Grand Challenge
Prepared for Environmental Change
ENVIRONMENTAL RESILIENCE INSTITUTE

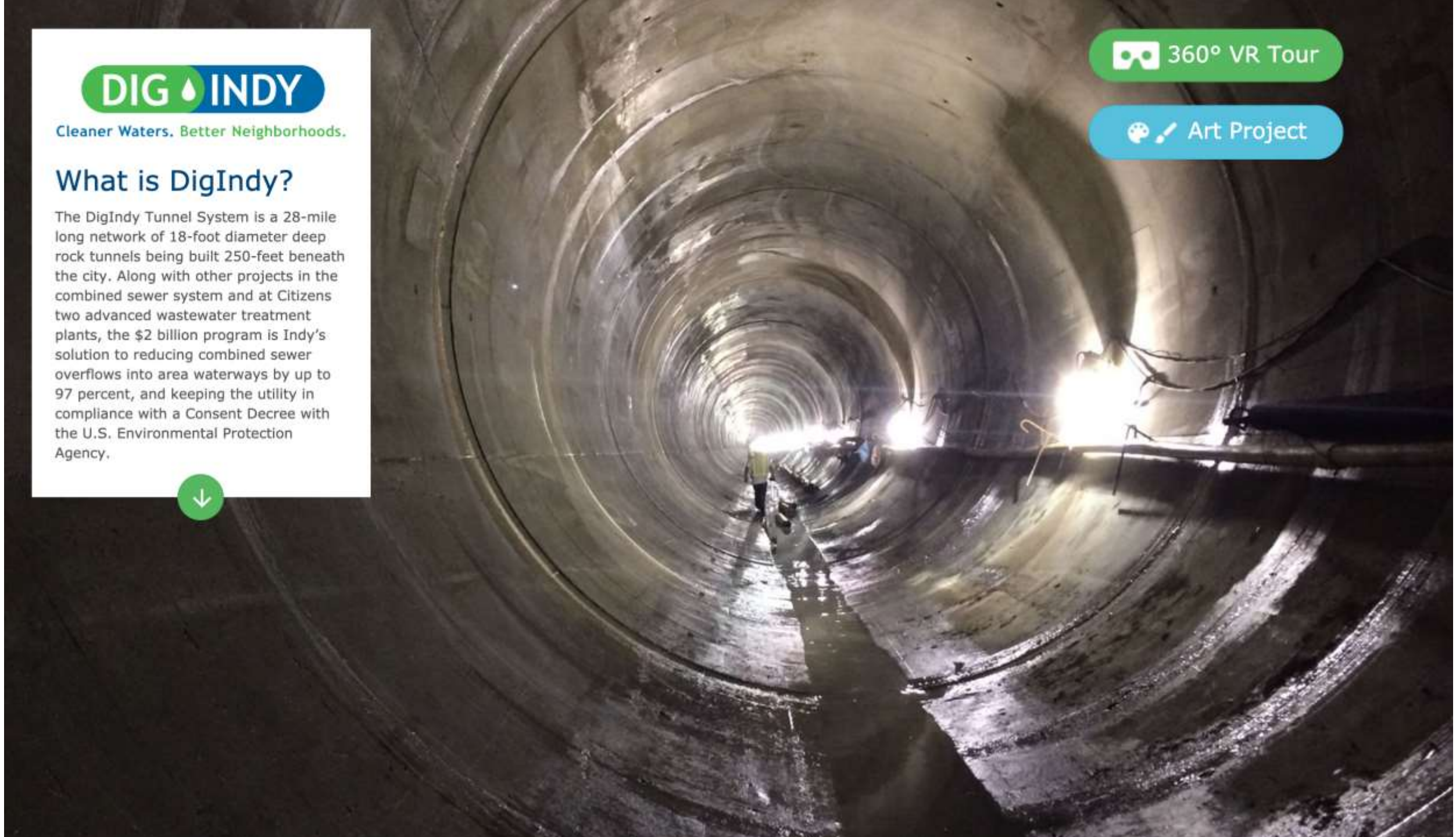
Deep dive into environmental characteristics of waterways undergoing important transitions

Gabriel Filippelli

Professor of Earth Sciences, IUPUI

Co-Chair, Reconnecting to Our Waterways

@GabeFilippelli



DIG INDY

Cleaner Waters. Better Neighborhoods.

What is DigIndy?

The DigIndy Tunnel System is a 28-mile long network of 18-foot diameter deep rock tunnels being built 250-feet beneath the city. Along with other projects in the combined sewer system and at Citizens two advanced wastewater treatment plants, the $2 billion program is Indy's solution to reducing combined sewer overflows into area waterways by up to 97 percent, and keeping the utility in compliance with a Consent Decree with the U.S. Environmental Protection Agency.

360° VR Tour

Art Project

The Problem

Combined sewers convey both storm water and wastewater (sewage) in one piping system. Historically, more than 800 communities across the United States built combined sewers once indoor plumbing became commonplace in the late 1800s.

During normal rain events with ¼-inch of rainfall or more, the combined system capacity can become overwhelmed, resulting in a mixture of storm water and wastewater overflowing into area waterways. This is referred to as a combined sewer overflow (CSO) event, which causes a threat to public health and the environment.

