Climate Resiliency in Charles County

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August-5-2021
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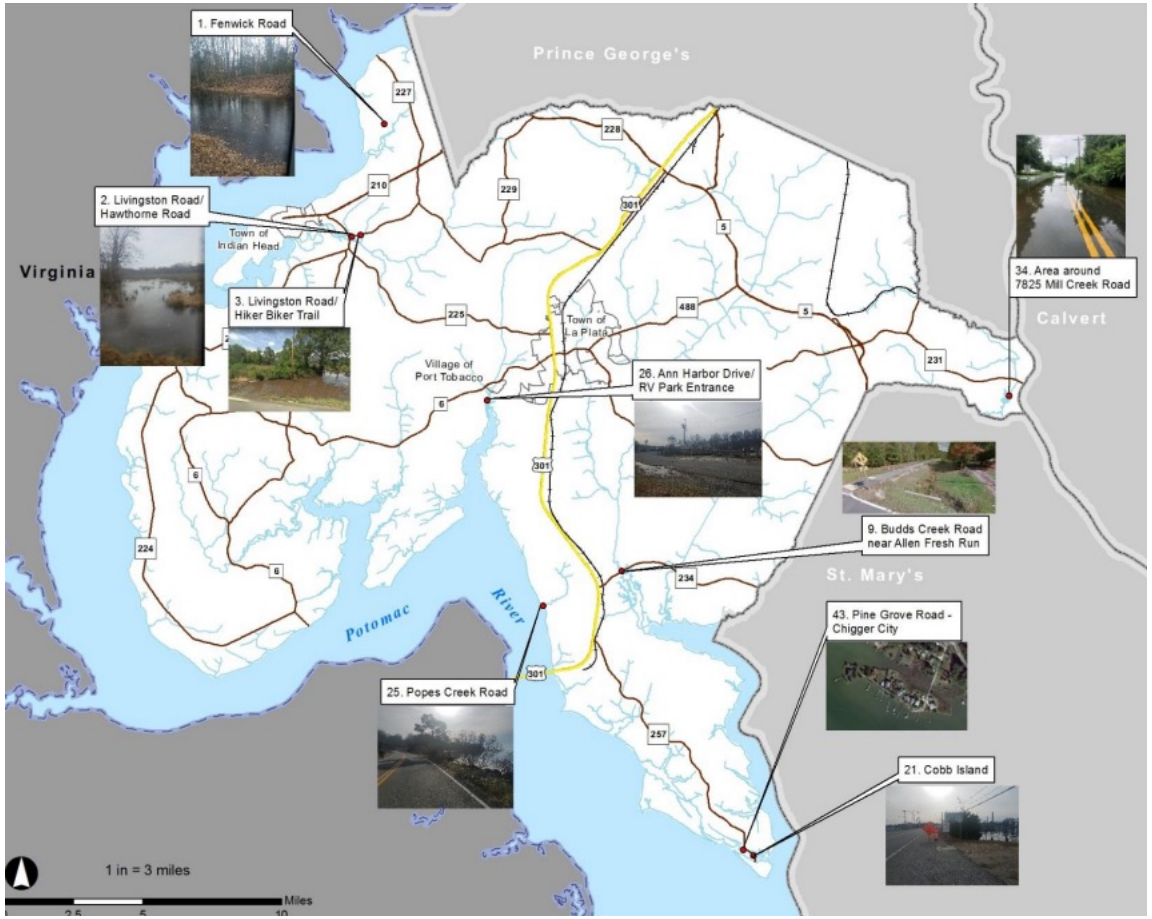
Background

- Charles County Department of Parks and Recreation has teamed with Chesapeake Conservancy to update their 5-year Land Preservation Parks and Recreation plan
- Data gathered from available parks, recreation amenities, and programs available in Charles County will serve as a blueprint for future enhancements provided by the open space funding grant.

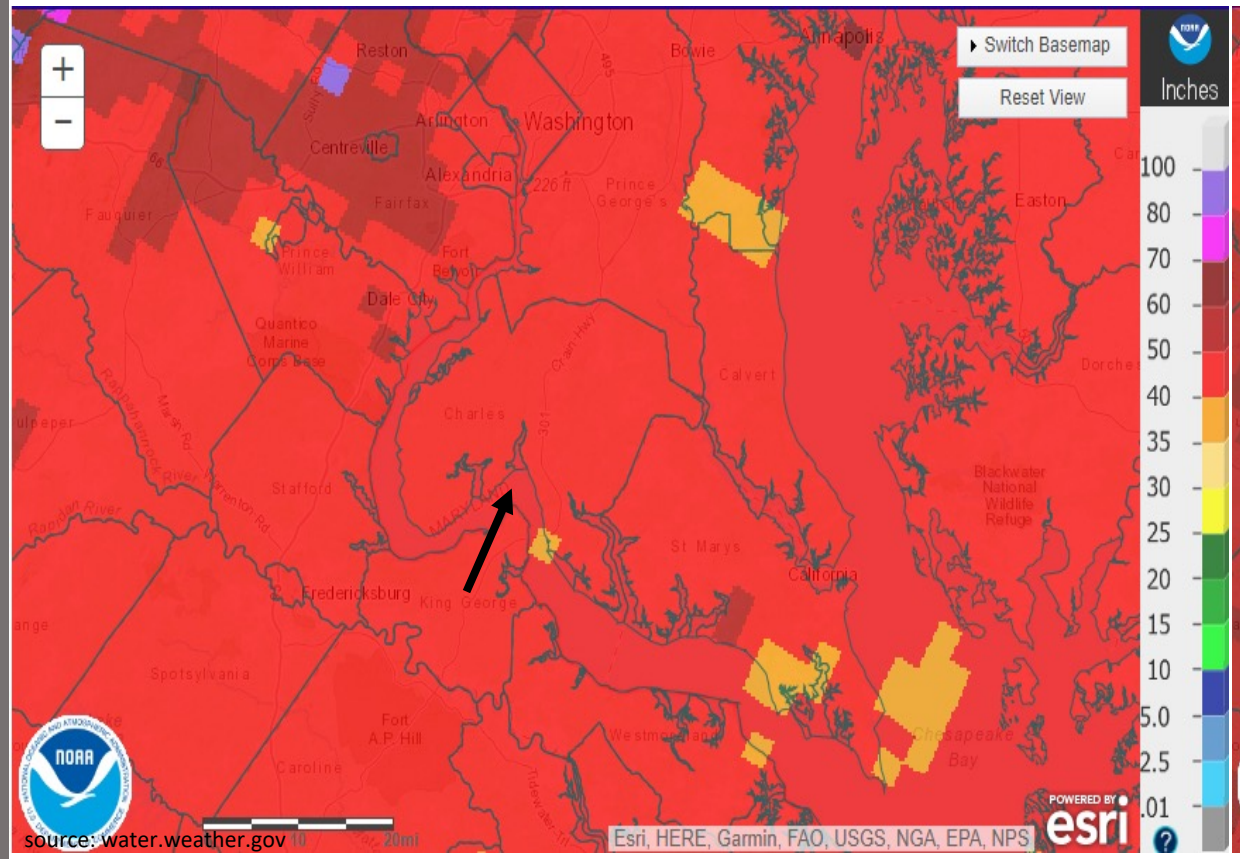
Problem: Increased flooding in Charles County

