



Downpour Detour

Jonathan, Alex, Amy, Erica, Alexcis, Luke



Jonathan Lee



'24 Economics

Alex Borengasser



'25 Molecular Bio

Amy Aririguzoh



'24 Medical Anthro

Erica De San Jorge



'25 Psychology

Alexcis Johnson



'26 Neuroscience

Luke Maake



'23 Computer Science

Our Purpose











**Empower local community members
to mitigate the effects of stormwater
flooding**

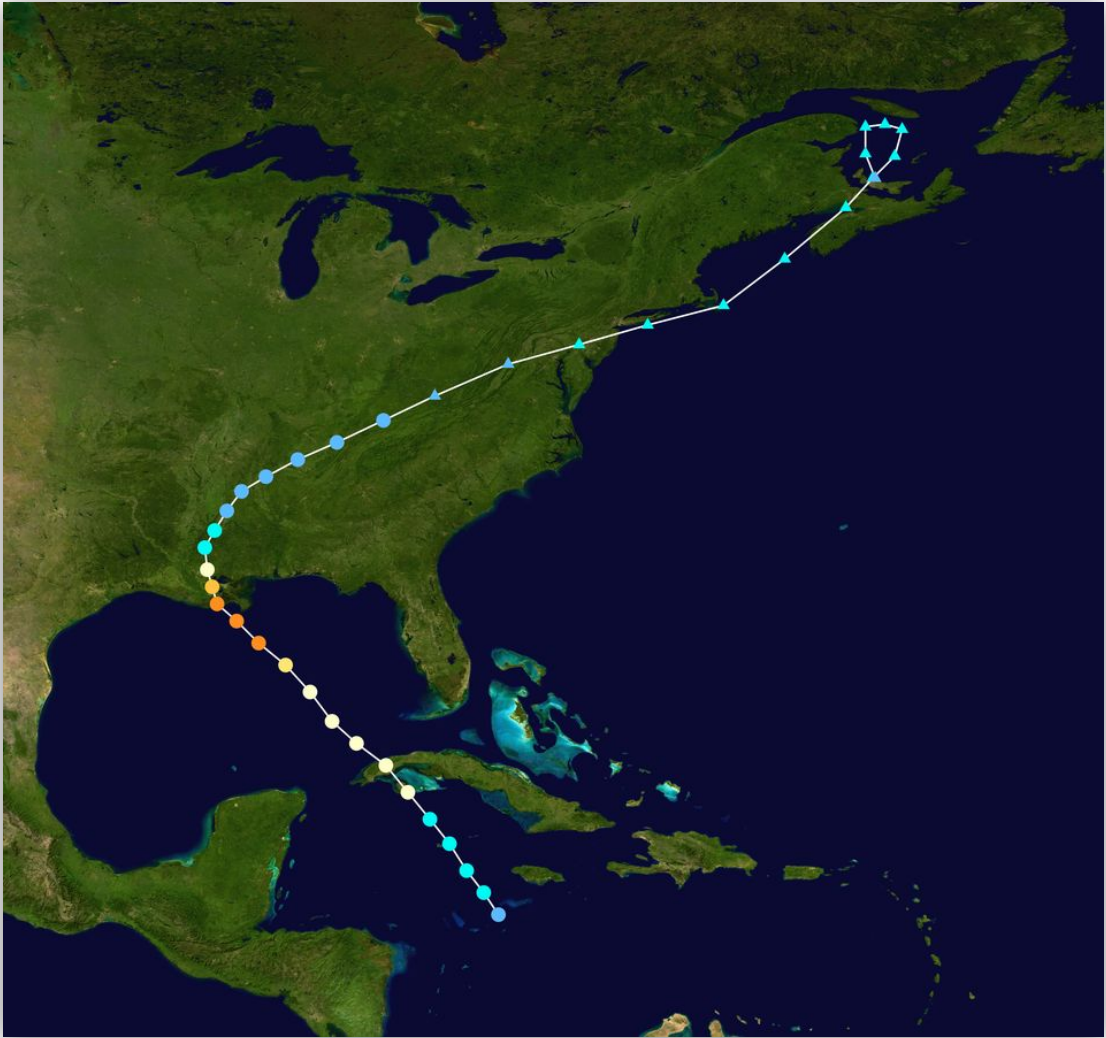
Why This Is Important

- During our trips around NJ, we witnessed several housing complexes that had been **completely destroyed** and now deemed **uninhabitable** due to flooding
- Residents of those homes were **displaced, some died, and many were injured**
- An apathetic approach to flooding results in **loss of life, financial damages, and destruction of property**
- Exploring stormwater mitigation efforts is important for **human safety, financial well-being**, and it prepares individuals for emergency situations
- Residents and community members need to understand the importance of floods so that that can **protect themselves and others**



