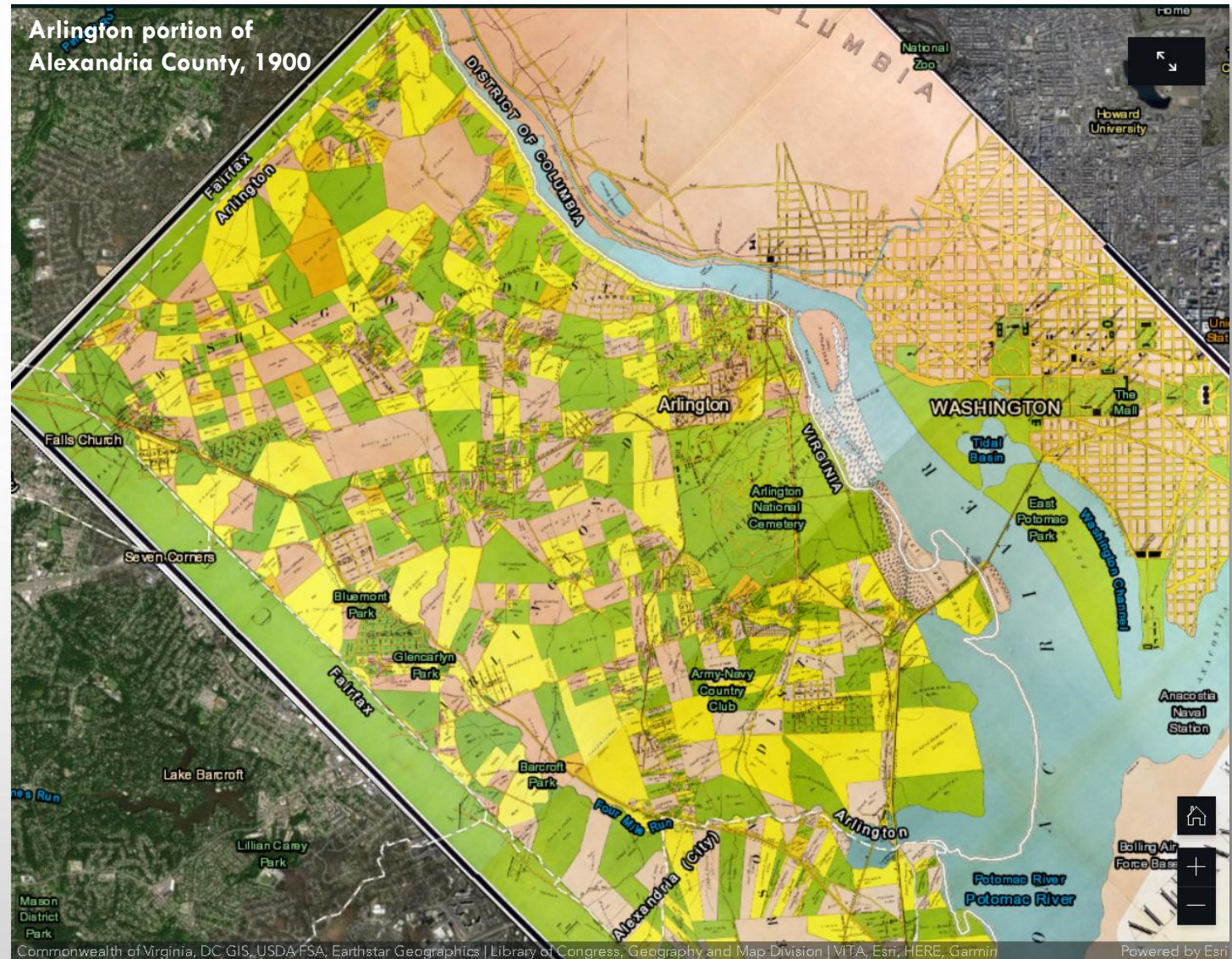


# STORMWATER RESILIENCY CHALLENGES AND OPPORTUNITIES IN ARLINGTON, VA

COG CHESAPEAKE BAY POLICY COMMITTEE  
NOVEMBER 15, 2019

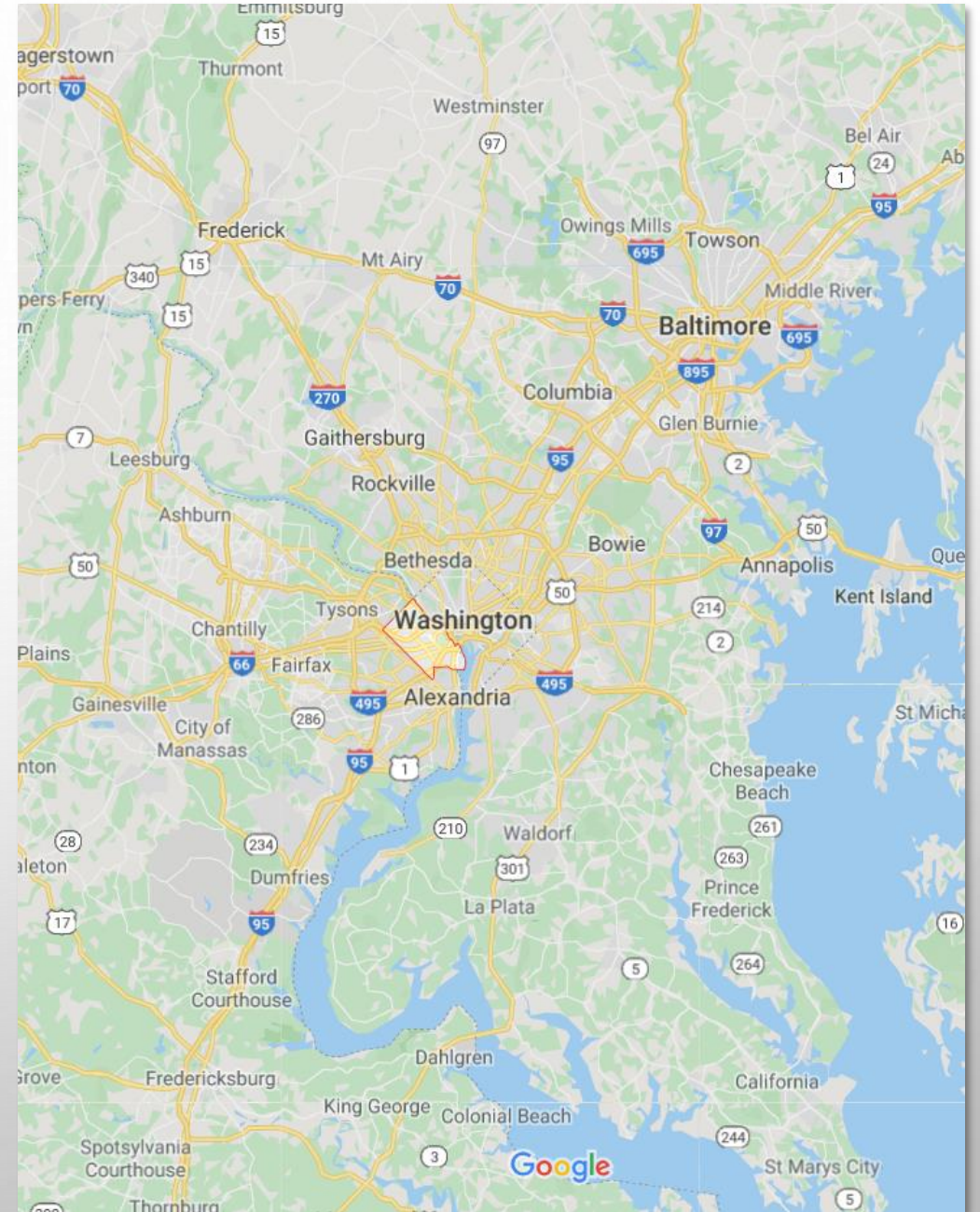
JASON PAPACOSMA  
WATERSHED PROGRAMS MANAGER  
DEPARTMENT OF ENVIRONMENTAL SERVICES





# OUTLINE

- STORMWATER SYSTEM AND RISK SNAPSHOT
- KEY CHALLENGES
- FLOODING
- STREAMS AND WATER QUALITY
- REGULATIONS
- MAGNIFICATION
- WHAT WE'VE BEEN DOING
- LOOKING AHEAD



## KEY CHALLENGES

- LEGACY LAND USE AND DRAINAGE PATTERNS
- CAPACITY CONSTRAINTS AND FLOODING
- AGING SYSTEM
- LIMITED TERTIARY INFRASTRUCTURE FOR ADEQUATE DRAINAGE
- STREAM EROSION AND WATER QUALITY IMPAIRMENTS
- DAMAGE TO INFRASTRUCTURE AND PROPERTY AND THREATS TO PUBLIC SAFETY
- REGULATORY OBLIGATIONS

