



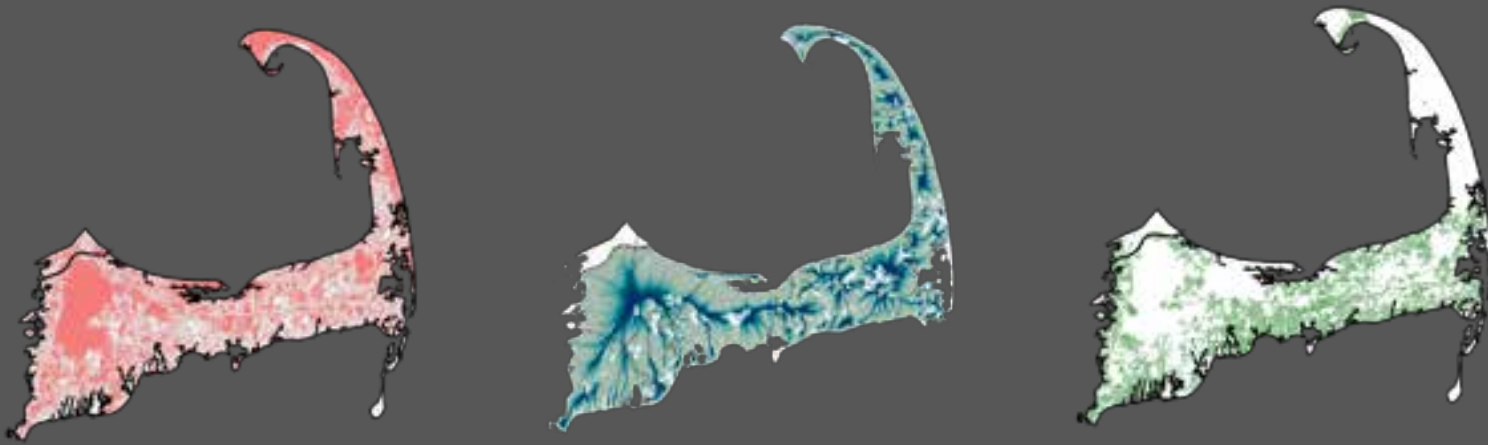
CAPE COD
COMMISSION

Philip 'Jay' Detjens, GIS Analyst II/Database
Administrator

How can we
BUILD CLARITY,
ENGAGE THE PUBLIC
& SHARE INFORMATION

On the process of
wastewater planning?






WATERSHED MVP

MULTI-VARIANT PLANNER

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WMA_100

WMA_ID	WMA_NAME	WMA_CODE	WMA_DESCRIPTION	WMA_STATUS	WMA_TYPE	WMA_CATEGORY	WMA_PRIORITY	WMA_EFFECTIVE_DATE	WMA_EXPIRES_DATE
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WMA_146
WMA_147
WMA_148
WMA_149
WMA_150

