



PennState Extension

Preparing Septic Owners in the Age of Floods

2023 Annual PASEO Conference & Trade Show

DELIVERING EDUCATION YOU CAN TRUST

Meet the Presenters



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**We believe that all people should have
access to science-based education.**



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Who We Are

The Penn State Extension team consists of a collection of educators, associates, and faculty that come together when their expertise is needed. Since team members live and work alongside you, they have a vested interest in ensuring our products and services better their communities.



Our extension educators meet your needs online or on-site.



Our team members live and work alongside you.



Pennsylvania residents are our customers and our advisers.

Areas We Cover



Today's Presentation



What Brought You Here



Why Talk About Floods and
Septic Systems



What to Do About Flooding
Around Septic Systems

Why Talk About Floods and Septic Systems



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Why Talk About Floods and Septic Systems

Why we care about OLWT and Floods?



More
Rain is
Coming!



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Climate Change Means:

- Increasing average temperature
- More heat waves
- More landslides
- Sea level rise (Philly)
- Heavy precipitation and inland flooding
- Severe tropical rain events



7200-RE-DEP4494 5/2021 G2502

Why Talk About Floods and Septic Systems

Table 1. Overall Risk Assessment Results

	Climate Hazard	Current Risk Rating	Mid-century Risk Rating
1	Increasing average temperatures	Medium	High
2	Heavy precipitation and inland flooding	High	High
3	Heat waves	Medium	High
4	Landslides	Medium	Medium
4	Sea level rise	Low	Medium
6	Severe tropical and extra-tropical cyclones	Medium	Medium