- Climate change presents itself as frequent storms, intense droughts, and heat waves
- Municipalities can install green infrastructure to mitigate impacts from climate change
- Long-term preservation of recreation sites, parks, and residential developments



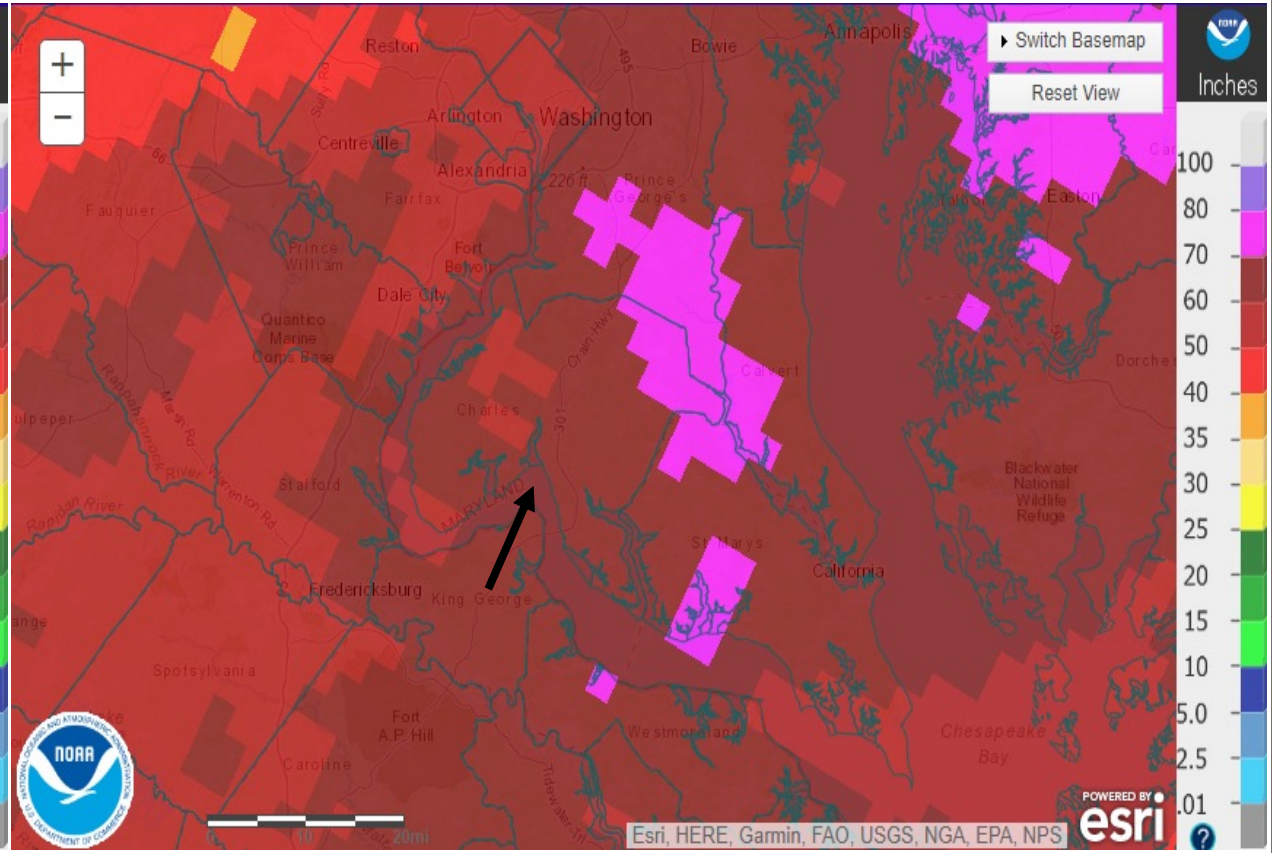
Increase in precipitation = risk of flooding

