



# REGIONAL WATER SUPPLY PLANNING AND RESILIENCY

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Presentation to the Chesapeake Bay & Water Resources Policy Committee  
March 17, 2017



Metropolitan Washington  
Council of Governments

# Overview

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- Regional Water Supply System
  - Importance of the Potomac River
- Potomac Sheen After Action
- Water Supply Planning and Resiliency
- Next Steps



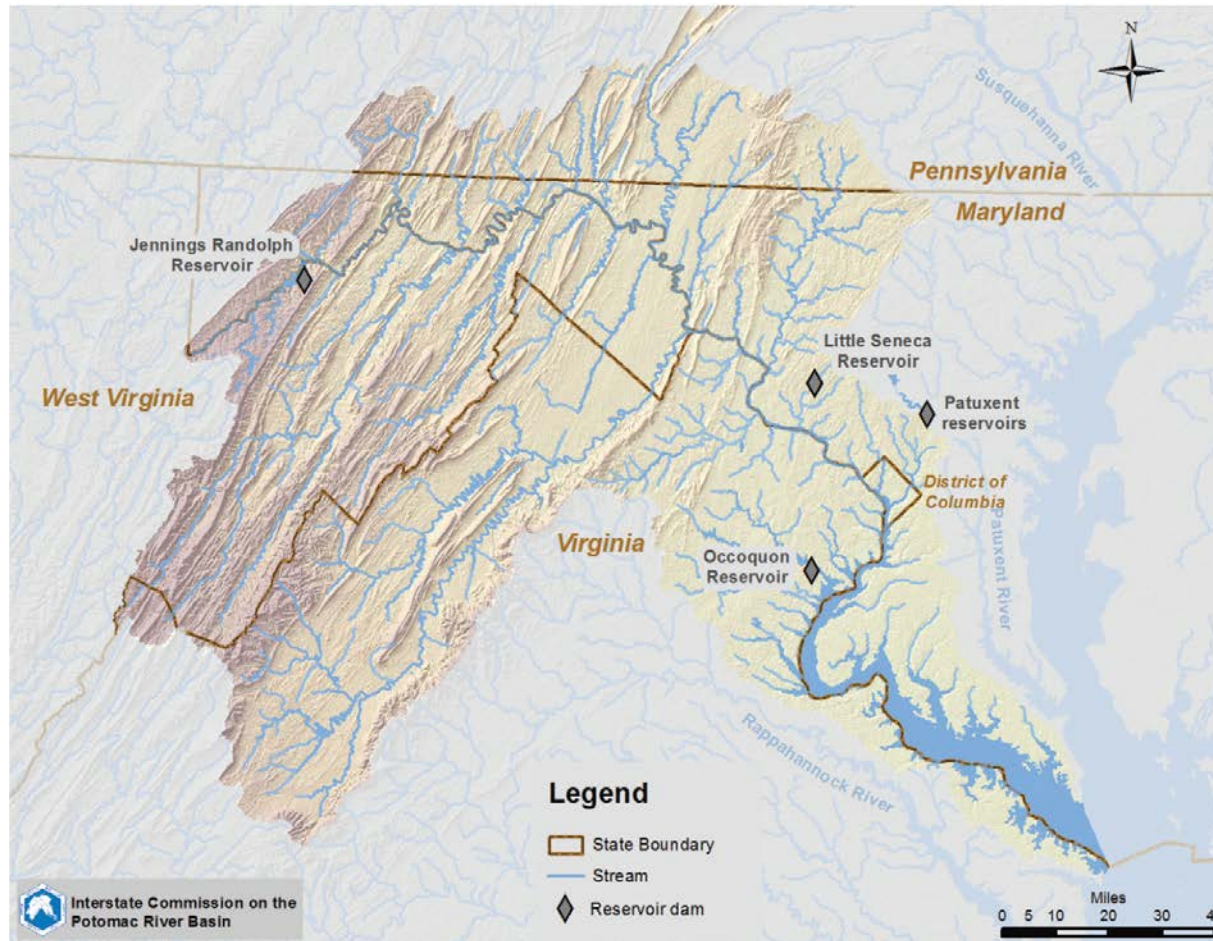


# Metropolitan Washington Drinking Water at a Glance

- Average daily demand  $\approx$  485 million gallons (MGD)
- 14,500+ miles of water mains
- $\approx$  114,000 fire hydrants
- 1,000,000+ metered accounts
- 5,000,000 + people served



