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HOUSE DEMOCRATIC POLICY COMMITTEE

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House of Representatives
COMMONWEALTH OF PENNSYLVANIA

HOUSE DEMOCRATIC POLICY COMMITTEE FORUM

Topic: Residential Stormwater Management

Upper Providence Township Building – Phoenixville, PA

December 13, 2019

AGENDA

- 10:00 a.m. Welcome and Opening Remarks
- 10:10 a.m. Kelly Flanigan
Global Warming Solutions Campaign Associate
PennEnvironment
- 10:15 a.m. *Questions & Answers*
- 10:35 a.m. Panel from Tredyffrin Township Resident Task Force on Stormwater:
- Ray Clarke, Member
 - Anne Murphy, Member
- 10:45 a.m. *Questions & Answers*
- 11:05 a.m. Panel of Local Township Officials:
- David Boelker, Director of Planning/Zoning/Code Enforcement and Zoning Officer, Borough of Phoenixville
 - Murph Wysocki, Board of Supervisors President, Tredyffrin Township
 - Bill Martin, Township Manager, Tredyffrin Township
- 11:15 a.m. *Questions & Answers*
- 11:35 a.m. Adam Suplee, RLA
Trustee
PA-DE Chapter of American Society of Landscape Architects
- 11:40 a.m. *Questions & Answers*
- 12:00 p.m. Closing Remarks

Kelly Flanigan, Global Warming Solutions Associate, PennEnvironment
Climate Change and Stormwater Testimony
December 13, 2019

Good morning everyone and thank you so much to Rep. Shusterman and her staff for inviting me to speak today. My name is Kelly Flanigan and I'm the Global Warming Solutions Associate for PennEnvironment. For those who aren't familiar, PennEnvironment is a statewide nonprofit environmental advocacy organization dedicated to protecting Pennsylvania's clean air, clean water, open spaces, and ensuring we have a safe, livable climate for generations to come. I have a background in meteorology and climate science, so I was asked to speak today about climate change and its impacts on rainfall trends and stormwater here in Pennsylvania.

To start, I thought it would be helpful to briefly explain what stormwater is. Then I'll dive a little more into the rainfall impacts we've already seen from climate change and what we can expect moving forward.

When it rains, or when snow melts, that water has to go somewhere. In more natural areas, water is simply absorbed by the ground, but in cities and towns where there are more impervious surfaces like pavement and rooftops, there isn't a way for the water to sink into the ground. All of the water that doesn't get absorbed by the ground, flows over the ground, over roofs and through gutters on buildings, into storm drains, and into the nearest waterway—our lakes, rivers, and streams. All of that water that isn't immediately absorbed into the ground is stormwater. ([Penn State Extension](#))

Improperly managed stormwater can cause a wide range of problems, including flooding, pollution, health impacts, streambank erosion, sedimentation, impacts to groundwater resources, and even impacts to recreational opportunities. ([Penn State Extension](#)).

So that's why it's so important that we understand how rainfall and flooding are going to be impacted by climate change and that we work to implement smart stormwater solutions as we move forward.

Decades of dedicated climate research have shown that our climate is changing and it's going to have widespread impacts across the globe, including here in Pennsylvania. The best way to summarize the impact of climate change on precipitation is to say that the "wet gets wetter and the dry gets drier." So, while drier places like California are seeing worsening drought, here in Pennsylvania we're already seeing more rainfall and flooding, which will only become more severe as our global climate continues to warm.

A recent climate central study showed that precipitation is the number one climate hazard for our region by 2050. ([Climate Central](#)).

The reasons for these increases in rainfall are twofold. First, rising global temperatures lead to more water evaporating from the land and oceans, and second, the warmer atmosphere can hold more water vapor. That means that when it does rain or snow, there is more water stored in the atmosphere to fall as precipitation. ([UCS 2018](#))

As I mentioned earlier, we're already starting to feel these impacts right here right now.

