Water Budgets of Coastal Rain Gardens

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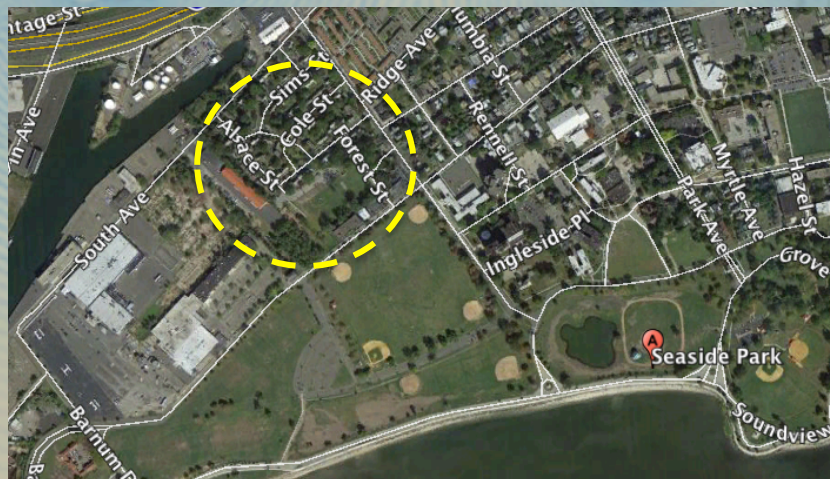
2014-15 Hixon Fellow

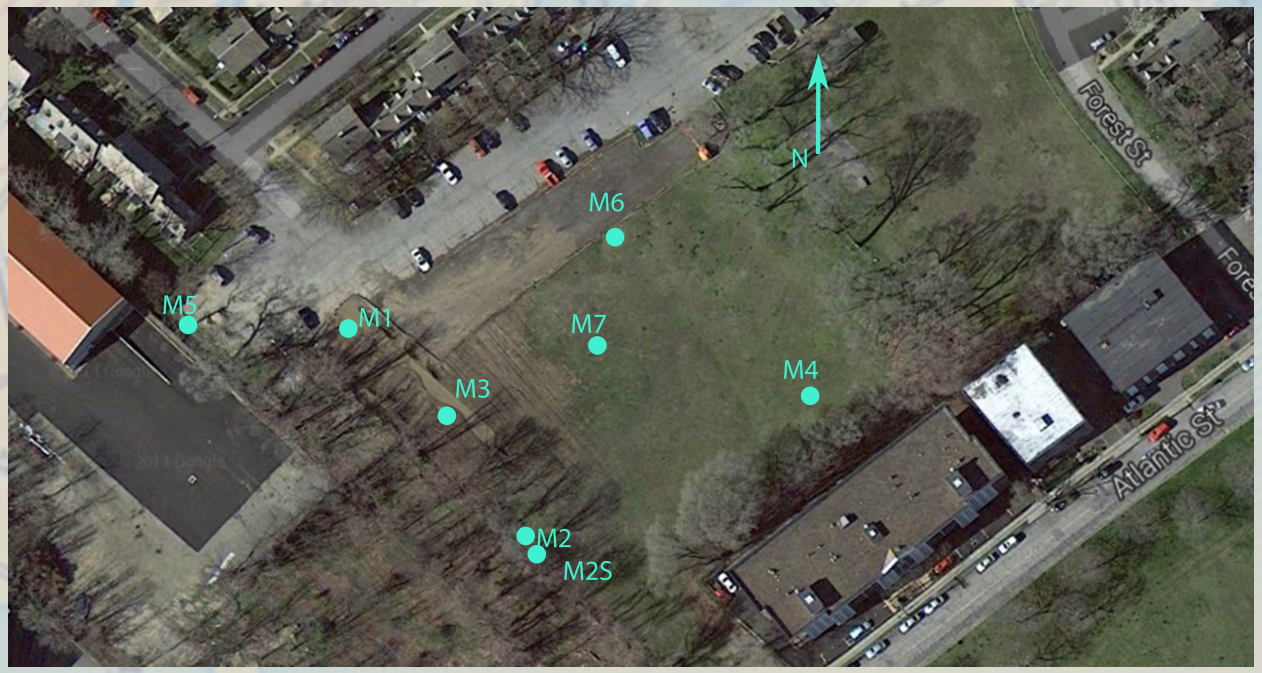
Coastal Urban Context



Study Area

Research Goals

- (How) does GSI work in a coastal context?
  - Physically: water budget
  - Socially: additional benefits (see my report!)



