

Triangle Water Resources Thought Leaders Workshop

May 12, 2015

NC Arboretum



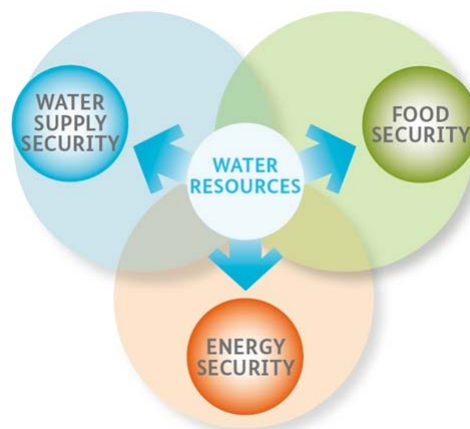
Transforming Our Approach to Water Resources Management



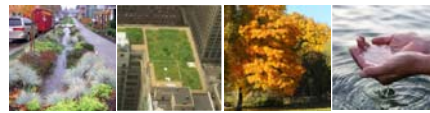
Importance of Water to the Region



- Humanity
 - Water & sanitation for PEOPLE
 - Rainfall & irrigation for FOOD
 - Water for INDUSTRY, ENERGY
- Ecosystems
 - Water for NATURE



Past Approach – Water Program Silos



- Reliance on CWA & SDWA Regulatory Programs
- Water Management:
 - Highly specialized
 - Centralized
 - Segregated
 - Linear
 - Prescriptive
 - Disconnected
- Legal and Cost Issues



■ US EPA HQ Example

- 13 Offices & 67 Sub-offices
- Water: 4 Sub-offices, 11 Divisions & 55 Programs

Challenges Under Current Approach



- **Water Quality Impairment is Increasing Despite >40 years under the Clean Water Act**
 - > 45 Percent of US waters are impaired (USEPA, current)
 - 41,512 impaired waters
 - 71,836 causes of impairment



Challenges Under Current Approach

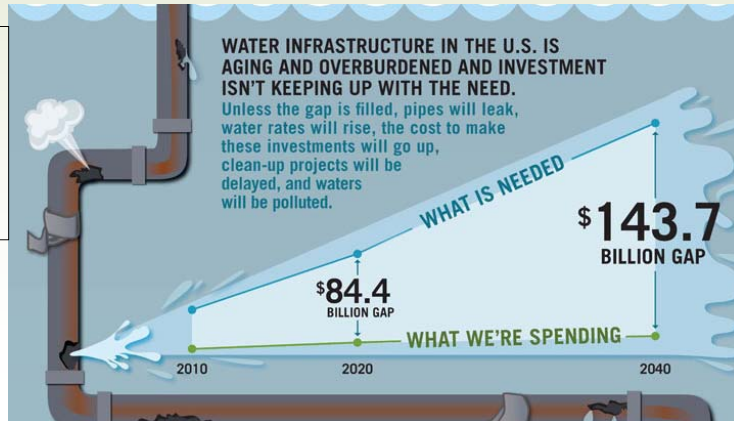


■ Aging Water Infrastructure

- Gap is growing quickly (>\$500B for combine drinking water and clean water facilities in next 25 yrs, USEPA)