Why Talk About Floods and Septic Systems

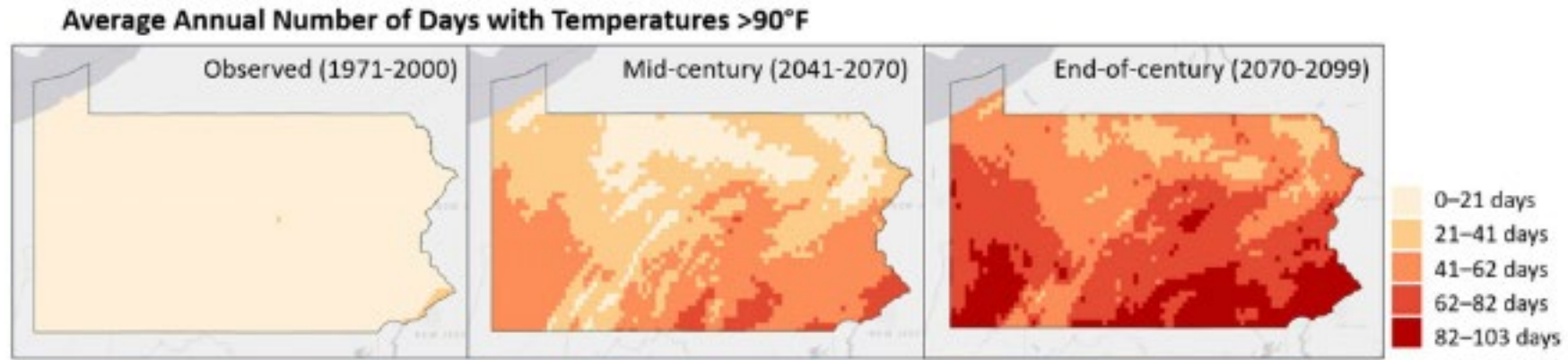


Figure 1. Observed and projected annual days with temperatures above 90°F

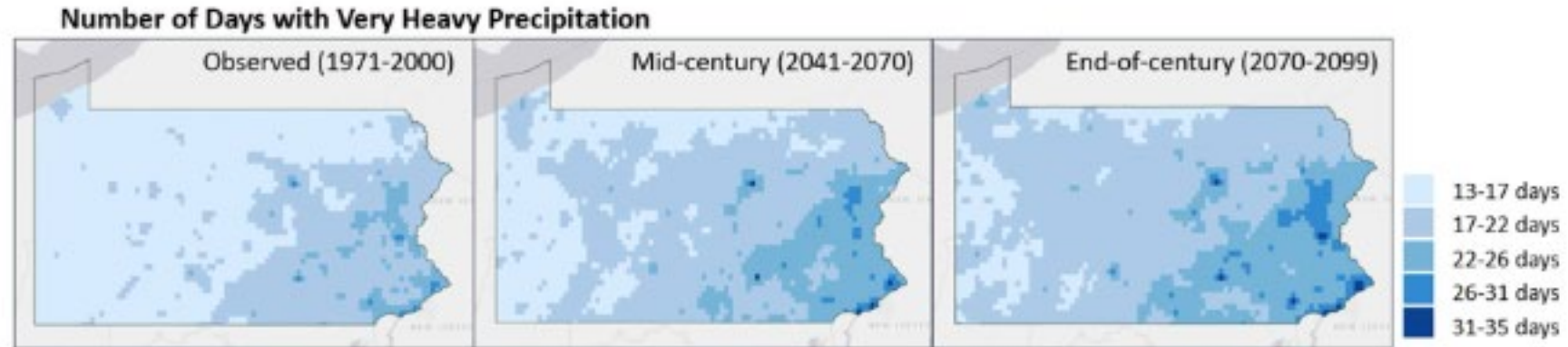


Figure 2. Observed and projected annual days with “very heavy” precipitation

Why Talk About Floods and Septic Systems

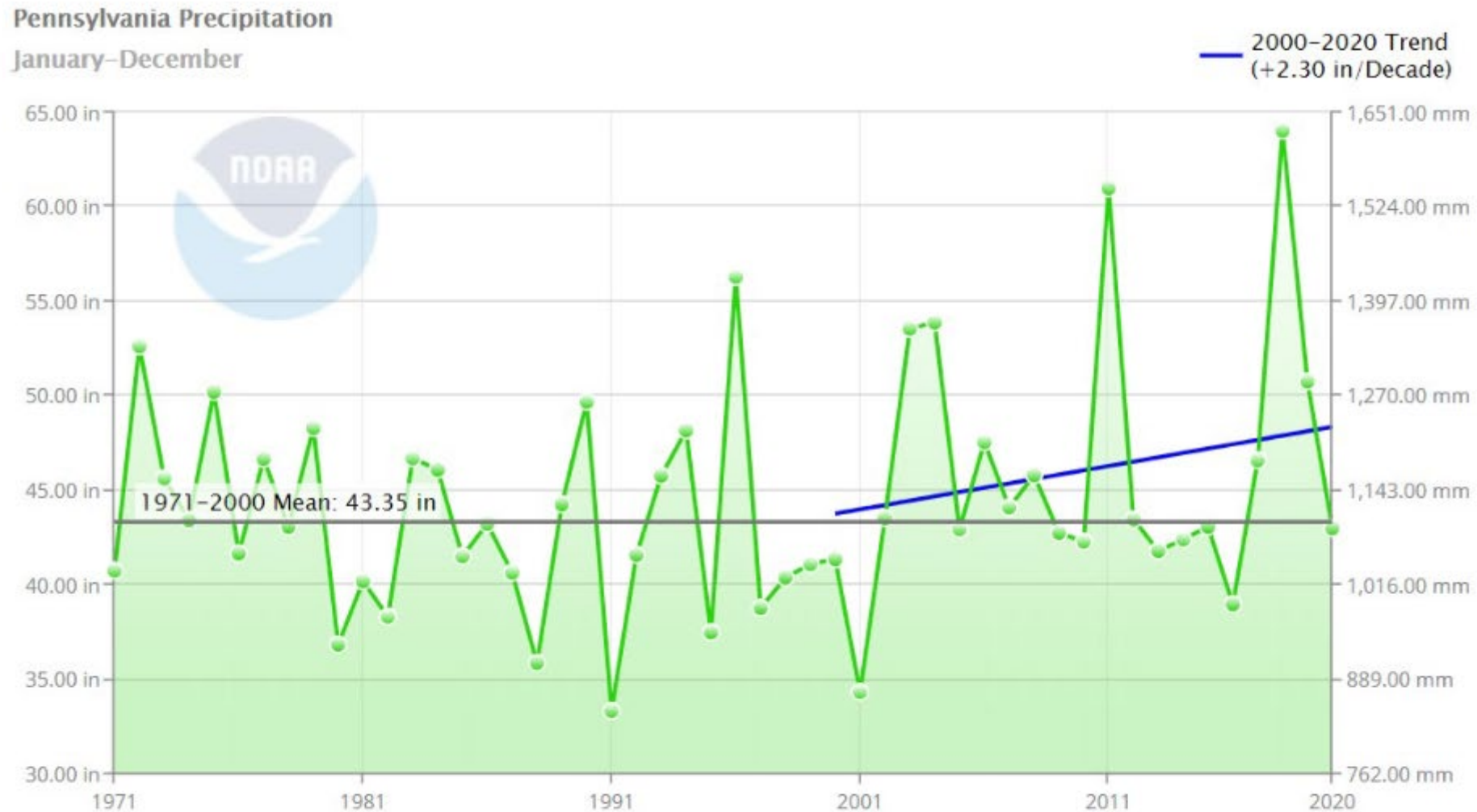


Figure 13. Annual precipitation in Pennsylvania 1971–2020

Source: National Centers for Environmental Information. Climate at a Glance- Statewide Time Series.

