



# **Modeling Green Infrastructure Implementation and Tracking Water Quality Improvement in Boston MS4 Reporting Areas**

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**2022 NEWWEA Annual Conference & Exhibit**  
**January 24, 2022**  
**Boston, MA**

# Agenda

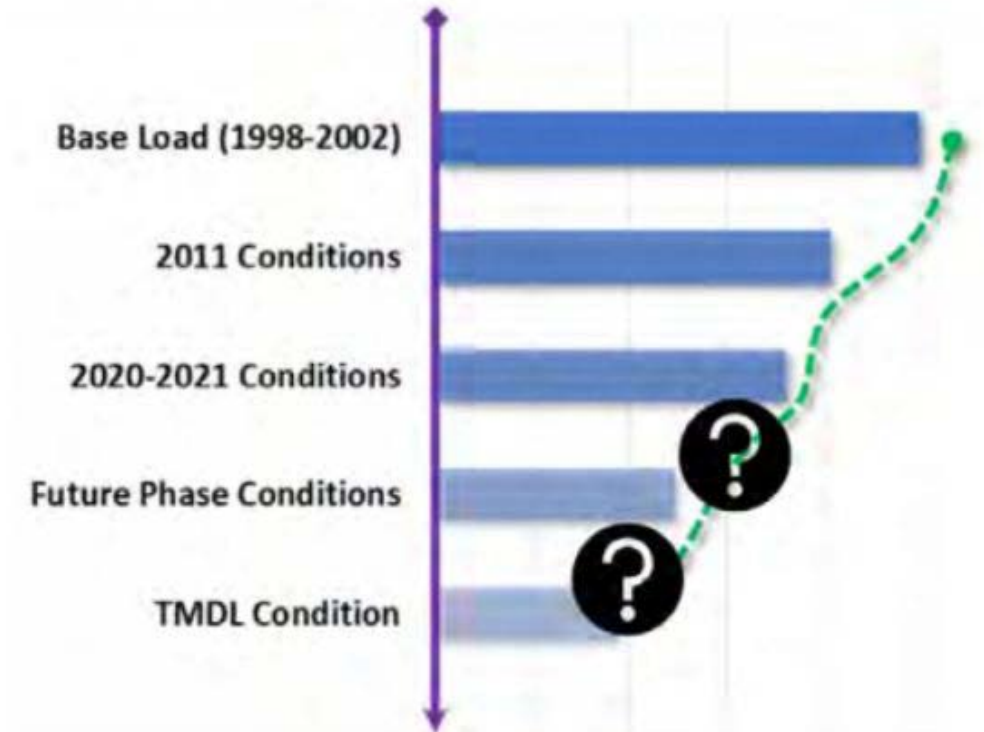
- Background
- Green Infrastructure Database Update
- Program Management Tool
- Live Demonstration
- Conclusions / Next Steps



# Background

Total Phosphorus (TP) loading in receiving water bodies

- Base load and TMDL estimates developed with 1998-2002 data
- Loads required to be updated every 10 years
- 2020-2021 Stormwater Monitoring and Model Validation Project to determine progress towards TMDL condition





# Background

Project includes:

- Robust sampling and monitoring program
  - Wet weather and dry weather
- Green Infrastructure (GI) database update
- Innovative program management tool



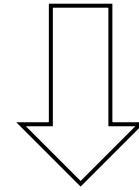
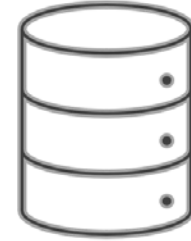
# Green Infrastructure Database

Updated GI database structure and GI features

- Added stormwater model parameter fields
- Added fields for EPA calculation
- Reviewed available as-built information and GIS layers to populate fields