## System Snapshot



**32,000**  
structures



**450 miles**  
of pipes



**32 miles**  
of streams



**43%** of County  
covered by  
impervious surfaces

## Condition and Risk Snapshot



**>50%** of system  
estimated at 60 -  
80 years old



**17 miles** of  
pipe under  
capacity for  
severe storms



**>6 miles** of  
streams with  
severe erosion

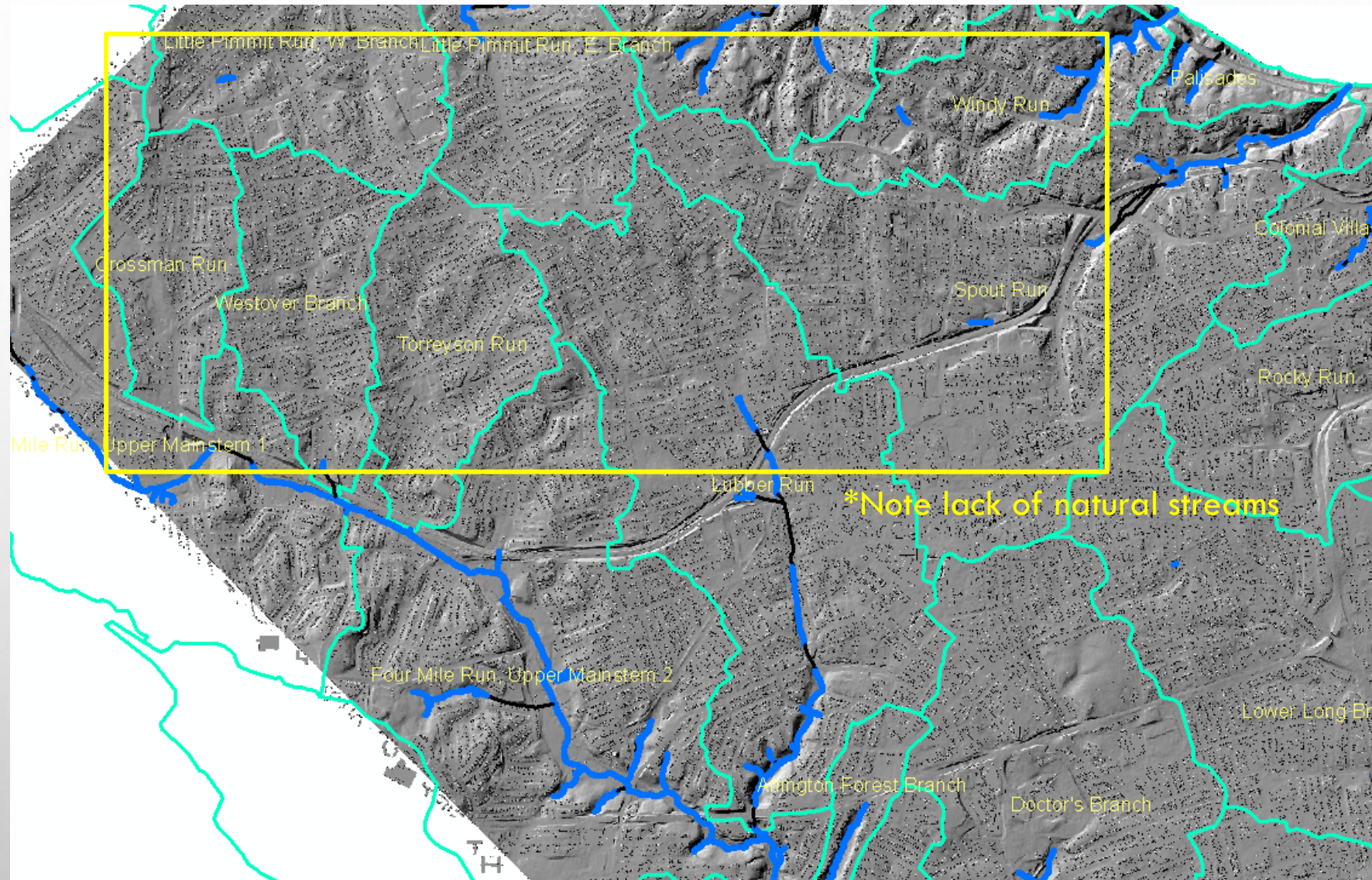


**>100**  
drainage  
complaints in  
FY 2018



# FLOODING

1930s THROUGH 1960s:  
RAPID DEVELOPMENT  
SIGNIFICANT PORTION OF  
ORIGINAL STREAM  
NETWORK WAS COVERED,  
PIPED, AND BUILT UPON