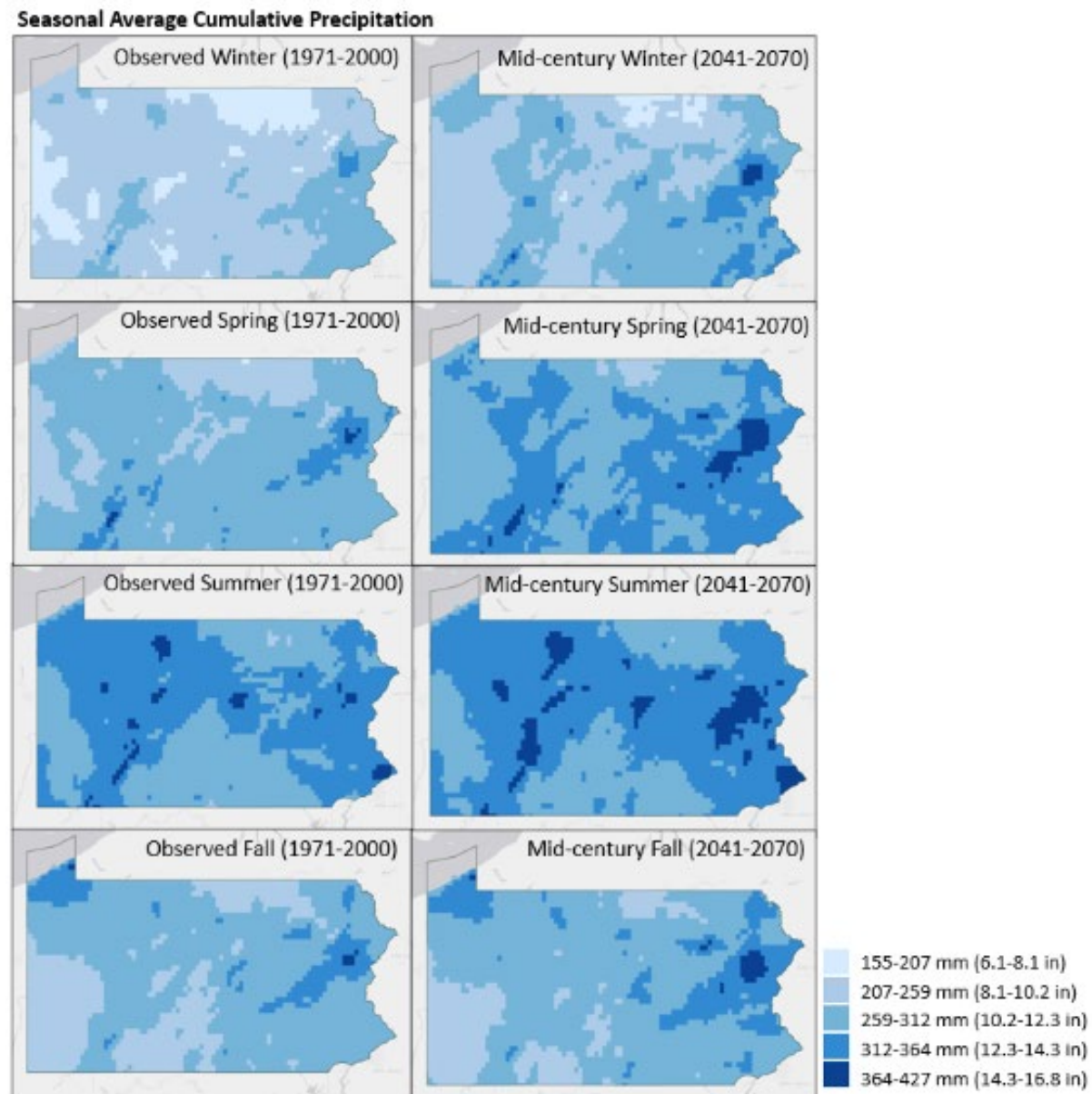


Figure 14. Observed and projected seasonal cumulative precipitation

Why Talk About Floods and Septic Systems

Number of Days with Very Heavy Precipitation