2005 Annual Precipitation Average

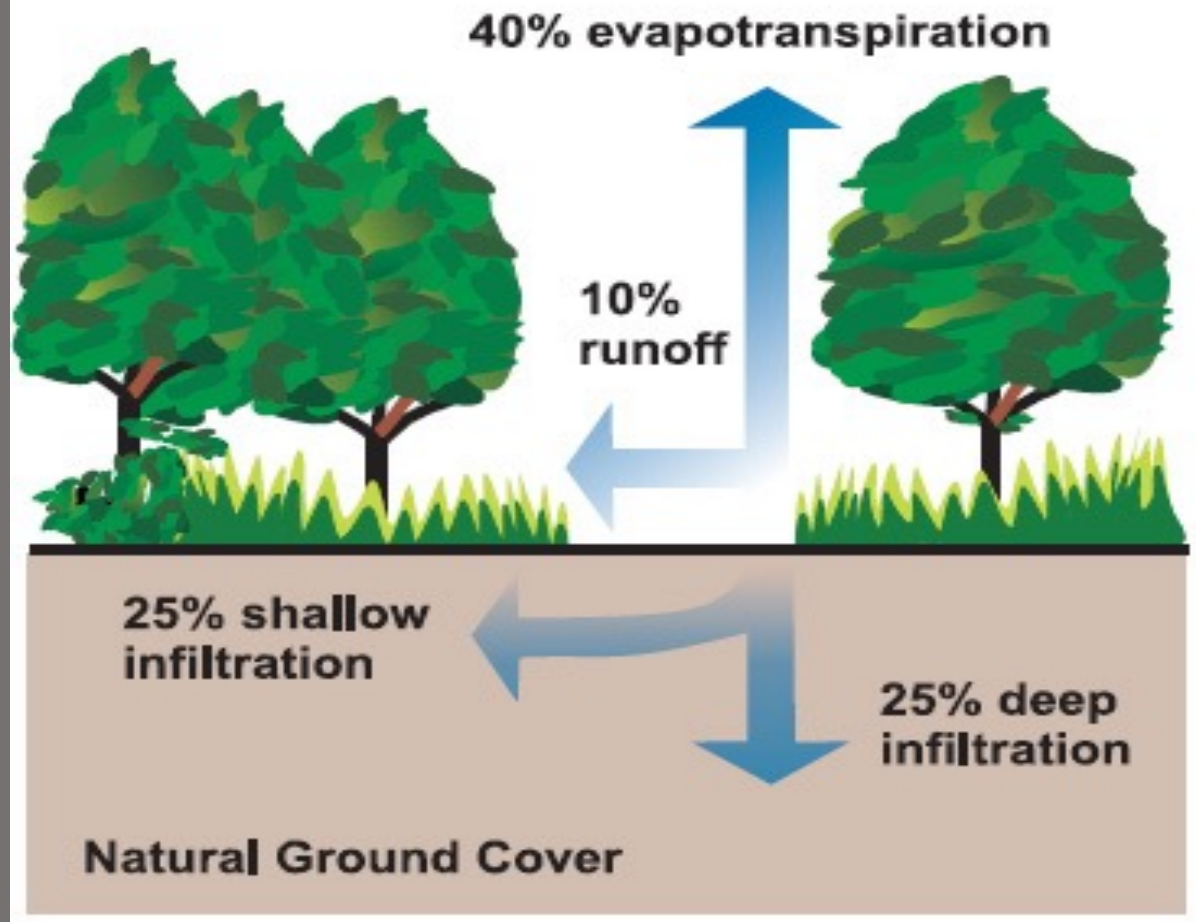


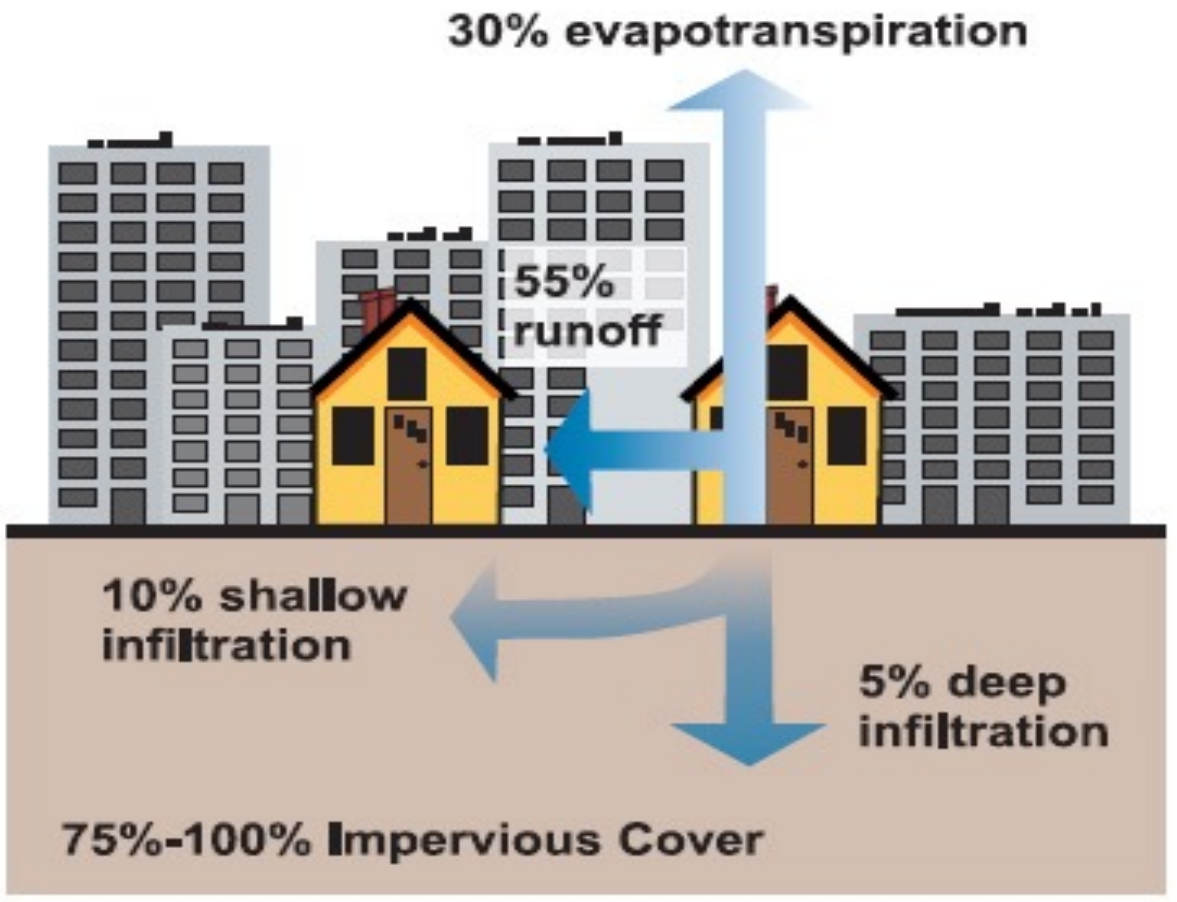
source: water.weather.gov

2020 Annual Precipitation Average



Tree canopy helps reduce flooding

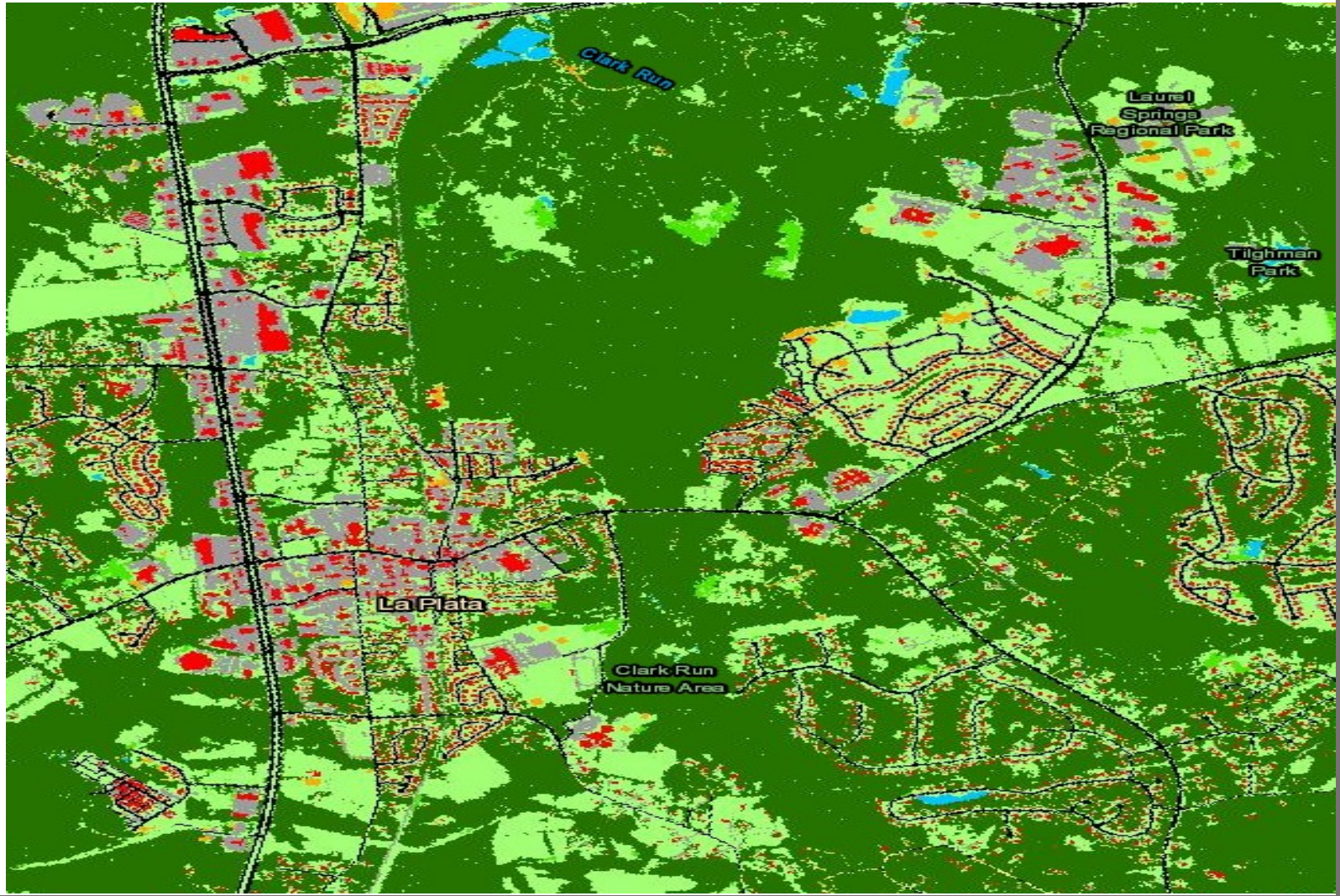




Impervious surfaces usually reduce tree canopy

Chesapeake Bay Watershed Land Cover

- No Data
- Water
- Wetlands
- Tree Canopy
- Shrubland
- Herbaceous Vegetation
- Barren
- Structures
- Impervious Surfaces
- Impervious Roads
- Tree Canopy over Structures
- Tree Canopy over Impervious Surfaces
- Tree Canopy over Impervious Roads
- Aberdeen Proving Ground

