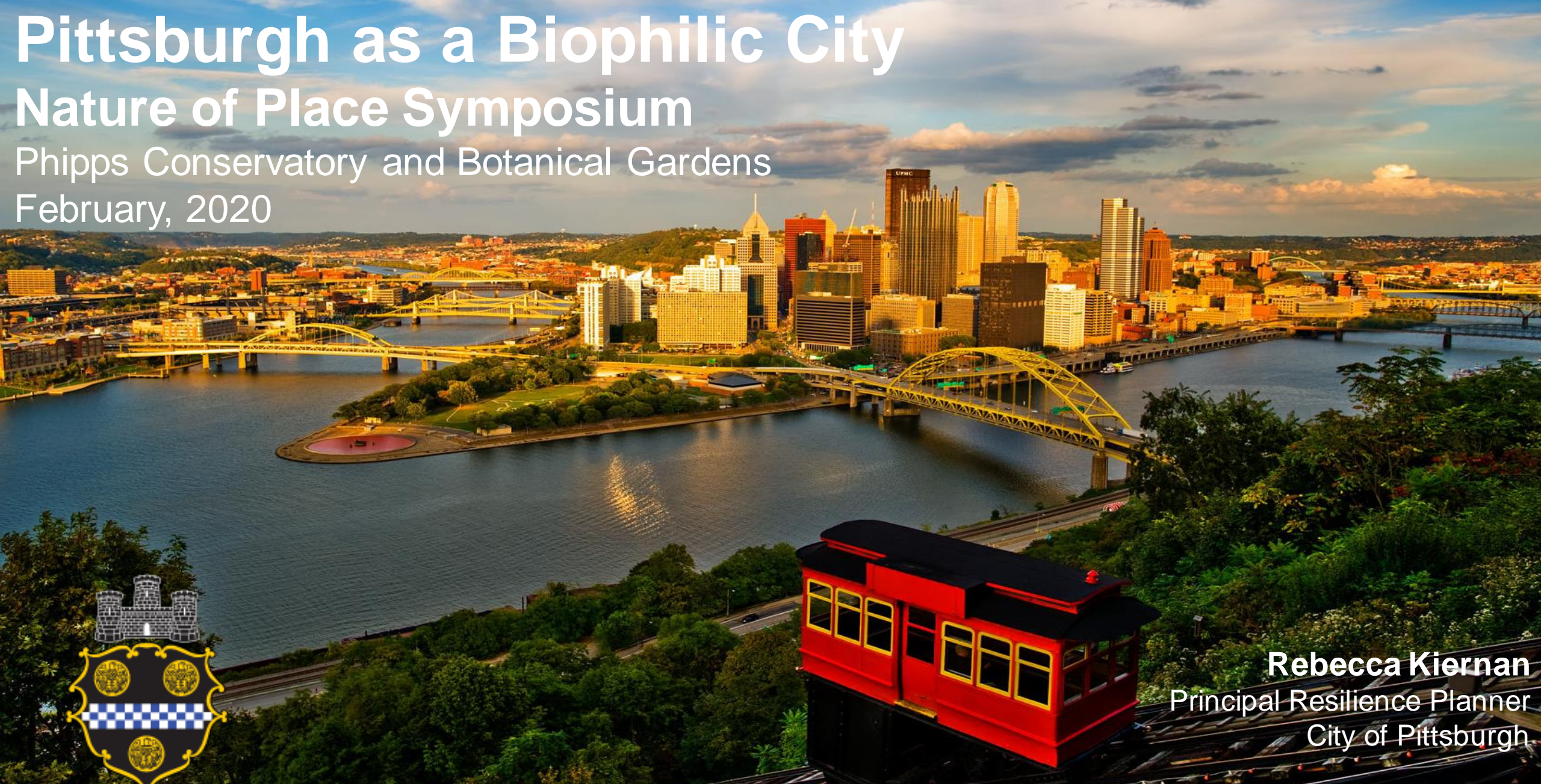# Pittsburgh as a Biophilic City
Nature of Place Symposium
Phipps Conservatory and Botanical Gardens
February, 2020

Rebecca Kiernan
Principal Resilience Planner
City of Pittsburgh

CITY OF
PITTSBURGH

Division of Sustainability & Resilience

Pittsburgh joined the Biophilic Cities Network in 2016

The designation is a partnership between Phipps Conservatory and Botanical Gardens and the City of Pittsburgh

"Being part of the Biophilic Cities Network will help us realize the goals in our own 2030 plan. It will help us to coordinate the efforts of all of the great organizations that work in the City of Pittsburgh on a daily basis. It will do what David Lawrence set out to do in the 1940s, which was to make Pittsburgh a shining example of how a post-industrial city can take care of its air, water, but most importantly take care of its people." - Mayor Peduto, 2016
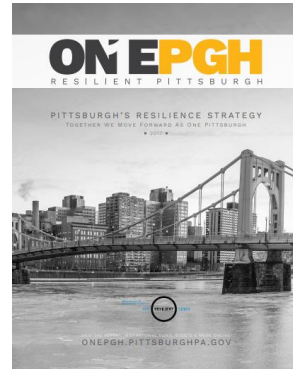

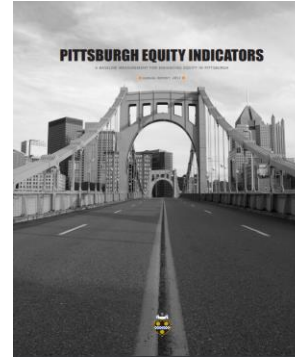*City Paper photo by Rebecca Addison*

Sustainability + Resilience Division Resilience Products and Vision

P4

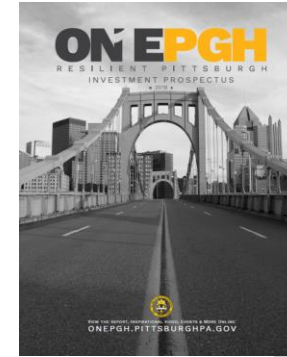**(2015)**

Preliminary Resilience Assessment

(2016)

ONEPGH Resilience Strategy

(2017)

Pittsburgh Equity Indicators

(2018 & 2019)

