

WATER WORKSHOP
August 13, 2009
Kingsgate Marriott Hotel, Cincinnati

A Summary

Workshop Objective

Provide a forum on the science required to sustainably manage the nation's water resources with a diverse cross-section of Federal, academic, and water provider /user stakeholders convening to identify & discuss challenges, knowledge gaps, and research needs, as well as effective means of translating research into sustainable water management.

Topic 1: Knowledge Base

Charge A: What types of data need to be collected to achieve national water sustainability in the short and long term beyond current water quantity, water quality, and water withdrawal data?

- National water “inventory”
- Consumptive water use data
- Data of help define water “knowledge base”
- Distribution inefficiencies
- Measurement system to identify water loss
- Data relevant to human health factors
- Ecological and biological integrity data

Topic 1: Knowledge Base

Charge B: What are the technological and social barriers to collecting such data? What is needed to overcome these barriers?

Barriers:

- Privacy issues on individual choices; employ survey techniques to preserve privacy
- Avoidance of measuring for fear of regulation
- Lack of education
- Unfunded mandate complaints by states

Solutions and justifications to overcome barrier(s):

- Federal government coordination and standardization
- Top-down framework and organization structure
- Bottom-up implementation mechanisms and incentive structure
- Prioritization driven by risk (scope and granularity)
- National security risks (food, water, energy)
- Economic security risks (energy, agriculture, transportation, commerce)

Topic 1: Knowledge Base

Charge C: What is the temporal and spatial resolution required of such measurements?

- Annual
- Household/farm/economic unit
- Regions having relevant similarities

Charge D: Should a census (e.g., exhaustive enumeration) be done at a small number of locations and/or can a random sample be designed to estimate a larger population? How do the different water resource management structures in the country influence this answer?

- Sampling vs. Census? Census will be impractical due to size
- Need knowledge and budget
- Small case study leading to scale up

Topic 2: Science Agenda

Charge: What are the gaps and needs in the science agenda for national water sustainability for short and long term

Technical Science Needs:

- Evapotranspiration, recharge, and withdrawal are the major uncertainties in the water balance.
- Capture and recharge urban stormwater
- Recycle runoff with nonpoint source solution
- Impacts of climate change
- Pollutants and treatments including scale and distribution
- Standardization and structure of how “clean” must water be (depends on usage)
- Water “footprint”
- Hydrology issues
- Infrastructure concerns

Topic 2: Science Agenda

Science Policy Issues:

- Interdisciplinary study
- Translation of science to use
- Important role of social science
- Identification of the “decision makers”
- Safety issues
- Economics of water

Long Term Issues:

- Balancing sustainability indicators
- Long term monitoring and evaluation
- Finding the connections to redesign perspective
- Long term agricultural and industrial impacts
- Consumption data and info for all segments of consumers
- Identification of future risks, i.e. nanoparticles

Topic 3: Technology Agenda

Charge: What are the gaps and needs in the technology research agenda for increasing national water availability?

Integrative solutions including:

- Need for greatly reduced energy use and concentration of residuals for desalination
- Technology to change cost structure; broaden to include all costs
- Recover stranded energy & heat recovery.
- Need to understand flow, flux, quality, disposal, reuse (black water) for energy production and understand the funding requirements
- Filtration technology
- Energy costs in membrane bioreactors for creating low-cost reusable water
- Stability drivers for wastewater treatment
- Generic water needs including “smart grid” of flows (sensors), differentiated systems for different water types, alternative energy needs to account for different water needs, single tool for water and carbon footprint, scale up technologies, nano and hybrid technologies

Topic 4: System Level Water Sustainability

Charge: What are the gaps and needs for the nation? For the research agenda?

DEFINITION: System Level--System under analysis, i.e. US, county, etc. The “scale” of the system.

- **Nationally accepted criteria and indicators for water sustainability** including plan to achieve targets for indicator values
- **Factors defining the “System”** including boundaries, hierarchies and structure of subsystems, scaling issues (i.e. local vs national), controllable factors vs non, timetable.
- **Life Cycle/Total Cost Analysis and “Water Footprint”** including standard metric system and measurement tools, study of trade-offs including virtual water analysis, pricing and economics issues, tools to assess platforms for “water footprint”
- **Water as a National Issue** including national water “balance”, security issues, standard of living and policy implications, water rights issues, ecosystem and environmental concerns, fair trade concerns in industry
- **Consumption** including motivation and incentive structures for various stakeholders, accurate and updated data on usage, monitoring systems both short and long term, inefficiencies, “New” water----public perception and barriers for direct potable reuse

Topic 5: Improved Coordination

Charge A: What is the appropriate role of each stakeholder (federal agencies, states, basin/regional planning authorities, NGOs, municipalities, industry, academia) in coordinating the information and research activities required to develop sustainable management of water resources?

- **Top-Down Decision**—Coordination is key---who, what, how
- **Bottom-Up Implementation**—Local communities, drivers & incentive structure
- **Propagation**—a network of stakeholders (both individuals and organizations) with a research community funneled through it
- **Information flow and knowledge base**
- **Measuring progress and tracking improvements**

Topic 5: Improved Coordination

Near Term Goals:

- Establish the science behind sustainability
- Framework to define water sustainability and long term goals and strategy
- Increase coordination among stakeholders, including motivators, needs, and roles
- Develop valuation and pricing structure for water
- Establish national guidelines/best practices for both water and sustainability
- Near term technical needs such as forecasting river flows and floods, water pumping data both quality and documentation, standardization in sample collection and analysis

Long Term Goals:

- Establish broad set of sustainability indicators
- Pursue long term strategy to achieve improved coordination and implementation
- ETV network with stakeholders and organic coordination that occurs with a specific technology category
- “Virtual Center” ---Multi-agency website with individuals links to websites of different stakeholders and a professional and social networking component