Why This Is Important

	Tropical depression (≤ 38 mph, ≤ 62 km/h)
	Tropical storm (39–73 mph, 63–118 km/h)
	Category 1 (74–95 mph, 119–153 km/h)
	Category 2 (96–110 mph, 154–177 km/h)
	Category 3 (111–129 mph, 178–208 km/h)
	Category 4 (130–156 mph, 209–251 km/h)
	Category 5 (≥ 157 mph, ≥ 252 km/h)
	Unknown



Hurricane Ida Path (Aug-Sep 2021)

Assumptions



Assumption 1: “Rain water isn’t a big deal.”



Fact 1: Precipitation events cause more fatal accidents in the United States than any other factor. It’s the leading cause of accidental death in the US, with **more than 33,000** deaths each year due to motor vehicle accidents that occur in the rain.



Assumption 2: “I don’t have to worry about stormwater mitigation because I don’t live in a flood zone.”



Fact 2: A recent investigation by the Department of Homeland Security's Inspector General revealed that **58% of all FEMA flood maps are considered inaccurate or out-of-date**. We have spoken to many people not in flood zones whose houses flooded.



Quotes

“As citizens, we complain and don't want huge developments like warehouses, but it's almost impossible to hire a lawyer to fight developers.”

-Co-Owner of Terhune Orchards

“Takes a lot of work to get the holistic picture of what's going on, even if towns are working together”

-Senior Planner for Mercer County Planning Department

“There are efforts to buy out people's homes, but there's only so much that can be done. Anything that is rebuilt in the area will also flood.”

-Red Cross Regional Preparedness Manager

“People buy homes or rent things and don't even know about the risks. We need to give the public the education and resources they need to make good choices.”

-Watershed and Land Management Assistant Commissioner DEP

“When it floods, Princeton becomes an island. No one can get in Princeton and no one can get out meaning we are unable to receive help from other places or send people to other places to help.”

-Chief of Princeton First Aid and Rescue Squad

Steve Flood

Homeowner

Upper Middle Class

Lives with family

Does not live in Flood Zone

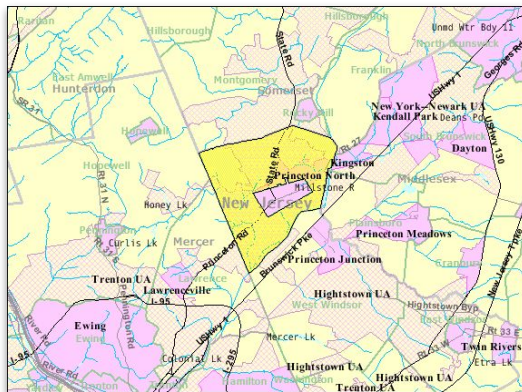


GOALS

Keep family safe

Get aid from gov.

Prevent flood damage



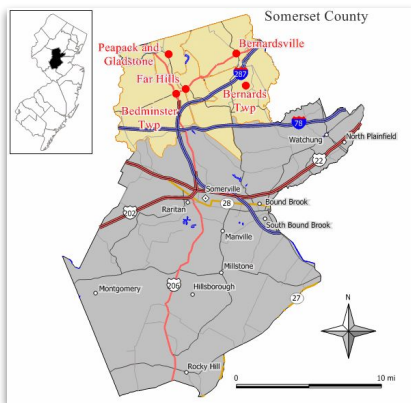
Mark Storm

Homeowner

Lower Middle Class

Lives Alone

Lives in Flood Zone



GOALS

Finding a safe home

Get aid from gov.