collect baseline data

Map Tools

- Map Navigation
- Identify
- Draw a Polygon
- Add/Remove Selection

Layers

- Town
- Watershed
- Subwatershed

Map

Planning Scenarios

Data Summary

Summarize by: **Nitrogen Load**

Existing
 Future
 Scenario

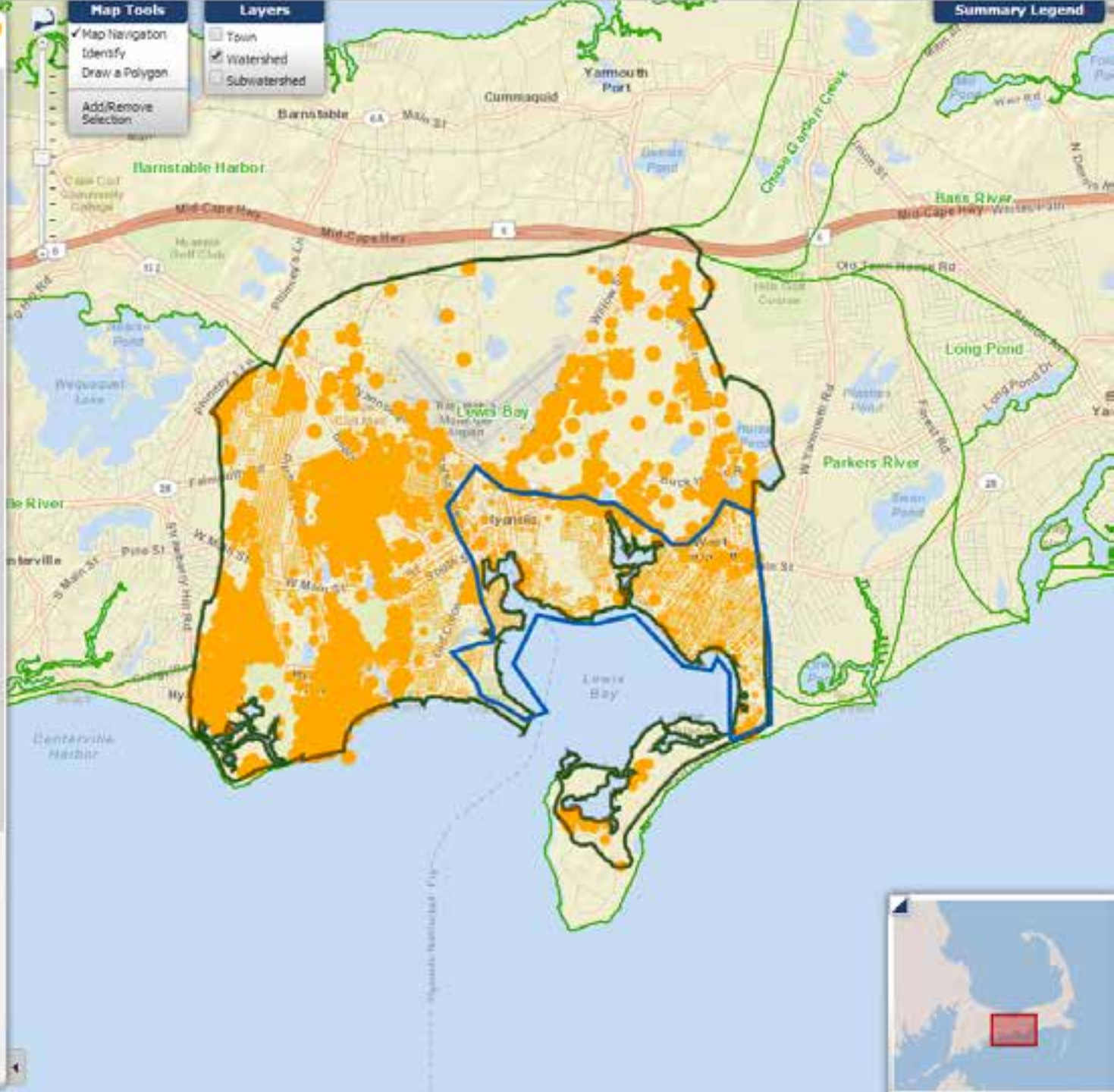


Results

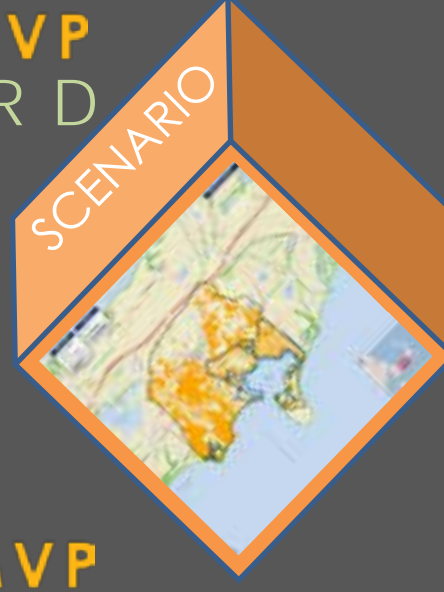
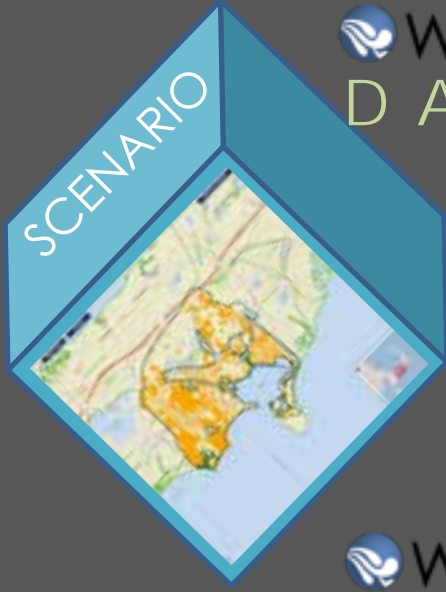
Total Number of Properties Selected	9,531
Existing Sewered	2,389
Total Scenario Cost	\$113,632,466.00
Cost/lb of Nitrogen Removed	\$172.00