Methods

- Treatments
- Soil and plant

- Water budget:

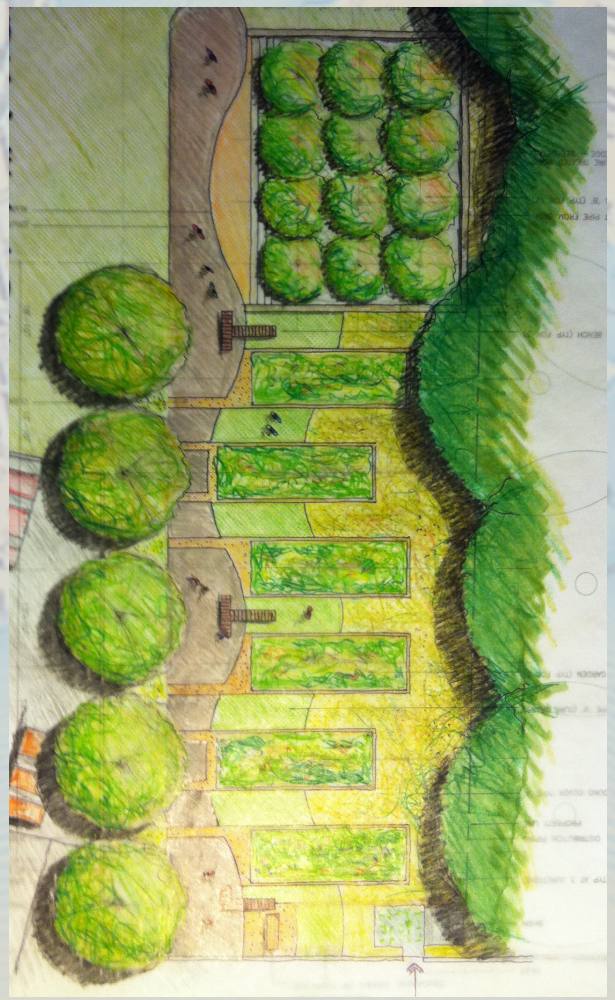
INFLOW

+ PRECIPITATION

–EVAPOTRANSPIRATION

± GROUNDWATER