Protect belongings from floods

Ashley Tempest-Highwaters

Business Owner

Middle Class

Lives with
Family

Owns Restaurant
in Flood Zone



GOALS

Keeping
business
safe

Ensure
customers'
safety

Establish
financial
stability

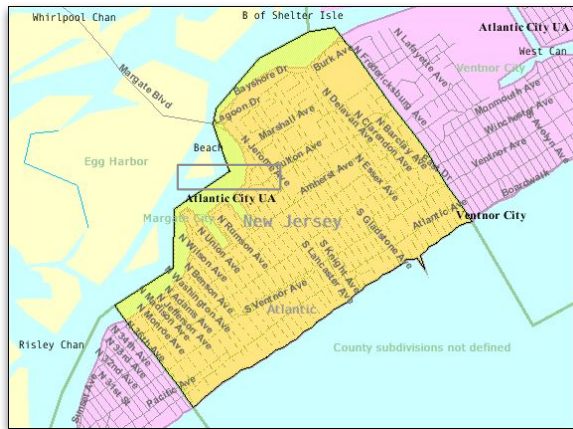
Danny Denier

Homeowner

Upper Middle Class

Lives with Partner

In Denial of Flooding



GOALS

Don't waste money

Flooding is fake

Ignore flood warnings

Mission and Vision

Mission: To develop an effective solution that helps residents better weather through floods and enhance stormwater mitigation efforts.

Vision: We envision a New Jersey where residents confidently navigate flood water crises, are aware of stormwater mitigation resources and know how to access them, and residents are more resilient and prepared to persevere through intense storms.



#2908844

Main Themes

**Overdevelopment
by Corporations**



Information Gap



**Continued
Occupation of Flood
Zones**



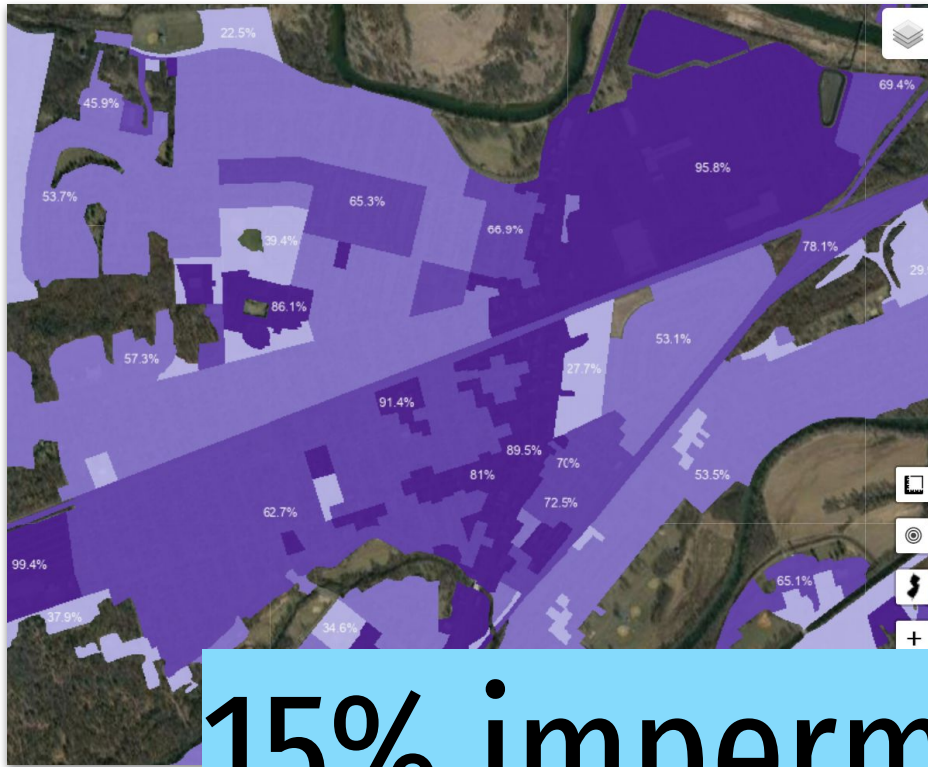
**Lack of Cooperation
Between Townships**



