



# Health Impact Assessment: A new approach for environmental health

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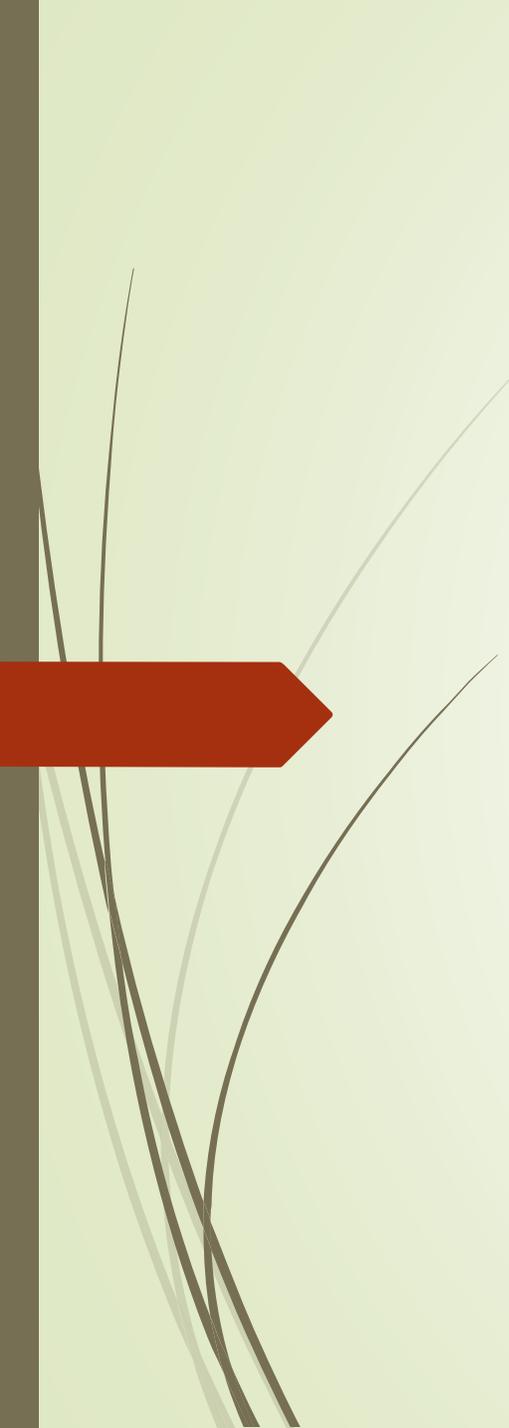
Kansas Health Institute

Water Reuse in Kansas: What about health?



# Outline

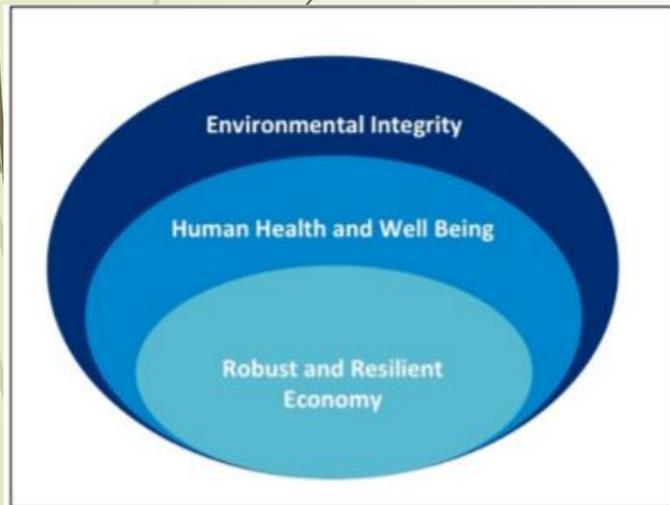
- Background
  - EPA ORD Sustainable and Health Communities Research Program
  - Health Impact Assessment
- Case Studies
  - Procter Creek, Atlanta GA
  - Suffolk County, Long Island NY
  - Kingsbury Bay and Grassy Point, Duluth MN
- Wrap up



# SHC and HIA

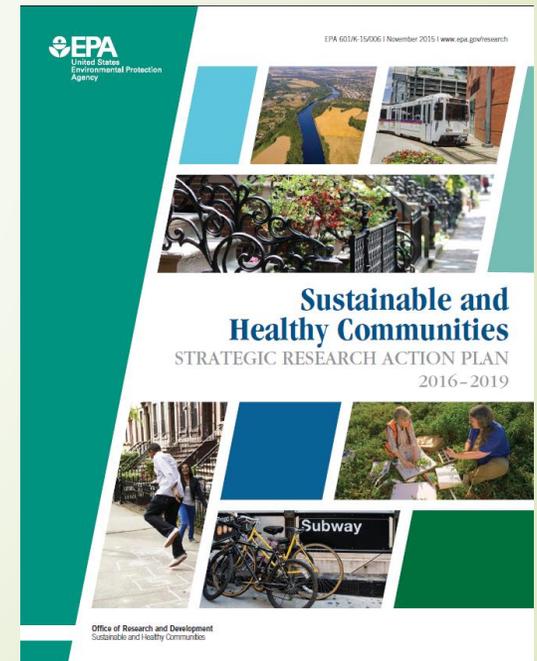
# EPA Office of Research and Development Sustainable and Healthy Communities (SHC) Research Program

*Communities make decisions every day that either directly or indirectly affect the environment, public health, and well-being. For some decisions, the environmental, health and well-being impacts (beneficial or adverse) are not well understood and are rarely evaluated from a systems or holistic perspective.*



## Program Vision

SHC's vision is to develop the science to support EPA's approach to a sustainable environment and to expand community stakeholders' capabilities to consider impacts of decision alternatives.



# Elements of SHC Strategy

- Consider the links between the *natural environment and human well-being*.
- Use *systems* approaches to *avoid unintended consequences and maximize valuable co-benefits*.
- Integrate *sustainability and ecosystem services* concepts.
- Focus on *preventative strategies* that optimize management of multiple chemical, material, and energy streams to achieve the greatest environmental benefit, economic resilience, and *promote health and well-being*.
- Conduct *actionable* research through *participative and collaborative case studies* to better understand sustainability drivers and to improve EPA tools.



## HIA Process



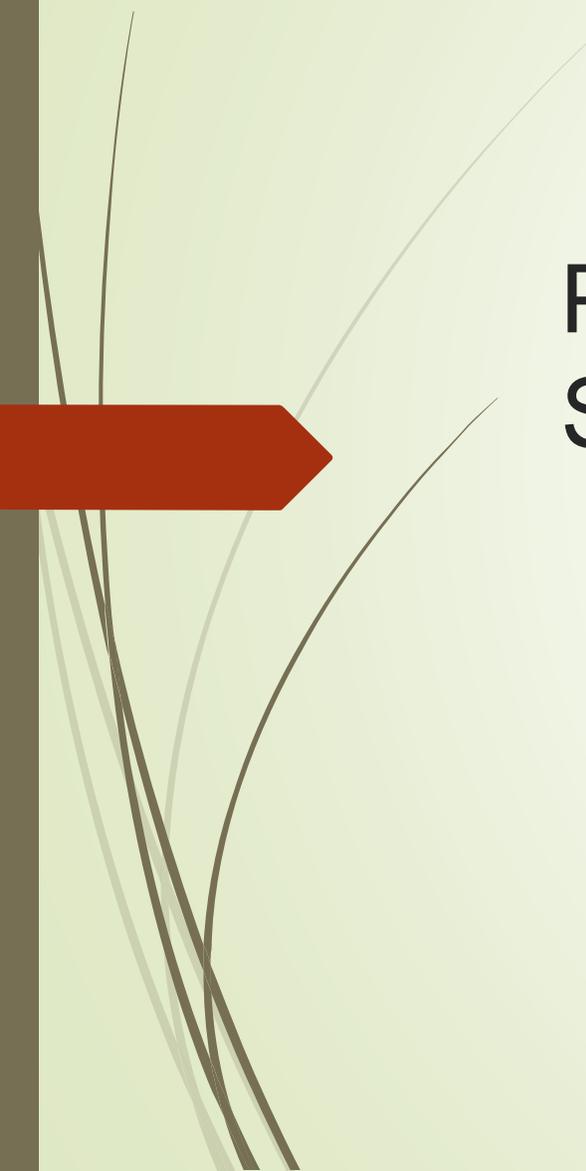


# HIA Case Studies

<b>Environmental Issues</b>	<b>Project or Policy</b>
Impaired water quality, flooding	Green Infrastructure
Nutrient enrichment, algal blooms	Sanitary Code for OSDS
Contaminated sediment, habitat impairment	Habitat remediation and restoration

For each case study:

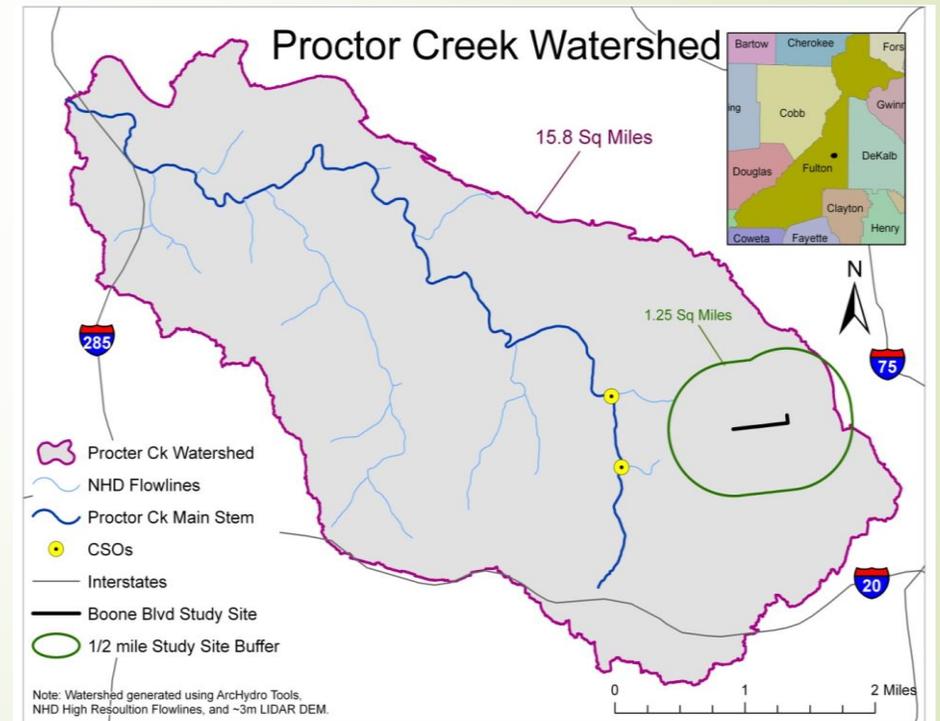
- Background on environmental issue
- Overview of proposed plan or policy
- Highlights of HIA process and findings
- Q&A



# Proctor Creek's Boone Boulevard Green Street Project HIA

# Environmental Issues

- Proctor Creek is one of the most impaired creeks in metro-Atlanta – listed for fecal coliforms
- Drains 10,100+ acre to Chattahoochee River
- Primarily urban residential and commercial lands
- Two combined sewer overflows



# Environmental Issues

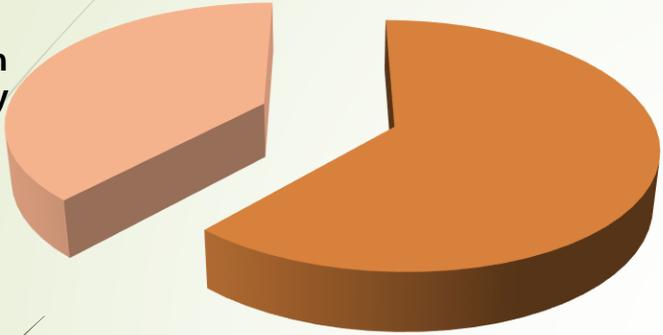
Beyond water quality issues, the community faces problems with:

- Pervasive Flooding
- Illegal dumping
- Poverty
- Derelict Properties
- Aging Infrastructure

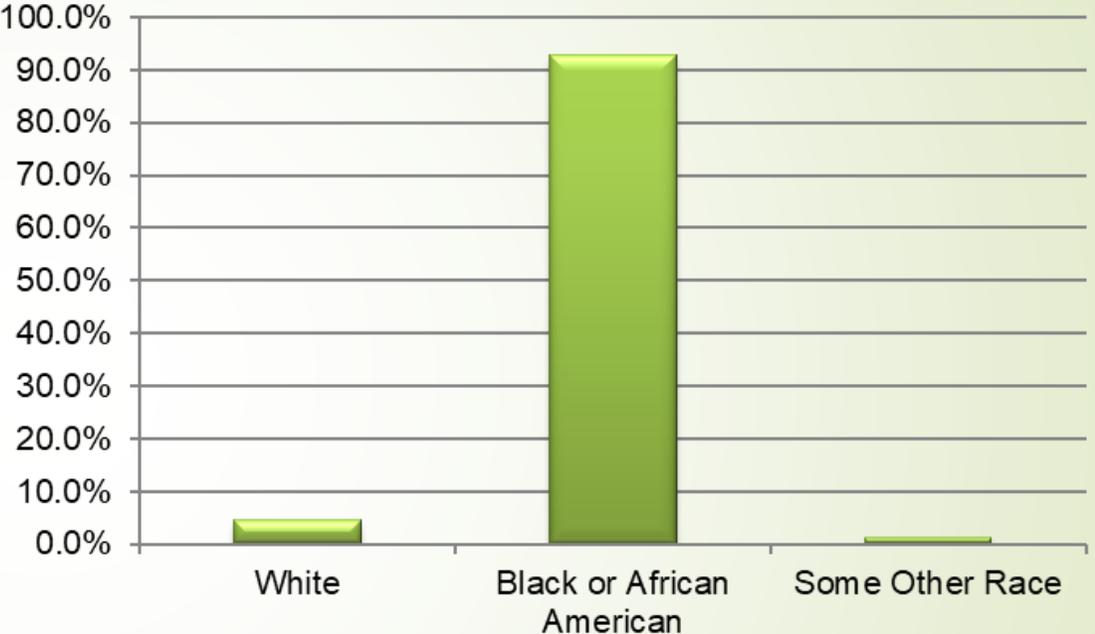
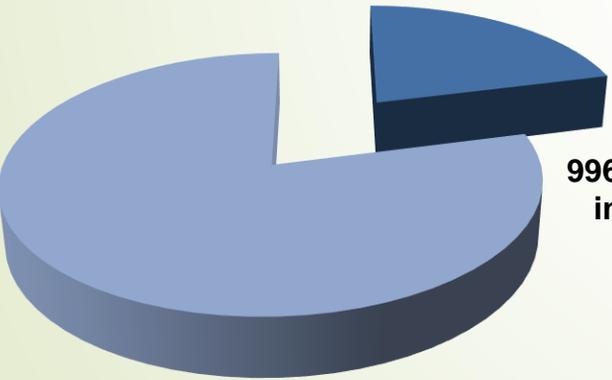


# Environmental justice community of concern

7,742  
Children  
and Youth  
in Poverty  
(62%)

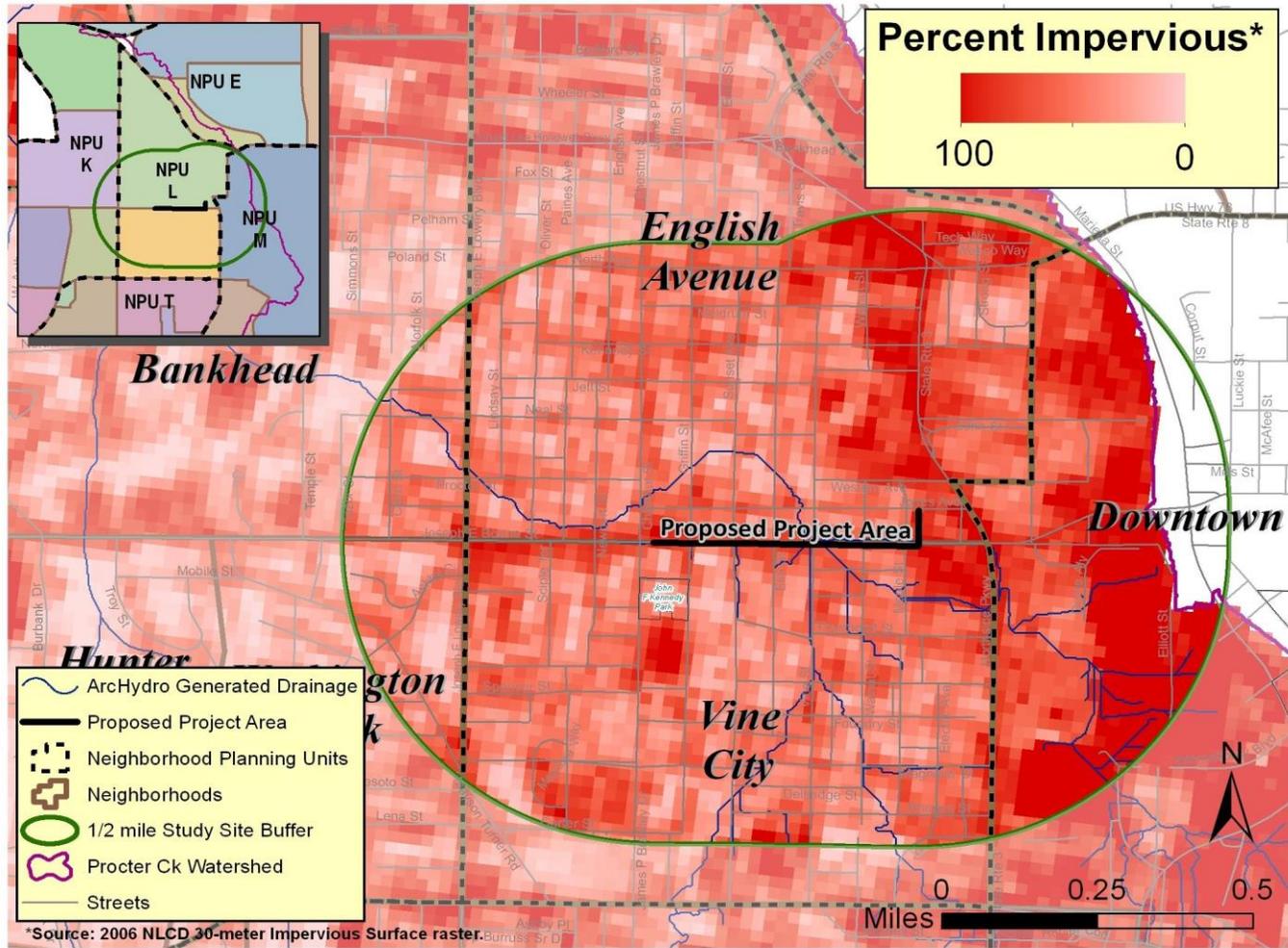


996 aged 65+  
in Poverty  
(21%)



	Census 2000	ACS 2011
Estimated Median Household Income	\$20,591	\$29,788

# Percent Impervious Surface



**Project:** Implementation of a green infrastructure project along Joseph E. Boone Boulevard, NW (in concert with road diet project)

**Decision-Makers:** City of Atlanta, Georgia

**Role of HIA:** Evaluate potential positive and negative health impacts of the green street project design and inform stakeholder decisions

**HIA Lead:** Region 4 – Office of Environmental Justice  
Office of Research and Development

**HIA Partners:**



# Proposed Boone Boulevard Green Street Project

There are three major elements to the design of the Green Street Project:

- Conversion of underutilized impermeable road surface into permeable planter boxes and pavement;
- Stormwater runoff redirected into BMPs prior to entering the storm sewer; and
- BMPs sized to treat runoff volume needs first and then water quality needs.

