



Office of Research and Development



SAFE AND SUSTAINABLE WATER RESOURCES RESEARCH PROGRAM

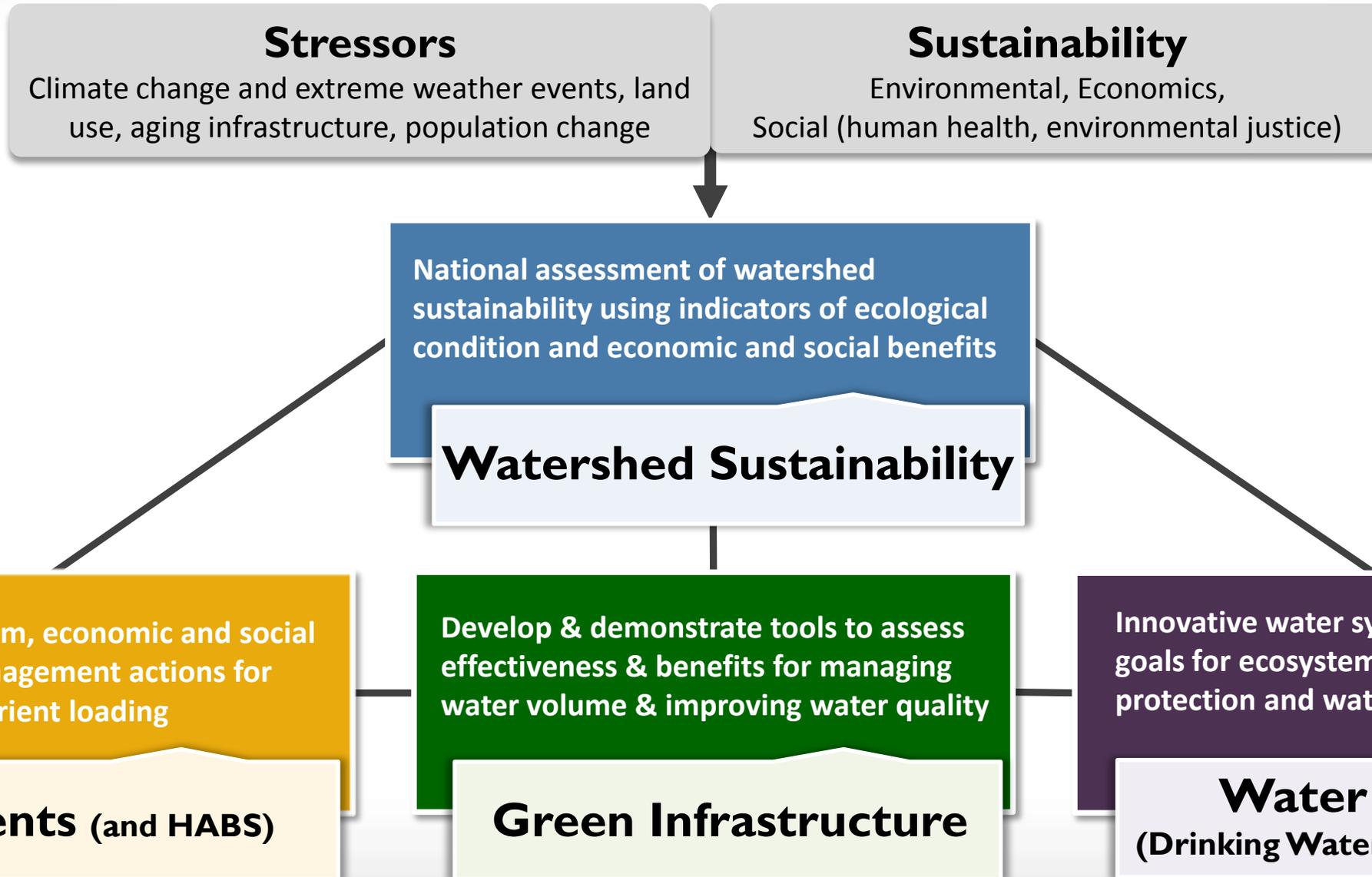
**Presentation to the EPA-Tribal Science Council Meeting
December 2, 2015**