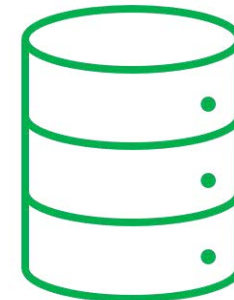
**Existing GI Database**

*19 Fields*  
*2,584 GI Features*



**Updated GI Database**

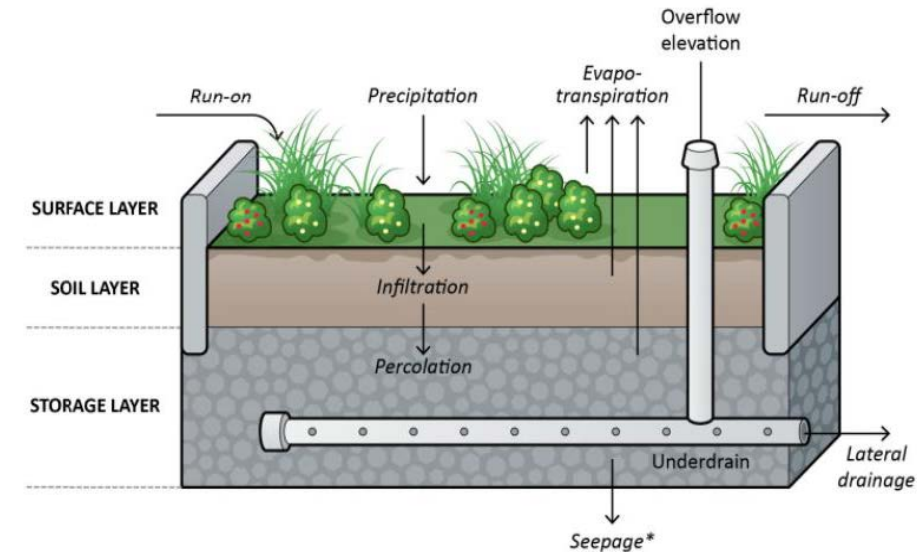
*57 Fields*  
*2,646 GI Features*



# Green Infrastructure Database

Added stormwater model fields:

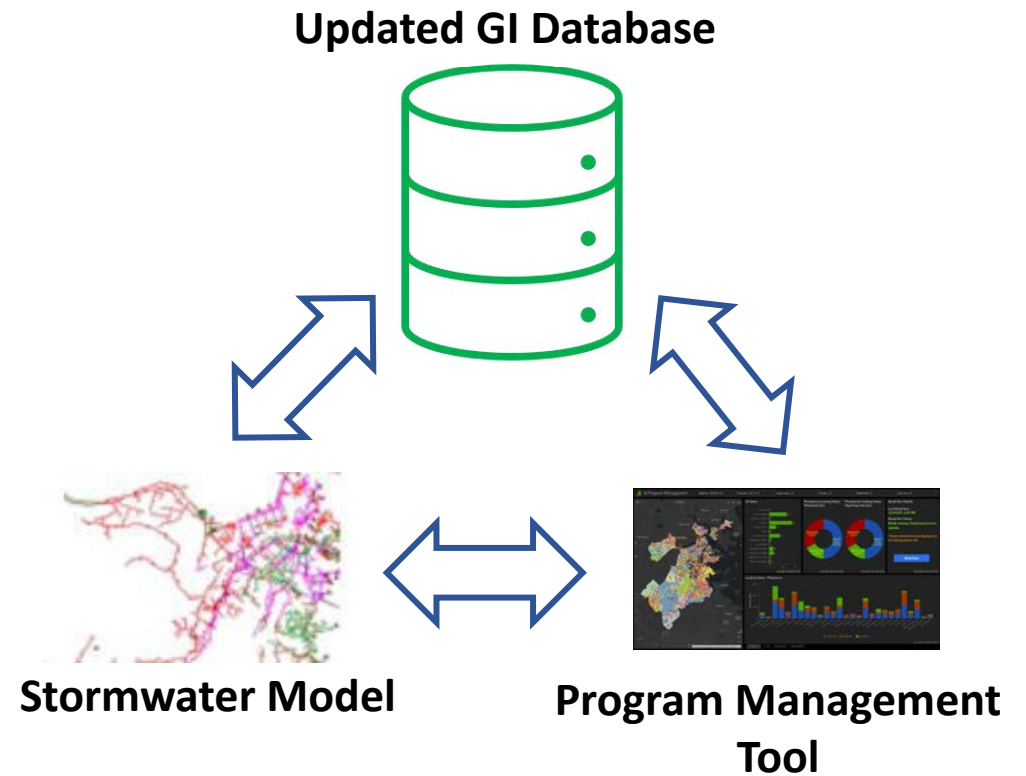
- EPA SWMM “LID Module” has 3 main types:
  - Bio-Retention Cell (i.e. Rain Garden, Tree Pit)
  - Infiltration Trench (i.e. Drywell, Leaching Basin)
  - Permeable Pavement
- Added EPA method calculation fields:
  - Land Use Type
  - Hydrologic Soil Group



