AND BENEFITS

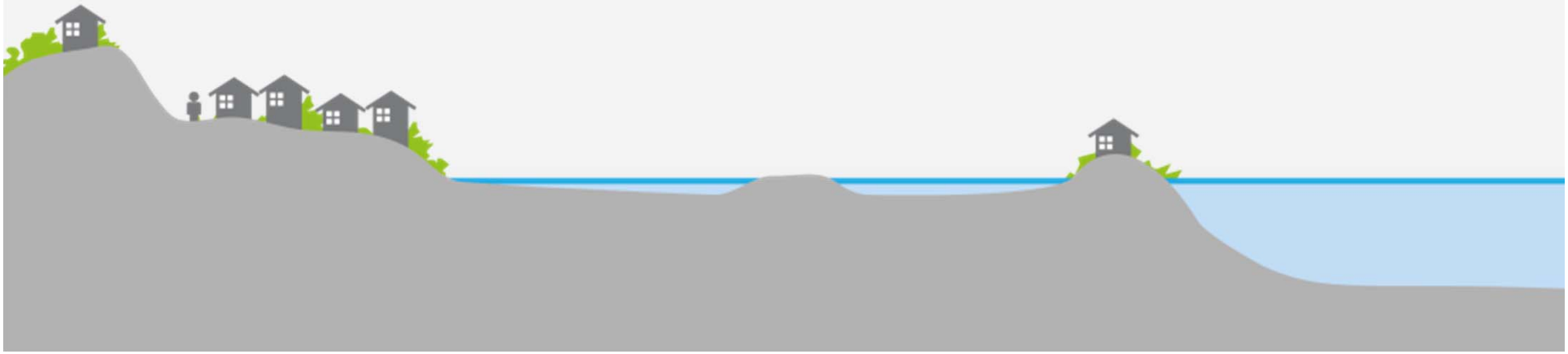
Green Infrastructure approaches for resilience through engineering systems to mimic natural processes to infiltrate, evaporate, retain and reuse stormwater runoff

Benefits

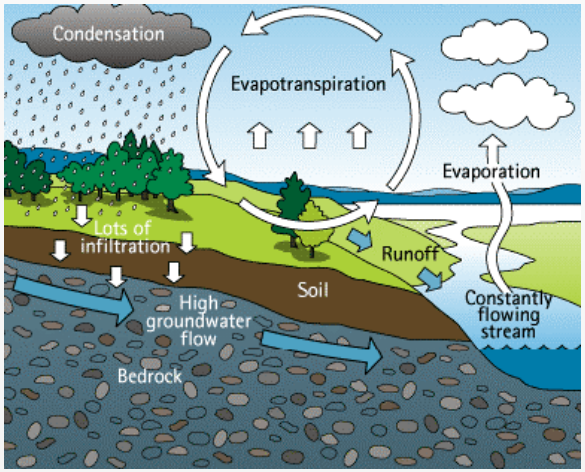
- Typically costs less than hard infrastructure solutions
- Faster implementation
- Can be deployed incrementally
- Good for the environment
- Provides additional co-benefits

Challenges

- Should be implemented in a regional, integrated approach
- Requires regional coordination



GREEN INFRASTRUCTURE
HYDROLOGY PRINCIPLES



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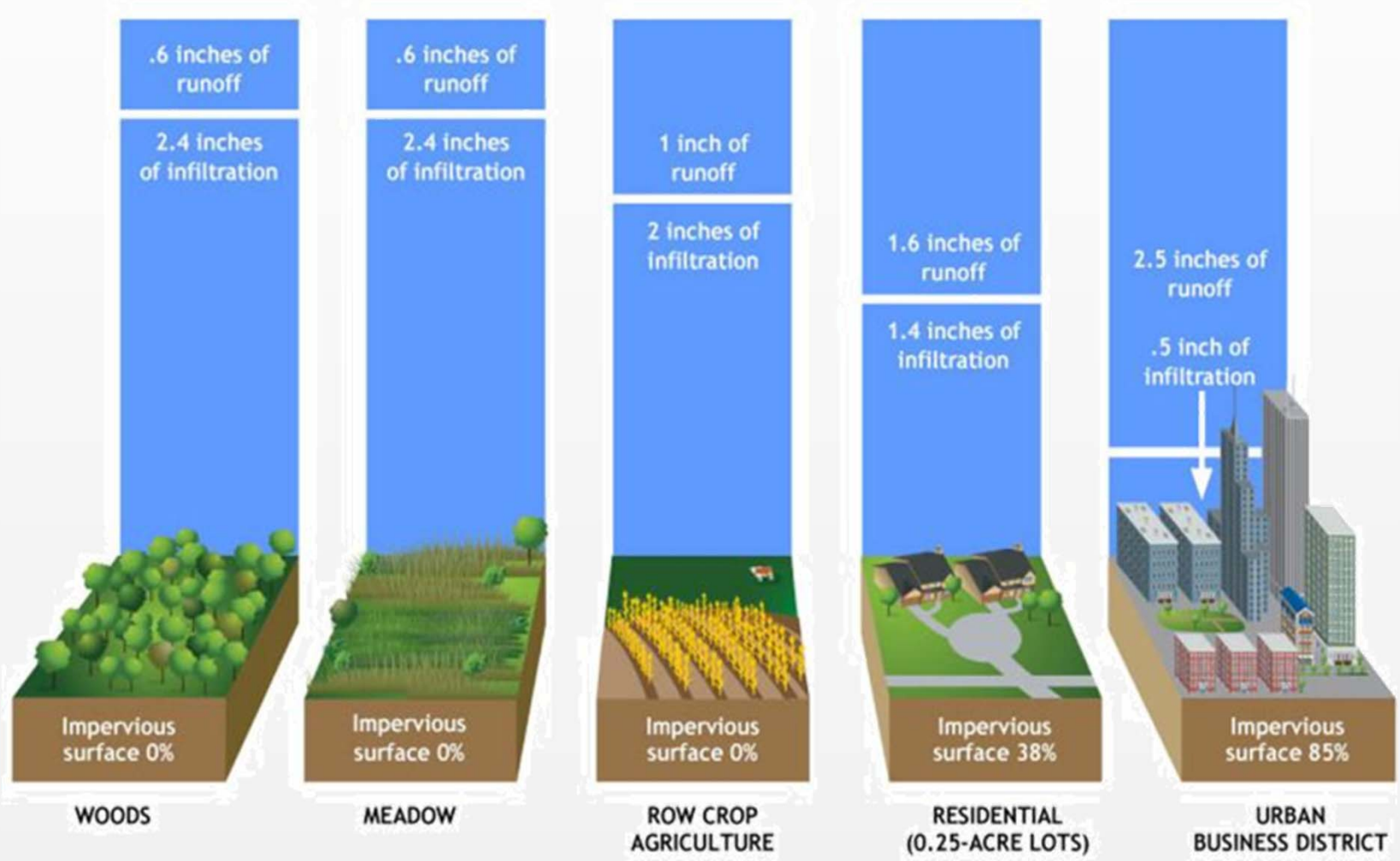

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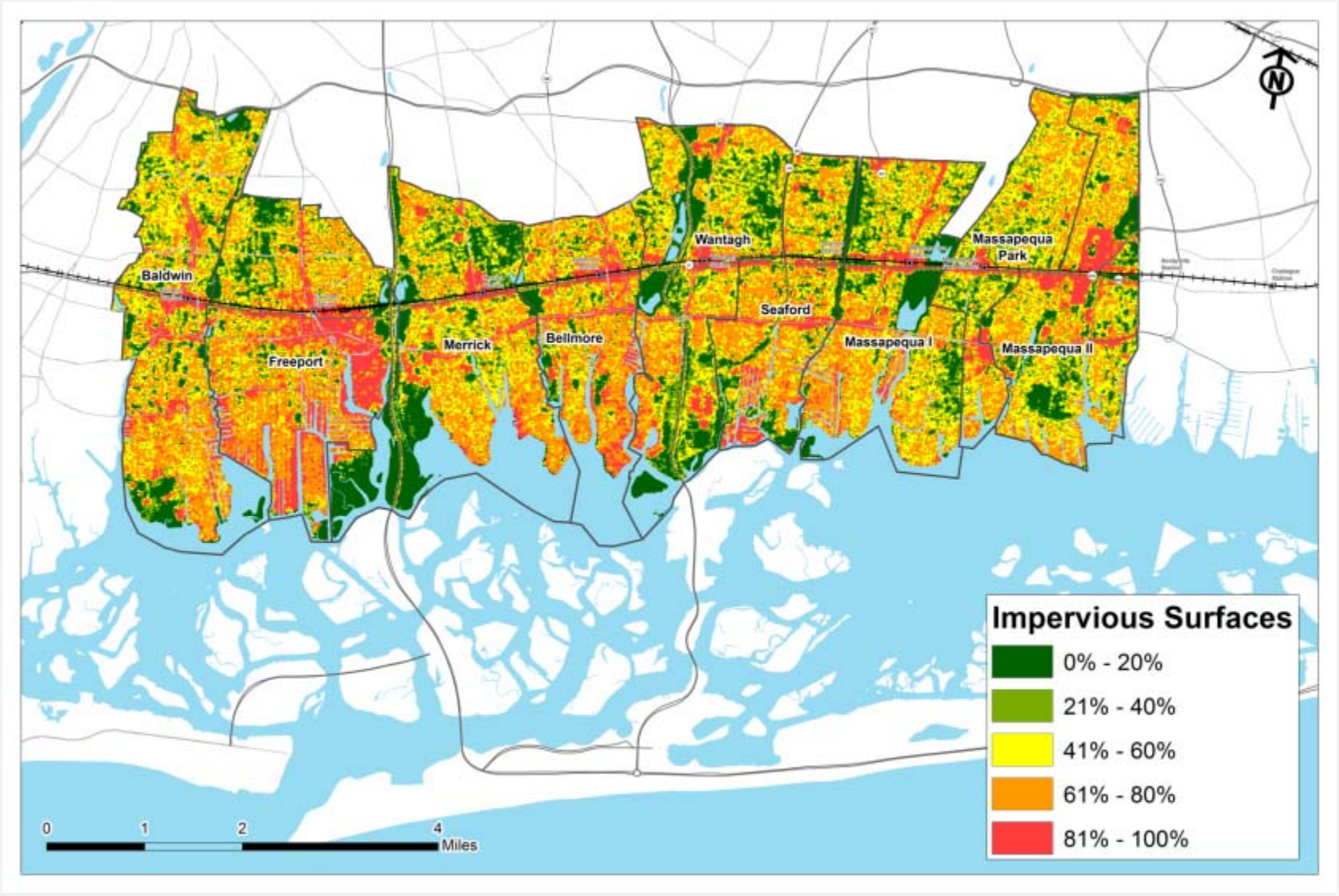
HYDROLOGY PRINCIPLES



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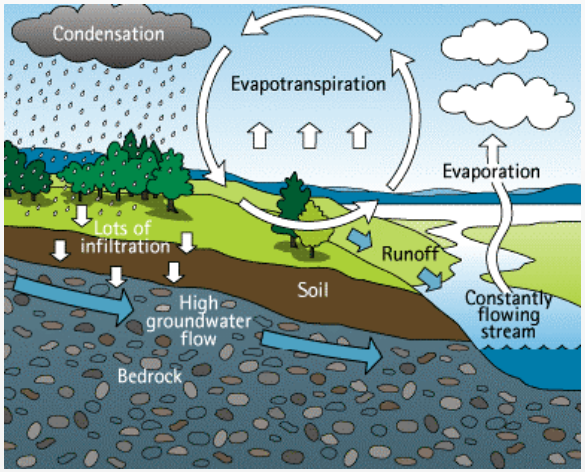
HYDROLOGY PRINCIPLES



GREEN INFRASTRUCTURE
HYDROLOGY PRINCIPLES

Nitrogen

Phosphorus

Oil and Grease

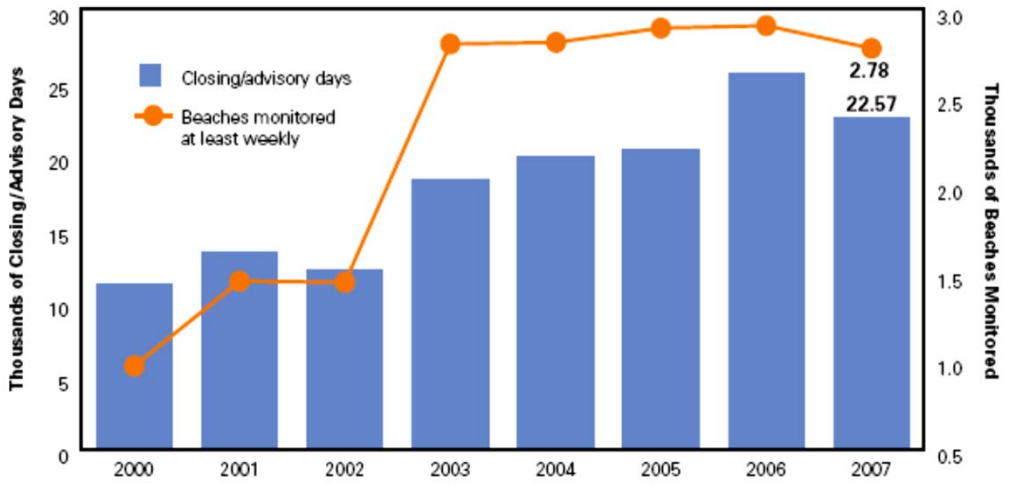
Sediments

Heavy Metals

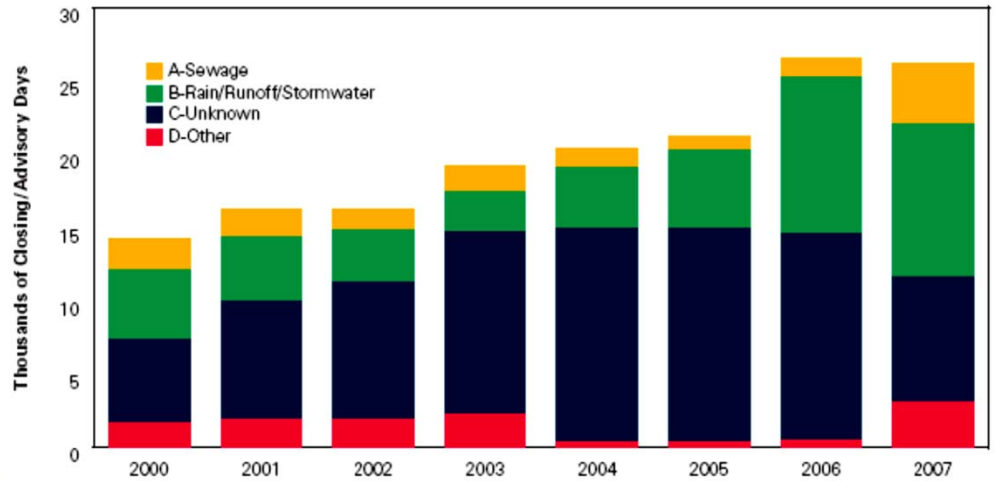
Pathogens

GREEN INFRASTRUCTURE
HYDROLOGY PRINCIPLES

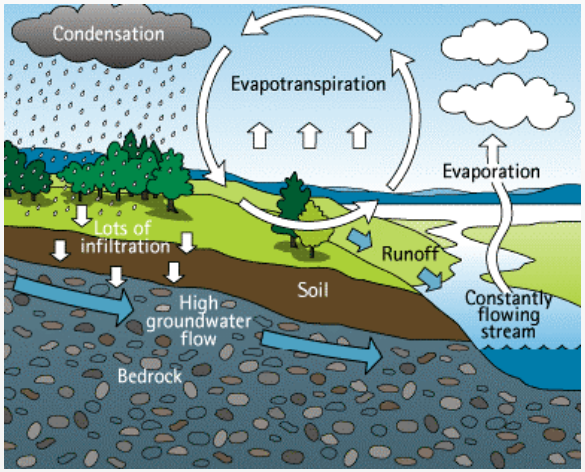
Total Beach Closing/Advisory Days for the U.S.

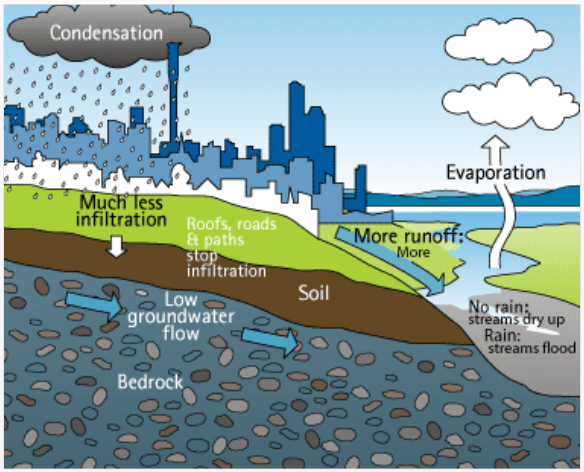


Causes of Beach Closing/Advisory Days for the U.S.