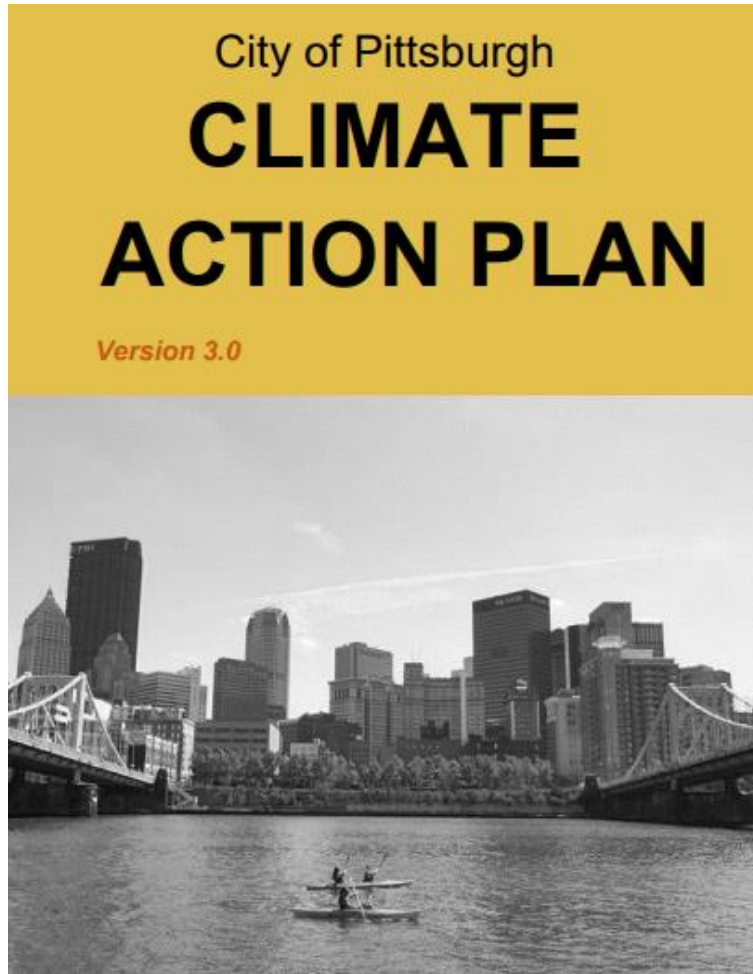**ONEPGH Investment Prospectus**

(2018)

SUSTAINABLE DEVELOPMENT GOALS

(2019)

Pittsburgh's Climate Action Plan

Climate Action Plan 3.0 (2019)

Pittsburgh's 2030 Goals

- 100% renewable energy use
- 50% building energy use reduction
- 50% water use reduction
- 100% fossil fuel free fleet
- 100% waste diversion
- 50% transportation emissions reduction
- Divestment strategy for pension fund

Chapters

- Buildings
- Energy
- Water
- Transportation
- Waste
- Food and Agriculture
- Urban Ecosystems

What is resilience?

Urban resilience is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience.

Urbanization, Globalization & Climate Change

# Pittsburgh's Shocks and Stresses Profile
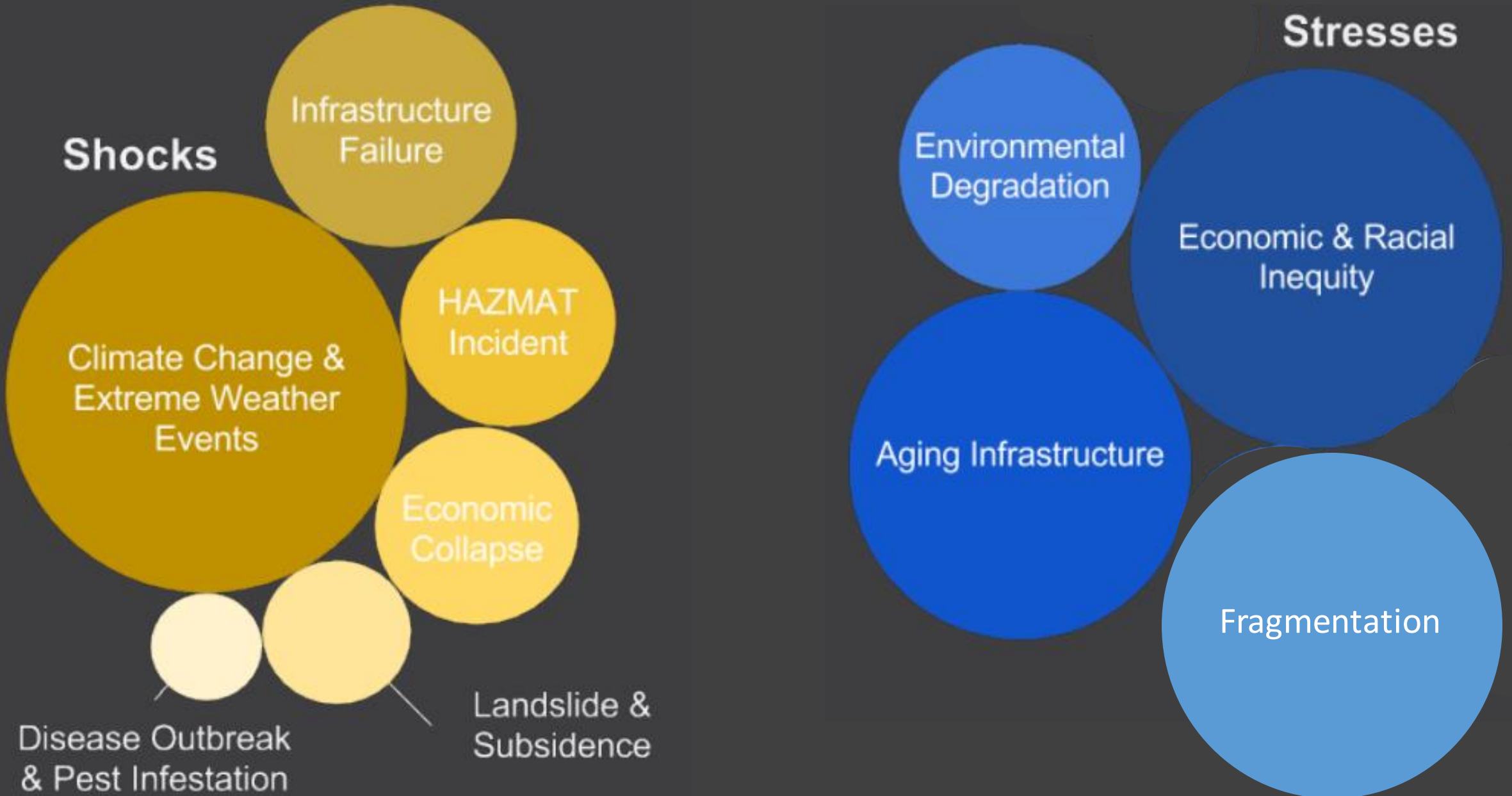
Focus: Addressing stresses to increase resilience to shocks and connect people to healthy, natural spaces

Agenda:
- Current conditions of our green spaces
- Changes in climate currently occurring in Pittsburgh and the impacts we're beginning to experience
- Opportunities to create systemic change in the way we maintain public land