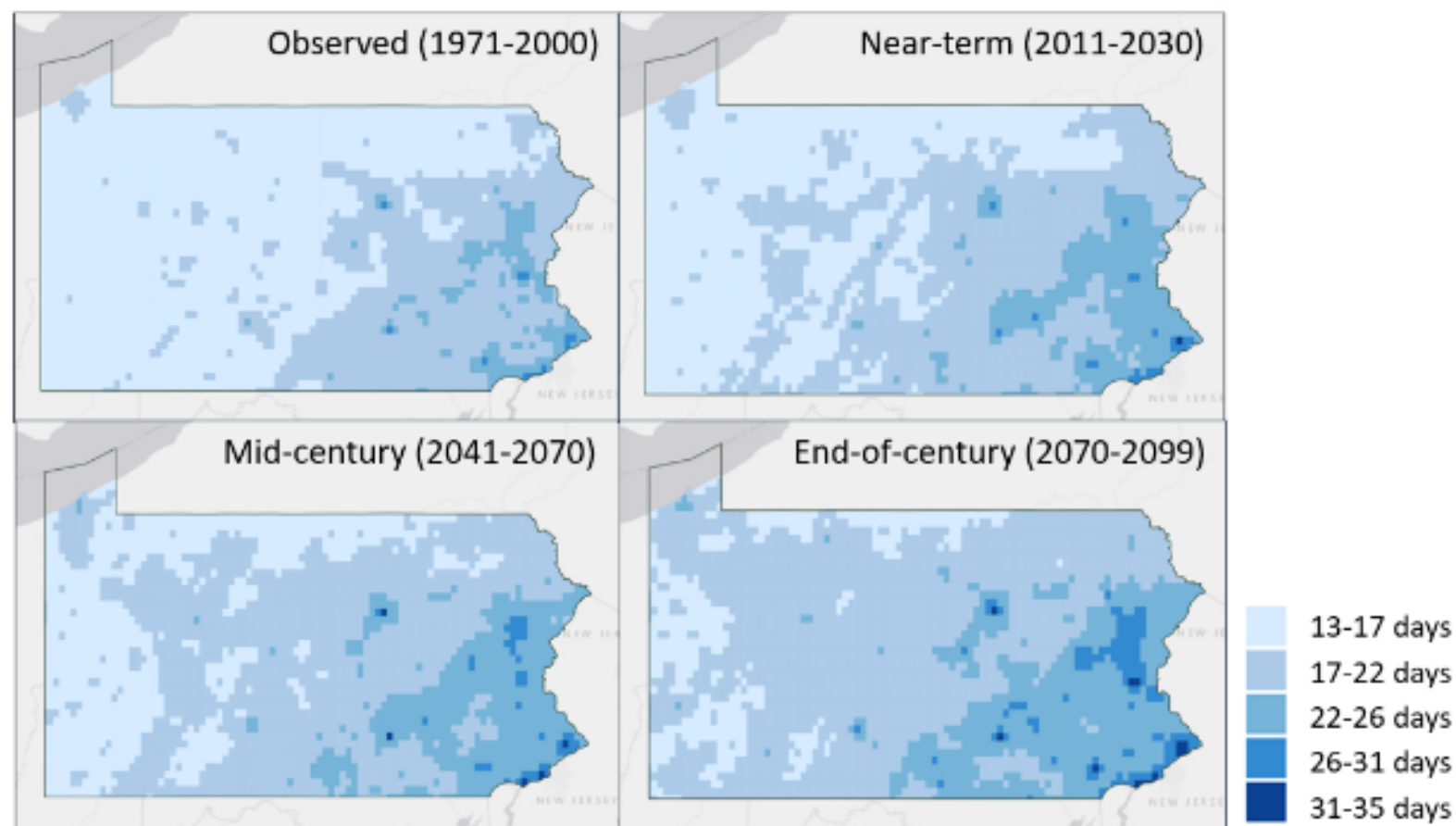


Figure 16. Observed and projected annual days with “very heavy” precipitation



Why Talk About Floods and Septic Systems

Why care about OLWT
and flood risk?

