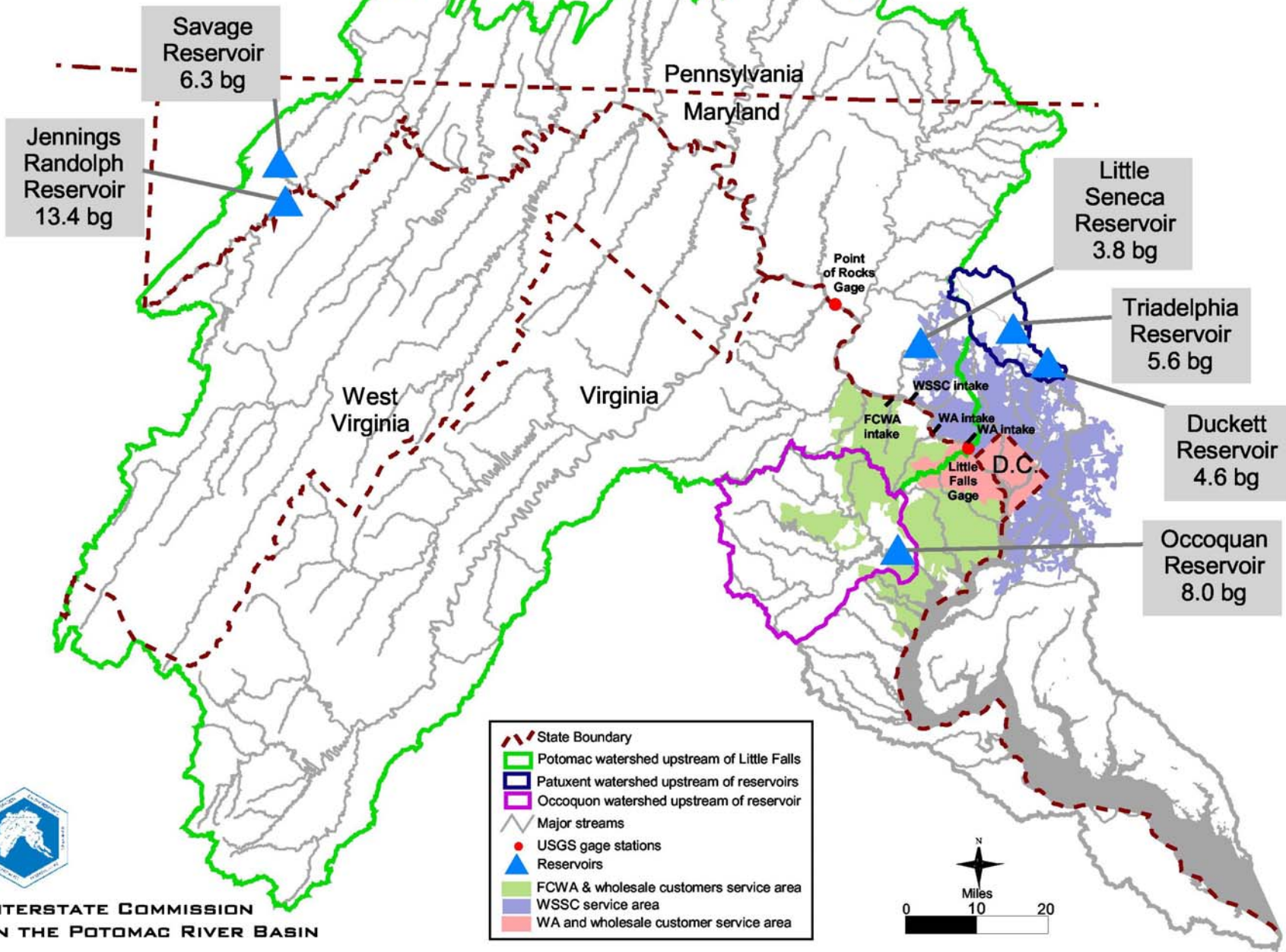


Climate Adaptation Workshop

July 23, 2009

Reservoirs and Watershed Areas



WMA* Regional Water Supply Agreements

- #1 Low Flow Allocation Agreement
(1978)**

- #2 Water Supply Coordination
Agreement (1982)**

*** Washington Metropolitan Area**

WMA Regional Water Supply Agreements, *cont.*

#1 Low Flow Allocation Agreement (1978)

- Water allocation during extreme low flow periods
- 20-year demand forecast every five years
- Little Falls flow-by
- Signed by:
 - US Government (Corps of Engineers)
 - State of Maryland
 - Commonwealth of Virginia
 - District of Columbia
 - Washington Suburban Sanitary Commission (WSSC)
 - Fairfax Water

WMA Regional Water Supply Agreements, *cont.*

#2 Water Supply Coordination Agreement (1982)

- **Cost-sharing**
- **Established CO-OP Section of ICPRB**
- **Formalizes drought operations procedures**
- **Signed by:**
 - **US Government (Corps of Engineers)**
 - **District of Columbia**
 - **Washington Suburban Sanitary Commission (WSSC)**
 - **Interstate Commission on the Potomac River Basin (ICPRB)**
 - **Fairfax Water**