CITY OF PITTSBURGH

Recovering from post-industrialism and subsequent disinvestment

Aging Infrastructure

Rivers and streams
Municipal boundaries
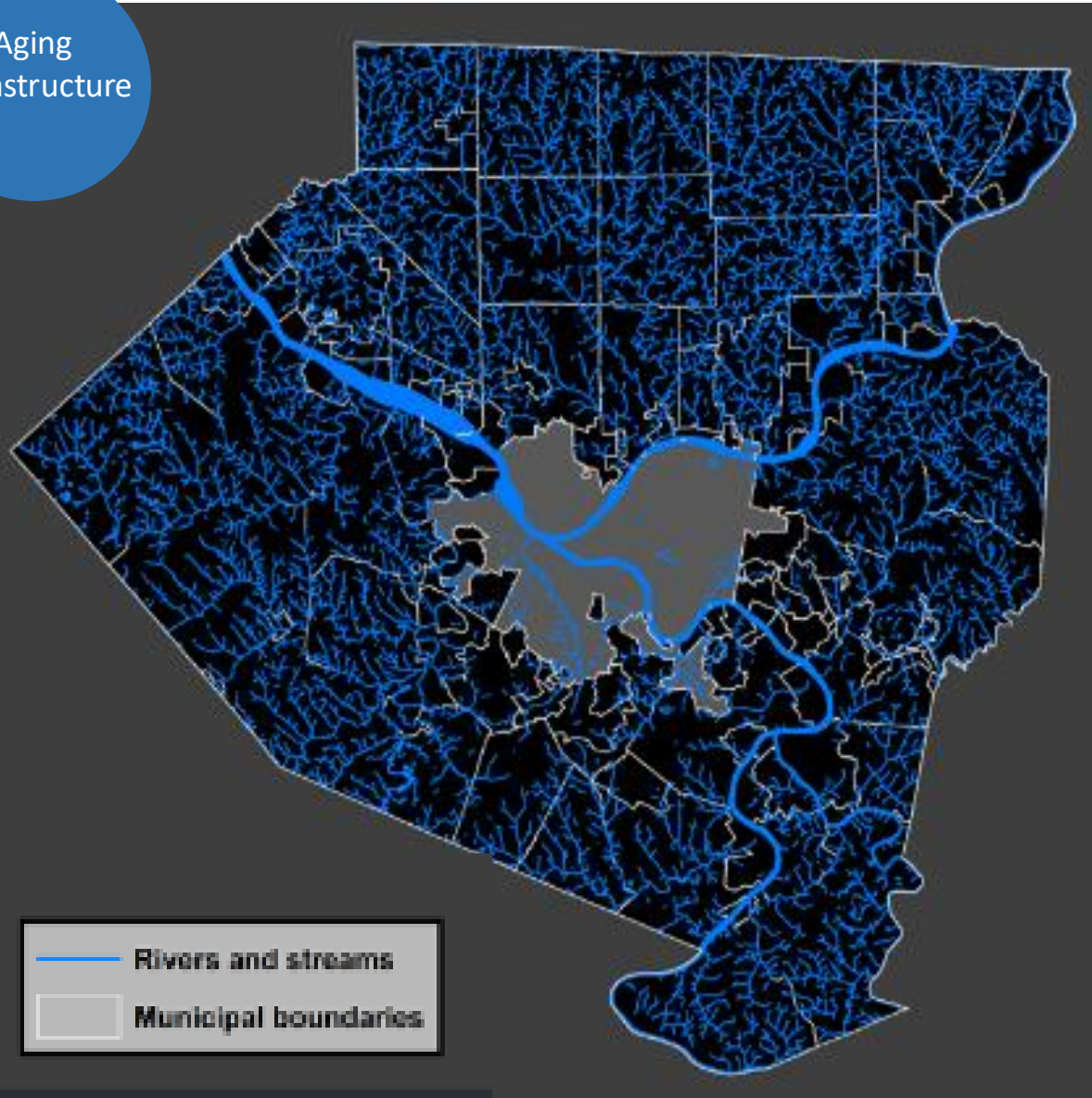
1940
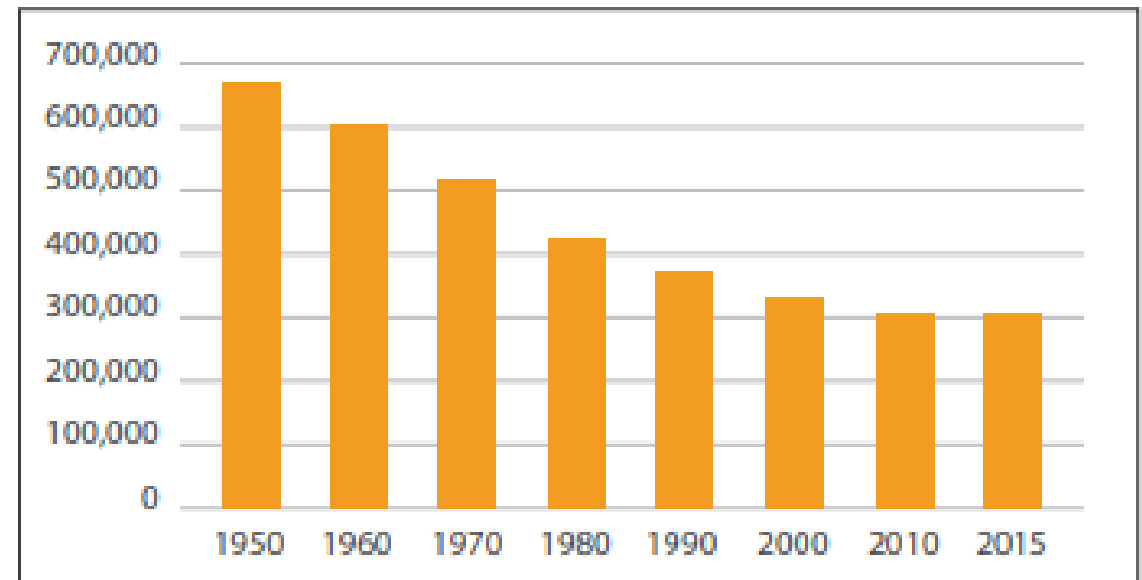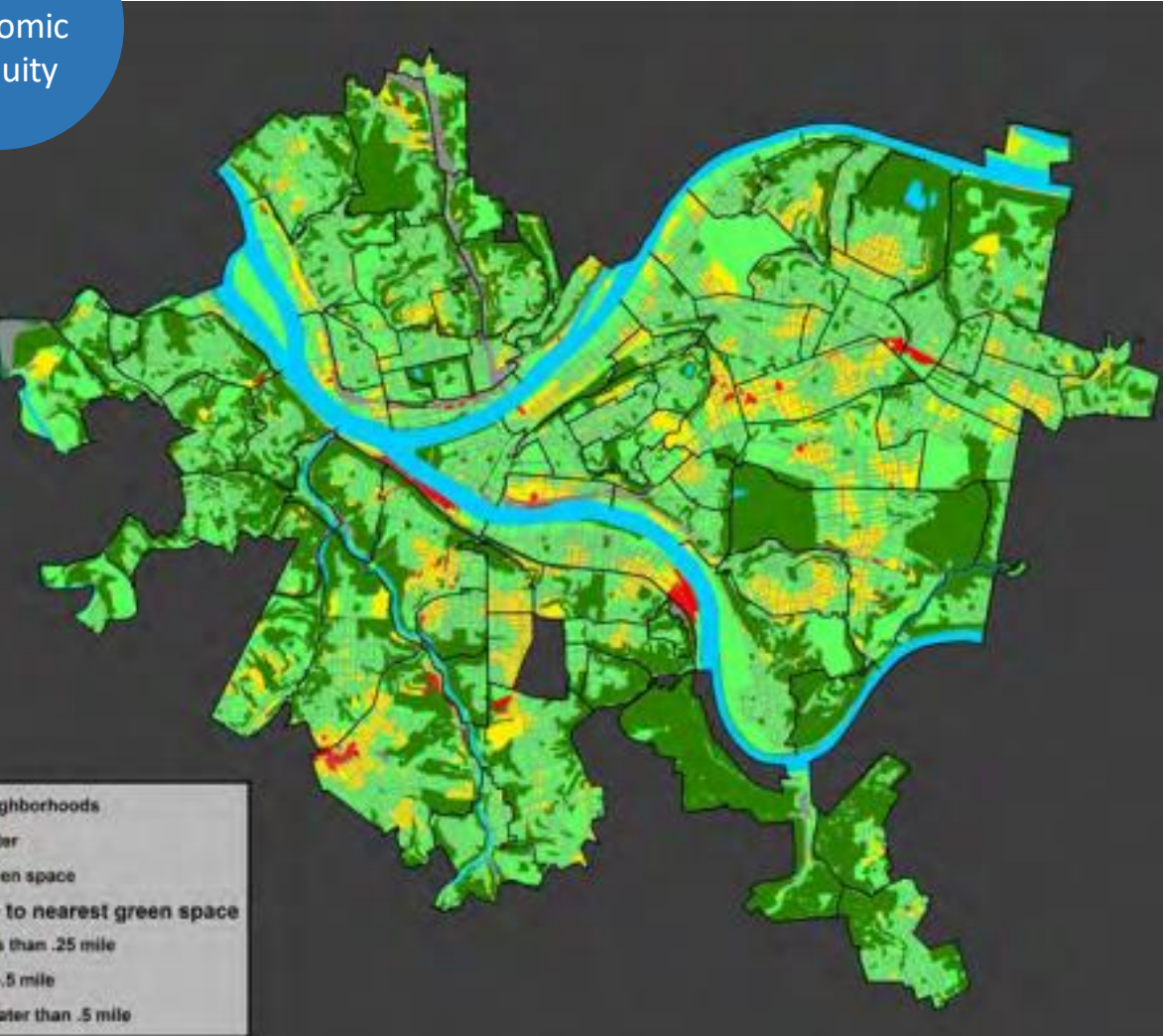
Pittsburgh Population, 1950-2015

