



**Hyatt Hotel, Reagan National Airport
Arlington, Virginia, January 22, 2018**

**Federal Research & Information on Water Resources - Opportunities for
Collaboration**

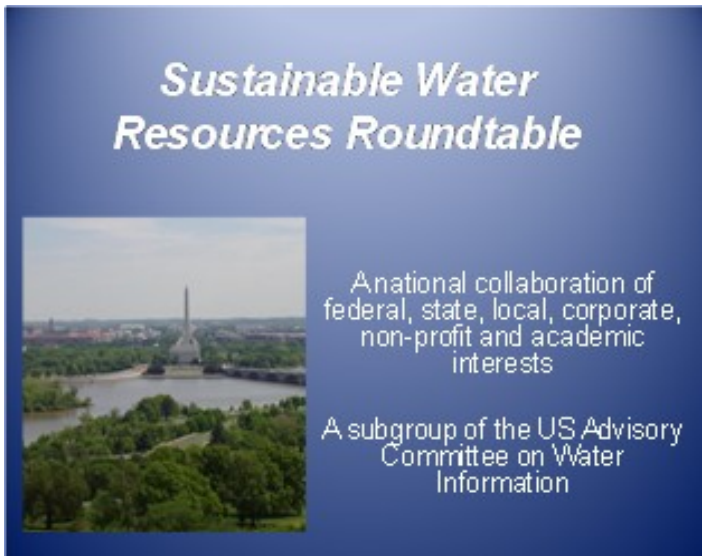
**A SWRR meeting held in conjunction with the annual meeting of the National Council on
Science and the Environment.**

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Introduction to SWRR:

John Wells, Robert Wilkinson, SWRR Co-Chairs, David Berry, SWRR Manager



Robert Wilkinson introduced the Sustainable Water Resources Roundtable to the participants, many of whom were new to SWRR. He described the SWRR process as an open dialogue among many stakeholders. Regular participating organizations include federal agencies, national labs, and the Department of Defense, state and local governments, corporations, NGOs, and people in research and academic institutions.

David Berry spoke about the founding of the Roundtable when it reported to the White House Council on Environmental Quality and later became a subgroup of the Advisory Committee on Water Information. He said that the building of connections among participating organizations leads to beneficial outcomes, SWRR is not a policy organization, and it does not lobby and take positions. It does provide vetting of organizations who want feedback on draft work and a channel of dissemination of completed work.

John Wells presented an introduction to the ideas SWRR developed over the years including a diagram of how the long-term capacity-building relationships of sustainable development relate to water use.

He also outlined the SWRR Indicator Framework:

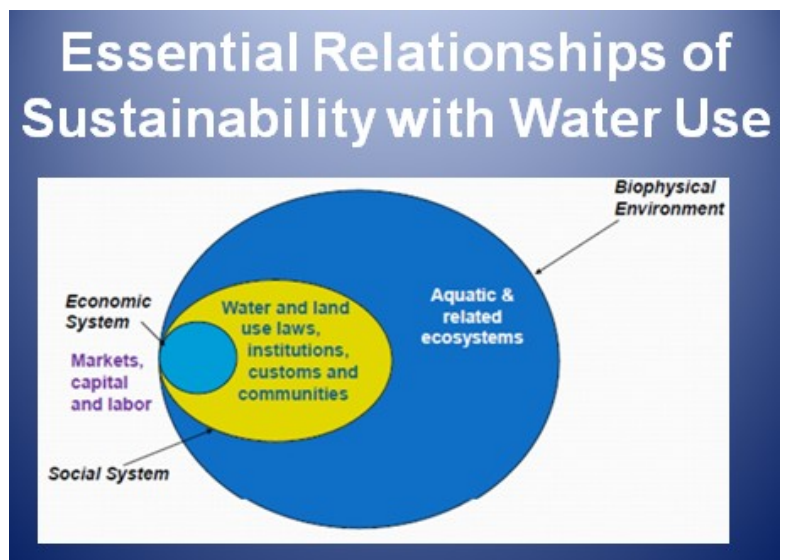
Water availability

Water quality

Human uses and health

Environmental health

Infrastructure and institutions



John explained that the California Department of Water Resources based their indicators of water sustainability on the SWRR indicator framework. That provided significant input to the California Water Plan. California has dedicated water planning staff, came up with series of long view things they want their water to do starting 2018

- Reduced risks from flooding unreliable water supplies groundwater depletion, and habitat and species declines
- Commonly understood in terms of the four societal values
- California water management supports increase public health and safety, healthy economy, ecosystem vitality and enriching experiences
- Water is approaching integrated access
- County planning boards needed to be involved, not approving development in a vacuum
- Take a “Sustainability Outlook” on water management and policy.

