

# Potomac River Watershed Plan

Team 1

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# Background on Watershed Planning

- Early stages:
  - Erosion control & flood management
- Clean Water Act of 1972
  - Provided a framework for addressing pollution and water quality
- Modern watershed planning emphasizes:
  - Adaptive management
  - Data-driven solutions
  - Climate resilience
  - Stakeholder engagement
  - Public education



# The POTOMAC Foundation



- **Protecting Our Territory, Optimizing Management, Advancing Conservation**
- **Mission Statement:**
  - POTOMAC's focus is to safeguard the health and resilience of the Potomac River Watershed and surrounding areas, specifically the Washington D.C. region, through analyzing results of climate change and other environmental issues, such as pollution, flooding and droughts, as well as the diminishing habitat of the region, and provide recommendations and inspire change and influence governmental policy by 2040.

# History of Potomac River Watershed

- **Pre-1600's: Indigenous Peoples**
  - Piscataway, Powhatan, and Susquehannock relied on the river for sustenance, transportation, and trade networks
- **1600's: European Settlement**
  - English, Scottish, and Dutch established trading posts and settlements along the river
  - Captain John Smith mapped river
- **1700's: Colonial Era**
  - Erection of port towns (Alexandria, Virginia) for shipping and commerce
  - Vital corridor, linking inland settlements to Chesapeake Bay and Atlantic Ocean
- **1800's: Industrial Revolution & Development**
  - Chesapeake and Ohio Canal facilitated transportation of coal, lumber, etc.
- **1900's-2000's: Conservation & Environmental Protection**
  - Creation of George Washington Memorial Parkway provided scenic opportunities along Potomac River
  - Clean Water Act

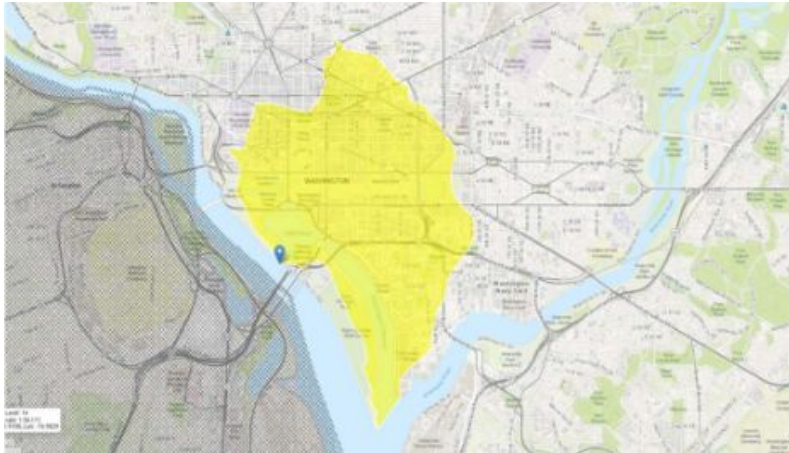


# Current Conditions



# Physical Characteristics

## Watershed Delineation

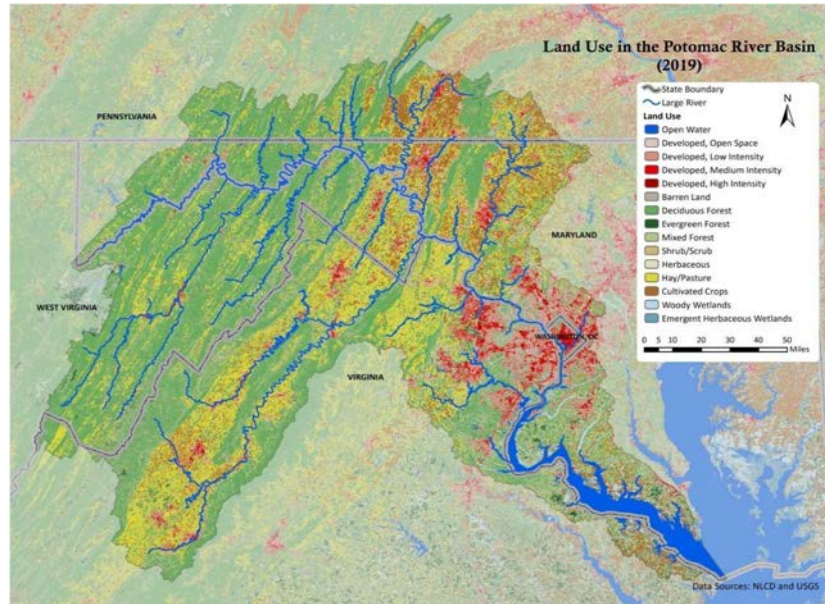


Potomac River Watershed Total Drainage Area: 14,679 sq. miles  
Potomac River Watershed Total Length: 383 miles  
Washington D.C. Drainage Area:  
Washington D.C. Length:

## Topography



# Land Use



## Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	4.74	square miles
FOREST	Percentage of area covered by forest	0.14	percent
FOREST_MD	Percent forest from Maryland 2010 land-use data	0	percent
IMPERV	Percentage of impervious area	60.1	percent
LIME	Percentage of area of limestone geology	0	percent
PRECIP	Mean Annual Precipitation	42.4	inches
SOILCxD	Percentage of area of Hydrologic Soil Type C or D from SSURGO	84.1	percent
SSURGOA	Percentage of area of Hydrologic Soil Type A from SSURGO	0	percent
STATSGOA	Percentage of area of Hydrologic Soil Type A from STATSGO	0	percent
STATSGOD	Percentage of area of Hydrologic Soil Type D from STATSGO	5.77	percent

# Soil Types



Arlington County, Virginia (VA013)  
District of Columbia (DC001)

Arlington County, Virginia (VA013)

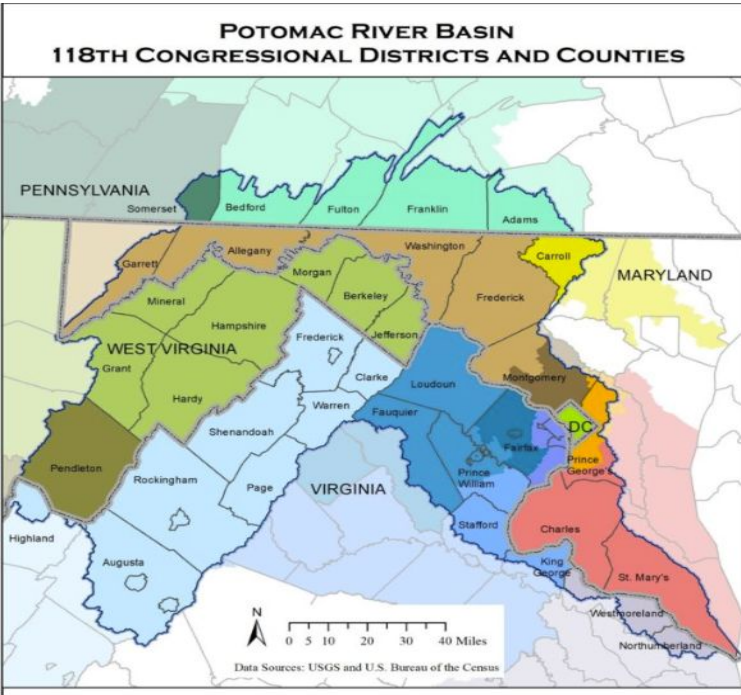
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
12	Urban land-Udorthents complex, 2 to 15 percent slopes	232.5	2.1%
W	Water	28.2	0.3%
<b>Subtotals for Soil Survey Area</b>		<b>260.7</b>	<b>2.4%</b>

# Economic Conditions

- Economic Drivers
  - Agriculture & Food Production
  - Tourism, Hospitality
    - National Mall, Lincoln Memorial, Jefferson Memorial
  - Government Services
  - Real Estate & Development
- Economic Challenges
  - Infrastructure Needs
  - Equity & Access



# Governmental Influence



## U.S. House of Representatives

District area within the Potomac Basin (approx. square miles)