Costs

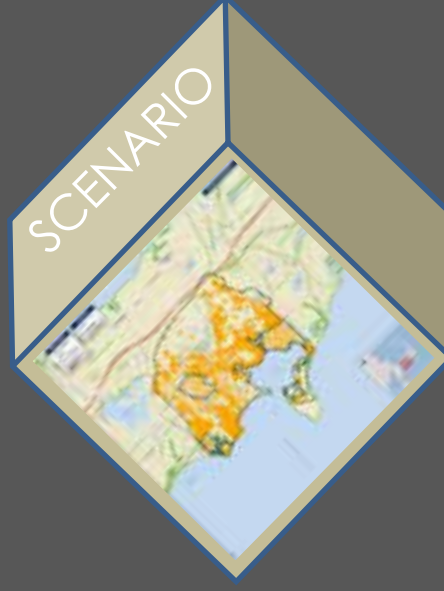
Show: **Annual Cost**



 **WATERSHED MVP**
DASHBOARD



 **WATERSHED MVP**
MULTI-VARIANT PLANNER



create scenarios



Map

Base Map

Summarize by: Nitrogen Load

Existing Future Scenario

- Scenarios
- 937 - CentFertStorm
 - 1147 - Lewis Bay GIS
 - 902 - CentInside
- Add Remove