➤ Uses natural processes:

- ❖ Vegetation
- ❖ Water Conservation
- ❖ Soil Filtration
- ❖ Carbon Sequestration
- ❖ Shading
- ❖ Stormwater Management

The overall vision of the project is to implement “green street” infrastructure in collaboration with the planned road diet along 2,200 feet of Boone Street



Planter Boxes

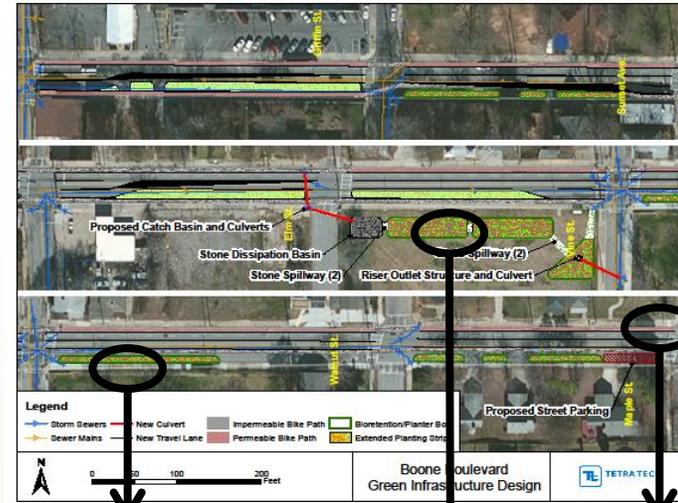
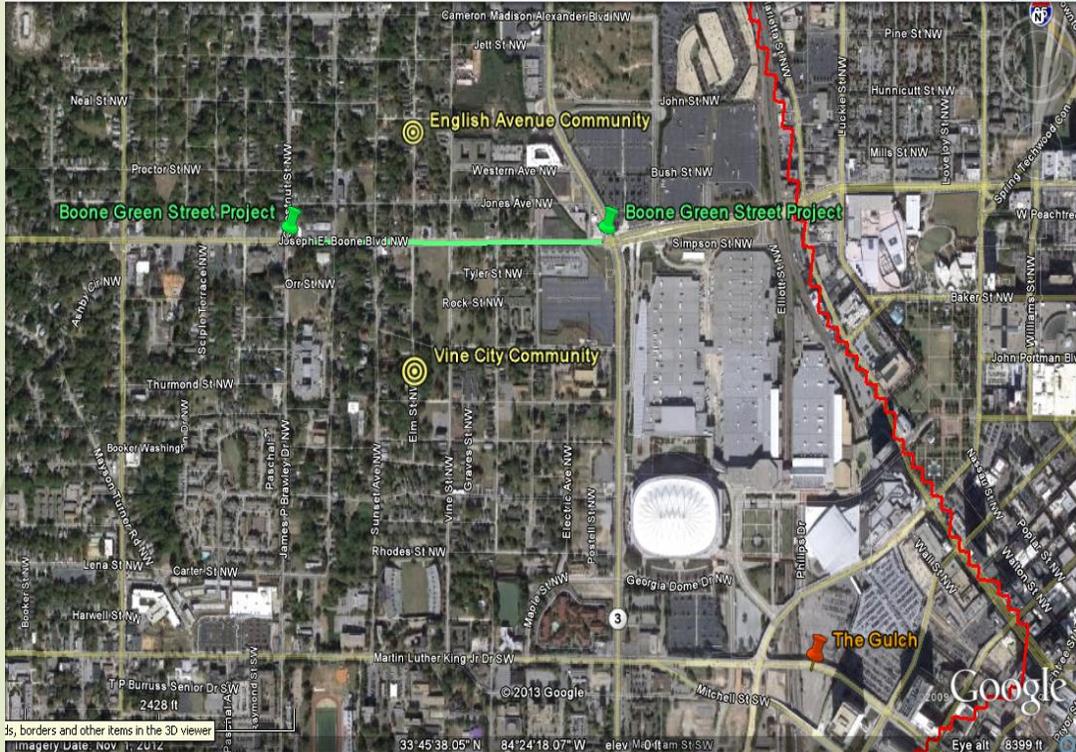


Urban Tree Canopy



Permeable Pavement

# Proposed Boone Boulevard Green Street Project



Planter box

Bioretention cell

Permeable pavement

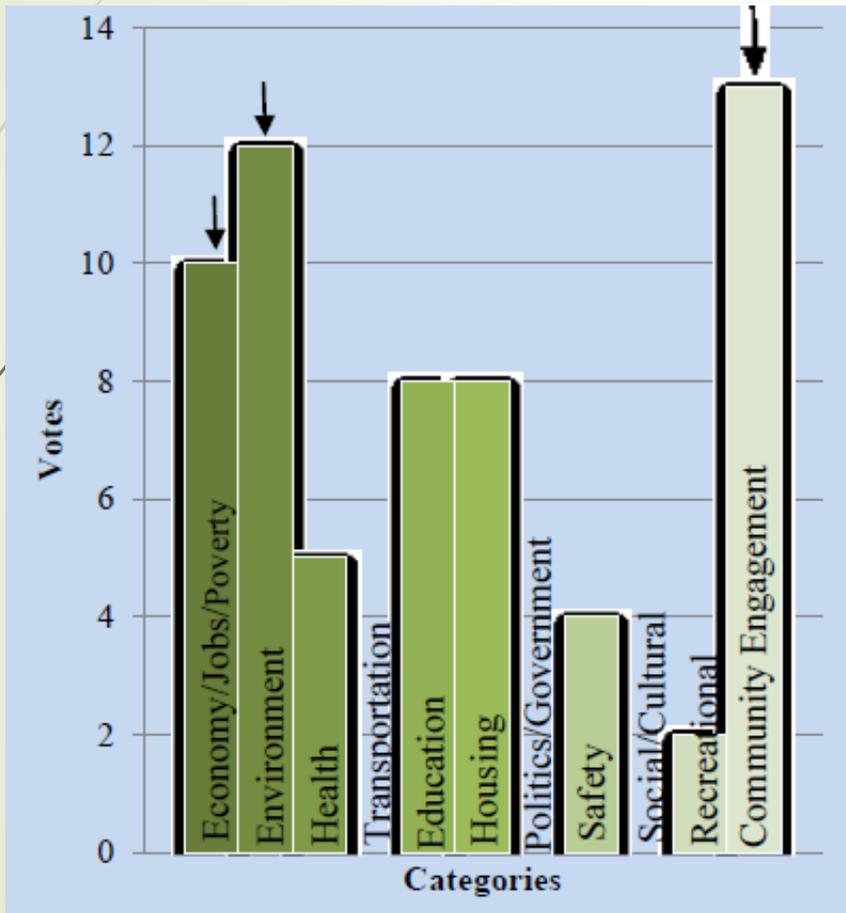
## Setting the Scope of the HIA

- Community Group and the Advisory Committee identified issues of interest and areas of concern in the community
- Both groups prioritized categories for the HIA to consider
- The results of this exercise set the scope (i.e., assessment plan) of the HIA

