

# Green Infrastructure Impacts on Urban Stream Hydrology: Dashboard Visualization

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GEOG 6165: Data Visualization

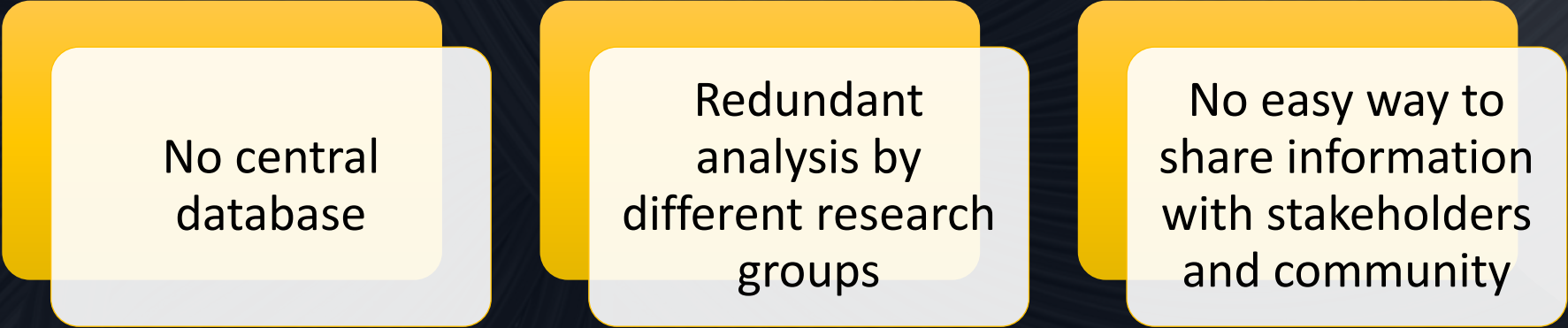
Spring 2022



# Introduction

- Landscape Lab
  - Green infrastructure facility
  - Construction completed Nov. 2020
- Research questions
  - Hydrology
  - Ecology
  - Wildlife
  - Community

# What is lacking?



No central  
database

Redundant  
analysis by  
different research  
groups

No easy way to  
share information  
with stakeholders  
and community



# Data

## Hydrographs

- Stream and storm drain discharge

## Sensor Sites

- Stream and storm drain sensor locations

## Estimated Irrigation Water Use

- Calculate irrigation water use and cost from invoices

## Pollutant Monitoring

- Metal pollutant monitoring database

# Methods

## RShiny App

### ui object – dashboard layout

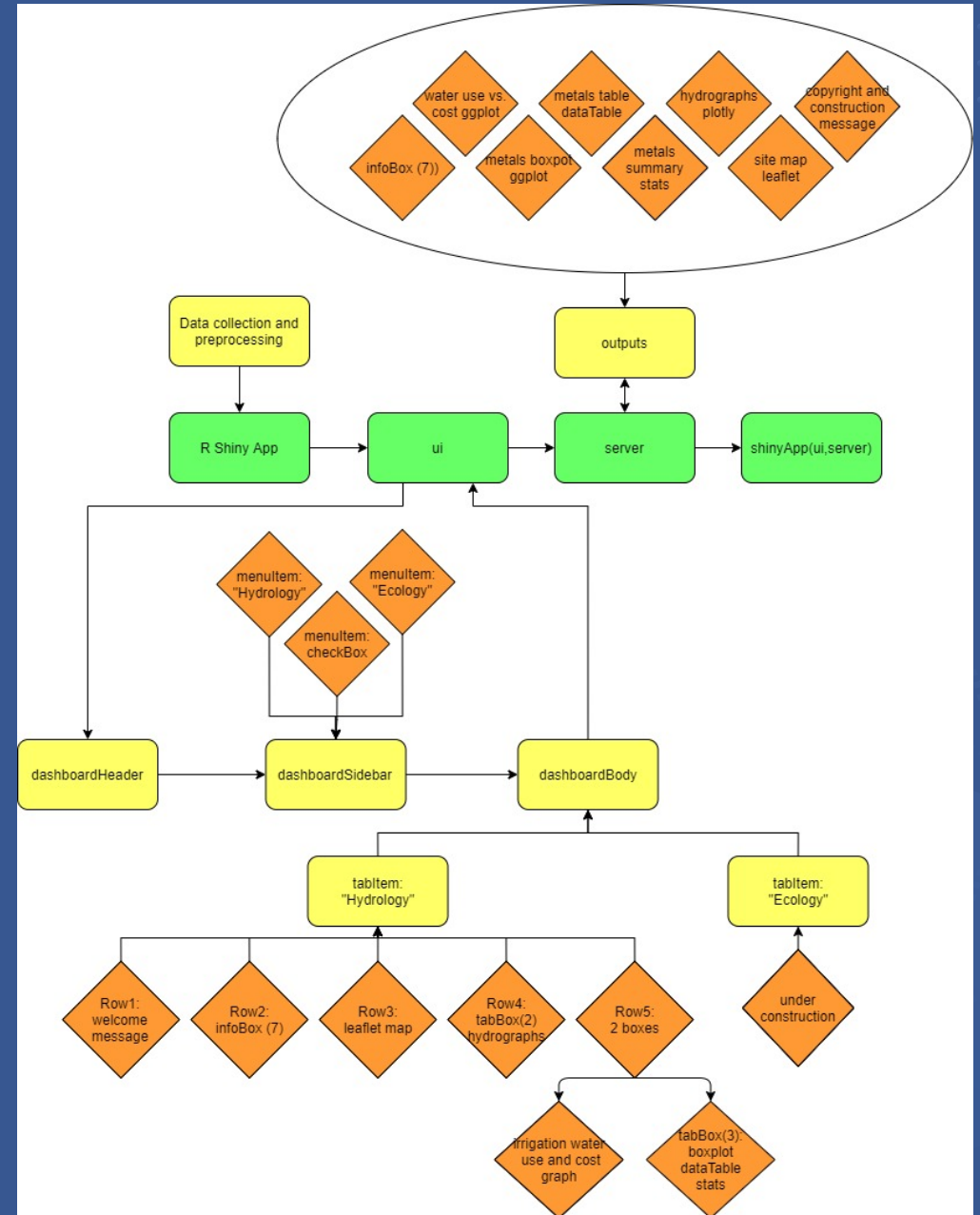
- Header
- Sidebar
  - 2 menuItem
  - checkbox
- Body
  - 5 rows – 1 text, 4 fluidRow
    - infoBox – current discharge at gage sites
    - Leaflet site map
    - Hydrograph tabBox - checkboxGroupInput, dateRange, plotlyOutput
    - Estimated irrigation water use and cost box plotOutput
    - Metal pollutant monitoring tabBox – plotOutput, data table, summary statistics