# Potomac River Basin Co-Op Utility Reservoir Sites



## Surface Water

≈ 4.5 Million people in the region rely on surface water for drinking water

## Primary Reservoirs

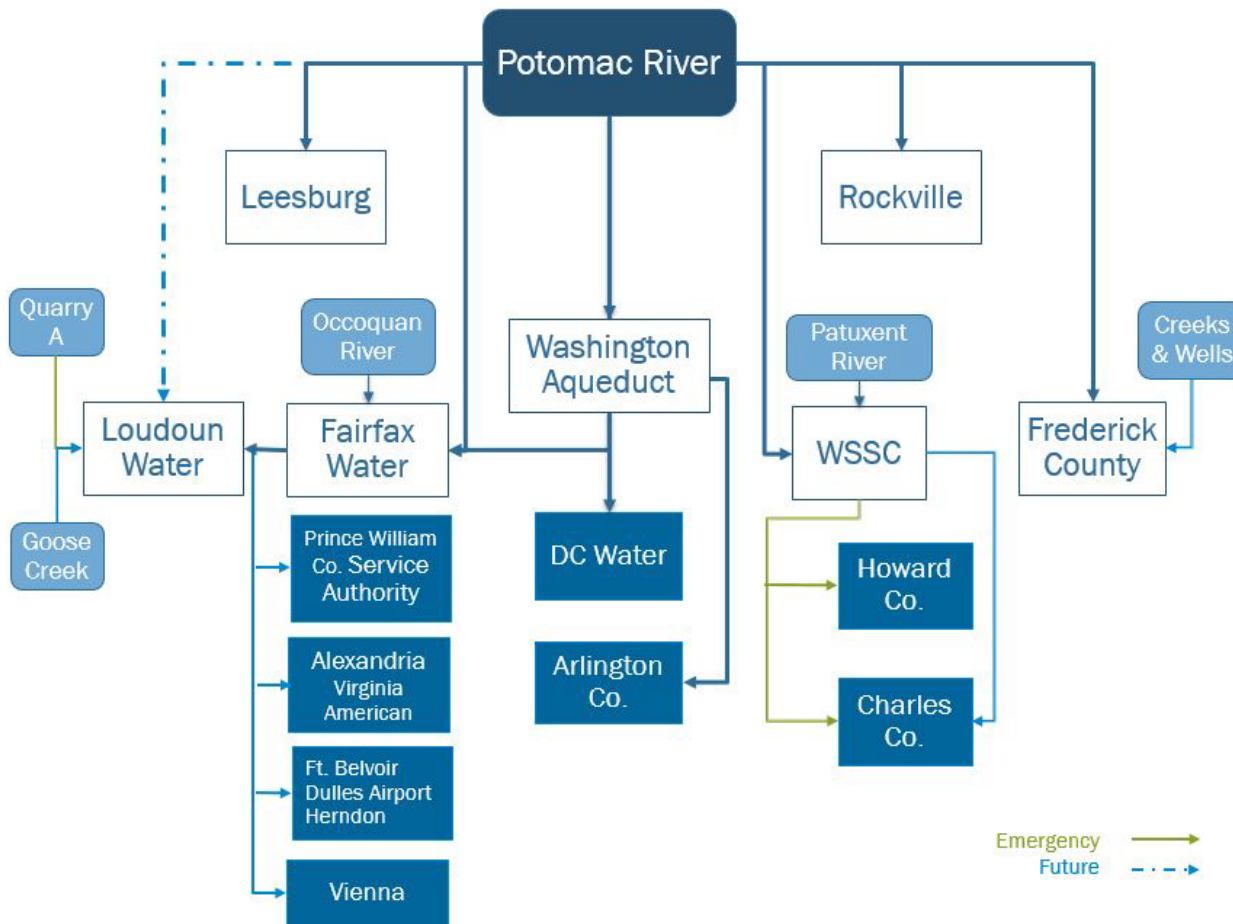
### Daily Use

Patuxent – WSSC  
Occoquan – Fairfax Water

### Regional Backup Supply

Jennings Randolph  
Little Seneca

# Regional Surface Water Supply



## Washington Aqueduct, Leesburg & Rockville

- 100% Potomac

## Fairfax Water

- 60/40 Potomac/Occoquan

## WSSC

- 70/30 Potomac/Patuxent