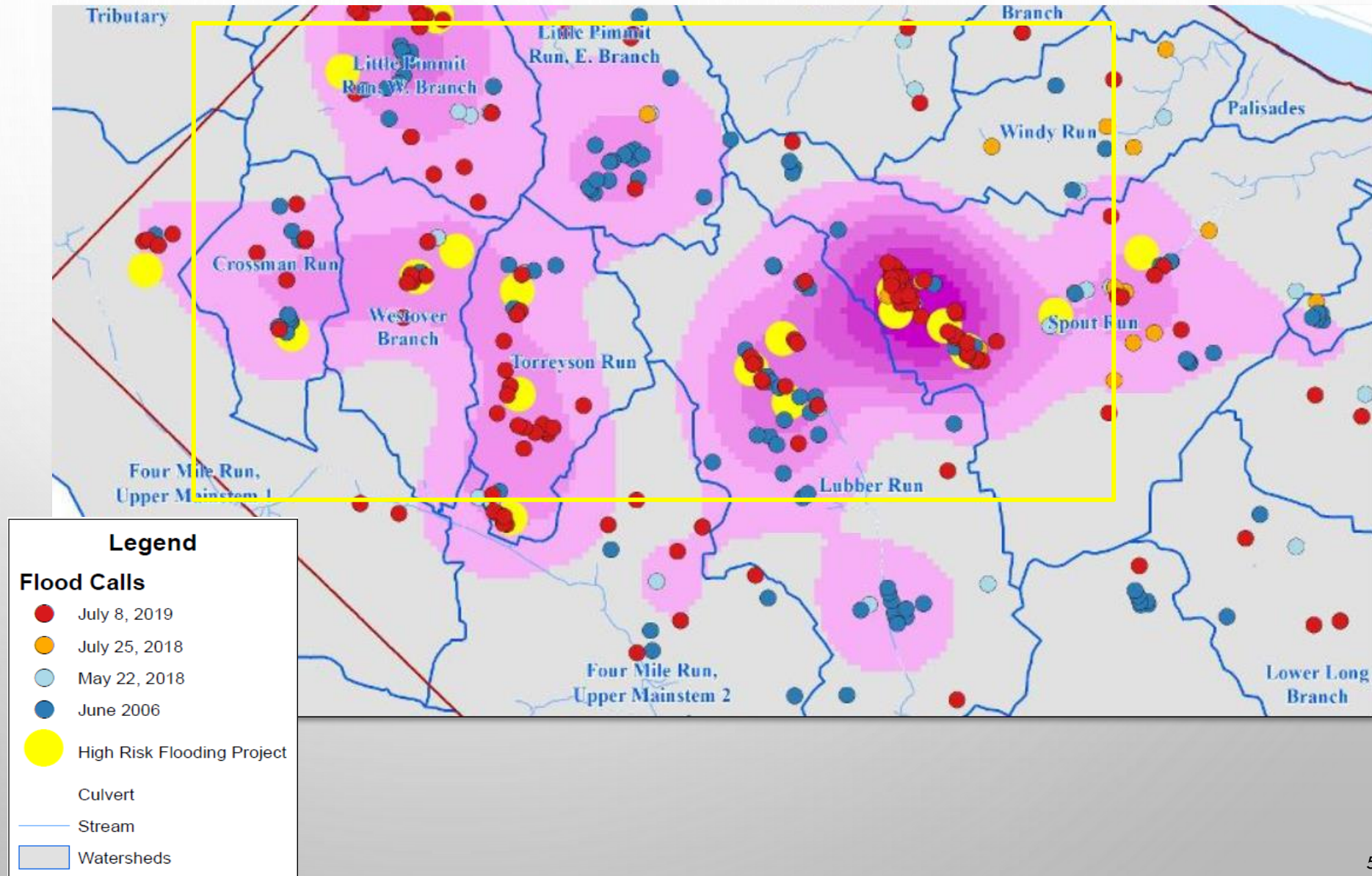




# FLOODING

FLOOD CALLS HEAT MAP

THESE ARE THE SAME AREAS WITH TODAY'S MOST ACUTE 'INTERIOR FLOODING' CHALLENGES – FLOODING THAT RESULTS FROM STORM DRAIN SYSTEM OVERFLOWS