The Sustainability Outlook

- Establish a comprehensive and practical method for tracking and reporting on water management and policy
- Provide shared understanding and consistency across State government and California's diverse regions.

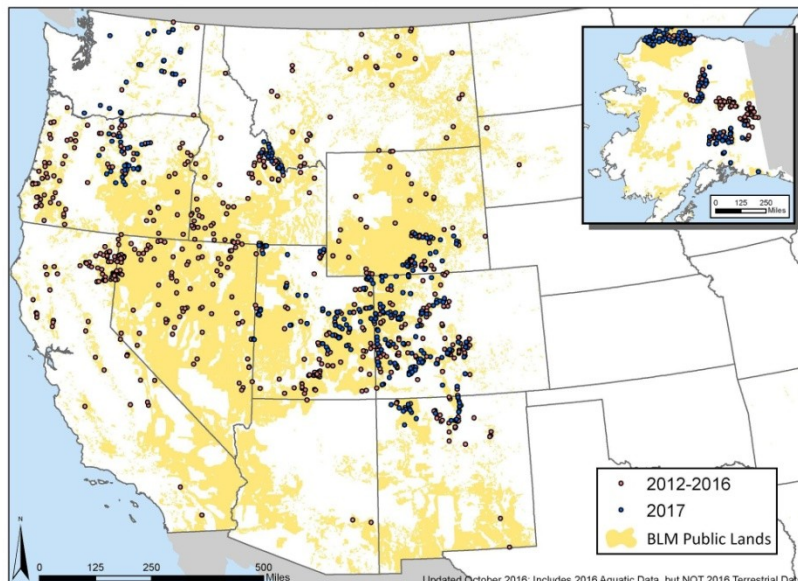


Contributions of Current Research and Analysis to Water Resources

Moderator, John Wells, SWRR Co-chair

Water Resources in the West: Ron McCormick, Bureau of Land Management

National Aquatic Monitoring Framework - Points Through 2017



Ron McCormick began by saying that a lot of his presentation was not agency specific – BLM lands are mixed with other public lands administered by other agencies (such as the US Forest Service, the National Park Service, the Department of Defense, the Fish and Wildlife Service, many state government and tribal agencies, and others. Most of what BLM does is cooperative in partnership with other agencies.

Ron discussed the National Aquatic Monitoring Framework, which started the aquatic and terrestrial independence measure (AIM). Yellow on the map represents BLM lands and the dots are monitoring points. The first inventory has

a single design and a single approach to data collection to enable broader scale data that are statistically defensible

With regard to water quantity, BLM focuses on water sources on federal lands and water passing through federal lands. Water rights are also a topic of interest whether the rights are federally held, user-held, or state-controlled.

The main water quality topics on BLM lands are sediment, salinity, pollutants including metals and acid mine drainage.

Water use topics in the west include grazing allotments, endangered species such as the Greater Sage-Grouse, riparian issues, mining uses, oil production uses and in-stream uses such as habitat for fish and other aquatic organisms, riparian vegetation and associated wildlife, fishing, and other recreation uses. Ron said that some states question federal water rights and other issues like the impact of pipelines make life interesting.

Restoration Projects include:

- Riparian – Floodplain reconnection
- Placer mining – stream complexity, floodplain
- Headcutting (abrupt vertical drops in the stream)
 - erosion control
 - sediment control
 - salinity control

Ron concluded by presenting some innovative solutions to water challenges:



& Sustainable Water Resources: Mary Reiley, Environmental Protection Agency



The SSWR research program uses an integrated, systems approach to support innovative scientific and technological solutions that ensure clean, adequate, and equitable supplies of water to protect human health and to protect and restore watersheds and aquatic ecosystems.