District	Representative	Party	Area (sq. miles)
District of Columbia	Eleanor Holmes Norton	(D)	68
Maryland			
District 2	Dutch Ruppersberger	(D)	212
District 4	Glenn Ivey	(D)	168
District 5	Steny Hoyer	(D)	1,213
District 6	David Trone	(D)	2,010
District 8	Jamie Raskin	(D)	233
Pennsylvania			
District 13	John Joyce	(R)	1,465
District 14	Guy Reschenthaler	(R)	121
Virginia			
District 1	Rob Wittman	(R)	279
District 6	Ben Cline	(R)	3,390
District 7	Abigail Spanberger	(D)	452
District 8	Donald Beyer	(D)	159
District 10	Jennifer Wexton	(D)	1,156
District 11	Gerald Connolly	(D)	254
West Virginia			
District 1	Carol Miller	(R)	699
District 2	Alexander Mooney	(R)	2,809
U.S. Senate			
MD	Benjamin L. Cardin	(D)	
MD	Chris Van Hollen	(D)	
PA	Robert P. Casey, Jr.	(D)	
PA	John Fetterman	(D)	
VA	Tim Kaine	(D)	
VA	Mark R. Warner	(D)	
WV	Shelley Moore Capito	(R)	
WV	Joe Manchin, III	(D)	

Legend:  
 Potomac Basin (shaded area)  
 State Boundary (thick line)  
 County Boundary (thin line)

No senators



At Large

Eleanor  
Holmes  
Norton

Democrat  
Since Jan 3,  
1991

# Governmental Policies

- **Clean Water Act (CWA)**
  - Federal water quality standard that regulates pollution in waterways. Protects biological, chemical, and physical stability of flowing water
- **National Environmental Policy Act (NEPA)**
  - Federal agencies assess environmental impact
- **Chesapeake Bay Program**
  - Regional partnership committed to restoring and protecting the Chesapeake Bay and its tributaries
- **Climate Solutions Now Act**
  - Addressing climate change in Maryland, calls for 60% reduction in climate-warming carbon emissions by 2031
- **Total Maximum Daily Load (TMDL) for Chesapeake Bay**
  - EPA set limits on amount of nitrogen, phosphorus, and sediment that can be discharged into the bay and its tributaries
- **Land Use and Zoning Regulations**
  - Local government have implemented planning and zoning regulations to restrict development and protect wetlands and other critical habitats
- **Stormwater Management Regulations**
  - Local jurisdictions have implemented regulations that reduce the impacts of urban and suburban runoff on water quality through use of BMPs



# Environmental Problems



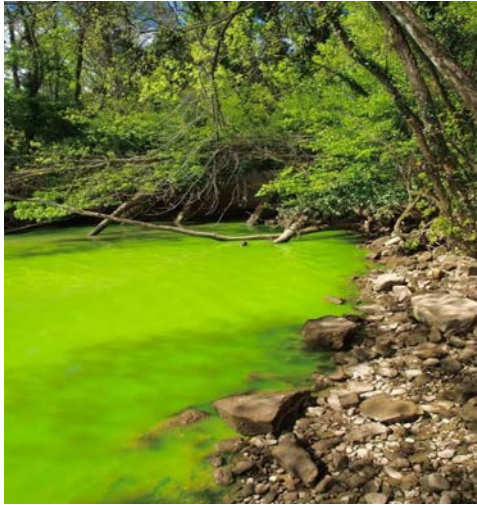
# Pollution

- Poor stormwater infrastructure has led to excessive runoff
- 525 million gallons of polluted runoff is produced from a 1.2 inch rainstorm in Washington D.C. (Kliefoth)
- Carries pollutants such as:
  - Agricultural
  - Heavy metals from industrial sources
- Runoff leads to bank erosion, exposing sewage leaks in some cases



Source: Bay Journal

# Habitat Degradation



Source: WikiMedia. 2012 photo of algal bloom on the Potomac River near Washington, D.C.

- Degrading habitat due to urban expansion and agricultural needs
- 62% of surrounding land is for agriculture or has impervious cover
- Deforestation also weakens defense to runoff
- Current dissolved oxygen levels are regularly below 3 mg/L
- Susceptible to algal blooms upstream, further degrading the watershed ecology

# Flooding & Droughts

- Climate change has led to global glacial melt, increasing sea levels
- 1,300 acres in Washington, D.C. sit below the projected high tide line for 2030
- Creates increased flood risk for the Potomac and its tributaries
- Also suffers consequences of drought
- The Potomac has experienced periods of low precipitation and high evaporation



Source: Alx Now

# Goals & Recommendations



# Pollution

## Goal:

- By 2040, through collaborative efforts:
  - Reduce nutrient and sediment levels,
  - Increase dissolved oxygen concentrations
  - Decrease pollutant loads entering source water bodies