Figure notes: Historical population of Pittsburgh, 1950-2015, Source: U.S. Census Bureau

Access to green space scores generally good and equitable, but health outcomes do not align
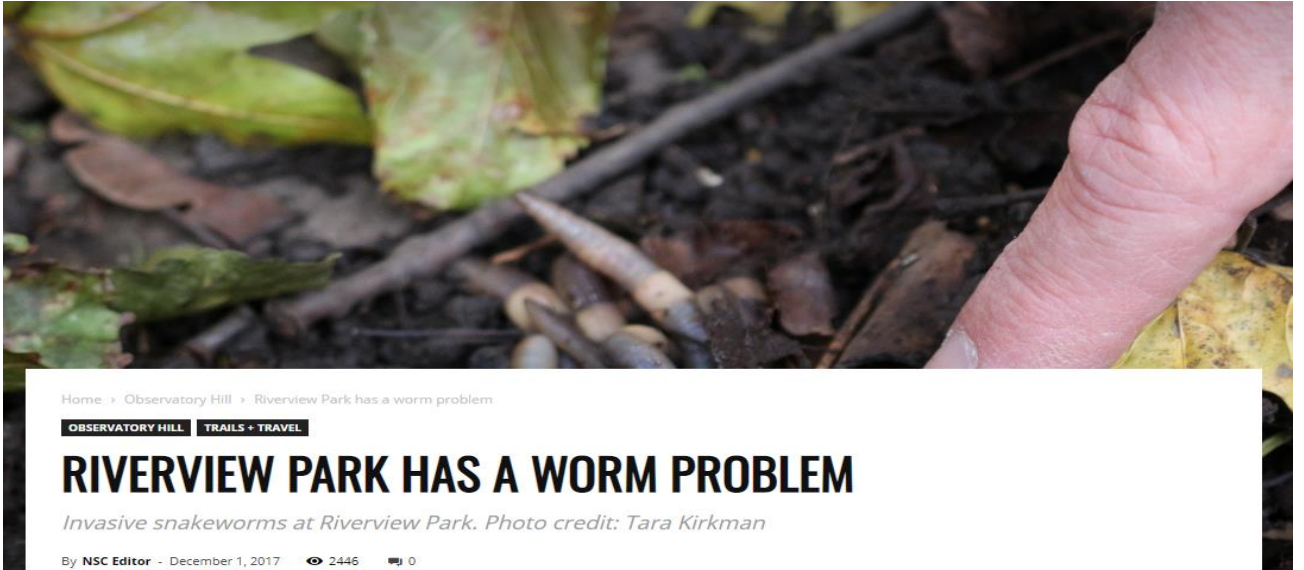

Racial + Economic Inequity

Indicator 59: Access to green space

2018 equality score: 100

Indicator definition	Ratio of the percentages of white and black residents living within one-quarter of mile from a green space	
Reporting year results	**2017** White: 91.0% (178,824 people) Black: 93.5% (68,586 people) **White-to-black ratio = 0.973, score 100**	**2018** White: 90.8% (184,621 people) Black: 94.5% (68,165 people) **White-to-black ratio = 0.961, score 100**
Changes from reporting year 2017 to reporting year 2018	White: −0.2% Black: 1.0% Change in equality score: 0	
Geography	City (census tract)	
Description of results and context	Access to green space (e.g., a park, wooded area, or greenway), based on a living within one-quarter of a mile from green space, is generally good in Pittsburgh. Access varied slightly between racial groups: black residents were slightly more likely to be living within one-quarter of mile from green space (94.5 percent) than white residents (90.8 percent). These findings indicate that black residents may have better access to parks and urban forests than their white counterparts. Between 2017 and 2018, the percentage of black Pittsburghers living within one-quarter of mile from a green space increased by 1.0 percent, while it decreased by 0.2 percent for white Pittsburghers. The small percentage change, and the maintenance of the flipped disparity between black and white Pittsburghers' access to green space, resulted in no change in the 2017 equality score of 100. There is no information available on the error associated with these data points, so we are unable to determine the statistical significance of changes in raw data or equality scores. Note that this analysis does not take into account the quality or specific amenities available at a given green space location.	