ICPRB CO-OP

Overseen by CO-OP Operations Committee
composed of three WMA suppliers:

1. Fairfax Water
2. Washington Suburban Sanitary Commission (WSSC)
3. US Army Corps of Engineers - Washington Aqueduct Division

ICPRB CO-OP, *cont.*

- **Provides operational and administrative support during droughts**
- **Provides technical support to improve WMA water supply coordination**
- **Publishes monthly Water Supply Outlook from April through October**
- **Conducts annual drought exercises**
- **Has conducted 20-year water demand forecast and resource reliability assessments every five years since 1990**



NOW do you believe global warming is for real?

CLIMATE CHANGE ALTERING WEATHER

MARGULIES
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Regional Precipitation Effects

- Fewer light or moderate events
- More sporadic and heavy events
 - *more flooding*
- Longer, more frequent droughts
- Reduced snowfall/snowpack
 - *less and earlier snowmelt*

Water Supply Impacts

- Longer, more frequent droughts
 - Worse than 1930 drought of record?
New input data for modeling of streamflows (extremes)
 - Increased peak demand
 - More storage needed?

- Fewer light, moderate events
 - Groundwater and base flow changes?
 - Increased peak demand

- More flooding
 - PMP/PMF changes (extremes)
 - Dam design deficiencies?
 - Protection of critical facilities
(from flood, storms, and loss of power)

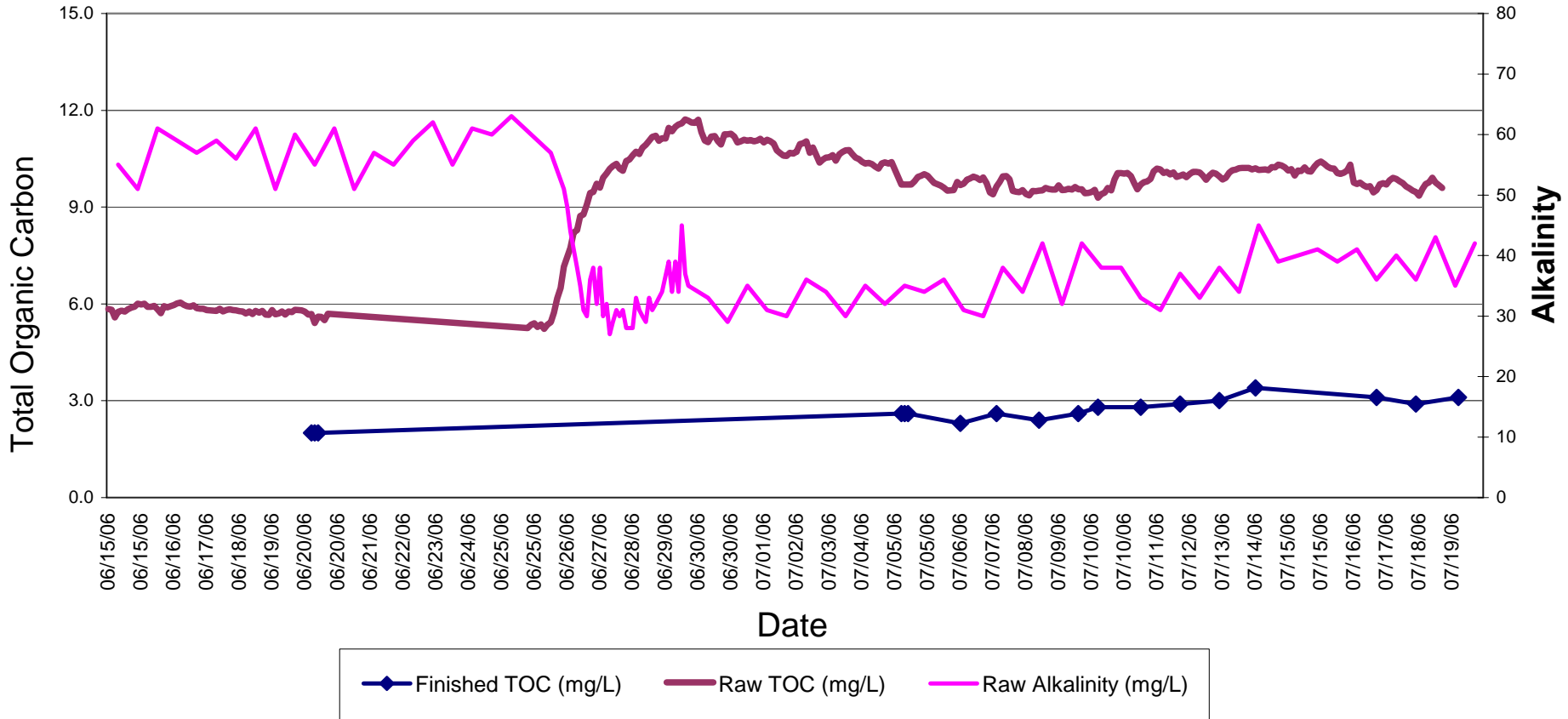
- Decreased snow pack
 - Storage

Water Quality Impacts

Drought and/or flood events can cause:

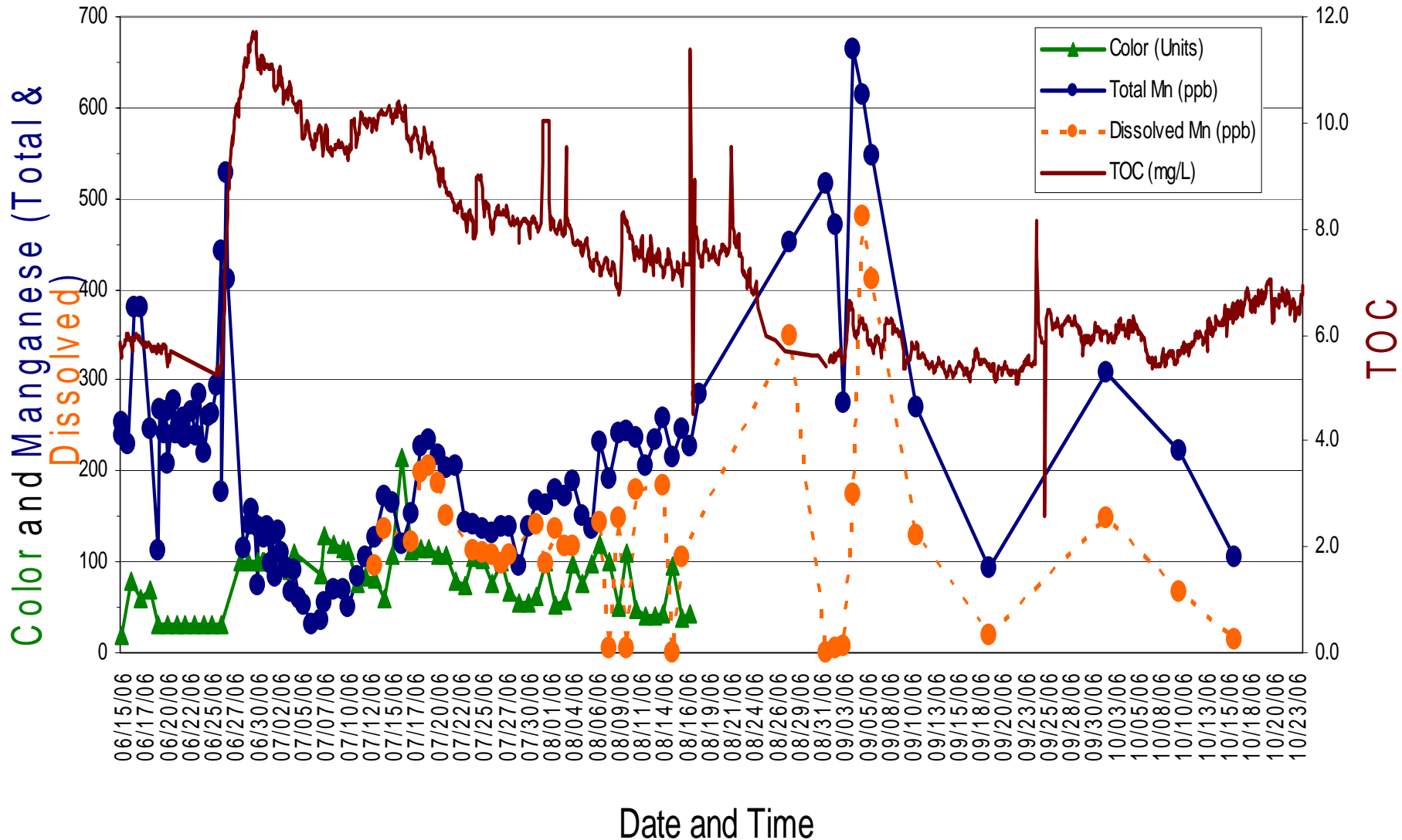
- ✓ **Algae → taste and odor**
- ✓ **Low-dissolve oxygen → reduced metals, manganese, and color**
- ✓ **Rapid alkalinity changes and increased turbidity → cryptosporidium risk**
- ✓ **Total organic carbon → disinfection by-products and biofilm**

Occoquan Raw and Griffith Finished Total Organic Carbon 6/15/06 - 7/19/06



Data produced and graphed by FW
Water Quality Laboratory

Occoquan Raw Water Quality Parameters



Treatment Impacts

- **Increased use of advanced treatment**
 - Ozone
 - Granular activated carbon
 - Ultraviolet light
 - Membranes
- **Increased energy use for advanced technologies**
 - Energy costs are now 1/3 of the operating budget



Climate Adaptation Workshop

Co-Sponsored by
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and Northrop Grumman

Presented by
Charles M. Murray
General Manager
Fairfax Water
July 23, 2009
Washington, DC

