Drivers for New Technology Solutions EPA Region III

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The Drivers

- Sustainability/Climate Change/Resilience
- Excess Nutrient Pollution/HABs
- Safeguarding Precious Drinking Water Sources
  - Emerging Contaminants and their health and ecological impact
- Energy/Water Nexus
- Advanced Monitoring Needs

Sustainability

- Energy Efficiency
- Water Conservation
- Pollution Prevention
- Preservation of High Quality Resources

"*To create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations*.."

“Water Sustains Us”

- **Practically, sustainability embodies the following principles**:

1. Taking a longer view
2. Achieving multiple benefits
3. Preventing pollution at the source
4. Reducing out footprint – water, carbon, energy
5. Preserving precious, limited resources

Enhancing Next Generation Techniques – Green Infrastructure

- Mimic nature to control urban storm runoff
  - Keeping clean waters clean; On-site retention of smaller storms meets multiple urban waters goals
  - Bioretention, infiltration and evaporation
  - Next generation GI techniques sought
- Leaders include: Philadelphia, Washington DC, Prince Georges County MD and more
- Promoting Green Streets, Green Schoolyards
- Engaging P3 partnerships for financing

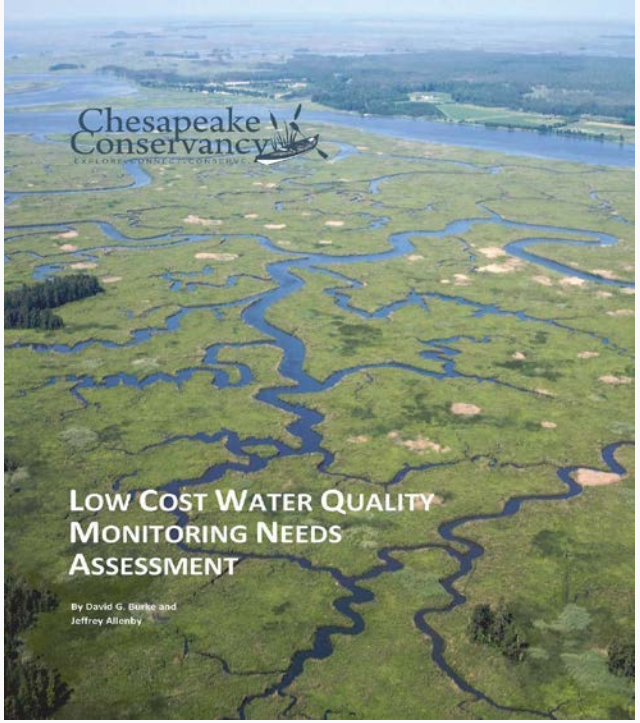
Sustainability: “Net Zero Energy “

- **A New Vision for local Wastewater treatment facilities**
  - Typically constitute 30-40% of the city energy demands
  - Local waste treatment facilities have the great potential to serve as local resource recovery facilities/energy producers
  - Greater use of **Combined Heat and Power** solutions
  - Taking bio-mass to convert to energy for the plant and the community
  - R3 doing outreach/technical assistance to operators

Climate Change

- Raise awareness of climate change impacts
  - Such as Sea level rise
  - More flooding
- "Climate Ready" Tools for Water Utilities
- Assess the impacts locally – visualization tools to spur action
- Helping Communities adapt/become more resilient

Challenges of Excess Nutrient Pollution (N and P)



- Harmful Algal Blooms on the rise
- Severe disruptions of local economies
- Manure imbalances
- Science yielding very low endpoints for aquatic life use

A satellite image from NOAA shows an aerial view of Lake Erie's massive 2011 algae below

The Chesapeake Bay TMDL

- **Nutrient and Sediment** cap loads for 6 states and Washington D.C. (December 2010)
- **By 2025 -** Put all practices in place to meet the load caps (roughly 20-25% reductions + growth)
- **Offsetting of New Growth** Required
  - Opportunity to provide solutions - greater efficiency to enable continued growth

Chesapeake Bay

Other key needs include:

- **More real-time monitoring** and sensors throughout a large watershed – cost effective
- **Verification systems** for BMPs across the landscape - to assure that systems are in place and working
- **Market-based trading** approaches

Excess Nutrient Pollution – Animal Waste

- Point Source Wastewater Treatment (from Cities and Towns) nearly meeting the new Bay reduction goals

- The Big Remaining Demand: Animal Waste (Manure) Imbalances in hot spot areas
  - MD proposing a new Phosphorous Management Tool (PMT) to assess resident “P” loading in soils
  - DELMARVA, Shenandoah Valley, Lancaster County, PA and other hot spots

Excess Nutrient Pollution – Animal Waste

- Need for Capacity to be developed - alternative technologies
  - Manure to Energy
  - Waste Digesters/Biomass
  - Nutrient Mining from Waste Materials (P mining) – international market
  - Capitol to support Regional solutions for many small farms

Protect Our Vital Drinking Water Sources

- The Water Security (WS) Initiative
- Contaminant Warning Systems
- Prevent and Prepare for Security Threats
- Cyber Security

Protecting Vital Drinking Water Sources

- New **Source Water Protection** requirements – WV legislation in particular (Charleston spill)
  - Early detection systems for emerging contaminants/spills
  - Risk Evaluation for multitude of chemicals
- Source Water Partnerships in major River basins - partners to drive pollution reductions - pathogens, sediment, nutrients and more
- Development of Alternative DW sources; emergency power options

Energy/Water Nexus

- Reducing the water footprint of energy extraction and processing
- Greater levels of water recycling and reuse
- Reducing the TDS, Bromide, and other contaminants in surface streams – advanced treatment – linking out clean water and safe water goals.

Water Technology Innovation: Ten Market Opportunities

- **Conserving and Recovering Energy**
- **Recovering Nutrients**
- **Improving and Greening of the Water Infrastructure**
- **Conserving and Eventually Reusing Water**
- **Reducing Costs and Improving Techniques for Water Monitoring**
- Improving Performance of Small Drinking Water Systems
- **Reducing Water Impacts from Energy Production**
- **Improving Resiliency of Water Infrastructure to the Impacts of Climate Change**
- Improving Access to Safe Drinking Water and Sanitation
- **Improving Water Quality of our Oceans, Estuaries and Watersheds**

Questions?

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