Legend:
- Neighborhoods
- Water
- Green space
- Distance to nearest green space
  - less than .25 mile
  - .25-.5 mile
  - greater than .5 mile

Source: ONEPGH Resilience Strategy

Source: ONEPGH Equity Indicators

Conditions: Not all natural spaces are functioning & maintained

Environmental Degradation

Hazelwood Greenway

Highland Park, 2010: 82 deer/ sq mile

Home › Observatory Hill › Riverview Park has a worm problem

OBSERVATORY HILL   TRAILS + TRAVEL

RIVERVIEW PARK HAS A WORM PROBLEM

Invasive snakeworms at Riverview Park. Photo credit: Tara Kirkman

By NSC Editor - December 1, 2017   2446   0
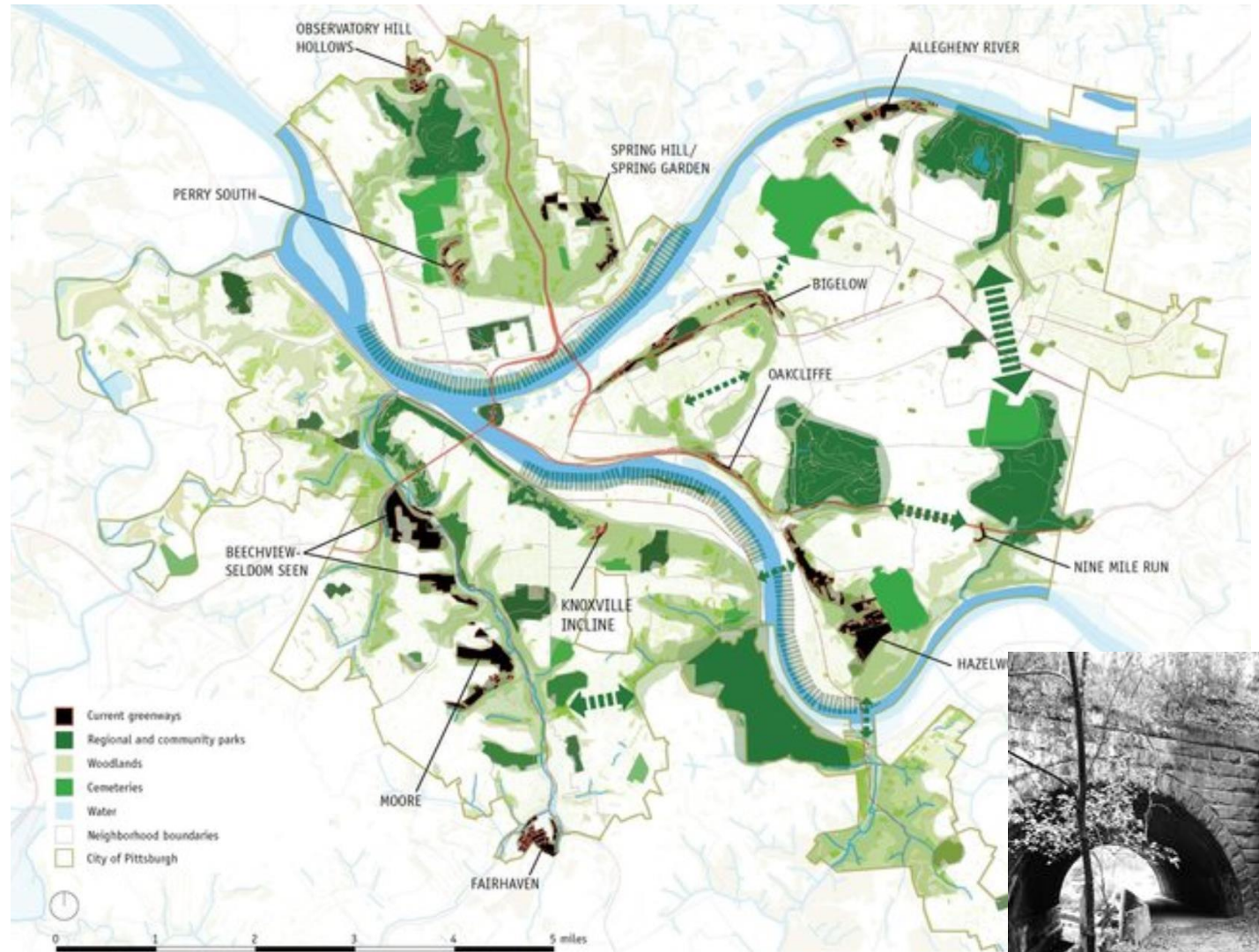
Caring for our urban ecosystems is a collective effort