Learn More

Exploring Environments, Engaging communities

- Air
  - Citizen science coordination of air quality measurements
  - Utilizes KIB network and focusing initially of Pleasant Run
  - Particulate matter, ozone and other chemicals

- **Water** + soil
  - Established six stations
  - Measuring chemistry and faecal coliform
  - Twice monthly monitoring

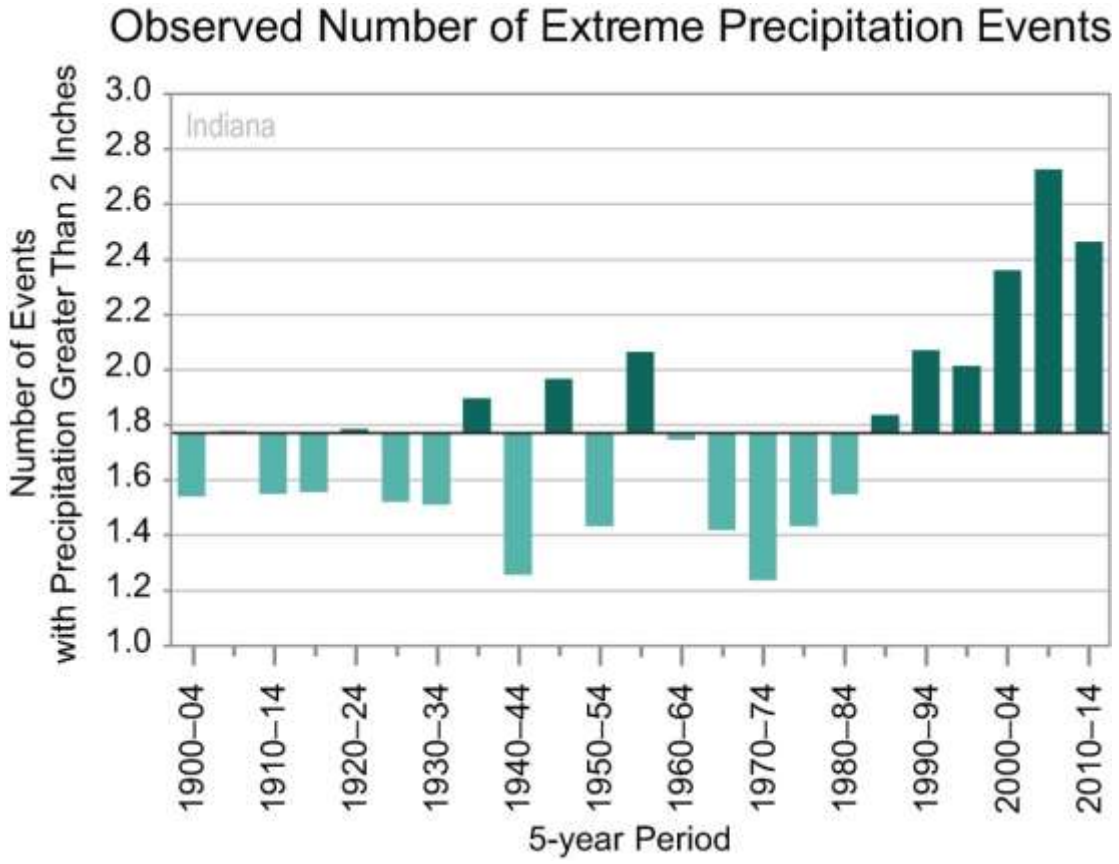
Exploring Environments, Engaging communities

Tunnel is not going to solve all of our problems!

Climate change

Multiple inputs

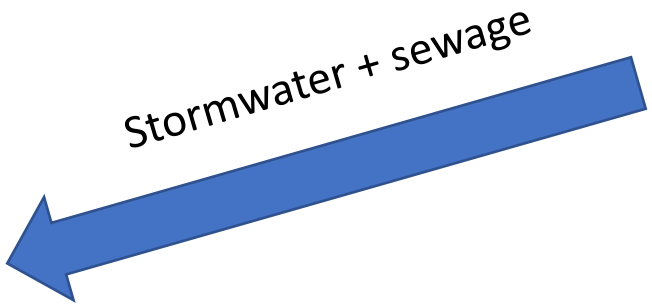
A systems approach



Realizing the full potential of UGI

- Engineered systems to remove sewage from waterways
- At the same time, removing water

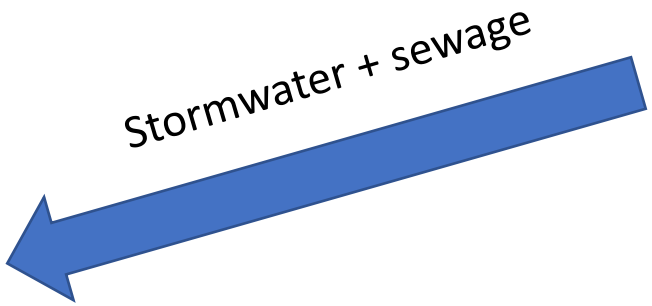
- Fully engineered system?