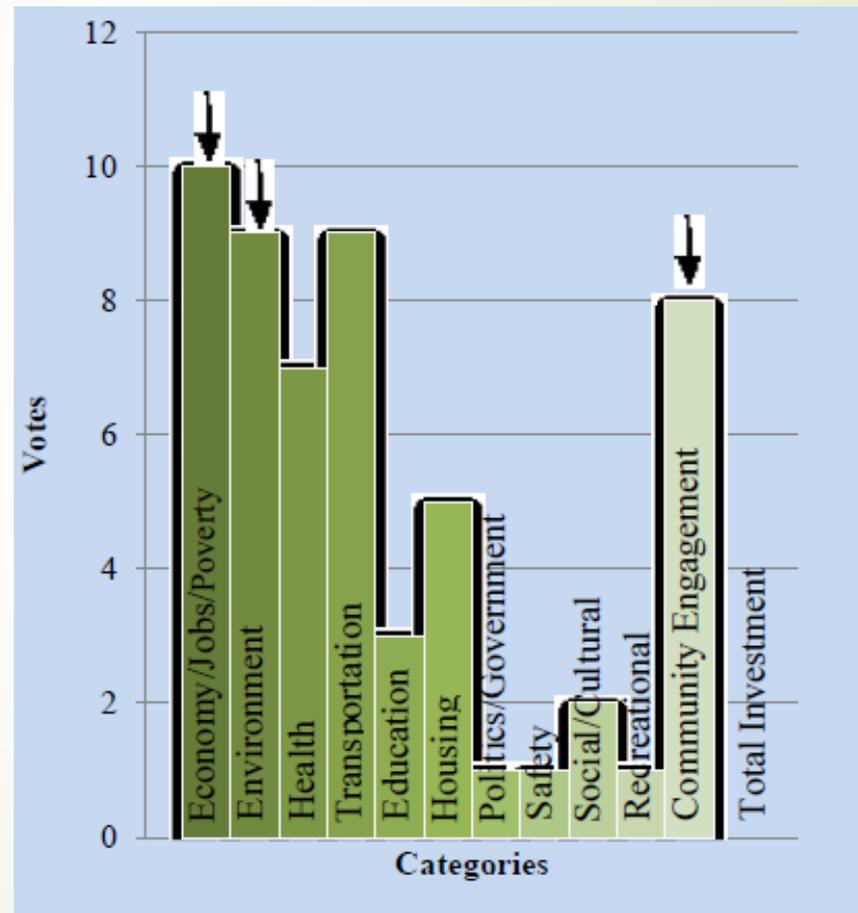


# Setting the Scope of the HIA

## Community Priorities



## Advisory Group Priorities



# Health Factors and Potential Health Benefits

	Health Factors	Potential Public Health Benefits
Environmental	Water Quality	Reduced stormwater runoff and pollutant loading
	Flood Management	Stormwater management and reduced CSO events/flooding hazards
	Climate and Temperature	Shading and relief from local urban heat island effect
	Air Quality	Filtration of air pollutants
	Traffic Safety	Traffic calming and reduction in vehicle crashes and injury
	Exposure to Greenness	Increased exposure to greenness and the natural environment
	Exposure to Urban Noise	Possible traffic and street noise abatement
Social	Access to Goods and Services, Greenspace, and Healthcare	Improved mobility and access to goods and services
	Crime	Possible reduction in the risk of crime due to improved aesthetics/lighting
	Social Capital	Possible improvement in social capital along the Green Street
Economic	Household Economics	Possible increase in employment opportunities for green infrastructure installation and maintenance
	Community Economics	Possible benefit to businesses in the area due to improved walkability/bikeability, especially if the project signals revitalization of the area

## *How does stormwater runoff impact health?*

Health Indicators Evaluated	Pathways Found
Exposure to Injury from Flooding	Flooding can lead to injury through slips / falls or floating debris.
Exposure to Vector-borne Disease	Pooling runoff promotes a reproductive habitat for disease carrying insects (mosquitoes with WNV).
Exposure to Waterborne Disease	Stormwater runoff can affect exposure through the transmission of pollution and pathogens in surface water.
Exposure to stress from loss / damage of property and self	Damage to the home, land, or self can lead to increased stress from lowered perceived safety and security, which can lead to other health outcomes (anxiety, high blood pressure, etc).

The proposed project is highly likely to improve flood management by retaining 17.6% of all runoff and reducing stormwater coming from the site by 20%.



## Example Recommendations for Flood Management

- ▶ **Before construction:**
- ▶ Increase law enforcement of nuisance laws in regards to abandoned properties, illegal dumping, and property maintenance.
- ▶ Increase community awareness of environmental factors that can lead to mosquitoes and preventative measures against vector-borne pathogens in the area.
- ▶ **During construction:**
- ▶ No recommendations identified for this phase.
- ▶ **After construction:**
- ▶ Ensure that routine maintenance and monitoring plan for green infrastructure elements are followed as directed.

# HIA: Benefits and Outcomes for Proctor Creek

- Demonstration project to address flooding and stormwater issues in the Proctor Creek Watershed
- Extensive stakeholder and community engagement
- Assessed health determinants in environmental, social and economic sectors
- Recommendations were prioritized by pre-construction, during construction, post-construction and long term phases
- New Local, State, Federal, and Community partnerships were developed





# HIA: Benefits and Outcomes for Proctor Creek

City of Atlanta agreed to expand the length of the green street to maximize its predicted health benefits.

A number of HIA recommendations have been incorporated into the *Green Street Project* design and construction plans:

- Selecting native species
- Incorporating complete streets in the design
- Maximizing “greenness”
- Adding infrastructure that promotes safety for pedestrians and cyclists
- Increasing street lighting
- Providing employment opportunities for local residents and businesses



Questions?



# Health Impact Assessment of Proposed Code Changes Regarding Onsite Sewage Disposal Systems in Suffolk County, NY

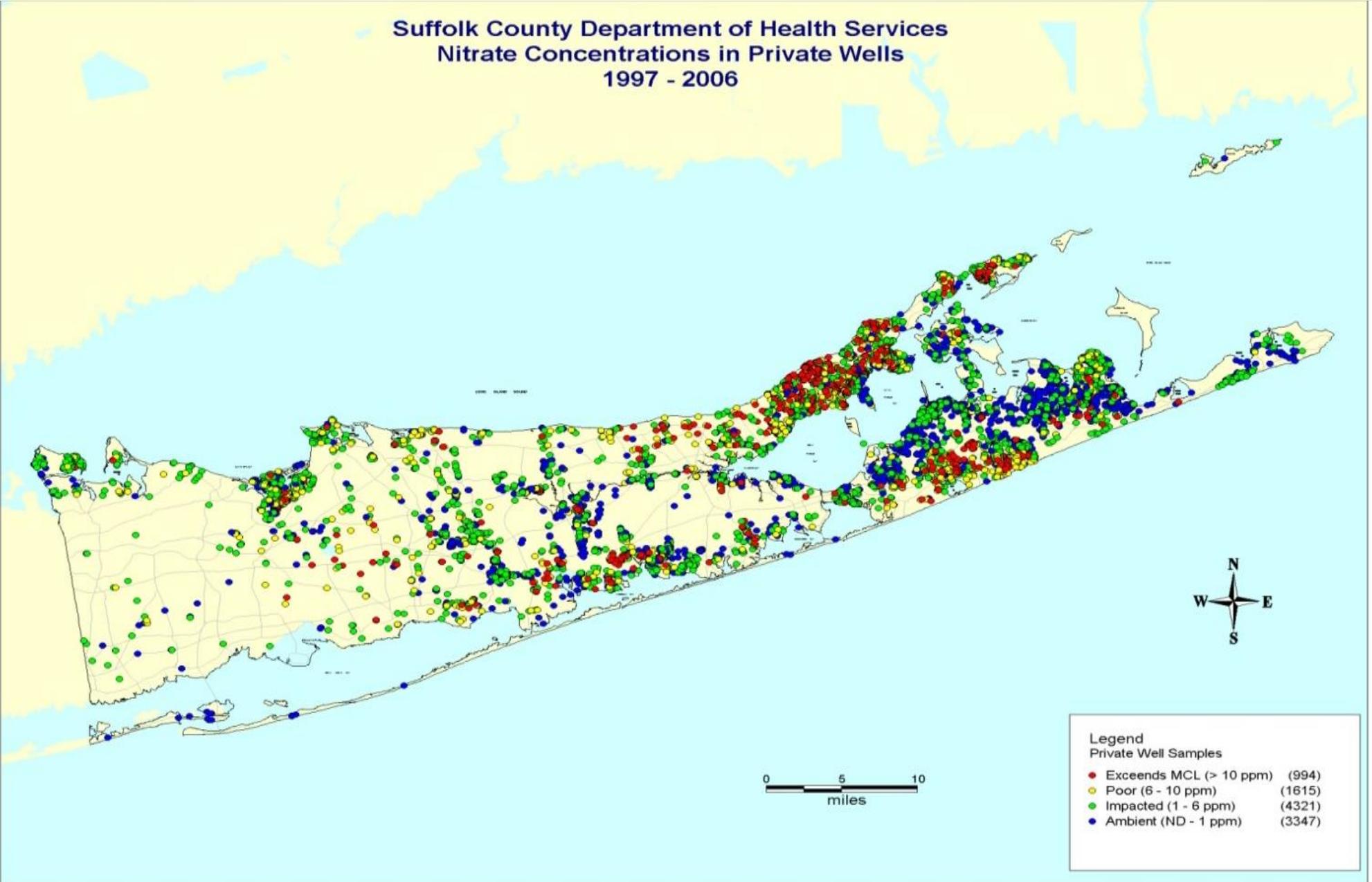
# Environmental Issues

- About 1.5 million people living in 900+ square miles (600,000 acres)
  - ~ \$4.7 billion tourism economy
  - 3 major estuary systems, wetlands, and other surface waters
  
- Municipal drinking water source: Sole Source Aquifer under Long Island (Groundwater)
  - > 1,000 wells attached to diffuse public water supply well network
  - ~ 45,000 private wells
  