## Loudoun Water

- Goose Creek
- Developing a Potomac intake/plant

## Frederick County

- Potomac, wells

## Frederick City

- Monocacy, creeks, wells, County interconnect

## Manassas

- Lake Manassas

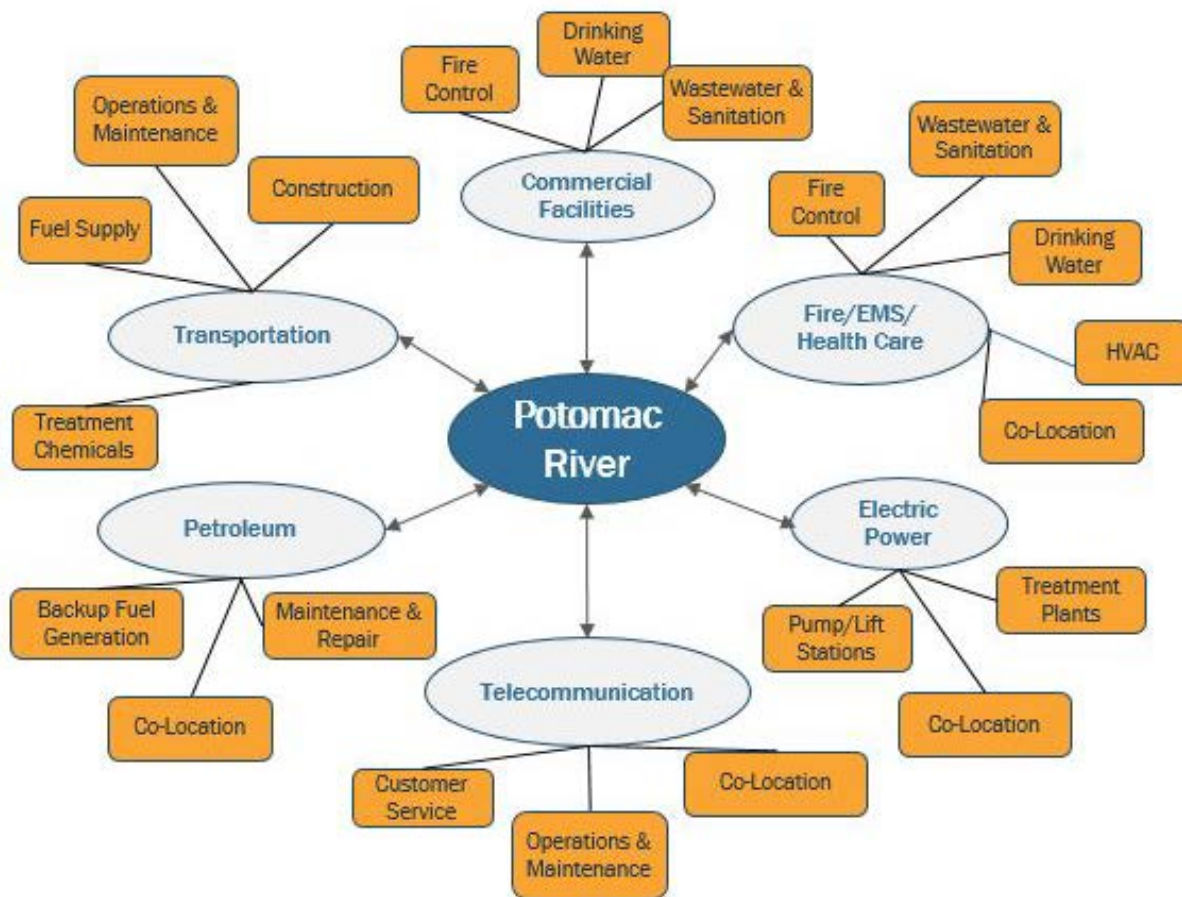
## Other small systems

- Creeks, wells





# No Potomac – Broad Disruptions



## Many interconnected uses of potable water

- Water service disruption is possible if Potomac River intakes closed for + 24 hours
- Regional economic impact is + \$1B after 3 days if service is disrupted