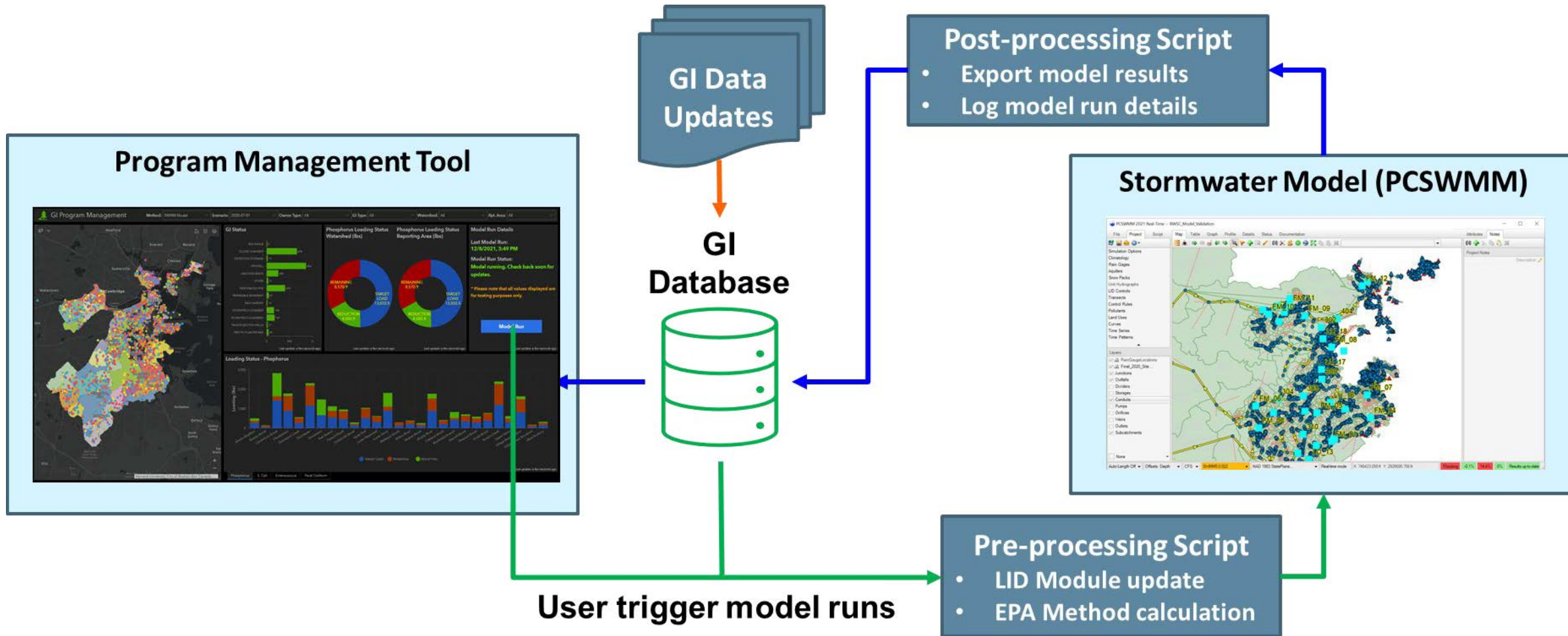
# Green Infrastructure Database

Updated GI Database is *Dynamic*

- Database integrates with:
  - Stormwater Model
  - Program Management Tool



# Program Management Tool





# Program Management Tool

*Live Demonstration of the Program Management Tool*

# Program Management Tool

Method: SWMM Model

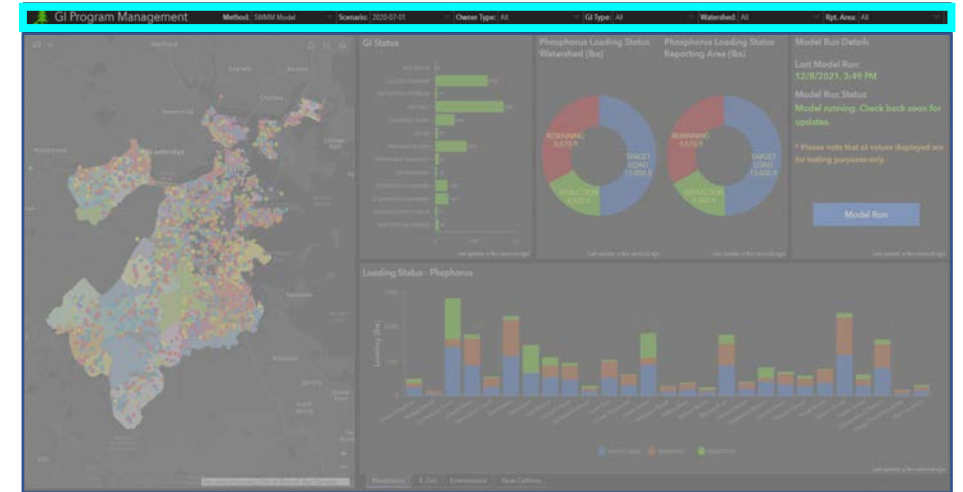