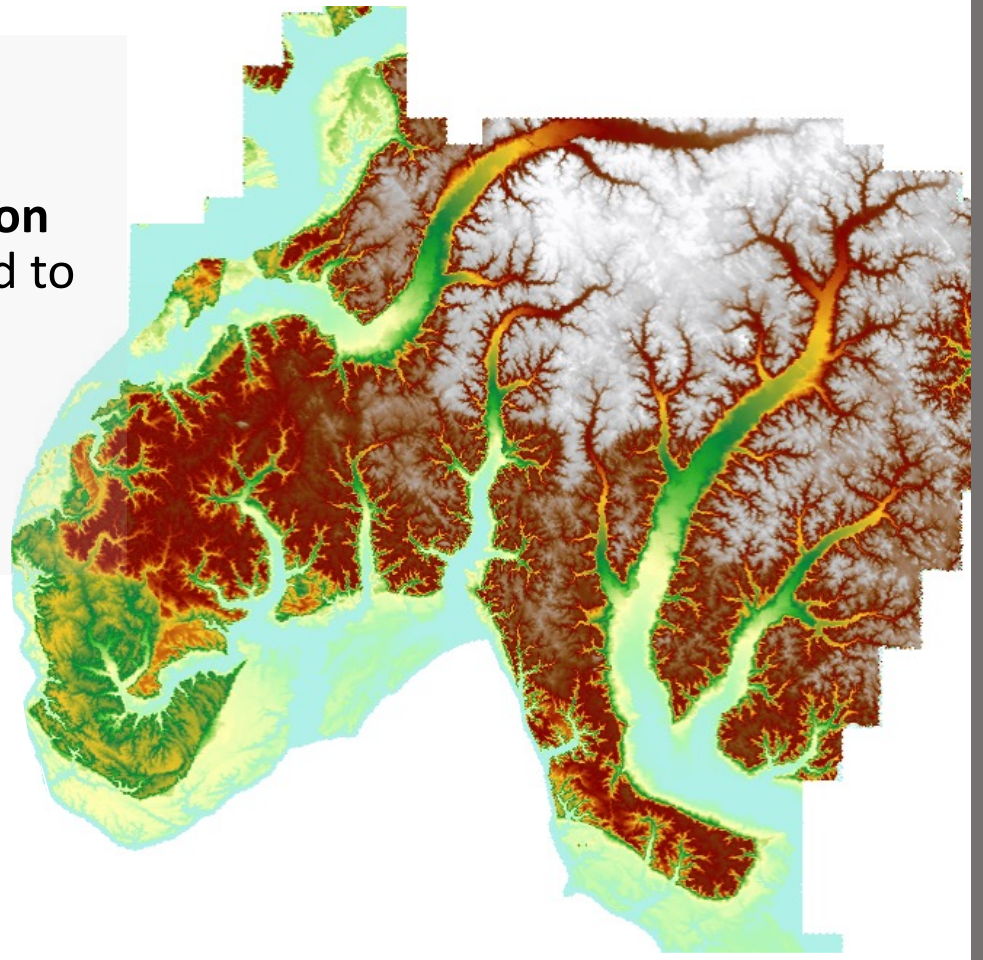


Project Goals

- Locate areas where there are drainage issues related to increased flooding
- Quantify land cover features near drainage sites
- Use land cover maps to identify changes in land cover features

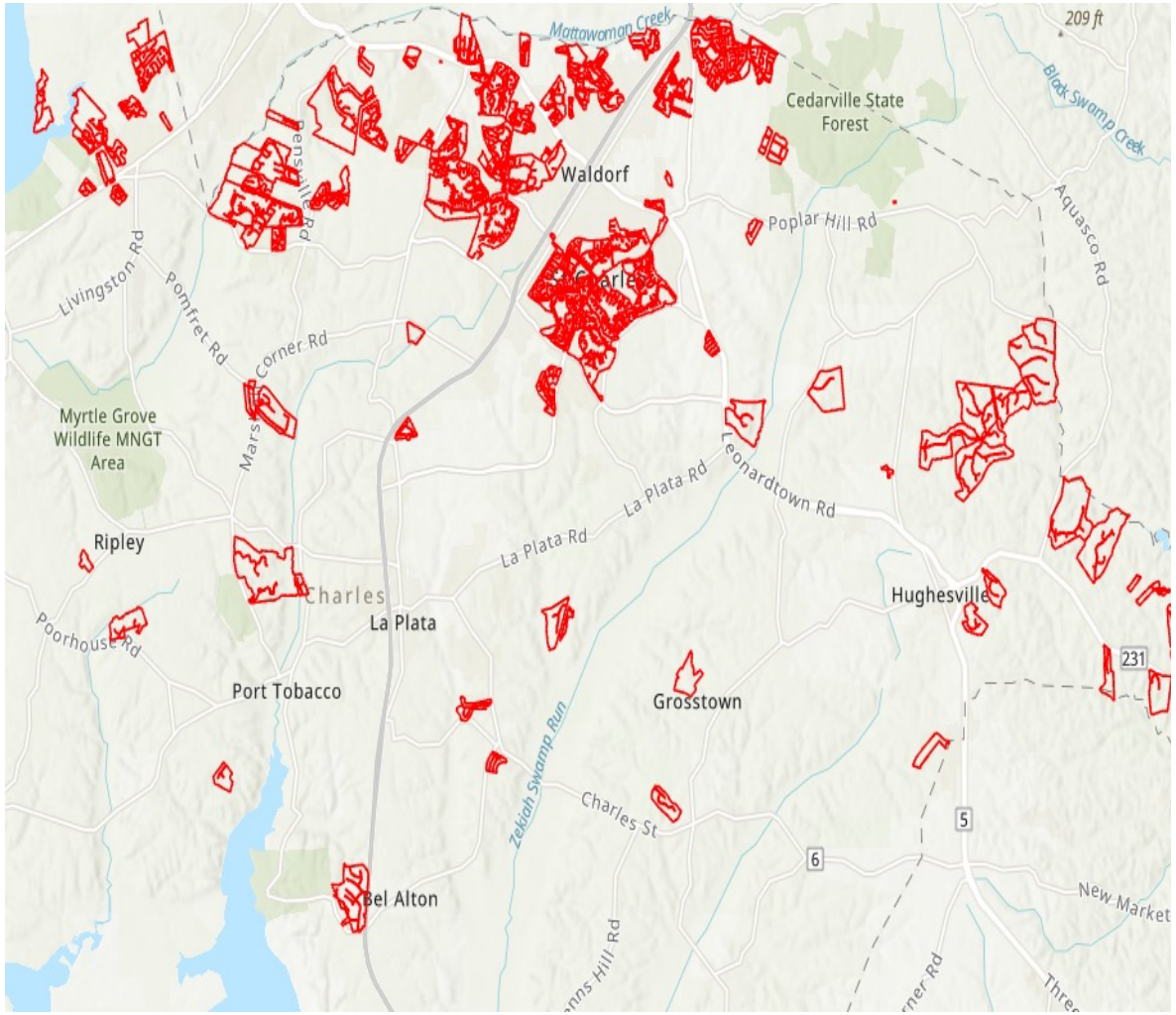
Methods: Digital Elevation Model (DEM)

