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COMMISSION

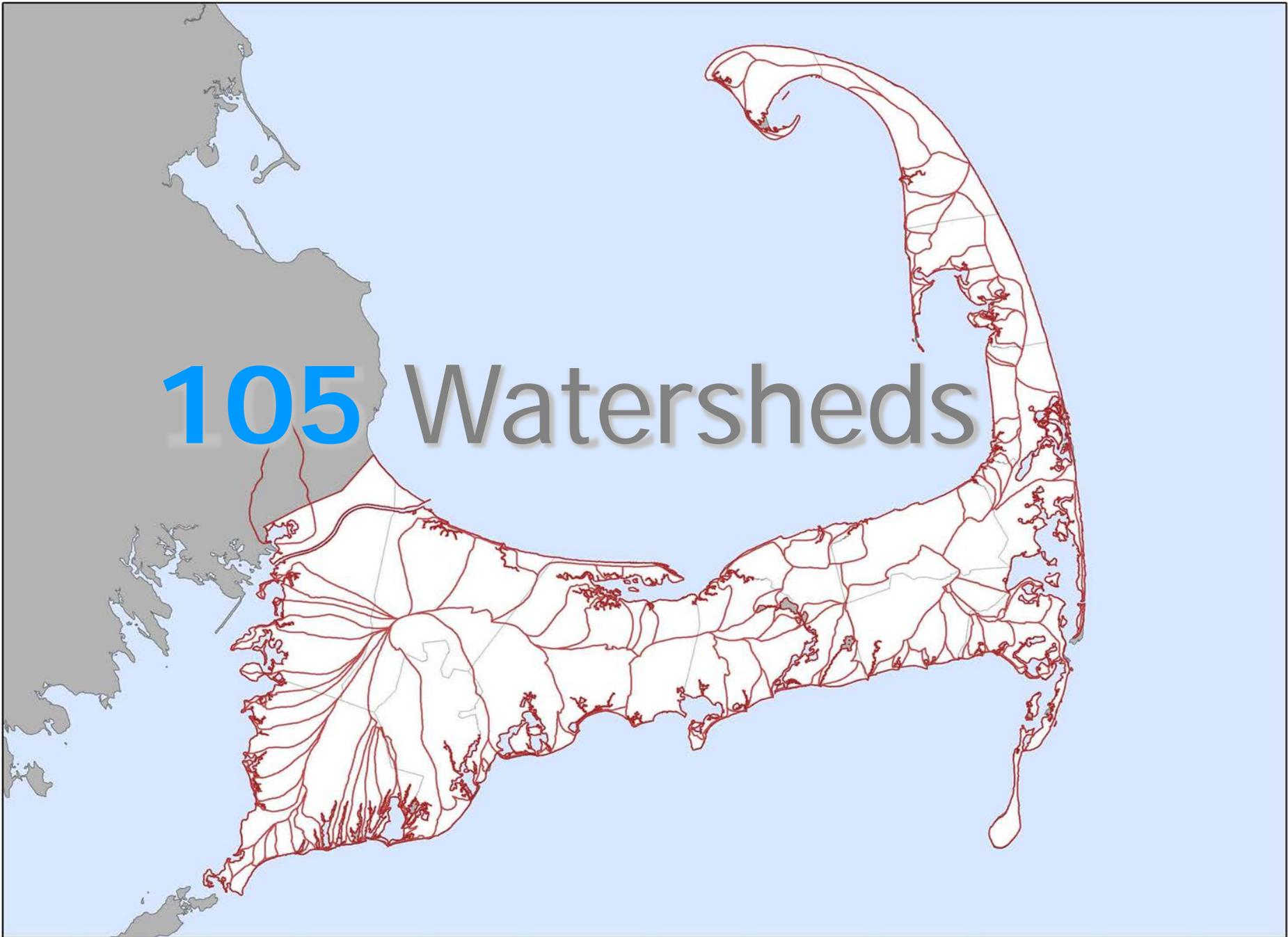
Cape Cod Regional Wastewater Management Plan – Status Report