Mary Reiley is Research Coordinator in the EPA Office of Water and works closely with Suzanne van Durnick, the National Program Director for EPA's Safe and Sustainable Water Resources Research Program (SSWR).

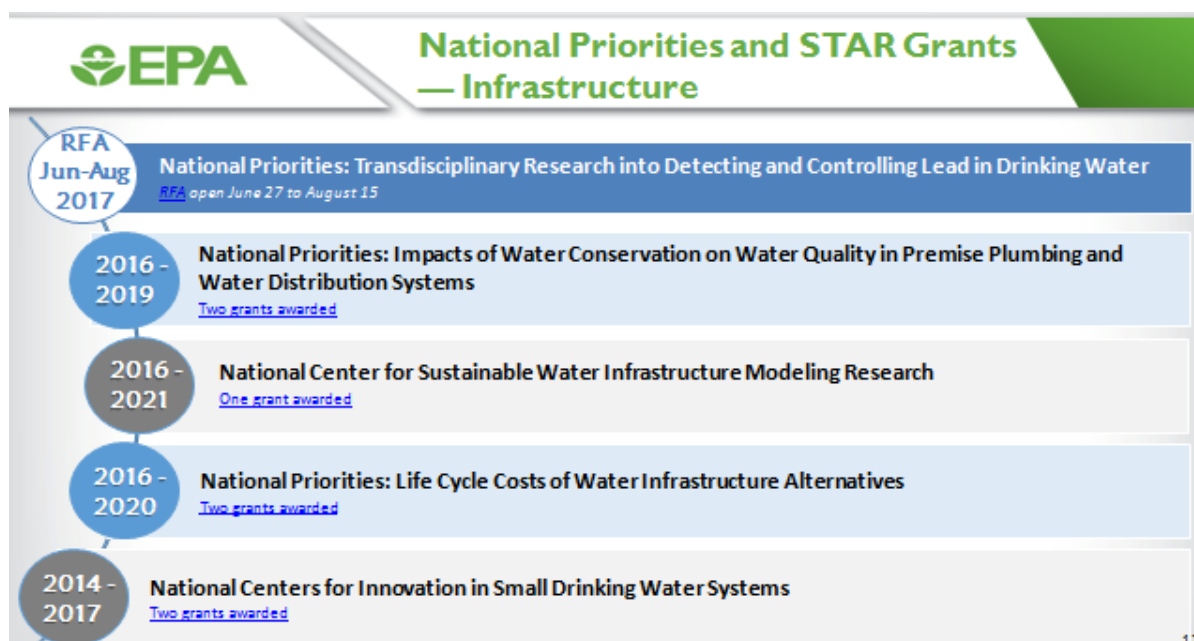
In 2009, The Office of Water decided to create first-ever national water research program. Over 30 years after passage of the Clean Water Act, there had never been a research strategy of what needed to be done to reach goals. There was a need to coordinate many programs in one place. The core program was updated in 2014 with new science areas, resiliency, and sustainability, things not part of original Clean Water Act for aquatic life and human health criteria. In 2018, EPA will update again.

The Sustainable Water Resources Research Program uses an integrated systems approach to support innovative scientific and technological solutions that ensure sufficient supplies of clean water to support economic, environmental, and public health requirements. Mary Reiley said the integrated systems approach is similar to the way the SWRR relates to water sustainability. Like SWRR, they address overarching topics, like roundtable indicators watershed sustainability, nutrients, green infrastructure, and water systems.

The watershed sustainability program is managed to ensure “adequate quantities of quality water” for a variety of water uses whether power plants, households, or habitat. What this research aims to do is identify how make surface waters usable in that way.



The research, actions, partnerships, and policies taken in each of these four topic areas are done in support of many statutes of the Clean Water Act.



The EPA Office of Research and Development also has STAR programs – science to achieve results although the funding has dwindled. Star grants are designed to do really early research into issues. In this case, it is investigatory research rather than less applied sciences and research. The SSWR water research webinar series, is available to the public at <https://www.epa.gov/water-research/water-research-webinars>

Question for Mary Reiley:

Jane Rowan, Normandeau: For the derma infections that oysters get, how much involvement does EPA have?