Realizing the full potential of UGI

- Engineered systems to remove sewage from waterways
- At the same time, removing water

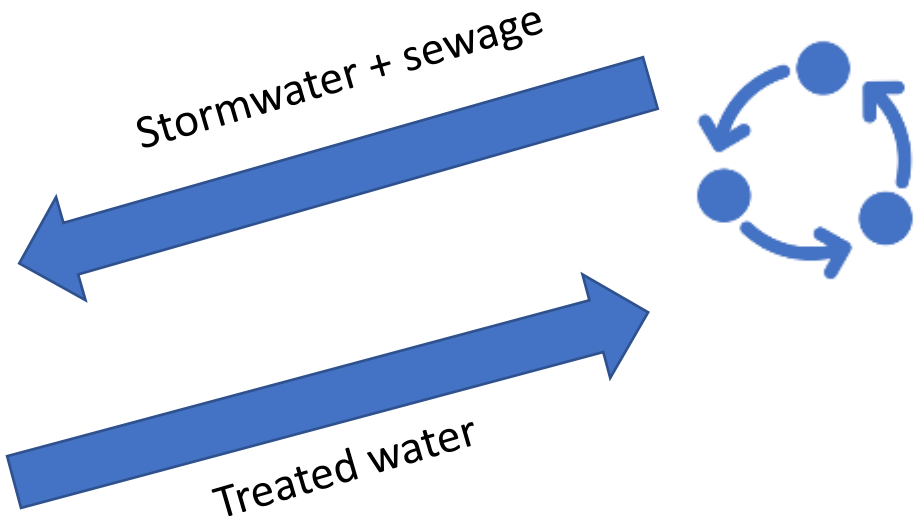
- Fully engineered system?



Realizing the full potential of UGI

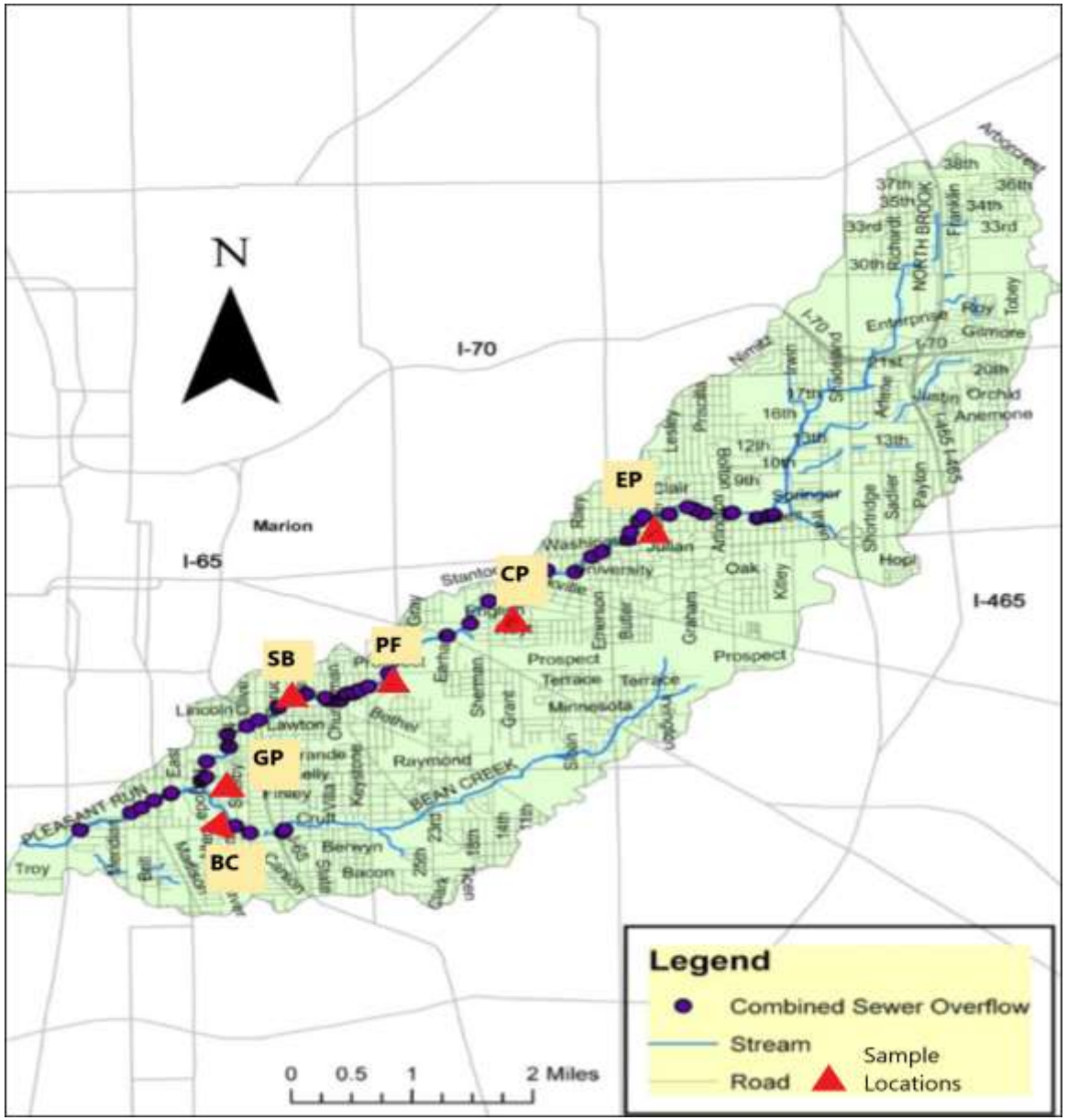
- Engineered systems to remove sewage from waterways
- At the same time, removing water