On-lot
systems are
everywhere



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Septic Numbers

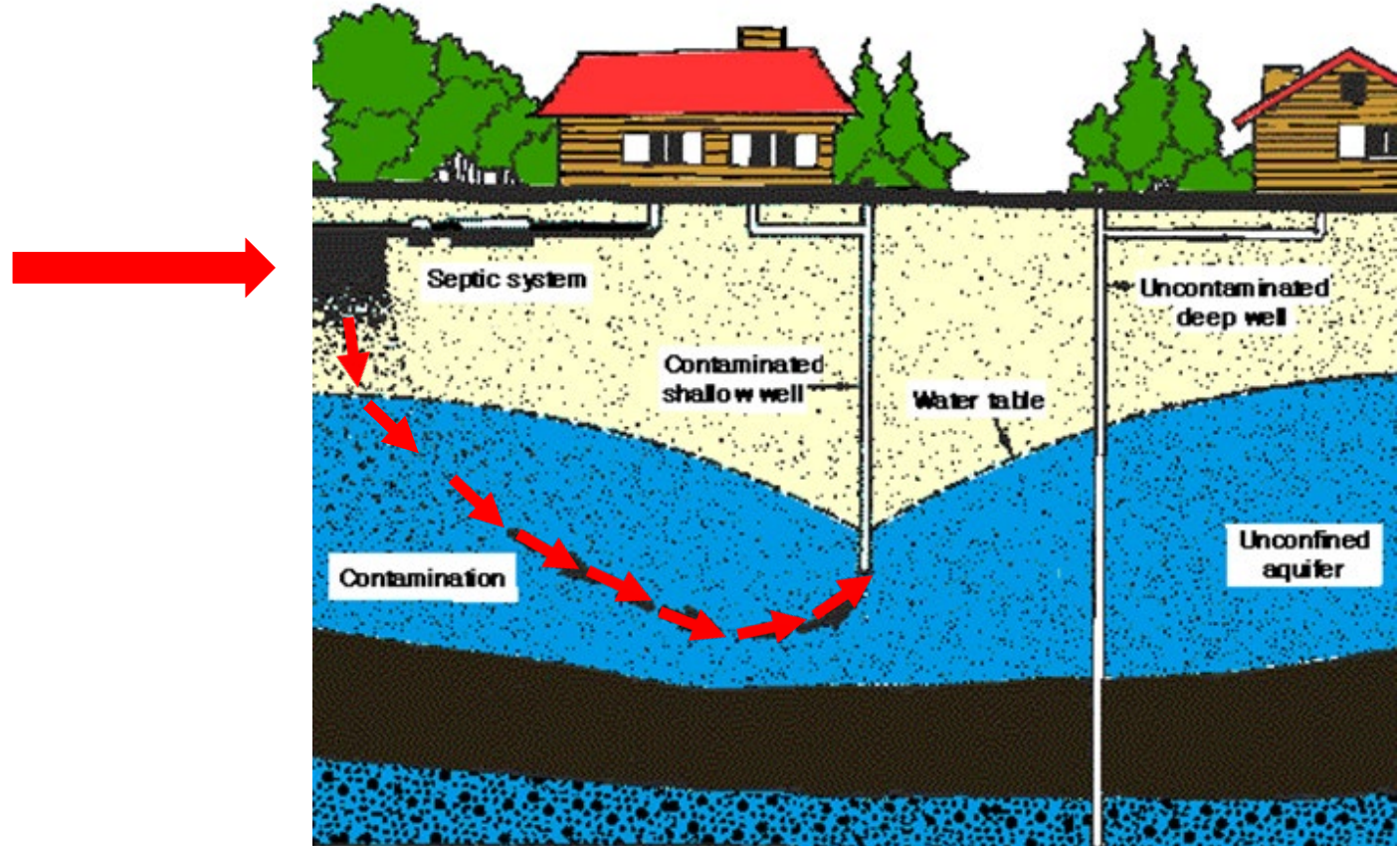
- ~ 26% of PA Households
 - 50% rural
 - 47% suburban
 - 3% urban
- > 50% are over 30 years old
- Failing systems polluted:
 - 202 impaired stream miles
 - 3,192 lake acres



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Wells at risk

- Contamination risk
 - Leaky septic tank
 - Failing drain field
- Pollutants
 - Nutrients
 - Pathogens



Bad news on many fronts!

- Inconvenience
 - Limited home water use
 - Clean up hassle
- Disease
 - Water well contamination (including neighbors well!)
- Physical injury
 - Electrical hazard
- Environmental pollution
 - Wildlife
 - People
- Financial hit
 - Septic repairs very costly
- Emotional strain
 - Short and long term



["sign explaining 1950's septic system"](#) by [snapping turtles](#) is licensed under [CC BY-NC-SA 2.0](#).