Fragmentation

- Greenways – unfunded community stewardship, City Planning

- Parks – City DPW, Pittsburgh Parks Conservancy, PWSA

- Tree Canopy – City DPW, Tree Pittsburgh, TreeVitalize

- Vacant Lots – City DPW, City Planning, Adopt-a-Lot, nonprofit orgs

- Streets – City DOMI, PWSA

Pittsburgh's climate is changing now: 2018 wettest on record

Climate Change & Extreme Weather

ANNUAL PRECIPITATION IN PITTSBURGH
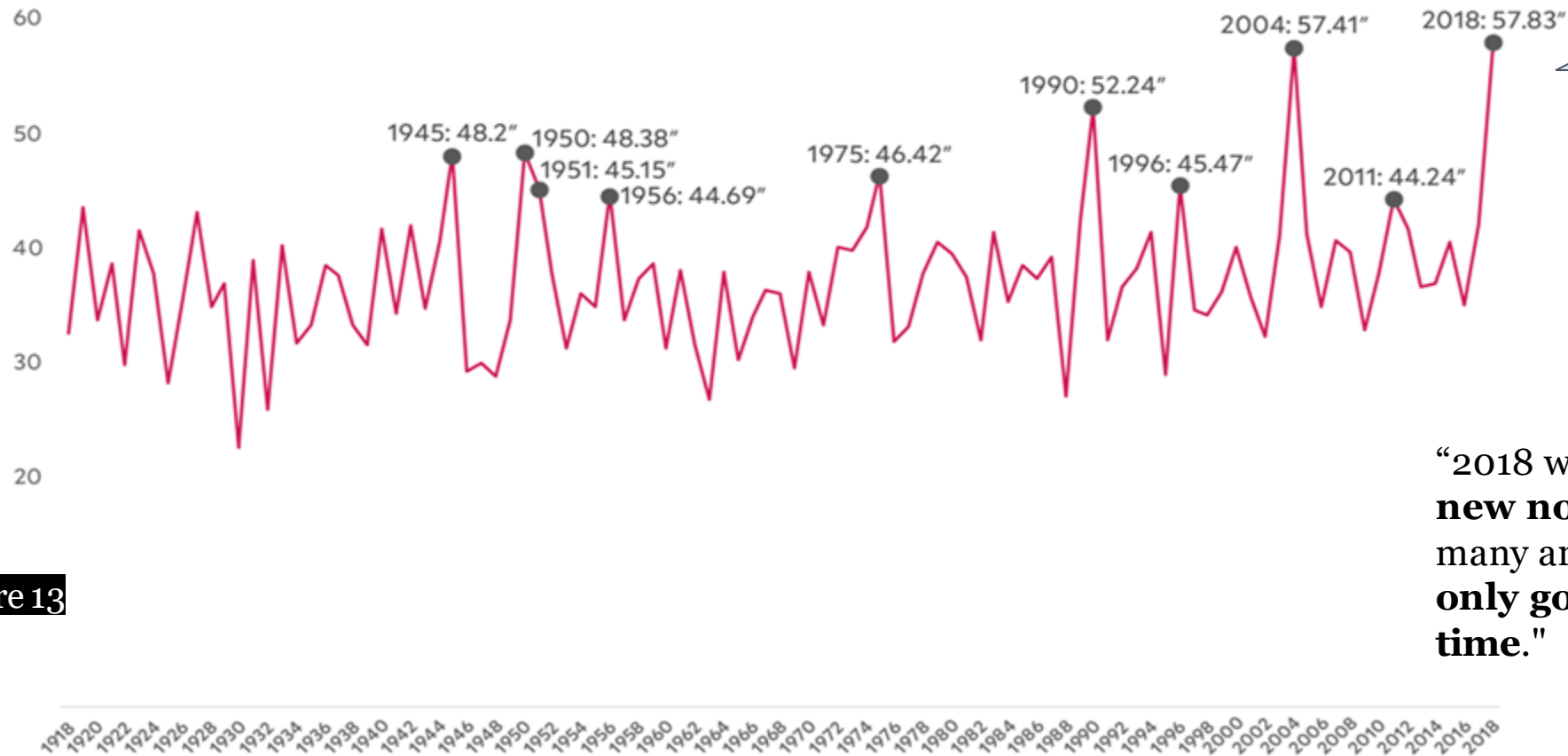
Per the National Weather Service. **2018 was the wettest year on record for the City of Pittsburgh**

2004: 57.41"   2018: 57.83"

1990: 52.24"

1945: 48.2"   1950: 48.38"
1951: 45.15"
1975: 46.42"   1996: 45.47"
1956: 44.69"   2011: 44.24"

"2018 wasn't an outlier — **it's the new normal** ... the issue is that many areas are becoming wetter ... **is only going to get worse over time**."

-CMU Metro21: Smart Cities Institute

Figure 13

(Source: Weather.gov)
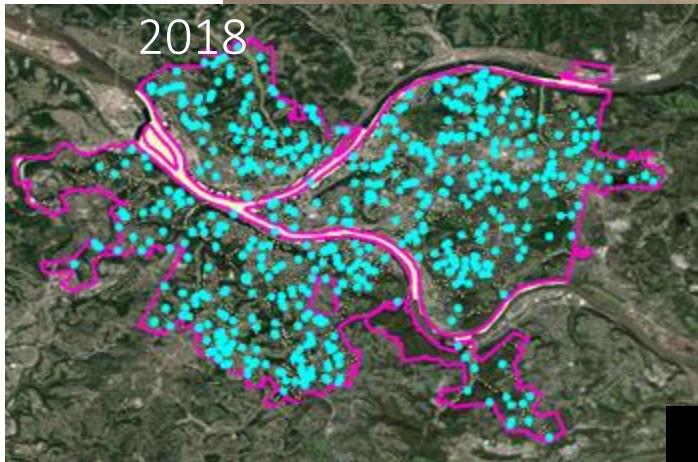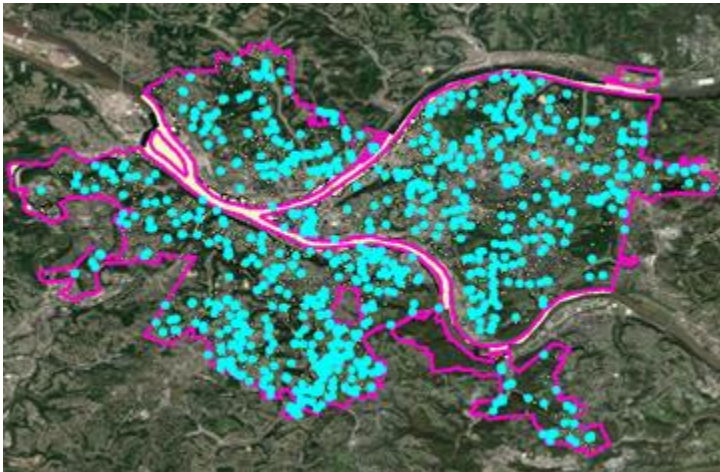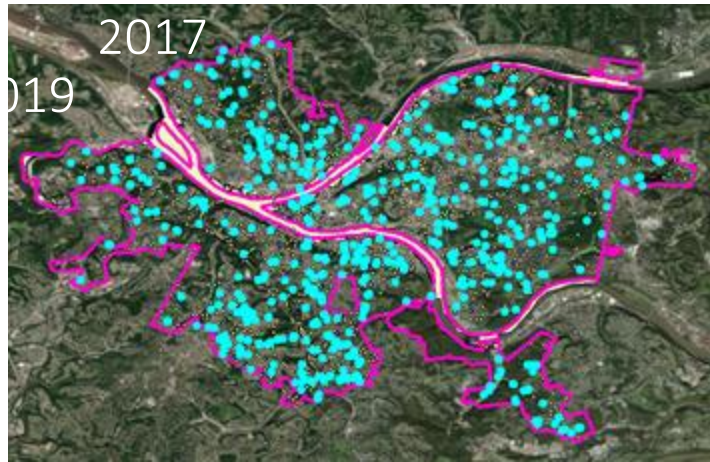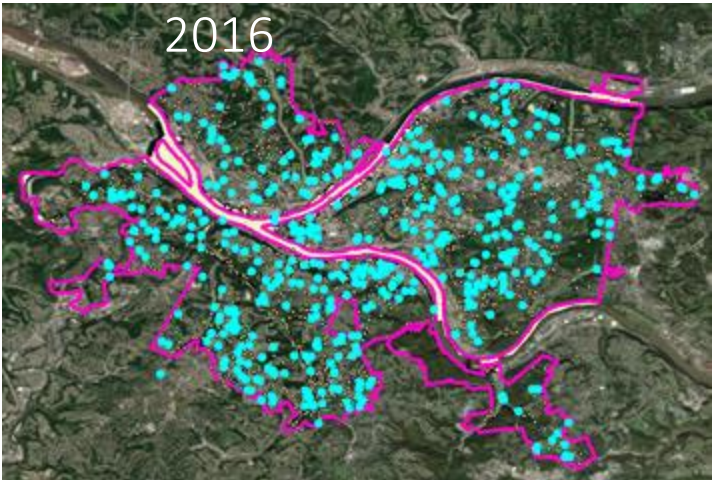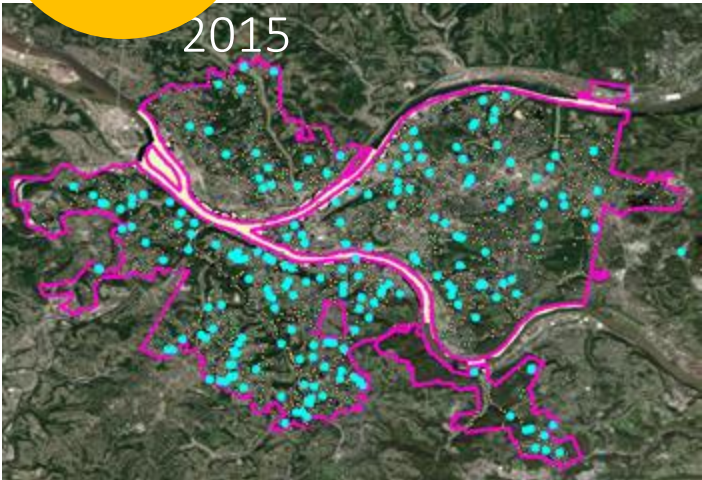
Source: Public Source