- Wastewater collection and treatment: both sewer and non-sewered areas

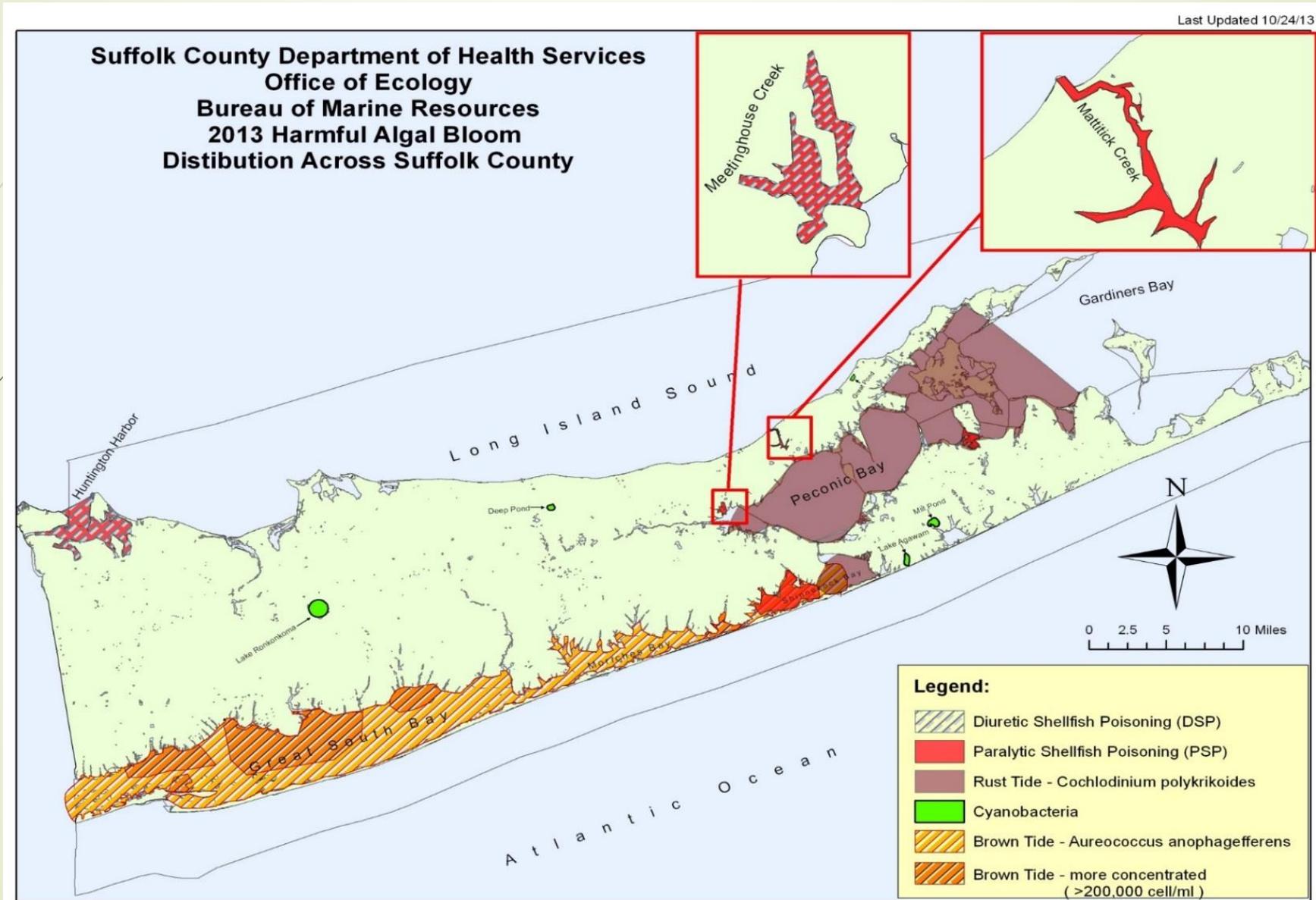
# Environmental Issues

- All Suffolk estuary systems are impaired by nitrogen (N).
  - Total nitrogen levels (TN) have been increasing since 1987 in all aquifers, by ~ 1 mg/L
  - Average TN in public water supplies still ~ 2-4 mg/L (well below minimum critical level of 10 mg/L)
  
- Public water supply is safe, but...
  - ~ 10% of private wells sampled exceed MCL standard

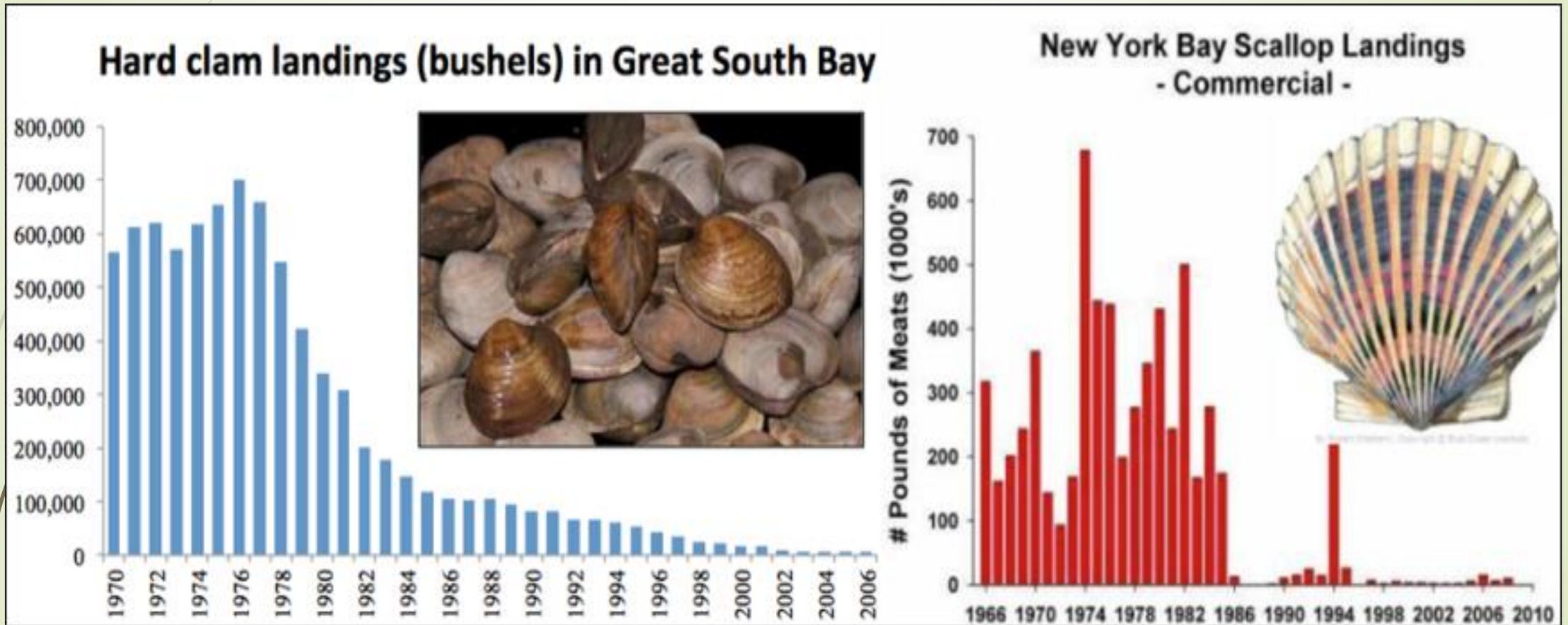
# Increasing nitrogen loading of surface and ground waters



# Spread of harmful algal blooms

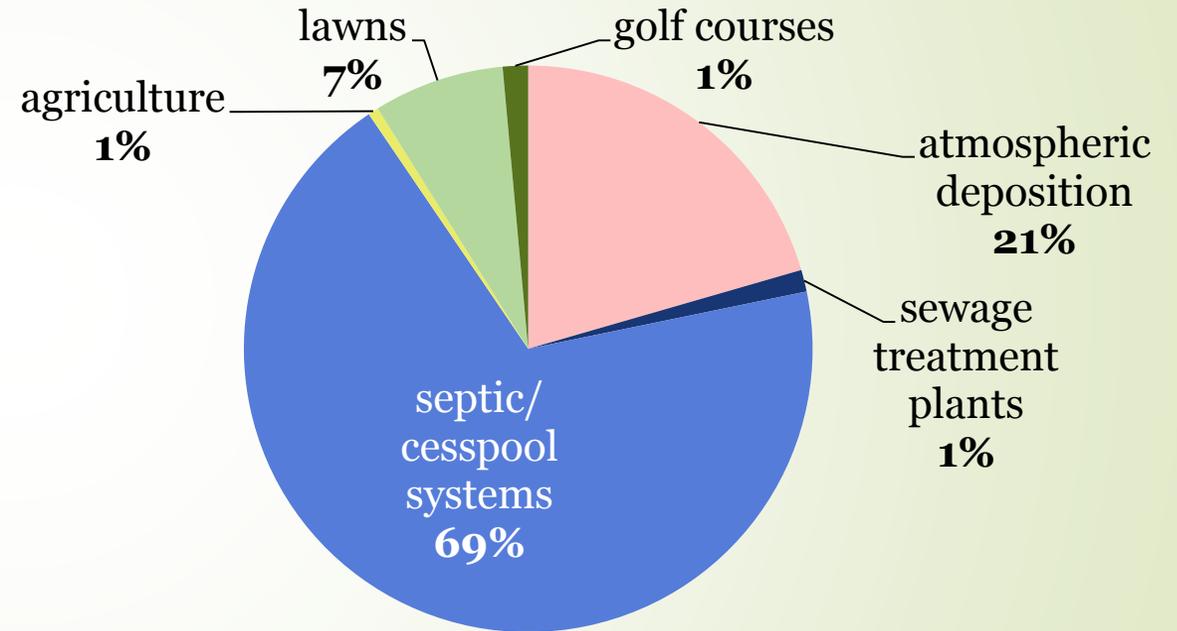


## Loss in shellfish populations and jobs in shellfish industry



## Nitrogen sources in the Great South Bay

- 74% (~360,000) of all Suffolk County homes are using private, onsite sewer disposal systems (OSDS)
- Homes built before 1973 pre-date the County code policies for OSDS (cesspools vs septic tanks)



(Source: Kinney, E.L. and Valiela, 2011)

~ 360,000 homes in Suffolk County an OSDS



# FEMA, EPA, and HIA?

- Post Hurricane Sandy (2012), EPA, FEMA, New York Department of State and Department of Environmental Conservation, Long Island Counties, and Metropolitan Transit Authority (i.e., the Partnership) began collaborating on several efforts in Long Island to promote more resilient and sustainable recovery.
  - HIA was promoted as a tool to help communities rebuild and move towards sustainable and resilient development.
- Suffolk County agreed to host a pilot HIA that would help the County's recovery efforts and help reach resiliency and sustainability goals.