Scenario: 2020-07-01

Owner Type: All

GI Type: All

Watershed: All

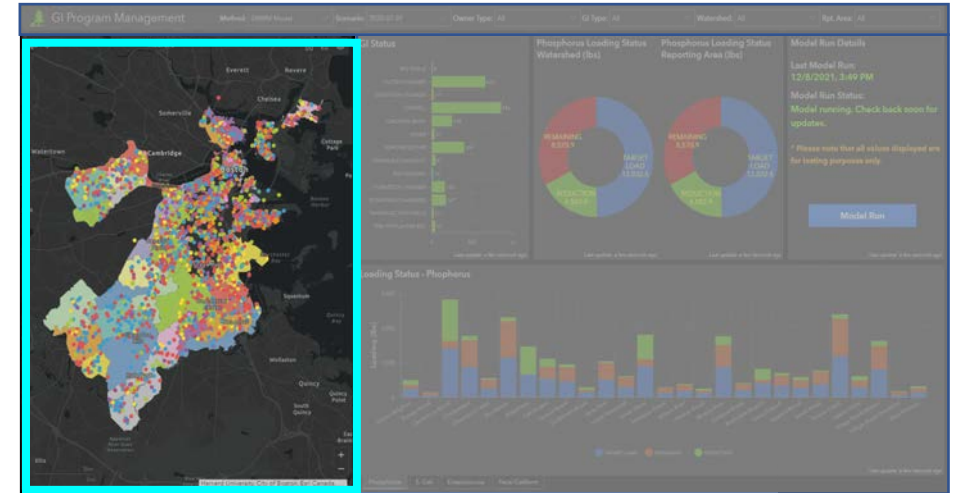
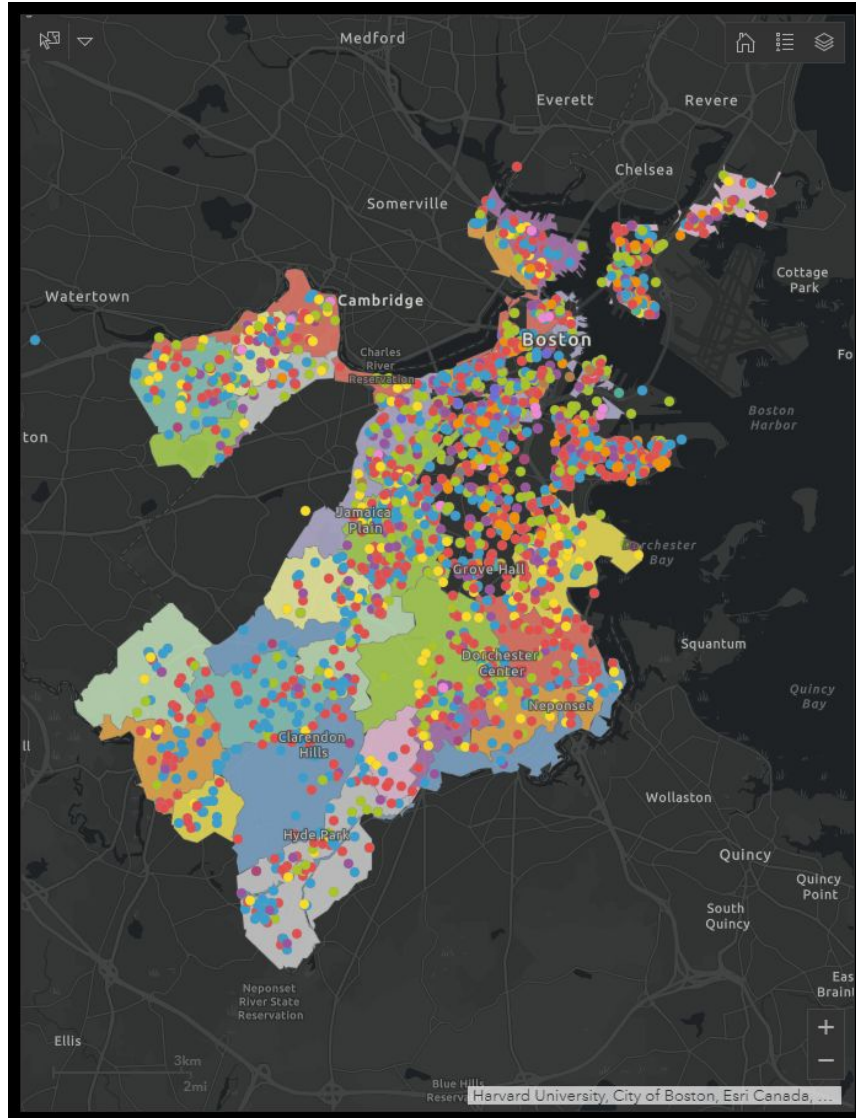
Rpt. Area: All



## Header Filter Panel

- Method: SWMM Model/EPA Method
- Scenario: Date of model run
- Owner Type: Public, Private,...etc.
- GI Type: Total 13 categories of GI
- Watershed: 4 Watersheds
- Reporting Area: 27 Reporting Areas