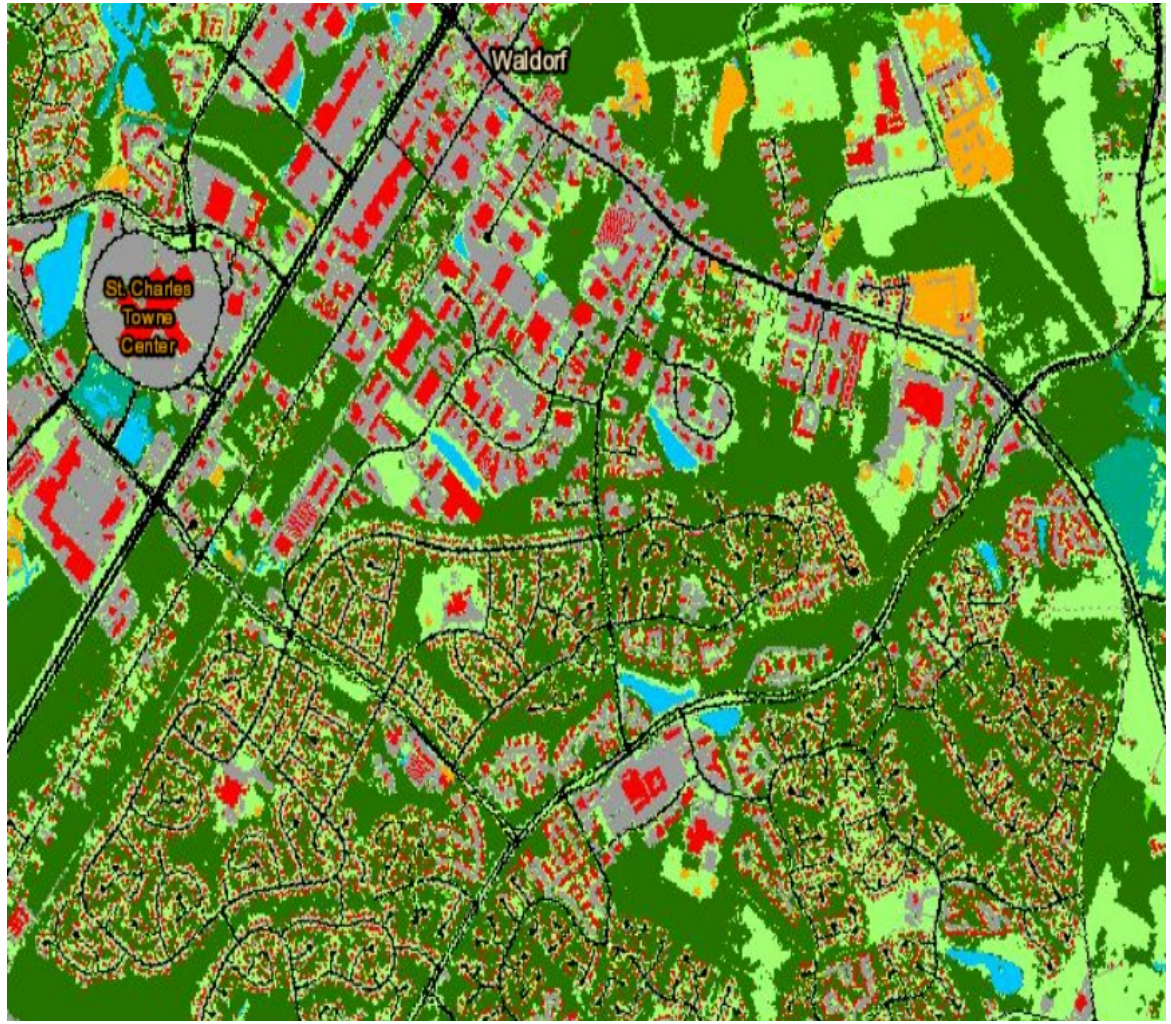
- Model used to produce watershed delineation
- Input rasters of **flow direction** and **flow accumulation** used to determine stream channels