Cape Cod Business Roundtable Meeting



November | 16 | 2012

105 Watersheds

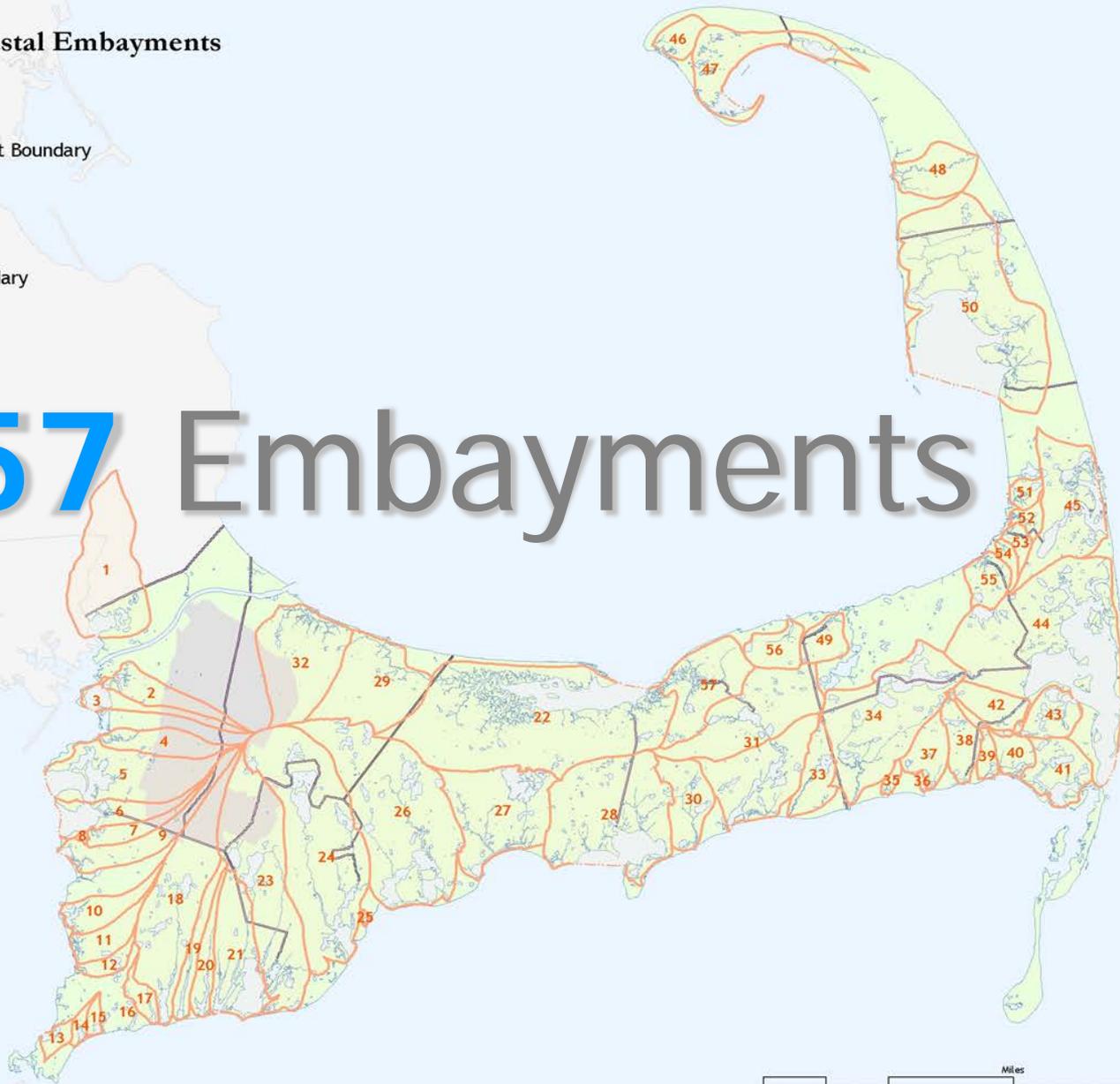


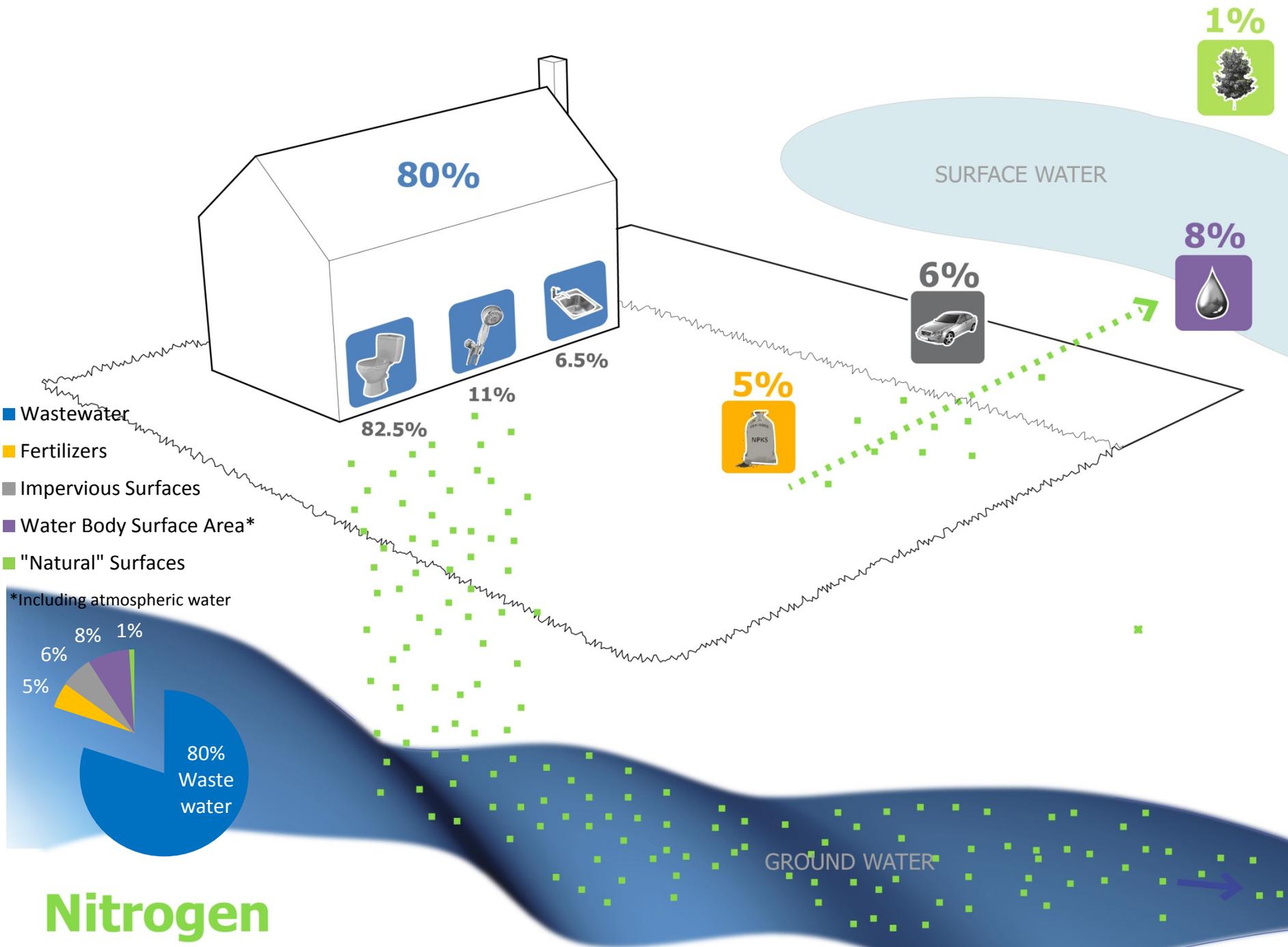
57 Major Coastal Embayments

- ◇ Embayment Boundary
- Creeks
- Townline
- ◊ Ponds
- MMR Boundary



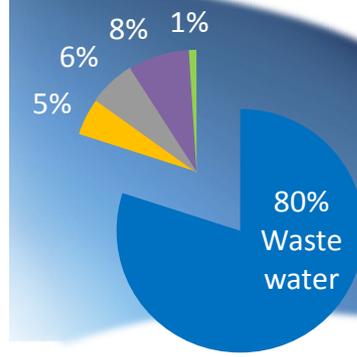
57 Embayments





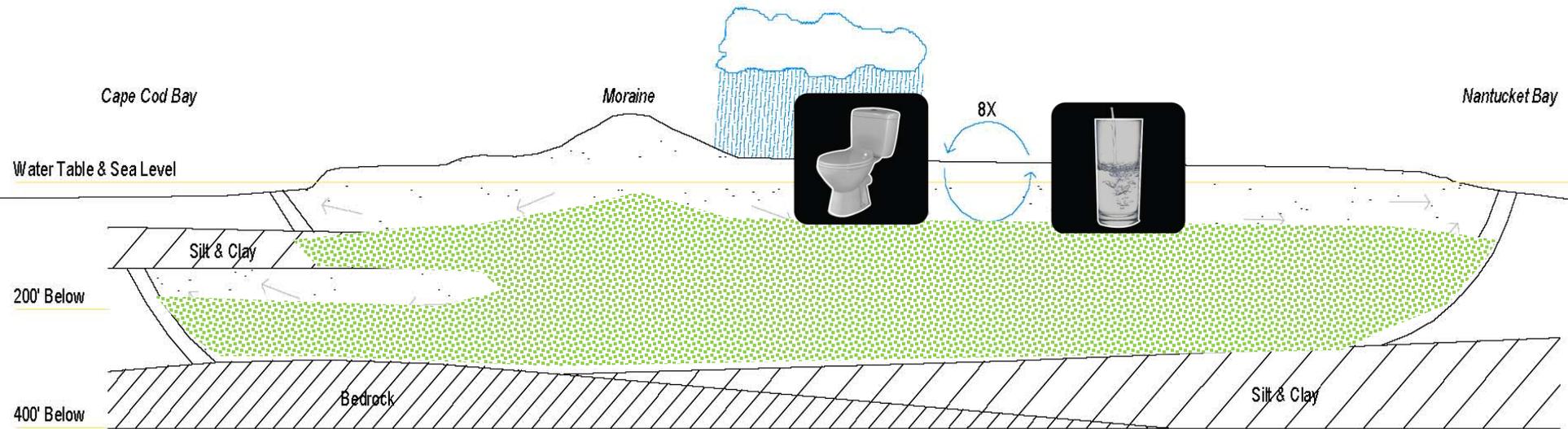
- Wastewater
- Fertilizers
- Impervious Surfaces
- Water Body Surface Area*
- "Natural" Surfaces

*Including atmospheric water



Nitrogen

Groundwater Pollutants



Pharmaceuticals, **Nitrogen**, Other

1 Sole Source Aquifer



Watersheds to Coastal Embayments and Town Boundaries

- ◆ Watershed Embayments within a Town Boundary
- ◆ Watershed Embayments that cross Town Boundaries

A **Regional** Issue



Cape Cod Regional Wastewater Management Planning (CCRWMP)



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Objective: Restore degraded water bodies through regional nutrient management policy promoting appropriate infrastructure and growth management mechanisms while protecting taxpayers from unnecessary costs.



Goal

Policy Integrating:

- Environment
- Affordability
- Infrastructure
- Growth Management



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RWMP – Guiding Principles

- **Develop and implement watershed-based plans,**
- **Utilize existing wastewater infrastructure,**
- **Sewer as few areas as necessary,**