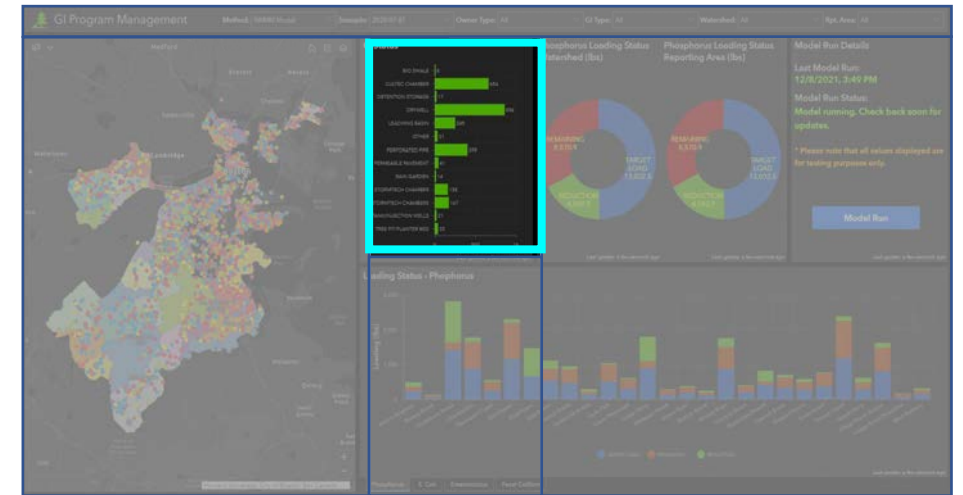
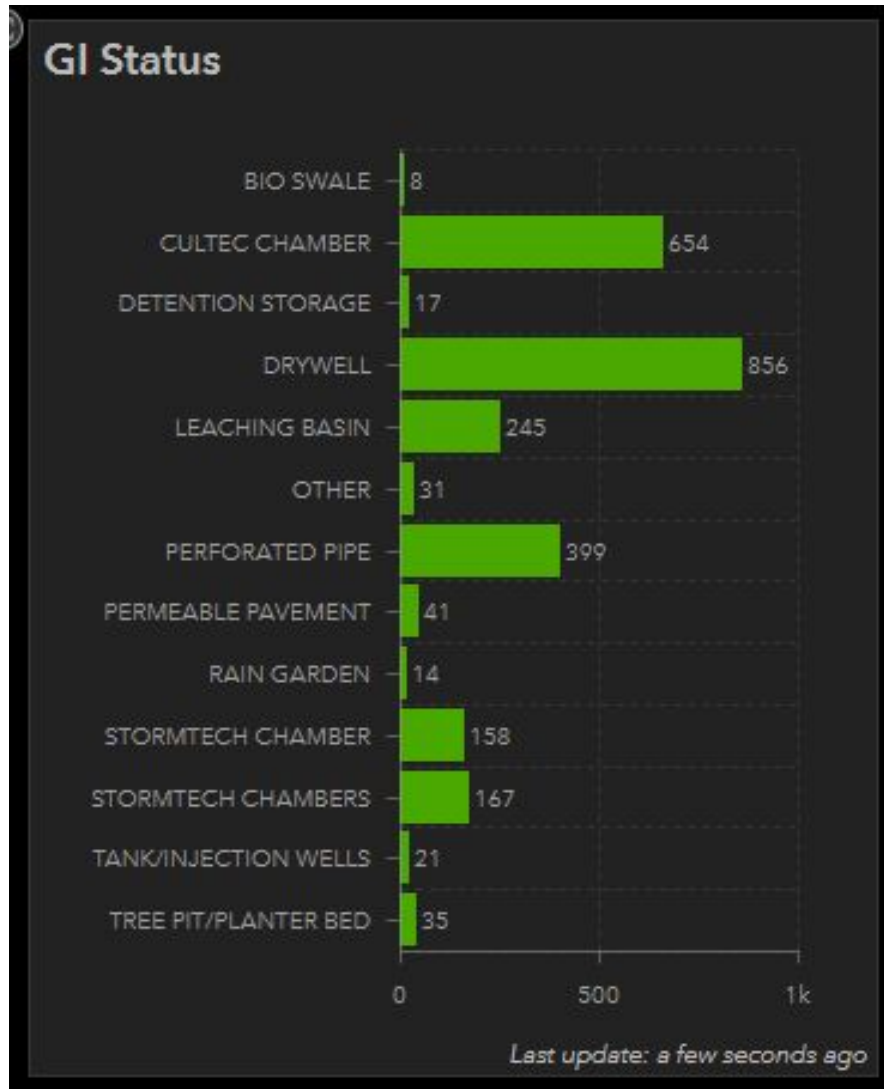
# Program Management Tool



