Building One Water Capacity –
A Collaborative Approach to Sustainable Integrated Water Management

Trevor Clements, Mid-Atlantic Regional Manager
Integrated Water Management Division
Research Triangle Park, NC
Jordan Lake Watershed

- Jordan Lake
  - Water supply
  - Flood prevention
  - Downstream flow augmentation

- Jordan Lake Watershed (~1700 sq. mi.)
  - 37 jurisdictions
Clean Water Act Process for the Jordan Lake Watershed

- Classify Waterbody for Best Use
  - Water supply, recreation, aquatic life support

- Monitor & Assess Waters
  - Physical, chemical & biological
  - Designated impaired (2002) - nitrogen & phosphorus

- Determination of Water Quality Use Impairment
  - TMDL-based nutrient rules in development since 2005

- Prescriptive Policies & Regulations

- Control Based Implementation
  - [Awaiting final adoption]
State Regulatory Agency Proposes Control-based Nutrient Management Strategy

- Relied on Clean Water Act Program components
  - Permitted point sources stringent limits for N and P
  - Municipalities required to
    - Regulate new development for stormwater management
    - Reduce N & P loads from existing developed land
  - Agricultural operations – subsidies/grants require enhanced nutrient management plans to reduce N & P
Traditional Clean Water Process Breaks Down

Prescriptive Policies & Regulations

Control Based Implementation

Outcomes:
- Economic Opposition
  > $2B cost
- Social Opposition
  ▪ Benefits of proposed programs questioned
- State Legislature remands Environmental Rules to be rewritten
Reductionist Thinking Can be Problematic

- Focus on nutrient load reduction alone cannot be successful
  - Without addressing root cause of problem (i.e., open loop nutrient flows)
    - It will become harder and more expensive every year to simply “Hold the line” let alone achieve a TMDL
  - Without addressing other community economic, quality of life, and environmental goals
    - Gaining public support will become harder and harder
Initial Impetus for One Water Approach

- NCDOT load allocation for similar TMDL
  - DOT roads not subject to high nutrient concentrations
    - Number of BMPs ~ 15,000 for Falls watershed
    - Cost ~ hundreds of millions $
    - Time-frame ~ 5,000 years to reach goal
  - DOT Concern = single parameter performance metric
    - Resources invested show little progress
    - Other more holistic benefits of DOT practices not being recognized nor optimized
The NCDOT Mission is holistic in nature, connecting people, products, and places safely and efficiently with a focus on customer satisfaction, accountability, and environmental sensitivity. This approach aims to enhance the economy and vitality of North Carolina.

Moreover, the mission represents the triple bottom line goals of economic prosperity, higher quality of life, and a healthy environment.
Opportunity for Integrated Water Management?

- Can North Carolina Department of Environmental Quality (DEQ) take a more balanced approach applying a triple bottom line policy?
  - New NC Governor & DEQ Secretary
    - DEQ to consider economy & innovation
  - New Division of Water Infrastructure (DWI)
    - Seeking innovation in Water-related Master Planning
- Held joint discussion to “reimagine” nutrient management for NC through One Water
One Water Approach: 2 key concepts

- One Water defined…2016 by
  - Water Research Foundation (WRF):
    - All forms of water are valuable
    - One Water is an integrated planning and implementation approach to managing finite water resources for long-term resilience and reliability, meeting both community and ecosystem needs
One Water Approach Connects Water Management to TBL Community Goals & Objectives

From: U.S. Water Alliance
Roadmap for One Water, 2016
NCDOT Reimagining Project: Connect nutrient management to community vision through One Water approach

- Vision-based approach for nutrient and water management
  - Community focus
    - Balance economic, quality of life, and environmental objectives

- Integrated water management framework
  - Optimize resources
    - Regulatory and non-regulatory
Reimagining Workgroup

Who we gathered around the table:

- County Water Quality
- County Soil & Water
- Development Designer – Business Enterprise
- NGO Land Trust
- Urban & Rural Utilities
- Council of Governments Water Planner
- NCDOT Hwy Stormwater Program Manager
- Municipal Mayor
- Div. of Water Infrastructure
- Ag Extension Specialist – Farm Business Enterprise
- NGO Citizens Group
- DWR NPS Planning
- DEQ Waste Management
- Sustainable Farming Consultant
- Integrated Water Consultant
Costs per pound vary over 4 orders of magnitude

Relative Per-Pound Costs of Reducing Nitrogen Pollution in the Chesapeake Bay Region

- Stormwater
- Wastewater TP
- Agriculture
- New Practices

Move from to
One Water Ideas for Achieving a Better Balance

Improved Nutrient Paradigm
Water connects upstream & downstream/urban & rural communities

Manage as a system
Water Infrastructure Business Model

- Support multiple community functions/goals
- Incorporate recovery & reuse
- Decrease vulnerability to climate impacts
- Decrease asset management cost
Rural Business Model
Healthy Soil = Equity

- Regenerative, rural agriculture
  - Managed-intensive grazing systems
  - Agroforestry integration
  - Keyline patterning and infrastructure design
- Less inputs = more profit
- Market-based conservation
Challenge for Urban Land Development, how to make this…

Function like this?
Role of Green Infrastructure & Smart Design

- Values hydrologic cycle
- Reflects multiple objectives
- Part of asset management solution
- Supports stormwater recovery & reuse
- Effective at multiple scales
- Adaptable
Key objectives for Reimagined Approach

- Help Communities, Implementers, Influencers change behaviors & business models for
  - Land management (urban and rural)
  - Nutrient import (fertilizers, food, feed, livestock)
  - Urban planning and development
  - Water management

- Support more collaborative approaches that advance community, regional & state triple bottom lines
1. Collaborative Network – Proposed Structure

- Citizenry/Community Goals
- Elected Officials
- Local Government Staff/Resources
- Private/NGOs
- COG Administrator HM Facilitation
- Steering Committee
- Stakeholder Workgroups
- Federal and State Agencies/Institutions
Example Communication Roles - Collaborative Network

- Elected Officials
- Holistic Goal, TBL Metrics
- Steering Committee
- Performance Tracking
- Federal and State Agencies/Institutions

- Feedback
- Priorities, HM Testing
- Options, Information

- Citizens
- Stakeholder Workgroups
- Results Data

- Implementers
- Results, Benefits
- Strategies, Benefits
2. Performance-based Approach

- Establish triple-bottom line goals
- ID actions/investments that support TBL goals
- Evaluate & address weak links
  - Economic, social, environmental indicators
- Select actions providing greatest return on investment (*TBL business case*)
- Monitor performance
  - Reinforce what’s working
  - Correct what’s not working
3. Implementation Support Structure

- Decision-making process incorporating TBL
- Process for tracking, analyzing, improving performance
- Process for reporting on actions & results
4. Outreach Structure to support...

- Connecting to the people/community/region
- Raising awareness
- Recruiting partners
- Networking
- Training
- Communicating approaches & outcomes
<table>
<thead>
<tr>
<th>Existing Approach</th>
<th>Reimagined Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-led</td>
<td>Locally-led</td>
</tr>
<tr>
<td>Regulatory-based</td>
<td>Community vision-based</td>
</tr>
<tr>
<td>Nutrient TMDL focus</td>
<td>Economy, Quality of Life, Environment focus</td>
</tr>
<tr>
<td>Watershed-based</td>
<td>Ecosystem-based</td>
</tr>
<tr>
<td>Limited Management Options</td>
<td>Flexible TBL-tested Management Options</td>
</tr>
<tr>
<td>Expense-based</td>
<td>Enterprise-based</td>
</tr>
</tbody>
</table>
Next Steps in Reimagining Approach

- Apply the concepts to the Jordan Lake One Water (JLOW) initiative
  - Partnership between NCDOT and regional Council of Government agencies
  - Support from DEQ, NGOs, local elected officials

- Developing a Work Plan to see how we can flesh out the framework to be able to “stand it up” for approval and implementation
  - Seeking critical mass for “coalition of the willing”
  - DEQ to incentivize through rule-making
Contact Information

trevor.clements@tetratech.com
(919) 485-2058