Scenario 937 - CentFertStorm

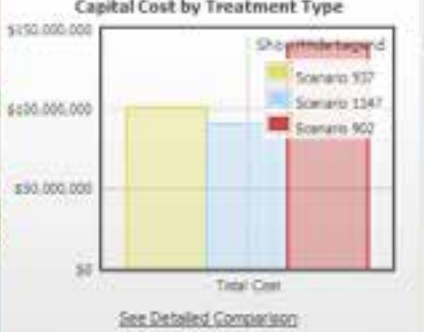
Scenario 1147 - Lewis Bay GIS

Scenario 902 - CentInside

Scenario Comparison

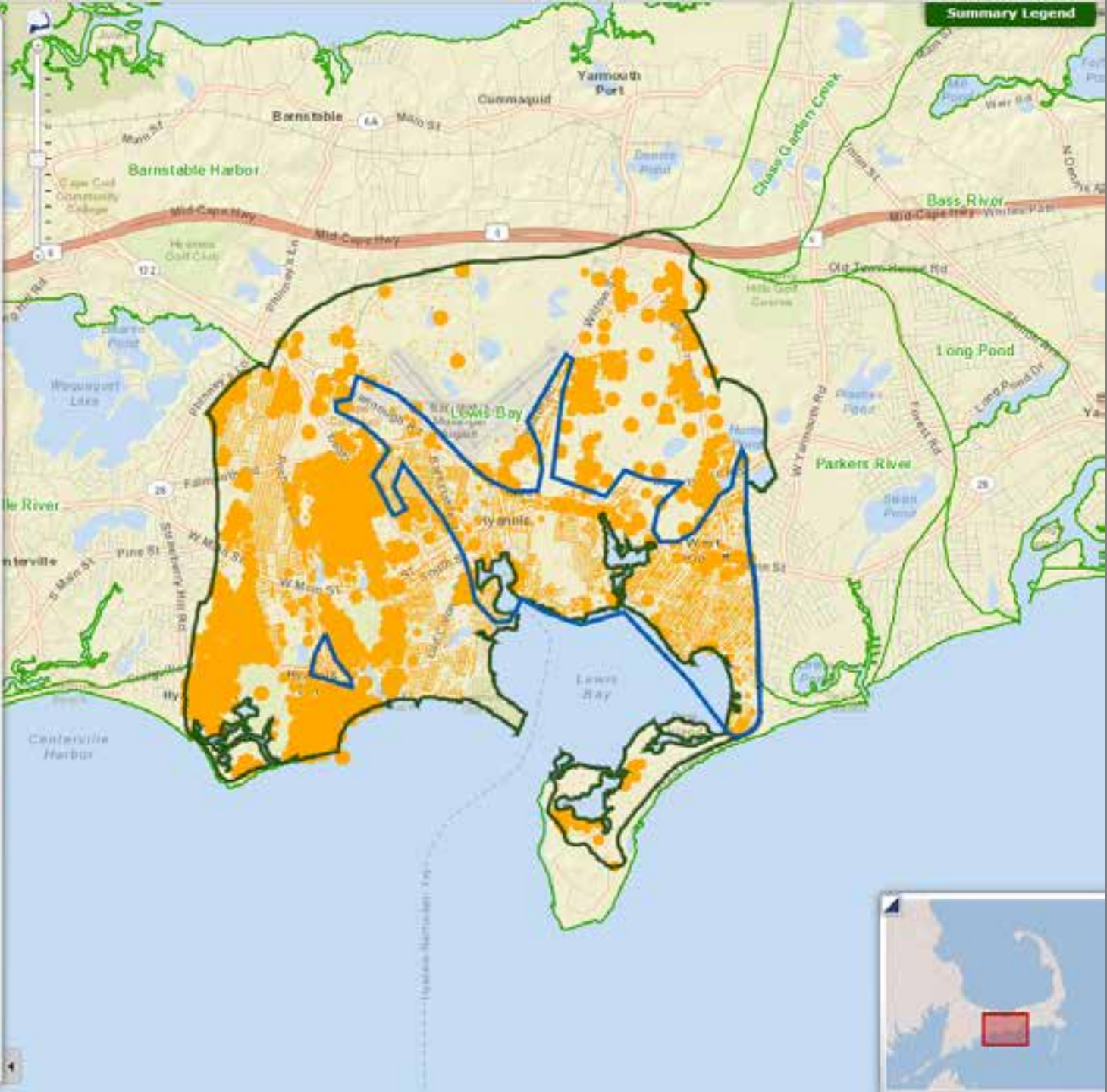
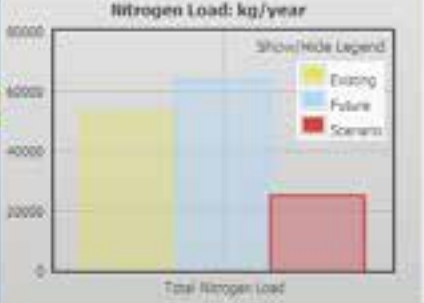
Charts