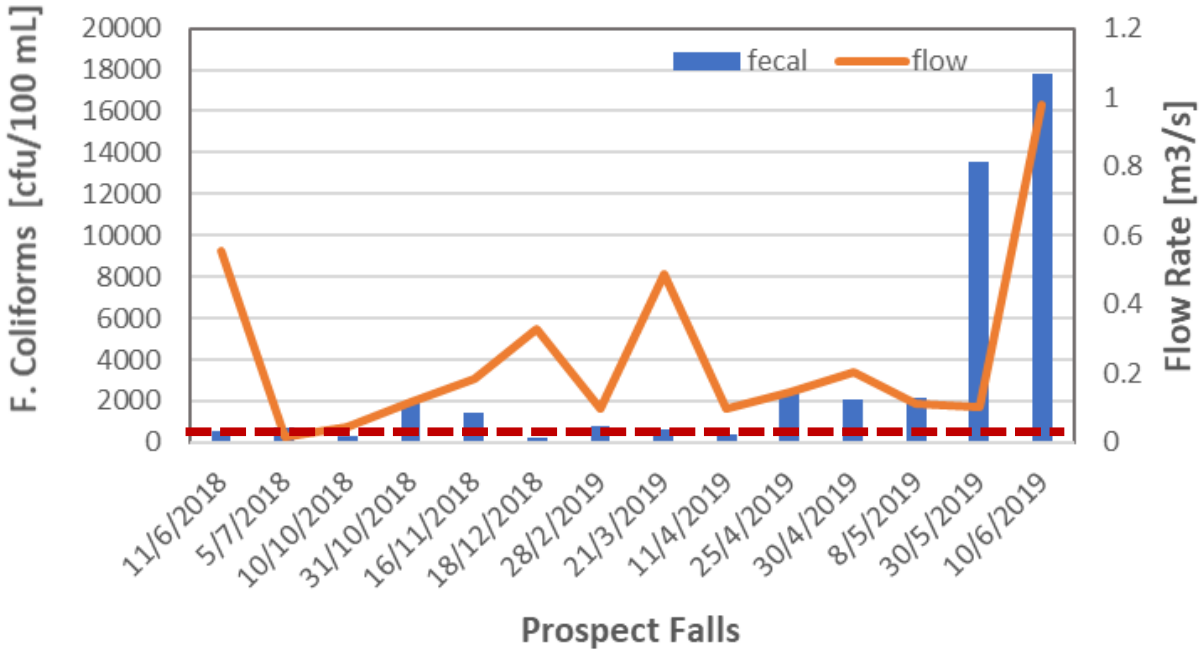
- Fully engineered system?