= CHANGE IN STORAGE



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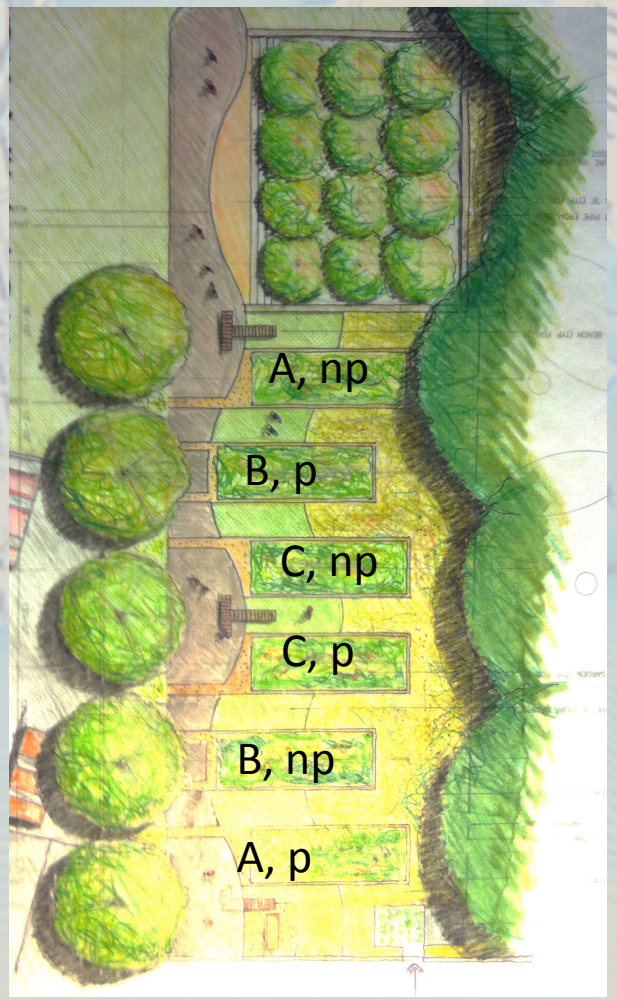
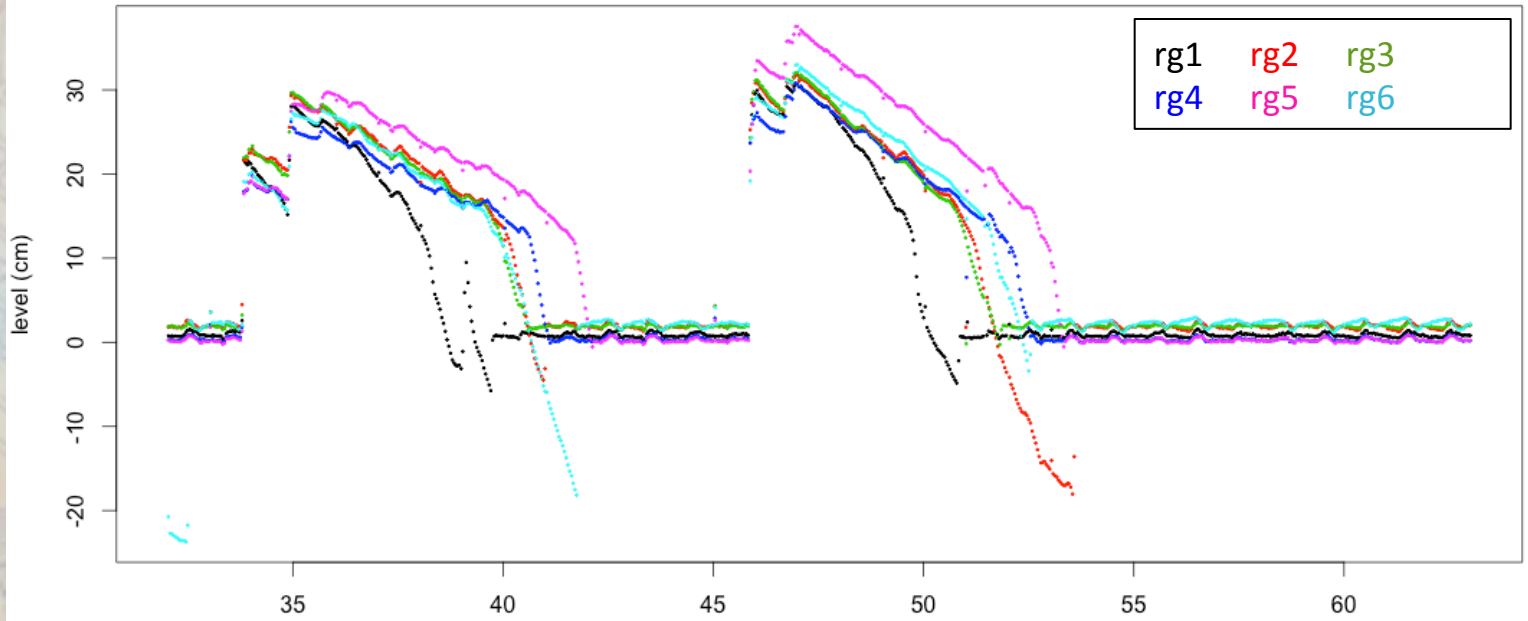