Since 1920, the average annual precipitation in Pennsylvania has increased 5 to 10 percent ([PA DEP](#)) and by the end of the century, the monthly precipitation in the Northeast is projected to be about 1 inch greater for December through April ([NCA4](#)).

But the biggest impact we'll see is not in average rainfall, but in the frequency of extreme downpours and the amount of rain that falls during them.

The Northeast US has already seen higher rates of increase in rainfall intensity than other regions of the US ([NCA4](#)), with more than a 70% increase in the amount of precipitation falling in very heavy events between 1958 and 2010 ([PA DEP](#)). The Northeast US is projected to see at least an additional 40% further increase in rainfall during these heavy rain events by the end of the century, especially in winter and spring.

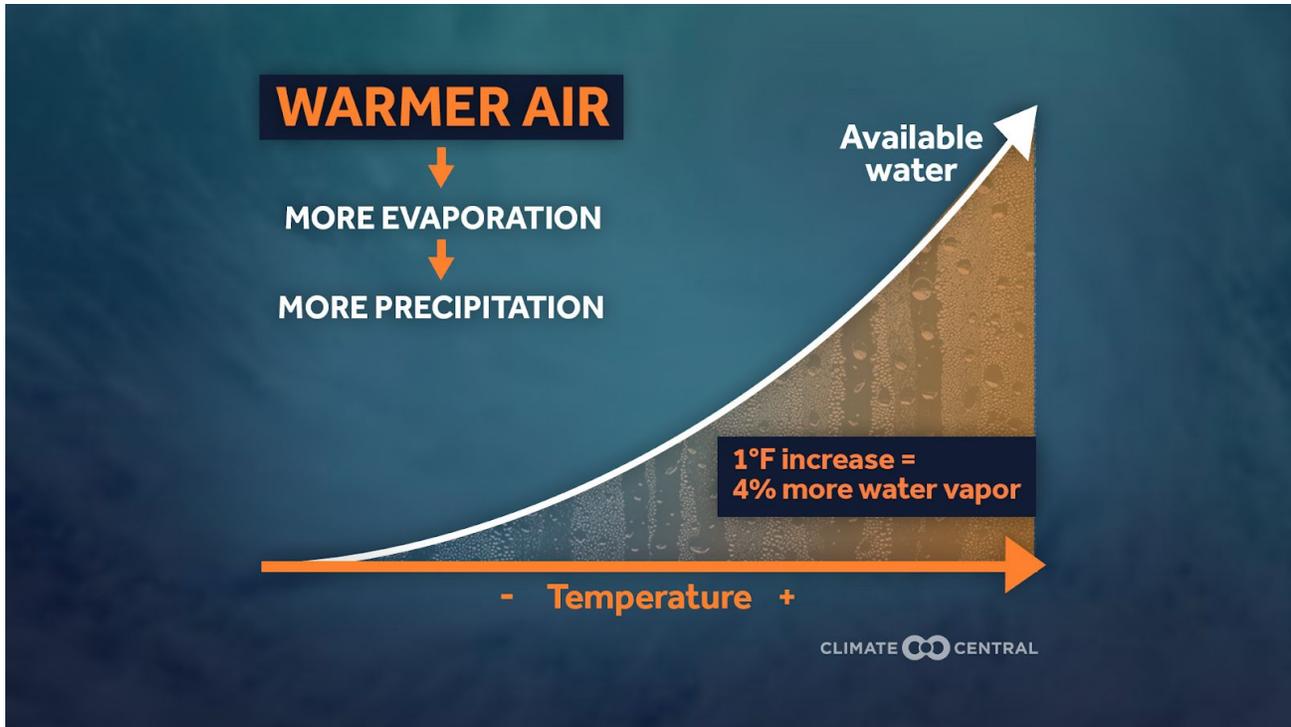
In fact, [the American Meteorological Society](#) just published a study that showed that the damaging floods throughout the warm season of 2018 were made 1.1 to 2.3 times more likely due to human-caused climate change.