Show Capital Cost

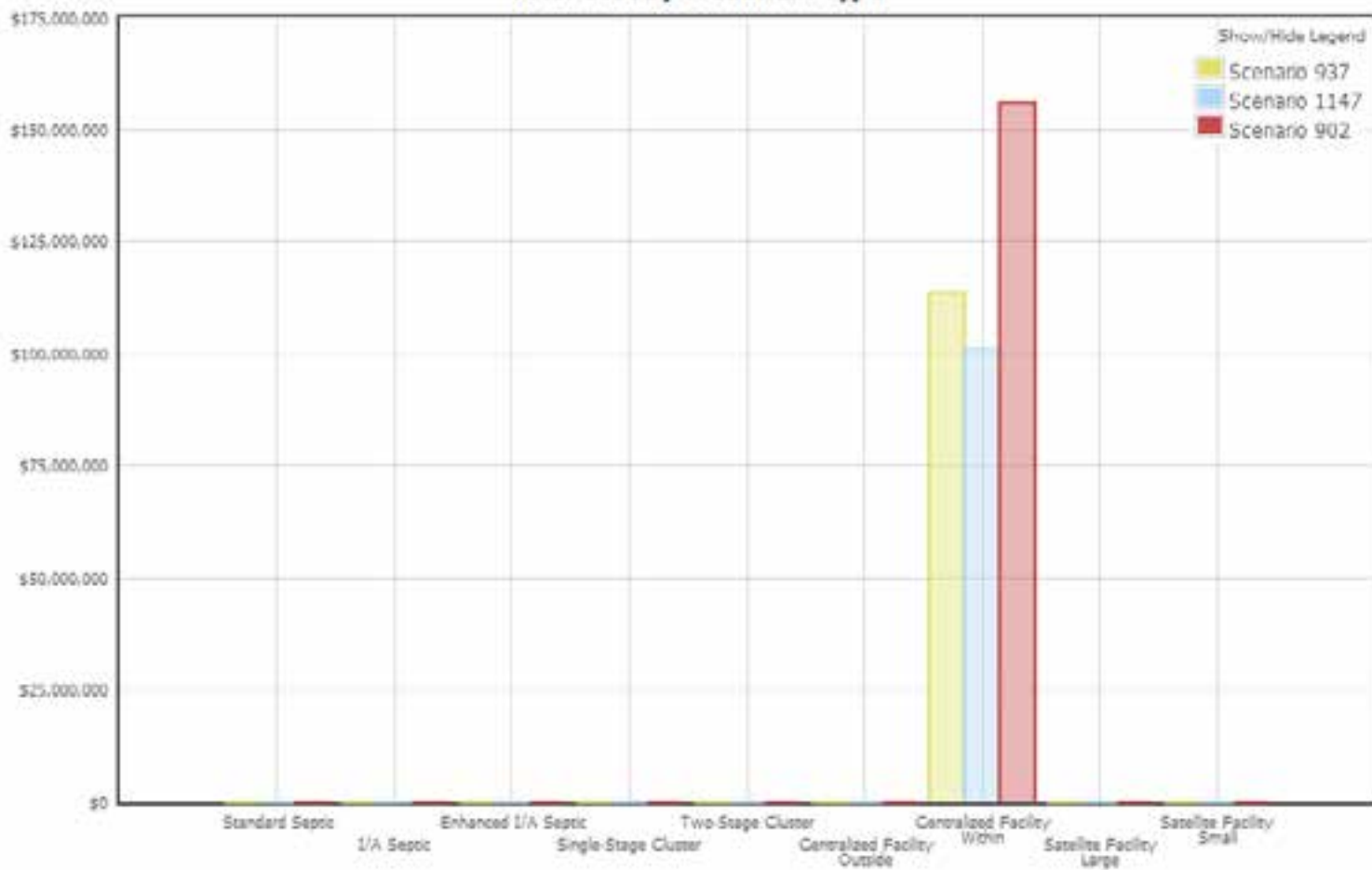


Data Summary

Chart



Total Cost by Treatment Type



compare scenarios

Area	embayment
Scenario Period	Existing
Use Override Factors	false
Flow Thru Factor	N/A
Water Use	N/A
Residential Factor	N/A
Water Use	N/A
Commercial Factor	N/A
Inflow/Infiltration Factor	N/A

Scenario 1147 - Lewis Bay GIS

Scenario ID	1147
Created By	Jay
Create Date	1/24/2014 9:46:55 AM
Description	Lewis Bay GIS
Area	Embayment
Scenario Period	Existing
Use Override Factors	false
Flow Thru Factor	N/A
Water Use	N/A
Residential Factor	N/A
Water Use	N/A
Commercial Factor	N/A
Inflow/Infiltration Factor	N/A