**Emergency Response
and Preparedness**



Main Theme 1: Overdevelopment by Corporations



15% impermeable surface

Main Theme 2: Information Gap

- 58% of FEMA flood maps are considered inaccurate or out of date

Outdated and inaccurate, FEMA flood maps don't fully capture risk

NEWS STORY: SEP 30, 2020 HOUSING, HURRICANE HARVEY

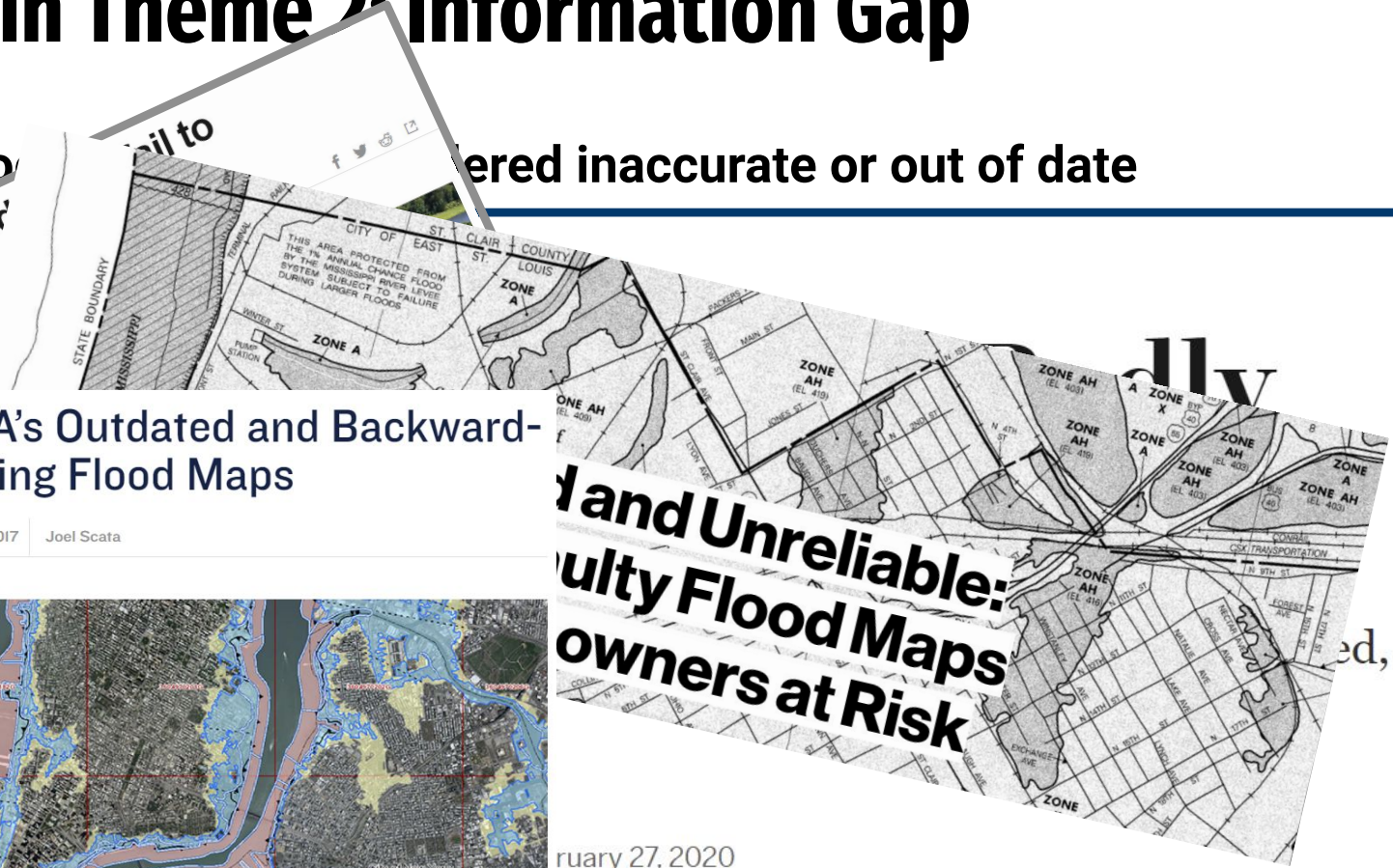
FEMA's Outdated and Backward-Looking Flood Maps