Climate models predict that if carbon emissions continue to increase as they have in recent decades, the types of downpours that used to happen once every 20 years could occur every 4 to 15 years by 2100. ([Climate Central](#))

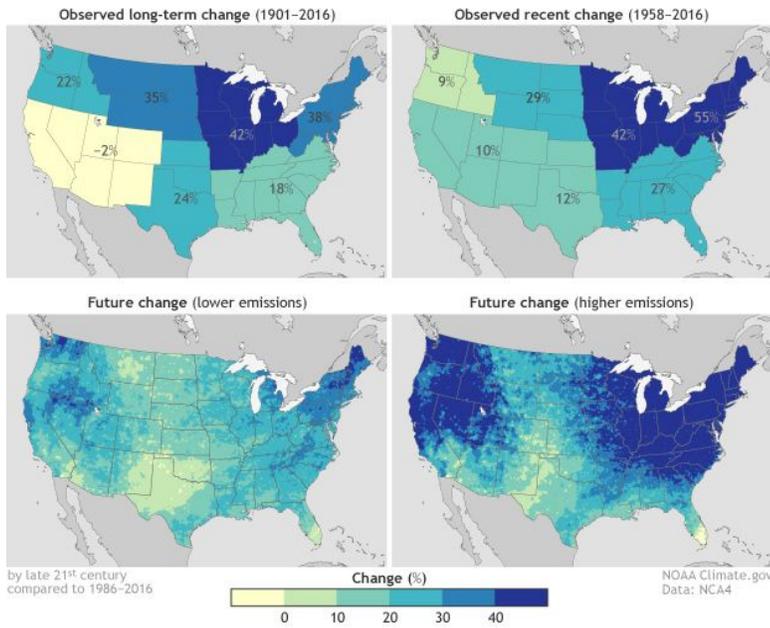
So it's clear that climate change is already dramatically impacting, and will continue to impact, our weather here in Pennsylvania and we need to take action. In the short-term, improving our stormwater infrastructure will be crucial, as we'll hear from the other panelists today. But as we move forward, it is imperative that we take bold steps to reduce our greenhouse gas emissions here in Pennsylvania and do everything in our power to take action on the climate crisis by getting off of fossil fuels and transitioning to 100% renewable energy.

Thank you again for having me today and I'd be happy to take any questions at this time.

Helpful Visuals:



Change in extreme precipitation across the United States



Top 50 Cities With Biggest Increases in Heavy Downpours

Rank	City	Percent Increase*	Rank	City	Percent Increase*
1	McAllen, TX	700	26	Columbus, OH	78
2	Portland, ME	400	27	Atlanta, GA	75
3	Philadelphia, PA	360	27	San Francisco, CA	75
4	New York City, NY	350	29	Albany, NY	71
4	Louisville, KY	320	30	Cleveland, OH	71
6	Visalia, CA	300	31	Austin, TX	67
7	Harrisburg, PA	283	31	Baltimore, MD	67
8	Houston, TX	167	31	San Diego, CA	67
9	Augusta, GA	140	34	New Orleans, LA	62
9	Providence, RI	140	34	Oklahoma City, OK	62
11	Cincinnati, OH	137	36	Bridgeport, CT	60
12	Durham, NC	129	36	Little Rock, AR	60
13	Baton Rouge, LA	120	36	Madison, WI	60
14	Knoxville, TN	112	39	Worcester, MA	58
14	Lancaster, PA	112	40	Springfield, MO	55
16	Albuquerque, NM	100	41	Grand Rapids, MI	54
16	Minneapolis, MN	100	42	Bakersfield, CA	50
16	Phoenix, AZ	100	42	Detroit, MI	50
19	Charlotte, NC	86	44	Birmingham, AL	44
19	Des Moines, IA	86	44	Toledo, OH	44
21	Lansing, MI	83	46	Melbourne, FL	43
21	St. Louis, MO	83	47	El Paso, TX	40
21	Tulsa, OK	83	47	Rochester, NY	40
24	Seattle, WA	82	47	Tucson, AZ	40
25	Kansas City, KS	80	50	Jackson, MS	37