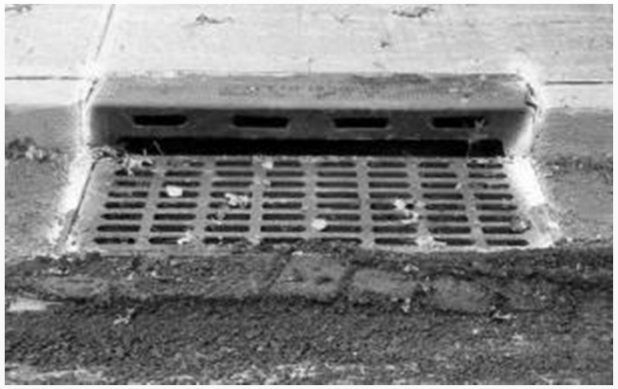


GREEN INFRASTRUCTURE
HYDROLOGY PRINCIPLES





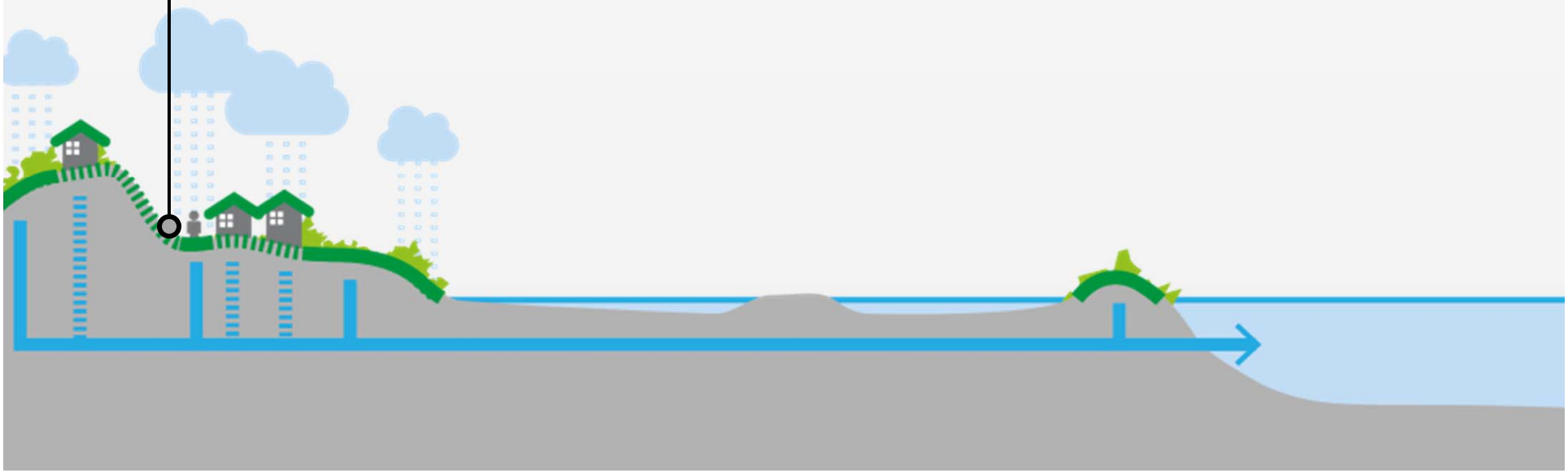
GREEN INFRASTRUCTURE
HYDROLOGY PRINCIPLES





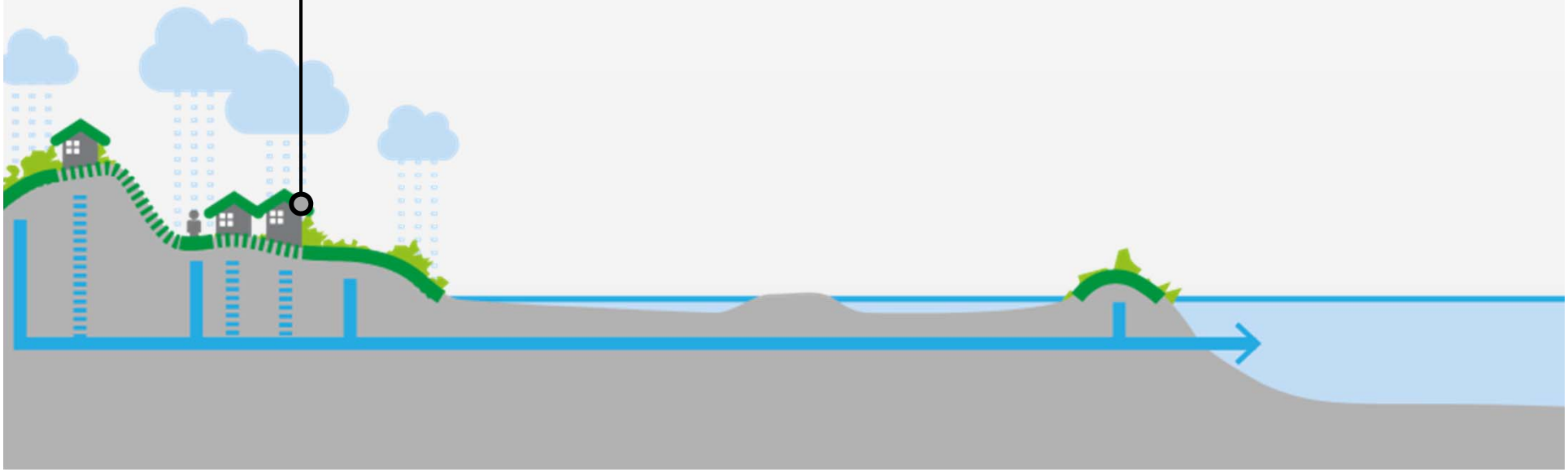

GREEN INFRASTRUCTURE
APPROACHES, COSTS AND BENEFITS

Permeable Paving
Allows stormwater to filter through paved surfaces to avoid overloading of storm sewers



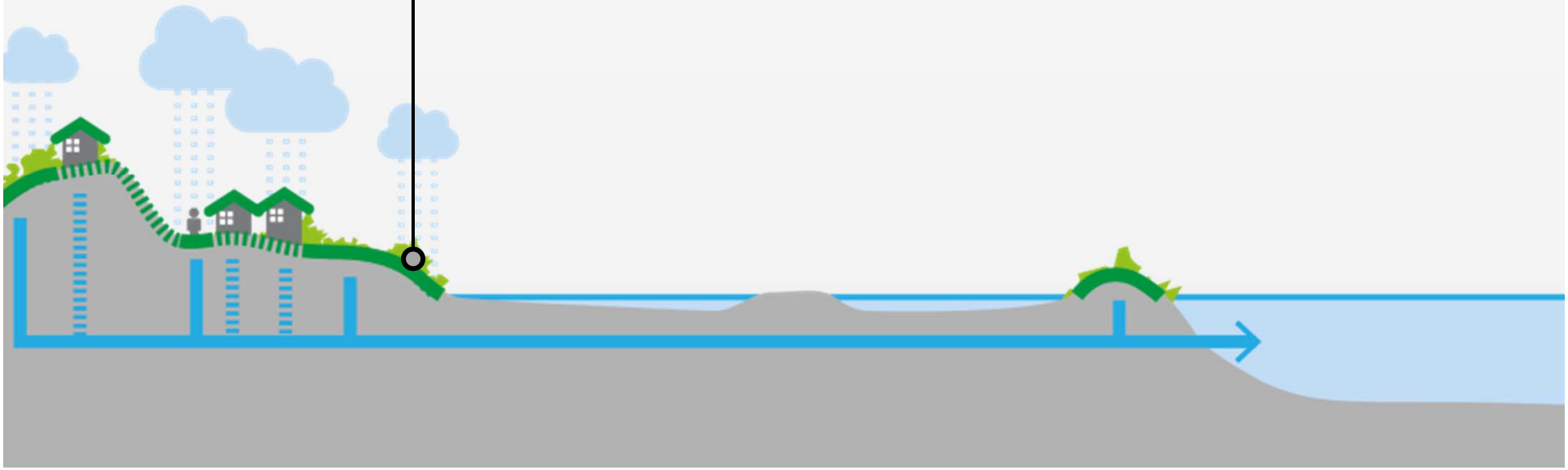
GREEN INFRASTRUCTURE
APPROACHES, COSTS AND BENEFITS

Bioswales and Green Roofs
Naturally treat and reduce stormwater runoff



GREEN INFRASTRUCTURE
APPROACHES, COSTS AND BENEFITS

Stormwater Ponds and Wetlands
Contain and naturally treat stormwater runoff



GREEN INFRASTRUCTURE
PERMEABLE PAVING

- Captures pollutants and improves stormwater runoff quality
- Cannot manage stormwater from other impervious surfaces

Scale	Local	■■□□□	Regional
Costs	Low	■■■□□	High
Timeframe	Short	■■□□□	Long
Effectiveness			
Tidal	Low	■■□□□	High
Sea Level	Low	■■□□□	High
Surface Runoff	Low	■■■■□	High
Storm Surge	Low	□□□□□	High

GREEN INFRASTRUCTURE
BIORETENTION & GREEN ROOFS

- Natural filtration removes sediment and pollutants from stormwater
- Reduces the volume of stormwater entering the storm sewer system

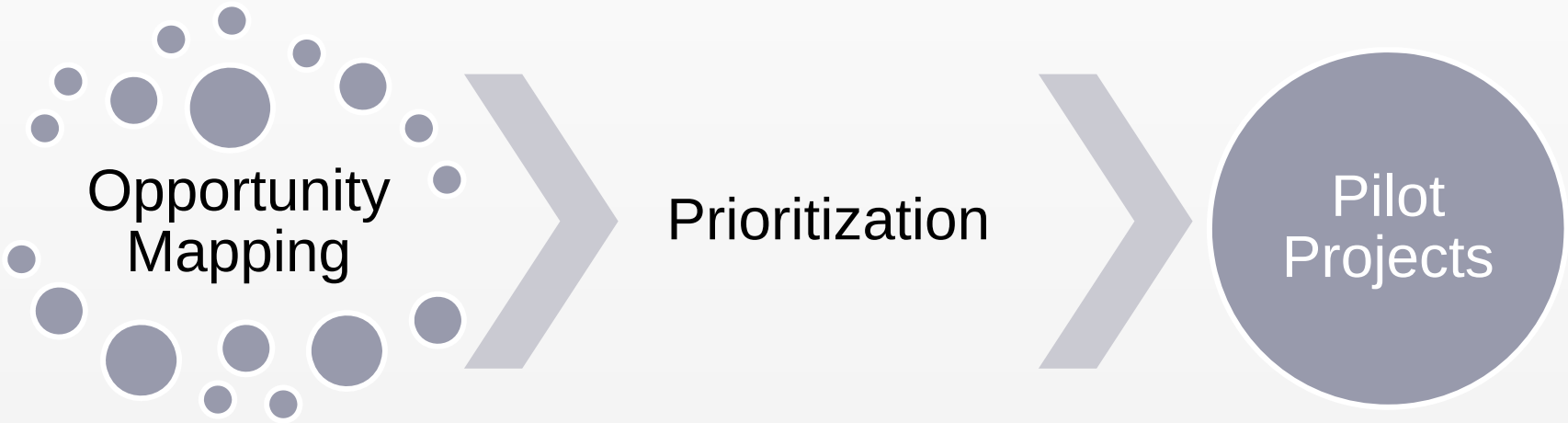
Scale	Local	■■■□□	Regional
Costs	Low	■■□□□	High
Timeframe	Short	■■■□□	Long
Effectiveness			
Tidal	Low	■■■□□	High
Sea Level	Low	■■□□□	High
Surface Runoff	Low	■■■■■	High
Storm Surge	Low	■□□□□	High

GREEN INFRASTRUCTURE
STORMWATER PONDS-WETLANDS

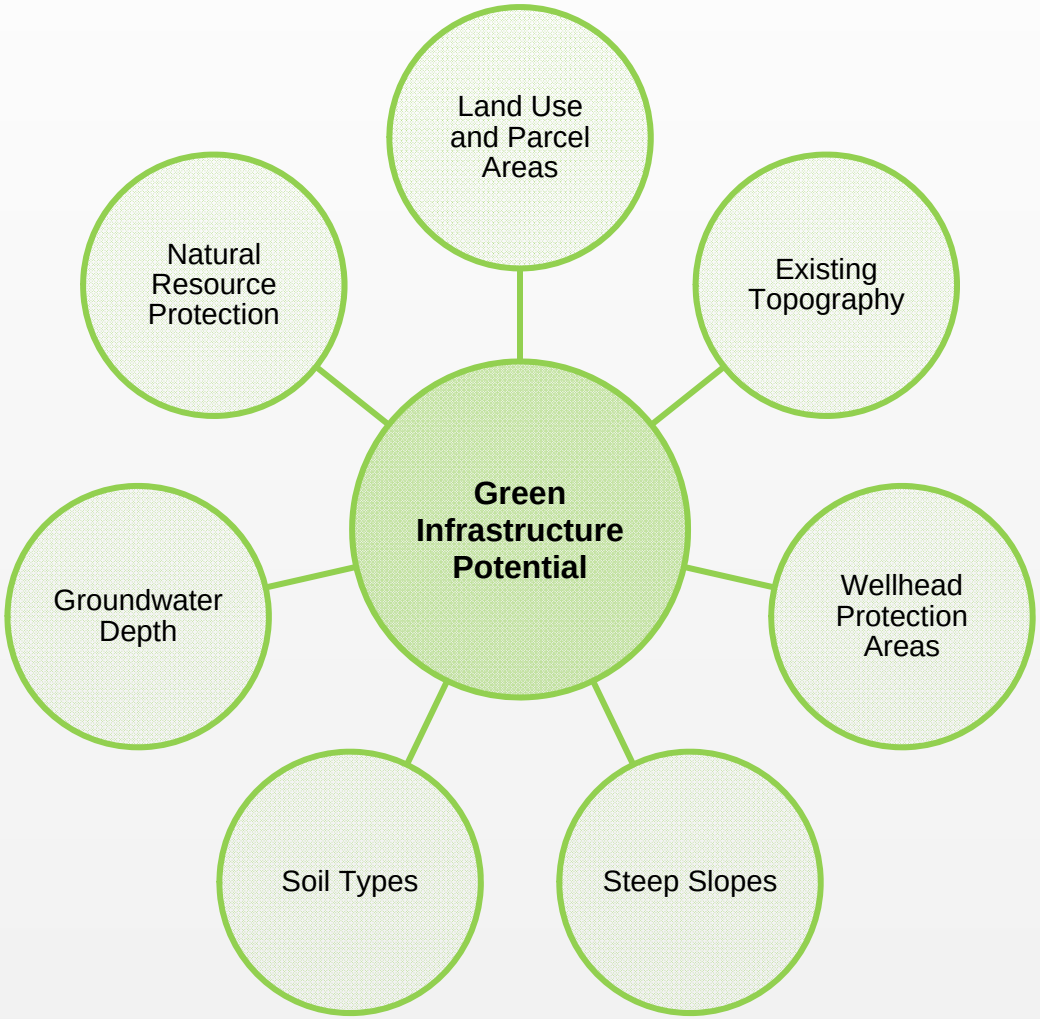
- Natural filtration removes sediment and pollutants from stormwater
- Reduces the volume of stormwater entering the storm sewer system

Scale	Local		Regional
Costs	Low		High
Timeframe	Short		Long
Effectiveness			
Tidal	Low		High
Sea Level	Low		High
Surface Runoff	Low		High
Storm Surge	Low		High

