

The background of the slide is a light blue gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance.

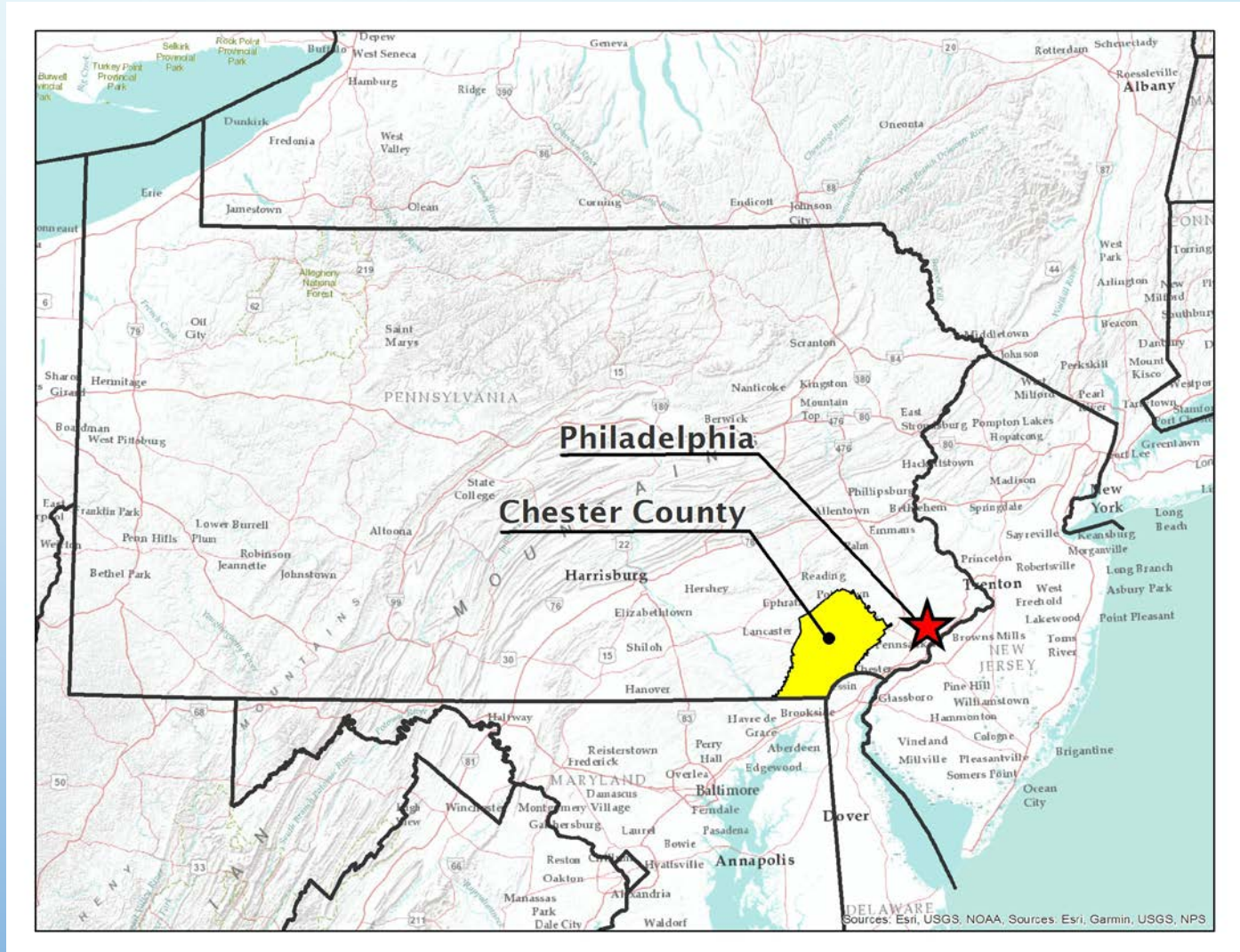
Flood Impact Forecasting Using the National Water Model

Dave Sekkes, GISP

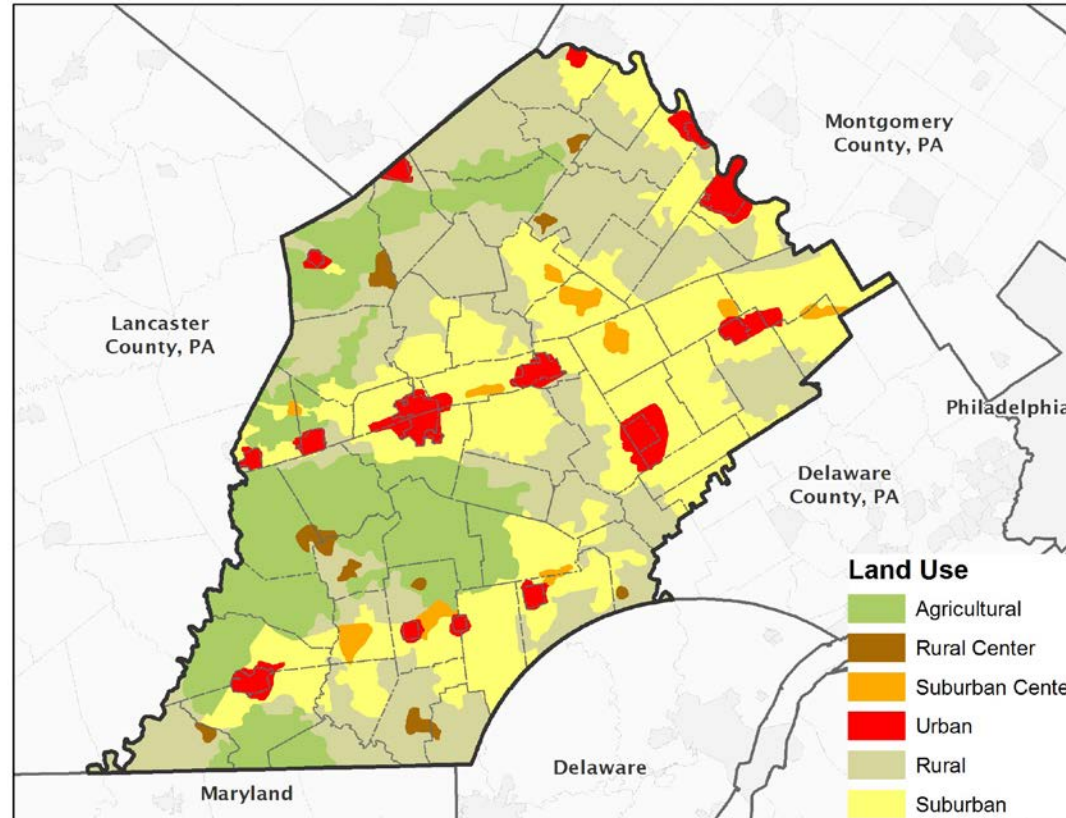
Chester County Department of Emergency Services

Chester County, Pennsylvania

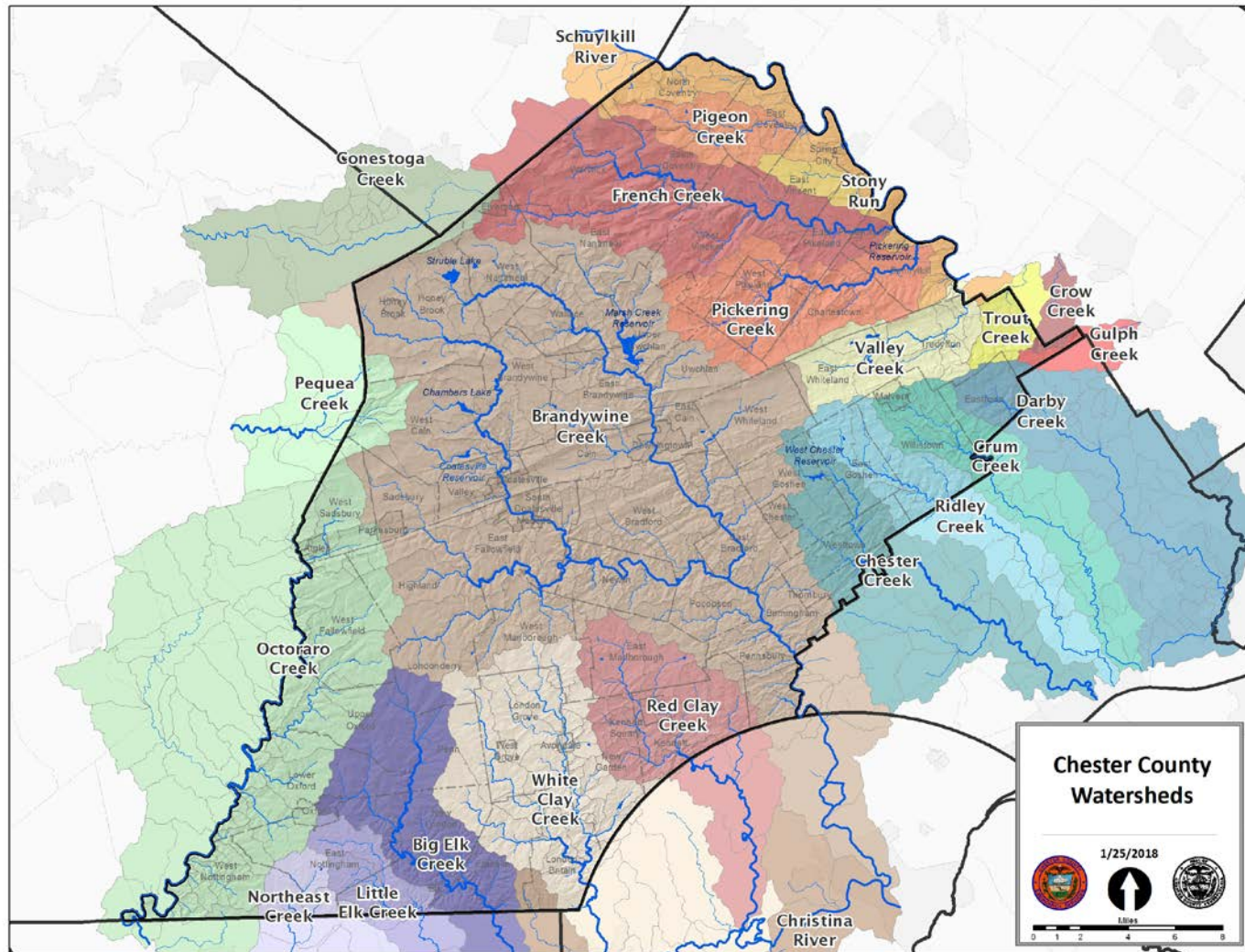
- Suburban county of Philadelphia
- 517,000 Residents
- 73 Municipalities: 1 City, 15 Boroughs, and 57 Townships
- Southeastern PA Regional Taskforce
- Many small and medium sized creeks with rolling hills and valleys of the Piedmont Plateau



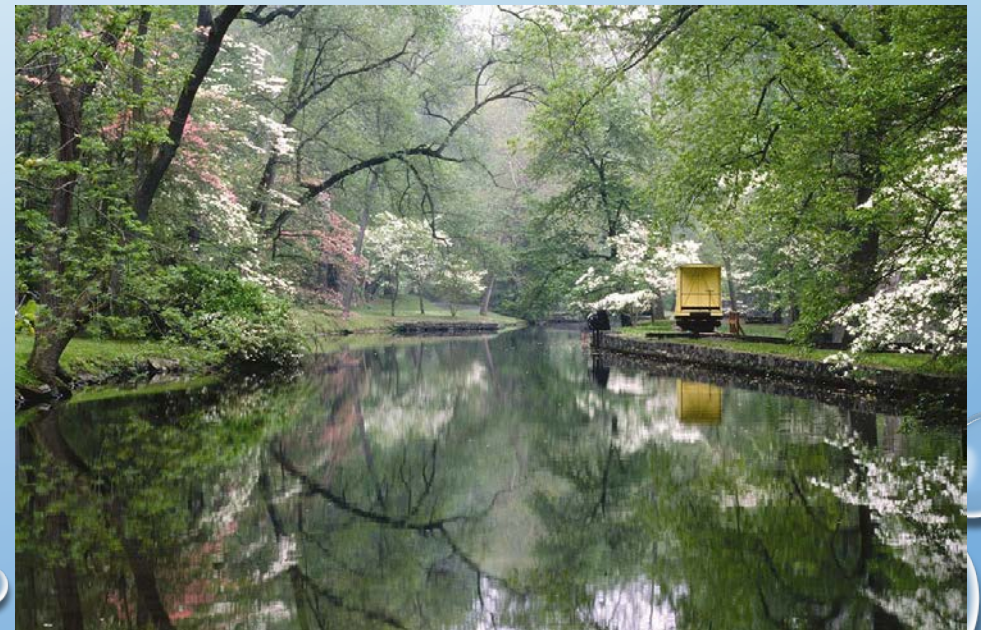
Chester County Landscape



Chester County, PA Watersheds and Waterways



- Brandywine Creek is the dominant watershed in the county and has historically experienced the most severe flooding
- Brandywine Creek splits the county in two during severe flood events
- Schuylkill River to the north has a large upstream watershed that creates severe flooding