- **Build appropriate infrastructure, taking advantage of natural attenuation and other alternative strategies, with recognition of the potential impacts of climate change,**
- **Manage growth such that additional growth occurs only where planned, and**
- **Share the costs as equitably as possible to ensure affordability.**

GOALS

Improve Water Quality



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Degraded



Impaired



Healthy



Eelgrass

GOALS

Improve Water Quality



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Strategies

Base nutrient management on science

Develop CWMPs that:

- Are town-wide and based on watersheds
- Integrate wastewater and land use planning
- Demonstrate how TMDLs will be met now and in the future

Incorporate CCC guidance for CWMPs

Measures

MEP Technical Reports and TMDLs

Completed CWMPs that:

- Prioritize infrastructure for water quality restoration
- Formally address shared watersheds through IMAs and MOUs
- Include an adaptive management plan

GOALS

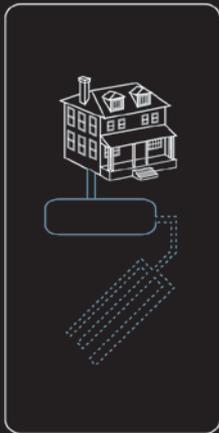
Build Suitable Infrastructure



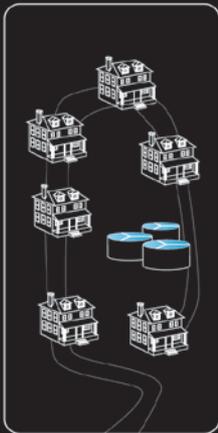
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No silver bullet to fit multiple needs

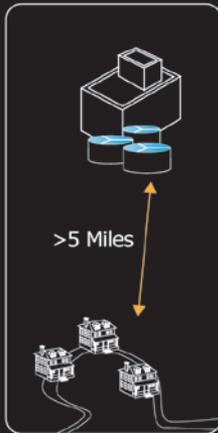
Mix of Gray Infrastructure:



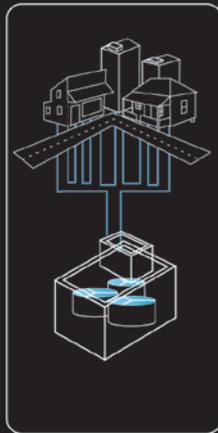
TITLE 5 / IA



CLUSTER



SATELLITE



CENTRALIZED

Plus

A Mix of Alternative Approaches

- Constructed Wetlands
- Stormwater retrofits
- Aquaculture
- Permeable Reactive Barriers
- Eco Toilets
- Phytoremediation