Following floods, property owners are often on their own

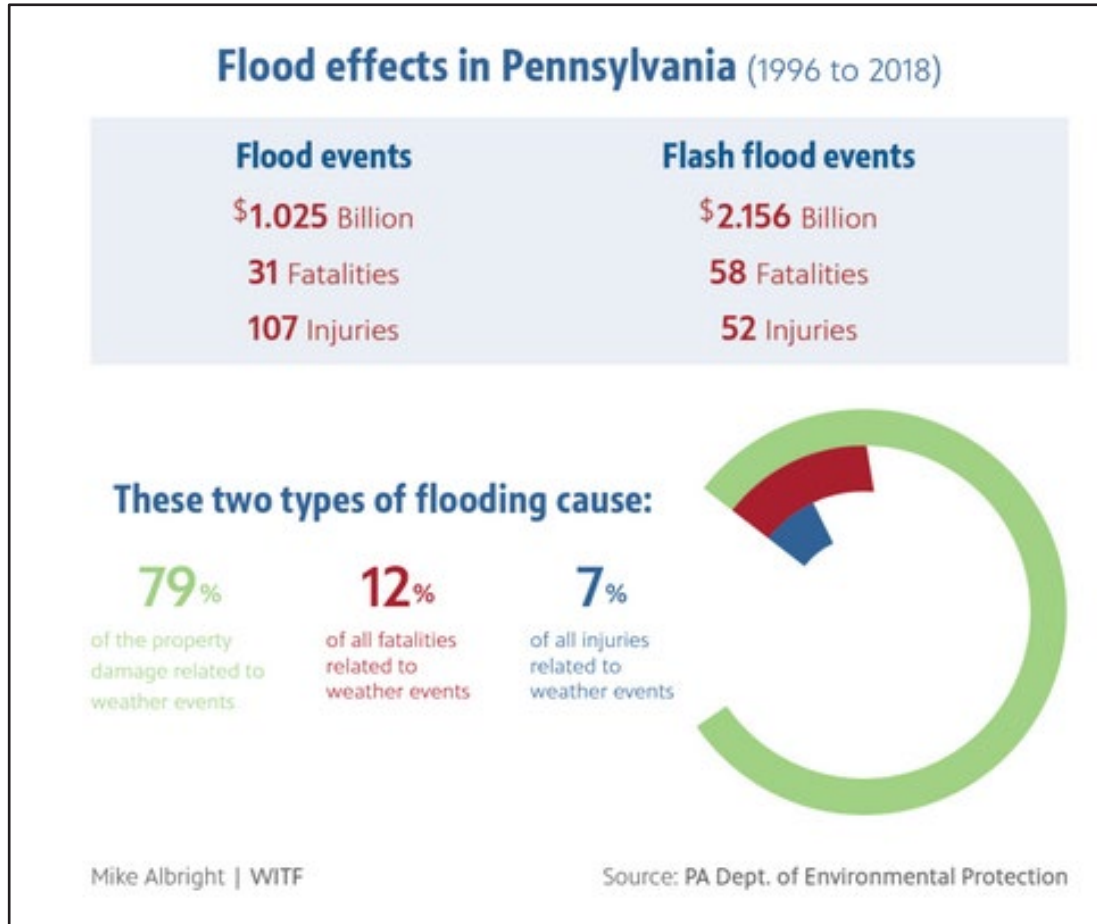
- Limited help available when septic systems fail due to flooding
- DEP and Extension can answer questions but don't have funding to help with repairs
- Funding sources (*More on these later*)
 - USDA Rural Development
 - [Single Family Housing Repair Loans and Grants](#)
 - PA Infrastructure Investment Authority (PENNVEST)
 - [PENNVEST Homeowner Septic Program](#)
 - Pennsylvania Housing Finance Agency
 - [Loans for home repairs](#)
 - Local funding sources
 - [PA Association of Housing and Redevelopment Agencies](#)







Floods are common in PA



- 194,440 properties have substantial flood risk
 - Concentrated in urban area
 - But located everywhere in PA
- 257,100 properties filing flood damage claims with FEMA since year 2000
 - River floods
 - Hurricanes (Isabel and Irene)

Why Talk About Floods and Septic Systems

Total properties at substantial risk*

In 2020

564,600

In 2050

587,400

30-year change

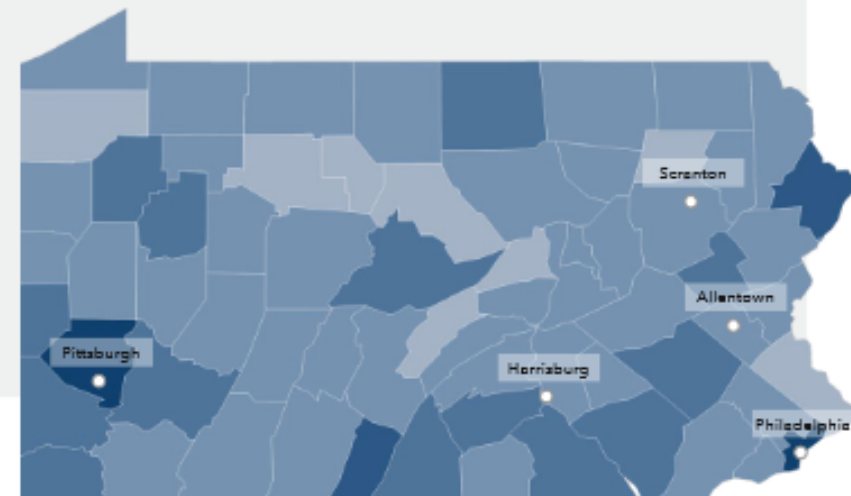
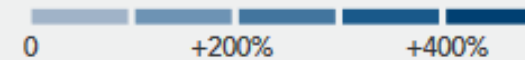
▲ +22,800 (+4%)