Emergency Operations Center

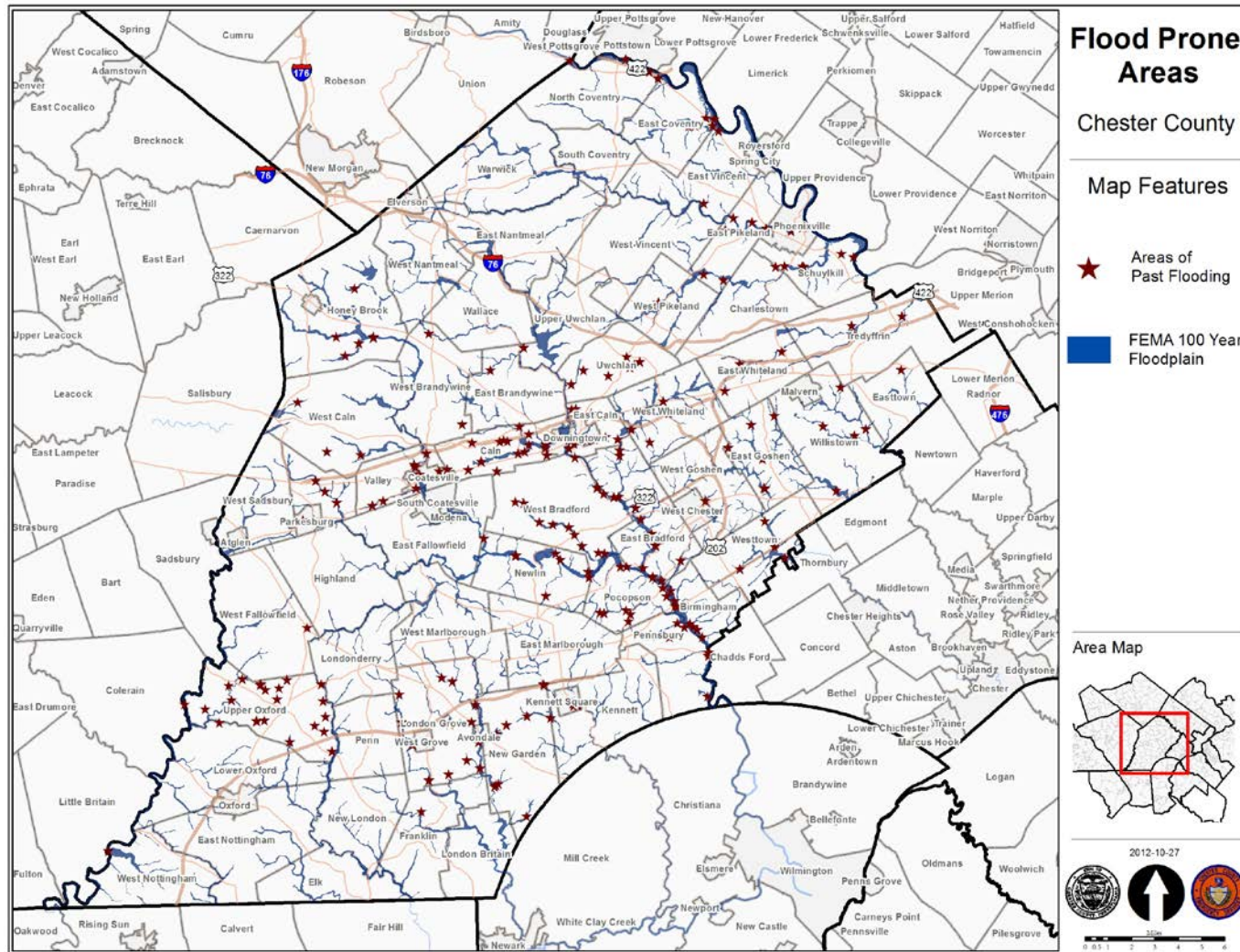
- The Chester County Emergency Operations Center (EOC) acts as an information portal to provide situational awareness and a common operational picture for responders and key partners
- Acts coordination center between agencies
- The County operates very few deployable resources



The background is a light blue gradient with several realistic water droplets of various sizes scattered across the surface. The droplets have highlights and shadows, giving them a three-dimensional appearance.

Early Situational Awareness Products

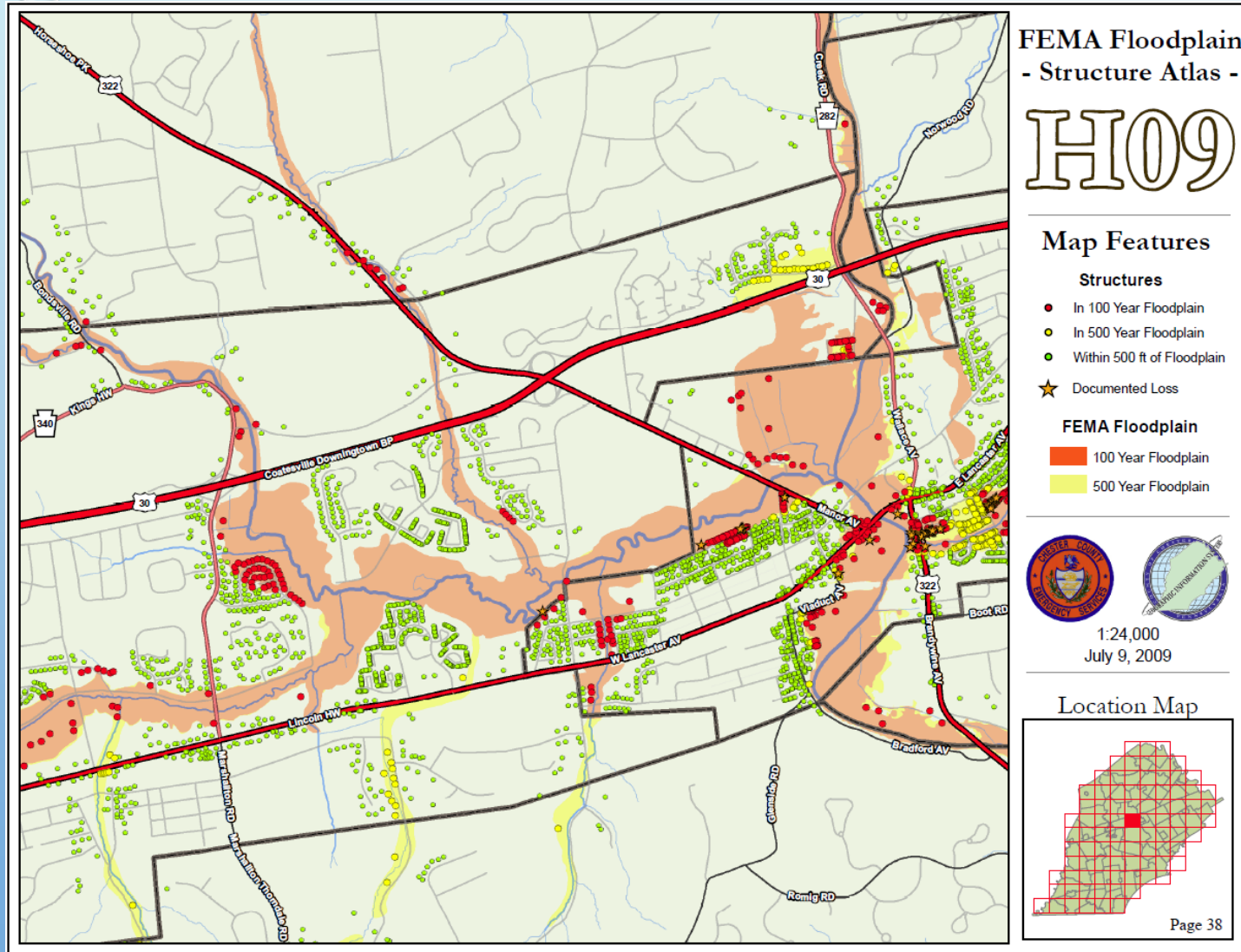
Mapping Historic Flood Damage Locations



The first attempt to quantify the flooding problem was to map historic flood locations from:

- Damage assessment reports
- Available newspaper articles
- Photos
- Firsthand accounts from the community

Floodplain Structure Atlas



- In 2009 every structure within 500 feet of the floodplain was mapped.
- This atlas was provided to local Emergency Management Coordinators and included in the Emergency Operations Plan Flood Annex.
- Most comprehensive assessment of the flood hazard vulnerability to date.