GOALS

Build Suitable Infrastructure



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Strategies

Build watershed-based infrastructure that reduces costs, limits unplanned growth, and utilizes technologies based on density and % removal required

Identify alternative infrastructure techniques and approaches and partner with towns assessing alternatives through pilot projects

Consider impact of climate change

Conduct long-term benefit analysis & produce adaptive management plans

Measures

Legally enforceable agreements for shared infrastructure

- IMAs, Joint Services Agreements, Management Districts

Wastewater collection and treatment that:

- Is appropriate for development density & TMDL removal requirements
- Is based on watershed lines
- Utilizes existing public and private infrastructure
- Is Non-structural in nature, where appropriate

System phasing, technology, and design that prioritizes nitrogen reduction in the watersheds to highly sensitive embayments and is flexible enough to meet future needs

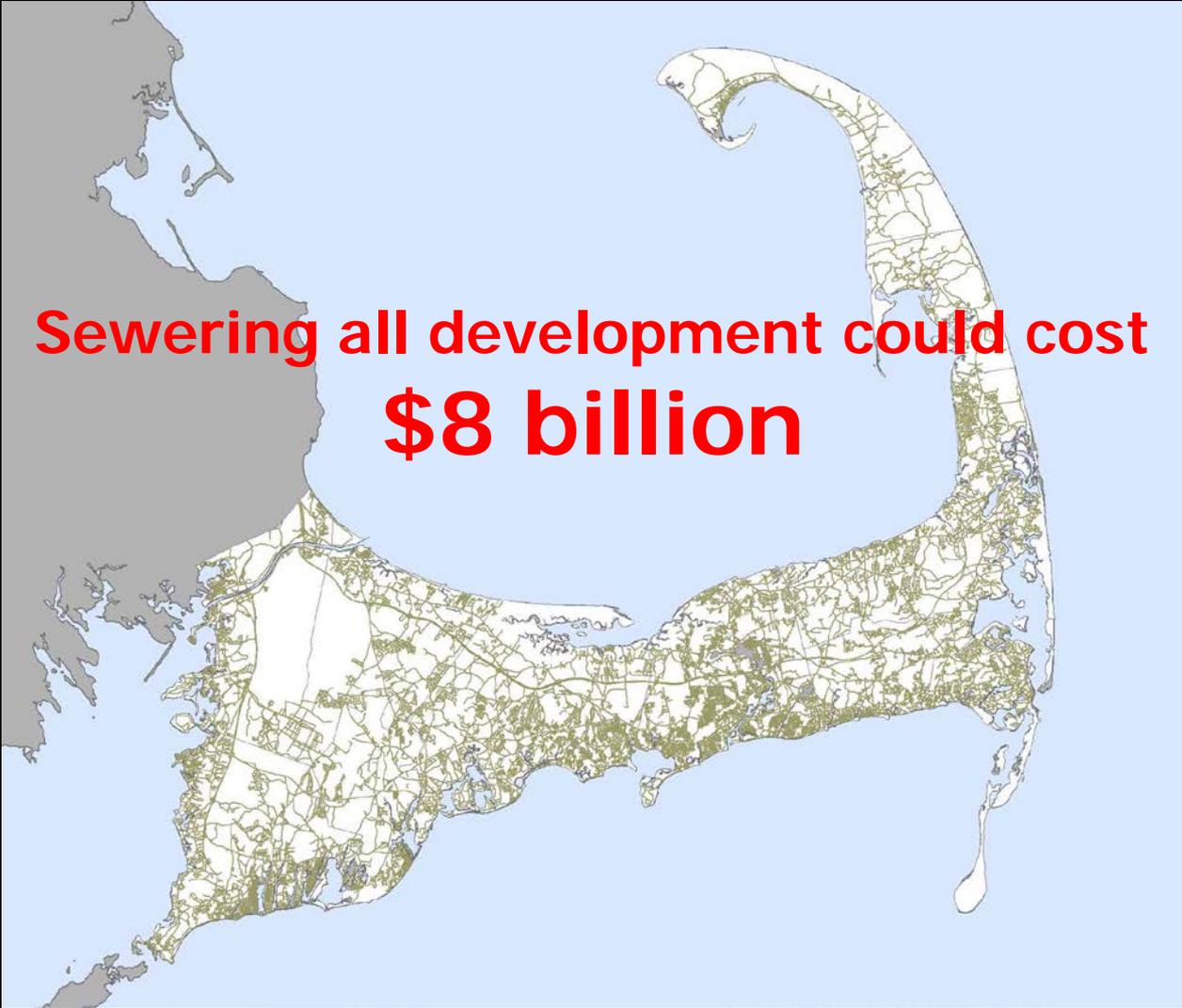
CWMPs with approved monitoring and adaptive management plans

GOALS

Affordability



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A map of Cape Cod, Massachusetts, showing a dense network of green lines representing a sewerage system. The map is set against a light blue background representing water. The text is overlaid on the central part of the map.

**Sewering all development could cost
\$8 billion**

GOALS

AFFORDABILITY



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Strategies

Reduce cost by:

- Utilizing and/or expanding existing wastewater infrastructure
- Promoting shared infrastructure in shared watersheds to reduce costs

Maximize Clean Water State Revolving Fund (SRF) and other funding

Promote equitable financing options for wastewater infrastructure and the use of Cape Cod-based innovation, management, and infrastructure sources

Establish the amount that Cape residents can reasonably be expected to contribute and seek out sources to cover gap in cost

Measures

Infrastructure:

- Maximized existing public and private infrastructure
- Established “host” and “customer” communities that realize financial benefit through shared treatment of proximate, high-density neighborhoods
- A reduction in the need for new infrastructure

Status of towns applying for and obtaining zero-percent interest State Revolving Fund (SRF) loans, other SRF loans, and other loans and grants