Mary Reiley: It's an illness in the oysters so it is more addressed by FDA than by EPA. We look at water quality.

Group on Earth Observations Geo Glows, Angelica Gutierrez NOAA

Angelica Gutierrez described the Initiative, its mission, and the relation to other water activities:

GEOGLOWS was established by the Group on Earth Observations (GEO) water community as a global Initiative to provide greater coordination among the diverse freshwater activities within GEO, with the goal of providing a comprehensive perspective on observations and modeling for water sustainability. The use of the term 'sustainability' encompasses humanity's goal of balancing social, economic, and environmental well being, and as such, water sustainability, including water quality, is an essential part of these broader sustainability goals. GEOGLOWS is working in coordination with CEOS to define collectively the needs of the wider community of beneficiaries of information related to water, in particular freshwater resources, water management and biodiversity. GEOGLOWS and CEOS will host the 2018 "Water from Space" workshop will be held 16-17 May in Delft, Netherlands.

GEOGLOWS consolidates the positive elements of the water activities in the first phase of GEO and ensures that strong coordination and commitment is in place for links between data, information, knowledge, applications, and policy. GEOGLOWS mission is to:

Connect the demand for sound and timely environmental information to the supply of data and information about the Earth's water system and to explore the science needed to achieve the goals outlined in the initiative.

Advocate for broad, open data policies and for the realization of the right to access information

Help ensure that the data collected through national, regional and global observing systems is both made available in the public domain and applied to decision-making.

Introduction to GEOGLOWS

The challenges

Climatic and environmental stakes

What climate shall we have tomorrow?

- Increases in global sea and air temperatures
- Widespread melting of snow and ice
- Rising global sea level



*"We do not inherit the land
from our ancestors, we
borrow it from our children"
(Native American proverb)*

How to improve our models?

What are the observation and accuracy needs for global water and energy cycle research, and for global climate change research? **continental to global scales to augment climate networks.**

How to predict at a finer scale?

What are the accuracy needs for water management, flood prediction, reservoir operation, agriculture and drought assessment? **regional problems and real-time data needs to augment operational networks.**

➤ To spatialize and to refine scale of perception

Observations at high spatial and temporal scales
(precipitations, evapotranspiration, water vapor...)



In the Americas, there are 16 participating countries and four different working groups including scientists, government, and academia. Similar activities are found in Asia, Africa, and Europe.

Why Geoglows?

- **Water sustainability is a critical issue** for sustainable development and achievement of the SDGs.
- **Decision-making in water resources planning and management** can be supported with the improved use of earth observation data and associated analytical tools and services.
- **Poor awareness and use of the available and evolving data** (incl. from earth observation) **and analytical services** especially in the developing world.
- Strong need to improve **open, public-domain access** to critical data and analytical services
- **Need for improved partnerships** to improve quality of supply of services and connect to demand of end-users.
- GEOGLOWS can contribute to **modernized management of water resources to improve productivity and better manage climate risks**
- The amount of satellite-based measurements is at any time, greater than any other measurement. **GEOGLOWS will promote the effective use of satellite data to contribute to water management.**
- GEOGLOWS will also explore the science needed to achieve the goals of water sustainability.

Angelica co-chairs Geoglows with Rose Osinde Alabaster of Waterlex, from Switzerland/Kenya. The first global steering committee meeting was held in Tuscaloosa, Alabama in May, 2017.

The working group draft deliverables include:

Complete a study to **quantify global water** availability (and quality).

- Develop **an Inventory water related products**
- **Develop tools**
- **Review** the descriptions of the EWVs in the Water Strategy and **make recommendations** on what additional information is needed for the EWVs in order to meet the requirements of **CEOS** and other interested groups.
- **Survey/inventory** and **mapping** of existing data portals already exist.
- Develop **global streamflow forecast system** based on the ECMWF/GloFAS system, Tethys streamflow prediction app, ESRI map services, and Cloud Services with World Bank Support - **This project is already in implementation with 6 pilot projects world-wide**
<https://www.youtube.com/watch?v=FFx92ztEezA>
- **Socio-economic database** linked with the science data from GEOGLOWS. **Case study** as a basis for capacity enhancement resources related to **SDG 6b** implementation.
- Baseline information needs defined as a basis for integrated water management. **Review of information needs and identification of gaps.**

GEOGLOWS and the GEOSS Water Strategy



- The **GEOSS Water Strategy** renews the observational component of the community's efforts to communicate the needs of the Water community within the framework of GEOSS.
- **CEOS Water Strategy Implementation Study Team (WSIST)** prepared the **CEOS Water Strategy** to the GEOSS Water strategy recommendations.
- Working with other initiatives and organizations **GEOGLOWS** will implement the GEOSS water strategy recommendations.