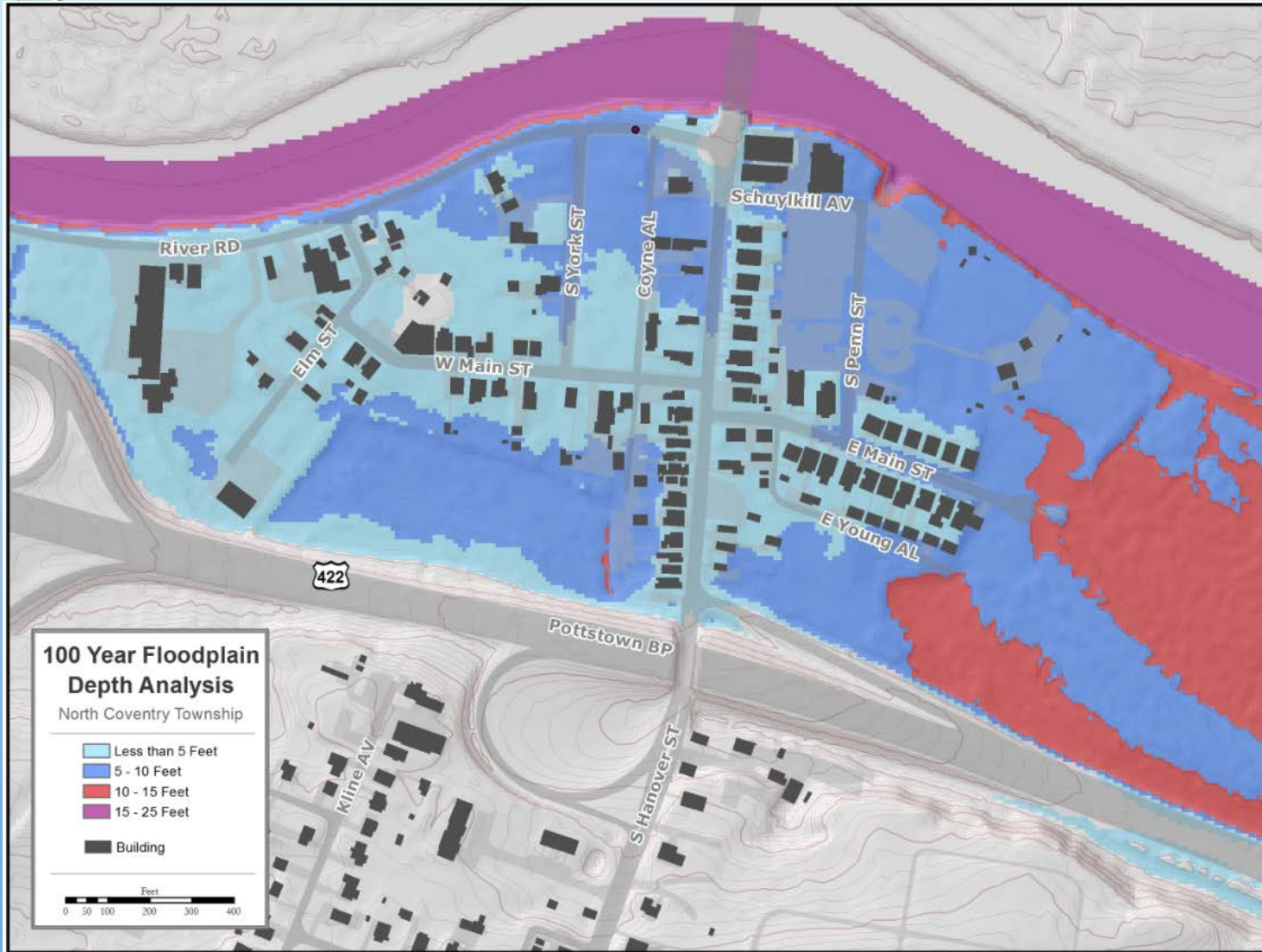
Stream Gauge Monitoring in Excel

Refresh																		
Brandywine River																		
Brandywine Tributaries																		
Clay Creek																		
Schuylkill																		
Schuylkill Tributaries																		
Susquehanna																		
Dams																		
Gauge Height Display																		
Location																		
Station #																		
Caution Stage																		
Flood Stage																		
Moderate Flooding																		
Major Flooding																		
DATE																		
4/16/18 10:30				4.29					3.37	▼					5.98	▼		
4/16/18 10:15				4.29	▲				3.41	▼		4.60	▲	7.72	▼	6.05	▼	
4/16/18 10:00				4.24	▲				3.43	▲		4.59	▼	4.52	▼	6.12	▼	
4/16/18 9:45				4.15	▲			2.88	▼	3.43	▼	4.47	▲	8.01	▼	6.18	▼	
4/16/18 9:30			4.42	▲	4.02	▲	4.53	▲	2.89	▲	3.46	▲	3.37	▲	4.84	▼	4.60	▼
4/16/18 9:15			4.40	▲	3.94	▲	4.39	▲	2.87	▲	3.44	▲	3.26	▲	4.90	▼	4.25	▲
4/16/18 9:00			4.36	▲	3.89	▲	4.25	▲	2.86	▲	3.38	▲	3.17	▲	4.91	▼	4.64	▼
4/16/18 8:45	4.15	▲	4.32	▲	3.85	▲	5.36	▲	4.10	▲	2.84	▲	3.32	▲	3.02	▲	4.91	▲
4/16/18 8:30	3.98	▲	4.29	▼	3.81	▲	5.20	▲	3.92	▲	2.81	▲	3.28	▲	2.87	▲	4.87	▲
4/16/18 8:15	3.75	▲	4.31	▲	3.77	▲	4.99	▲	3.70	▲	2.79	▲	3.24	▲	2.76	▲	4.84	▲
4/16/18 8:00	3.47	▲	4.26	▲	3.71	▲	4.75	▲	3.54	▲	2.77	▲	3.19	▲	2.65	▲	4.72	▲
4/16/18 7:45	3.15	▲	4.18	▲	3.67	▲	4.48	▲	3.41	▲	2.74	▲	3.09	▲	2.57	▲	4.54	▲
4/16/18 7:30	2.83	▲	4.06	▲	3.63	▲	4.21	▲	3.29	▲	2.71	▲	2.97	▲	2.50	▲	4.31	▲
4/16/18 7:15	2.50	▲	4.00	▲	3.56	▲	4.01	▲	3.19	▲	2.67	▲	2.83	▲	2.41	▲	4.14	▲
4/16/18 7:00	2.18	▲	3.97	▼	3.51	▲	3.82	▲	3.01	▲	2.63	▲	2.68	▲	2.34	▲	3.96	▲
4/16/18 6:45	1.93	▲	4.02	▼	3.45	▲	3.65	▲	2.89	▲	2.60	▲	2.57	▲	2.30	▲	3.83	▲
4/16/18 6:30	1.72	▲	4.04	▲	3.29	▲	3.51	▲	2.74	▲	2.58	▲	2.48	▲	2.25	▲	3.75	▲
4/16/18 6:15	1.58	▲	3.76	▲	3.00	▲	3.39	▲	2.61	▲	2.55	▲	2.41	▲	2.20	▲	3.70	▲
4/16/18 6:00	1.47	▲	3.48	▲	2.70	▲	3.30	▲	2.54	▲	2.55	▲	2.35	▲	2.18	▲	3.68	▲
4/16/18 5:45	1.40	▲	3.40	▲	2.56	▲	3.23	▲	2.44	▼	2.52	▲	2.30	▲	2.16	▲	3.65	▲
4/16/18 5:30	1.35	▲	3.38	▲	2.48	▲	3.18	▲	2.45	▲	2.49	▲	2.26	▲	2.14	▲	3.62	▲
4/16/18 5:15	1.32	▲	3.38	▲	2.44	▲	3.14	▲	2.43	▲	2.48	▲	2.25	▲	2.10	▲	3.61	▲
4/16/18 5:00	1.29	▲	3.32	▲	2.42	▲	3.11	▲	2.40	▲	2.47	▲	2.23	▲	2.10	▲	3.61	▲
4/16/18 4:45	1.28	▲	3.28	▲	2.40	▲	3.08	▲	2.35	▼	2.47	▲	2.23	▲	2.09	▲	3.61	▲

Excel Spreadsheet with VBA code to read and visualize the most recent stream gauge data on problem streams

- This still runs in the EOC today
- XML feed that updates the values every 10 minutes
- Caution, Flood, and Major Flood stages are highlighted
- Red and green arrows show trends from the last value

Early Flood Severity Analysis



- In preparation for an anticipated flood event, the 100 year floodplain was used as a base level flood extent.
- Used a new DEM and building footprints to locate who would be most impacted by the anticipated flooding for known problem areas.

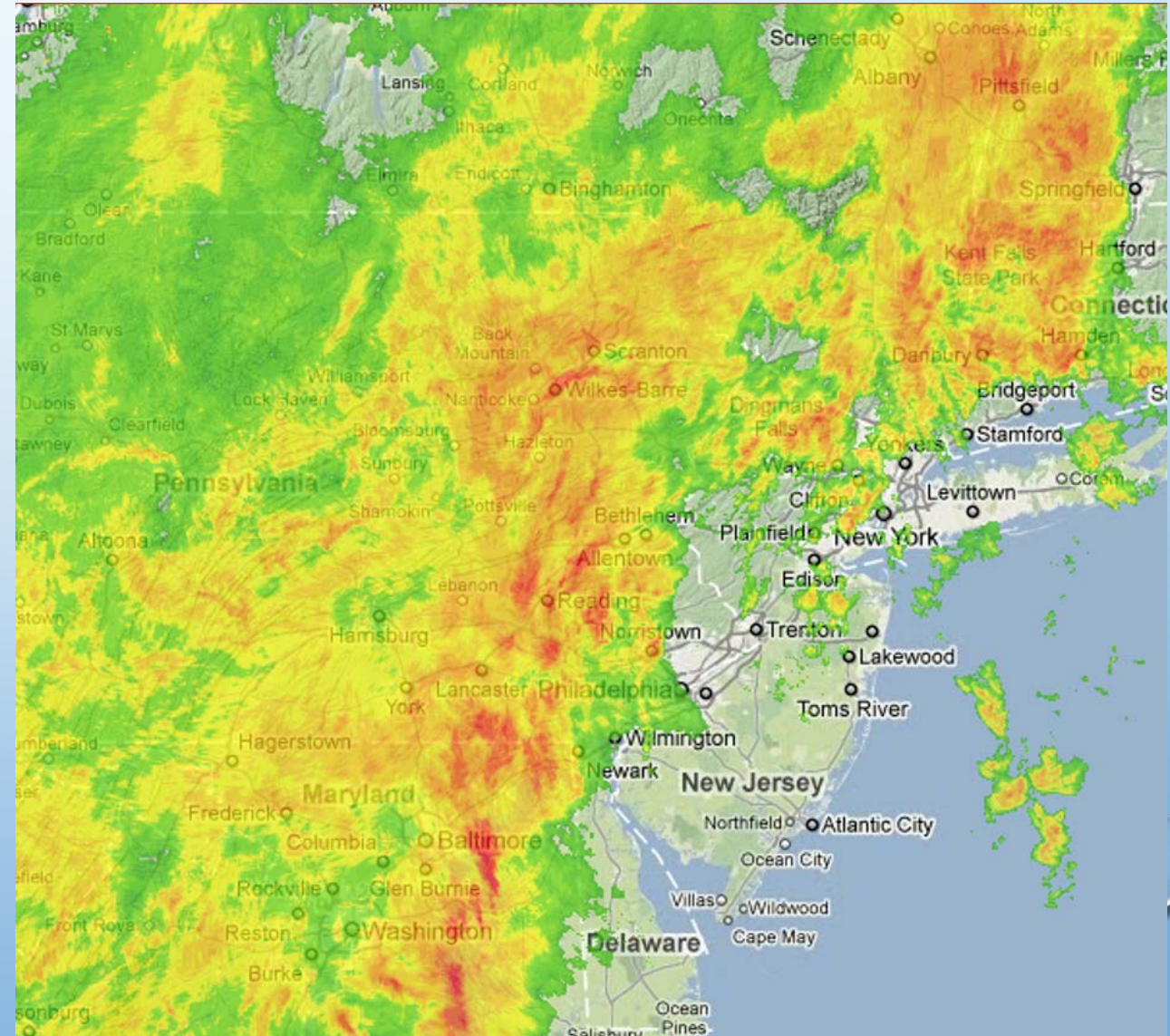
The background features a light blue to medium blue gradient. Scattered across the surface are numerous water droplets of various sizes, some appearing as simple circles and others as more complex, rounded shapes with highlights and shadows, giving them a three-dimensional appearance.

Recent History of Flooding in Chester County

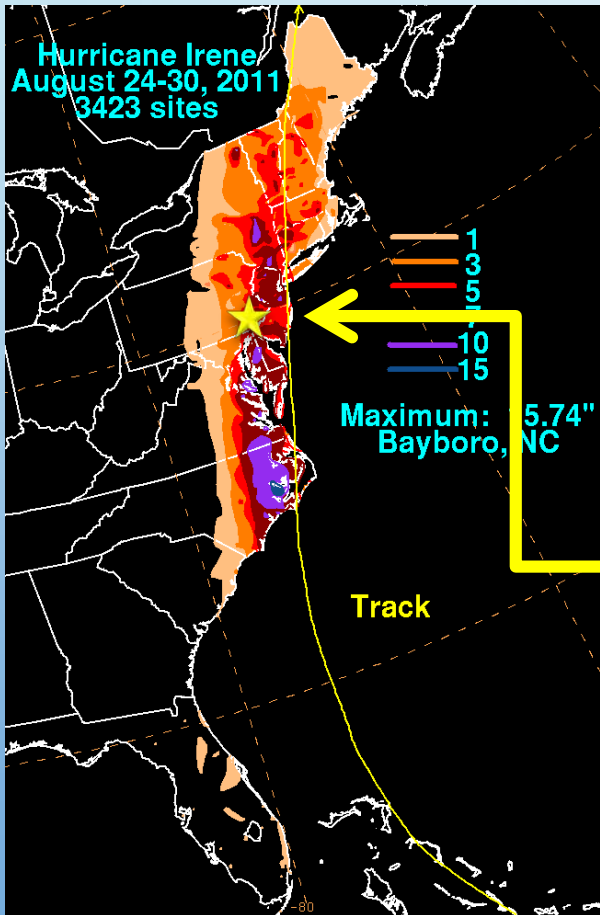
Recent Major Countywide Flooding Events

- June 1972 Hurricane Agnes (The “Big One”)
- June 2001 Hurricane Allison
- Sept 2003 Hurricane Isabel
- Sept 2004 Hurricane Ivan
- June 2007 Hurricane Barry
- Sept 2008 Tropical Storm Hanna
- September 2010 Tropical Storm Nicole
- August 2011 Hurricane Irene
- September 2011 Tropical Storm Lee (The other “Big One”)
- October 2012 Hurricane Sandy
- April 2014 Long Term Rain Event

...Chester County is overdue!