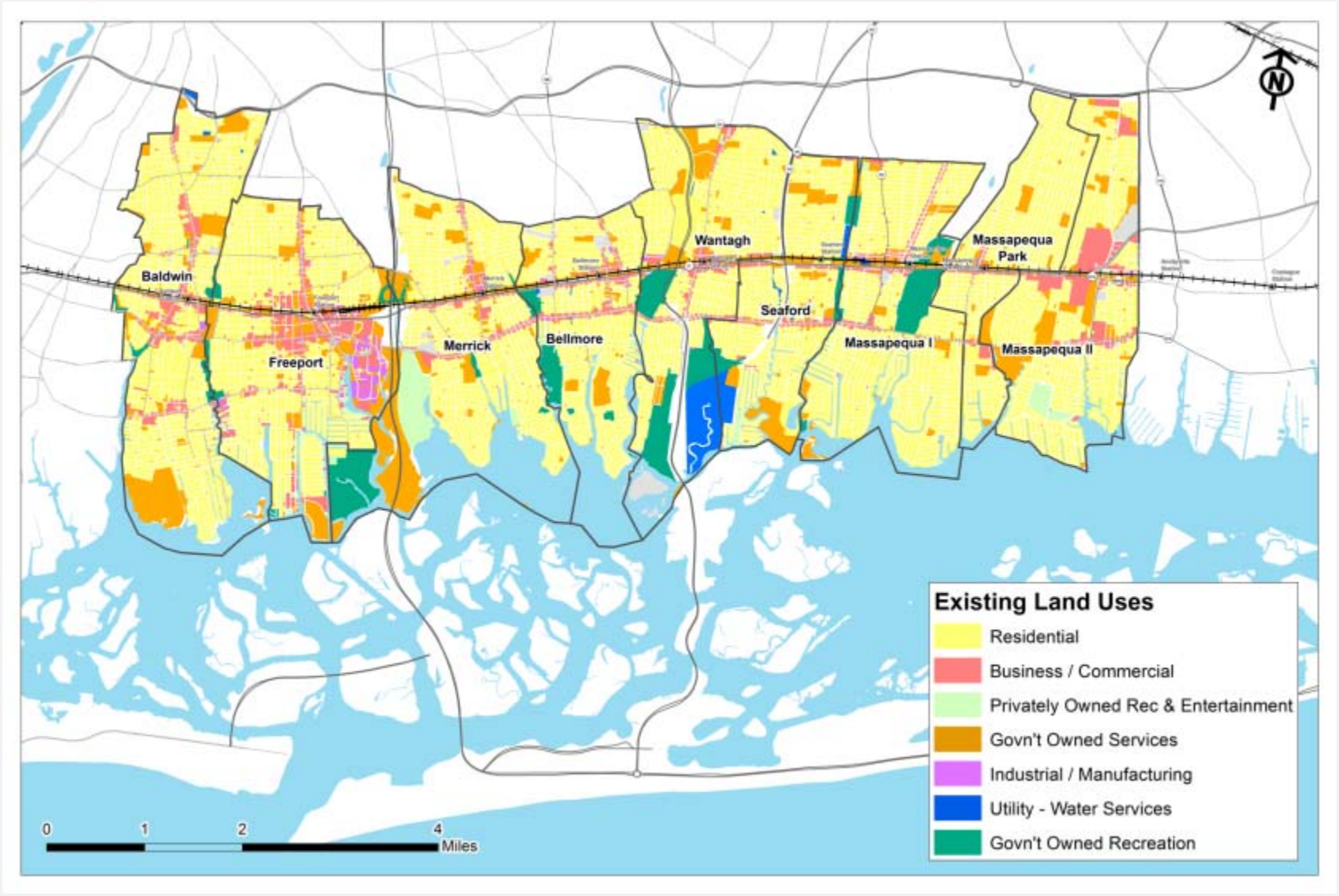
GREEN INFRASTRUCTURE
PLANNING PROCESS



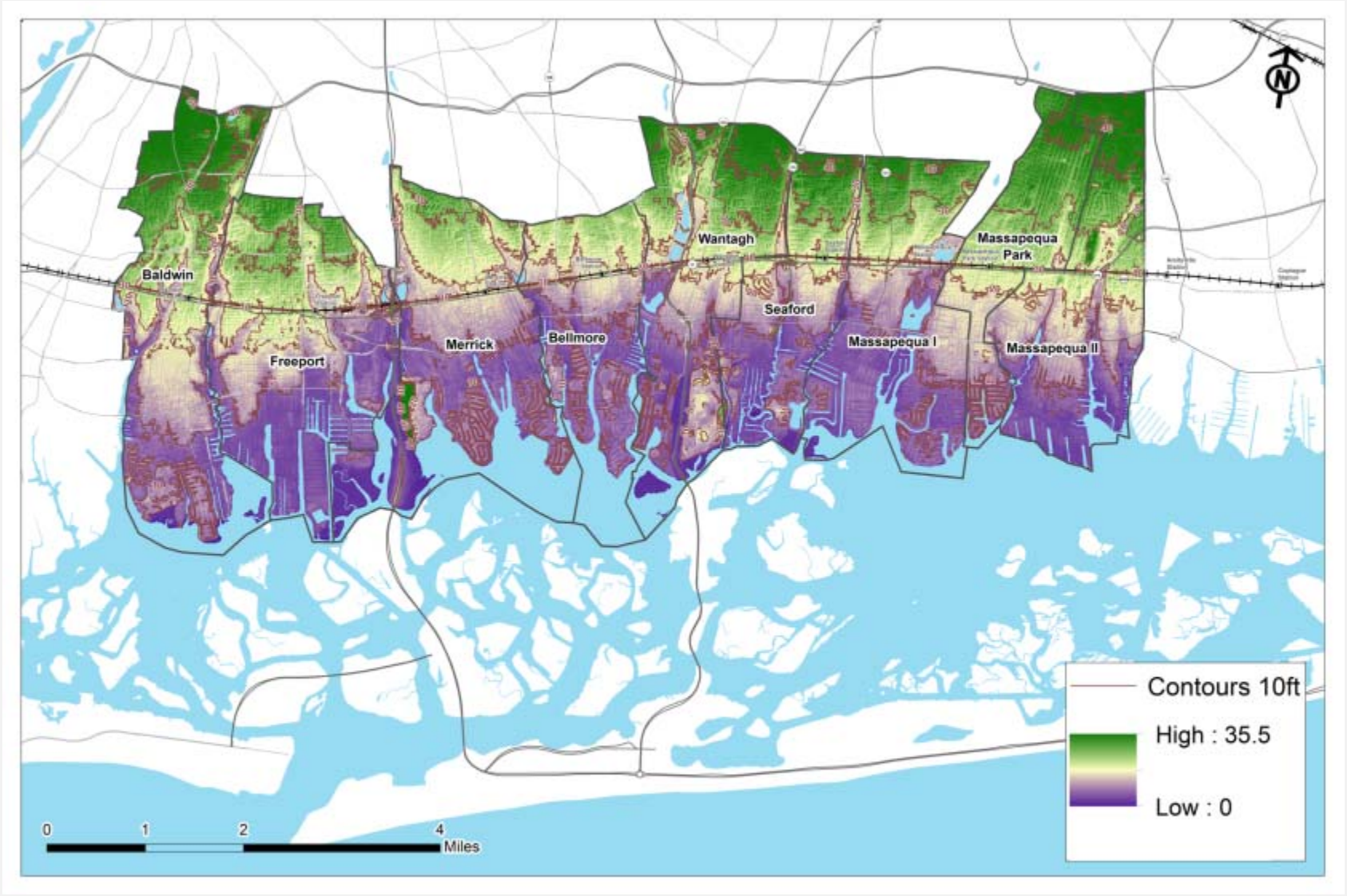
GREEN INFRASTRUCTURE
POTENTIAL OPPORTUNITIES



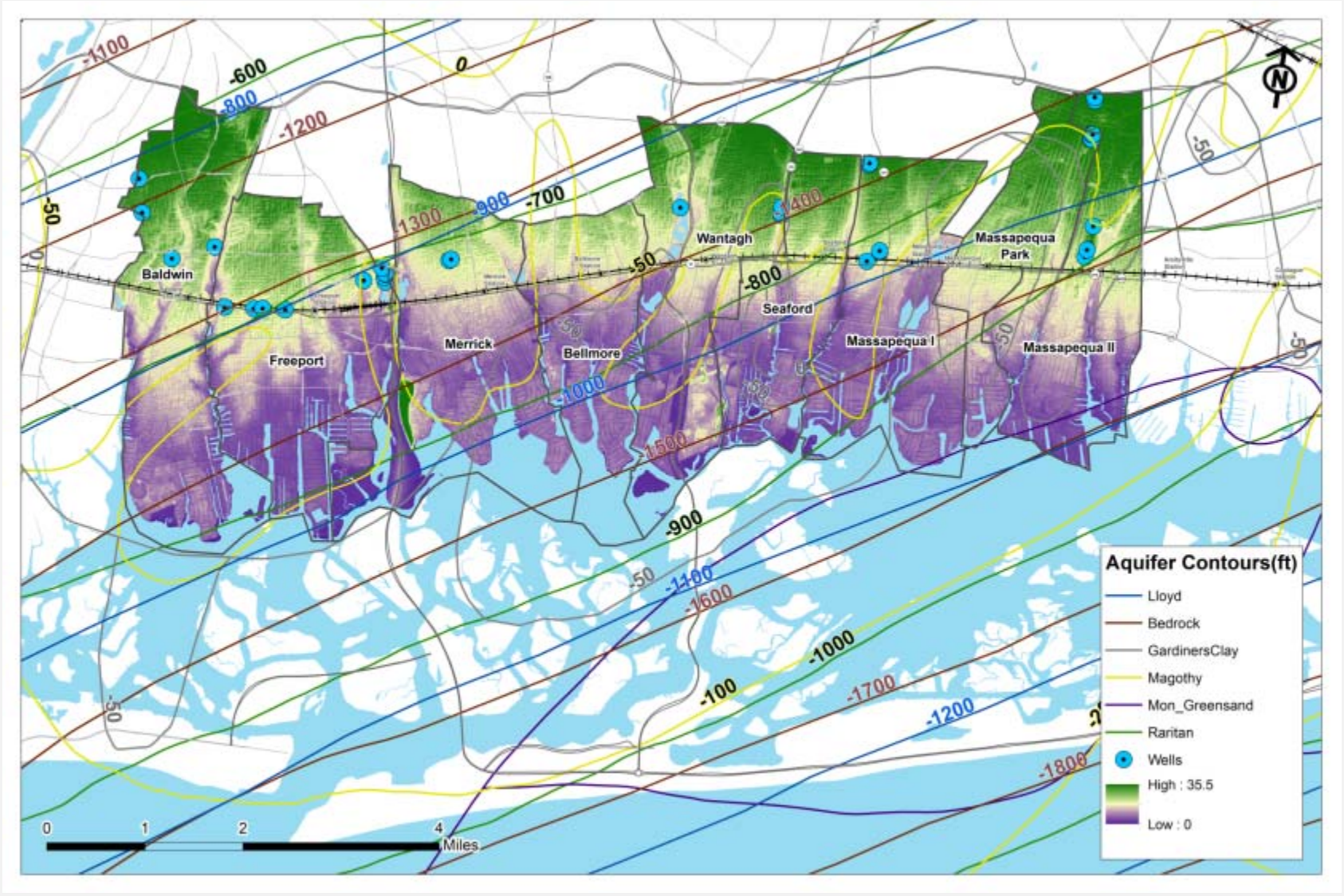
GREEN INFRASTRUCTURE
EXISTING LAND USE



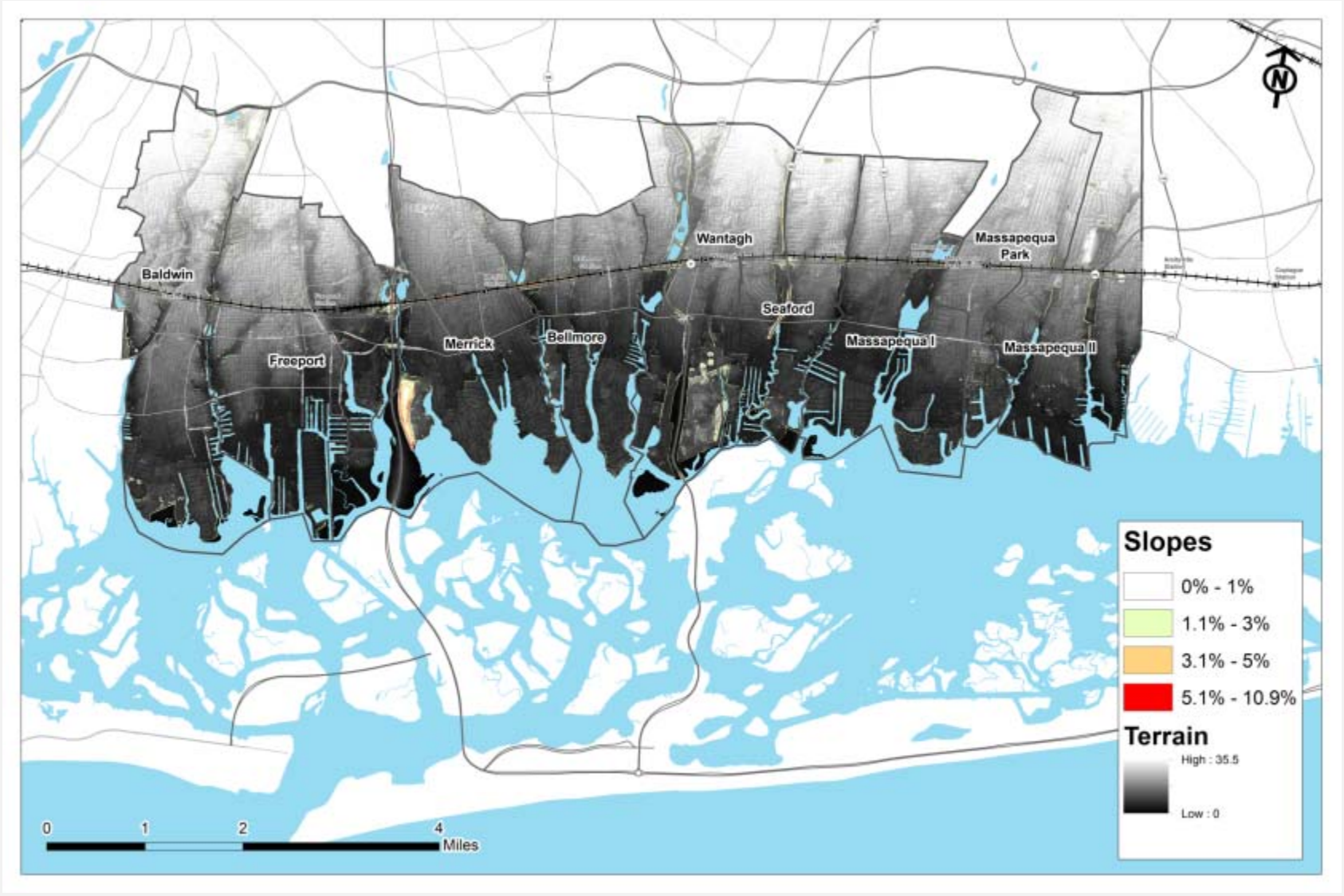
GREEN INFRASTRUCTURE
EXISTING TOPOGRAPHY



GREEN INFRASTRUCTURE
AQUIFERS AND WELLS

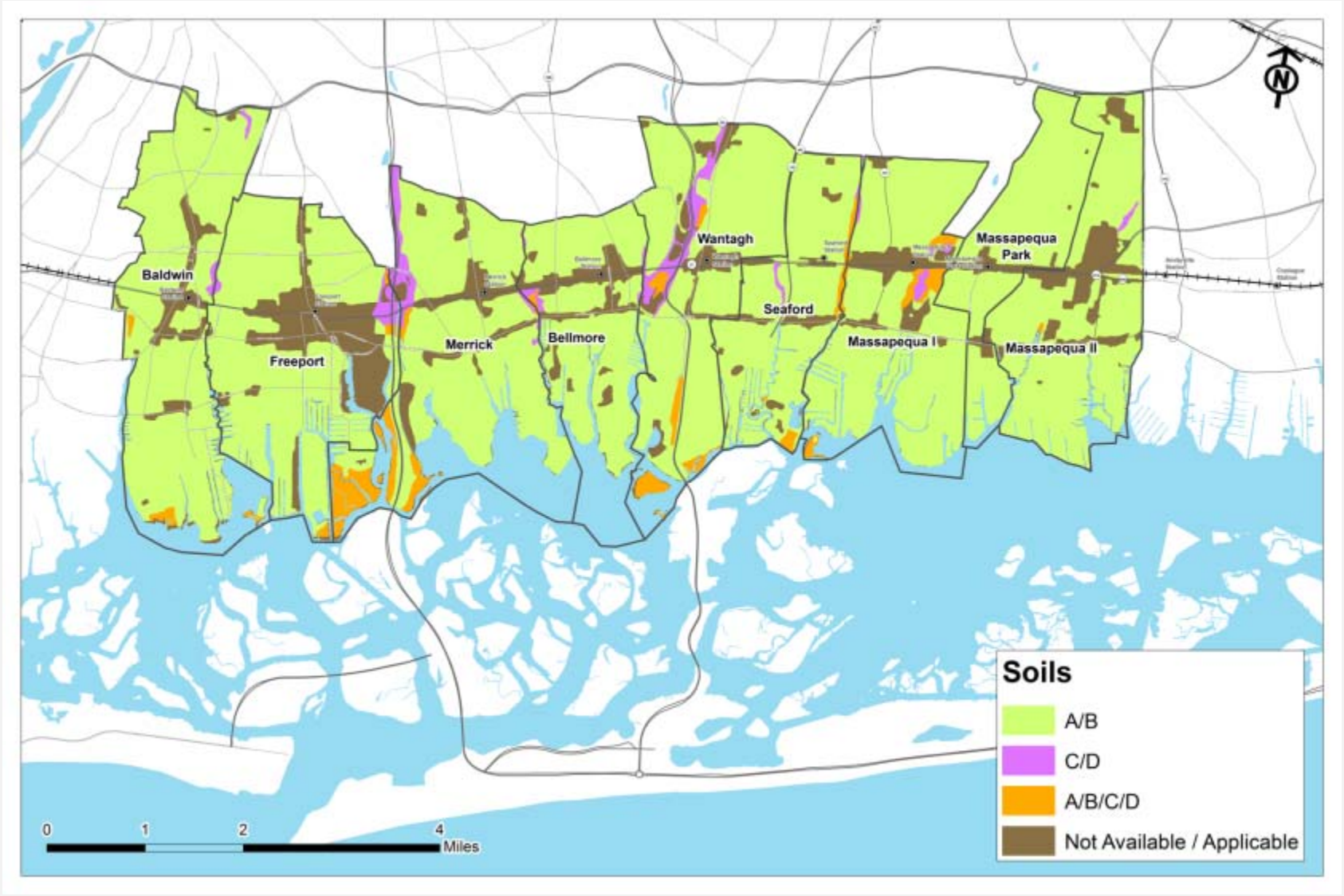


GREEN INFRASTRUCTURE
STEEP SLOPE ANALYSIS

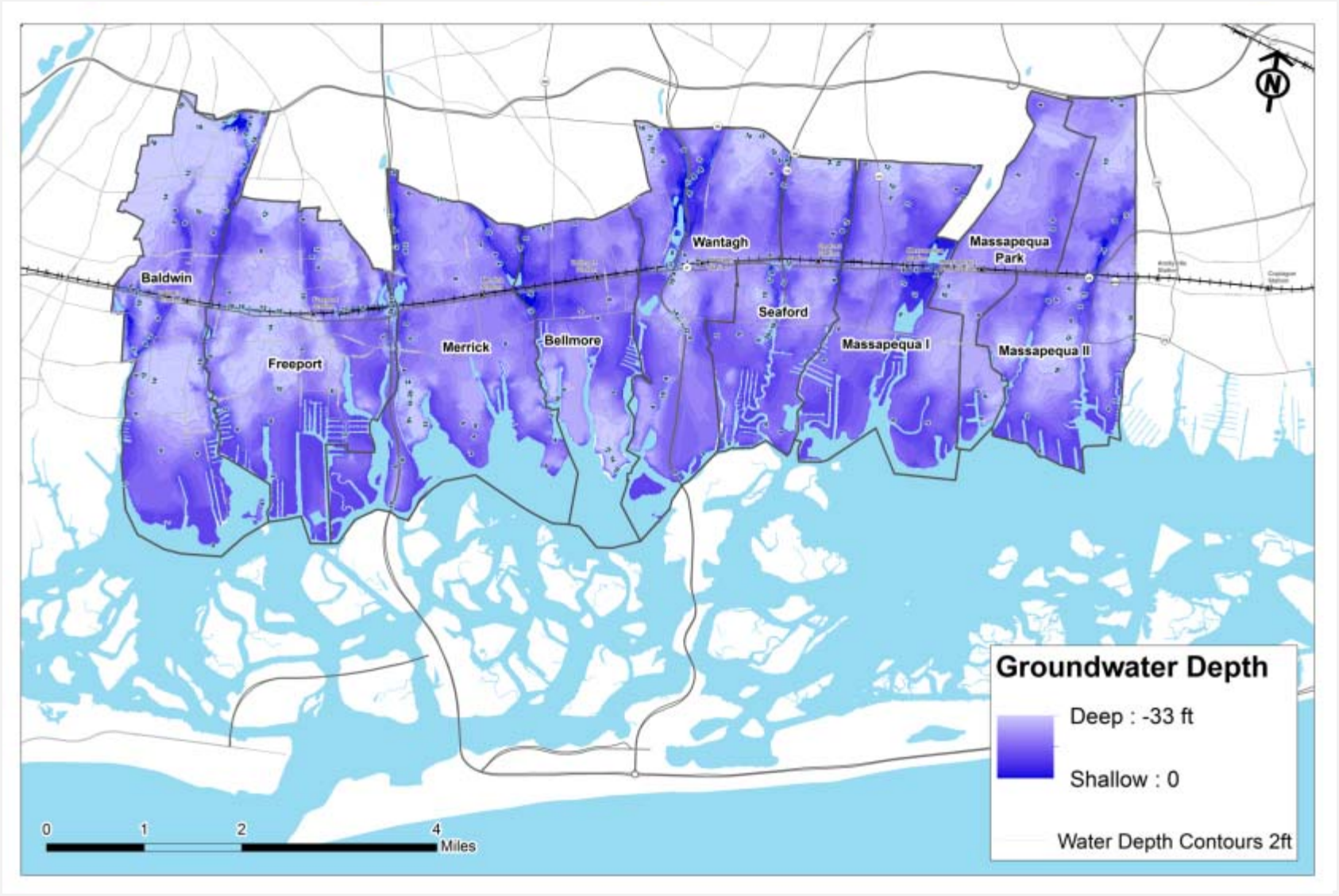


GREEN INFRASTRUCTURE

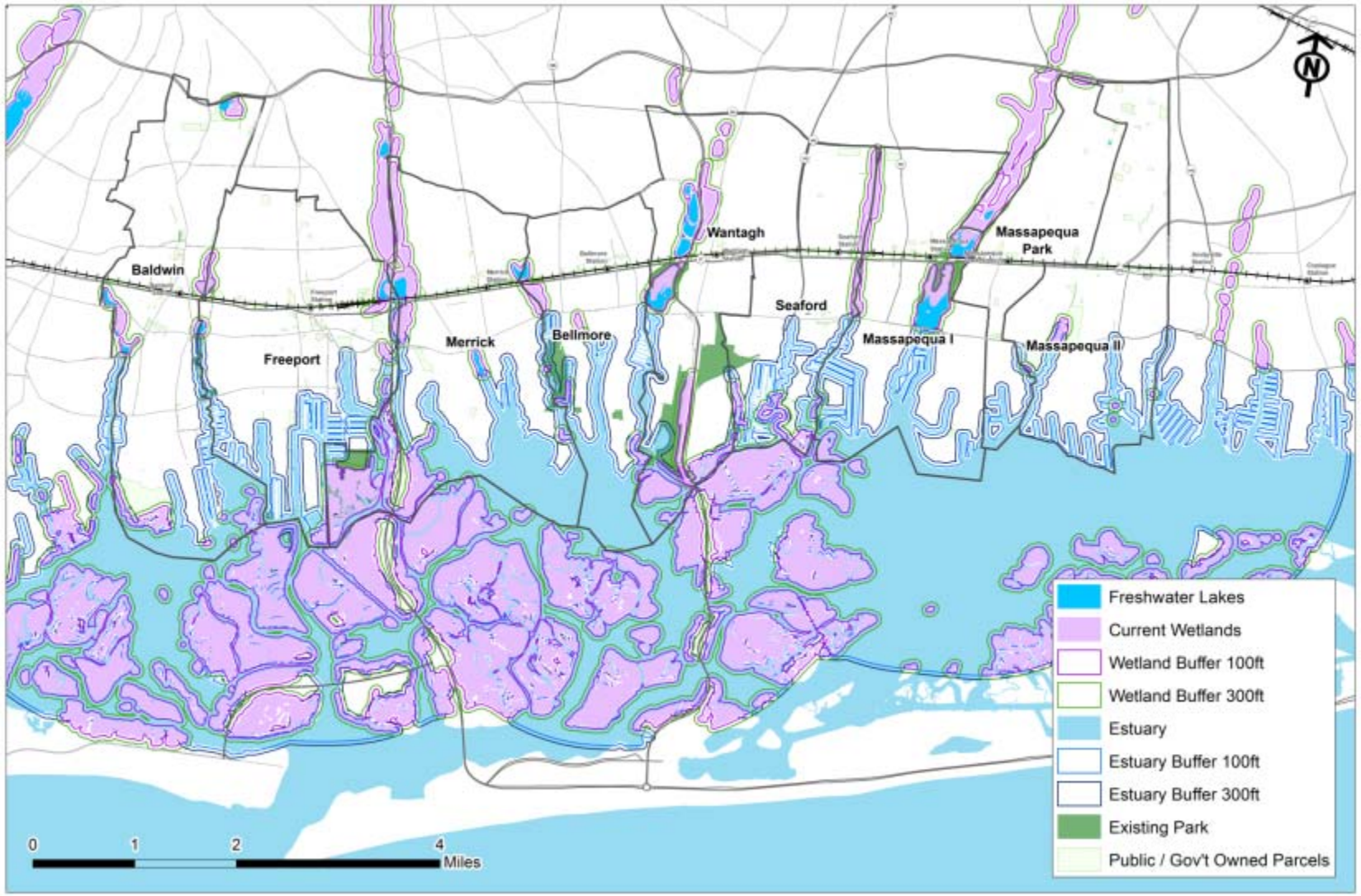
NRCS SOILS MAP



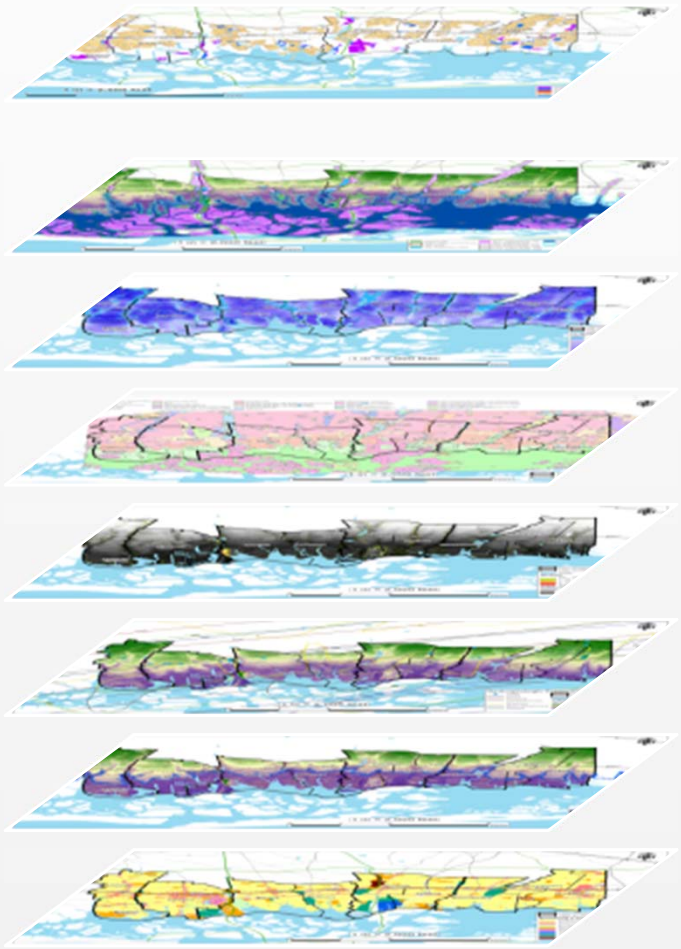
GREEN INFRASTRUCTURE
GROUNDWATER MAP



GREEN INFRASTRUCTURE
NATURAL RESOURCES MAP



GREEN INFRASTRUCTURE