# POTOMAC SHEEN DISCHARGE EVENT FOLLOW UP

**Photo # 6**  
Observed Sheen  
North of Golf Course



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# After Action Report

## Unified Command

- Did not prioritize drinking water protection
- No water utility presence

## Situational Awareness

- Incident Action Plans, Situation Reports and other information not initially shared with water utilities or released too late for use in decision making

## Operations

- Focus on identifying responsible party, not stopping the spill
- Delayed collection & recovery

## No Non-Tidal Potomac Spill Response Plan



# Non-Tidal Potomac Spill Response Plan

- Primary objective must include drinking water protection
- Prioritize preventing spills
- Ensure water utility role and participation in Unified Command during spill events affecting water supplies
- Emphasize data collection and information sharing (e.g. samples, monitoring)
- Prepare to assess potential human health effects & communicate clearly





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# Regional Water Supply/Drought Planning

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- Water Supply Emergency Plan
- Water Supply & Drought Awareness Response Plan
- National Capital Region Water & Wastewater Mutual Aid Agreement (NCRWARN)
- State drought management plans
- Flow Monitoring
  - Flows – USGS & Occoquan Lab
  - ICPRB Flow Model



# Resilience in the Water Sector

- Resilience
  - The ability to maintain operations despite challenges to the system
  - The ability to recover in shortest period possible
- Stressors can include
  - Weather (e.g., hurricanes, floods, snow storms)
  - Accidents (e.g., spills, power outage, water main break)
  - Intentional acts



# Regional Collaboration to Improve Water Sector Resilience

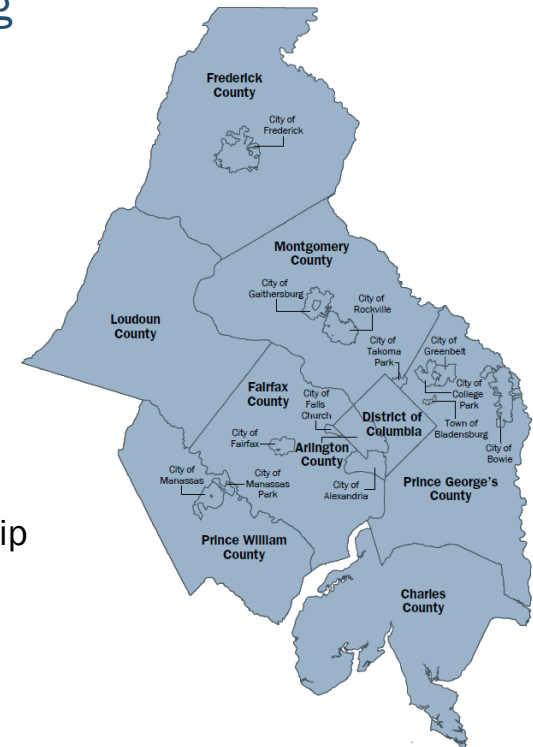
- Regional-level planning and response is highly effective to enable resilience
- Use regional goals, resource-sharing criteria, and performance metrics
- Relationship building and knowledge transfer
- Successful models for mutual-aid, such as WARN
- Coordinated regional water supply planning promotes sharing of benefits, risks, & resource costs



# Long-term Cooperative Water Supply Planning & Management

- Cooperative regional monitoring of source & finished water
- Collaborative training, exercises & contingency planning
- Regional communication & coordination

- |            |  |
|------------|--|
| 1970       | • Water supply added to ICPRB scope                    |
| 1978       | • Low Flow Allocation Agreement                        |
| 1981       | • Added reservoir capacity                             |
| 1982       | • Water Supply Coordination Agreement                  |
| 1994/04/09 | • Water Supply Emergency Plan                          |
| 2000       | • Water Supply & Drought Response Plan                 |
| 2004       | • Potomac Drinking Water Source Protection Partnership |
| 2007       | • Regional Redundancy Study                            |
| 2008       | • NCR Water/Wastewater Agency Response Network         |
| 2013-16    | • Emergency water supply planning                      |
|            | • Updated source water assessment                      |
|            | • Regional water system resiliency study               |