Flooding events occurring citywide

Infrastructure Failure

Total 311 Flooding Events by Year

2015

2016

2017

2019

2018

- **2015** - 238
- **2016** - 581
- **2017** - 642
- **2018** - 1038
- **2019** - 756

Pittsburgh is experiencing higher highs, lower lows, and more extreme temperature swings

Climate Change & Extreme Weather

Average Annual Temperature (F)

Figure 2

ANNUAL 5-Year AVERAGES

	Max Temp	Precip (in)	Snow (in)
2005-2010	60.93	3.16	3.91
2014-2019	61.76	3.68	3.50
Difference	0.83	0.52	-0.41

Figure 3

JAN 5 Year AVERAGES

	Max Temp	Min Temp
2005-2010	37.17	25.17
2010-2019	35.33	18.83
	-1.83	-6.33
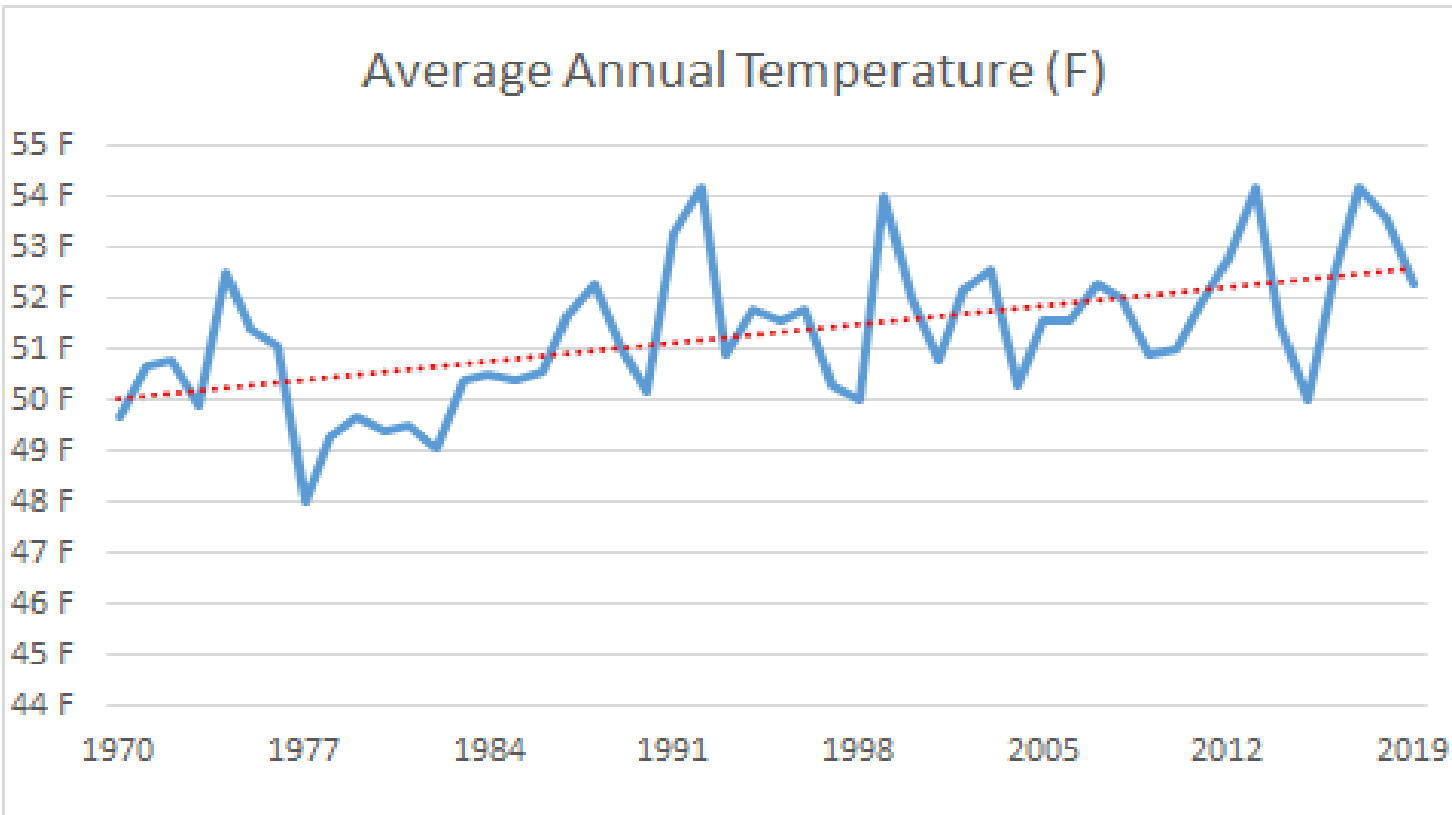
Figure 4

JULY 5-year AVERAGES

	Max Temp	Min Temp
2005-2010	82.33	62.83
2010-2019	82.83	64.33
	0.50	1.50

Landslide & Subsidence

Freeze/thaw and heavy rains lead to landslides, which we see occurring more frequently and on public property

Legend

◇ Public_Assistance_Landslide
◆ Individual_Assistance_Landslide
◆ NASA_Landslides
◆ 311_Landslides
▨ Landslide_Prone_Areas
▨ Pittsburgh_Parks
▨ Greenways
▨ City Owned Vacant Lots

Total Incidents by Source

Individual Assitance	28
Public Assitance	9
NASA	51
311	680
Total	768

	Individual Assitance	Public Assitance	NASA	311	Total
Landslide Prone Areas	0%	78%	41%	47%	
Parks	0%	0%	12%	2%	
Greenways	0%	0%	2.0%	1.8%	
Vacant Lots	0%	0%	3.9%	2.4%	
Total	0%	78%	59%	53%	51%