# FLOODING

WHEN THESE  
OVERFLOWS  
OCCUR, THERE IS  
NO 'OVERLAND  
RELIEF' TO SAFELY  
CONVEY THE  
FLOODWATERS



INUNDATION FROM  
INTERIOR FLOODING



July 8, 2019  
100 to 500+ year rainfall



# STREAMS AND WATER QUALITY

REMAINING STREAM  
SYSTEM –  
CONTINUED EROSION  
THREATENING  
INFRASTRUCTURE,  
PUBLIC SAFETY, AND  
WATER QUALITY



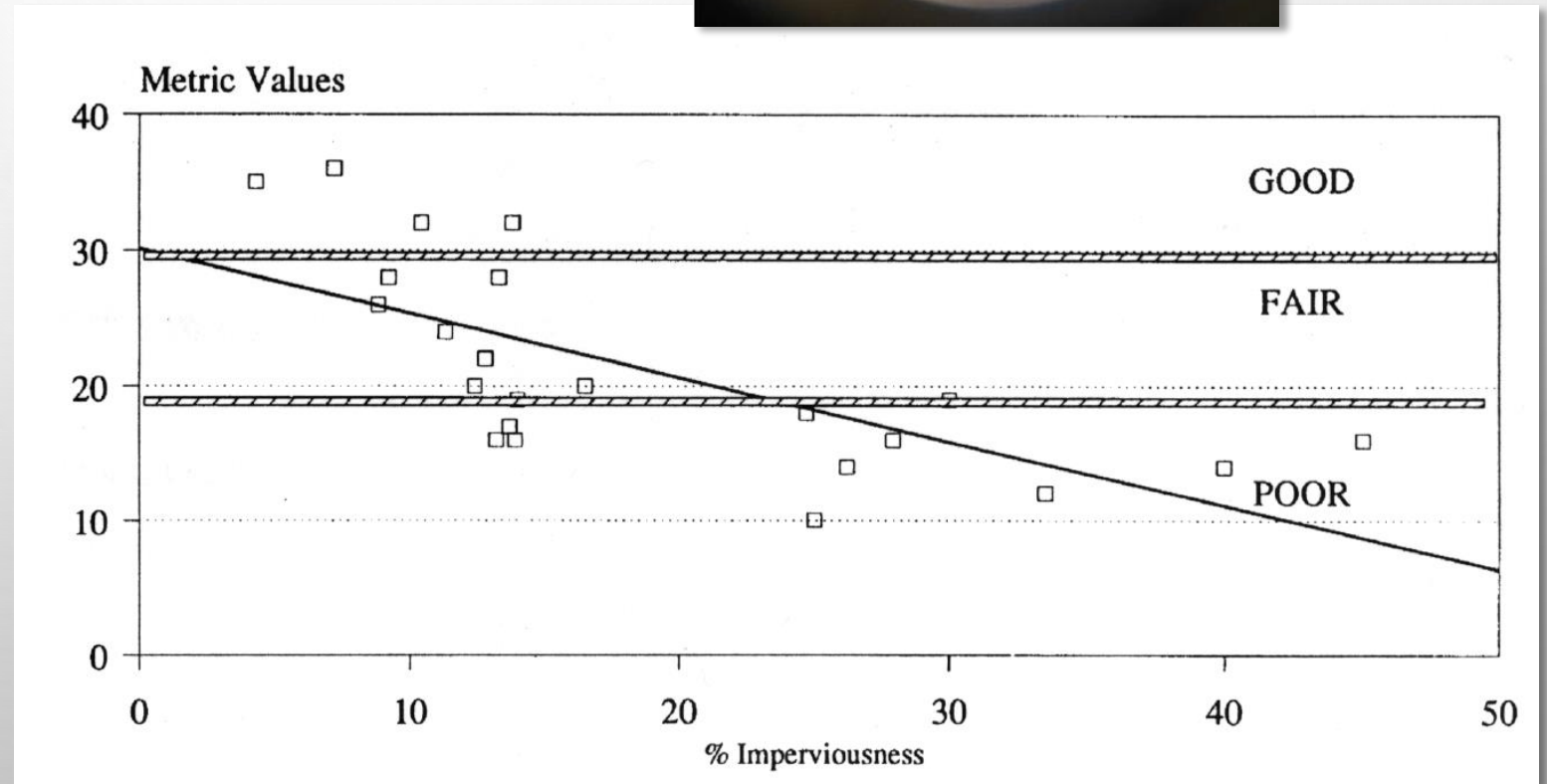


# STREAMS AND WATER QUALITY

BIOLOGICAL MONITORING  
AS PROXY FOR WATER  
QUALITY AND STREAM  
HEALTH

MOST STREAMS 'FAIR' TO  
'POOR' – DRIVEN BY  
IMPERVIOUS COVER

STREAMS WITH BETTER  
HABITAT PROVIDE MORE  
WELCOMING HOME...UNTIL  
IT RAINS





# REGULATIONS

CHESAPEAKE BAY TMDL

MS4 PERMIT

LOCAL IMPAIRMENTS AND TMDLS

(BACTERIA, SEDIMENT, SALT, BIOLOGICAL,  
PCBS)

CATALYSTS FOR STORMWATER

MITIGATION EFFORTS BUT NEED FOR