IDENTIFYING OPPORTUNITIES



Green Infrastructure Opportunities

Natural Resources

Groundwater

NRCS Soils

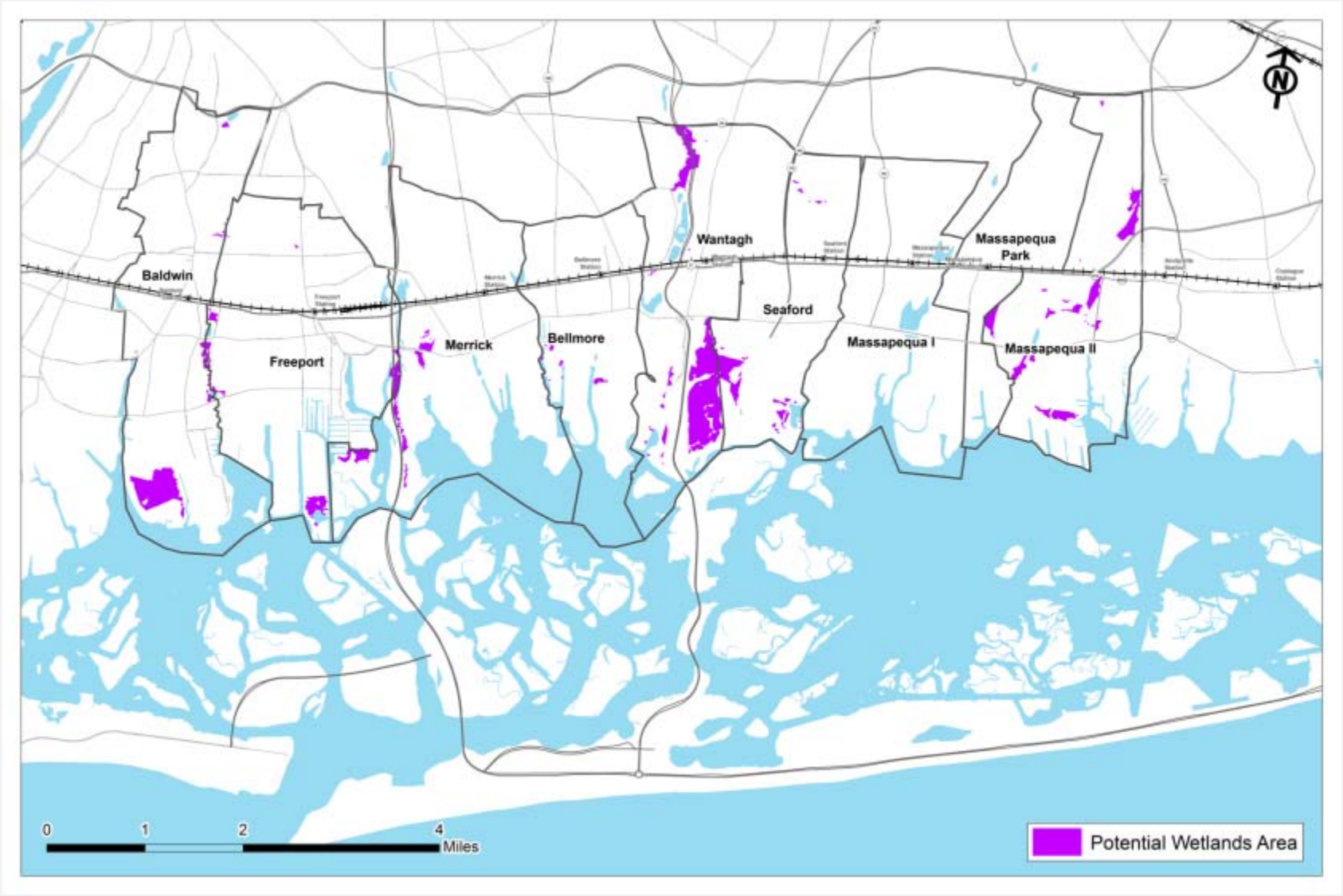
Steep Slope Analysis

Aquifers and Wells

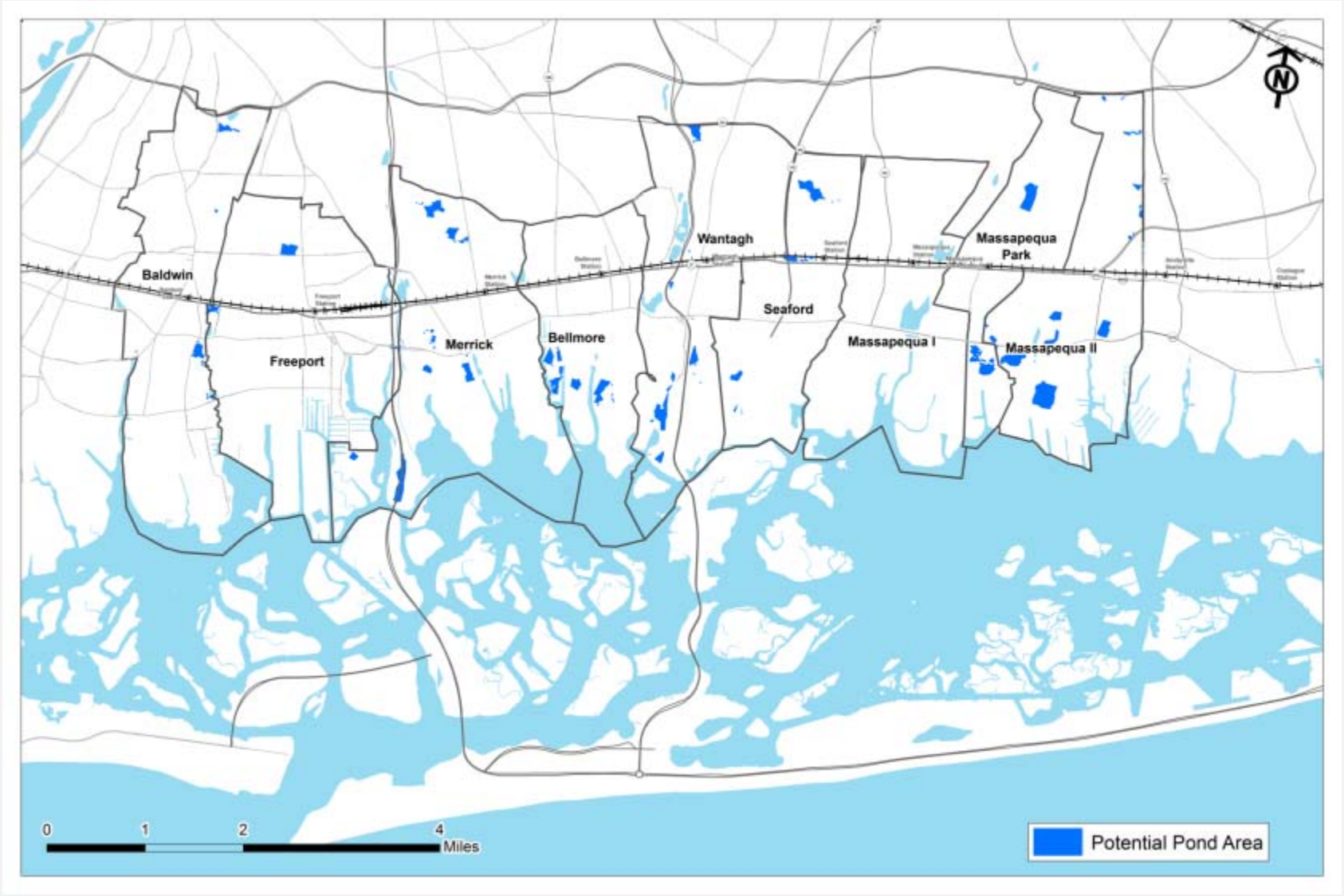
Existing Topography

Land Use and Parcels

GREEN INFRASTRUCTURE
STORMWATER WETLAND OPPORTUNITY ZONES

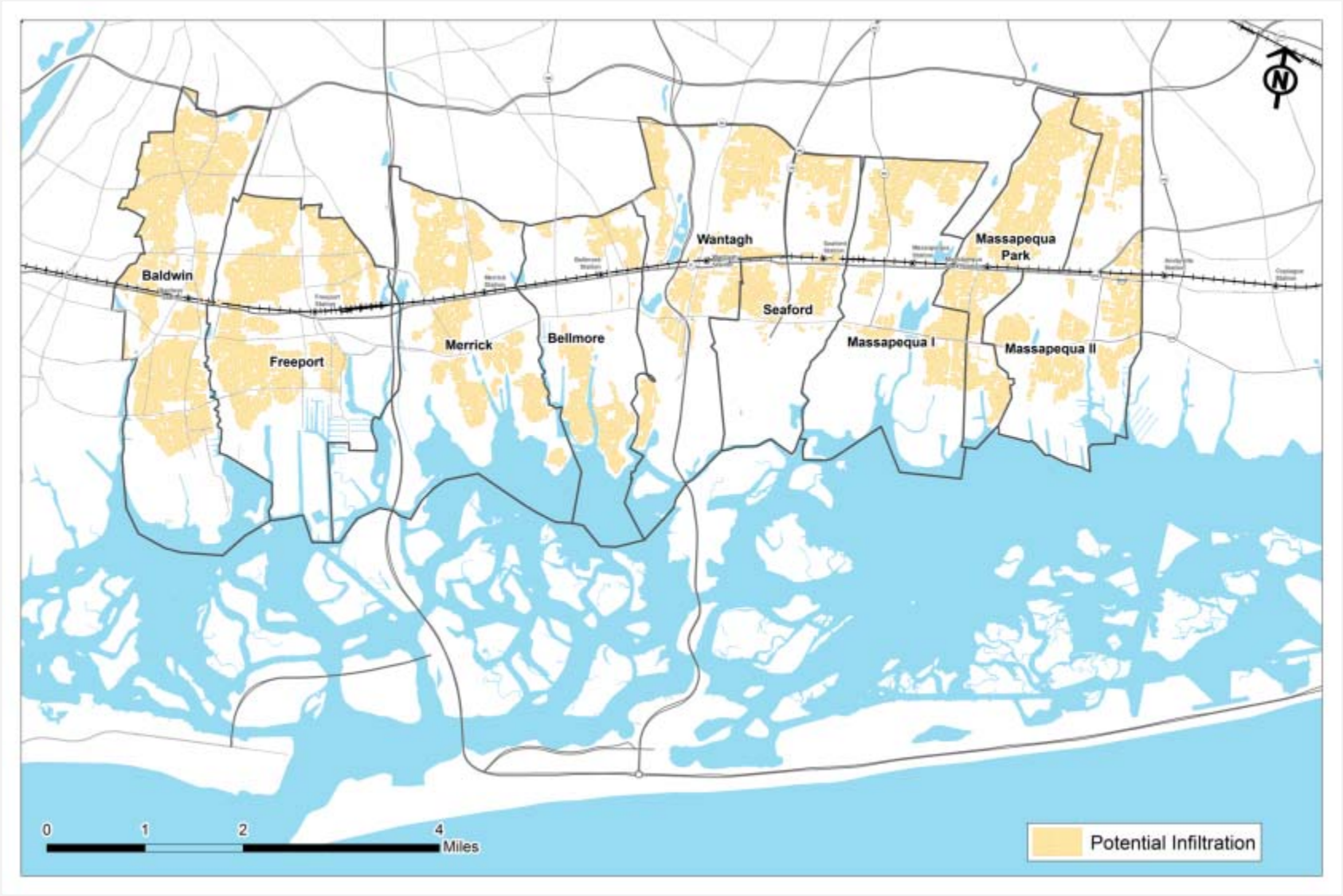


GREEN INFRASTRUCTURE
STORMWATER POND OPPORTUNITY ZONES

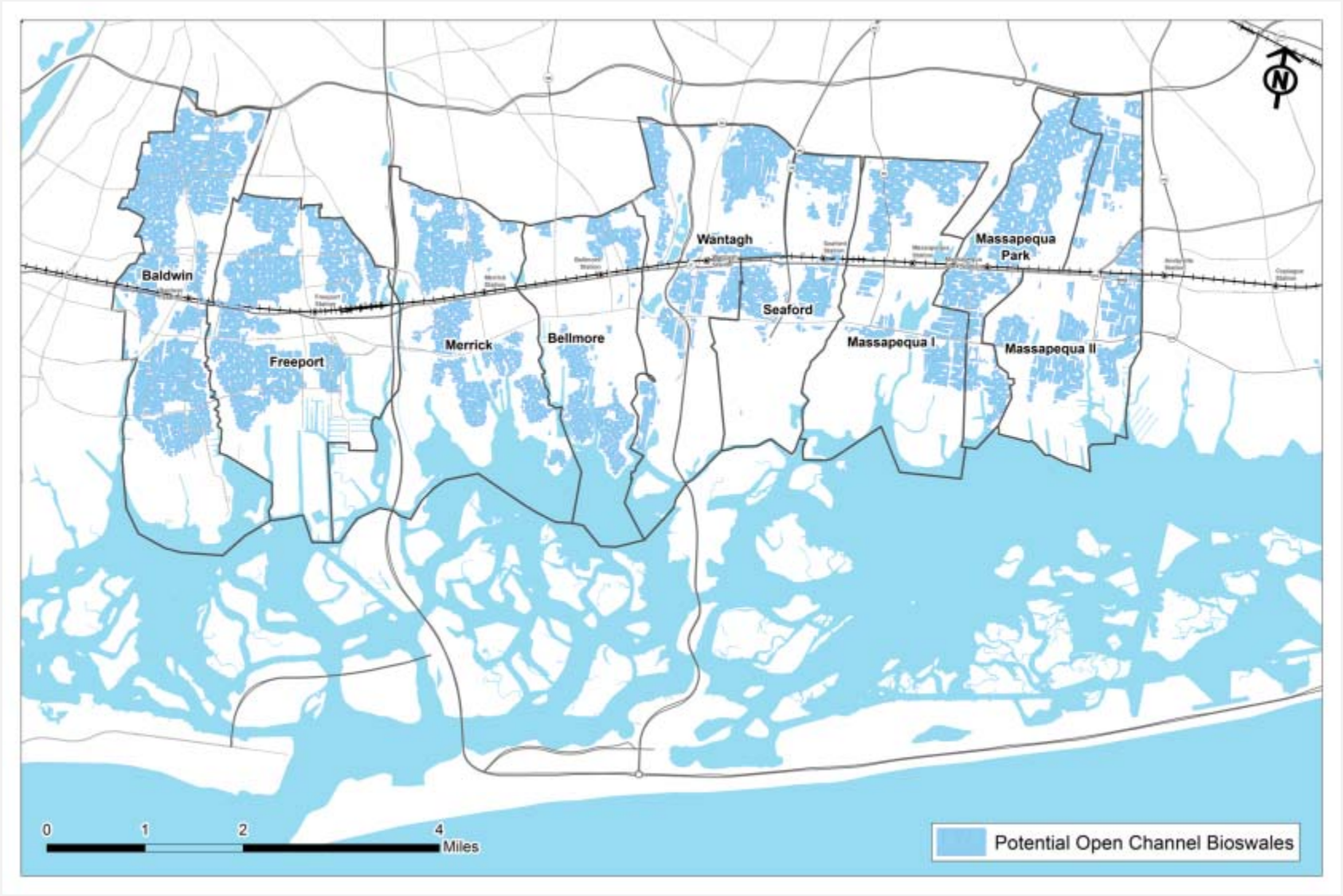


GREEN INFRASTRUCTURE
FILTRATION SYSTEM OPPORTUNITY ZONES

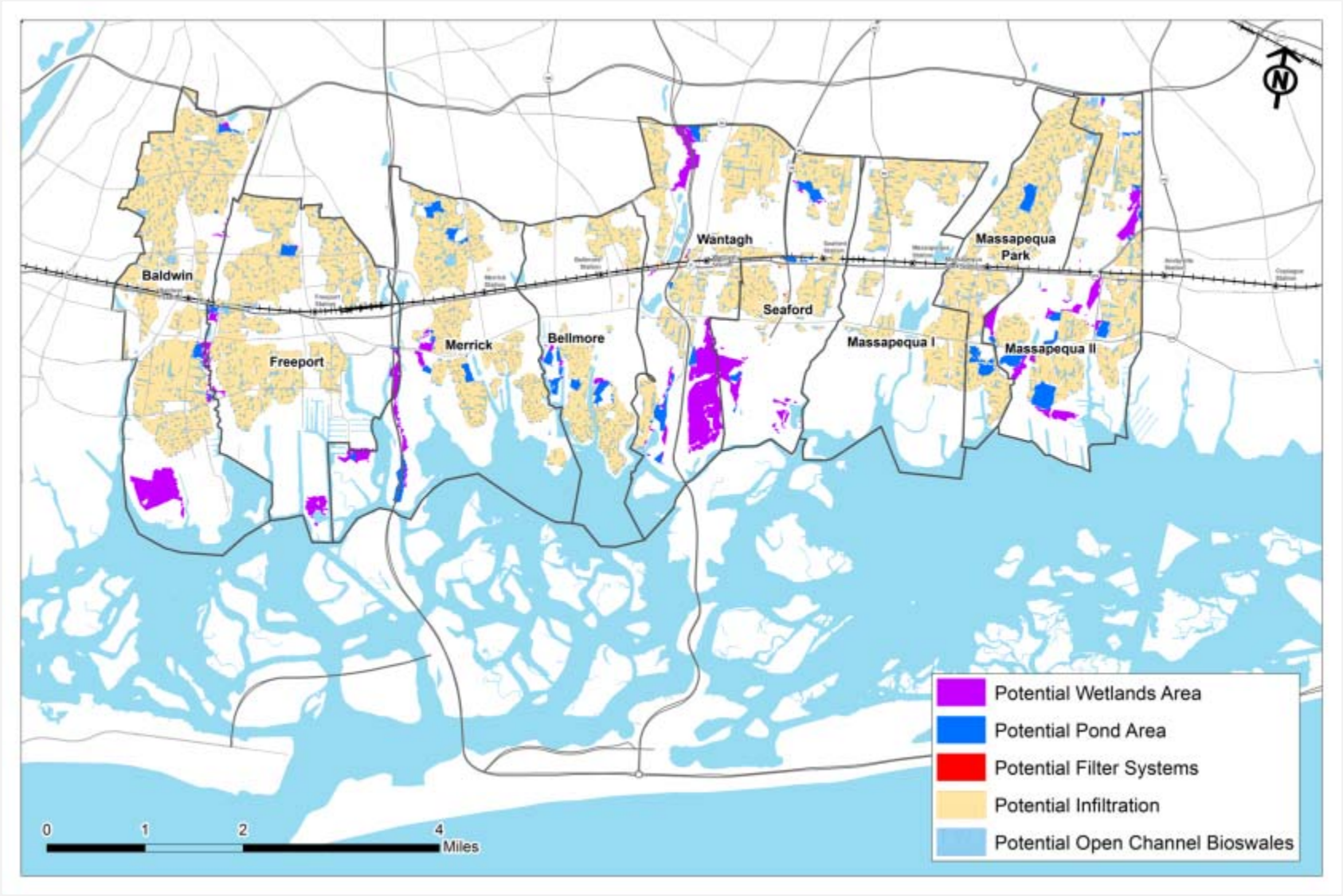
GREEN INFRASTRUCTURE
INFILTRATION SYSTEM OPPORTUNITY ZONES



GREEN INFRASTRUCTURE
OPEN CHANNEL BIOSWALE OPPORTUNITY ZONES

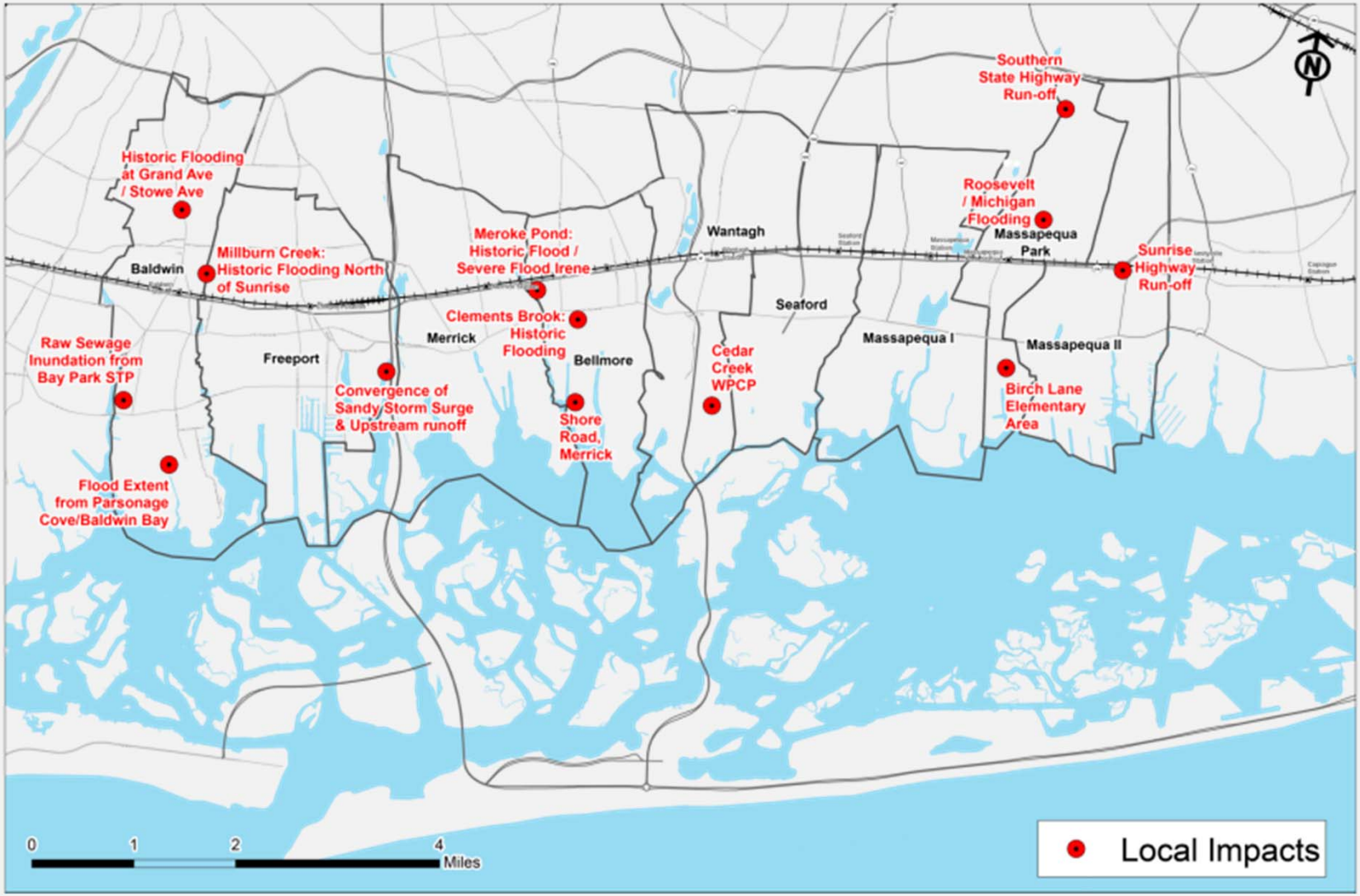