GOALS

Growth Management



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GOALS

Growth Management



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Strategies

Towns

- Adopt growth management strategies that limit growth to what is allowed under existing Title 5 regulations
 - Exception: areas specifically designated for growth to sustain economic development and vitality
- identify appropriate wastewater infrastructure to service Economic Centers, Village Centers, and Industrial Service and Trade Areas (ISTAs)

A case study assessment of the application of “flow neutral” regulations required for 0% SRF loans

Measures

Towns adopting:

- Flow neutral regulations
- Economic Centers, Village Centers, and ISTAs
 - Appropriate wastewater infrastructure
 - Planned disposal capacity
- Other growth management controls for areas outside of identified growth areas

G.L. Chapter 83 “checkerboarding” provisions (collection system limits) adopted, where appropriate

Data Collection, Integration & Analysis

Understanding Treatment Options



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Alternatives Research & Mapping

Innovative Technology & Management

EcoMachines

Permeable Reactive Barriers

Seaweed Farming

Shellfish Seeding/Aquaculture

Phytoremediation

Green Infrastructure

Constructed Wetlands

Stormwater Treatment Wetlands

Surface Flow Biofiltration Strips

Non-Discharging On-Site Systems

Composting Toilets

Packaging Toilets

Urine Diverting Toilets

System Alteration

Dredging

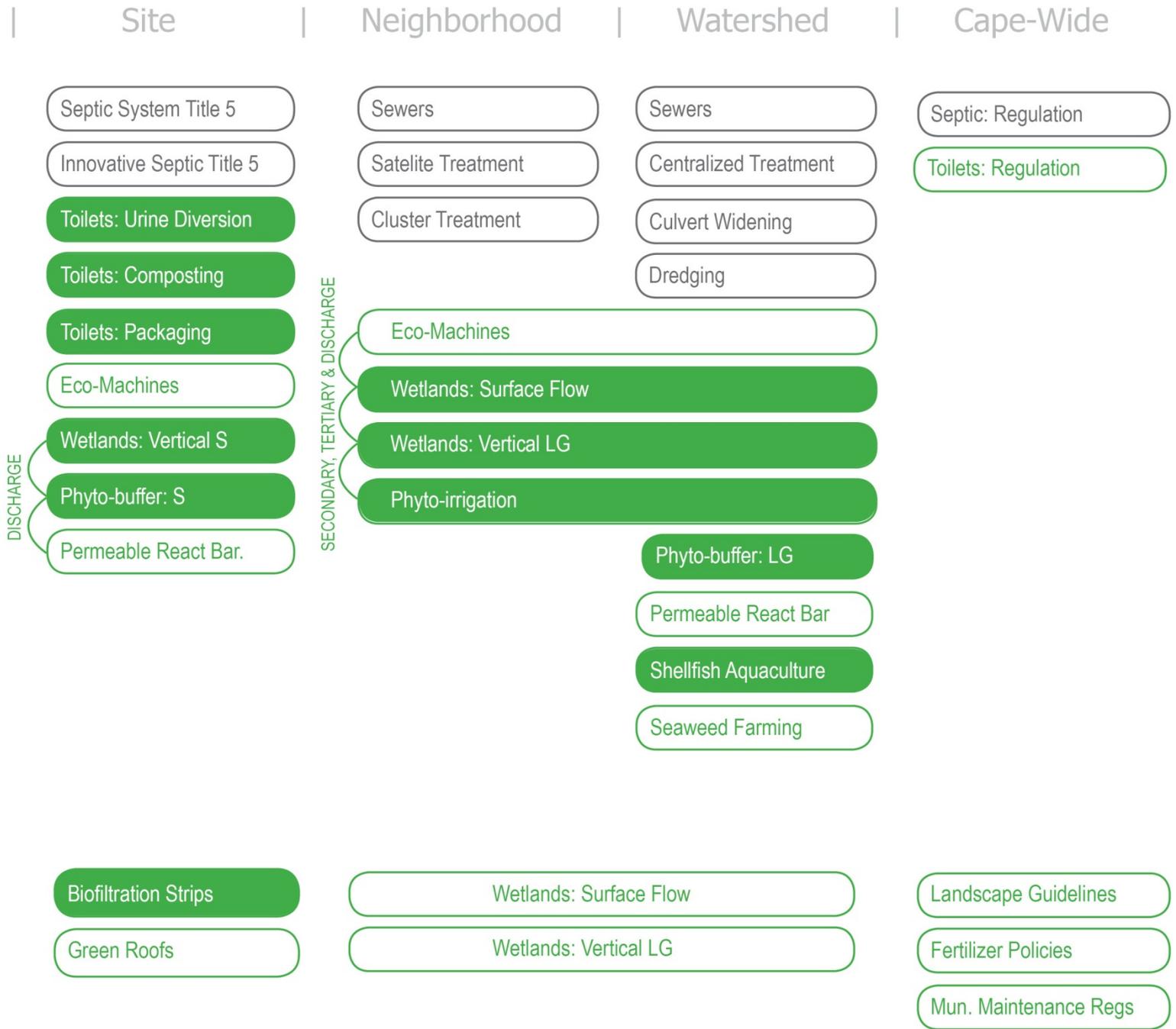
Culvert Widening

Wetland Restoration



Phytoremediation test cell demonstration project at Hyannis WPCF

NITROGEN POLLUTION



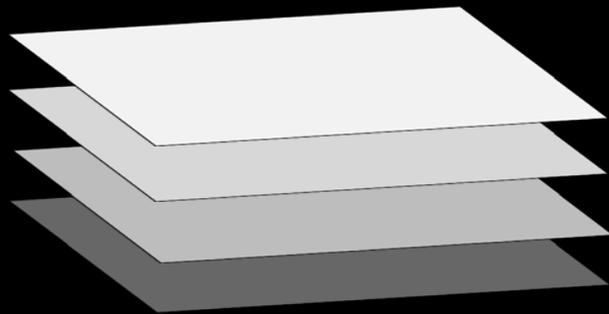
Data Collection, Integration & Analysis

Land Use & Development



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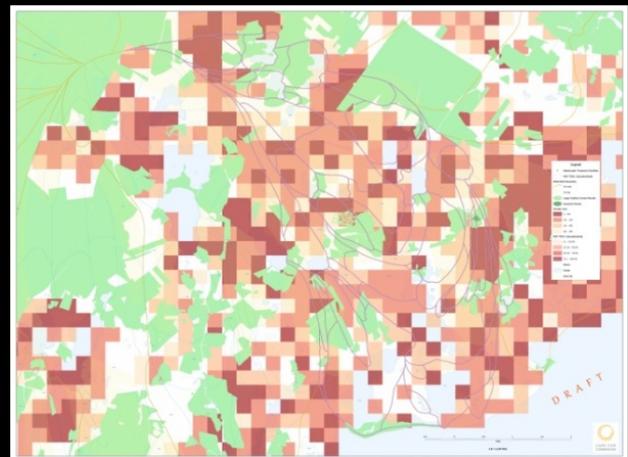
Data Collection