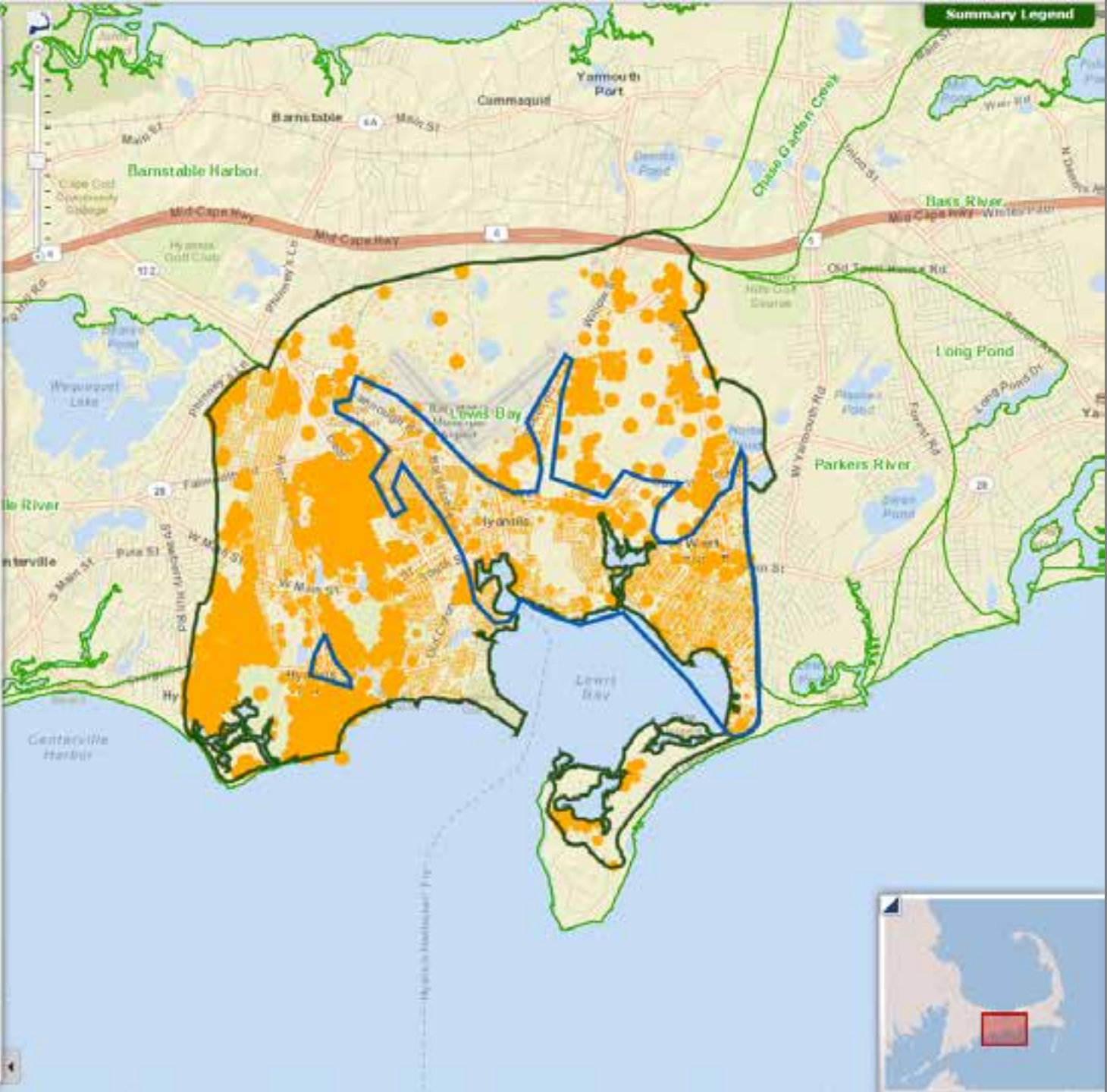
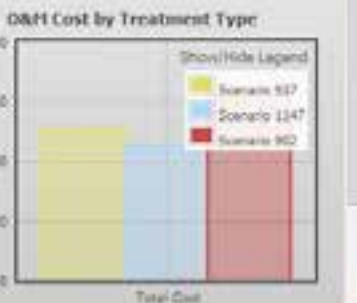
Scenario 902 - CentInside

Scenario ID	902
Created By	tc
Create Date	1/24/2014 8:42:30 AM
Description	CentInside
Area	Embayment
Scenario Period	Existing
Use Override Factors	false
Flow Thru Factor	N/A
Water Use	N/A
Residential Factor	N/A
Water Use	N/A
Commercial Factor	N/A
Inflow/Infiltration Factor	N/A

Scenario Comparisons

Charts

Show **O&M Cost**



But what about
GREEN SOLUTIONS
or the effect on our
COMMUNITIES?

How to account for a more
HOLISTIC SOLUTION?





Triple Bottom Line (TBL) Assessment Model

Environmental + Social + Financial Sustainability

AECOM



HOME

MODEL INPUTS

CRITERIA EVALUATION

SCENARIO BUILDER

COMPARE SCENARIOS

TBL DATABASE

Select to add/remove/clone a strategy/technology

Select a Location (Watershed)



A4: I/A Systems



Lewis Watershed

SCENARIO NAME

Balanced Approach 2B



Current Application Stack: 6 Strategies/Technologies

View Scenario Overview

View Technology Performance

Compare Technologies

Management Options

- M1: Fertilizer Management
- M2: Stormwater: Constructed Wetlands

Watershed Options

- W1: Permeable Reactive Barriers (PRBs)
- W2: **Constructed Wetlands - Subsurface Flow**