GREEN INFRASTRUCTURE
COMBINED OPPORTUNITY ZONES

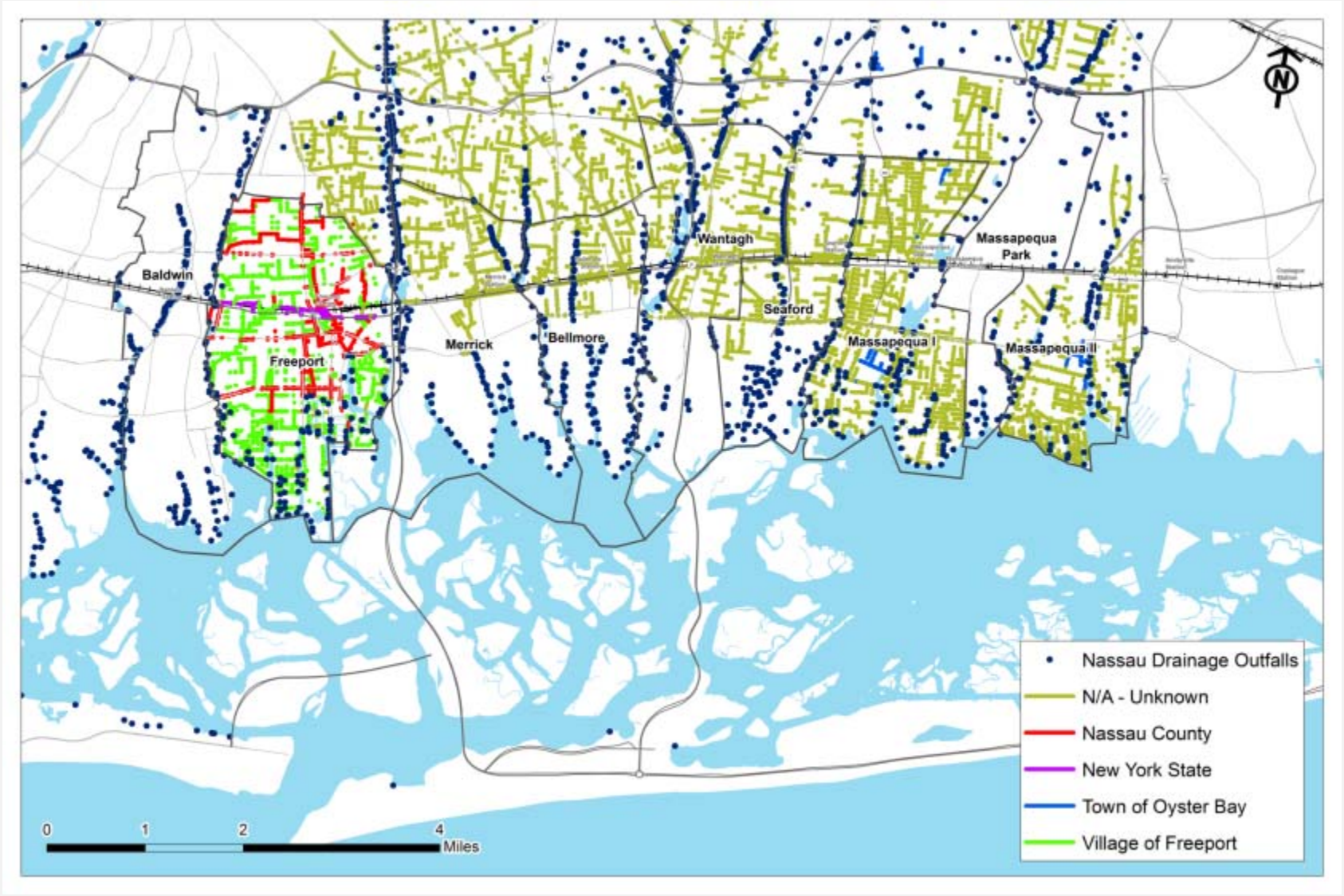


GREEN INFRASTRUCTURE
POTENTIAL OPPORTUNITIES

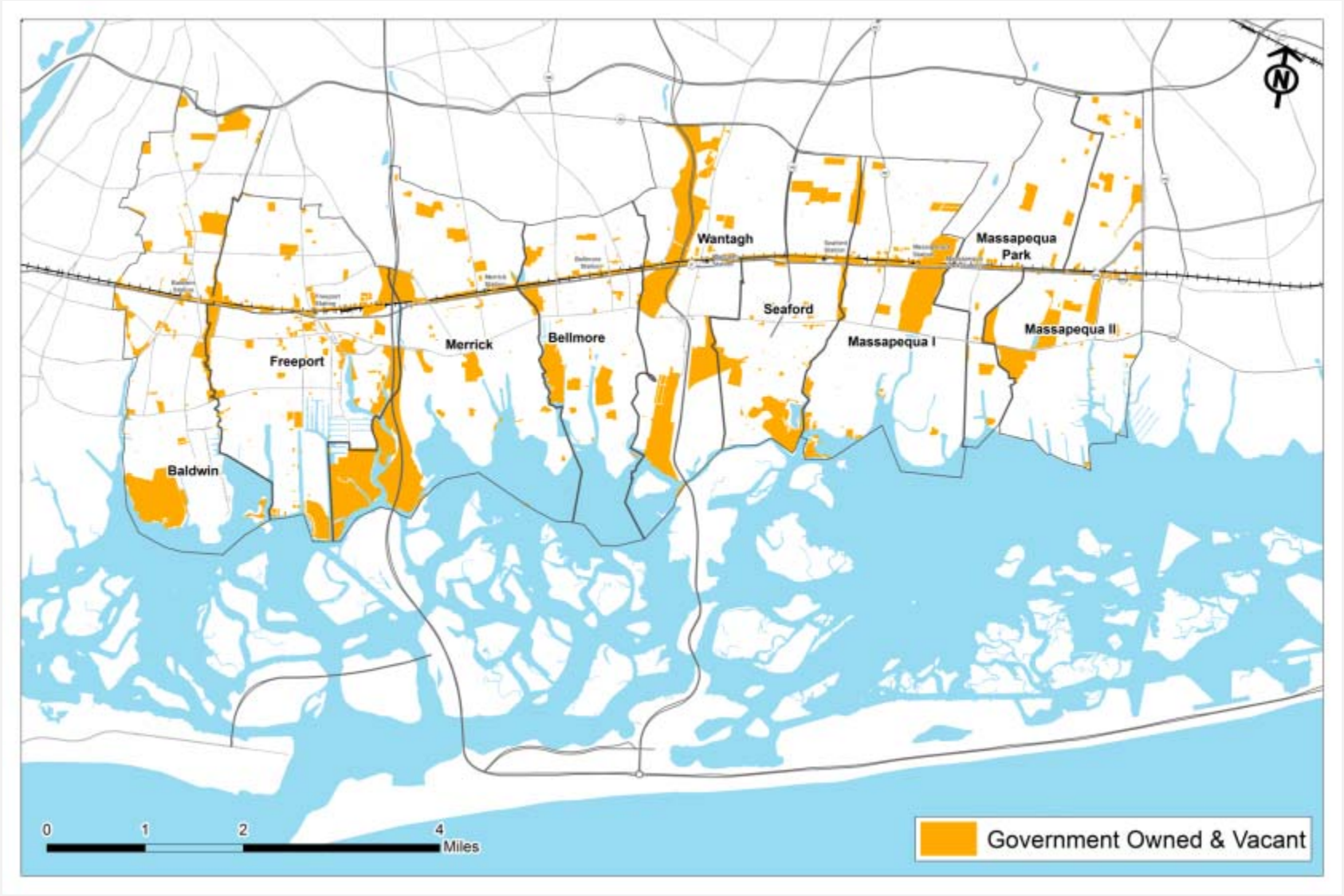
GREEN INFRASTRUCTURE
COMBINED OPPORTUNITY ZONES



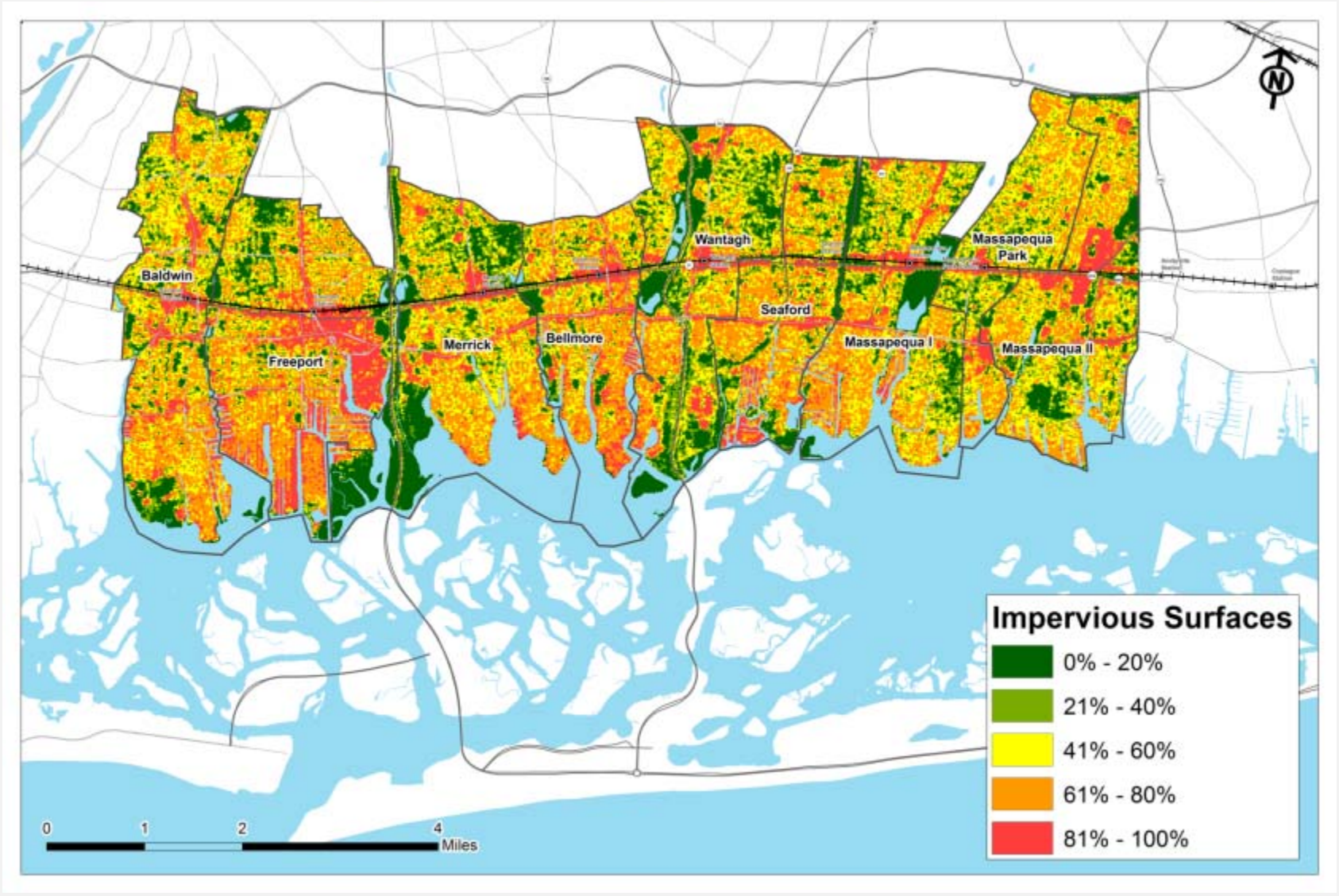
GREEN INFRASTRUCTURE
STORMWATER DRAINAGE SYSTEM



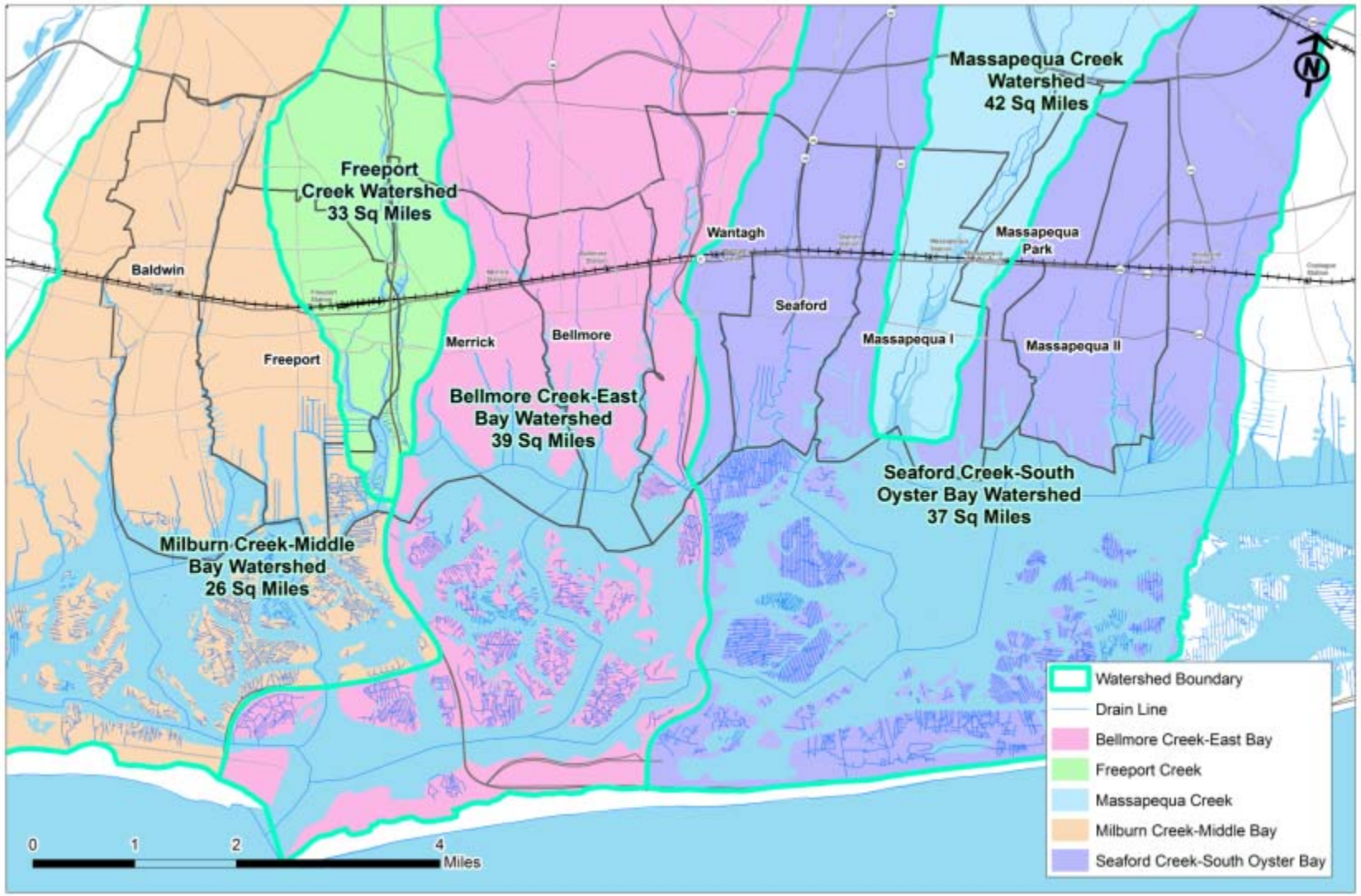
GREEN INFRASTRUCTURE
PUBLICALLY OWNED OR VACANT LAND



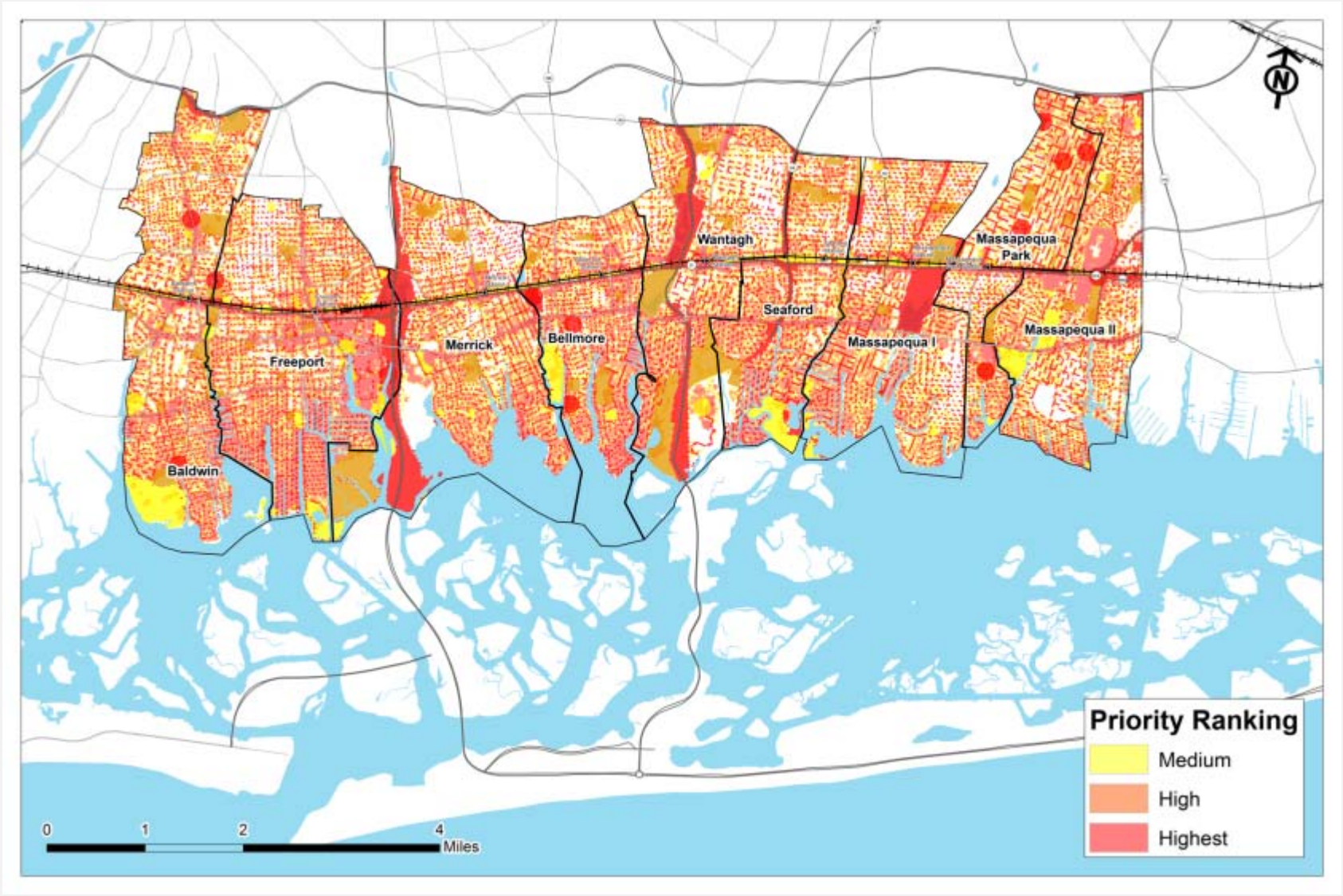
GREEN INFRASTRUCTURE
HYDROLOGY PRINCIPLES



GREEN INFRASTRUCTURE
WATERSHED MAP

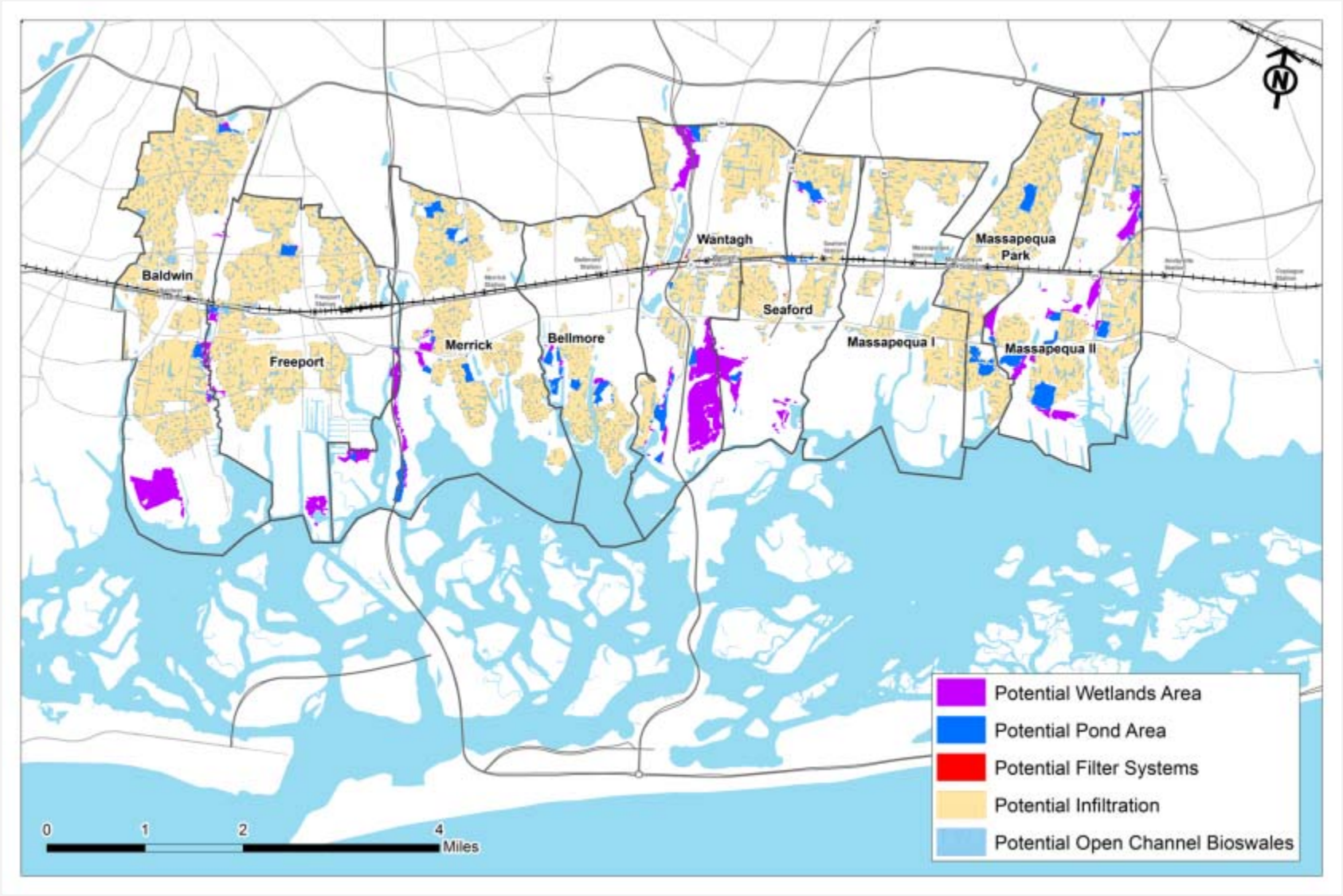


GREEN INFRASTRUCTURE
COMBINED PRIORITIZATION MAP

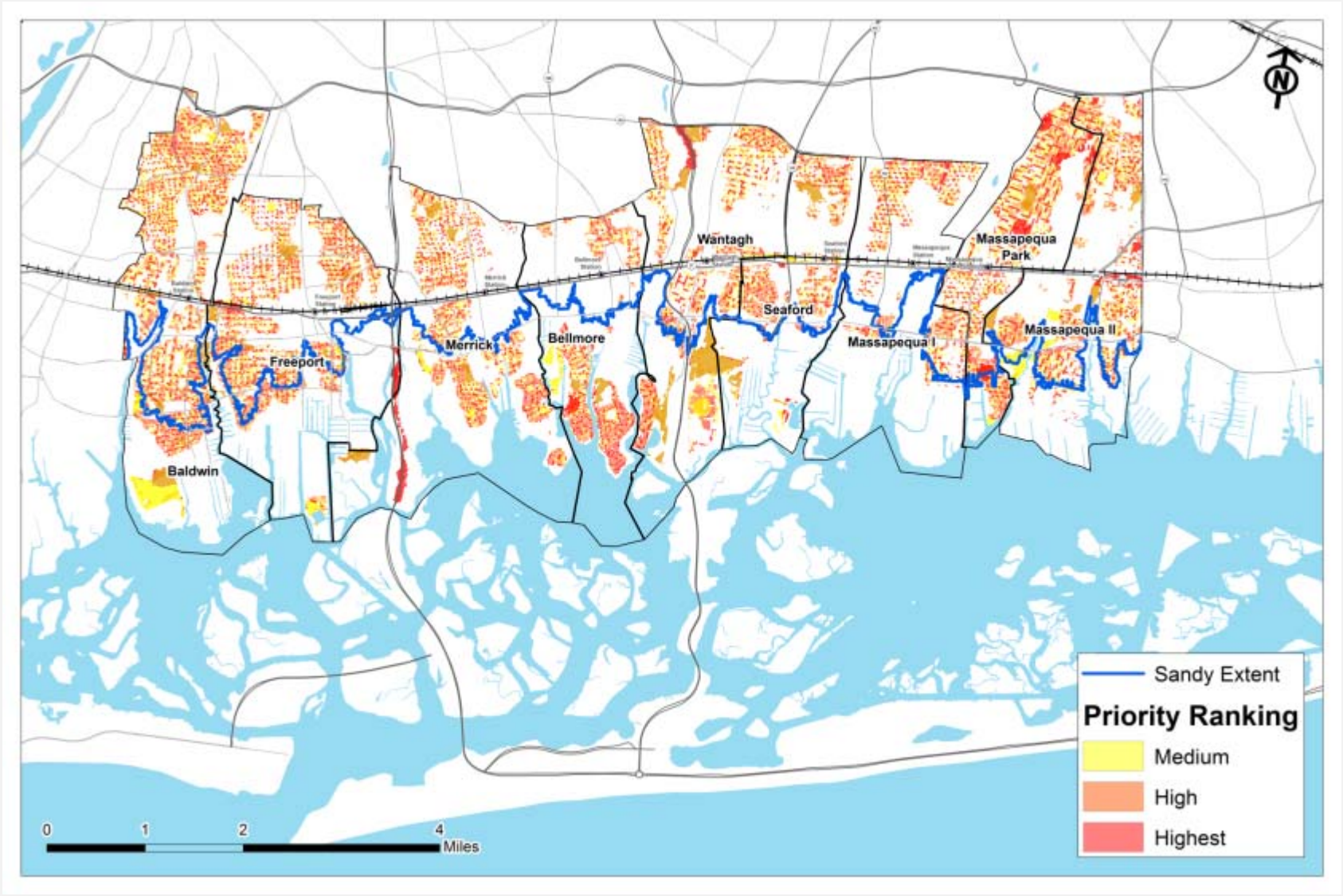


GREEN INFRASTRUCTURE

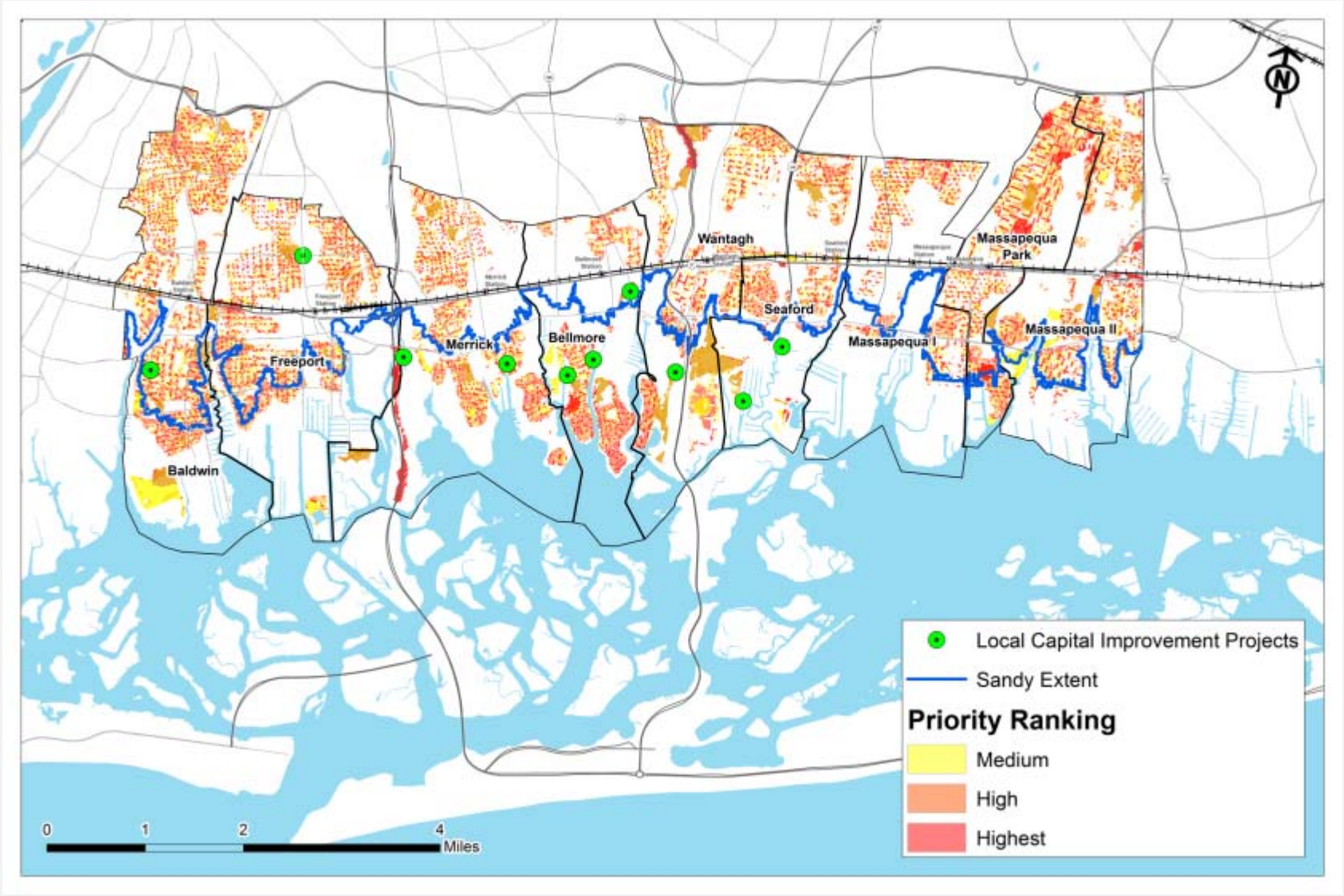