# 1978 Low Flow Allocation Agreement

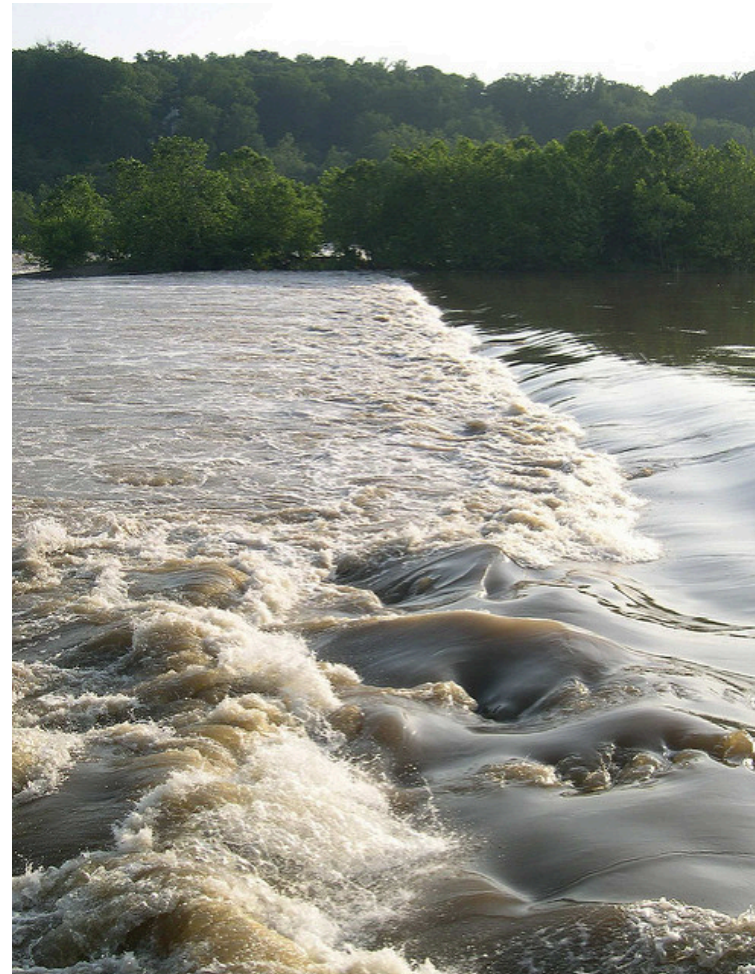
- Signed by the United States (Secretary of the Army), Maryland, Virginia, the District of Columbia, Fairfax Water, and WSSC, on January 11, 1978
- Allocates water during a drought based on each utility's usage during the previous five winter seasons.
- Designed to preserve a 100 mgd flowby to maintain the river's ecology.





# 1982 Water Supply Coordination Agreement

- Signed on July 22, 1982
  - District of Columbia
  - Fairfax Water
  - WSSC
  - Washington Aqueduct
  - Interstate Commission on the Potomac River Basin.
- Coordinated management of water resources to meet environmental requirements and municipal demands for water during low flows.
- Overseen and funded by a committee of water utility representatives.



# Regional Resiliency Study - Overview

- UASI funded regional study
- In an emergency
  - Limited capability in the National Capital Region to transfer raw or potable water to areas where shortfalls might occur – Limited connections between water systems
- Consequences to the region include extended water outages, direct costs and societal impacts