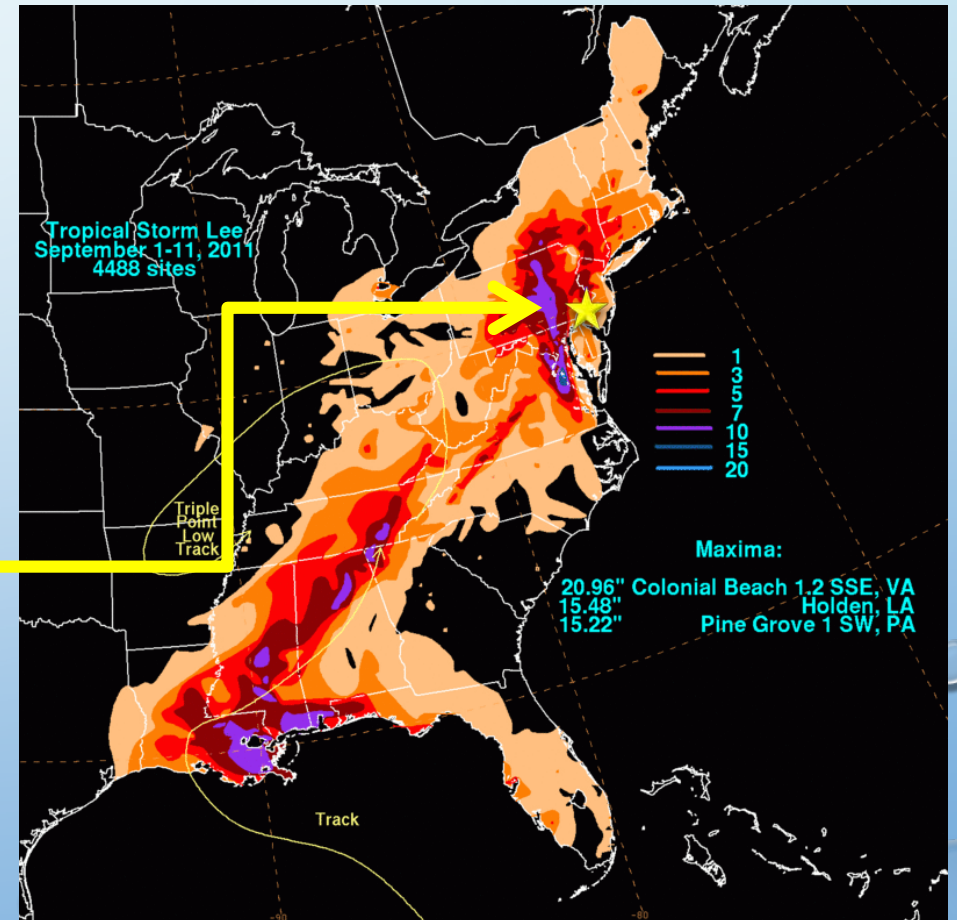
Hurricane Irene & Tropical Storm Lee Aug-Sept 2011



Two major storms impacted Chester County about a week apart.

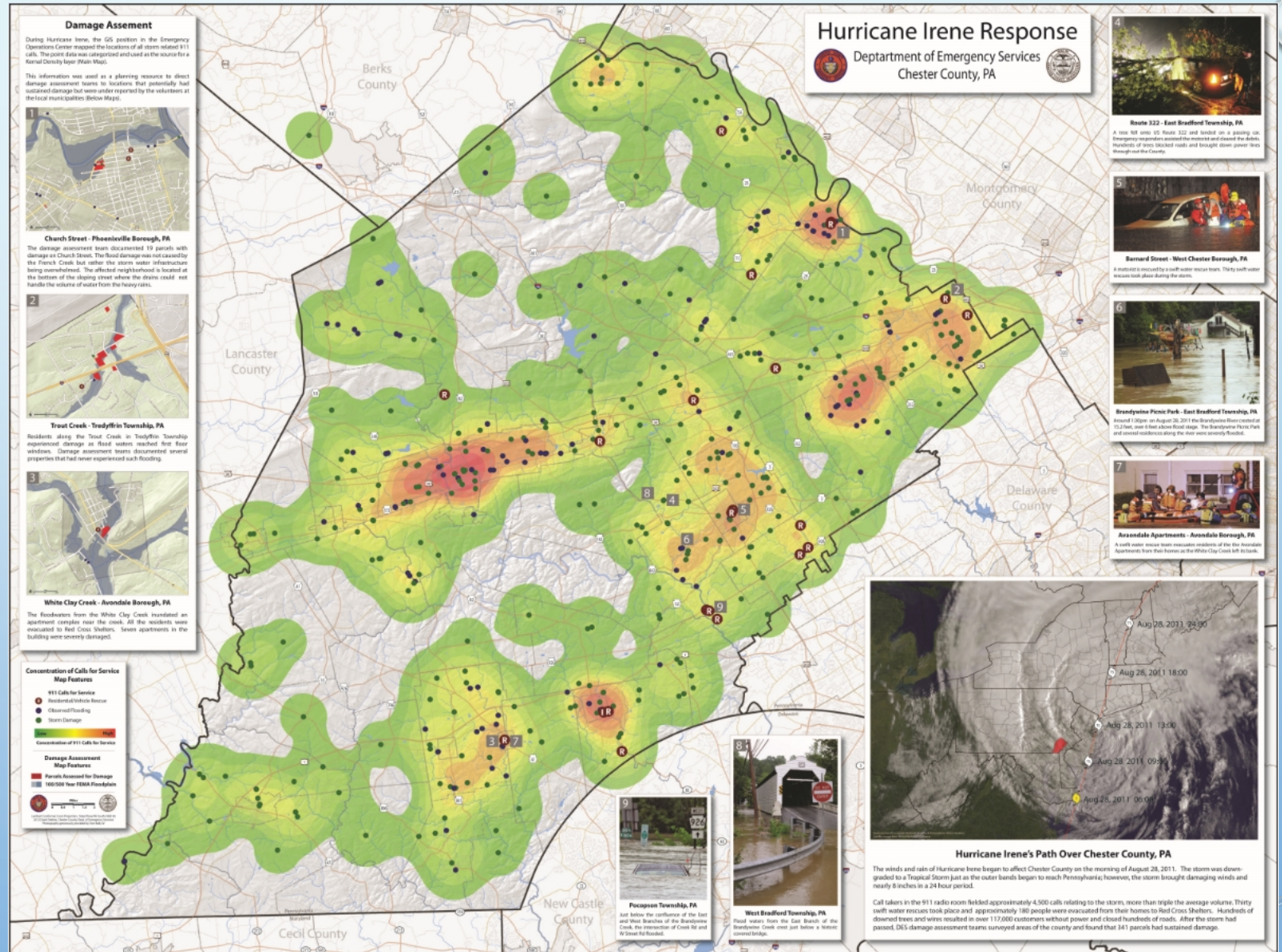
This led to widespread flooding that effectively cut the county in two.

Chester County, PA

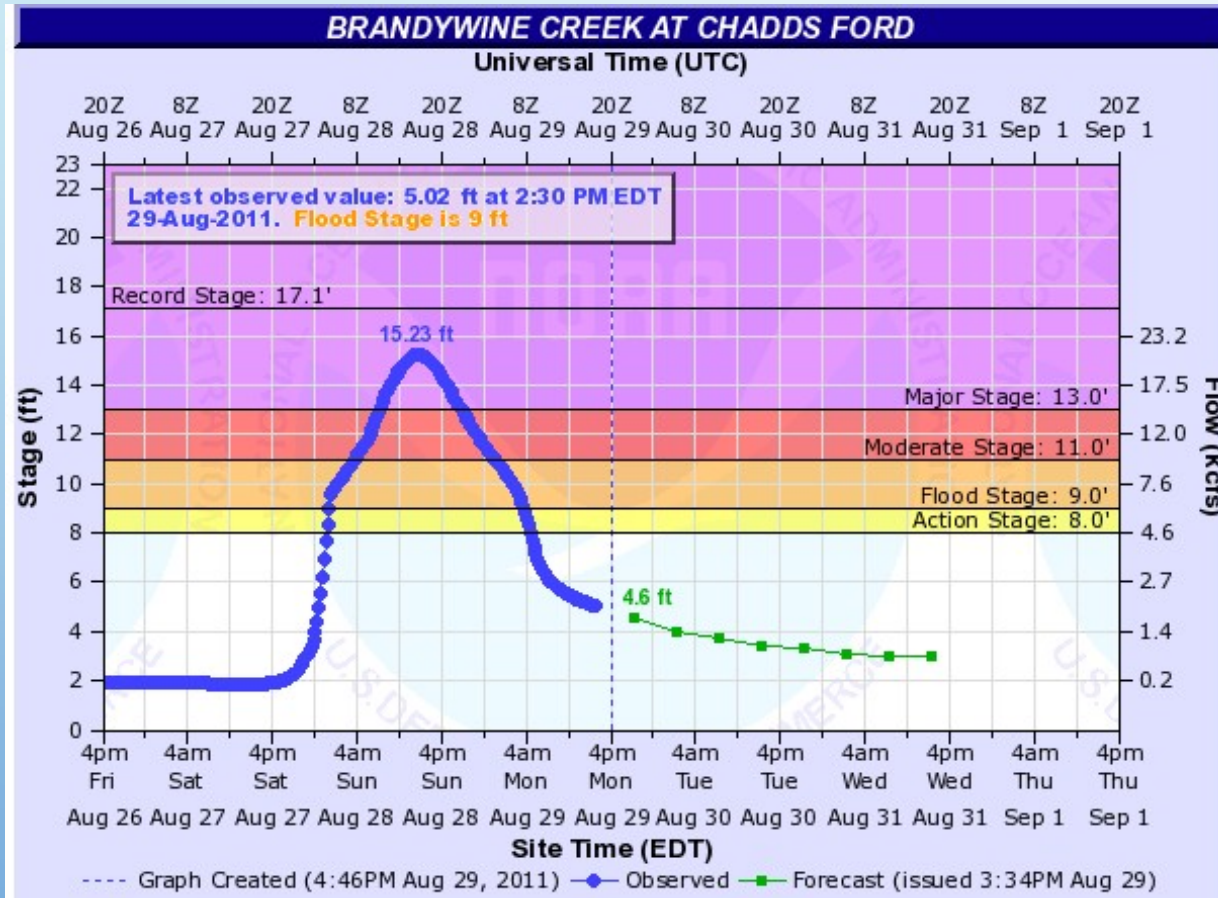


Hurricane Irene Response

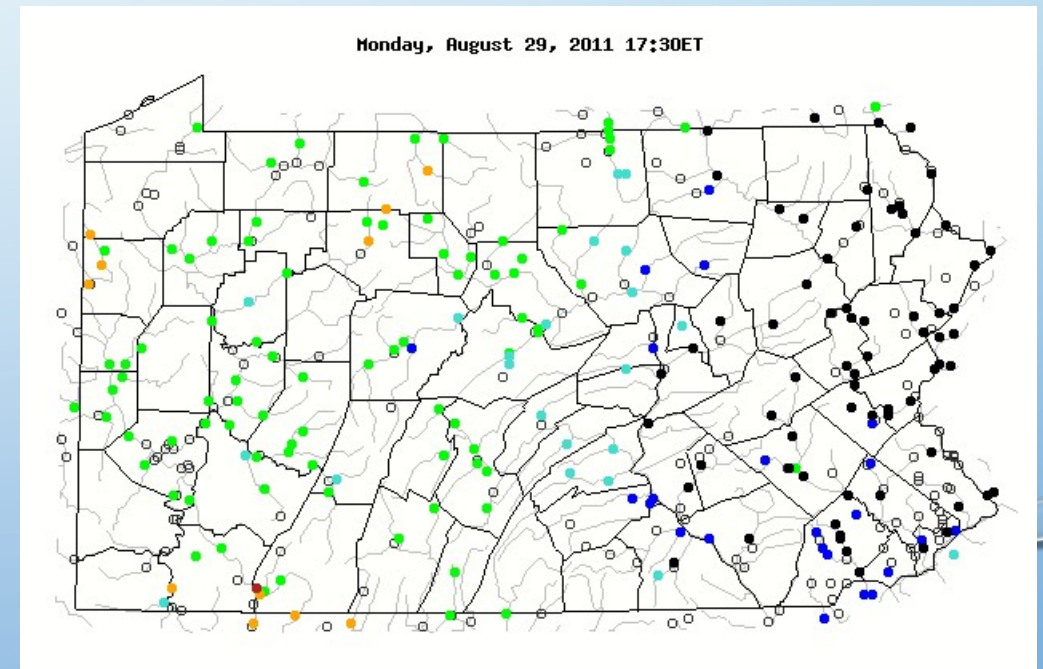
- 4,500 calls for service relating to the storm – triple the daily average
- 30 swift water rescues
- 180 residents evacuated from their homes to shelters
- 117,000 customers without power, about 50% of the entire County
- 341 buildings with significant damage