## Map View Panel

- GI layer
- Reporting area layer
- Pop-out window with GI details

# Program Management Tool

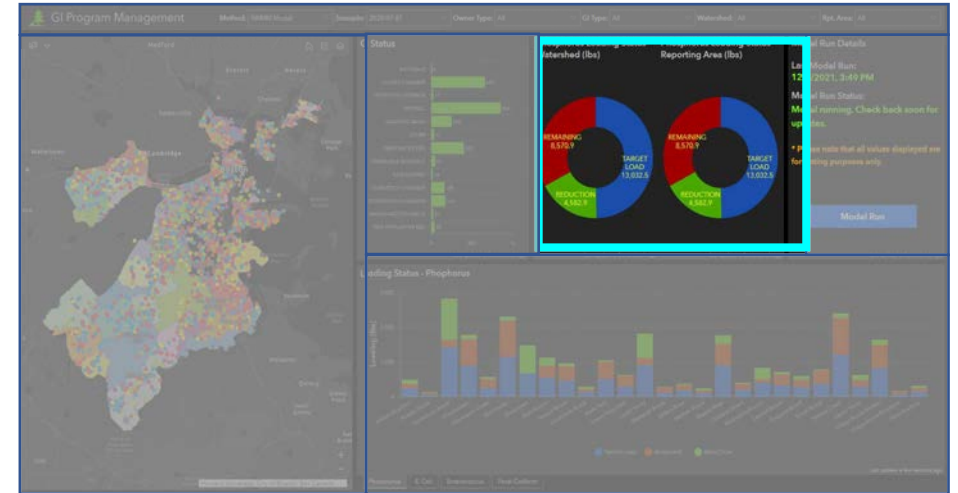
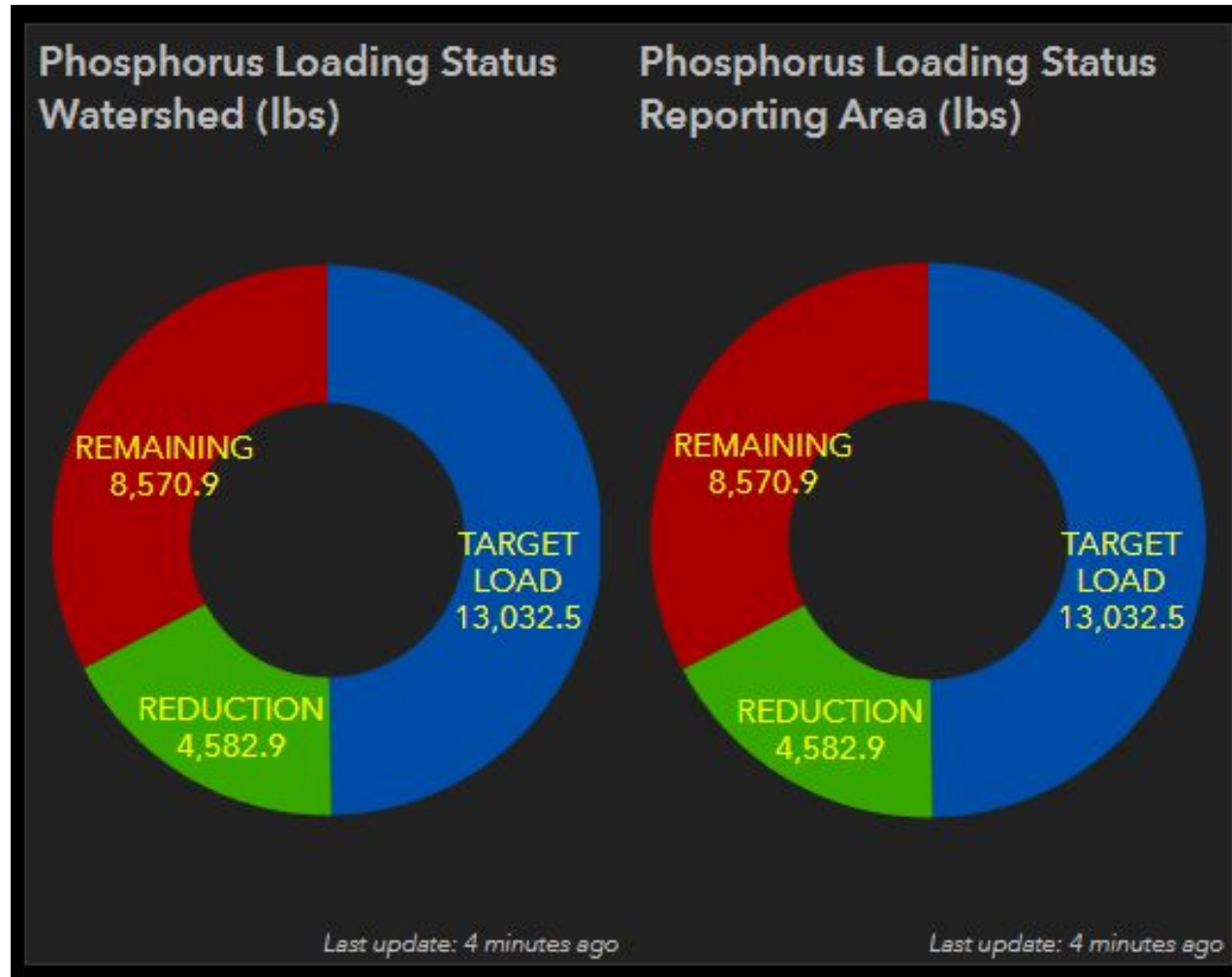