- Parcel Data
- Assessing Data
- Water Use Data
- Local Zoning



Data Generation

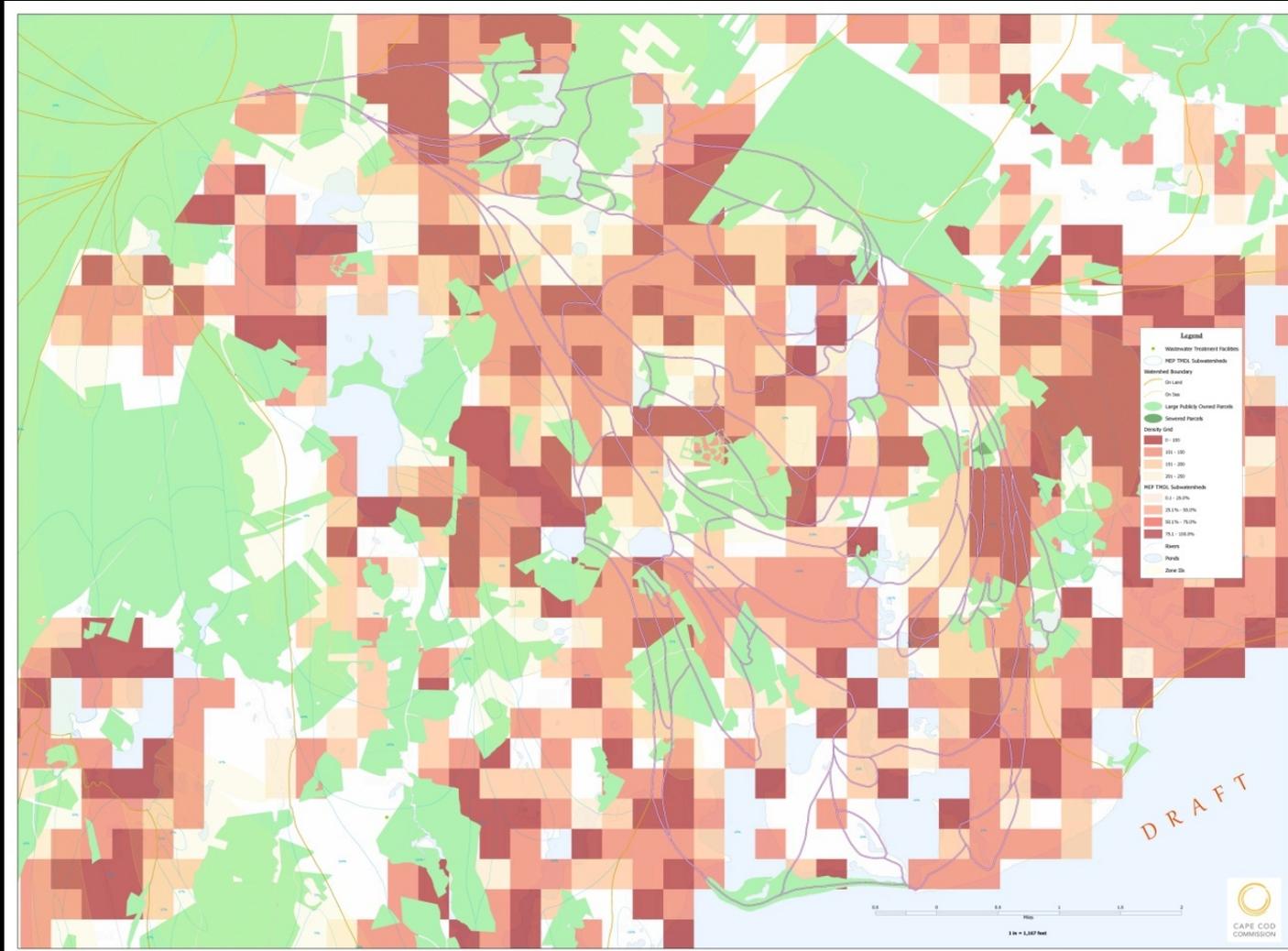


Data Collection, Integration & Analysis