Drinking Water Infrastructure Only

Source: ASCE



Challenges Under Current Approach

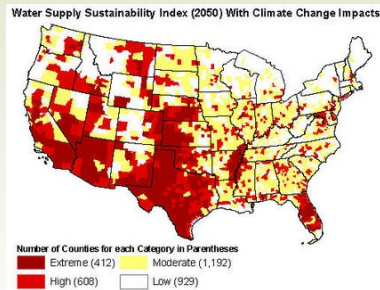


■ Climate change increasing risk of water shortages and extreme weather events



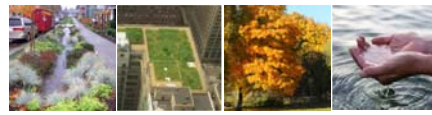
Hurricane Sandy –
Source: NASA

Source: NRDC report written by Tetra Tech, 2010

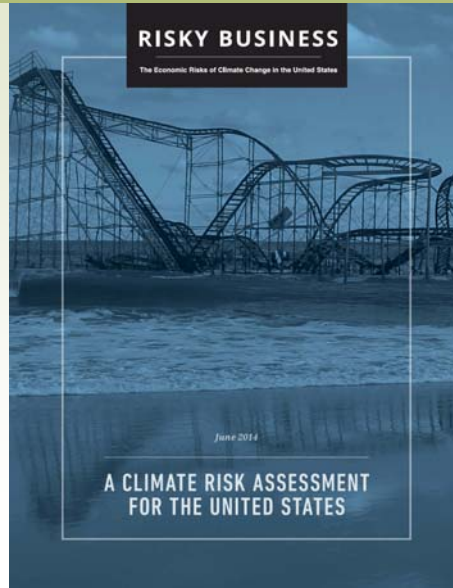


Hurricane Sandy –
Hoboken NJ
Source: Charles Sykes/AP

Messages for Change are Growing Louder...



- Risky Business Report: Gov't & Business Sector
 - Impacts include
 - Damages (prop./infra.)
 - Public health
 - Labor productivity
 - Ag production
 - Energy demand
 - Cost of inaction are already in the billions and impossible to ignore
- Farmer's Insurance lawsuit for cities failure to prepare

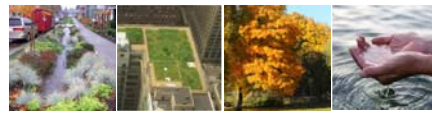


Management Assumptions Changing...



- Variability vs Constant (“Stationarity”)
- Unpredictable vs Linear (“Probabilistic”)
- Flexibility vs Prescription
- Economic Opportunity vs Regulatory Cost

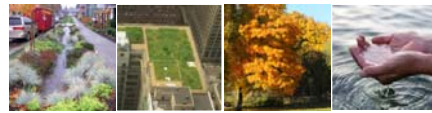
Alternative Approach



- Can we look at this and other water resource management needs for the region a different way?



Emerging Focus for 21st Century Communities



Triple Bottom Line:

- Strong and Prosperous Economy
- High Quality of Life
- Healthy Environment

Enabling a TBL approach



- Practically speaking, requires local leadership...
 - Strong backing of the business community
 - Good governance
- Functionally, requires...
 - Institutional capacity
 - Ability to administer and support implementation
 - Incentives
 - Financial, social, regulatory