October 12, 2017 Joel Scata



**Outdated and Unreliable:
Faulty Flood Maps
Leave Homeowners at Risk**

February 27, 2020



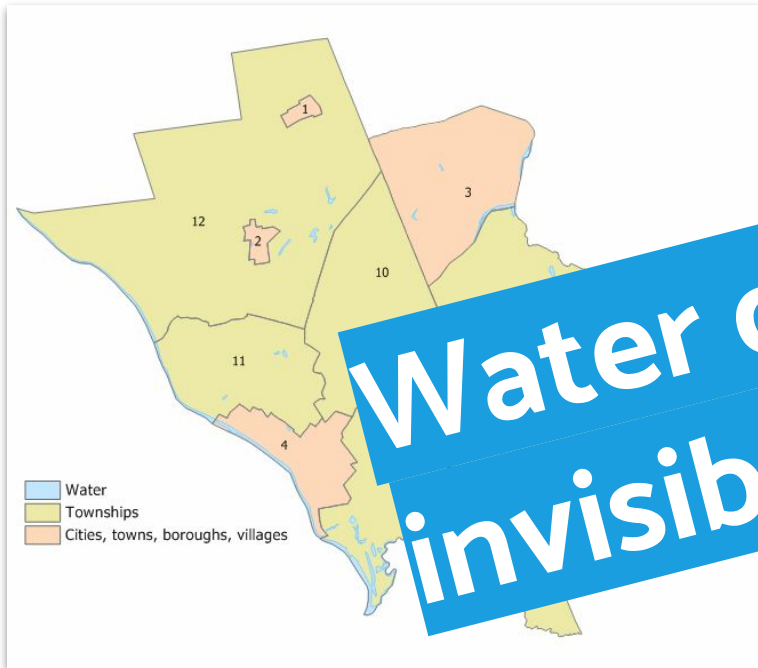
Main Theme 3: Continued Occupation of Flood Zones



14.6 million homes in flood zones



Main Theme 4: Lack of Cooperation Between Townships



Mercer County

- 253 boroughs
- 253 boroughs

Water doesn't follow invisible border lines

Main Theme 5: Emergency Response and Preparedness

- 30 deaths from Hurricane Ida throughout NJ
- But some resilient towns such as Manville had 0 casualties

1. The emergency response of Manville is **better equipped** to respond to storms and flooding due to their experience



2. The citizens are more **knowledgeable** about how to **prepare** their homes against and **protect** themselves during high floods.

Let's get more concrete with our opportunities

Interviews

- Flood damages
- Lack of awareness over flood zones and other key issues
- Rampant overdevelopment isn't helping the issue
- Lots of existing and potential solutions require *money!*