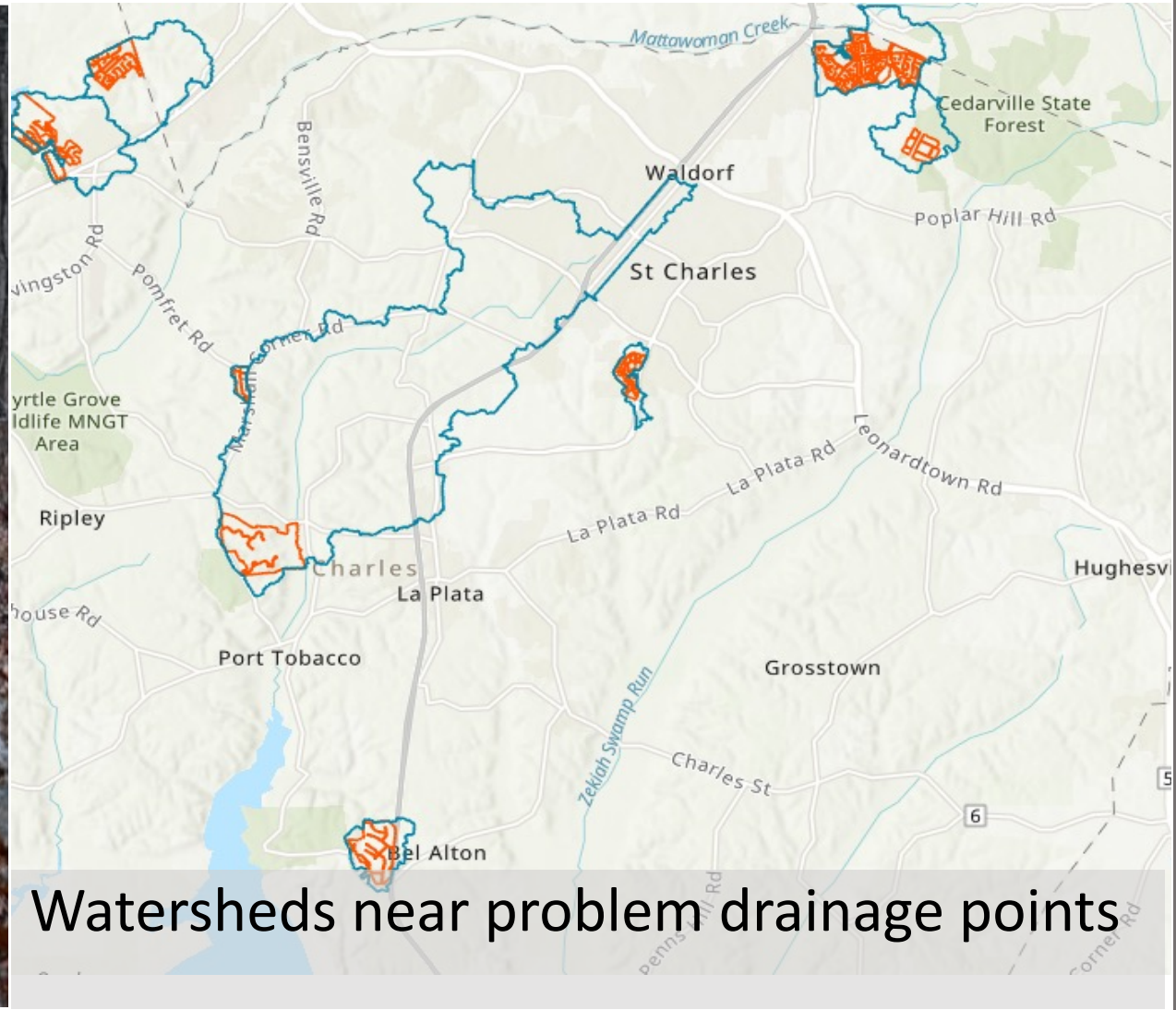
source: earth.google.com

Polygon Data and High-Resolution Land Cover Map





Watershed Delineations



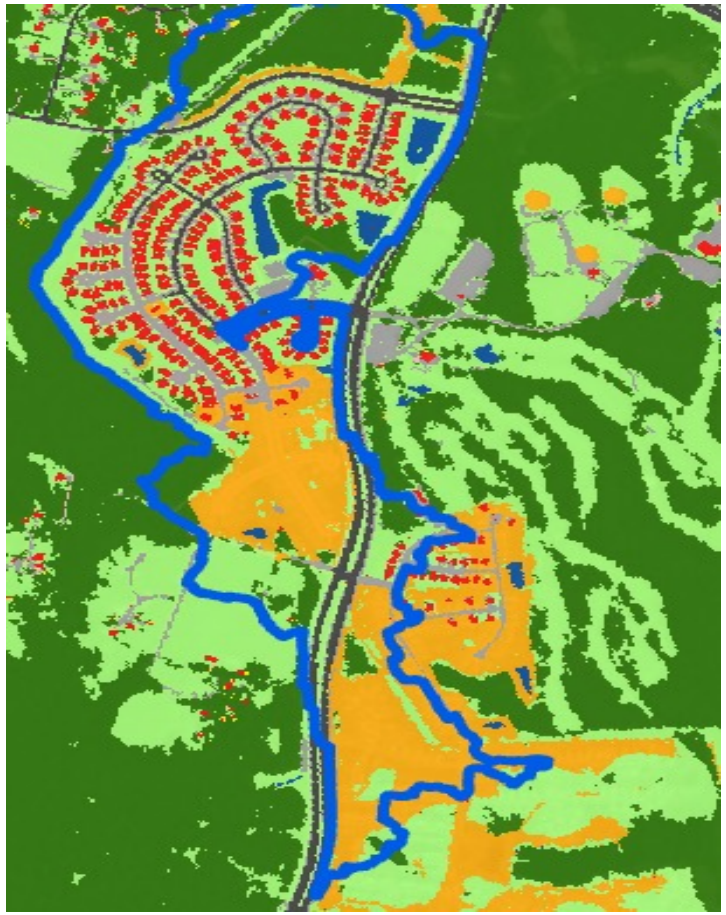
Watersheds near problem drainage points

Research Findings

Using land cover maps from 2013/2014 and 2017/2018 percent changes were calculated, and three sites were selected as examples.