Pittsburgh faces flooding from snowmelt and rainfall. Winter ice jams both cause and intensify backwater flooding along upstream tributaries of the Allegheny and Monongahela rivers. Upstream dams attempt to manage their flows. Philadelphia sees riverine, storm surge, and high tide flood events from hurricanes and tropical storms. It has focused on stabilizing streams and improving infrastructure to reduce flood risk.

Difference in number of properties currently at substantial risk compared to FEMA**

▲ +370,200

More properties at risk in FSF model →



Federal Emergency Management Agency

- Created in 1978
- Part of Department of Homeland Security
- Manages the National Flood Insurance Program
- Produces flood risk maps
 - National Flood Hazard Layer



FEMA

<https://www.fema.gov/flood-maps>



FEMA Flood Map Viewer

<https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd>



What to Do About Flooding Around Septic Systems

Before, During, and After



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Preparing from Day 1

- Site Selection



Preparing from Day 1

- Slope away from access covers



Preparing from Day 1



- Redirect stormwater

Preparing from Day 1



- Use berms as stormwater diversions

Preparing from Day 1

- Waterproof electrical connections



Preparing from Day 1

- Backflow Prevention



Preparing from Day 1

- Don't connect foundation drains to septic systems



Protect It and Inspect It!



Regular septic system maintenance can save homeowners thousands of dollars and protect public health. Learn more at www.epa.gov/septic.



What to Do About Flooding Around Septic Systems

Preparing from Day 1

- Keep up with inspections
 - Clogs
 - Corroded baffles
 - Drainfield wet spots
 - ...

When a Flood is Forecasted

Reduce water use

- Reduce Hydraulic Loading



When a Flood is Forecasted



- Postpone pumping
- Avoid Floating Tanks

When a Flood is Forecasted

Organize records

- Septic tank location
- Septic tank layout/diagrams/engineering plans
- Underground components, especially electric



When a Flood is Imminent



Turn Off
Electricity

Let your system
be a holding tank





What to Do About Flooding Around Septic Systems

When Flooding is Happening

Only essential water use

- Stop using the system if the drainfield is underwater
- Turn off recirculating treatment devices (softners, etc)