## Status of GI inventory

- Total 13 categories of GI
- Total 2646 GI features



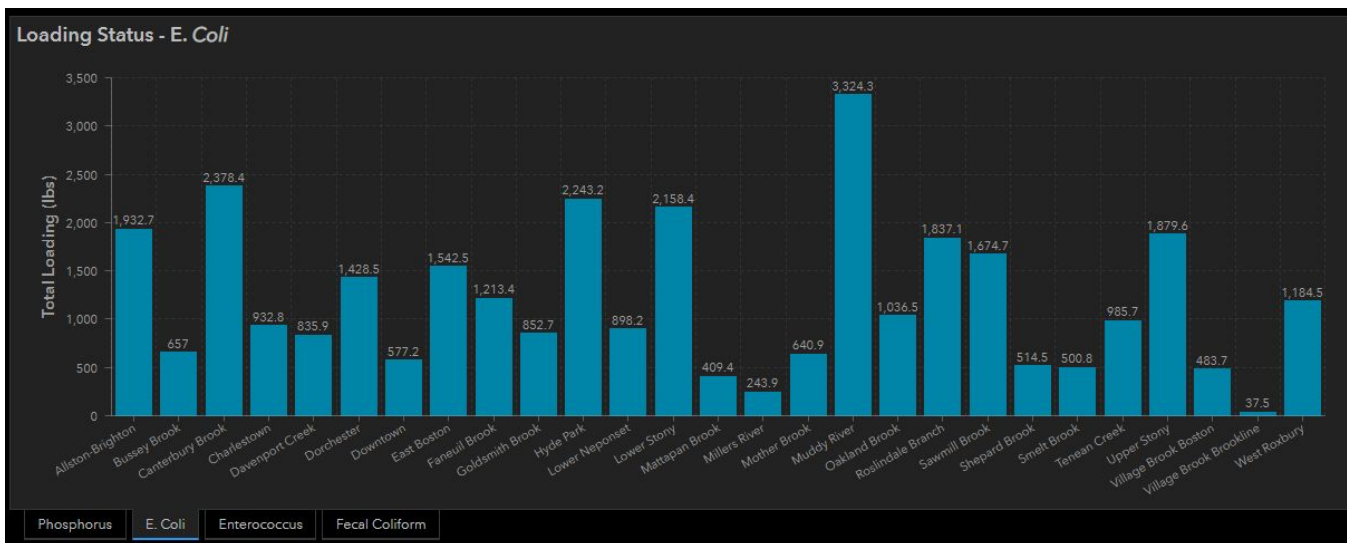
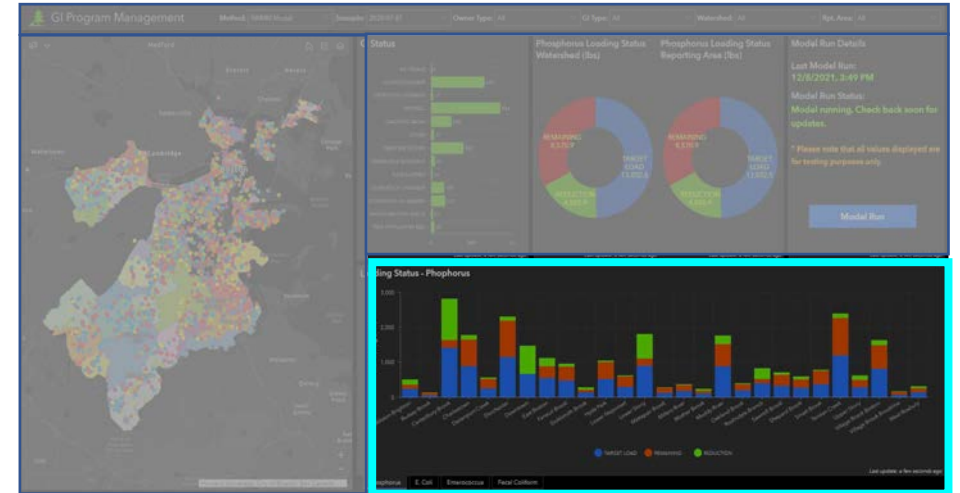
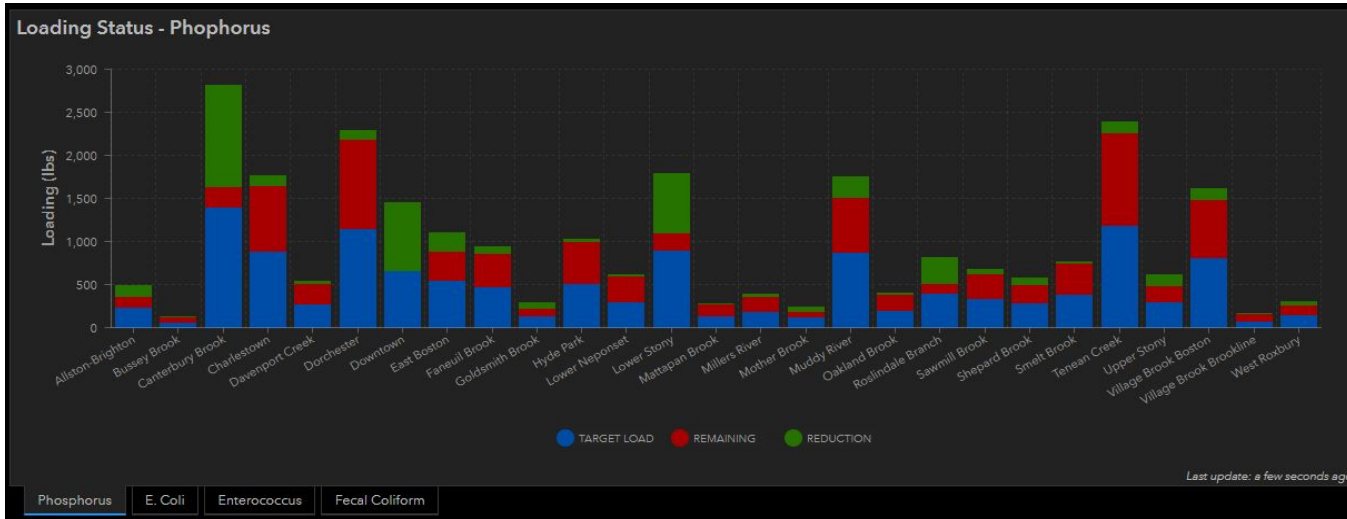
# Program Management Tool