Overarching SSWR Research Priorities

- ❖ Current and long-term water resource challenges for complex chemical and microbial pollutants
- ❖ Recognizing a dynamic 'one water' hydrologic cycle
- ❖ Transform the concept of 'waste' to 'resource'
- ❖ Preparedness for changes in climate and extreme weather events
- ❖ Sustainable environmental, economical, and societal goals
- ❖ Real-world solutions







Collaboration with Alaska Tribal Communities

Characterizing the fate of contaminants released from Landfills in Alaska

Issue and what was done

- ❖ Study characterizing the fate of contaminants released from landfills in rural Alaska and their potential impact on local drinking water sources
- ❖ Collaboration with R10 and five Alaska tribal communities.
- ❖ Included the tribal communities of Allakaket, Eek, Ekwok, White Mountain, Fort Yukon.



What it provides

- ❖ Provides the tribal communities and other dump sites throughout the State of Alaska with information that can be used to improve the management of their landfills to protect source waters.





Collaboration with Otoe Missouria Tribe

Disinfection Byproduct (DBP) Control Using Aeration Technologies

Issue and what was done

- ❖ Evaluated aeration technologies to remove DBPs the plant clearwells
- ❖ Conducted with EPA R6 at the Otoe Missouria Tribe drinking water treatment plant in Red Rock, OK.

What it provides

- ❖ Provides water system operators with technical assistance options that are not cost prohibitive.
- ❖ Illustrates how a sustainable and cost effective aeration approach can be applied to utilities that have issues controlling DBPs.
- ❖ Guidance to help small communities meet the Stage 2 Disinfectants and DBP Rule

Published Report: <http://pubs.rsc.org/en/content/articlelanding/2015/ew/c4ew00020j/unauth#!divAbstract>

Webinar Recording: <https://www.youtube.com/watch?v=Tguk9Iup2Zw&feature=youtu.be>

Photo: Kristy Fox



Biological treatment technology taken from pilot- to full-scale at a small water system

Issue and what was done

- ❖ Small Iowa Community relied on individual and neighborhood shallow wells, which became contaminated after a flood in 2008.
- ❖ Pilot system was designed, built, and installed by EPA staff and demonstrated the ability to effectively remove ammonia and iron from the community's source water.



What it provides

- ❖ As part of a federal HUD grant, the full-scale water treatment plant based on the pilot system was completed in Jan. 2014.
- ❖ Community now has a functioning public water system.
- ❖ Provides guidance for other small systems.

Engineering Design and Operation Manual: <http://nepis.epa.gov/Adobe/PDF/P100KY74.pdf>

Journal Article: <http://www.awwa.org/publications/journal-awwa/abstract/articleid/54638849.aspx>



Technical Assistance to a Water System

Assistance with *Naegleria fowleri* contamination in a drinking water supply in Louisiana

Issue

- ❖ A case of amebic meningoencephalitis (PAM), a brain infection caused by *Naegleria fowleri* (commonly referred to as the "brain-eating amoeba") was traced to the St. Bernard Parish drinking water system.

Assistance

- ❖ Technical assistance with R6.
- ❖ ORD engineer invited to attend meetings as an expert in disinfection chemistry and distribution system operations.
- ❖ Expertise and participation directly contributed to the ability of the Parish to develop their Three-Point Plan for bringing the water system back into compliance.
- ❖ Opened the door with their health department and R6 to assist with any future questions the Parish may have.