# Methods cont.

## Server object – reactive codes

- ui output
  - Reactive infoBox
  - ggplot boxplot and line/bar graphs
  - Plotly
  - leaflet

`shinyApp(ui,server)`



- Stormwater 3
- Stormwater 4
- Common Road
- Cottonwood Grove
- Densbury
- Foxhill Drive

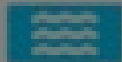
🏠 Ecology

📊 Hydrology

■ Sensor Sites

- Stormwater 1
- Stormwater 2
- Stormwater 3
- Common Road
- Cottonwood Grove
- Densbury
- Foxhill Drive

## Current Discharge



FOXHILL DRIVE INSTREAM  
0.8958 cms



COTTONWOOD GROVE INSTREAM  
0.0043 cms



DENSBERY STORM DRAIN  
0.0198 cms



COMMON ROAD STORM DRAIN  
0.0357 cms



STORMWATER 1  
Not Active



STORMWATER 2  
Not Active



STORMWATER 3  
Not Active

## Watch Environmental Observatory Sensors



# Results

Instream Hydrographs

Storm Drain Hydrographs

Hydrographs

Instream Sensor Site

Enter a Date Range

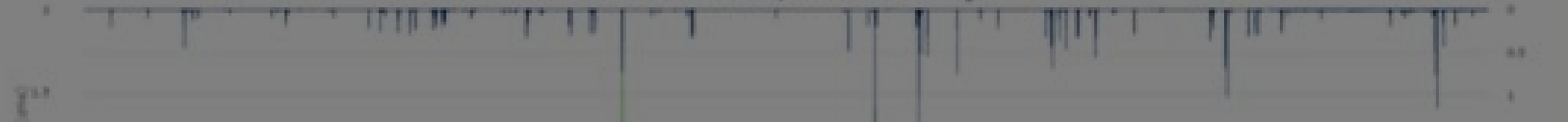
☒ Foxhill Drive

2021-01-01

2021-01-01

☐ Cottonwood Grove

Red Butte Creek Hourly Storm Drain Discharge



1

### Set up

- Set up a shared drive for hydrology sensor data

2

### Add

- Add run-off efficiency data to hydrology page

3

### Add

- Add ecology data to dashboard when available

4

### Investigate

- Investigate Google Earth API or create custom basemap

5

### Launch

- Launch shiny app

# Next Steps



The background of the image is a dark, textured surface filled with numerous question marks of varying sizes and shades of gray and brown. Some question marks are in sharp focus, while others are blurred, creating a sense of depth. A single, light gray question mark is positioned to the left of the word "Questions?", with a thin white vertical line separating it from the text.

Questions?