Near Record Flooding



- Brandywine Creek crested at 15.2 feet, less than 2 feet under the all-time record
- Eastern half of PA experienced widespread flooding



Hurricane Irene & Tropical Storm Lee Aug-Sept 2011



Bobby's White Whale

This event led to Bobby Kagel, the Emergency Management Deputy Director in 2011, to search for his "White Whale":

**Predictive Flood
Impact Forecasting!**



Emergency Planning for Flood Events

Emergency Management needs to answer three fundamental questions to plan for major flood events:

WHEN will flooding occur

WHERE will flooding occur

WHO will be impacted by flooding

Flood Impact Forecasting

WHEN:

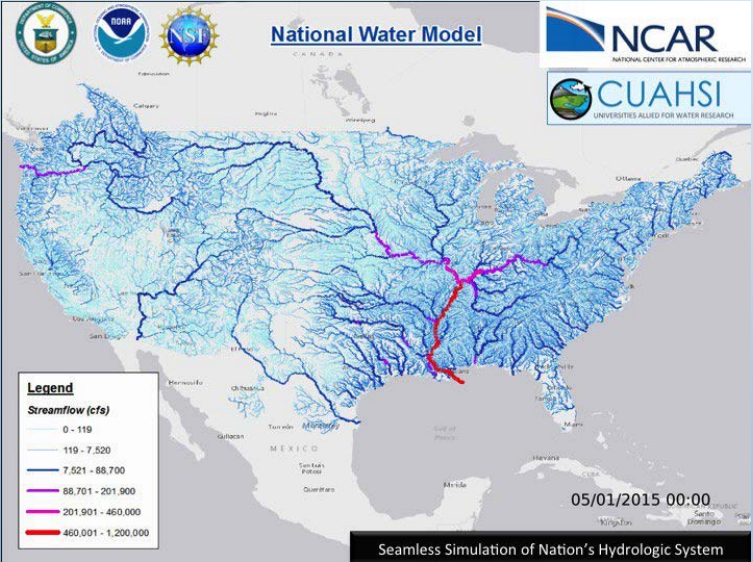
National Water Model

WHERE:

Arc Hydro Tools

WHO:

Local County GIS Data



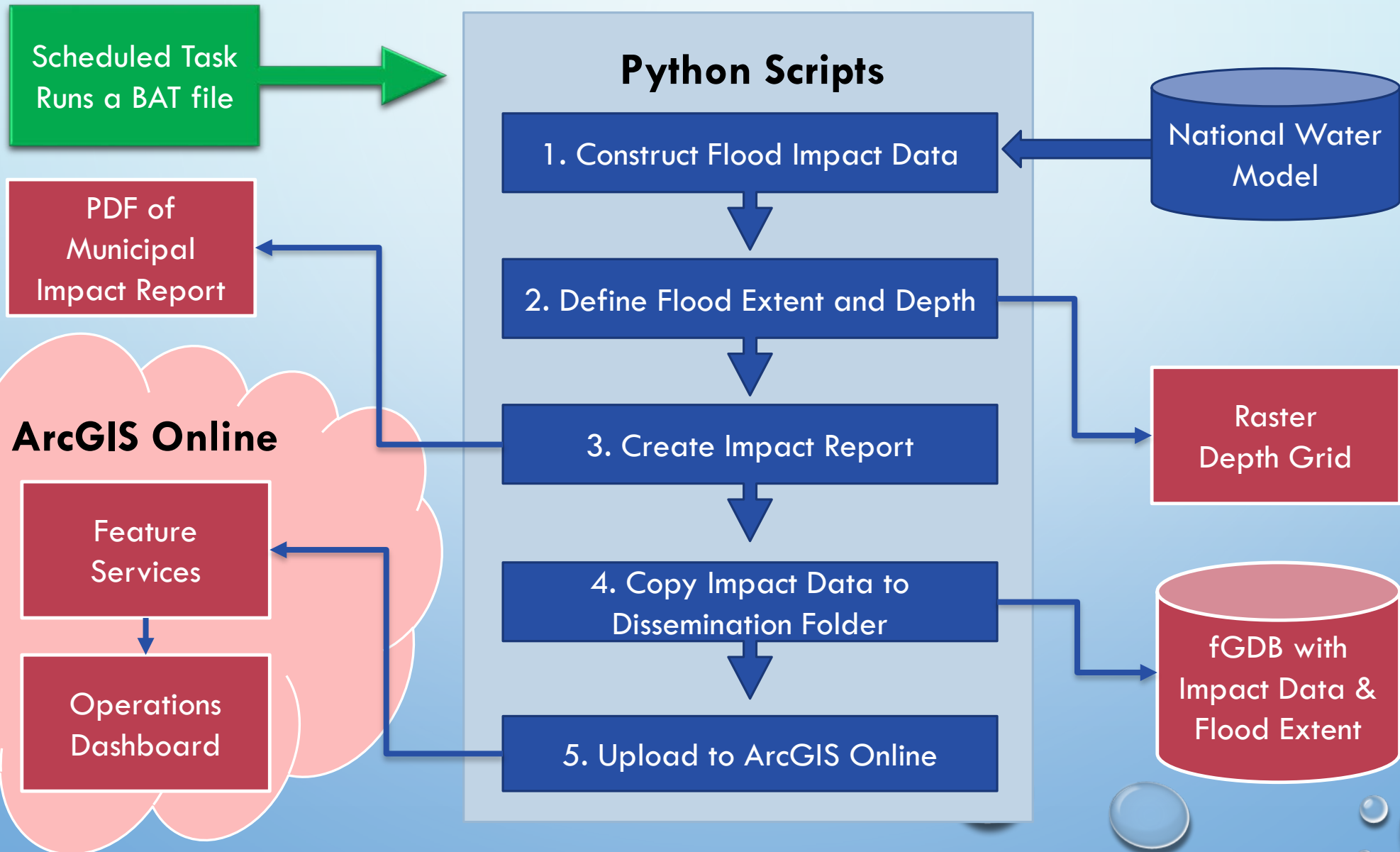
Arc Hydro Tools

- Arc Hydro Setup
- Attribute Tools
- GIS Data Exchange
- H & H Modeling
- Cross-Section Characterization
- Floodplain Delineation
- GeolCPR
- Green and Ampt
- Map to Map
- Streamstats
- Time of Concentration
- Utility

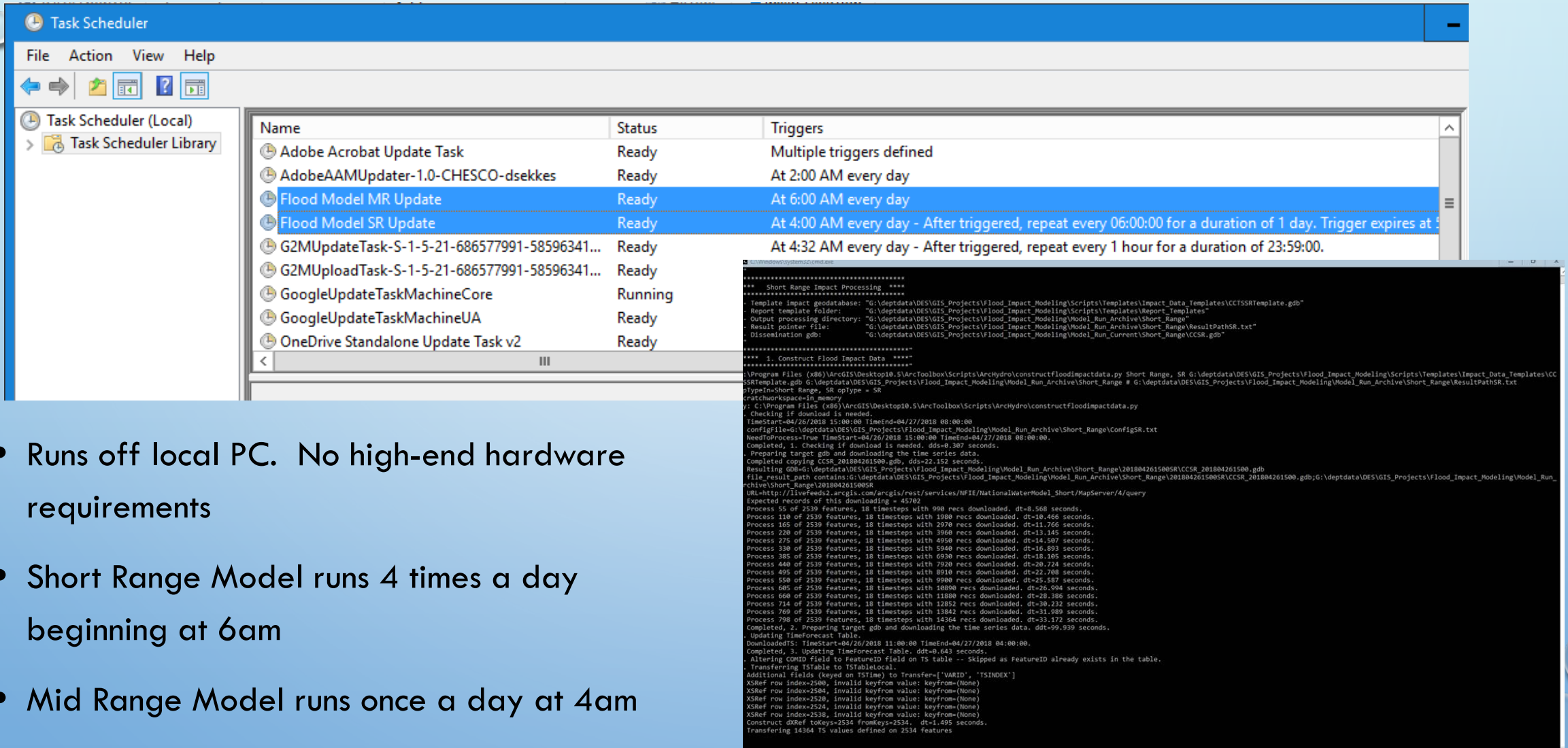
Critical Facilities

ID	Shape	NAME	ADDRESS	CITY	STATE	ZIP	MUNI_NAME_FULL	PKW COMMON	LAT_Y_COORD	LONG_X_COORD	CI_SECTOR	CI_TYPE
1	Point	West Brandyvine - Manor Road	2508 Manor Rd	Coatesville	PA	19320	West Brandyvine Township	29.9-19.3-0	-81.024417	-75.512207	Emergency Services	Electrical Substation
2	Point	Hillside Elementary School	557 Hillside Rd	Berwyn	PA	19312	Tredyffrin Township	43.108-25.1-E	41.05662	-75.405772	Education Facilities	School
3	Point	District Court 15-1-03	256 E Locust highway	Coatesville	PA	19320	City of Coatesville	39.8-25-4-E	39.983732	-75.520763	Government Facilities	District Court
4	Point	West Chester East High School	455 Elm Ln	West Chester	PA	19380	West Chester Township	39.5-38.3-4-E	39.978044	-75.564053	Education Facilities	School
5	Point	Avon Grove Charter School	115 State Rd	West Grove	PA	19390	London Grove Township	39.8-49-4-E	39.824624	-75.854329	Education Facilities	School
6	Point	Texas Eastern - Upper Swanton 1	496 Swanton Rd	Downingtown	PA	19340	Upper Swanton Township	40.3-34-4-W	41.062878	-75.7168	Energy Sector	Pipeline
7	Point	St. Simon & Jude School	8 Clearbough Ct	West Chester	PA	19382	Tredyffrin Township	41.2-43	39.965904	-75.52393	Education Facilities	School

Flood Impact Forecasting Process



Scheduled Task



The screenshot shows the Windows Task Scheduler interface. The 'Task Scheduler Library' contains several tasks, with 'Flood Model MR Update' and 'Flood Model SR Update' highlighted. The 'Triggers' column for these tasks shows they are scheduled at 6:00 AM and 4:00 AM every day, respectively. A console window in the foreground displays the output of a Python script, which includes details about data processing, downloading, and updating a forecast table.