Sewer Collection Density Grid



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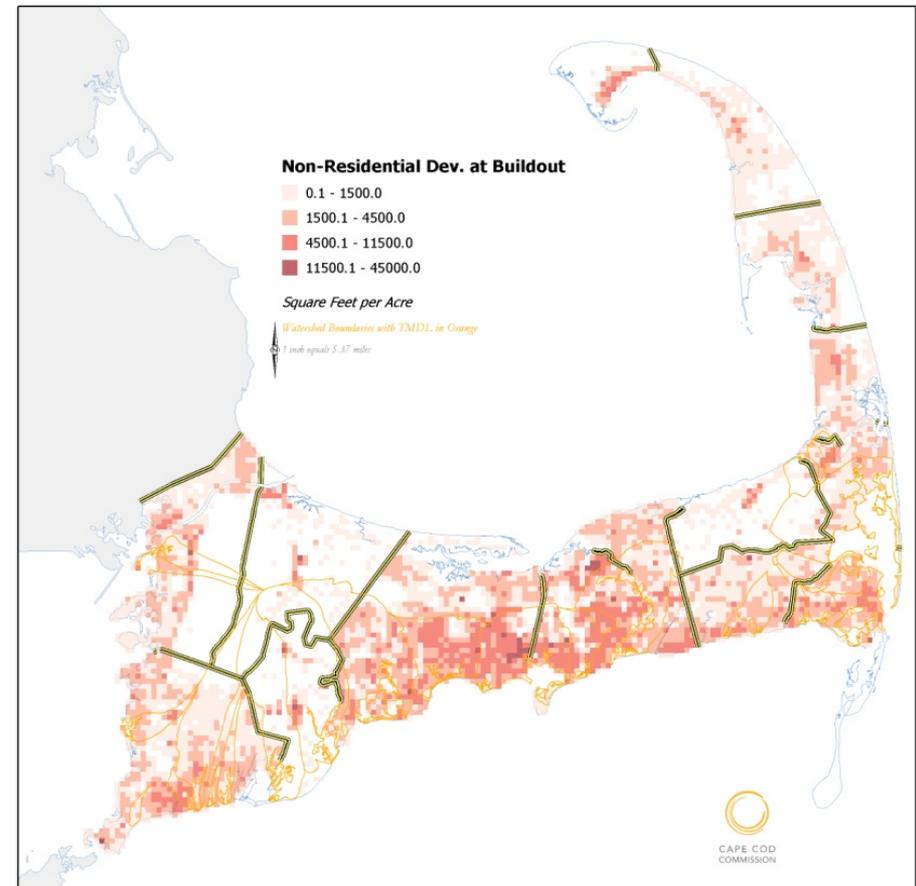
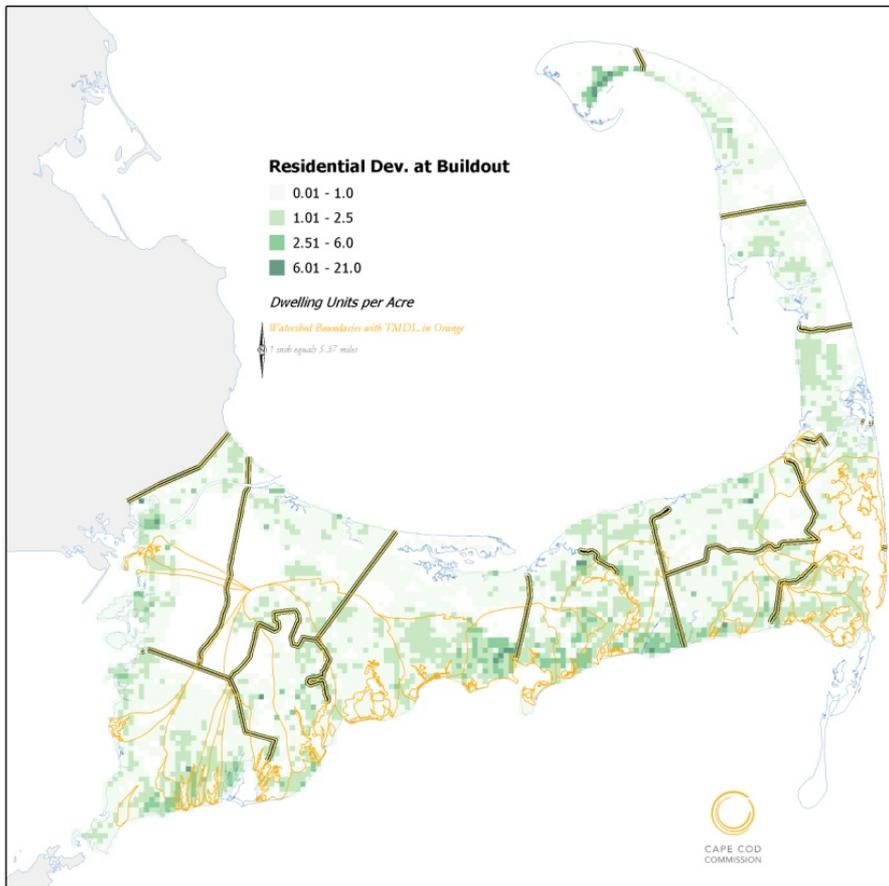