Bristol Bay Assessment

- ❖ Assessment characterized the biological and mineral resources of the Bristol Bay watershed, identified impacts of large-scale mining on the region's fish resources, and brought together information to inform government decisions related to protecting the watershed.
- ❖ Throughout the assessment process, there was extensive involvement with tribal governments
 - ❖ All tribes within Nushagak and Kvichak drainages participated in consultation and coordination process at some degree
 - ❖ Traditional Ecological Knowledge - interview with tribal Elders
 - ❖ Intergovernmental Technical Review Team

Assessment: <http://www2.epa.gov/bristolbay/about-epas-bristol-bay-assessment>

Website: <http://www2.epa.gov/bristolbay>



CADDIS: The Causal Analysis/Diagnosis Decision Information System

Website developed to help scientists and engineers in the Regions, States, and Tribes conduct causal assessments in aquatic systems. It is organized into five volumes:



- ❖ Volume 1: Stressor Identification (Step-by-Step Guide)
- ❖ Volume 2: Sources, Stressors & Responses (Candidate Causes)
- ❖ Volume 3: Examples & Applications (Examples, Databases)
- ❖ Volume 4: Data Analysis (Analyzing Data)
- ❖ Volume 5: Causal Databases (Candidate Causes, Databases)

Basins: Better Assessment Science Integrating point & Non-point Sources

Multipurpose environmental analysis system designed to help regional, state, and local agencies perform watershed- and water quality-based studies.



- ❖ Assist in watershed management and TMDL development by integrating environmental data, analysis tools, and watershed and water quality models.
- ❖ Useful tool for those interested in watershed management, development of total maximum daily loads, coastal zone management, nonpoint source programs, water quality modeling, and NDPES permitting



Tools: Drinking Water Treatability Database

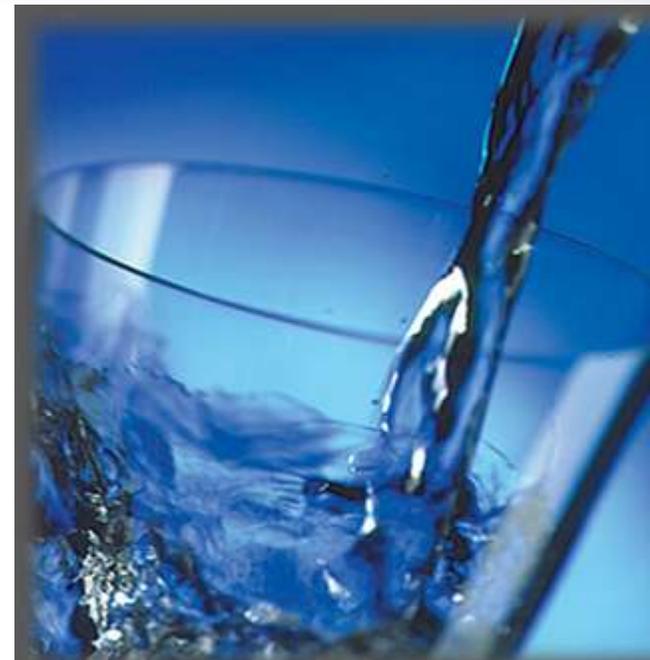
Publically Available Resource

- ❖ Easy to use, interactive database that contains over 60 regulated and unregulated contaminants and covers 34 treatment process.
- ❖ Referenced information gathered from thousands of literature sources assembled on one site.
- ❖ Carbon tetrachloride, nitrate, strontium, 1,2,3-TCP, and cis 1,2-DCE added recently.

Uses to small systems

- Identifying effective treatment processes
- Emergency / First response: Security and spill events
- Designating best available technology

<http://iaspub.epa.gov/tdb/pages/general/home.do>



As resources allow, the number of regulated and unregulated drinking water contaminants will increase each year



Webinars (Attendees from all 50 states, including and Tribal Nations)

Schedules: <http://www2.epa.gov/water-research/water-research-webinars>

❖ **SSWR Research Monthly Webinar Series**

- Wide-range of water topics
- 100-400+ attendees

❖ **Small Systems Monthly Webinar Series**

- Drinking water and wastewater systems
- 600-900 attendees (6,600+ to-date)
- Offer certificate for one contact hour (2,500+ given to-date)

Workgroups and Workshops

❖ **Annual small systems workshop**

- ORD/OW/ASDWA collaboration
- 259 participants from 46 states (including Tribal Nations) at 2015 workshop

❖ **Small systems communication workgroup**

❖ **Energy-Water workgroup**

ORD/OW/DOE Work plan on Sustainable and Resilient Water and Wastewater Utilities



Questions?