UPDATE AND INTEGRATION WITH

BROADER STORMWATER RESILIENCY

CONCEPTS TO MEET LOCAL NEEDS WITH

LIMITED \$\$\$

Commonwealth of Virginia  
Chesapeake Bay TMDL Phase III  
Watershed Implementation Plan



August 23, 2019

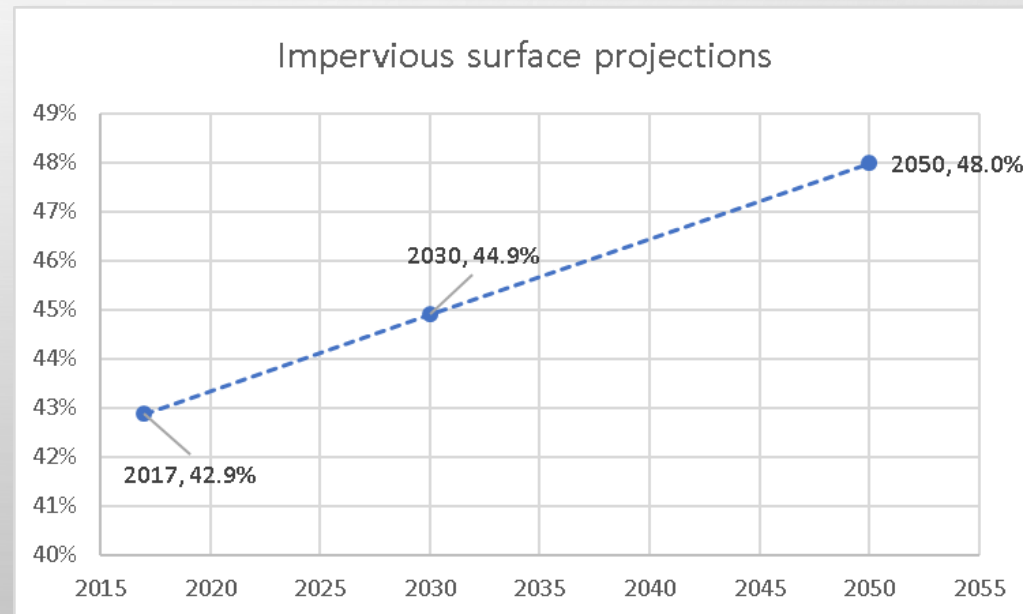
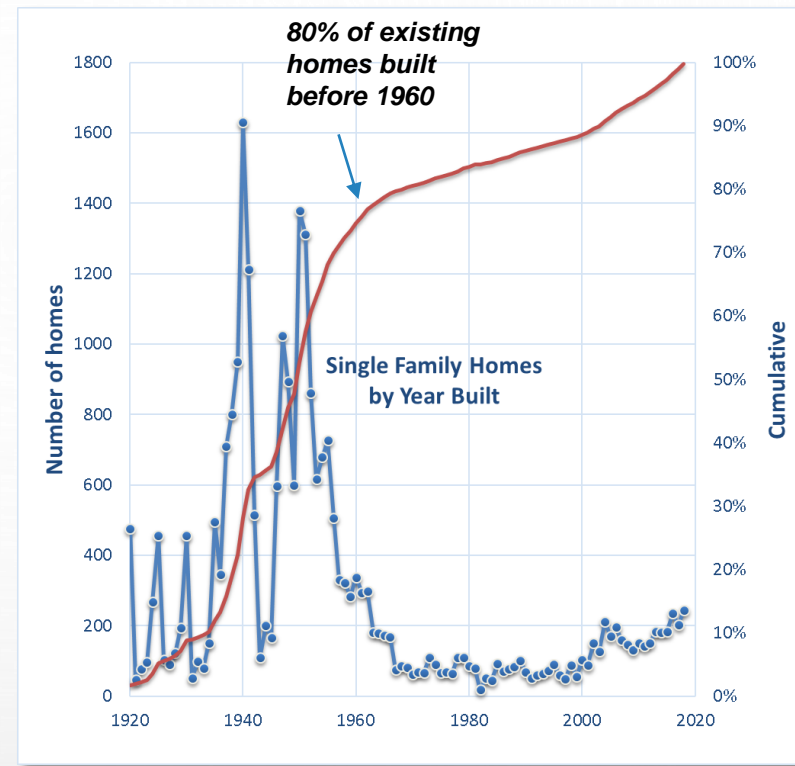
*In addition to these targets and expectations, the Commonwealth's goals for the Phase III WIP are to engage local partners in developing a practical plan to improve cost-effectiveness, **maximize the potential for co-benefits**, and tackle the impacts from climate change. Co-benefits include improvement to living marine resources, restoration and conservation of vital habitats, improving public access and awareness, **increasing climate resilience, improving the water quality of local streams** and driving economic development.*