## Total Phosphorus Loading

- Watershed based
- Reporting Area based
- Display total phosphorus loading of all watersheds and reporting area by default

# Program Management Tool



## Pollutant Loading Status

- Total Phosphorus
  - Target Loading (TMDL)
  - Remaining
  - Reduction
- E. Coli
- Enterococcus
- Fecal Coliform

# Program Management Tool

## Model Run Details

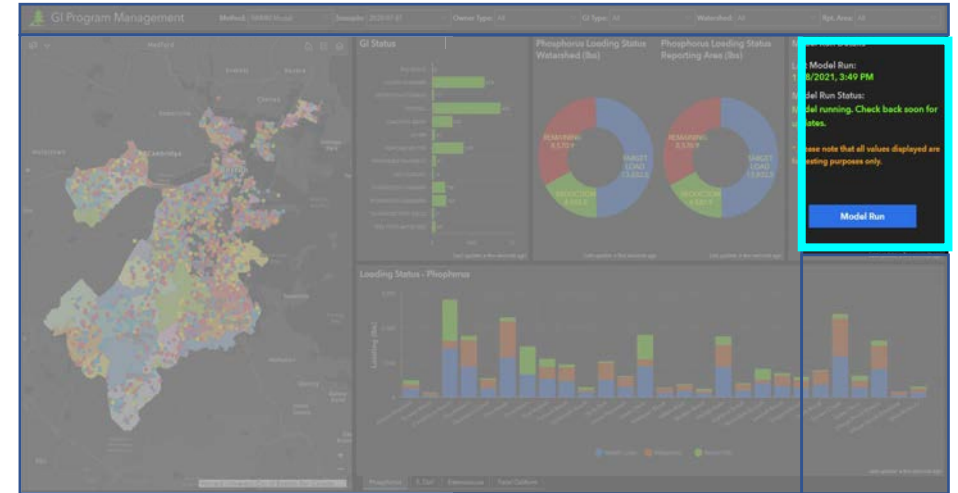
Last Model Run:  
**12/8/2021, 3:49 PM**

Model Run Status:  
**Model running. Check back soon for updates.**

**\* Please note that all values displayed are for testing purposes only.**

**Run Model**

*Last update: a few seconds ago*



## Model Run Details

- Time of last model run
- Current model run status

## Model Run Trigger Button

- Integration with stormwater model and GI database

# Conclusions

- Commission's GI Database expanded and dynamically linked to model
- Program Management Tool makes tracking GI implementation and progress towards TMDL goals easier
- The Program Management Tool helps the Commission to optimize the utilization of stormwater budget



# Next Steps

- Recalibration and expansion of Commission's Stormwater Model
- Use Program Management Tool and Sampling Data to revise TMDL estimates for receiving waters

**Questions?**

**Thank You!**

**Contact Us!**

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