* between number of heavy downpours from 2005-2014 compared to 1950-1959

Ray Clarke's Notes for Stormwater Management Policy Hearing
State Representative Melissa Shusterman

Part II: Residents' Issues and Concerns

Questions/Topics to consider for Testimony

- Residents' stormwater concerns
- Resident questions for township officials and state legislators

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1. Background

- Who am I:
 - o Tredyffrin resident, adjacent to regularly flooding Valley Creek
 - o Vice-President of Open Land Conservancy: 7 Nature Preserves in Tredyffrin, protecting 500 acres of open space, all volunteer managed and supported, recipient of stormwater run-off, grantor of stormwater management easements to Tredyffrin Township
 - o Co-Chair of Tredyffrin's newly authorized Citizen Stormwater Advisory Task Force
- What is the Task Force
 - o Group of regional residents with experience dealing with watershed issues in the Township
 - o Origins with the Valley Creek Restoration Partnership, formed to rehabilitate Valley Creek after contamination from the Paoli railyards. Includes Valley Forge NHP (into which Valley Creek flows on way to Schuylkill), PA F&BC. Trout Unlimited
 - o Group made presentation to Tredyffrin Board of Supervisors in April 2019; argued for action; the Supervisors agreed, and (among many other things they are doing), authorized the STF.
- Task Force Approach
 - o Two key thrusts, based on bringing facts and data to bear:
 - What are the problems, where are they and what are the priorities?
 - What are potential solutions and how could they be funded: project portfolio, ordinance changes, resident education and actions, tree canopy protection, municipal funding benchmarks?
- Where are we now:
 - o **Set a meeting like this one, focused purely on Tredyffrin – January 7th**
 - Similar agenda but keyed around the particular geography in Tredyffrin: particularly the Valley Creek and Trout Creek watersheds and their confluences in the valley, the steep slopes, impervious cover, and so on.
 - o **Developed a survey to collect data on the specific problems** that residents have experienced: what are they, where are they, how often
 - www.surveymonkey.com/r/TredyffrinStormwater
- My plan today is to use the context the Task Force has already gathered, resident conversations that I've had, plus my experience with OLC and of living here for 20 years to provide some thoughts on the prompts that Rep Shusterman's office gave me:
 - o Residents' stormwater concerns
 - o Resident questions for township officials and state legislators

2. Resident Stormwater Concerns

- **Safety**
 - o Probably more than anything else, people do not want to be swept away in floods
 - o There have been instances in the past two years where folks have had to be rescued from their cars and children swept into stormwater culverts
- **Property damage**
 - o People do not want to have to deal with the hassle and cost of remediating damaged property
 - o Areas of damage: structures, driveways, yards
- **Property Value**
 - o Residents are concerned that their property value will be diminished if potential purchasers are put off by having to deal with stormwater run-off problems on the property
- **Transportation problems**
 - o From damaged roads, bridges and culverts, from flooded roads, from debris in roads
- **Cost to the Township**
 - o Repairs, management projects