Name	Status	Triggers
Adobe Acrobat Update Task	Ready	Multiple triggers defined
AdobeAAMUpdater-1.0-CHESCO-dsekkes	Ready	At 2:00 AM every day
Flood Model MR Update	Ready	At 6:00 AM every day
Flood Model SR Update	Ready	At 4:00 AM every day - After triggered, repeat every 06:00:00 for a duration of 1 day. Trigger expires at 10:00:00 AM on 04/27/2018
G2MUpdateTask-S-1-5-21-686577991-58596341...	Ready	At 4:32 AM every day - After triggered, repeat every 1 hour for a duration of 23:59:00.
G2MUploadTask-S-1-5-21-686577991-58596341...	Ready	
GoogleUpdateTaskMachineCore	Running	
GoogleUpdateTaskMachineUA	Ready	
OneDrive Standalone Update Task v2	Ready	

```
Short Range Impact Processing
Template Impact geodatabase: "G:\deptdata\DESGIS_Projects\Flood_Impact_Modeling\Scripts\Templates\Impact_Data_Templates\CCTSSRTemplate.gdb"
Report template folder: "G:\deptdata\DESGIS_Projects\Flood_Impact_Modeling\Scripts\Templates\Report_Templates"
Output processing directory: "G:\deptdata\DESGIS_Projects\Flood_Impact_Modeling\Model_Run_Archive\Short_Range"
Result pointer file: "G:\deptdata\DESGIS_Projects\Flood_Impact_Modeling\Model_Run_Archive\Short_Range\ResultPathSR.txt"
Dissemination gdb: "G:\deptdata\DESGIS_Projects\Flood_Impact_Modeling\Model_Run_Current\Short_Range\CCSR.gdb"

**** 1. Construct Flood Impact Data ****
*****
C:\Program Files (x86)\ArcGIS\Desktop10.5\ArcToolbox\Scripts\ArcHydro\constructFloodImpactData.py Short Range, SR G:\deptdata\DESGIS_Projects\Flood_Impact_Modeling\Scripts\Templates\Impact_Data_Templates\CCTSSRTemplate.gdb G:\deptdata\DESGIS_Projects\Flood_Impact_Modeling\Model_Run_Archive\Short_Range\ResultPathSR.txt
TypeIn=Short Range, SR otype = SR
cratchworkspace=In memory
C:\Program Files (x86)\ArcGIS\Desktop10.5\ArcToolbox\Scripts\ArcHydro\constructFloodImpactData.py
Checking if download is needed.
TimeStart=04/26/2018 15:00:00 TimeEnd=04/27/2018 08:00:00
configfile=G:\deptdata\DESGIS_Projects\Flood_Impact_Modeling\Model_Run_Archive\Short_Range\ConfigsSR.txt
NeedToProcess=True TimeStart=04/26/2018 15:00:00 TimeEnd=04/27/2018 08:00:00
Completed, 1. Checking if download is needed, dds=0.307 seconds.
Preparing target gdb and downloading the time series data.
Completed copying CCSR_201804261500.gdb, dds=22.152 seconds.
Resulting GDB=G:\deptdata\DESGIS_Projects\Flood_Impact_Modeling\Model_Run_Archive\Short_Range\201804261500\CCSR_201804261500.gdb
File result_path contains:G:\deptdata\DESGIS_Projects\Flood_Impact_Modeling\Model_Run_Archive\Short_Range\201804261500SR
URL=http://livefeeds2.arcgis.com/arcgis/rest/services/NFIE/NationalWaterModel_Short/MapServer/4/query
Expected records of this downloading = 45702
Process 55 of 2539 features, 18 timesteps with 990 recs downloaded, dt=8.568 seconds.
Process 110 of 2539 features, 18 timesteps with 1980 recs downloaded, dt=10.466 seconds.
Process 165 of 2539 features, 18 timesteps with 2970 recs downloaded, dt=11.766 seconds.
Process 220 of 2539 features, 18 timesteps with 3960 recs downloaded, dt=13.145 seconds.
Process 275 of 2539 features, 18 timesteps with 4950 recs downloaded, dt=14.507 seconds.
Process 330 of 2539 features, 18 timesteps with 5940 recs downloaded, dt=16.893 seconds.
Process 385 of 2539 features, 18 timesteps with 6930 recs downloaded, dt=18.105 seconds.
Process 440 of 2539 features, 18 timesteps with 7920 recs downloaded, dt=20.724 seconds.
Process 495 of 2539 features, 18 timesteps with 8910 recs downloaded, dt=22.780 seconds.
Process 550 of 2539 features, 18 timesteps with 9900 recs downloaded, dt=25.587 seconds.
Process 605 of 2539 features, 18 timesteps with 10890 recs downloaded, dt=26.994 seconds.
Process 660 of 2539 features, 18 timesteps with 11880 recs downloaded, dt=28.386 seconds.
Process 714 of 2539 features, 18 timesteps with 12852 recs downloaded, dt=30.232 seconds.
Process 769 of 2539 features, 18 timesteps with 13842 recs downloaded, dt=31.989 seconds.
Process 798 of 2539 features, 18 timesteps with 14364 recs downloaded, dt=33.172 seconds.
Completed, 2. Preparing target gdb and downloading the time series data, ddt=99.939 seconds.
Updating TimeForecast Table.
DownloadedTS: TimeStart=04/26/2018 11:00:00 TimeEnd=04/27/2018 04:00:00.
Completed, 3. Updating TimeForecast Table, ddt=0.643 seconds.
Filtering COMID field to FeatureID field on TS table -- Skipped as FeatureID already exists in the table.
Transferring TSTable to ISTableLocal.
Additional fields (keyed on TSTime) to transfer=['VARID', 'TSINDEX']
XSRef row index=2500, invalid keyfrom value: keyfrom(None)
XSRef row index=2504, invalid keyfrom value: keyfrom(None)
XSRef row index=2520, invalid keyfrom value: keyfrom(None)
XSRef row index=2524, invalid keyfrom value: keyfrom(None)
XSRef row index=2538, invalid keyfrom value: keyfrom(None)
Construct dXRef tokeys=2534 fromkeys=2534, dt=1.495 seconds.
Transferring 14364 TS values defined on 2534 features
```

- Runs off local PC. No high-end hardware requirements
- Short Range Model runs 4 times a day beginning at 6am
- Mid Range Model runs once a day at 4am

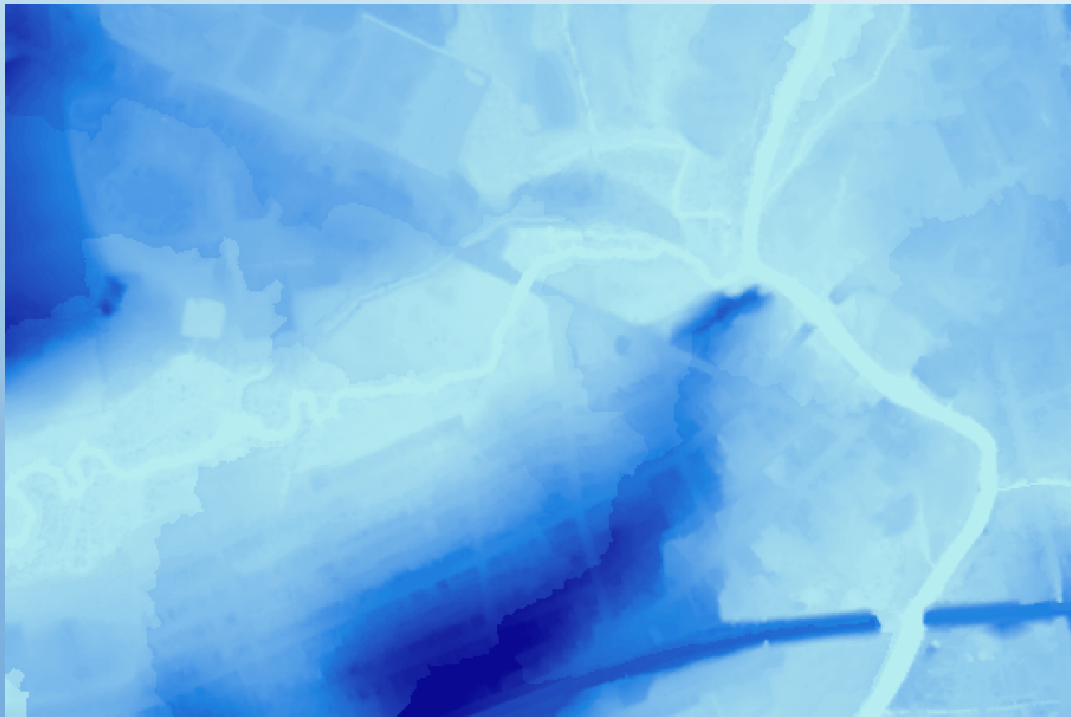
WHEN: National Water Model Forecast

Analysis & Assimilation	Short-Range	Medium-Range	Long-Range
Cycling Frequency	Hourly	4 x Day at 00Z, 06Z, 12Z, 18Z	Daily Ens (16 mem)
Forecast Duration	0-18 hours	0-10 days	0-30 days
Forecast Latency (latency of external forcing data accounts for most of delay)	1 hour 45 mins	6 hours	19 hours
Meteorological Forcing	Downscaled HRRR/RAP blend	Downscaled GFS	Downscaled & bias-corrected CFS
Spatial Discretization & Routing	1km/250m/NHDPlus Reach	1km/250m/NHDPlus Reach	1 km/NHDPlus Reach
Assimilation of ~7,000 USGS Obs			
Reservoirs (1260 water bodies parameterized with level pool scheme)			

WHERE: Pre-processed Data

Chester County Department of Emergency Services partnered with Esri to create the automation scripts and data preprocessing.

HAND and Catchment Rasters



Template Data

- + CCTSMRTemplate.gdb
- CCTSSRTemplate.gdb
 - Layers
 - AddressPoint
 - CriticalFacility
 - DrainageLine
 - MunilImpact
 - FloodEventTS
 - ForecastTime
 - pf_DrainageLine
 - TSXRef
- + Data_Updates.gdb
 - ConfigMR.txt
 - ConfigSR.txt

- AddressPoint
- CriticalFacility
- DrainageLine
- MunilImpact

WHERE & WHO: Forecasted Impacts

Arc Hydro tools combine the NWM data and the pre-processed data to output:

WHERE:

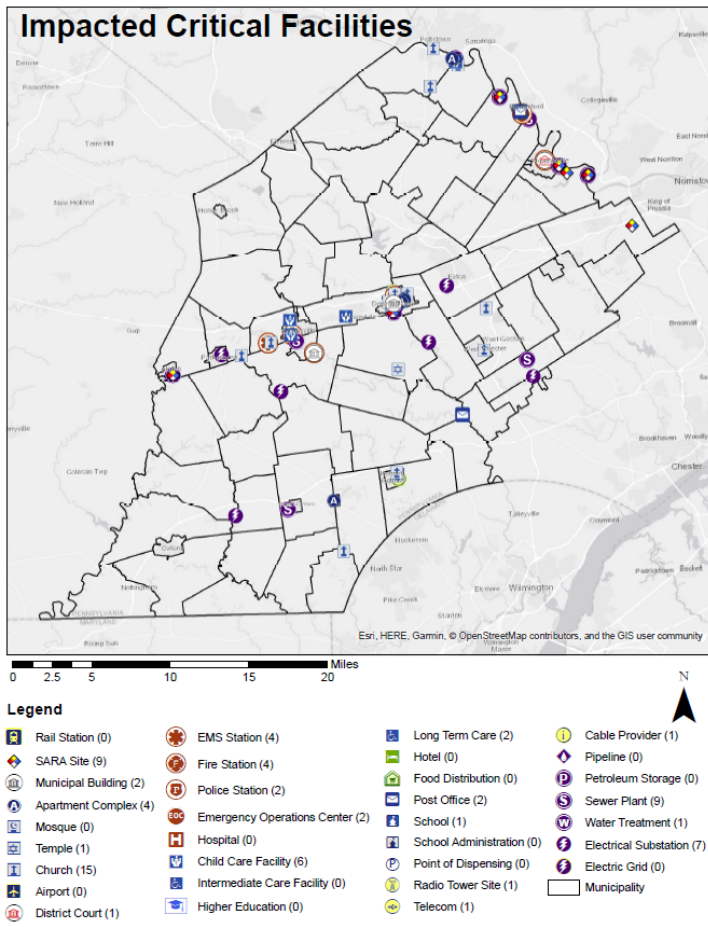
- Flood extent polygons
- Depth raster

WHO:

- Affected addresses
- Affected critical facilities



WHO: Printable PDF Impact Report



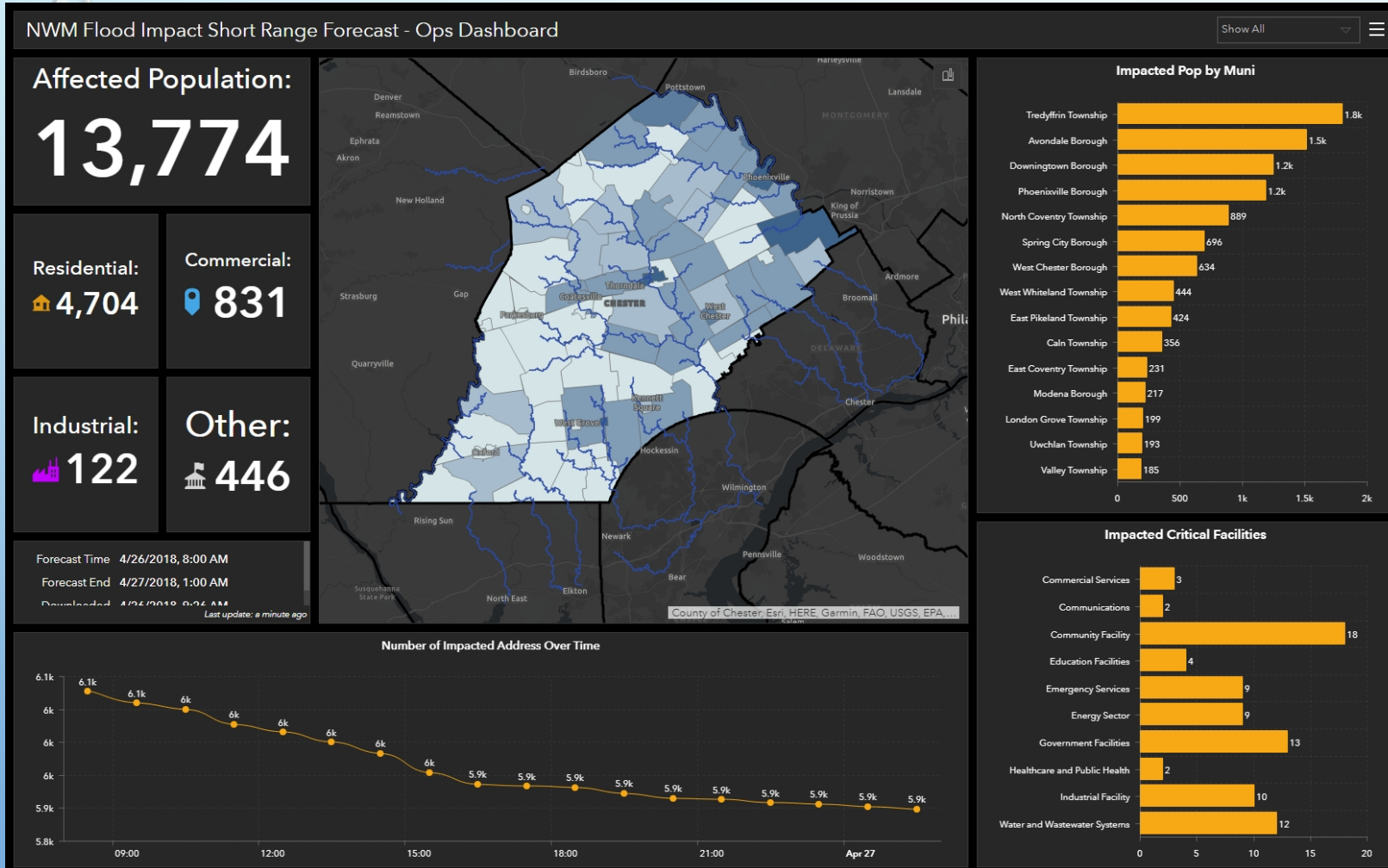
Municipality Impact

Nb	Municipality	Estimated Affected Population	Fire Station	EMS Station	Police Station	EOC	SARA Facility	Water/Sewer Treatment Plant	Hospital	Long-Term Care Facility	School	Child Care Facility	Place of Worship	Apartment Complex
7	Atglen Borough	26					1	1						
4	Avondale Borough	1383												1
65	Birmingham Township	11												
39	Calm Township	477										1		
35	Charlestown Township	33												
16	City of Coatsville	183	1	1								1		
11	Downingtown Borough	1903	1	1	1	1	1				1	1	4	2
51	East Bradford Township	95												
30	East Brandywine	87												
40	East Cain Township	55					1	1					1	
18	East Coventry Township	234								2		1		
47	East Fallowfield Township	27											1	
53	East Goshen Township	126												
61	East Marlborough	10												
24	East Nantmeal Township	37												
69	East Nottingham	122												
26	East Pileland Township	191												
21	East Vincent Township	119					1	1						
42	East Whiteland Township	134												
55	Easttown Township	73												
70	Elk Township	16												
13	Elverson Borough	0												
72	Franklin Township	15												
45	Highland Township	11												
22	Honey Brook Township	37												
12	Honey Brook Borough	0												
62	Kennett Township	171												
3	Kennett Square Borough	71										1	2	
73	London Britain Township	27												

- Included in situation reports
- Distributed to local emergency managers and key partners

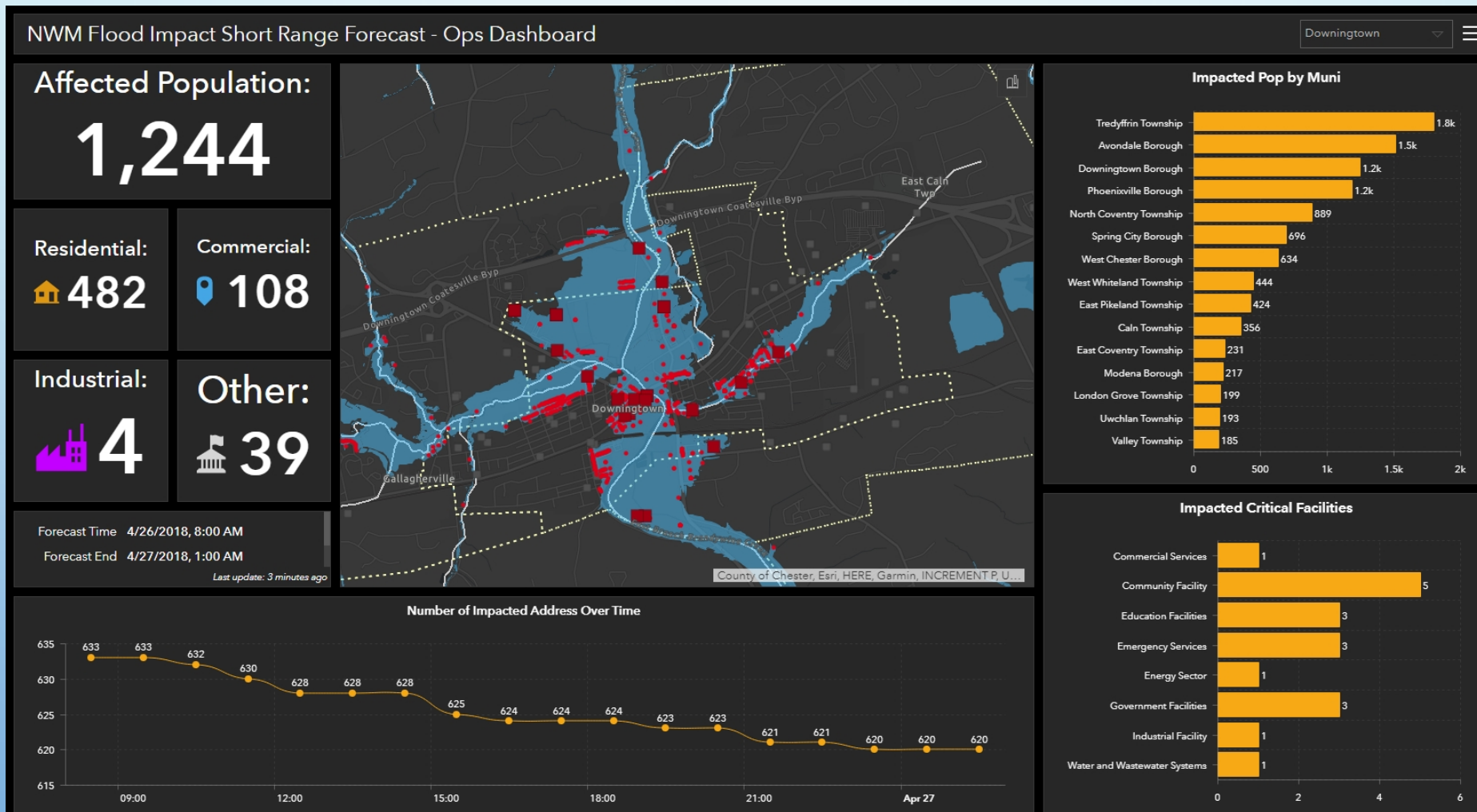
MUNICIPALITY	Downingtown Borough			16
CI SECTOR	Commercial Services			1
<i>CI TYPE</i>	<i>Child Care Facility</i>			<i>1</i>
Child Care Center	Teach And Learn Day School	86 W Lancaster Av	Downingtown	19335
CI SECTOR	Communications			1
<i>CI TYPE</i>	<i>Telecom</i>			<i>1</i>
Phone Exchange	Verizon Downingtown Co (PA21017)	201 Whiteland Av	Downingtown	19335
CI SECTOR	Community Facility			6
<i>CI TYPE</i>	<i>Apartment Complex</i>			<i>2</i>
Apartment Complex	Chestnut Village Apts	238 Chestnut St	Downingtown	19335
Apartment Complex	Downingtown Arms Apts	227 Whiteland Av	Downingtown	19335
<i>CI TYPE</i>	<i>Church</i>			<i>4</i>
Protestant	Downingtown Friends Meeting	800 E Lancaster Av	Downingtown	19335
Protestant	Messiah Evangelical Lutheran Church	46 W Lancaster Av	Downingtown	19335
Protestant	Mount Raymond Church	220 Manor Av	Downingtown	19335
Protestant	New Beginnings Fellowship	39 W Lancaster Av	Downingtown	19335
CI SECTOR	Education Facilities			1
<i>CI TYPE</i>	<i>School</i>			<i>1</i>
Private School	Regina Luminis Academy	40 W Pennsylvania Av	Downingtown	19335
CI SECTOR	Emergency Services			3
<i>CI TYPE</i>	<i>EMS Station</i>			<i>1</i>
ALS/BLS	Minquas Ambulance	141 Wallace Av	Downingtown	19335
<i>CI TYPE</i>	<i>Fire Station</i>			<i>1</i>
Fire Station	Minquas FC	141 Wallace Av	Downingtown	19335
<i>CI TYPE</i>	<i>Police Station</i>			<i>1</i>
Municipal Police Station	Downingtown Boro PD	10 W Lancaster Av	Downingtown	19335
CI SECTOR	Energy Sector			1
<i>CI TYPE</i>	<i>Electrical Substation</i>			<i>1</i>
Electrical Substation	Downingtown - Jefferson Ave	120 Jefferson Av	Downingtown	19335