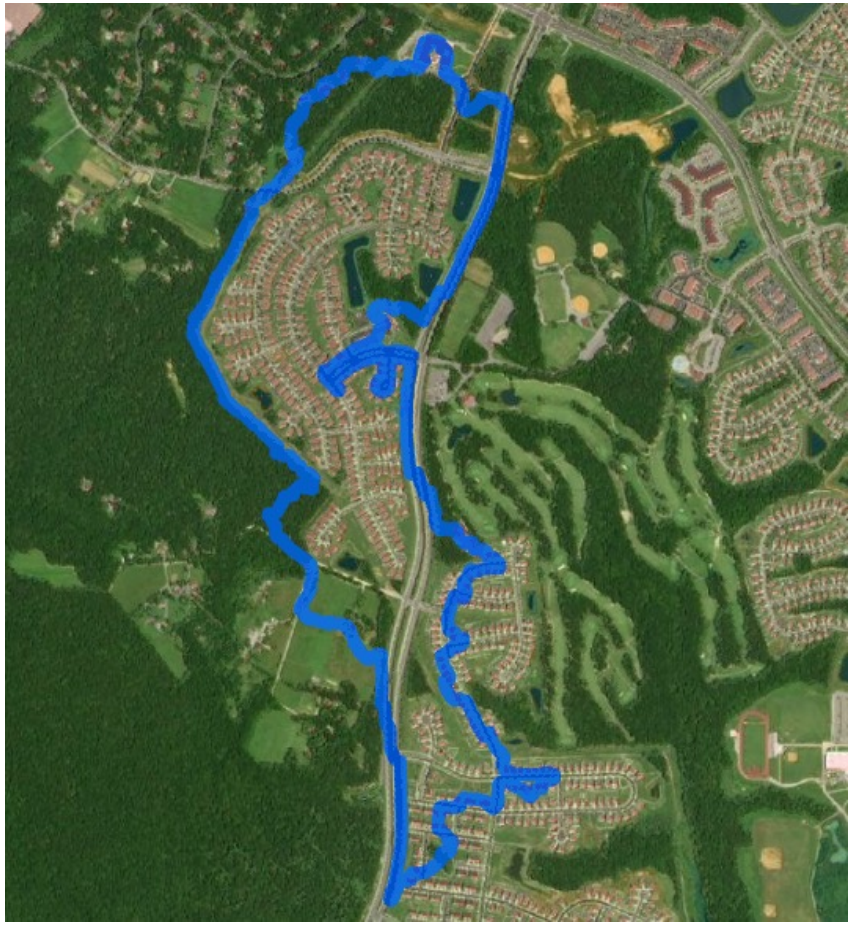
Subdivision	Tree Canopy 2013-2014	Tree Canopy 2017-2018	% Change	Structures 2013-2014	Structures 2017-2018	% Change	Impervious Surfaces 2013-2014	Impervious Surfaces 2017-2018	% Change	Barren 2013-2014	Barren 2017-2018	% Change
CHAPEL POINT WOODS	290.52	289.52	**-0.3%**	9.20	9.08	**-1.4%**	12.78	16.24	**27.1%**	0.11	0.05	**-54.0%**
LONGMEADE	7931.69	7492.92	**-5.5%**	302.53	299.23	**-1.1%**	574.91	690.31	**20.1%**	102.26	78.76	**-23.0%**
POMFRET ESTATES	40.22	33.99	**-15.5%**	2.57	2.51	**-2.4%**	2.89	4.14	**43.2%**	0.00	0.10	
HERITAGE AT ST CHARLES	**34.58**	**30.71**	**-11.2%**	**22.79**	**27.44**	**20.4%**	**21.42**	**28.72**	**34.1%**	**48.75**	**4.29**	**-91.2%**
SOUTH HAMPTON	676.03	621.01	**-8.1%**	61.18	60.86	**-0.5%**	89.65	112.44	**25.4%**	10.45	7.44	**-28.8%**
STRAWBERRY HILLS	**484.01**	**404.05**	**-16.5%**	**30.11**	**27.25**	**-9.5%**	**24.09**	**40.40**	**67.7%**	**1.14**	**14.98**	**1218.5%**
WINDSOR MANOR	**44.34**	**15.83**	**-64.3%**	**0.0002**	**0.88**	**356400%**	**0.03**	**2.63**	**8610.7%**	**0.00**	**16.90**	
PINEFIELD	304.31	291.20	**-4.3%**	79.04	76.55	**-3.2%**	60.31	81.59	**35.3%**	0.92	0.28	**-69.0%**
PINEWOOD	426.35	426.00	**-0.1%**	4.77	4.85	**1.6%**	7.49	10.64	**42.0%**	0.93	0.85	**-8.4%**
INDIAN CREEK ESTATES	158.92	159.79	**0.5%**	1.50	1.40	**-6.6%**	2.50	3.86	**54.5%**	0.00	0.00	
MAXWELL HALL	1183.97	1182.66	**-0.1%**	11.94	12.58	**5.3%**	22.25	31.49	**41.5%**	0.00	10.04	
BENEDICT	202.98	215.93	**6.4%**	11.54	9.87	**-14.5%**	15.81	21.12	**33.6%**	0.39	0.49	**23.6%**

Heritage at Charles



2013-2014

2017-2018



Present Imagery

Strawberry Hills

2013-2014

2017-2018

Present Imagery

Windsor Manor

2013-2014

2017-2018

Present Imagery

Solutions and Recommendations


source: maps.google.com

- Decrease length of driveways
- Install permeable pavement
- Increase vegetation
- Install rain gardens


source: city of Portland

source: Saif Eddin Sayed Ahmed


source: www.elkcoswcd.org

Questions

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