Insights

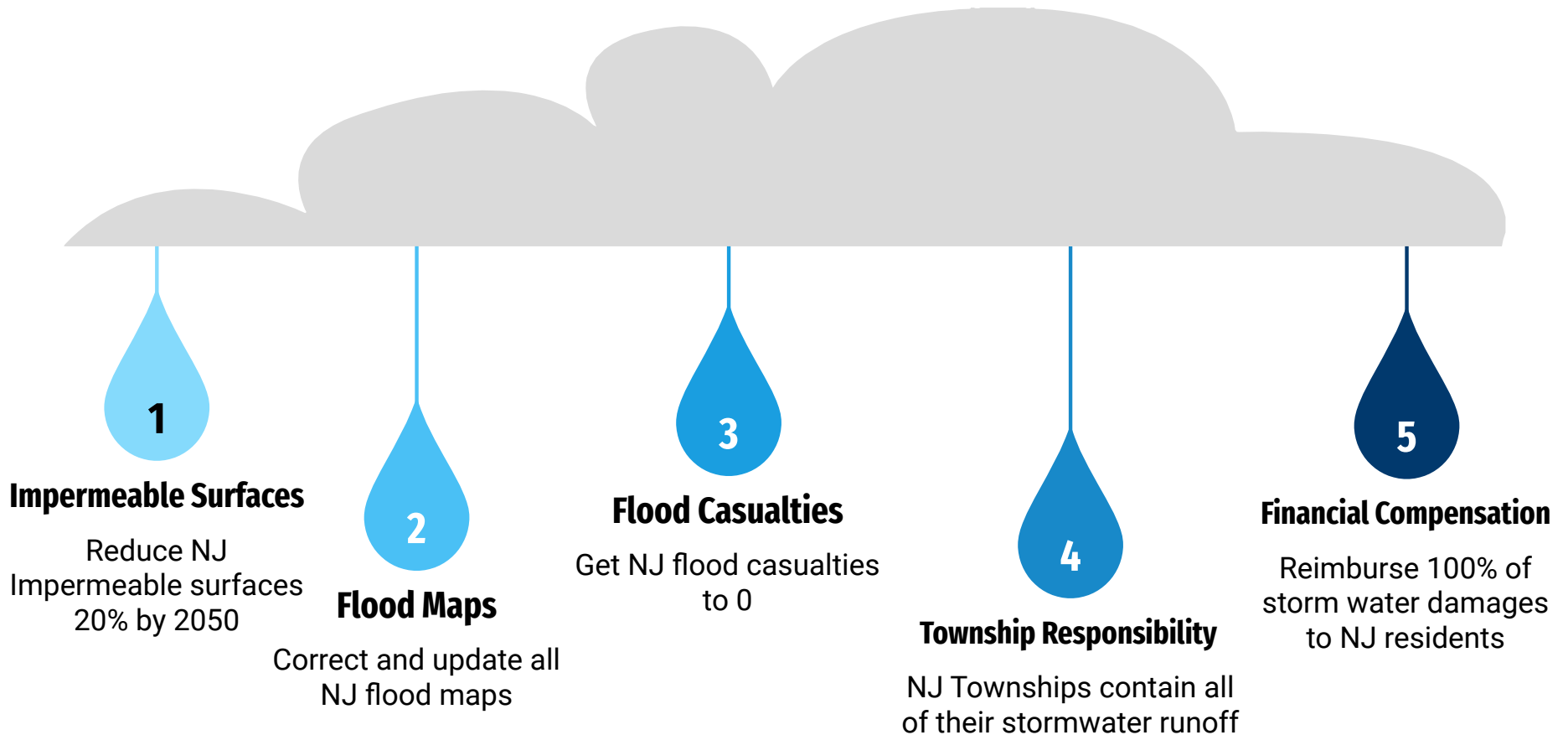
- Towns aren't always on top of stormwater management – and when they are, they typically only have themselves in mind
- Residents simply aren't aware of existing solutions
- Our efforts would likely be more effective if we worked with and for residents – products, education, services?



How Might We?

- How might we inform potential home dwellers of flood zone locations?
- How might we use influential platforms like social media to spread information about ways to mitigate stormwater?
- How Might We encourage collaboration and teamwork between towns and cities?

What might be our BEHAGs?





Watershed Institute Partner

Expertise (WI)

Experts from various fields including advocacy, outreach, sustainability, etc.

Area of Studies (DD)

Diverse array of backgrounds and majors - unique insights

Established Institution (WI)

Important community foothold with established name

Field Work (DD)

We have personal experiences with flooding and conducted 40+ interviews

Princeton University (DD)

Access to university resources and student body

Some Exciting Ideas

Run flood simulations to find weak points in existing infrastructure

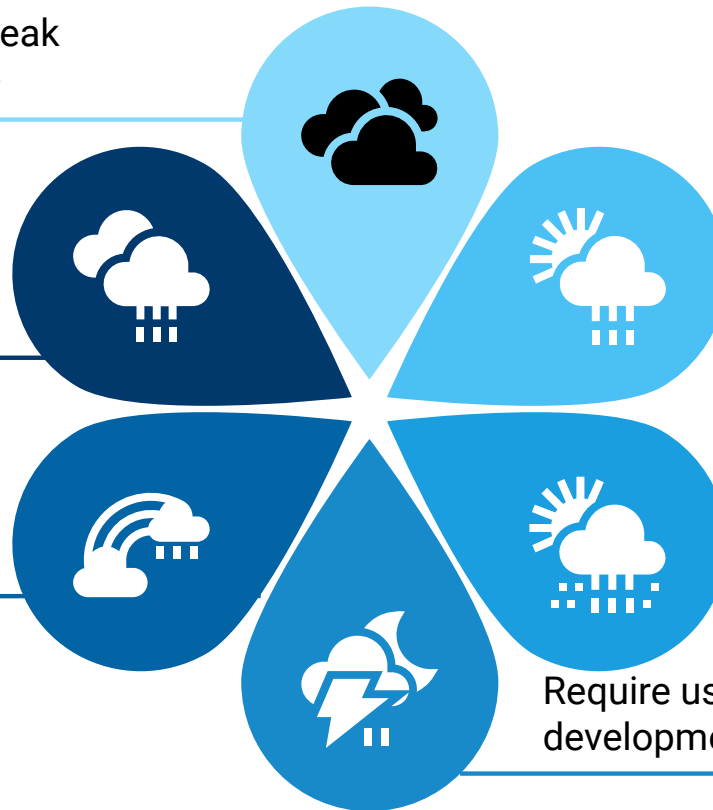
Implement better flash flood warning systems (i.e. sirens)