## Recommendations:

- Promote sustainable land use practices
- Promote green infrastructure
- Enhance monitoring & enforcement
- Enhance agriculture best management practices
- Enhance stormwater management practices
- Upgrade wastewater treatment facilities
- Educate and engage the community
- Foster Collaboration and partnerships



# Habitat Degradation

## Goal:

- By 2040, through collaborative efforts:
  - Increase habitat connectivity
  - Increase species diversity
  - Improve ecosystem functions

## Recommendations:

- Conduct habitat assessments
- Implement reforestation projects
- Restore wetland and riparian areas
- Manage invasive species
- Protect and expand green spaces
- Enhance habitat connectivity
- Promote sustainable land management practices
- Engage and educate the community



# Flooding & Droughts

## Goal:

- By 2040, through collaborative efforts:
  - Enhance floodplain and land use management
  - Implement green and climate resilient infrastructure projects
  - Strengthen coastal and riverine resilience

## Recommendations:

- Implement green infrastructure projects
- Enhance floodplain management
- Improve water conservation practices
- Implement sustainable land use planning
- Strengthen coastal and riverine resilience
- Increase climate resilience of infrastructure



# Current Watershed Conservation Efforts



- Reducing pollution in source water
  - Upgraded WWTP in Maryland, saw significant reduction in nitrogen and phosphorous
  - Stormwater retrofits decreased nitrogen pollutants
  - Drinking Water Source Protection Program (DWSPP)
- Combating habitat degradation
  - Alice Ferguson Foundation Annual Potomac River Watershed Cleanup
  - Incentives for land use that protects water quality
    - Over 55,000 acres have been preserved by Maryland conservation programs
- Reducing effects of climate change
  - Cover crops planted to reduce carbon emissions
    - Over 80,750 acres of cover crops planted by Maryland Department of Natural Resources
- Other foundations helping the Potomac River Watershed
  - Interstate Commission on the Potomac River Basin (ICPRB) (1940)
  - The Potomac (1967)



# Financing



# Funding Strategies

- Annual Cost: \$500,000 - \$2 million
- Total Cost by 2040: \$10 - 30 million
- Financed by:
  - Government policy & funds
    - Clean Water State Revolving Fund (CWSRF)
  - Capacity Building grants
  - Matching Funds
  - Private Donations



# Conclusion



# Protecting Our Territory, Optimizing Management, Advancing Conservation

- Hopefully will play pivotal role in safeguarding Potomac River watershed for future generations
- Promotes:
  - Resilience
  - Biodiversity
  - Inclusion
- Plan is nothing without:
  - Collective action
  - Innovation
  - Commitment from community



**Any Questions?**



# Thank You



# Works Cited

- ICPRB, Drive, 30 W. G., Suite 450, Rockville, & Md 20850 301.984.1908.(n.d.). Comprehensive Plan. ICPRB. Retrieved March 7, 2024, from <https://www.potomacriver.org/focus-areas/water-resources-and-drinking-water/water-resources/planning/basin-wide-comprehensive-plan/>
- ICPRB, Drive, 30 W. G., Suite 450, Rockville, & Md 20850 301.984.1908. (n.d.). Threats to the Watershed. ICPRB. <https://www.potomacriver.org/focus-areas/communication-and-education/threats/>
- Interactive Map: Potomac Wastewater Mapper | U.S. Geological Survey. (n.d.). [www.usgs.gov](http://www.usgs.gov). Retrieved March 7, 2024, from <https://www.usgs.gov/tools/interactive-map-potomac-wastewater-mapper>
- Jungova, D. (2022, July 25). 5 recent policy wins for the Potomac River you should know about. Potomac Conservancy. <https://potomac.org/blog/2022/7/22/5-recent-policy-wins-for-the-potomac-river-you-should-know-about>
- Kliefoth, W. (2021, July 21). A River Rising: Flooding and Sea Level Rise in the Potomac River Region. Potomac Conservancy. <https://potomac.org/blog/2021/7/21/a-river-rising>
- Kliefoth, W. (2021, June 28). Rising to the Challenge: A New Climate Reality for the Potomac River Region. Potomac Conservancy. <https://potomac.org/blog/2021/6/28/potomac-river-climate-report-part-one#:~:text=The%20Potomac%20River%20region%20is%20experiencing%20hotter%20temperatures%2C>