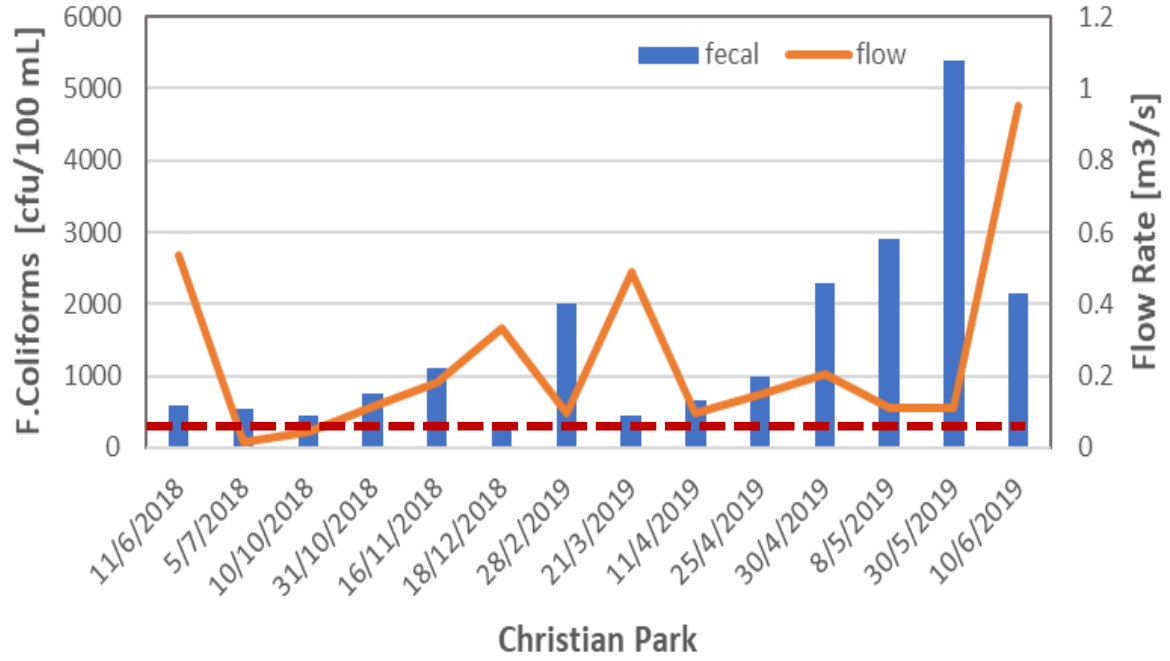


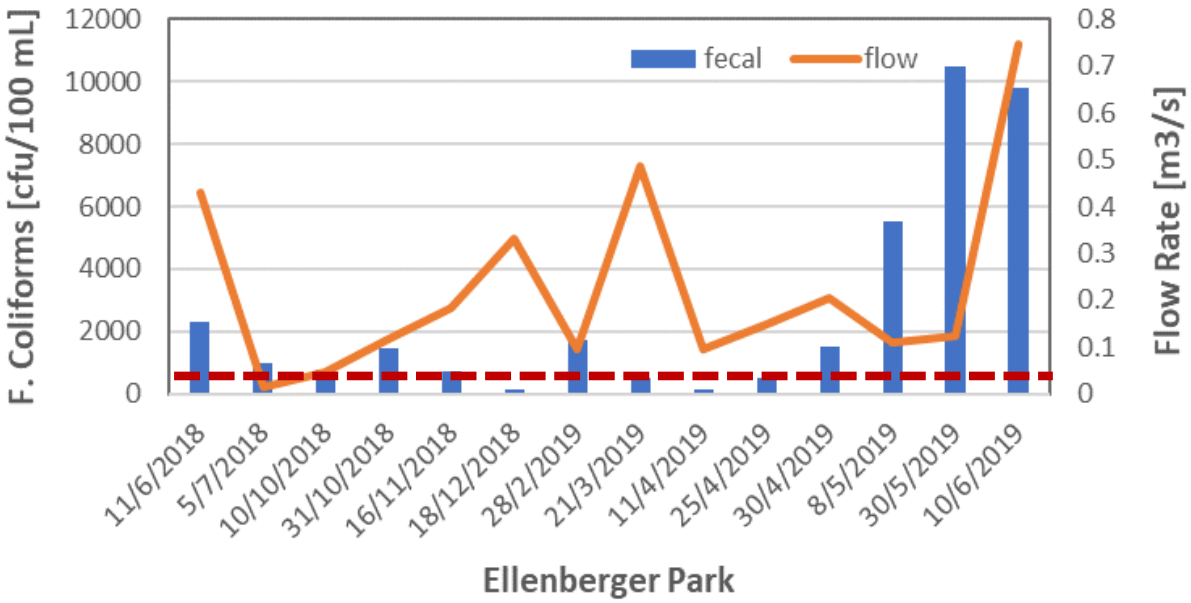

PLEASANT RUN

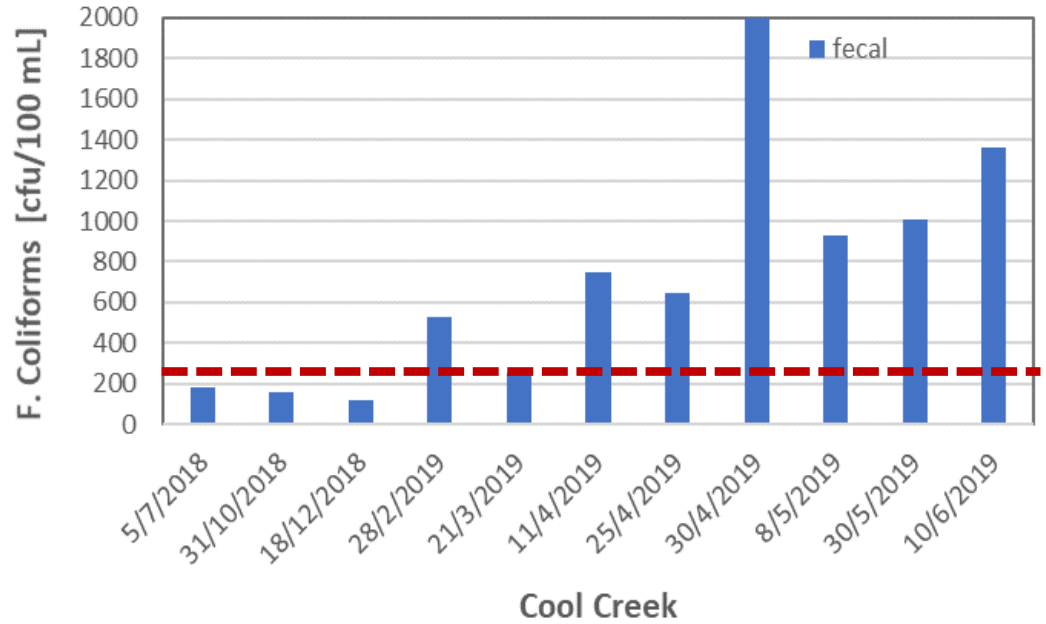
Sampling Stations



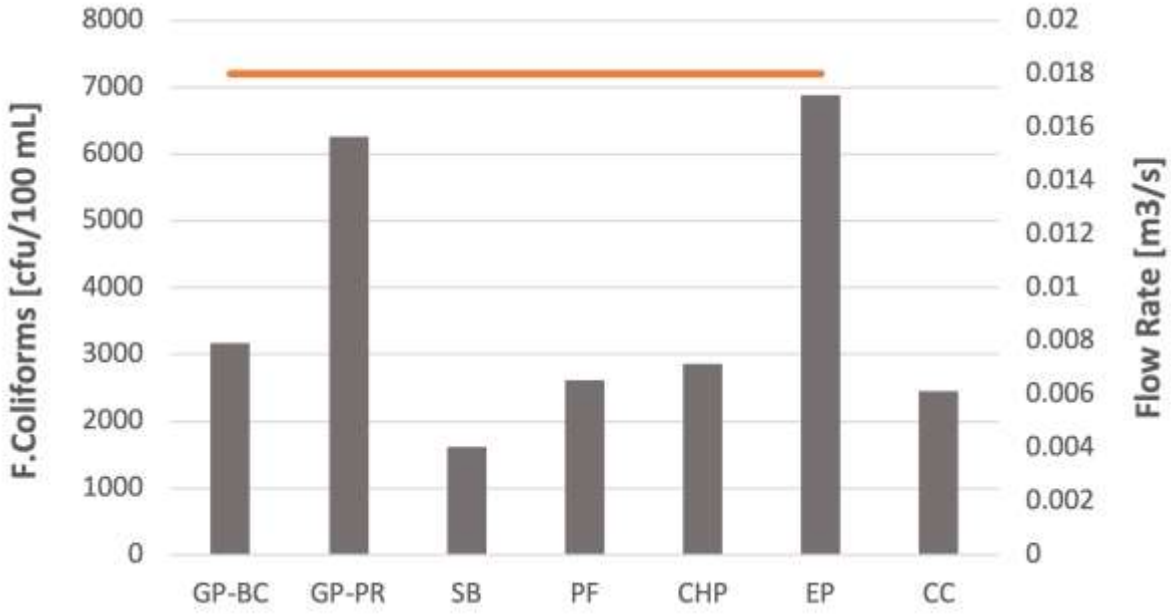

F. Coliforms [cfu/100 mL]
Flow Rate [m3/s]
fecal
flow
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1.2
1
0.8
0.6
0.4
0.2
0
11/6/2018
5/7/2018
10/10/2018
31/10/2018
16/11/2018
18/12/2018
28/2/2019
21/3/2019
11/4/2019
25/4/2019
30/4/2019
8/5/2019
30/5/2019
10/6/2019
Prospect Falls


F.Coliforms [cfu/100 mL]
Flow Rate [m3/s]
fecal
flow
6000