COMBINED GREEN INFRASTRUCTURE OPPORTUNITY SITES



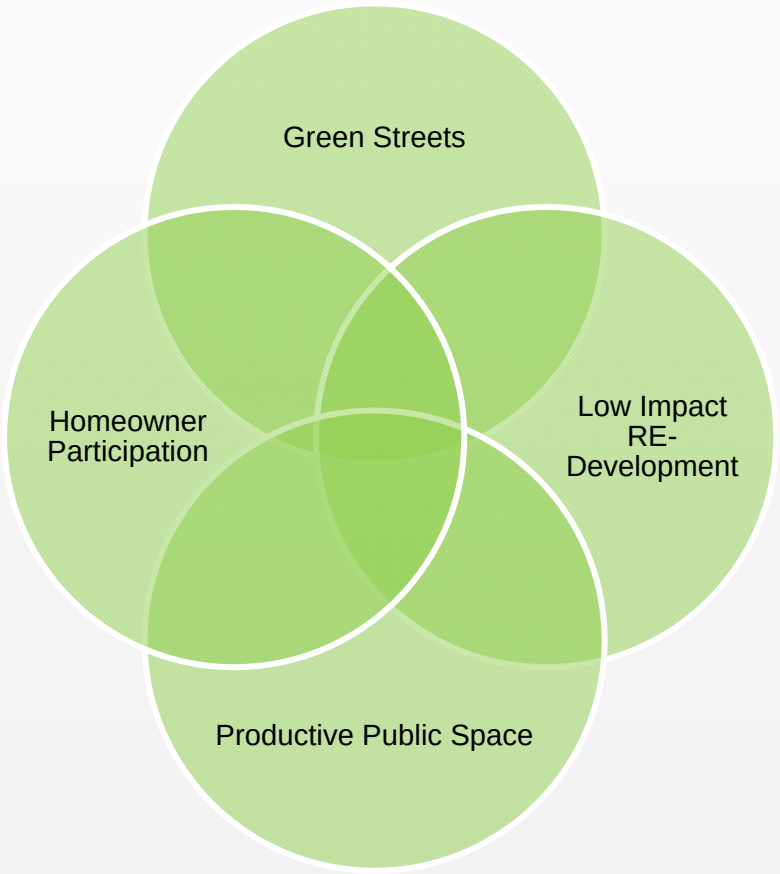
GREEN INFRASTRUCTURE
INTERSECTING PRIORITY AND OPPORTUNITY



GREEN INFRASTRUCTURE
PROJECT PIPELINE



GREEN INFRASTRUCTURE
PILOT PROJECTS



GREEN INFRASTRUCTURE

GREEN STREETS

GREEN INFRASTRUCTURE

GREEN STREETS

GREEN INFRASTRUCTURE

GREEN STREETS

GREEN INFRASTRUCTURE

PRODUCTIVE PUBLIC SPACE

GREEN INFRASTRUCTURE
PRODUCTIVE PUBLIC SPACE

GREEN INFRASTRUCTURE

PRODUCTIVE PUBLIC SPACE

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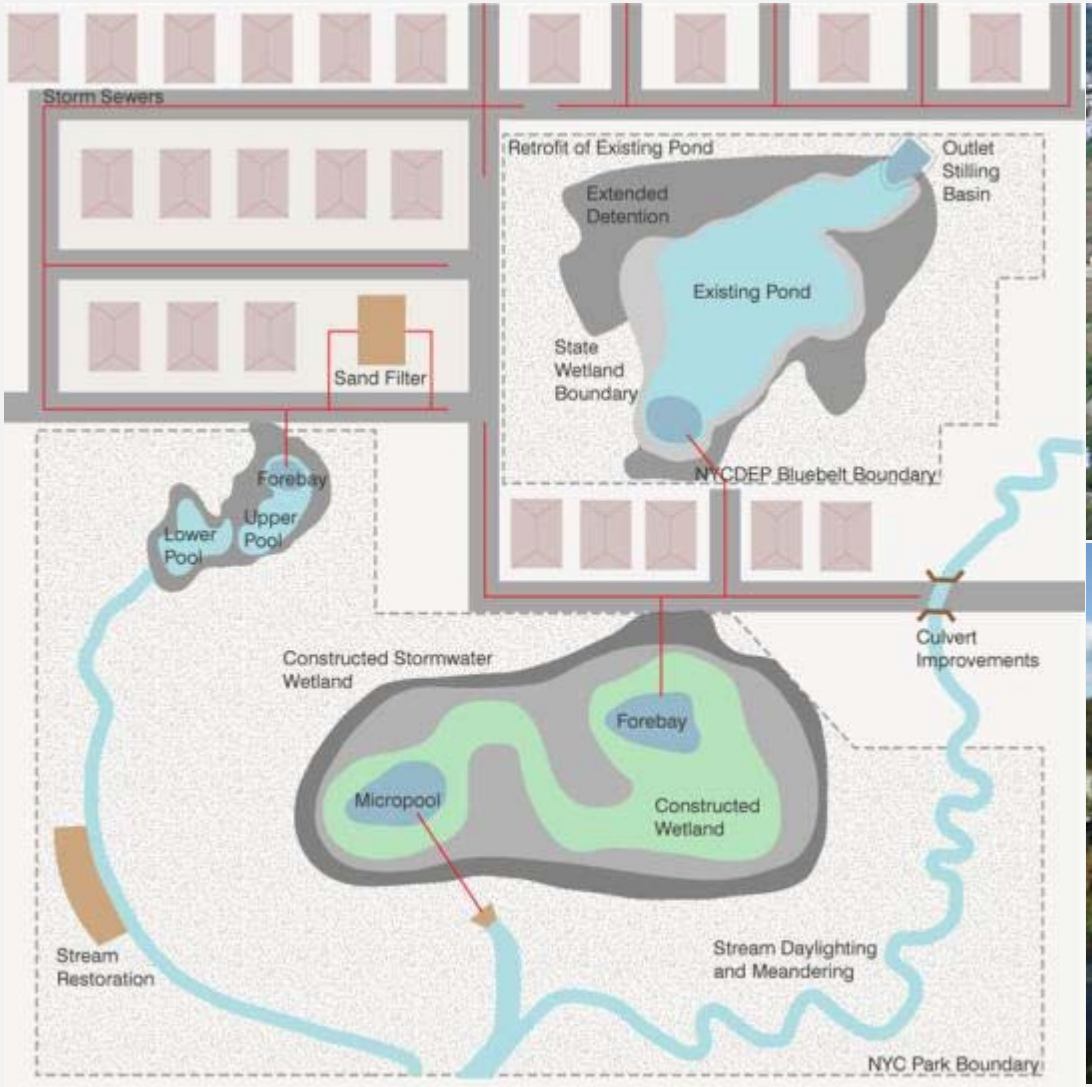
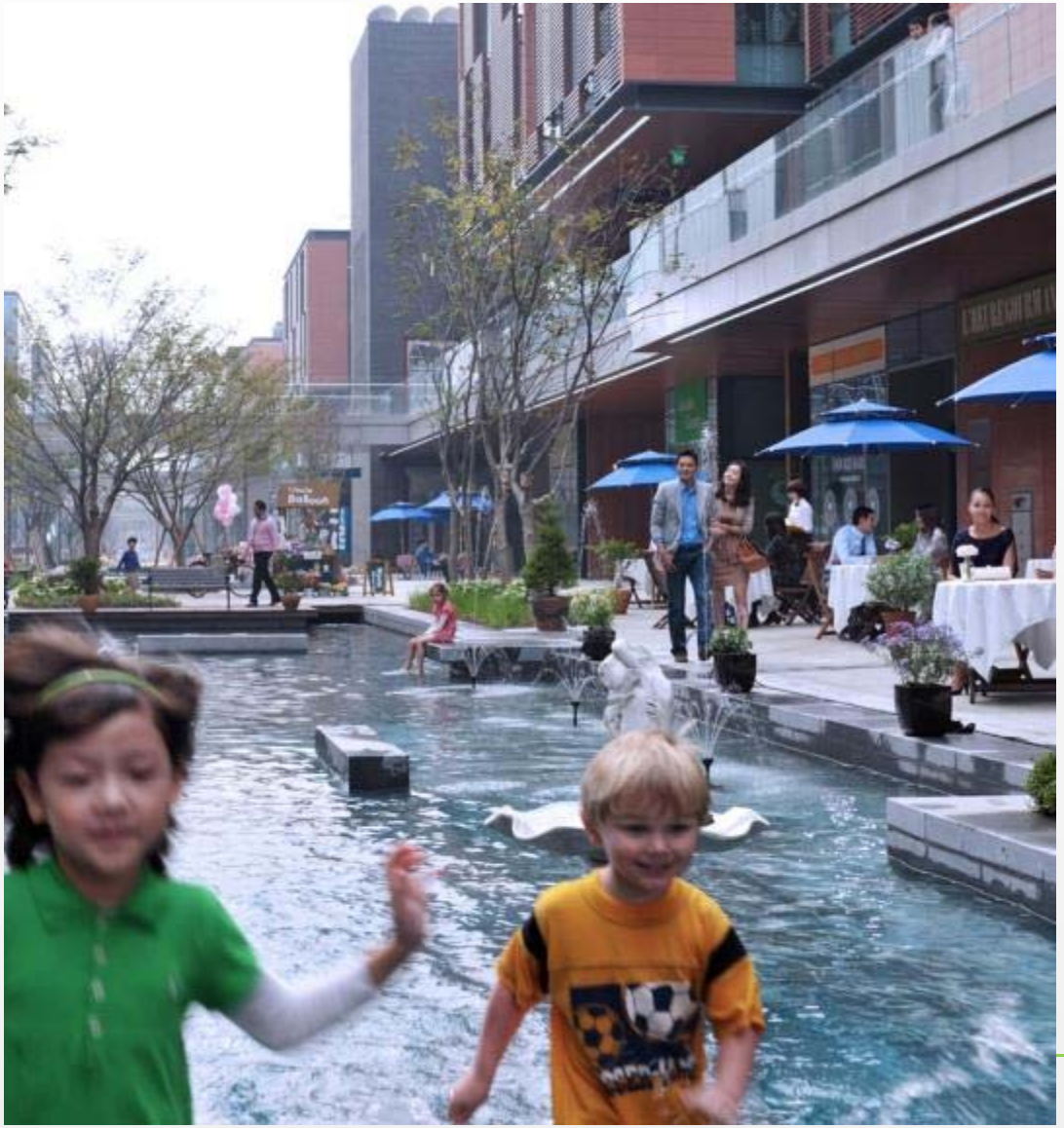
PRODUCTIVE PUBLIC SPACE



GREEN INFRASTRUCTURE
LOW IMPACT RE-DEVELOPMENT



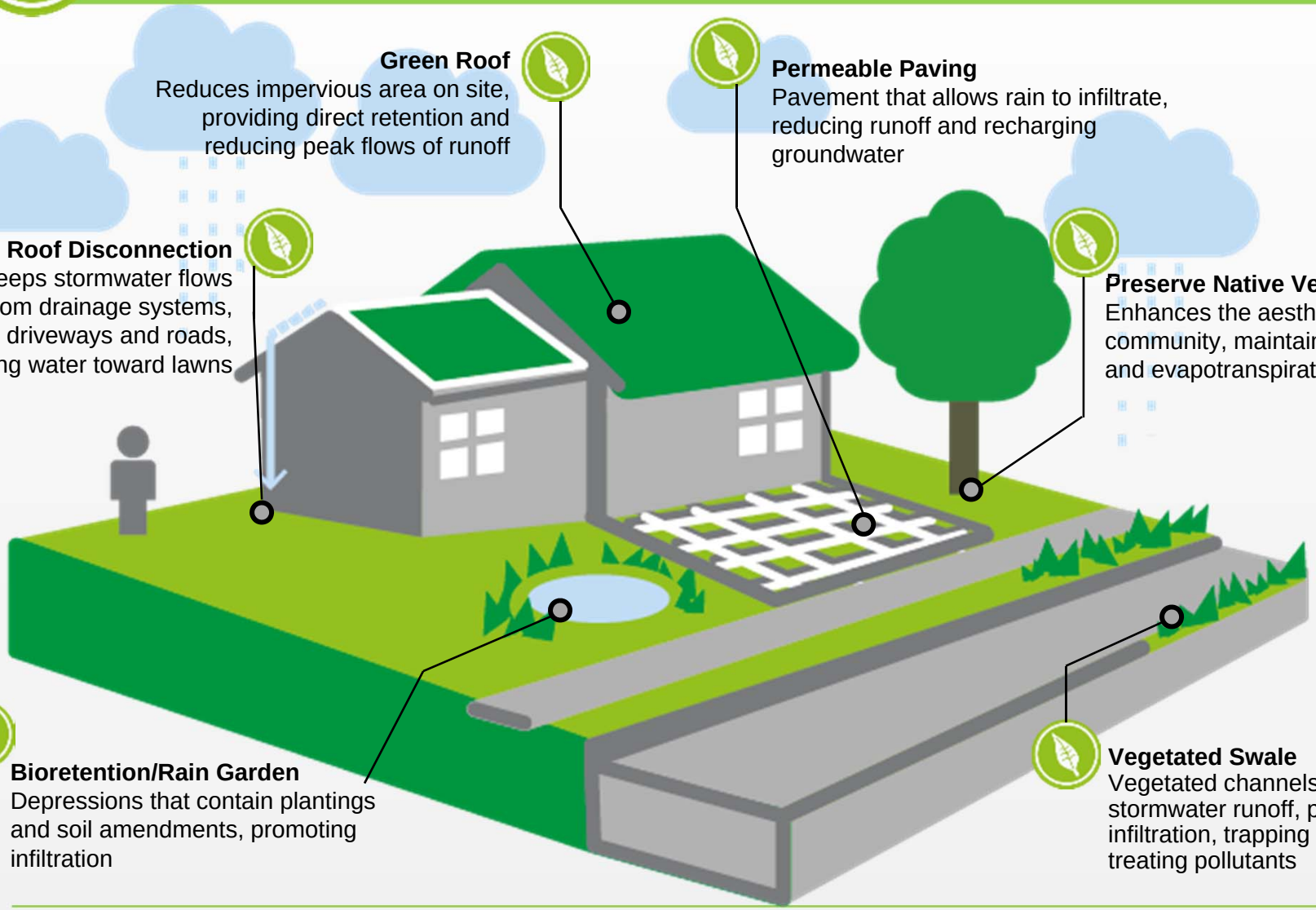