Results

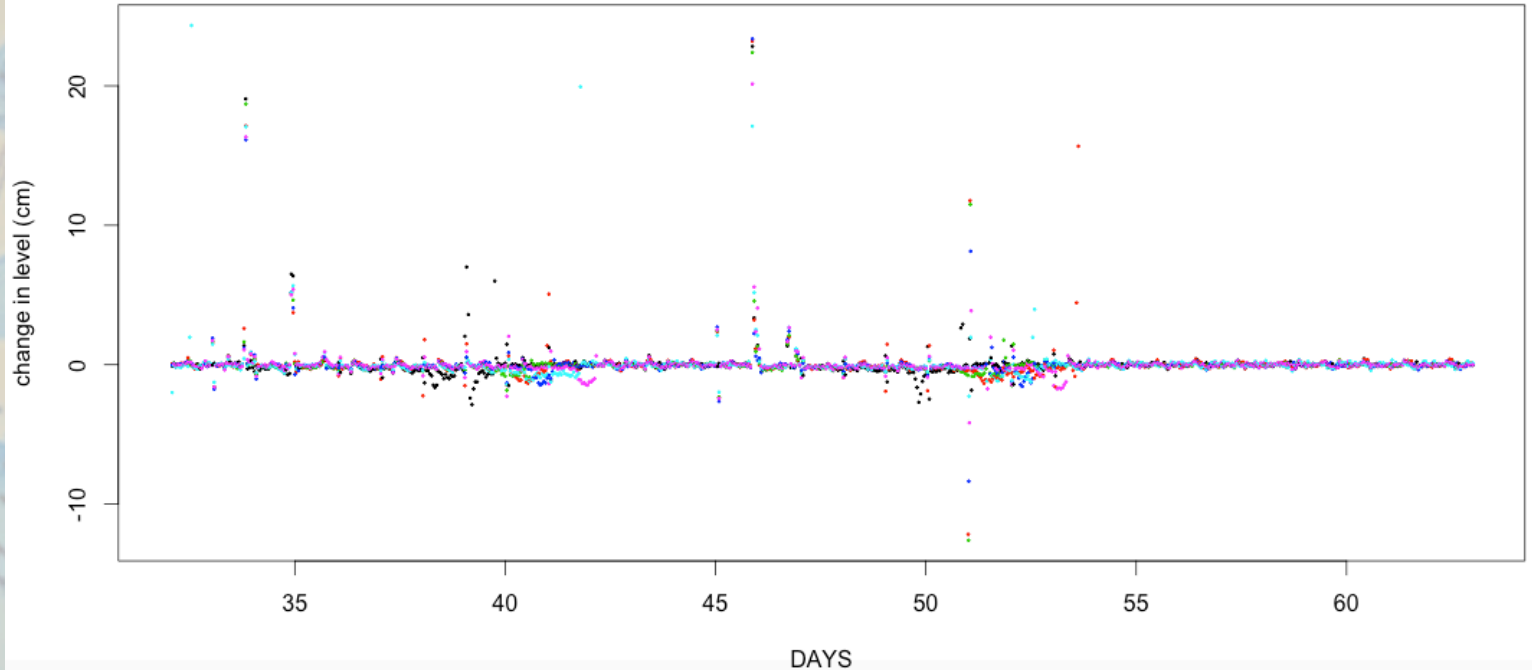
- Pipe inlets
- Rain gauge
- Solar & climate
- Water level
- Control for elevation
- Tidal cycle
- Treatment effect

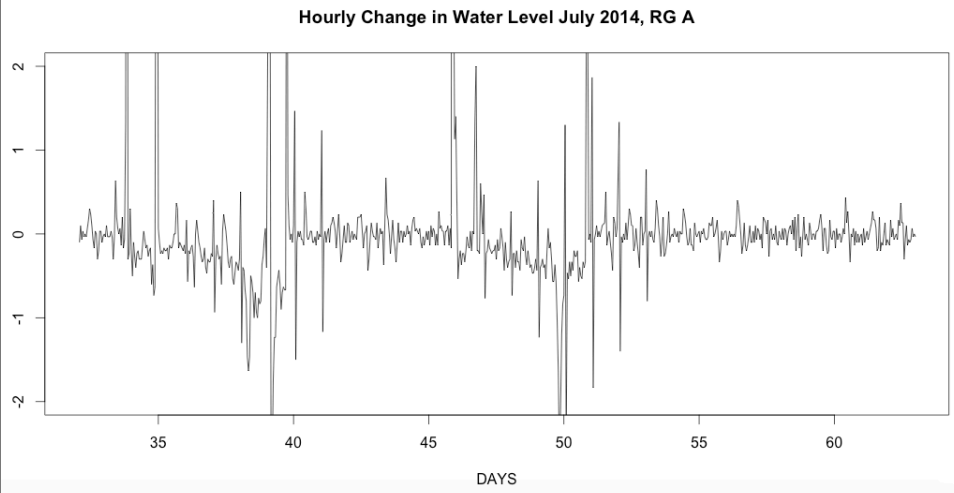
- July 2014
- Data collection completed June 2015