WHO: Flood Impact Short Range Forecast Ops Dashboard

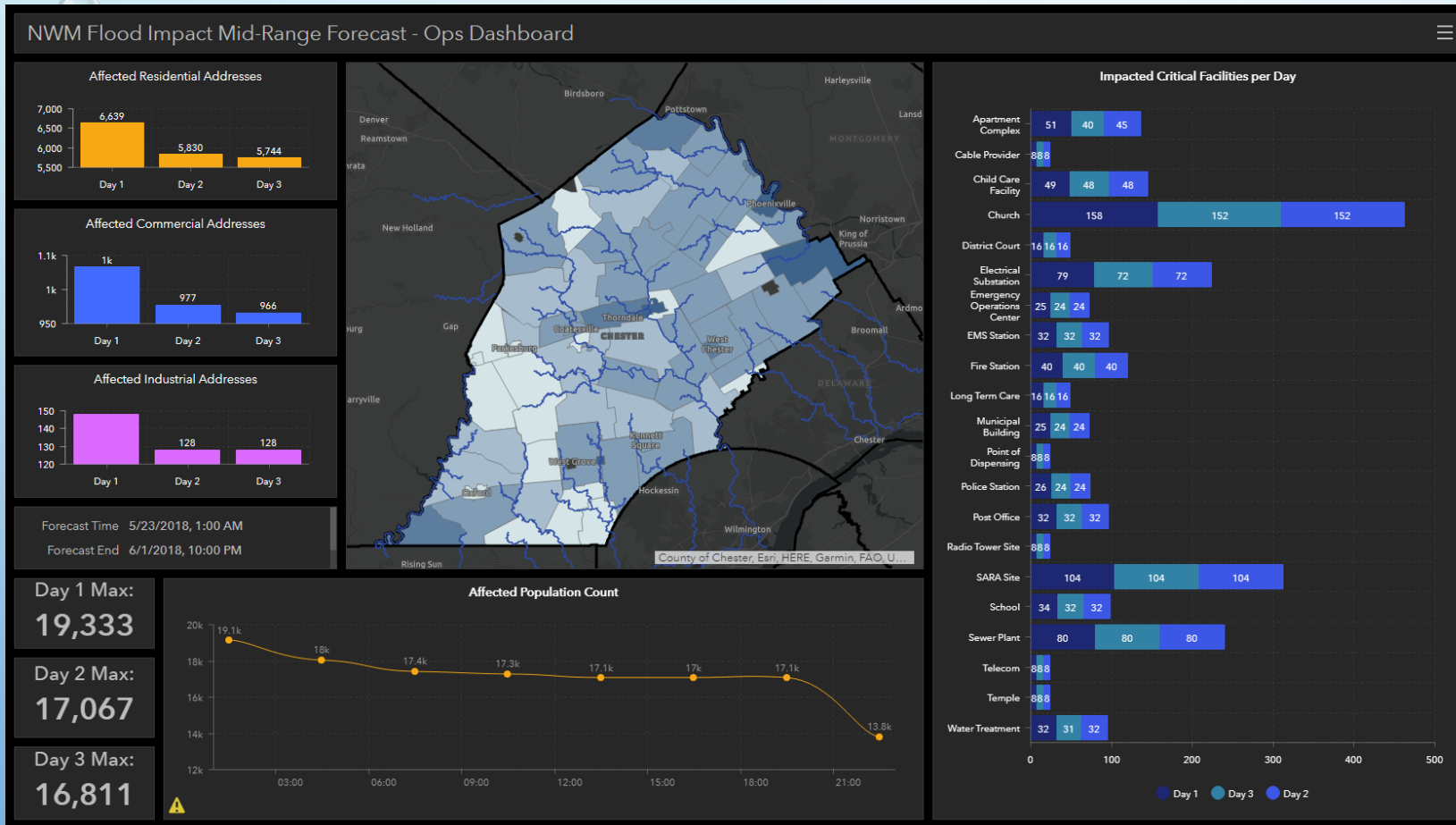


- Total affected population
- Count of addresses affected by type
- Timeline of the number of affected addresses within the next 24 hours
- Top 15 most impacted jurisdictions
- Impacted critical facilities count by sector

WHO: Flood Impact Short Range Forecast Ops Dashboard



WHO: Flood Impact Mid-Range Forecast Ops Dashboard



- Total affected population for the next 3 day
- Count of addresses affected by type for the next 3 days
- Timeline of the number of affected addresses within the next 3 days
- Impacted critical facilities count by type

Emergency Management Coordinator

- Municipal Public Works can:
 - Target areas to clear drains and culverts before the rain begins
 - Stage barricades for roads
 - Open secondary emergency exits/entrances to neighborhoods that will be isolated
- Notify Emergency Services chiefs to plan for staffing and resource needs for swift water rescue and basement pumping
- Notify neighborhoods that will be directly impacted
- Check up on individuals with lack of transportation or have mobility issues who may not be able to evacuate on their own

ReadyChesco - Public (Organization Admin) | Welcome Dave Sekkes (dsekkes) | Help & Support | Logout

everbridge | Dashboard | Universe | Notifications | Incidents | Contacts | Reports | Settings | Access

Select Contacts | You've selected: 104 contact(s) | New Notification

Create Message

High priority message | [Use a message template](#)

* Title
Warning: Flooding expected in the next 24 Hours

Body

Text Include a separate message for email notifications

All delivery methods

Severe Flooding is expected on Mary St between Hunt Ave and Manor Ave beginning tonight at 10:00pm through the morning. We recommend parking your car south of Pennsylvania Ave and elevating all materials at least 18 inches off the ground in your basement. Please monitor the Borough's social media pages and the National Weather Service for changes to the forecast.

Email/Fax : 2086, SMS : 66, Estimated # of SMS : 4

Speech

Text-to-speech | Use a voice recording

Save this as a message template

Message type:

Standard | Polling | Conference Bridge

[Attach Files](#)

Publishing Options

Publishing Channels: Everbridge Network

The background is a light blue gradient. There are several realistic water droplets of various sizes in the corners: top-left, top-right, and bottom-right. The droplets have highlights and shadows, giving them a 3D appearance.


Next Steps to Improving the Model

Real World Observations

Simple Survey 1 23 to collect data during flood events:

- When the flooding occurred
- Where it occurred
- And a photo (picture is better than a description)

Tell Us Where Is It Flooding



Completing this survey will help the Chester County Department of Emergency Services collect detailed data on where flooding occurs.

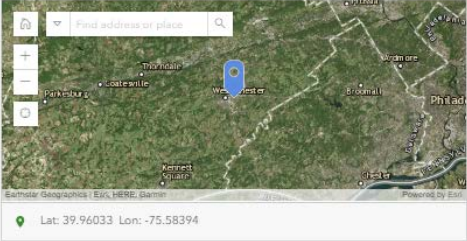
This data will help provide important information used to calibrate our flood impact planning tools. Please make all observations from a safe distance.

Date of Observation*

Time of Observation*

Where is the flooding occurring?*

1. Click on the Map to enter it (Phone Only).
2. Search your location or click the target to access your GPS.
3. Set the pin to the location of the high water mark by moving the map. Zoom in and be as accurate as you safely can.
4. Click the OK button towards the top of the map when finished (Phone Only).



Lat: 39.96033 Lon: -75.58394

Take a photo of the flooding

Try to include things like street signs, buildings, parking lots, etc that give context and scale to the flood waters


[Click here to upload image file. \(<10MB\)](#)

Survey 123 Flood Observations


Flooding Survey

Overview Design Collaborate Analyze Data

5/9/18 - 5/17/18 Report (Beta) Export Open in Map Viewer Show individual response



Where is the flooding occurring?
Lat: 40.00583 Lon: -75.70478

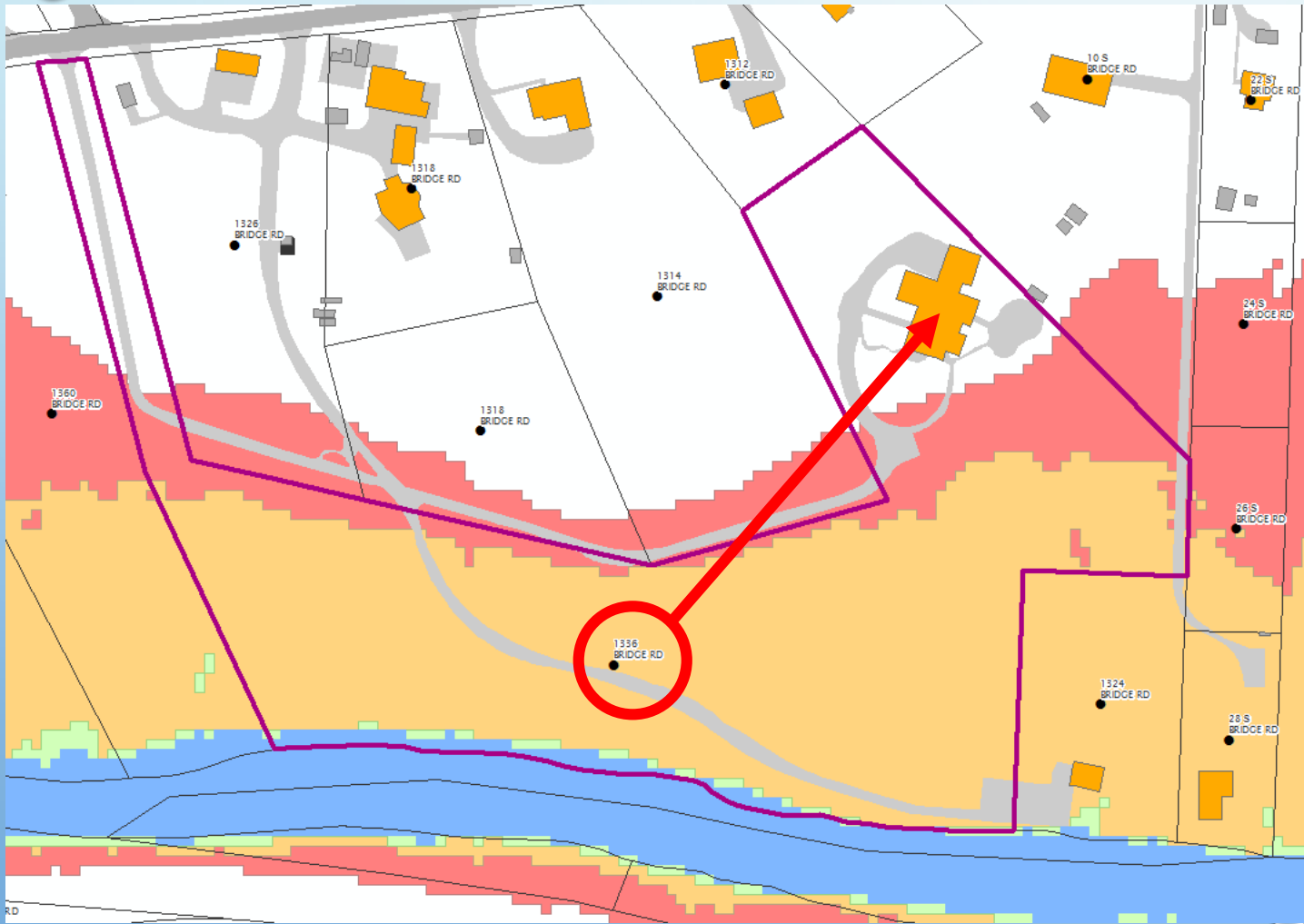


surveyPoint (Features: 5, Selected: 1)

Date Of Observation	Time of Observation
May 17, 2018	17:20
May 17, 2018	08:00
May 17, 2018	10:45
May 16, 2018	09:09
May 9, 2018	15:24



Address Point Clean Up



- Building footprints are spatially accurate but are unattributed
- Address points have great assessment, land use, and address data but are mapped to the parcel centroid
- Centroid is in the flood extent but the actual building is not in danger of flooding

First Floor Elevation Values

Pictometry Explorer

- Measure first floor elevations remotely
- Labor intensive



Questions?

Dave Sekkes, GISP

Chester County Department of Emergency Services

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610-344-4485