GREEN INFRASTRUCTURE
LOW IMPACT RE-DEVELOPMENT

GREEN INFRASTRUCTURE

LOW IMPACT RE-DEVELOPMENT

GREEN INFRASTRUCTURE

HOMEOWNER PARTICIPATION



Green Roof
Reduces impervious area on site, providing direct retention and reducing peak flows of runoff

Permeable Paving
Pavement that allows rain to infiltrate, reducing runoff and recharging groundwater

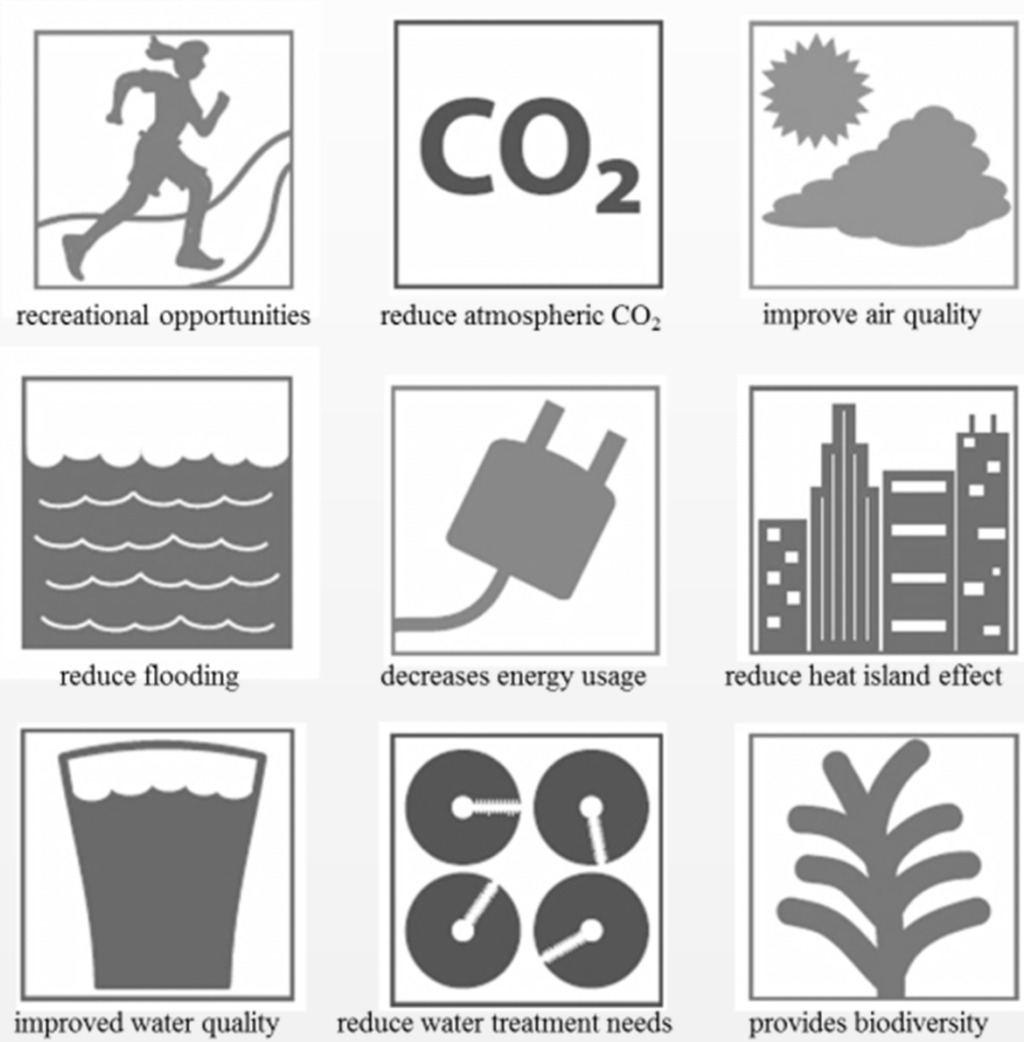
Roof Disconnection
Keeps stormwater flows from drainage systems, driveways and roads, draining water toward lawns

Preserve Native Vegetation
Enhances the aesthetic quality of community, maintaining infiltration and evapotranspiration rates

Bioretention/Rain Garden
Depressions that contain plantings and soil amendments, promoting infiltration