Transformative Water Management

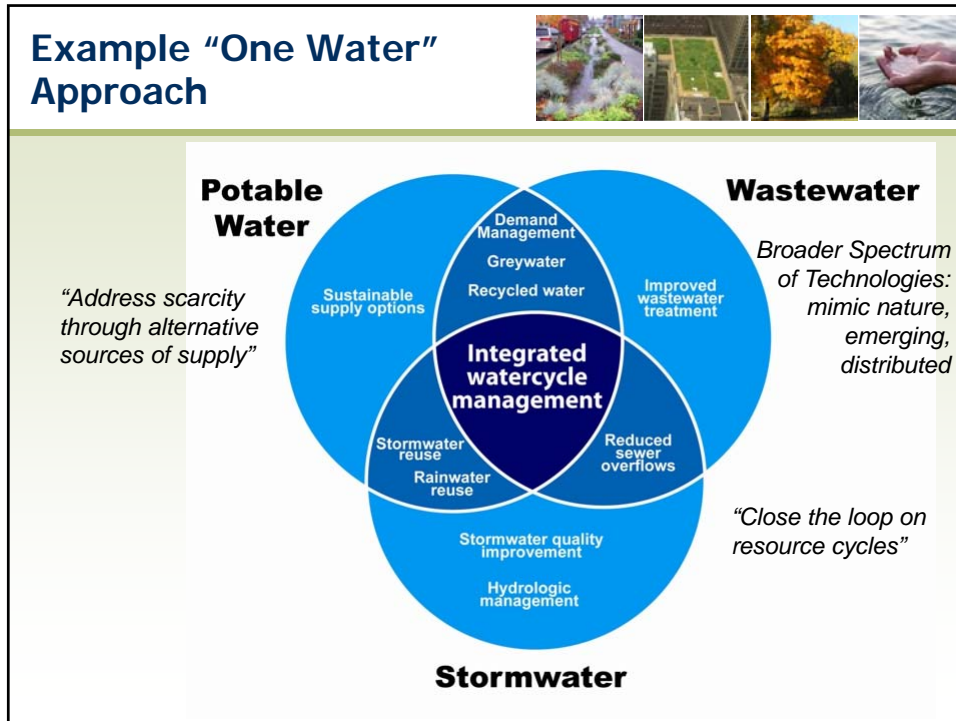


Needed Features In 21st Century

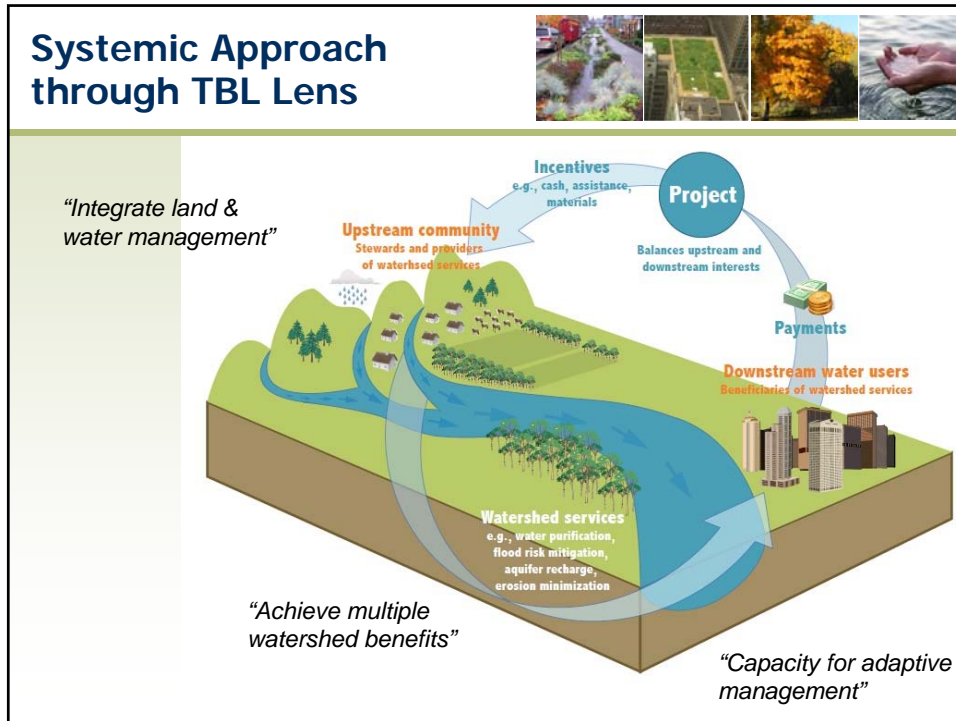
- *Multifunctional*
- *Distributed*
- *Integrated*
- *Systemic*
- *Restorative*
- *Adaptive*
- *Connected*



How do we navigate this change?