Data Collection, Integration & Analysis

Cape-Wide Buildout Analysis



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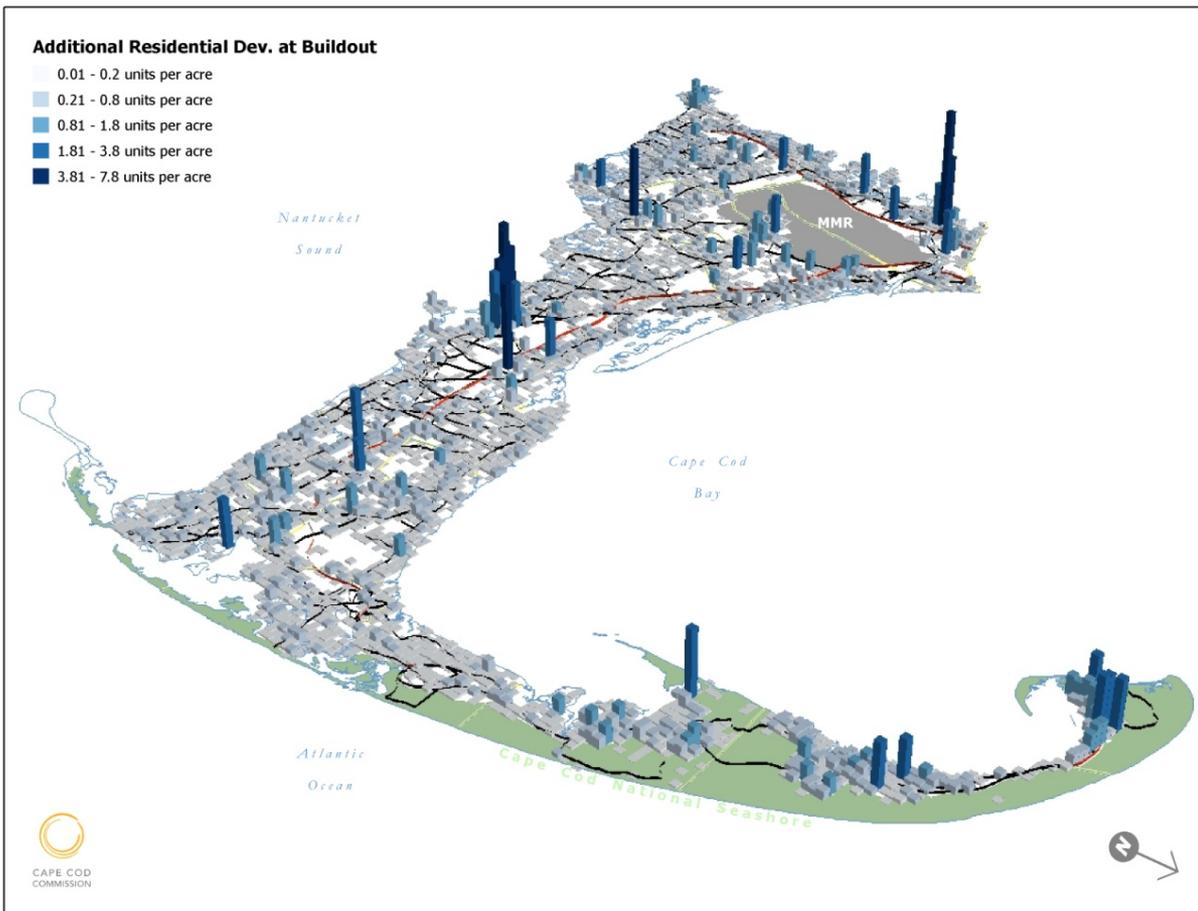


Data Collection, Integration and Analysis

Change in Density Analysis



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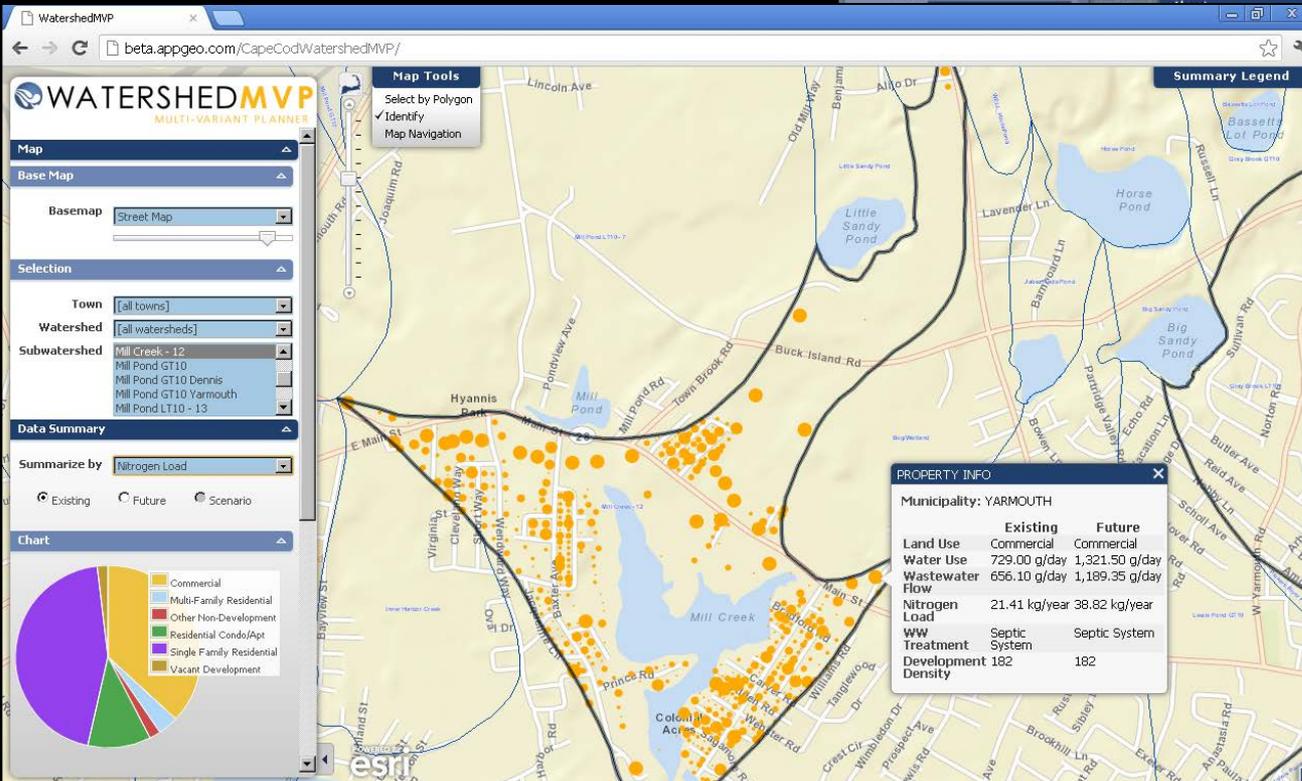


Note: Certain areas with high development potential are due to assessor characterization of parcels (e.g. Provincetown is identified as having significant development potential because parking lots have been characterized as commercial parcels and our buildout program attributed future development to those parcels).

Data Collection, Integration & Analysis Watershed MVP



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Summary Legend

WatershedMVP
MULTI-VARIANT PLANNER

...oped the WatershedMVP application for
 ...nd community members in order to assist in
 ...and efficient solutions to Cape Cod's wastewater
 ...formational resource intended to provide regional
 ...WatershedMVP is an initiative of the Cape Cod
 ...Office (SIO). To learn more about the
 ...the Cape Cod Commission and its SIO, please

...boundaries):
 ...achusetts' Office of Geographic Information, a
 ...ogy Division (ITD) within the Executive Office for
 ...ded the Cape Cod Commission with the parcel
 ...ing from 2010-2012) for 14 of the 15 Cape

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