When Flooding is Happening

Plug all basement drains leading to septic system



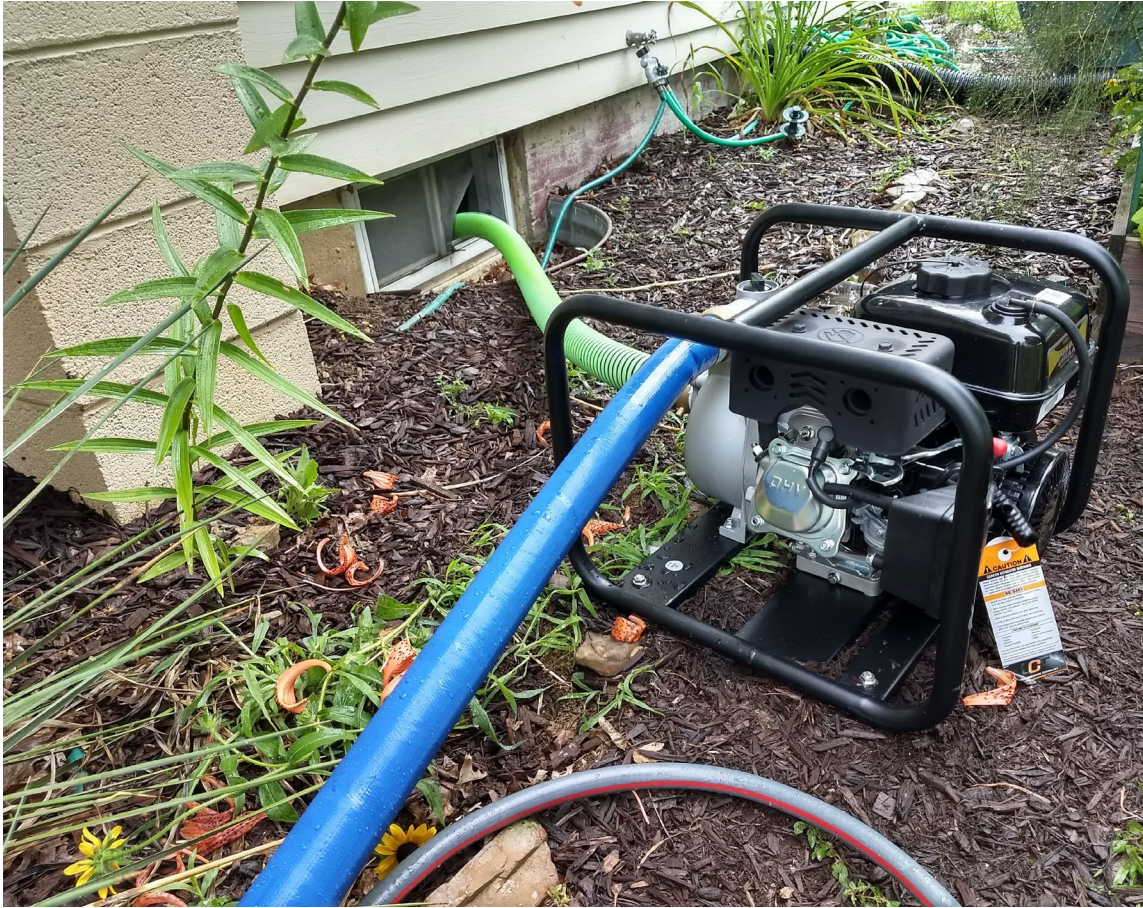
When Flooding is Happening

Be on the watch and avoid, if necessary

- Floating tank
- Exposed sewage
- Drinking water contamination



When Flooding is Happening



Don't pump flood waters into your drains or onto drainfield

After the Flood



- Allow the system to dry
- Minimize (or stop) use of the system until normal water levels return
- Could take weeks

After the Flood

Test your well water

- Especially for pathogens (coliform bacteria, E. coli)



After the Flood

- Get a professional inspection



Pump Your Tank!



Ensure your septic tank is pumped at regular intervals as recommended by a professional and/or local permitting authority. Learn more at www.epa.gov/septic.



What to Do About Flooding Around Septic Systems

After the Flood

- Pump to remove sediments before they enter drainfield
- Refill with clean water if ground is still wet

Funding Opportunities for Repairs

USDA Rural Development

- Single Family Housing Repair Loans and Grants

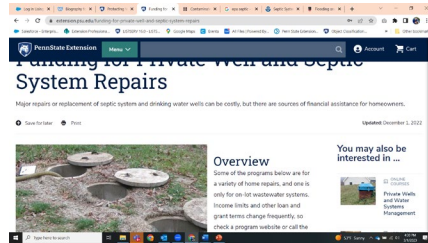
Pennsylvania Infrastructure Investment Authority (PENNVEST)

- Homeowner Septic Loan Program

Pennsylvania Housing Finance Agency (PHFA)

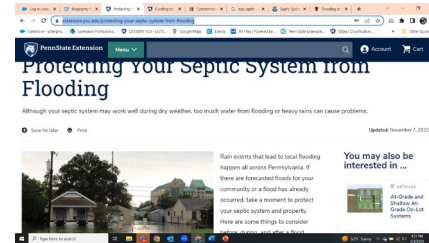
- Keystone Renovate and Repair Loan Program

Resources You Can Share With Septic Owners



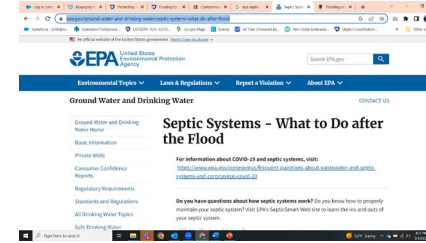
Repair Funding

<https://extension.psu.edu/funding-for-private-well-and-septic-system-repairs>



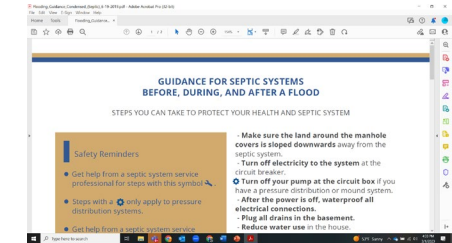
Septic Flood Protection

<https://extension.psu.edu/protecting-your-septic-system-from-flooding>



EPA After the Flood

<https://www.epa.gov/ground-water-and-drinking-water/septic-systems-what-to-do-after-flood>



NEHA Checklist

<https://www.neha.org/preparedness-septic>

When and How to Share

- Periodic Reminders (Annually?)
- During typical flood seasons



- As articles in your townships' newsletters

- When floods are forecasted
- After floods have happened



- On social media sites (community groups, municipal sites, personal?)
- In press releases

Questions?



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Interested in learning more?

<https://extension.psu.edu/water-team-sign-up>



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Thank you!



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