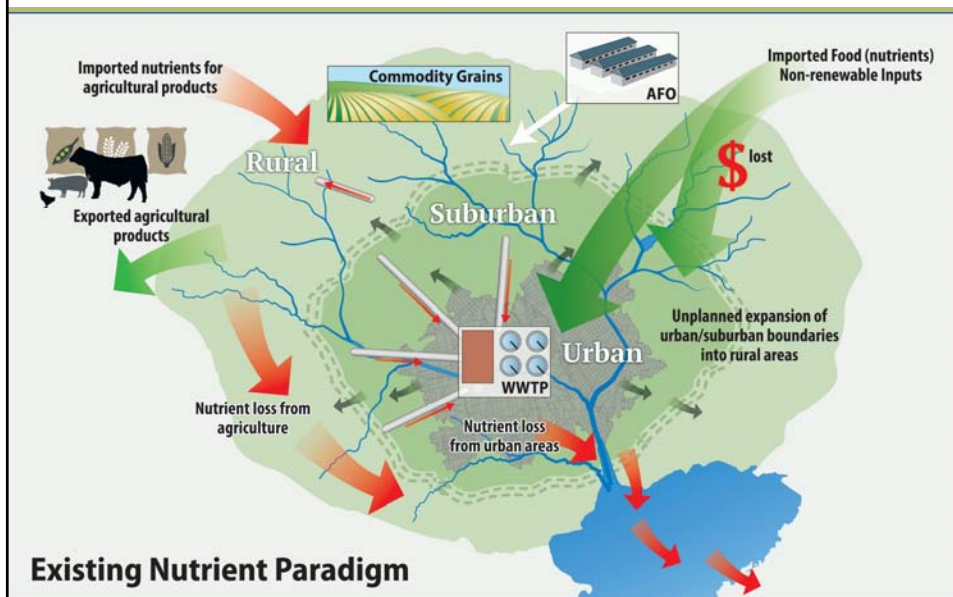
- ### Integrated Infrastructure
- 
- Integration across...
 - Scale (onsite, decentralized, neighborhood, regional)
 - Media (land, water, air)
 - Sector (utilities, agriculture, industry, residential)
 - Form (water supply, wastewater, stormwater, graywater, ground/surface water)
 - How?
 - Fit-for-purpose – *match resource need to supply*
 - Distributed – *don't be constrained by scale*
 - Interdisciplinary – *engage diverse stakeholders in plan*
 - Micro-grids



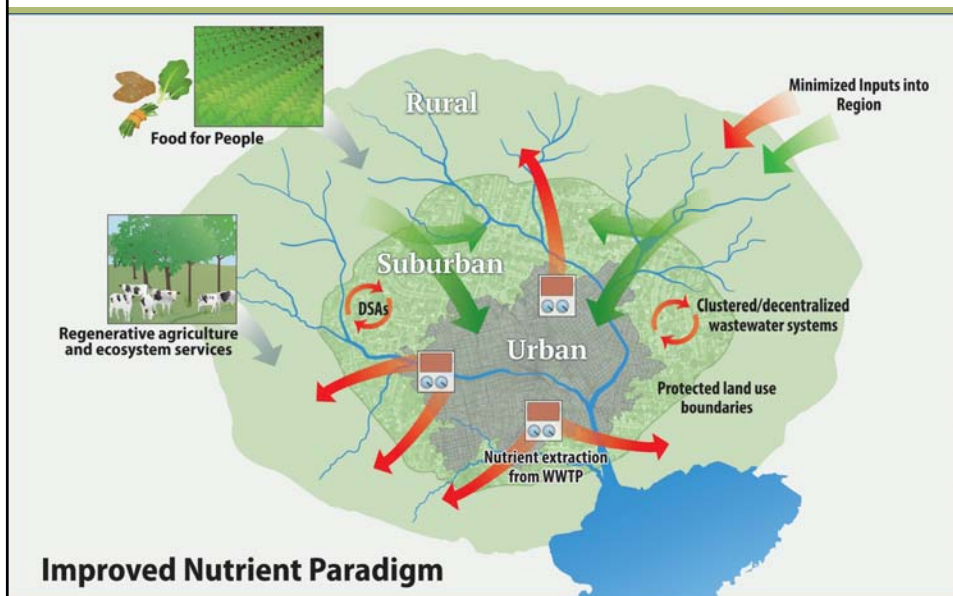
Jordan Watershed Nutrient Management Strategy

- 303(d) listed
 - Impaired by nutrients
- TMDL developed
 - N & P reductions
- DENR-led Strategy
 - Stakeholders involved
 - Wastewater
 - Stormwater
 - Existing development
 - New development
 - Agriculture
- High implementation cost
 - NC legislative action