Inversion events are increasing

HazMat Incident

Figure 11

Table 1. Inversion Statistics for Pittsburgh, PA (2008-2017).*

| Year	Avg. Inversion Strength (°C)	Avg. Inversion Top Height (m)	Inversion Break-Up Time (EST)	Total Annual Days of Inversion (%)
2008	4.1	263	10:00	160 (44)
2009	3.8	244	9:30	154 (44)
2010	4.1	226	9:30	171 (47)
2011	3.7	246	9:30	134 (37)
2012	3.9	229	9:30	158 (43)
2013	3.4	244	9:30	127 (35)
2014	3.4	233	9:30	141 (39)
2015	3.9	250	10:00	166 (45)
2016	4.1	262	10:00	167 (46)
2017	3.8	214	9:30	203 (56)
2008–2017 Average	3.8	240	9:30	158 (44)

*Note: Inversion statistics are based on morning (12:00 UTC, 7:00 a.m. EST) inversion data observed by the U.S. National Weather Service (NWS) office serving Pittsburgh, located near the International Airport in Allegheny County, PA. A minimum surface inversion strength of 1.0 °C was chosen to ensure that an inversion observed at the NWS office at a relatively high elevation was indicative of conditions throughout most of the rest of the county. The estimated time until break-up of the morning inversion was calculated using a method developed by the author.

Allegheny County Health Department

Opportunity: Pittsburgh is endowed with a wealth of greenspace

- Natural Infrastructure is a first line of defense against the changing climate for Pittsburghers

- Connect people to nature, but must improve ecosystem health
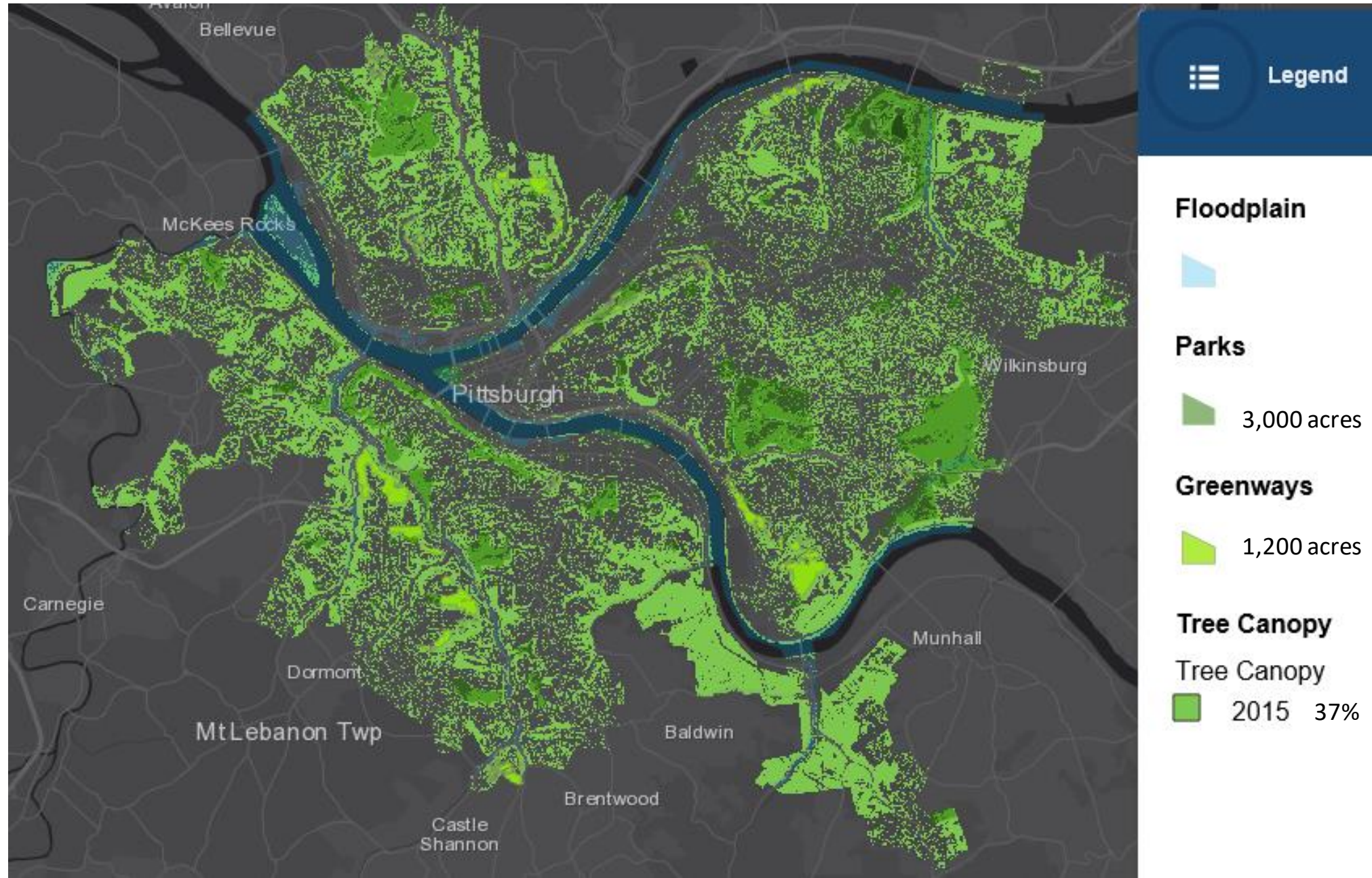
Addressing stresses now will move public property from liabilities to assets

- Stream daylighting projects great first step towards optimizing for stormwater and improved agency coordination

- Important to set ecological standards

- Also need ecosystem services to function for:
  - Slope stabilization
  - Improved air quality
  - Carbon sequestration
  - Species habitat

- Improving ecosystem health is tantamount to connecting people to nature

Adapting public assets to protect people and place is a budget exercise

Analyze current spending

- Unnecessary routine maintenance, mowing
- Post-disaster costs (~$12mil landslide cleanup 2018)
- Deer fencing / replanting after deer browse

Allocate resources to optimize our natural infrastructure

- Identify priority areas
  - Stabilize hillsides appropriately
  - Absorb stormwater
  - Increase and protect tree canopy
  - Plant vegetation that scrubs pollutants from air, water and soil
- Prepare for more frequent use of heating and cooling emergency centers, add air quality filters

KEITH SRAKOCIC / AP

CITY CUTS

WHAT IS CITY CUTS?

City Cuts is the City of Pittsburgh's lawn cutting program for our older neighbors, our veteran neighbors, and our neighbors with disabilities who do not have the means to cut their own grass.

In 2019, this service will be provided approximately every two weeks, weather permitting, from May to October.