5000
4000
3000
2000
1000
0
1.2
1
0.8
0.6
0.4
0.2
0
11/6/2018
5/7/2018
10/10/2018
31/10/2018
16/11/2018
18/12/2018
28/2/2019
21/3/2019
11/4/2019
25/4/2019
30/4/2019
8/5/2019
30/5/2019
10/6/2019
Christian Park

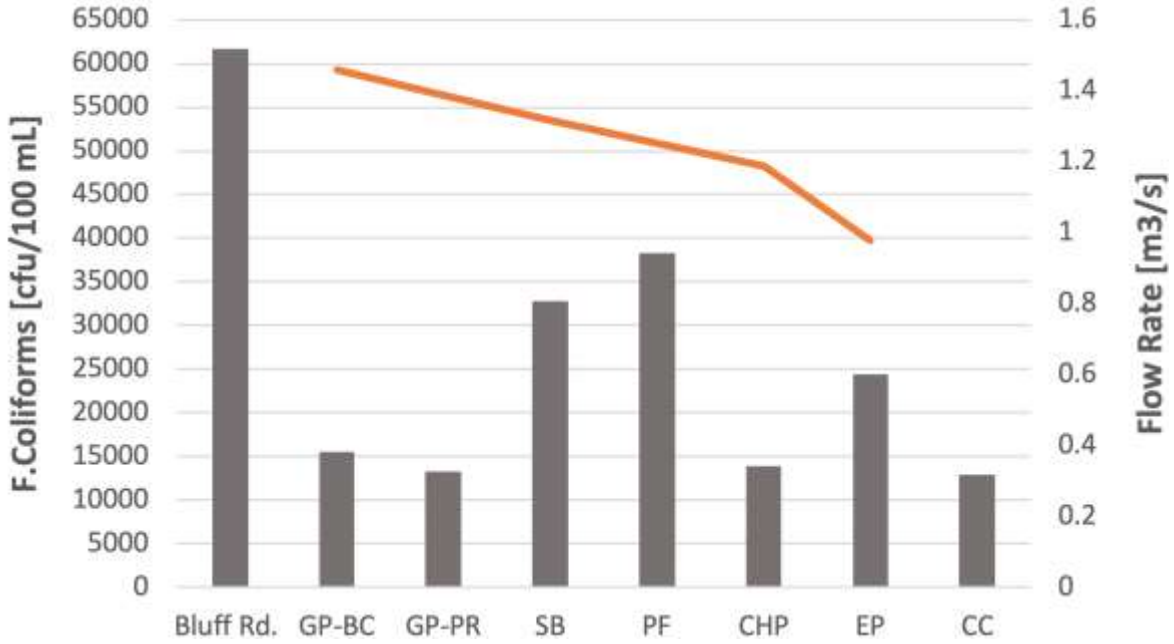

F. Coliforms [cfu/100 mL]
Flow Rate [m3/s]
fecal
flow
12000
10000
8000
6000
4000
2000
0
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
11/6/2018
5/7/2018
10/10/2018
31/10/2018
16/11/2018
18/12/2018
28/2/2019
21/3/2019
11/4/2019
25/4/2019
30/4/2019
8/5/2019
30/5/2019
10/6/2019
Ellenberger Park