	From Selection
Total Number of Properties	379
Land Area (acres)	133.3
Properties Impacted	379
Estimated wetland area (ac)	8.3

[Clear Selection](#)

Alternative On-Site Options

- A1: Toilets: Composting
- A4: I/A Systems

Sewering Options

- S1: High Density Areas Sewering



STRATEGY/TECHNOLOGY:

W2: Constructed Wetlands - Subsurface Flow

TBL Assessment for Technology



Technology Applied to:

379 Properties

8 Acres

Technology Metrics

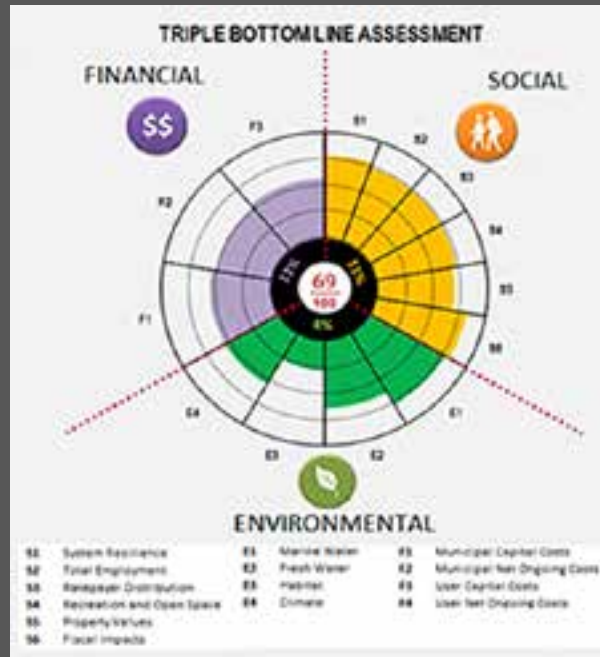
Applied Nitrogen Reduction: 2,763 kg/yr

Avg. Project Cost: 4.627K

Avg. O&M Cost: 36K

Avg. Cost/yr/kg N Removed: 1,619 \$/kg N/yr

find sustainable solutions



System Resilience
 Total Employment
 Ratepayer Distribution
 Recreation and Open Space
 Property Values
 Fiscal Impacts

Marine Water Quality
 Fresh Water Quality
 Habitat
 Climate

Municipal Capital Costs
 Municipal Net Ongoing Costs
 User Capital Costs
 User Net Ongoing Costs



Triple Bottom Line (TBL) Assessment Model

Environmental + Social + Financial Sustainability

AECOM



HOME

MODEL INPUTS

CRITERIA EVALUATION

SCENARIO BUILDER

COMPARE SCENARIOS

TBL DATABASE

Alternative Definition

Alternative Results

Alternative Scoring Rules

Criterion Scores

SOCIAL	
Water Reliability	91
Employment	82
Recreation Generation	81
Recreation and Open Space	84
Property Values	88
Public Impact	88
ENVIRONMENTAL	
Marine Habitat	81
Peak Water	82
Water	83
Climate	84
FINANCIAL	
Municipal Capital Costs	71
Municipal Other Costs	72
Property Owner Capital Costs	73
Property Owner Other Costs	74

Strategy/Technology Distribution



COST & PERFORMANCE

Nitrogen Reduction %	30%	52%	61%
Remaining Nitrogen Load (Kg N)	8,400	5,760	4,680
Life Cycle Costs (\$K)	\$5,922	\$7,350	\$8,800
Municipal O&M Cost (\$K)	\$325	\$425	\$610
Municipal Project Cost (\$K)	\$1,329	\$1,600	\$1,800
Property Owner O&M Cost (\$K)	598	\$128	\$183
Property Owner Project Cost (\$K)	\$397	\$480	\$540

COMMUNITY BENEFITS

Quality Habitat (acres)	0.5	1.8	2.4
New Open Space Added (acres)	1.5	4.6	9.0
GHG Reduced (MT CO2e/yr)	2.1	3.1	3.3
Avg. Increase in Property Value (\$/pr)	\$200	\$1,200	\$2,000
New Employment Added (jobs)	152	188	252
Additional Cost per Household (\$/HH/yr)	\$20	\$26	\$37

find sustainable solutions

AppGeo



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