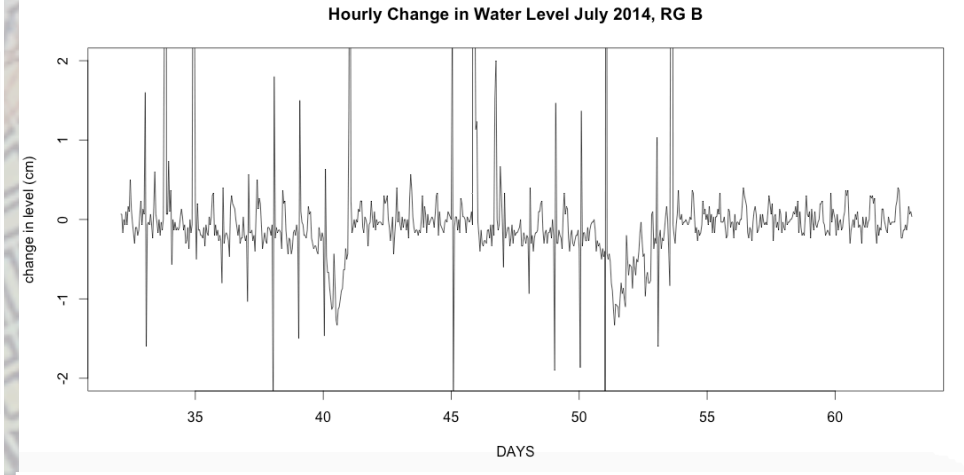
Rain Garden Water Levels July 2014

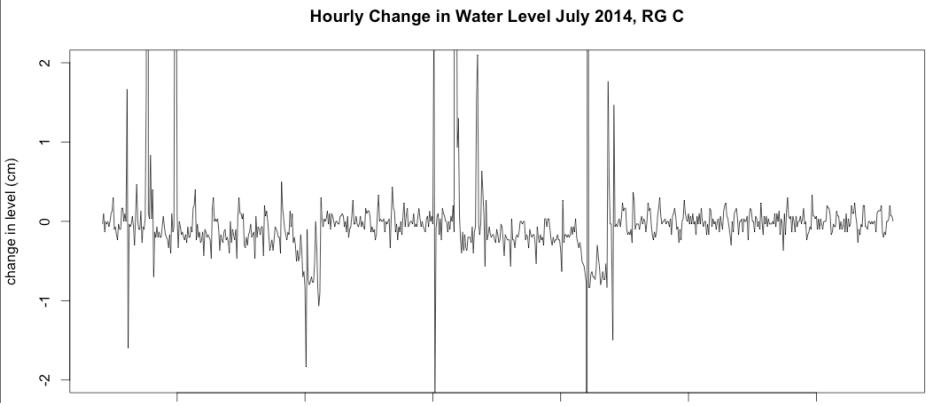


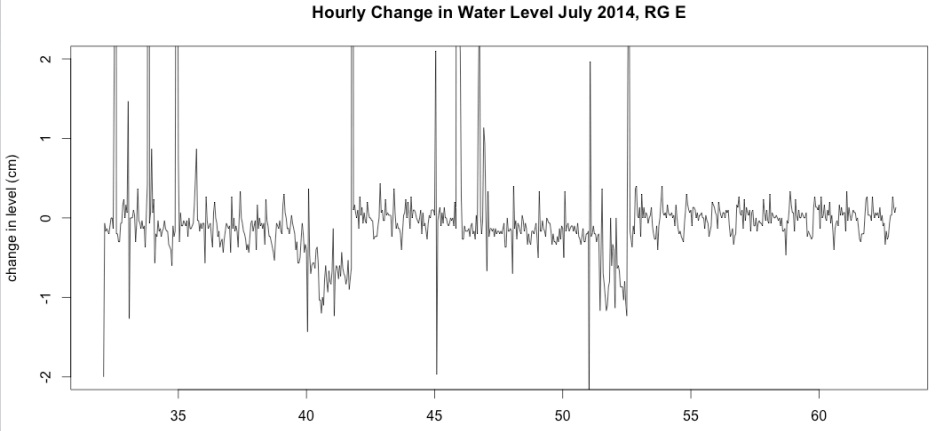
Change in Water Level July 2014

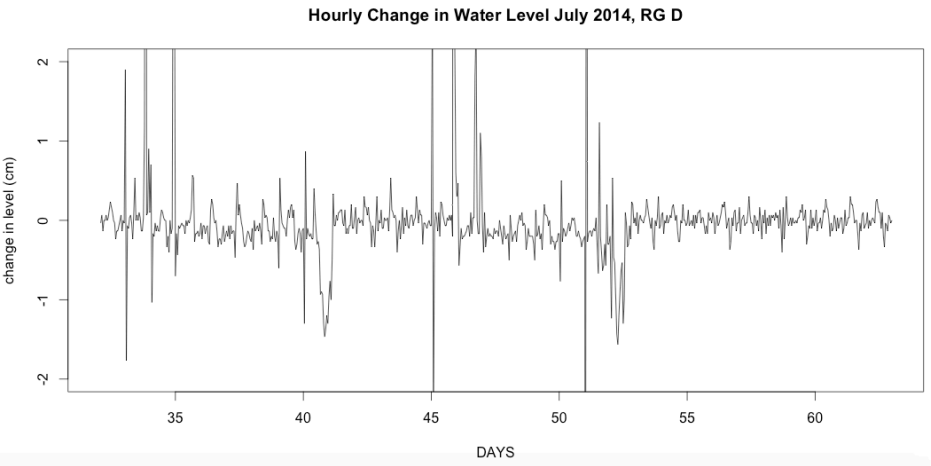


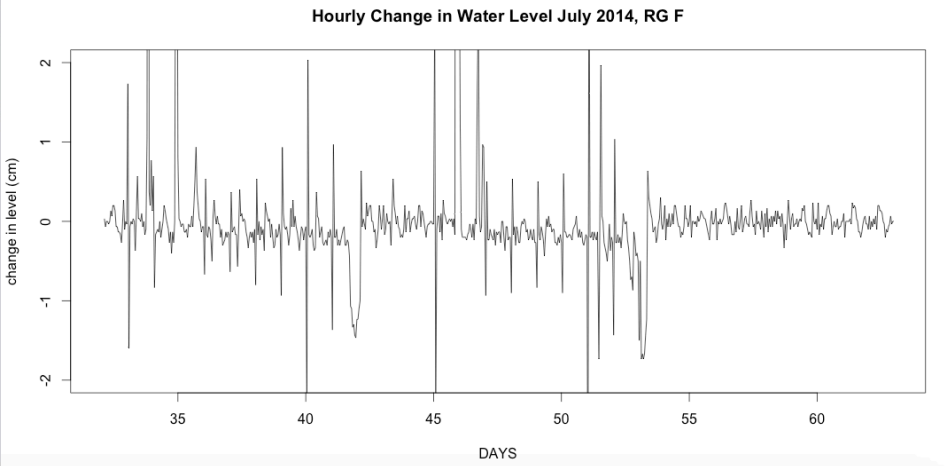

Hourly Change in Water Level July 2014, RG A
2
1
0
-1
-2
35
40
45
50
55
60
DAYS


Hourly Change in Water Level July 2014, RG B
change in level (cm)
2
1
0
-1
-2
35
40
45
50
55
60
DAYS


Hourly Change in Water Level July 2014, RG C
change in level (cm)
2
1
0
-1
-2


Hourly Change in Water Level July 2014, RG E
change in level (cm)
2
1
0
-1
-2
35
40
45
50
55
60


Hourly Change in Water Level July 2014, RG D
change in level (cm)
2
1
0
-1
-2
35
40
45
50
55
60
DAYS


Hourly Change in Water Level July 2014, RG F
change in level (cm)
2
1
0
-1
-2
35
40
45
50
55
60
DAYS

Discussion

- Relative rain garden water levels appear consistent across rain events
- Control for elevation an important next step
  - Water budget
  - Infiltration rate
  - Statistical analysis
- Implications for coastal GSI design and resilience of coastal cities + communities

Thank you!

- Hixon Center for Urban Ecology

- Gabe Benoit
- Alex Felson + UEDLAB

- Seaside Village and City of Bridgeport