Considering a Nutrient Mass Balance



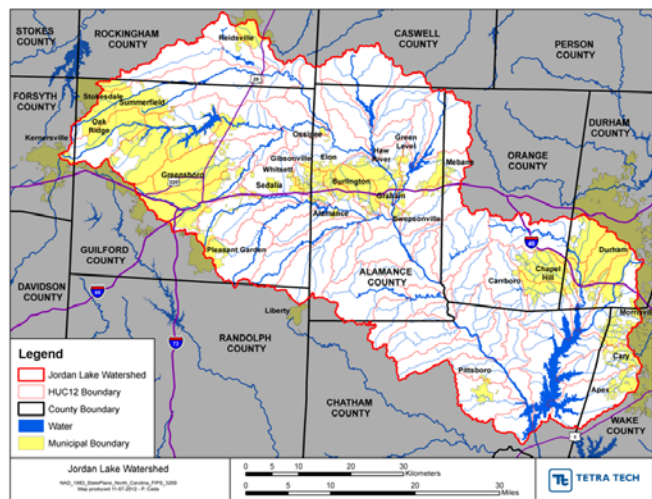
Ideas for Achieving a Better Balance



A TBL-based Approach for the Jordan Watershed



What are existing drivers/features to build upon?

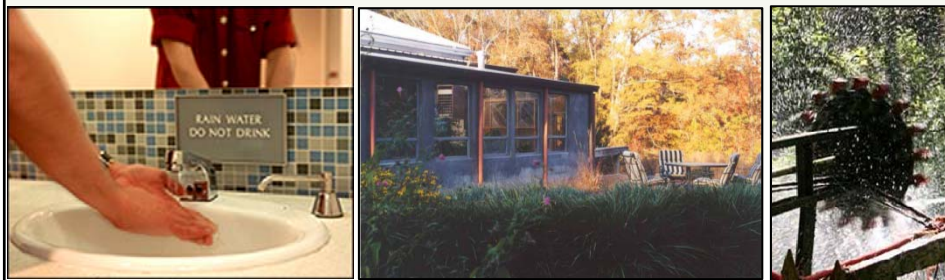


- Clean Tech/ Entrepreneurs
- GI/LID
- Urban revitalization
- Local food movement
- Exurban development
- Research Institutions

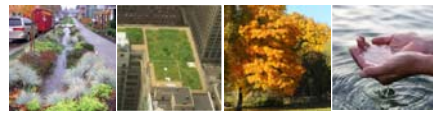
Clean Tech Options



- Resource recovery and reuse
 - Clean (“reclaimed”) water
 - Nutrients
 - Energy
- Match resource with use