## Proposed Changes to Sanitary Code Policy

- Proposed changes to upgrade existing Onsite Sewage Disposal Systems (OSDS)
- ~ 74% of housing units are not sewerred (n=360,000)
- Current systems contribute to excess nitrogen in waterways, potential exposure to pathogens, significant OSDS failures during Hurricane Sandy

Alternative I	Alternative II	Alternative III
Require all new AND existing individual (onsite) sewage disposal systems (OSDS) serving single-family residences must conform to current County Sanitary Code and standards.	Require all new AND existing OSDS serving single-family residences in high priority areas* must conform to current County Sanitary Code and standards.	All new AND existing individual sewerage systems (either cesspool-only systems or conventional OWTS) serving single-family residences in high priority areas* must be upgraded to innovative/alternative OWTS.

# Proposed Changes to Sanitary Code Policy

- High priority areas were defined as areas parcels in 0-25 year contributing zone to major streams and the coastline and 0-50 year contributing zone to groundwater.





# HIA in Suffolk County

- Help inform the County's decision by evaluating the potential for the proposed changes to impact individual and community health
- Provide evidence-based recommendations for the County to consider in their decision process
- Provide an opportunity to explicitly include ecosystem services linked to health determinants and public health



## Health Impact Assessment of Proposed Code Changes Regarding Onsite Sewage Disposal Systems in Suffolk County, NY

U.S. EPA | UNITED STATES ENVIRONMENTAL PROTECTION AGENCY



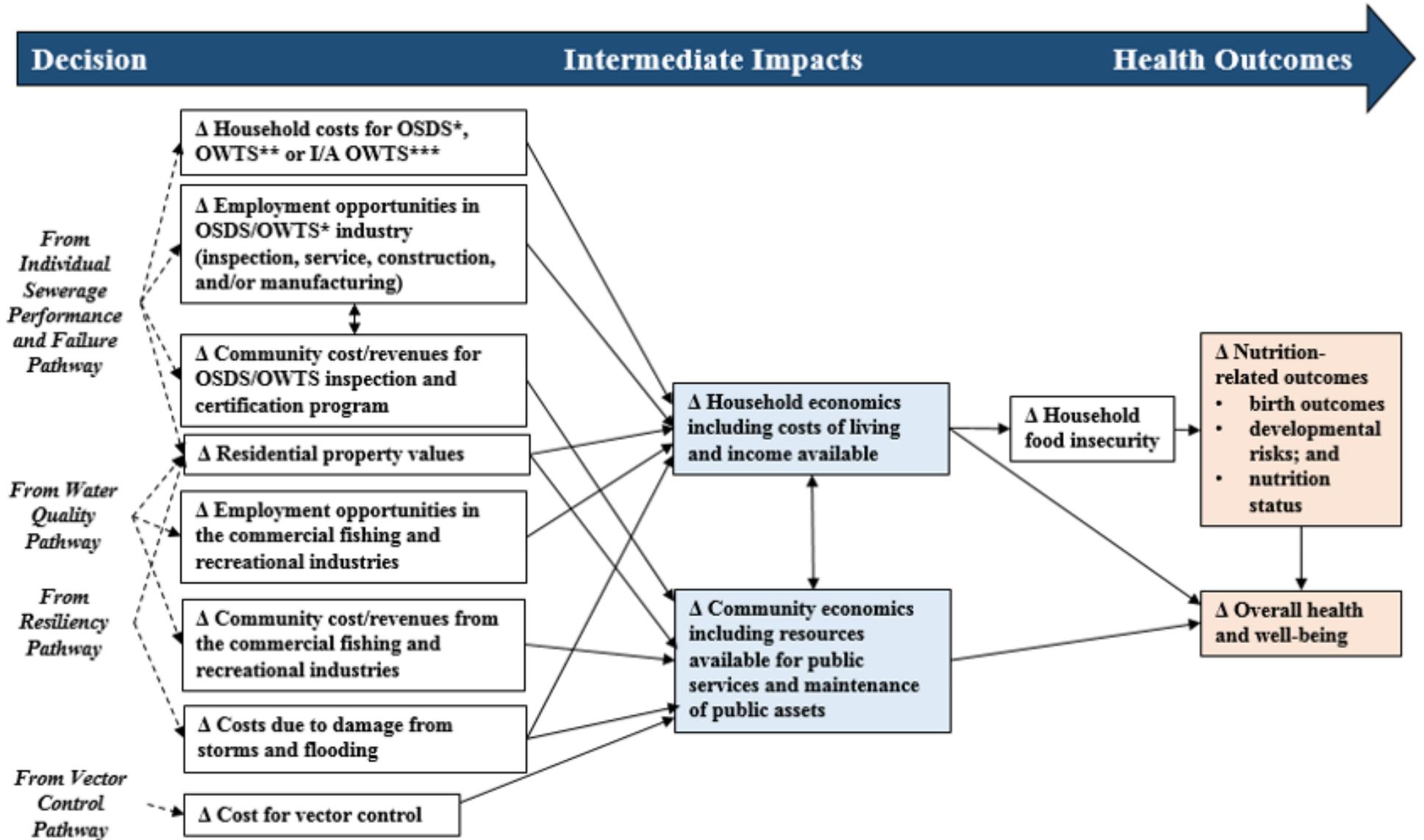


# Pathways of Impact

Based on input from stakeholders, community members, and scientific experts, pathways were identified through which the proposed code changes could potentially impact health. Five pathways were prioritized for inclusion in the HIA:

- Individual Sewerage System Performance and Failure
- Water Quality
- **Community and Household Economics**
- Vector Control
- Resiliency to Natural Disaster

# Community and Household Economics





## How does household income impact health?

- ▶ Household income and housing costs determine the ability to afford essential goods and services (including safe housing, food, and healthcare)
- ▶ Lack of these essentials can increase the risk of poor health outcomes such as chronic disease, infectious disease, exposure to environmental toxins, and mental distress
- ▶ Children in households displaced by financial insecurity are at increased risk

## How may the policy change impact household income?

- ▶ Households will incur costs related to replacement or upgrade. Estimated costs can range from \$5000 to \$23,000 for installation, \$100 to \$500 dollars per year for maintenance and no cost to \$300 a year for operation
- ▶ These costs can reduce the amount of expendable household income available for nutrition and essential health-related goods and services, especially for renters and those with fixed income or high housing costs
- ▶ Potential for new employment opportunities for County residents



## Example Recommendations for Household Economics

- ▶ Seek outside funding to **reduce the costs for individual households**. Assistance for cost burdened, and low income households should be prioritized. Assistance should be available for all household types **including non-family households**.
- ▶ Work with communities and OWTS vendors to plan **concurrent upgrades to neighboring properties to reduce construction costs**.
- ▶ Suffolk County should take steps to encourage OSDS and I/A OWTS **businesses to locate and hire within the county**.

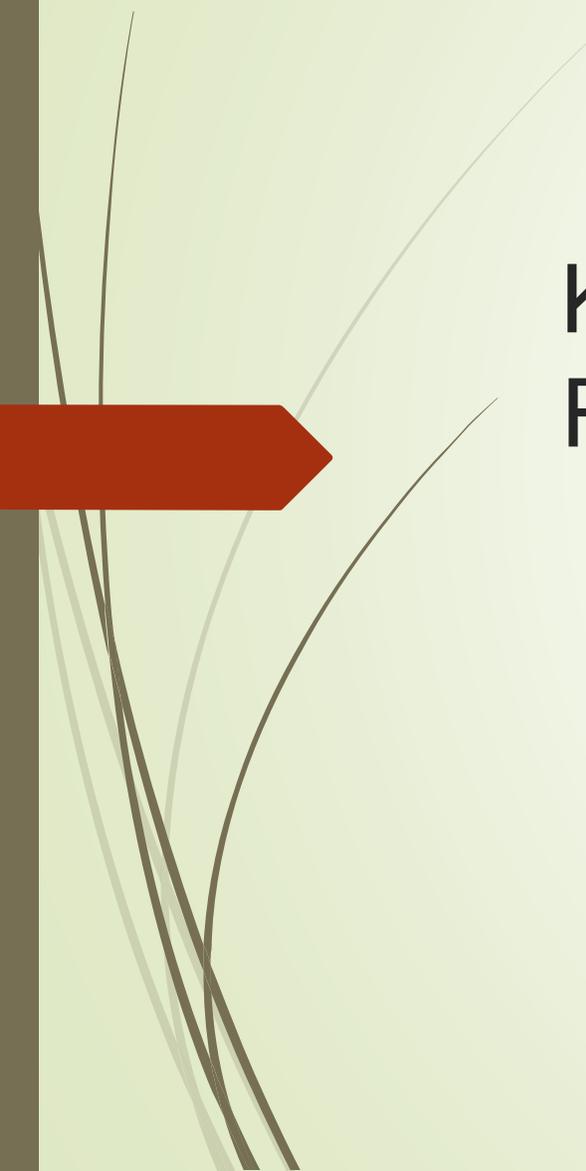


## Status of HIA

- Assessment - complete
  - Review of draft HIA report - complete
  - Resolution of comments – in progress
  - Release of final HIA report – January 2018
- 



Questions?