Vegetated Swale
Vegetated channels that slow stormwater runoff, promoting infiltration, trapping sediment and treating pollutants

GREEN INFRASTRUCTURE
MULTI-FACETED BENEFITS



NATURAL SYSTEMS

APPROACHES FOR RESILIENCE

NATURAL SYSTEMS
APPROACHES, COSTS AND BENEFITS

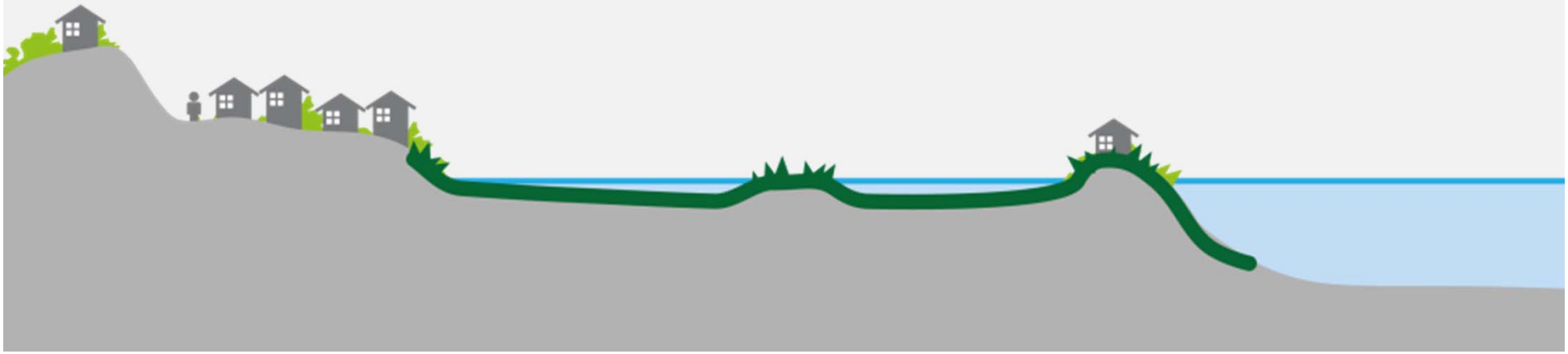
Natural Systems approaches for resilience through restoration and enhancement of natural assets

Benefits

- Typically costs less than hard infrastructure solutions
- Good for the environment

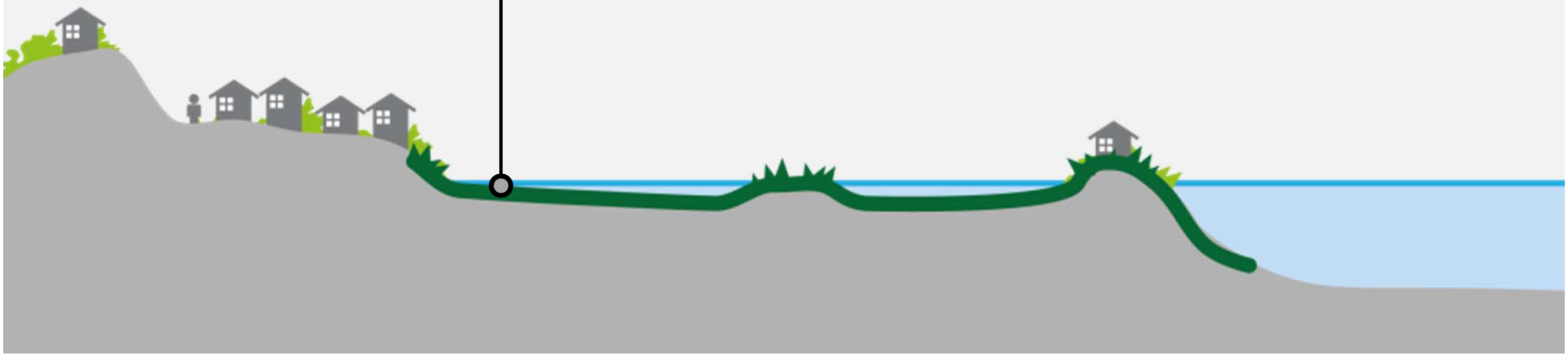
Challenges

- Requires regional coordination
- Long implementation time



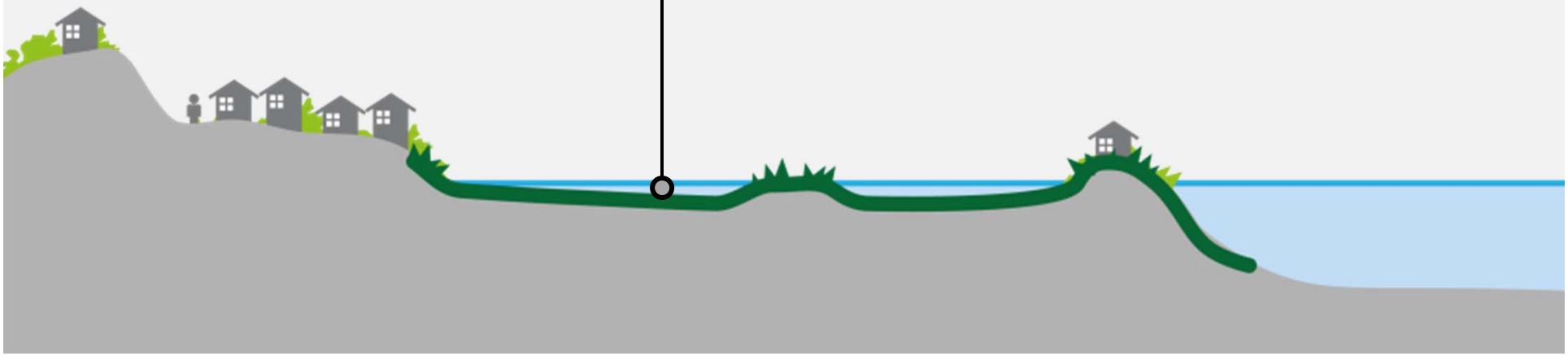
NATURAL SYSTEMS
APPROACHES, COSTS AND BENEFITS

Tidal Marsh Restoration and Protection
Layer of dredged sediment sprayed or slurried over existing or historical marsh locations to stabilize shoreline and reduce erosion



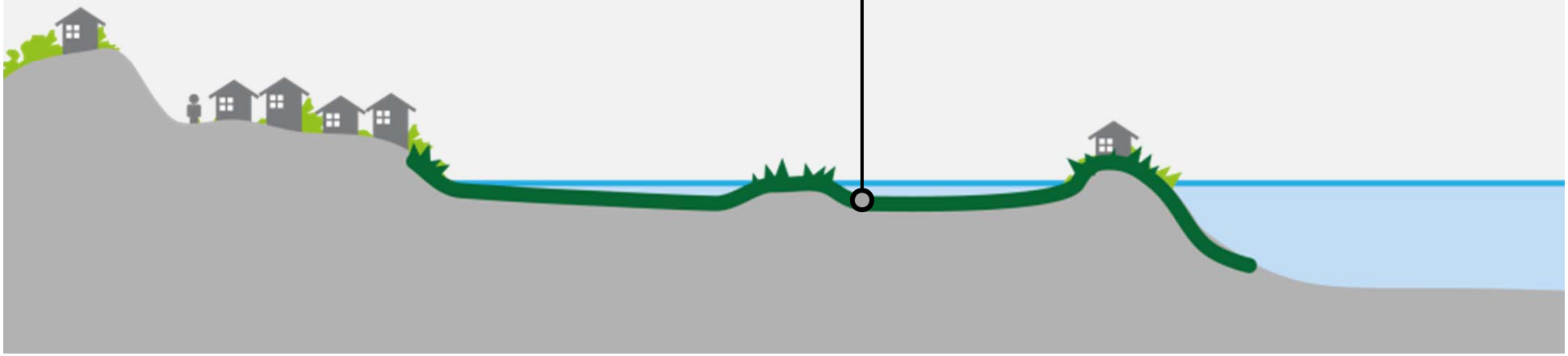
NATURAL SYSTEMS
APPROACHES, COSTS AND BENEFITS

Sea Grass Restoration
Seagrass is planted using transplants or seeds in shallow, soft-substrate areas with low turbidity and areas with previously damaged seagrass beds

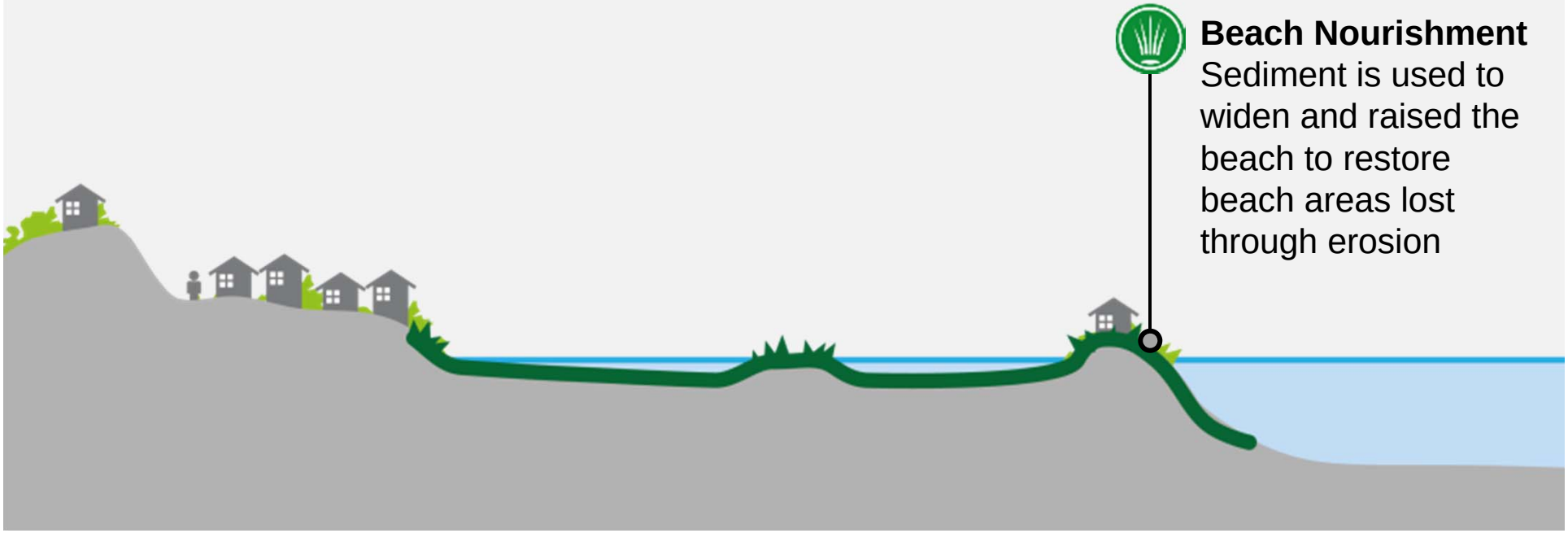


NATURAL SYSTEMS
APPROACHES, COSTS AND BENEFITS

Oyster Reef Restoration
A reef of shell and/or rock that forms an oyster bed along the shoreline



NATURAL SYSTEMS
APPROACHES, COSTS AND BENEFITS



Beach Nourishment
Sediment is used to widen and raised the beach to restore beach areas lost through erosion

NATURAL SYSTEMS
MARSH NOURISHMENT

- A layer of dredged sediment is sprayed or slurried over the marsh surface at a thickness that adds sediment while not negatively impacting the marsh.
- Existing or historical marsh locations where loss of marsh has been occurring
- Receiving marshlands must have sufficient slope to allow for drainage
- In large tidal areas or areas with heavy wave action, sediment may be dispersed
- Has been successful in Jamaica Bay

Scale	Local	■■■□□	Regional
Costs	Low	■■□□□	High
Timeframe	Short	■■■□□	Long
Effectiveness			
Tidal	Low	■■□□□	High
Sea Level	Low	■□□□□	High
Runoff	Low	□□□□□	High
Storm Surge	Low	■■■■□	High

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NATURAL SYSTEMS
SEAGRASS RESTORATION

- Shallow, soft-substrate areas with low turbidity and areas with previously damaged seagrass beds
- Stabilizes sediment, reduces wave energy, improves water quality
- Requires high light levels and low turbidity
- Important habitat to many species of fish
- Not appropriate for areas with high wave exposure and tidal current speeds

Scale	Local	■ ■ □ □ □	Regional
Costs	Low	■ □ □ □ □	High
Timeframe	Short	■ □ □ □ □	Long
Effectiveness			
Tidal	Low	■ ■ □ □ □	High
Sea Level	Low	■ □ □ □ □	High
Runoff	Low	□ □ □ □ □	High
Storm Surge	Low	■ ■ □ □ □	High

NATURAL SYSTEMS
OYSTER REEF RESTORATION

- Requires stable, hard areas with uniform depth
- Shoreline protection by absorbing wave energy
- Traps sediment, improves water quality, and provides recreational fishing
- Currently under study by the Town of Hempstead Department of Conservation and Waterways

Scale	Local	■■■□□	Regional
Costs	Low	■■□□□	High
Timeframe	Short	■■■□□	Long
Effectiveness			
Tidal	Low	■■□□□	High
Sea Level	Low	■□□□□	High
Runoff	Low	□□□□□	High
Storm Surge	Low	■■■□□	High

NATURAL SYSTEMS
BEACH NOURISHMENT

- Narrow beaches where wave action had eroded the beach area and property behind beach is threatened
- Dissipates energy across the surf zone
- Nourished beaches erode faster, and nourishment must be repeated

Scale	Local	■■■□□	Regional
Costs	Low	■■■■□	High
Timeframe	Short	■■■■□	Long
Effectiveness			
Tidal	Low	■■■■□	High
Sea Level	Low	■■■□□	High
Runoff	Low	□□□□□	High
Storm Surge	Low	■■■□□	High

NATURAL SYSTEMS
CO-BENEFITS AND CO-COSTS

Co-Benefits

- Beautification
- Habitat restoration
- Beach, bay and ocean improvement
- Job growth in new industries
- Protection of tourism industry
- Water quality improvement
- Reduction in ongoing costs
- Increased recreational space
- Local food production
- Public education

Co-Costs

- New training for public sector employees
- On-going maintenance costs could be high
- Potential to impact waterway navigability

What's needed to move ahead

- Hydrodynamic modeling of whole system
- Water/sediment quality assessments
- Pilot studies to assess viability

SUMMARY OF APPROACHES

CO-BENEFITS AND CUMULATIVE ACTION

SUMMARY OF APPROACHES AND CO-BENEFITS

Hard Infrastructure

- Can be more effective than other approaches, especially for major storm events
- Infrastructure upgrades can be combined with energy efficiency measures
- More time and capital cost intensive than other solutions
- Potential for significant environmental impacts

Green Infrastructure

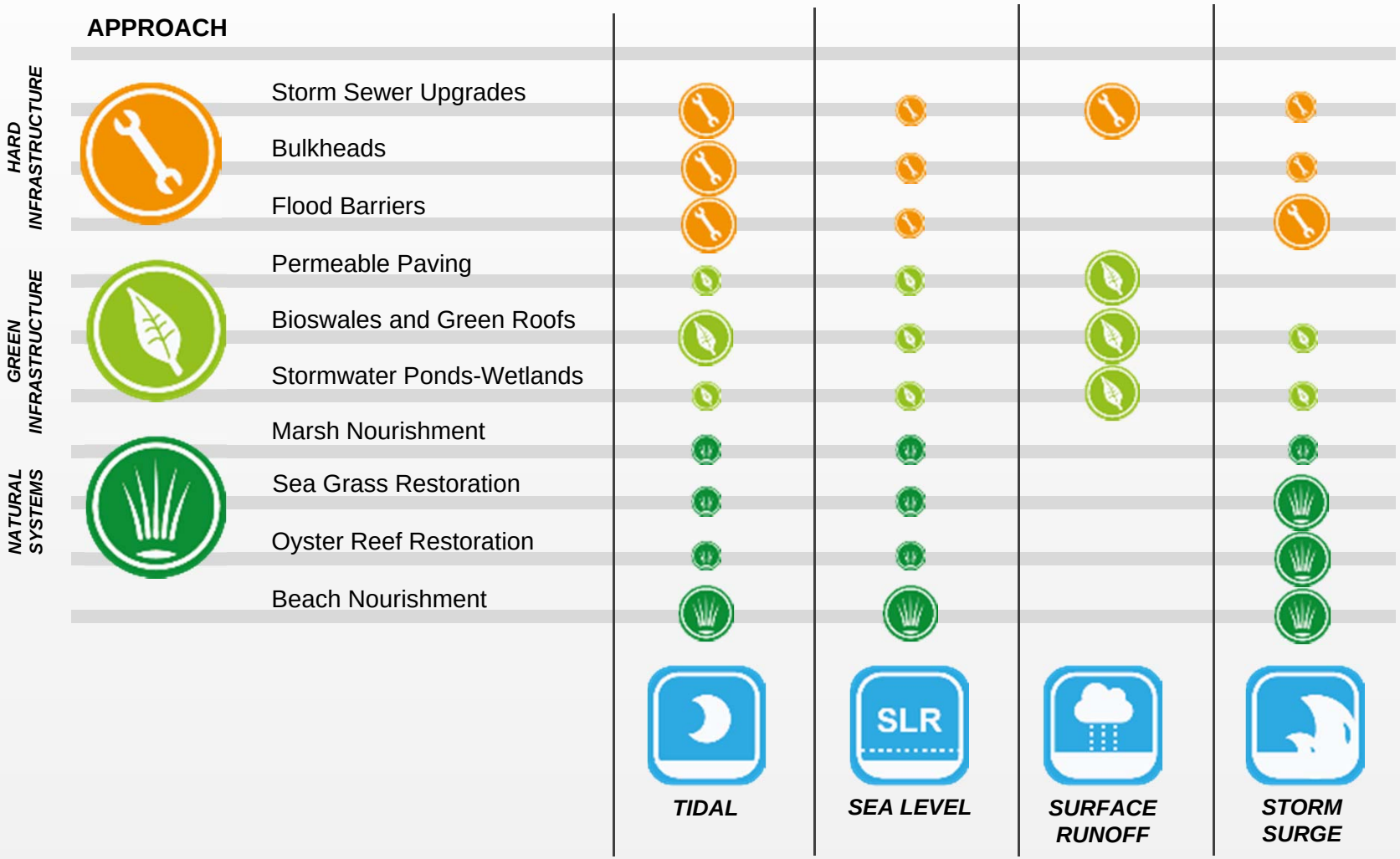
- Can cost less and be implemented faster than hard infrastructure approaches
- Would require regular maintenance to maintain functionality
- Reduces strain on utility infrastructure by improving capacity
- Enhances local natural assets and is good for the environment

Natural Solutions

- Low capital costs, but potential high ongoing maintenance costs
- Implementation would take a long time
- Enhances local natural assets and is good for the environment
- Would improve water quality and benefit the bays, beaches and ocean

SUMMARY OF APPROACHES

DECISION MAKING MATRIX



NEXT STEPS

- Refine and finalize community assets
- Focus on project identification
- Next Public Meetings: Feb. 21st to 28th
- Next Committee Meetings: mid-January, mid-February

QUESTIONS ?

THANK YOU