F. Coliforms [cfu/100 mL]
fecal
2000
1800
1600
1400
1200
1000
800
600
400
200
0
5/7/2018
31/10/2018
18/12/2018
28/2/2019
21/3/2019
11/4/2019
25/4/2019
30/4/2019
8/5/2019
30/5/2019
10/6/2019
Cool Creek

What a difference a day makes…July 10, 2019



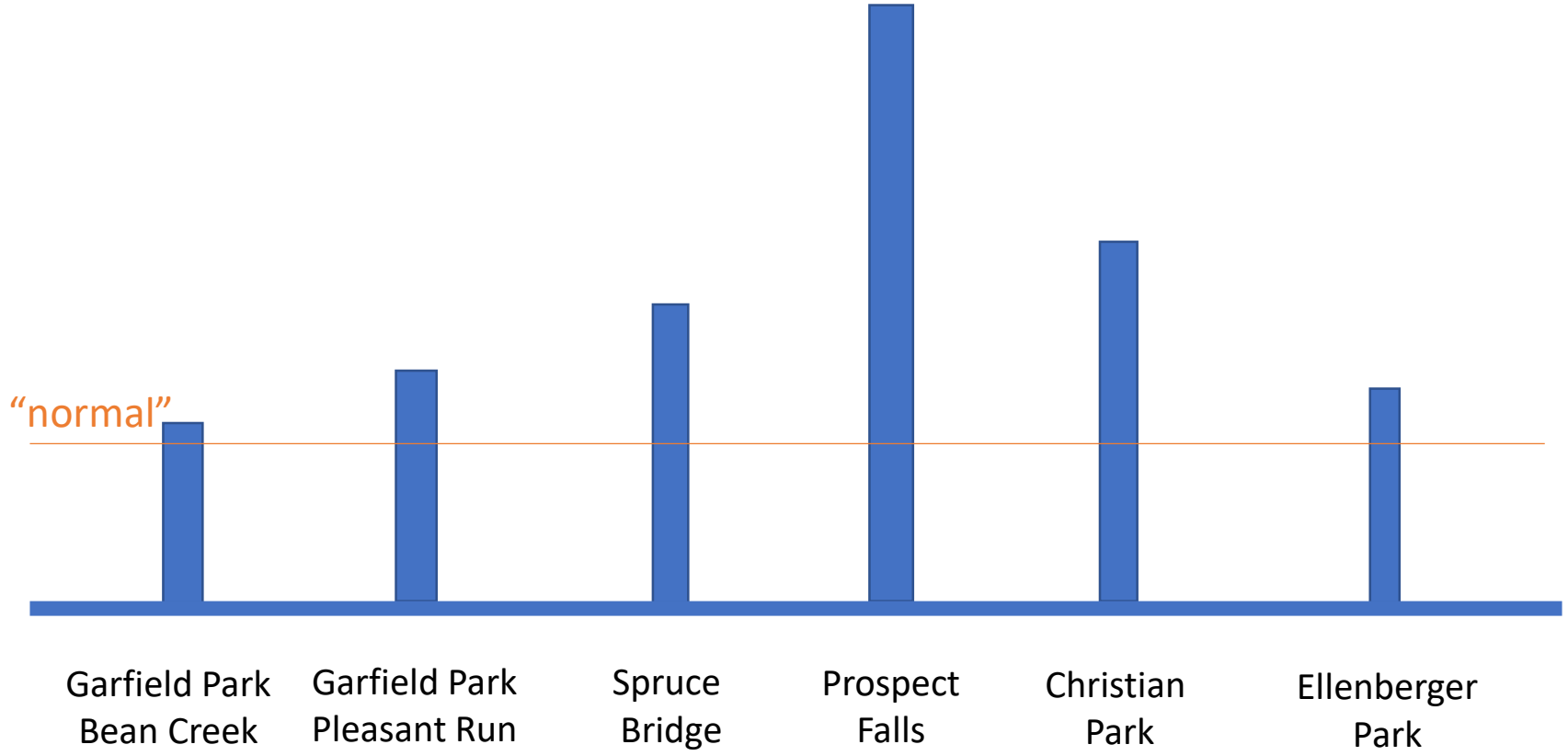
Before rain



After rain

Exploring other Env. Health issues

Lead Content in streambed



white RIVER PLAN

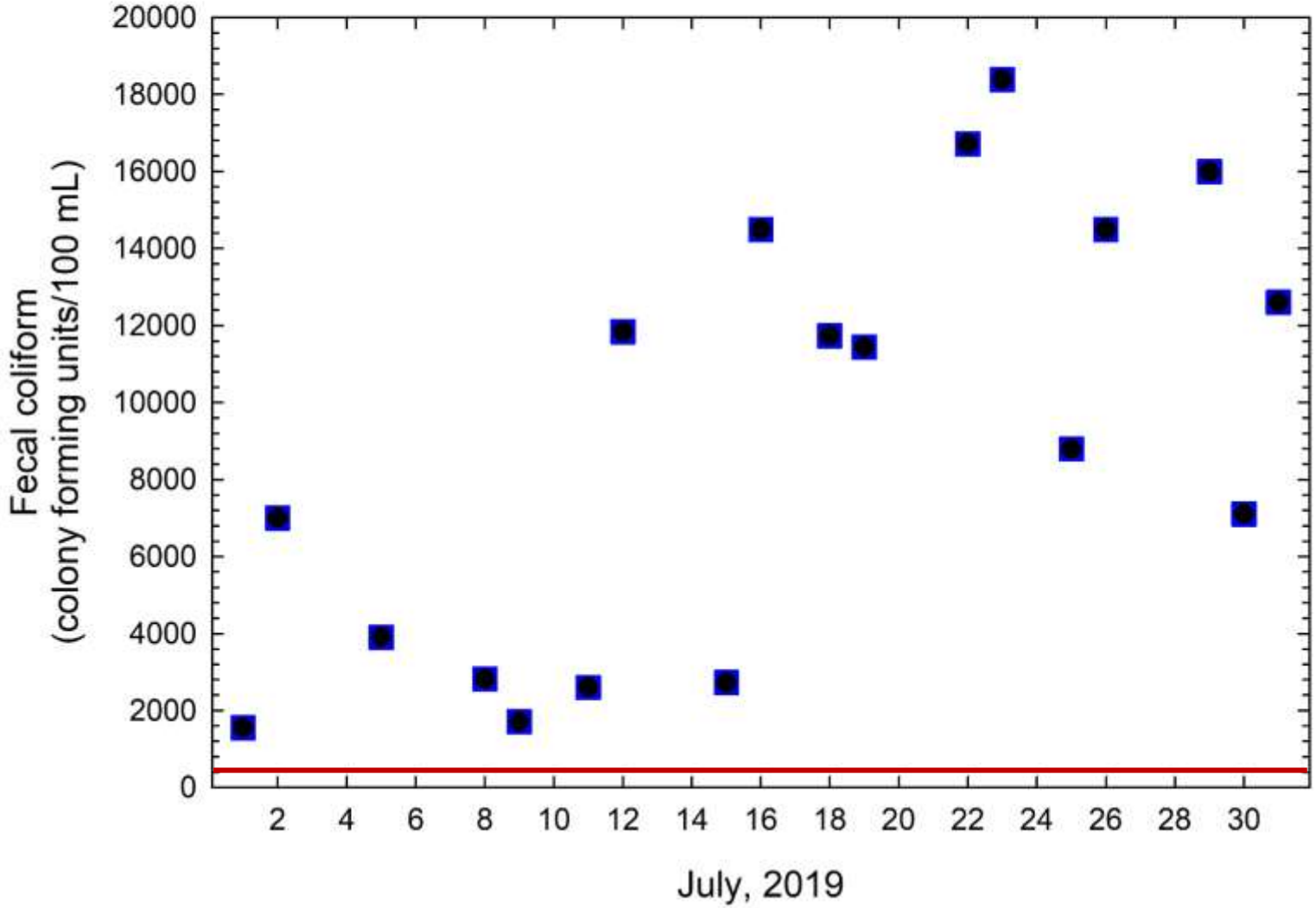
HAMILTON CO. to INDIANAPOLIS

WHITE RIVER VISION PLAN


RIVER HEALTH
2
Remove invasive understory and create river views
I-65
MICHIGAN RD
4
ACCESS
Build a canoe launch and integrated trail network
EXPERIENCE
3
Implement the Riverside Regional Park master plan
ENVIRONMENT
Retrofit Emrichsville Dam
1
EXPERIENCE
Upgrade Mozel Sanders Park and incorporate physical river access
3
10TH ST
PARTNERSHIPS
7
Unify civic, academic and business campuses
MICHIGAN ST
ENVIRONMENT
1
Protect vital wildlife habitat below the levee and create new downtown park space
LAND USE
9
Preserve neighborhood character and connect anchor parks and facilities to the riverfront
WASHINGTON ST
8
COMMUNITY
Strengthen pedestrian and bike infrastructure across all bridges into Downtown
ECONOMY
6
Support sustainable and inclusive development that strengthens our shared riverfront

White River “beach” and continued issues

White River Water Quality just downstream of Emerichsville Dam
Indianapolis, IN



Current Work

- Re-engaging w/Pleasant Run and Citizens Stakeholders groups
- Re-assigning sampling array
- Working with local partners (Christian Park School) in promoting Citizen Science and Science education curriculum in schools

Grand Challenge
Prepared for Environmental Change
ENVIRONMENTAL RESILIENCE INSTITUTE