2018 National Capital Region Water Resources Symposium

Resilient Solutions for Water Management in Urban Environments: Advances in Research, Technology, Financing and Policy

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6 April 2018

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“Every day, America loses more than 4,000 acres of open space to development; that’s more than 3 acres per minute”

USDA Forest Service
Over 80% of the U.S. Population Live in Urban Areas

Land Development and Population Growth

Example: Washington DC Population

1800 - 8,144

2017 – 693,972
Population growth is high in water-stressed areas

Problems could be exacerbated by climate change
Modern Water Infrastructure

20th Century Approaches

- **Potable Water System**
  - Water Sources, Water Treatment and Distribution

- **Wastewater Network**
  - Wastewater Drainage, Treatment Plants, Discharge

- **Stormwater (Runoff) Drainage Network**
  - Storage and disposal to surface waters
Urban Water Infrastructure Characteristics and Problems

- Planned, designed and managed as separate systems
- Interconnectedness of natural landscape and engineered systems are not considered
- Significant wastewater and stormwater runoff
- Dependence upon extensive pipe networks
- Dependence on chemicals
- Urban water infrastructure is energy intensive

Existing water infrastructure is not sustainable from environmental and cost perspectives
Quality of Life Criteria in Urban Environments

Our Goals and Expectations

<table>
<thead>
<tr>
<th>Quality of Life Criteria 20th Century</th>
<th>Quality of Life Criteria 21st Century</th>
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<tbody>
<tr>
<td>Running tap water in each household</td>
<td>Running tap water free of chemicals</td>
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<td>Sewer disposal for each household,</td>
<td>Zero pollutant discharge</td>
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<td>industrial pollution control</td>
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<td>Develop surface water resources –</td>
<td>Develop alternative water sources -</td>
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<td>build dams and reservoirs</td>
<td>rainwater and stormwater capture,</td>
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<td>Excessive groundwater withdrawal</td>
<td>wastewater reuse, desalination of</td>
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<td>saline water</td>
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<tr>
<td>Accelerated urban development and</td>
<td>Low Impact Development and green</td>
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<tr>
<td>stormwater drainage network</td>
<td>urban environment, urban aesthetics</td>
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<tr>
<td>Affordable housing &amp; buildings</td>
<td>Water/energy efficient housing &amp;</td>
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<tr>
<td>Develop fossil-fuel energy resources</td>
<td>buildings</td>
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<td>Import food, use pesticides for</td>
<td>Generate clean and renewable energy</td>
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<td>increased food production</td>
<td>resources - decentralize</td>
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<td>Develop communication infrastructure</td>
<td>Wireless and satellite technologies</td>
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<td>Cyber infrastructure</td>
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Challenges Facing Urban Water Management in the 21st Century

- Emerging Contaminants in Surface and Groundwater
- Half-Empty Aquifers Across the United States
- Potable Water Leakage and Contamination via Pipelines
- Chemicals in Drinking Water
- Anthropogenic Flood and Drought in Urban Areas
- Energy Demand in Water Infrastructure
- Climate Change and Consequences
- Cyber Security
2018 NCR Water Resources Symposium

Agenda

Morning Agenda

• Keynote

• Expert Panel

• Coffee Break & Poster Presentations

• Lunch & Luncheon Speaker

Afternoon Agenda

• Special Session: Water Reuse
• Con-Current Sessions & Poster Presentations
• Coffee Break & Poster Presentation Awards