# MAGNIFICATION: IMPERVIOUS SURFACE INCREASES

TODAY'S WATERSHED-SCALE IMPACTS—  
FLOODING, STREAM EROSION, AND OVERALL  
DEGRADED WATER QUALITY CONDITIONS—ARE  
PRIMARILY FROM EXTENSIVE DEVELOPMENT THAT  
HAS BEEN IN PLACE FOR DECADES

BUT - CONTINUED IMPERVIOUS COVER AND  
RUNOFF INCREASES FROM CURRENT AND  
PROJECTED REDEVELOPMENT ACTIVITY WILL  
MAGNIFY THESE IMPACTS OVER TIME



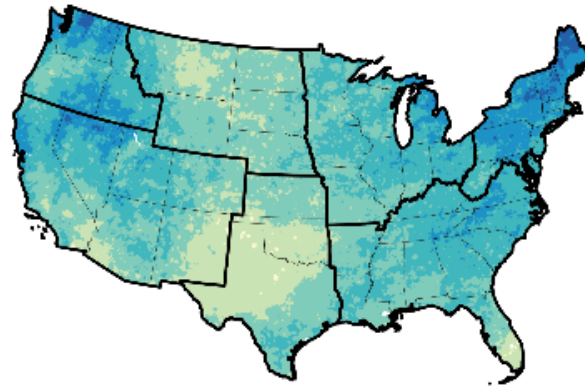


## MAGNIFICATION: CLIMATE CHANGE

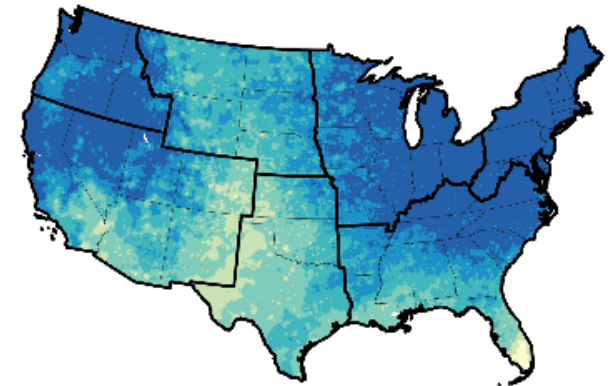
“HEAVY PRECIPITATION IS BECOMING MORE INTENSE AND MORE FREQUENT ACROSS MOST OF THE UNITED STATES, PARTICULARLY IN THE NORTHEAST AND MIDWEST, AND THESE TRENDS ARE PROJECTED TO CONTINUE IN THE FUTURE.”

Projected Change in Total Annual Precipitation  
Falling in the Heaviest 1% of Events by Late 21st Century

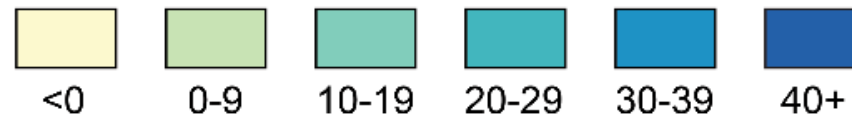
Lower Scenario (RCP4.5)



Higher Scenario (RCP8.5)



Change (%)