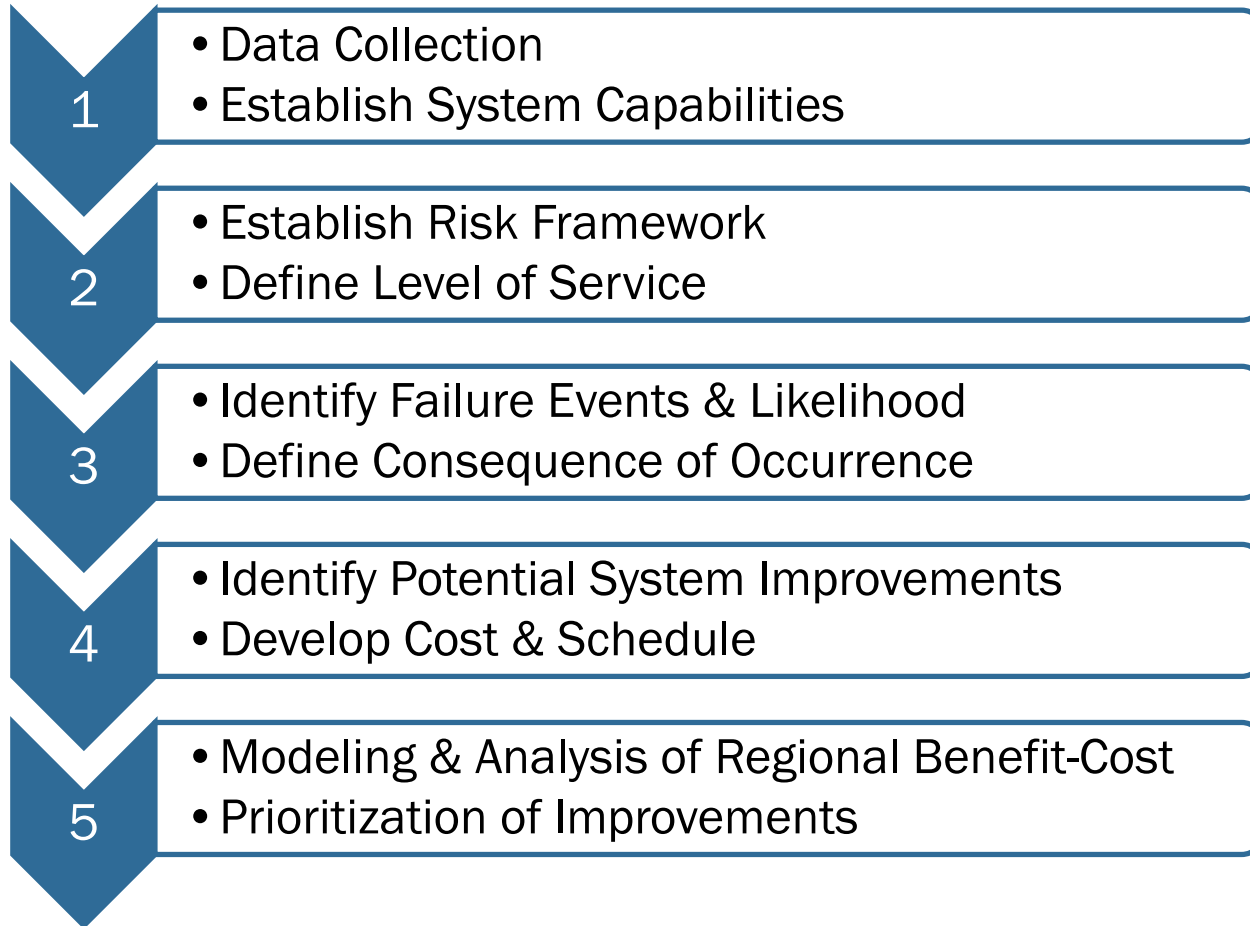
# Regional Resiliency Study - Overview

## Objectives

- Evaluate ability of region's water systems to withstand regional emergencies
- Identify improvements to enhance the overall resilience and reliability of water system under emergency conditions



# System resilience approach to identify prioritized improvements



# Regional Resiliency Study Outcomes and Conclusions

- River contamination events are responsible for a substantial amount of total risk
- Raw water storage combined with water transfer improvements are effective risk-mitigating initiatives
- Need to plan with a long term vision
- Identification of optimum balance of risk reduction and cost



# Regional Resiliency Study Recommendations

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- **No regrets type improvements (short term implementation)**
  - Upgrade interconnections between WSSC and DC Water
  - Dalecarlia Reservoir bypass
- **Off-river raw water storage (long term implementation)**
  - Travilah Quarry Reservoir
  - Chantilly Quarry or similar in Northern Virginia
- **Treated water interconnections (coordinate with long term plan)**
  - Additional connections between WSSC and DC Water



# Next Steps

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## Actions

- After action reports
- Non-tidal Potomac Spill Response Plan
  - Prioritizing Drinking Water Protection
- Source water protection partnerships & collaboration
- Water Supply Emergency & Drought Management Plans
  - Updates
  - Exercises

## Resiliency Investments

- Increase reservoir storage
- Interconnections
- Monitoring
- Modeling
- Draft being discussed with utility boards & commissions



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