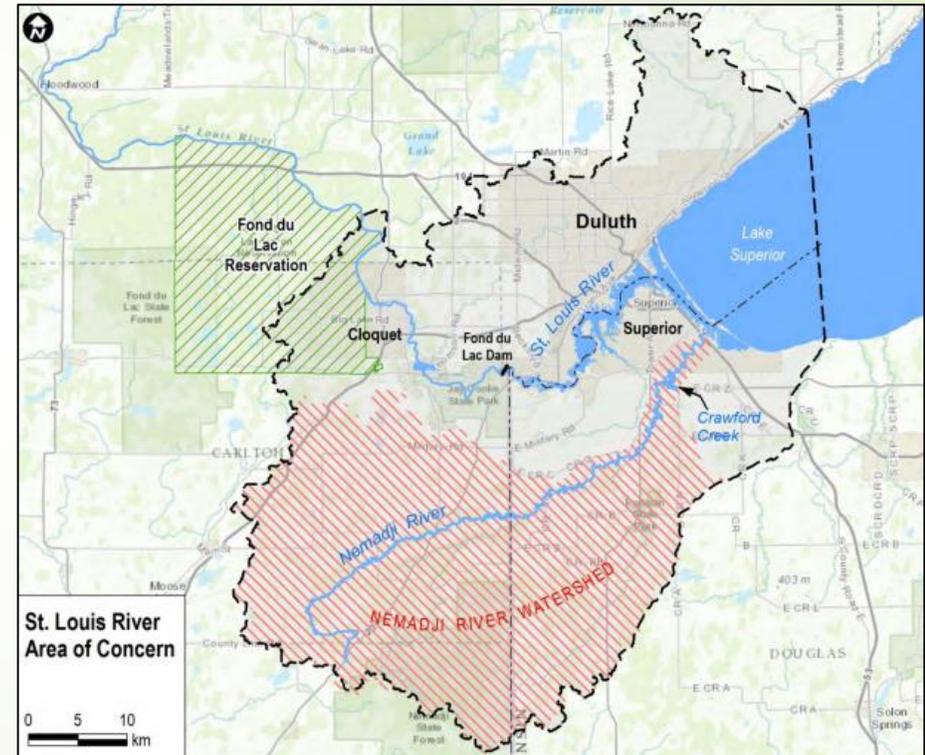


# Kingsbury Bay – Grassy Point Habitat Restoration: A Health Impact Assessment

# Environmental Issues

## St. Louis River Area of Concern

- Due to historical practices such as logging and hazardous waste disposal there are 14 BUIs
  - Fish consumption advisories
  - Beach closures
  - Loss of fish and wildlife habitat
- Remediation to Restoration (R2R) projects in the AOC involve remediation (of sediment contamination) and restoration (of habitat)
- Goal is to delist the AOC by 2025



# Environmental Issues

## ➤ Kingsbury Bay

- Too much sediment has washed down the creek to the bay, creating a delta at the creek's mouth
- Vegetation dominated by narrow-leaf cattail (invasive) & tag alder

## ➤ Grassy Point

- Two sawmills built over the water deposited wood waste for years
- Legacy wood waste limits natural diversity and flow
- Based on environmental studies both sites given a **yellow rating**
- Restoration of the sites could proceed, but should consider the presence of contaminants

**Remediation** >>> **Restoration**

# Kingsbury Bay-Grassy Point Habitat Restoration

- **Kingsbury Bay Restoration** - Restore wetland complex at the mouth of Kingsbury Creek to pre-1961 condition by dredging
- **Grassy Point Restoration** - Remove non-native material and restore optimum habitat and water depths



## Kingsbury Bay-Grassy Point Habitat Restoration

- The sediment from Kingsbury Bay will be reused at three different restoration sites in the St. Louis River, including **Grassy Point\***

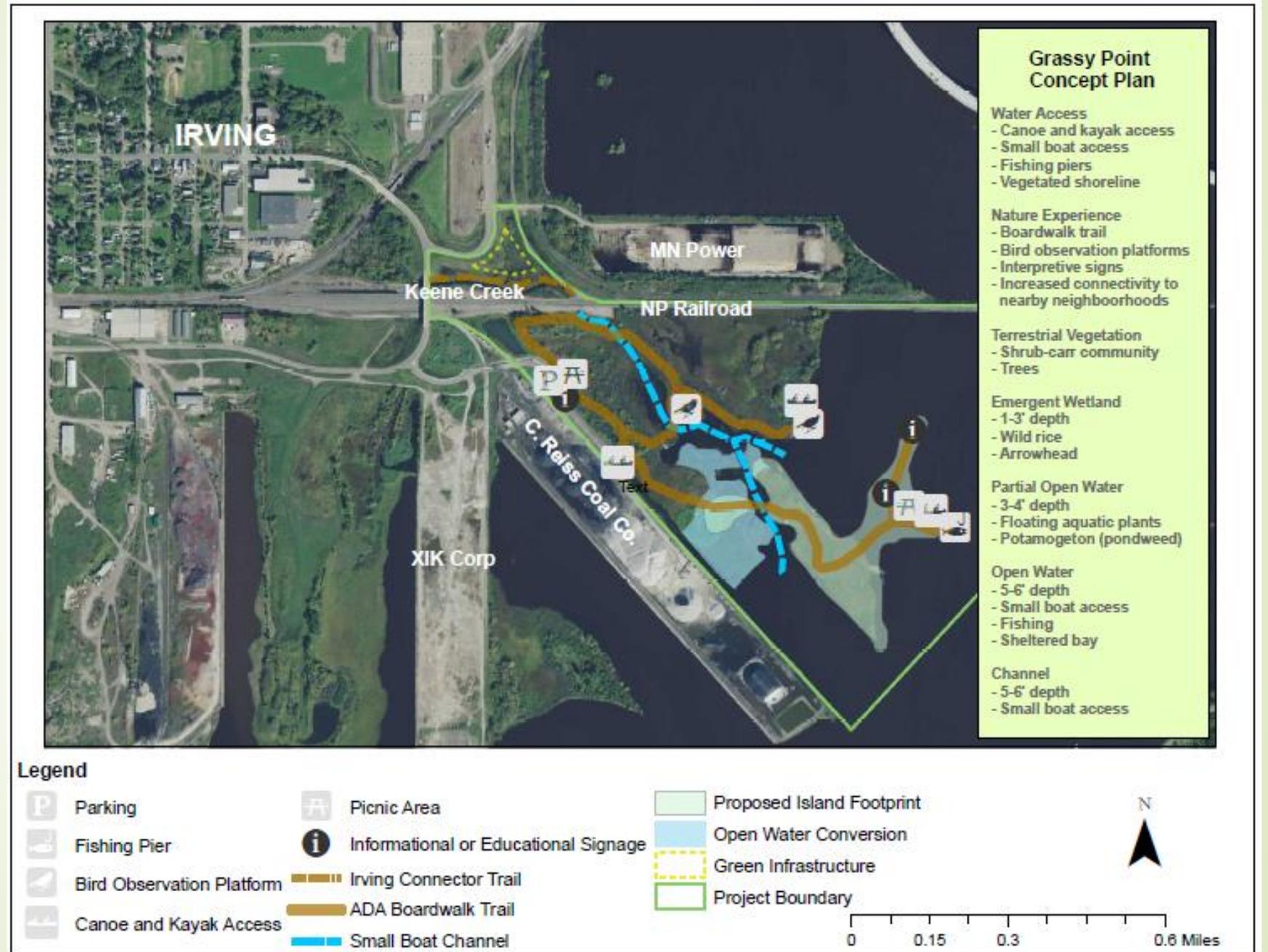


# Kingsbury Bay-Grassy Point Park Improvement Projects

- Following the restoration work by the MN DNR, the City of Duluth will undertake park improvement projects at these sites
- Concept Plans were created for both Kingsbury Bay and Grassy Point showing potential amenities at these locations
- The Kingsbury Bay-Grassy Point Habitat Restoration HIA will be shared with the MN DNR and City of Duluth to help inform the planning process in 2018