Centralize up-to-date flood maps

Compare/contrast Manville's emergency protocol w/ other towns

Form a council that evaluates existing development laws

Require usage of pervious pavement in new developments



Milestone Timeline / Next Steps

Sept 6
Conceptualization
Phase Begins

Oct 1
Narrow down to 3
solutions and start
prototyping

Nov 1
2 Prototypes
completed

Dec 1
Finalize
Product Idea

Jan 29
Implementation
Phase Begins

Sept

Oct

Nov

Dec

Jan

Feb

Mar

Apr

Early Sept
Advisor
Meeting

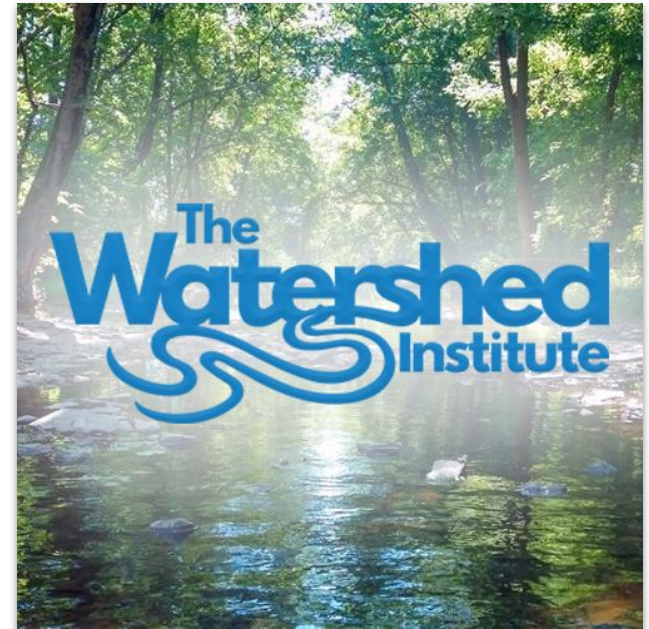
Late Sept
Partner
Meeting

Late Oct
Partner
Meeting

Late Nov
Partner
Meeting



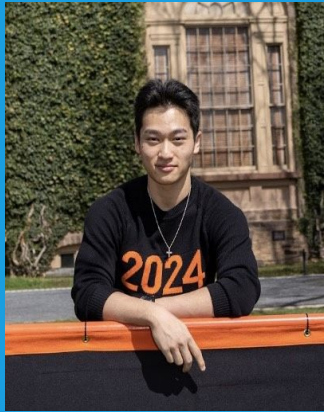
THANK YOU!!!



Q & A

You can email us at
downpourdetour
@gmail.com with
any more questions
or comments you
may have