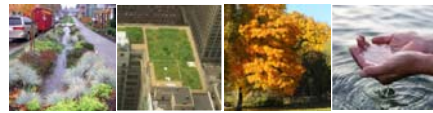
Regency Centers Commercial LID Example

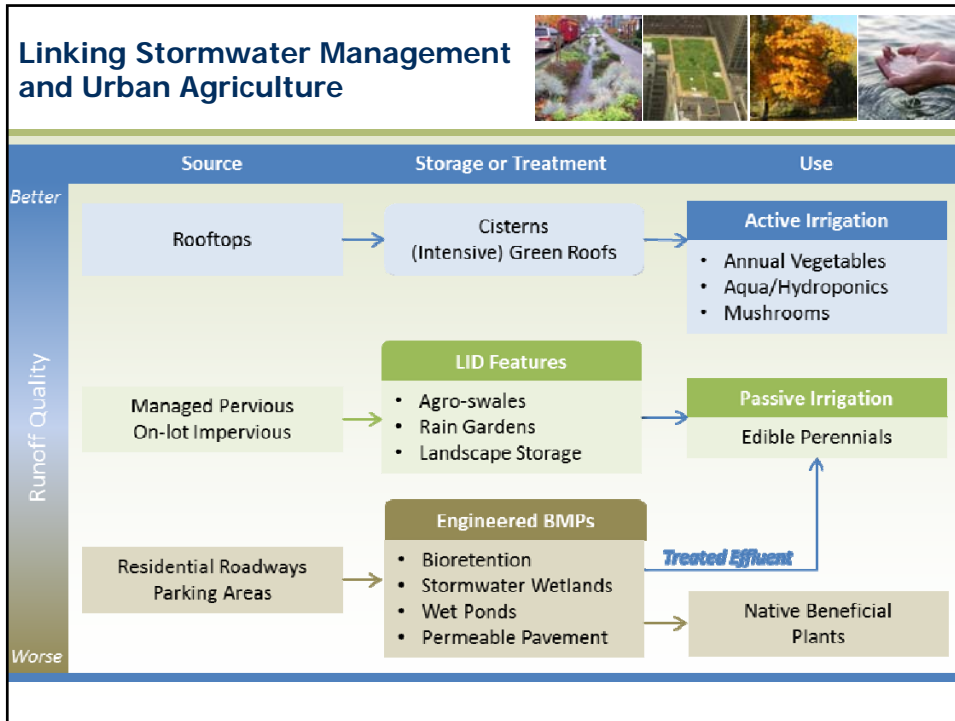


- Colonade Shopping Center





Chatham Park Community-scale LID





Urban Agriculture TBL Benefit Examples

- **Economic**
 - Local \$
 - Micro-enterprises
 - Food affordability
 - Energy savings
- **Social**
 - Food-Energy-Water security
 - Health
 - Empowerment
 - Youth development
 - Safe spaces
- **Ecological**
 - Soil improvement
 - Stormwater mgmt.
 - Biodiversity
 - GHG reduction

Rural Benefits Healthy Soil = Equity



- Regenerative, rural agriculture
 - Managed-intensive grazing systems
 - Agroforestry integration
 - Keyline patterning and infrastructure design
- Less inputs = more profit
- Market-based conservation



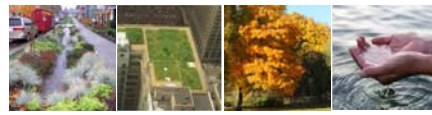
Example: Milwaukee 2050 Comprehensive Plan



- Asset management integrating W, WW & SW
- Incorporating GI, urban biodiversity, energy conservation, social equality & other local Sustainability Plan goals



Example: Dockside Green, Victoria, B.C.



- Water-centric brownfield redevelopment based on **integrated resource management**
- On-site, closed-loop treatment provides **fit-for-purpose**, reclaimed water supply (augmented by rainwater)
 - Toilet flushing, landscape irrigation, green roof watering, and natural stream/pond
- Stream/pond complex provides residential access, enhancing unit value, ecological function and biodiversity
- On site press for sludge dewatering to produce feedstock for co-located gasification plant
 - Single operations company = reduced staffing, maintenance and commissioning, and travel, reducing impact




Courtesy: Dockside Green and Aqua-Tex Scientific

Summary of Transformational Principles

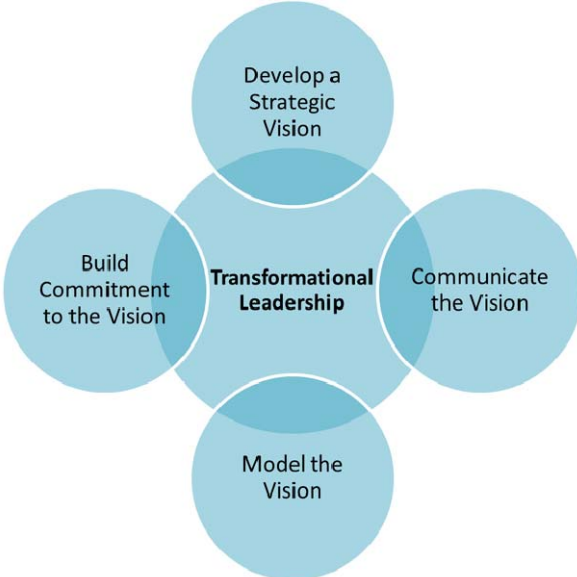


- Value all water
- Integrate scales and multiple functions
- Consider all aspects of community development
- Recognize life-cycle costs/maximize TBL benefits
- Choose smart, clean and green approaches
- Foster innovation
- Adapt and evolve (better, stronger)

Leading Transformation



- Where are we headed?



Develop a Strategic Vision


Communicate the Vision

Model the Vision

Build Commitment to the Vision

Transformational Leadership

Are you in...?



"The two most important days in your life are the day you are born...and the day you find out why."

~ Mark Twain

