8. Watersheds, Stormwater, Source Water Protection

Presenter

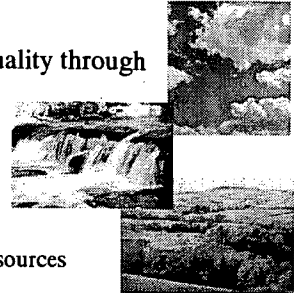Tyler Richards, Water Environment Research Foundation

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Watersheds, Stormwater, Source Water Protection

Tyler Richards

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The Watershed Management Approach

- Holistic approach
- Evaluating water quality through
  - Land
  - Water
  - Air
- Observing
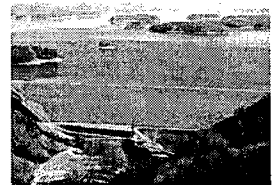 - All land uses
  - Potential pollution sources

The Watershed Management Approach cont.

- Focusing on
  - Maintaining water quality
  - Improving water quality
- For viable and healthy ecosystems

The Watershed Management Approach cont.

- Parallels Source Water Protection
  - Can emphasize urban & urbanizing watersheds
  - Source Water looks at drinking water sources

Watershed Management Drivers

- Clean Water Act goal
  - all waters should be fishable and swimmable
- Recent understanding that improving point sources only will not ensure goals are met
- Address other sources of pollution, like storm water runoff
- Looks at all pollution sources and various ways to cost-effectively reduce pollution

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WERF Research—Watershed Management Topical Areas

- Effective Water Quality Tools
- Effective Management Strategies and Tools
- Total Maximum Daily Loads
- Addressing Regulatory Mandates
- Aquatic Ecosystem Health

WERF Research Examples— Watershed Management

- Sensor Technology for Water Quality Monitoring: XRF Spectroscopy
- Validation of underlying assumptions for integrating frequency, magnitude, and duration in NPDES permit conditions
- Global lessons for watershed management in the United States

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Strategies for Sustainable Water Resources Management
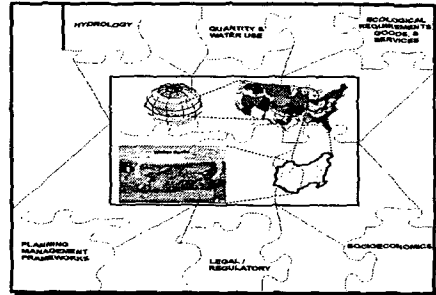
from Kent Thornton, FTN associates for WERF project 00-WSM-6

WERF Research Examples: Complying with CWA through the Watershed Approach

- Total Maximum Daily Load (TMDL) research
  - How to evaluate health and impairment of waterways?
  - How do you apply narrative criteria (trash, toxicity, water clarity)
  - How do you identify and address pollutants in sediments?
  - How do you develop site specific nutrient limits?

Stormwater Drivers

- Clean Water Act
  - requirement to address water quality in stormwater runoff
- Flood Control
  - protection of life and property

Stormwater Drivers cont.

- Increases in impervious surfaces and population
  - increased effects from stormwater runoff

WERF Research: Stormwater

- Identify and address research needs for stormwater utilities and municipalities charged with managing stormwater quality and quantity.
- Will provide technical information for efficient and cost effective conveyance and management of stormwater flows
  - To prevent urban flooding and protect surface and ground water quality.

WERF Research: Stormwater

- Range of Conveyance and Treatment Methods
- Post-project monitoring of BMPs/SUDS to determine performance and whole-life costs
- Impacts of stormwater on receiving waters and watersheds
- Anticipate some Low Impact Development and "raingarden" research
  - parallels ongoing research in Japan

Source Water Protection

- Similar to Watershed Management approach but focuses on protecting drinking water sources
  - applies to both surface and groundwater sources

Source Water Protection Drivers

- Safe Drinking Water Act
  - Requires maintenance of safe, clean sources of drinking water
- Recent understanding that all pollution sources impact drinking water safety and treatment cost
- Keeping pollutants out of drinking water sources is safe and cost-efficient approach

Source Water Protection Drivers cont.

- High level of interest in protecting source waters from pathogens such as Giardia and Cryptosporidium
- May have to balance the need for safe drinking water with other needs
  - Recreation
  - Agriculture
  - energy production

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Source Water Protection Research: Topical Areas

- Contaminant Sources and Occurrence
- Fate and Transport
- Monitoring and Analysis
- Source Water Protection Tools

Source Water Protection: Research Examples

- Chemical Occurrence Datasets for Source Water Assessments (AWWARF):
- Pathogens:
  - Sources of Cryptosporidium in Watersheds (WERF/AWWARF)
  - Field Calibration and Verification of a Pathogen Transport Model (WERF)
  - Fate and Transport of Surface Water Pathogens in Watersheds

Source Water Protection: Research Examples

- Source Water Watershed Protection:
  - Source Water Protection Alliances Between Water Utilities and Agricultural Operations (AWWARF)
  - Decision Support Framework for Sustainable Water Supply Planning (AWWARF)

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Questions??