USGCRP, 2018: *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*



## WHAT WE'VE BEEN DOING

- FLOOD RISK REDUCTION PROJECTS
- STREAM RESTORATION AND REPAIR
- GREEN INFRASTRUCTURE
- MITIGATING DEVELOPMENT ACTIVITY IMPACTS

*BUILDING BLOCKS IN PLACE:  
NEED FOR INTEGRATED AND SCALED-UP  
APPROACHES*





# LOOKING AHEAD

## ‘FLOOD RESILIENT ARLINGTON’ INITIATIVE

WORKING TOWARD FLOODING RESILIENCE THROUGH DEFINING BALANCE BETWEEN PRIVATE AND PUBLIC RESPONSIBILITY; SCALING LEVELS OF FLOOD PROTECTION AND MITIGATION; AND NEEDS BASED INVESTMENT

[www.arlingtonva.us/flooding](http://www.arlingtonva.us/flooding)

## RISK ASSESSMENT AND MANAGEMENT PLAN

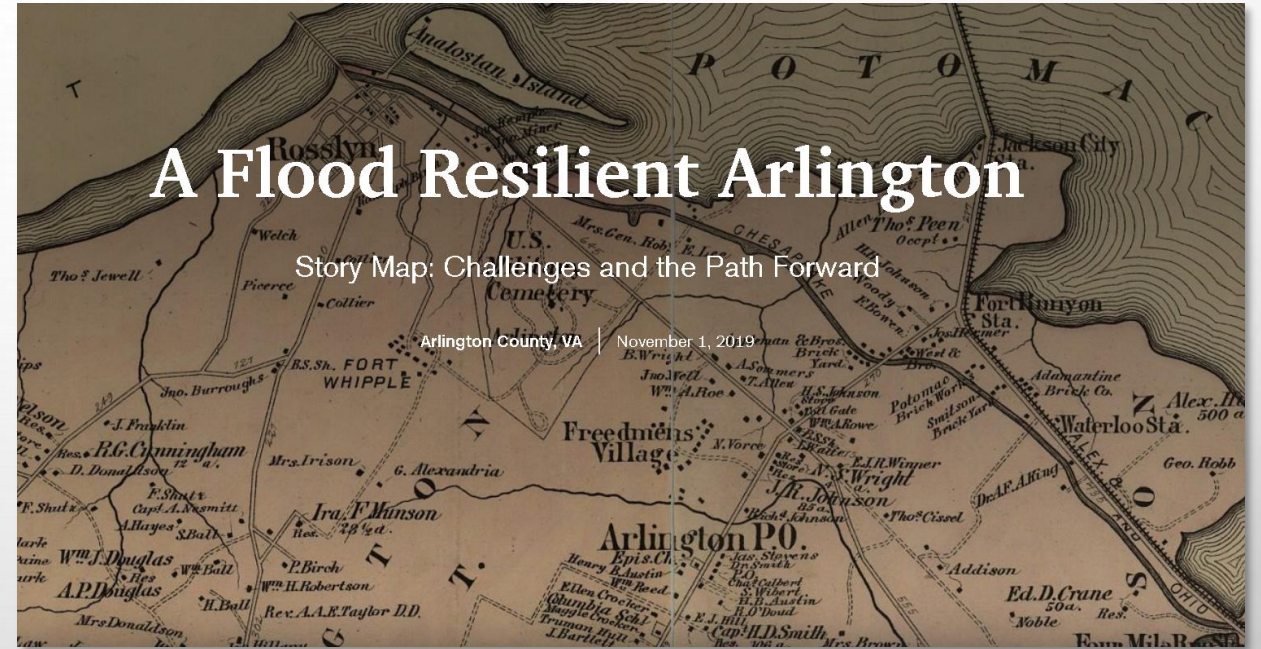
IDENTIFY HIGH RISK FLOOD AREAS BASED ON HISTORIC, CURRENT & PROJECTED RAINFALL TRENDS, WITH RECOMMENDATIONS FOR MITIGATION AND ADAPTATION STRATEGIES

## LAND DEVELOPMENT PERMITTING 2.0

## NEXT MS4 PERMIT(?)

## FY21-30 CAPITAL IMPROVEMENT PROGRAM AND FY21 BUDGET PROCESS

## STORMWATER UTILITY FEASIBILITY STUDY





# WHAT ARE THE DESIRED OUTCOMES OF RESILIENT LOCAL STORMWATER PROGRAMS?



**PURPOSEFULLY BLANK CLOSING SLIDE TO CUE  
FURTHER DISCUSSION OF HOW WE GET THERE....**