Jonathan Lee



'24 Economics

Alex Borengasser



'25 Molecular Bio

Amy Aririguzoh



'24 Medical Anthro

Cocoa



'22 18th Century
Slavic Literature

Erica De San Jorge



'25 Psychology

Alexcis Johnson



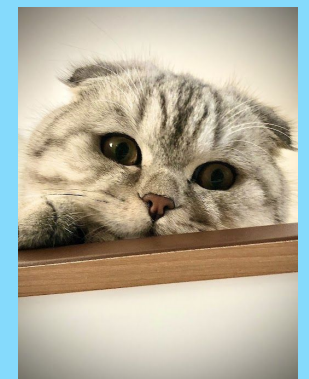
'26 Neuroscience

Luke Maake



'23 Computer Science

Simba



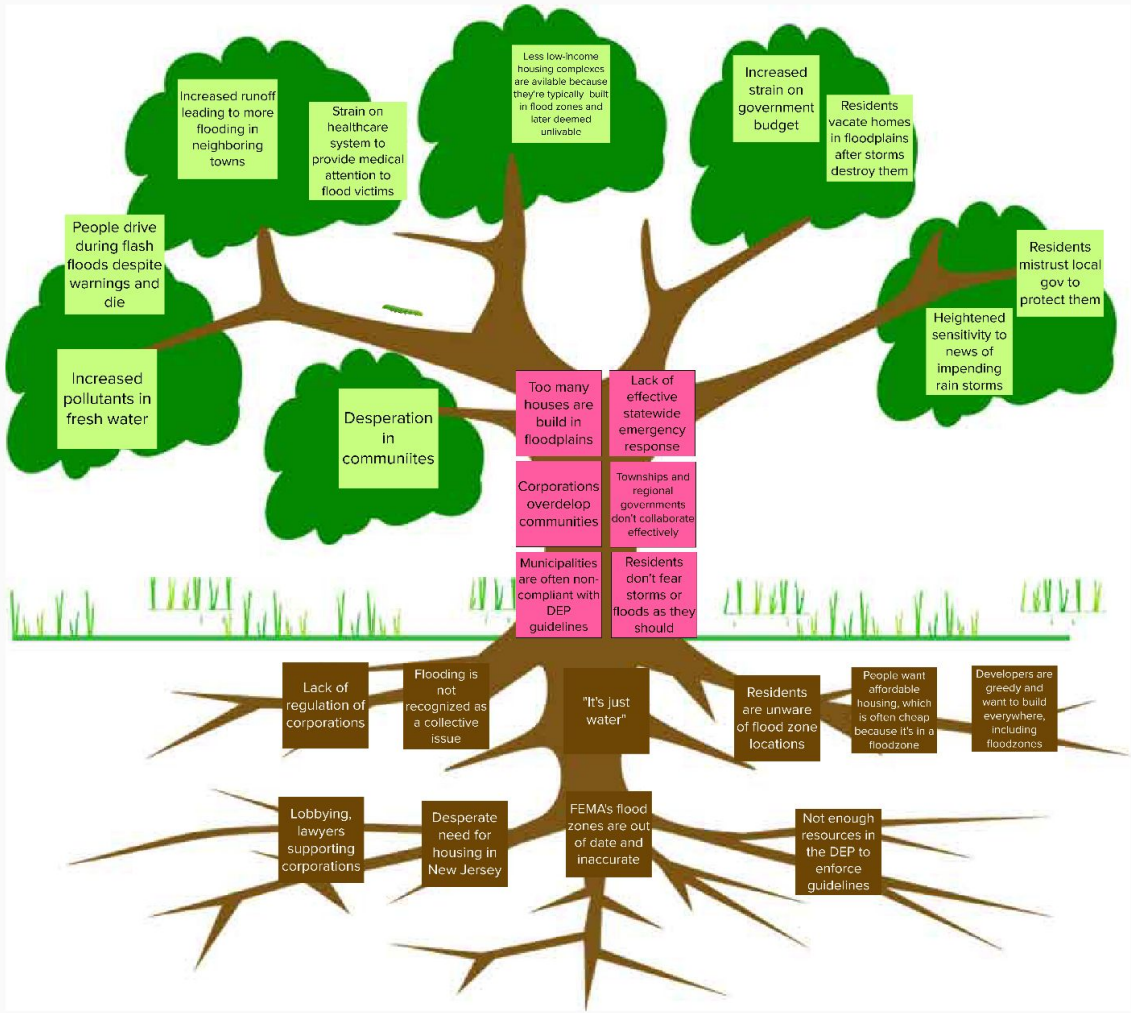
'21 17th Century
Russian Literature

Framing the Problem

CONSEQUENCES

MAIN PROBLEMS

ROOT CAUSES





Random yet CRITICAL Facts Slide

- A cross between a zebra and a horse is delightfully called a zorse
- Cory Booker and RuPaul are genetic cousins
- Tomatoes and potatoes are closely related
- The cornea is the only living tissue in the body with no blood flow
- The bird with the greatest wingspan is the albatross
- The combined biomass of all ants far outweighs that of humans
- On average, 100 people choke to death on ballpoint pens every year.
- Humans and giraffes both have the same number of neck bones
- The "dot" over the letter "i" is called a tittle
- You can fit all the planets between the Earth and the Moon
- Queen Elizabeth owns all of the dolphins in England and Wales