# Grassy Point Park Improvements



# Kingsbury Bay Park Improvements

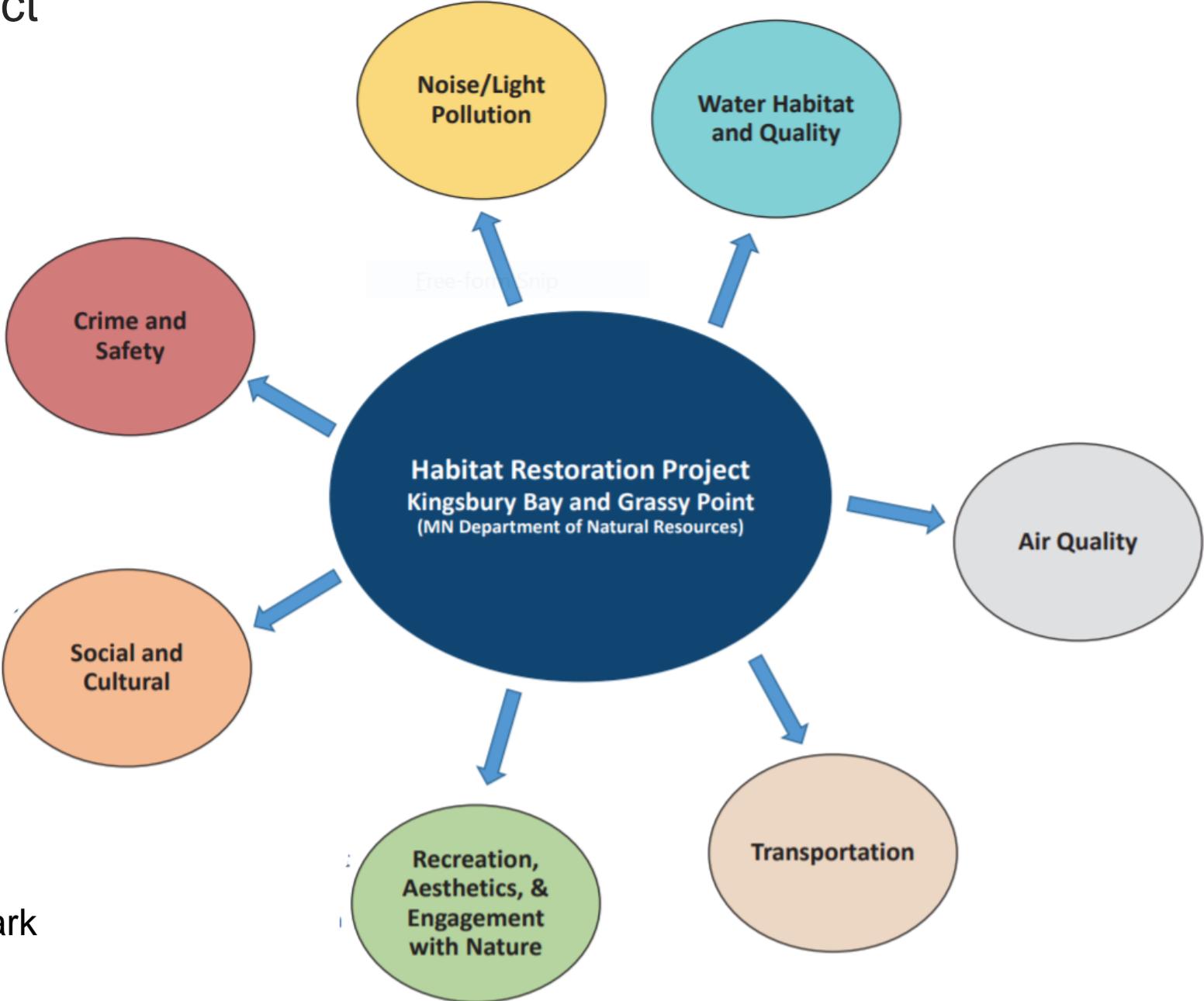


# HIA for Kingsbury Bay and Grassy Point

- Consider the public health implications of both the environmental changes to the river at two remediation and restoration project areas and the potential park amenities adjacent to these projects.
- Provide recommendations to the Minnesota Department of Natural Resources (MNDNR) and City of Duluth's decisions on the design of habitat restoration and park improvement projects.
- Demonstrate the use of HIA for AOC projects with a focus on community involvement

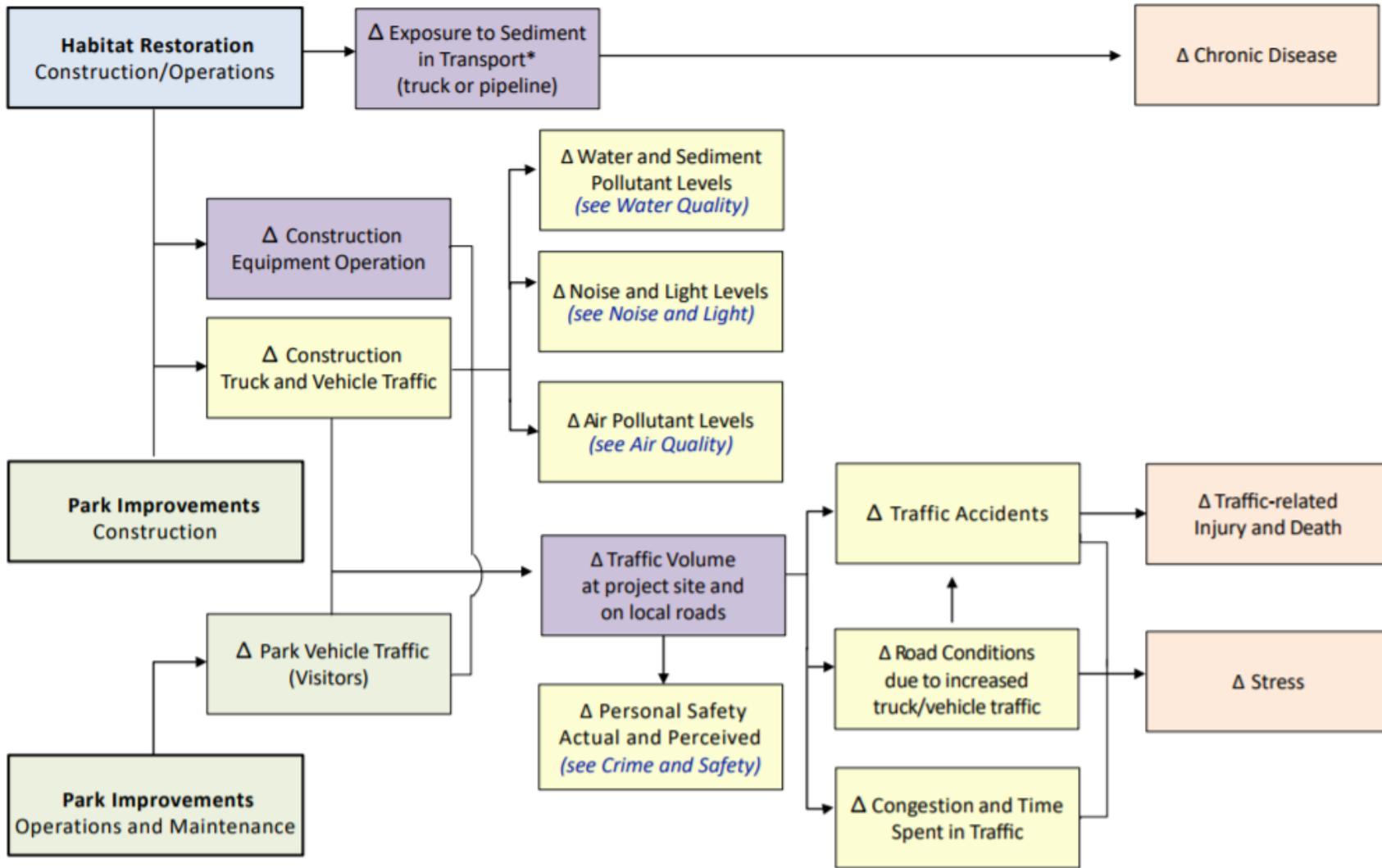


# Pathways of Impact



Similar pathways for park improvements

# Equipment Operation, Traffic, and Transport



\* Exposure to sediment and traffic-related impacts include construction crews, residents, and recreational users

- Health impacts of chronic disease includes: cardiovascular and pulmonary disease, cancer
- Health impacts of stress include: poor mental health, high blood pressure, heart disease, obesity, diabetes, decreased immune response

# Equipment Operation, Traffic and Transport

- ▶ During habitat restoration project
  - ▶ Total sediment dredged at Kingsbury Bay estimated at 17,900 cubic yards
  - ▶ At 10 cy/truck, the number of truck loads needed to transport the sediment increased from 6,500 truck loads to 8,900 truck loads
  - ▶ Proposed transport route is ~ 5 miles with a portion over neighborhood streets
- ▶ NTSB Report – Crashes involving single-unit trucks provides recommendations on improving roadway safety





## Status of HIA

- ▶ Assessment – in progress
  - ▶ Draft recommendations – November 2017
  - ▶ Release of final HIA report – January 2018
- 



Questions?



Wrap Up

# The Rule of Three: Points to Remember

- ▶ ***HIA is a great approach to broaden the discussion about health for environmental, water infrastructure and water resource projects/policies***
  - ▶ Environmental scientists, public health advocates and community members
- ▶ ***Be very clear about role of the HIA, what it is and what it is not***
  - ▶ Conducted from a neutral position
  - ▶ Science based assessment vs scientific assessment
  - ▶ Voluntary vs mandatory
  - ▶ Recommendations vs mandatory actions
- ▶ ***Understand the political climate***
  - ▶ Scale matters – local, county, regional
  - ▶ History matters – trust, previous projects, community engagement
  - ▶ Perception matters – levels of knowledge, different viewpoints