3. Resident questions for township officials and state legislators

- What is the Township doing to protect residents and their property?
 - o How are you going to fix the run-off that comes from Township (and State come to think of it) roads and damages resident property?
 - o What is the Township doing through its ordinances or other means to limit the run-off that gets into the streets, and waterways in the first place?
- What can residents do about the neighbor who is sending stormwater run-off from their property onto theirs?
- What is the process for following up after construction projects to ensure that stormwater management facilities are working as designed, and if they are not, to require the property owner to fix the system so that it does work?
 - o When rainfall exceeds the design capacity of systems installed upstream from residents' property, how will their property be protected?
 - o When stormwater runs off projects during construction, what government entity has jurisdiction, who do residents call, and what enforcement capability do they have?
- What is the Township doing to ensure its - aging - stormwater management infrastructure can manage what seems to be increasing intensity and frequency of rainstorms?
 - o What is a fair way to pay for needed improvements to Township infrastructure?
 - o Should property owners with a lot of impervious surface have to manage their own stormwater or pay a fee for the Township infrastructure to do so?
- The Township has limited people and funding capacity for the oversight and projects needed to deal with what seems to be an accelerating problem:
 - What actions is it taking
 - What is the Commonwealth doing to help?
 - What actions is the Commonwealth taking to improve the MS4 process to help Townships implement cost-effective programs with real benefit
- Residents have ideas to improve management of stormwater on their property (and help residents downhill) through a number of containment, infiltration or tree planting possibilities; do the Township, County or State have any programs to help with the cost?

What Homeowners can do to protect themselves against the effects of stormwater?

Adam Supplee, RLA, AICP, LEED AP
Landscape Architect, Planner
Trustee, American Society of Landscape Architects

- Landscape Architects are a licensed profession in the State of Pennsylvania
- For over a century, landscape architects have designed GSI, *Green Stormwater Infrastructure*, including nationally known projects such as Boston's Emerald necklace, New York City's Central Park
 - Landscape Architects design for a balance of stormwater mitigation and aesthetics
 - GSI recharges stormwater into the ground
 - GSI supports the base flow of streams, this groundwater cools and regulates stream temperatures, benefitting the native stream ecosystem
- Last year (2018), the amount of precipitation for SE PA was approximately 74", while the average annual precipitation in our area is about 41.5" annually
- One inch of precipitation falling on one acre of ground is equal to 27,000 gallons of water

Design, in this case, stormwater design, is a very broad topic, ranging from the intricate to the global standpoint.

Decisions that we make locally affect not only ourselves, and our surroundings, but impact the potential for regional flooding, and as we know, our cumulative decisions even affect the entire world, through impacts such as global warming.

- Landscape Architects begin design with a detailed site analysis, to identify and protect natural and cultural features including
 - **Existing trees and woodlands:** (complete, functioning woodland ecosystems provide complex environmental benefits including purification of air, water, soil and support of animals. Mature, functioning woodlands are difficult to replace or re-establish and should be preserved rather than 'reconstructed')
 - **Flood Plains:** As we have recently seen throughout Pennsylvania, devastating flooding has become more extreme and has been occurring more often. We need to consider the impact of flooding on our new and existing communities. Preserved natural or restored floodplains provide areas to absorb the excess volume of water during a storm event.
 - **High water tables:** Water tables and percolation rates should be evaluated when planning for new development. In Pennsylvania, too many new homes are being built in areas with high water tables only to find that sump pumps need to run constantly to keep the natural groundwater at bay. If there is a power outage, basements flood and property damage is imminent if a natural gravity drainage solution is not included.
- **With a complete analysis of existing conditions, Landscape Architects can plan to keep infrastructure like roads & buildings as well as people out of harm's way.**
- **Green stormwater infrastructure can take many forms**
 - **Rain gardens-** shallow stormwater collection areas vegetated with shrubs, plants and trees

- **Complete Streets** include more than just vehicular traffic, they include stormwater infiltration areas, plus many other assets such as room for active transportation (human powered transportation), mass transit, and opportunities for community interaction.
- **Pervious pavement** can collect rainwater and infiltrate it into adjacent vegetated areas such as street trees
- **Green roofs** collect and store water on buildings and release it slowly through drainage or evapotranspiration. Green roofs also stay cooler in the summer, reducing urban heat islands.
- **Preserved green space** used for GSI can also serve as public spaces and parks
- **Green cemeteries** offer a way to infiltrate stormwater that would otherwise run off of mowed lawn cemeteries.
- **Grayfield and brownfield** sites offer an opportunity for ecological restoration and new stormwater infiltration via GSI, while still providing a new functional development on the site.
- **Streambank restoration and floodplain enhancement** projects can increase flood storage capacity and reduce sediment loading in our streams.
- **Greenways preserve stream corridors** including the surrounding lands to be used as linear parks while providing stormwater volume and quality benefits.
- GSI offers multiple benefits to communities
 - Rather than the traditional large tank in the ground or large detention basin, trees, plants and gardens not only mitigate stormwater flooding, they also purify the water, and provide aesthetic enhancements to communities.
 - Tree-lined streets and nearby open spaces are known to **increase real estate values.**

The benefits of trees.

- **Trees capture stormwater even before it hits the ground.** If you've ever walked under a tree in a light rain to "get out of the rain", you have witnessed this capturing ability of trees.
- Even when not in leaf, trees can absorb and hold significant volumes of water from the massive surface area of a tree's bark, this water can be released back into the atmosphere through evaporation.
- The cumulative benefits of the entire stratified ecosystem of a forest have exponentially greater stormwater benefits.
- Trees also act as massive pumps, drawing water from the ground and releasing it into the air through evapotranspiration.
- Trees and vegetation hold soil in place, encourage water recharge into the ground, and slow the runoff of stormwater.

What Can Homeowners Do?

When purchasing a home, buyers need to look critically at the site.

- Look at the elevation of the home compared to surrounding waterways.
- The "100-year" floodplain is a 1% chance of flood, compare this to a lottery ticket. If you had a 1:100 chance of winning the lottery, a lot more people would play.
- Even if the floor elevation of your "living quarters" is above the 100 year flood, is your garage?
Are the local roads that you travel to and from your home out of this flood zone?
Do you have a safe alternate route to go home, or will you be

inconvenienced by road closures or evacuations during a “100 year flood”?

- Evaluate the elevation of your home compared to surrounding ground. The finished grade around your home should slope away from your home, on all sides of your home.

- Did the homebuilder install 2 sump pumps as a nice gesture, or is the groundwater really that bad?

- When buying a home, look for indicators of a high water table, look for nearby indicators, such as ponds and wetlands that lie within similar elevations to the home, or its basement floor. Locally, look for regional indicators such as roads or community assets with the name “Swamp” in them. These were likely named well before marketing agents were involved.

- Does the basement depend on electricity to drain, or is there a pipe or drain that has natural fall that will drain the basement by gravity?

- Downspouts should be clean and directed away from the home, but not directly connected into a centralized stormwater system.

- Attend your local municipal meetings, don't let more problems get built upstream. Good design and properly built communities are an asset, but there is no place for bad or irresponsible design.

- Stormwater should be managed and regulated on a watershed basis. Stormwater doesn't follow municipal boundaries.

When building stormwater improvements to your property,

- Be careful to not infiltrate upgradient or within 25' of a basement, this is often done by accident or poor design
 - Minimize lawn areas only to locations where activities warrant it. Lawn should not be the 'default' groundcover. It should be meadow or woodland.
 - Be sure that your stormwater improvements don't become your neighbor's new challenges.
 - Plant trees, lots of trees. Encourage your municipality to adopt policies that require 2 replacement trees for every tree that is removed.
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- The American Society of Landscape Architects offers technical documents, metrics, and project examples that offer real world examples on their website, including the following...
 - <https://www.asla.org/stormwatercasestudies.aspx#pennsylvania>
 - [https://www.asla.org/uploadedFiles/CMS/Government_Affairs/Federal_Government_Affairs/Banking%20on%20Green%20High Res.pdf](https://www.asla.org/uploadedFiles/CMS/Government_Affairs/Federal_Government_Affairs/Banking%20on%20Green%20High%20Res.pdf)
 - [Banking on Green](#)
 - [Smart Policies for a Changing Climate](#)
 - [Guidelines for Resilient Design](#)