Questions for Angelica Gutierrez:

Dave Clark, RCAP – How does the data trickle down to people who do the work on the ground. How can we get hold of the information? Is there a way our organization can get this information and distribute it? We obtained a grant to do work in Puerto Rico. Our people are down there now. If we could get a map and imagery, we would need someone who understands GIS.

Angelica: GEOGLOWS participates in Capacity building activities organized by the regional initiatives such as AmeriGEOSS, providing training to government organizations in the region. We provided instruction in the use of hydro-informatics tools during the AmeriGEOSS Week in 2016 (<https://www.youtube.com/watch?v=KVxlueGBTcs>) and 2017 (<https://www.youtube.com/watch?v=hCwLg0wOemM>). We also promote the open data policy globally and regionally. Open Water data can be found at the GEO Portal <http://www.geoportal.org/> and AmeriGEOSS.org portal.

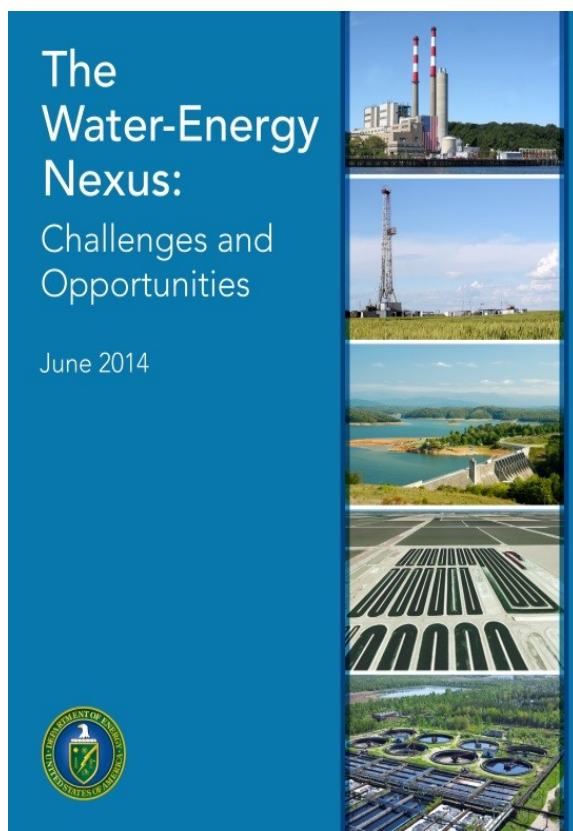
Information about GEOGLOWS can be found at (<https://www.earthobservations.org/activity.php?id=118>)

Collaboration among Governments and Other Sectors on Water Resource Topics

Moderator, Bob Wilkinson SWRR Co-chair

Energy-Water Nexus: DOE Resources to Collaborate with States, Samuel Bockenbauer, Department of Energy

Samuel Bockenbauer said Energy and water are in many cases interdependent and water scarcity, variability, and uncertainty are becoming more prominent. This is leading to vulnerabilities in the U.S. energy system.



We cannot assume the future is like the past in terms of climate, technology, and decision-making. Aging infrastructure can bring fresh opportunities. DOE has strong expertise in technology, modeling, analysis, and data, and can contribute to understanding the issues and pursuing solutions.

Why Focus on States?

- States are often on the front lines of addressing emerging issues in the energy-water nexus (e.g. drought) that can have national implications.

- There is significant variation in energy and water policy across states and regions.

- Policy lessons from one state could be applicable in other states or the federal government. States can be “laboratories” for policy.

- A sometimes fragmented policy landscape presents opportunities for greater policy integration across:

- Energy and water policy
- State and federal policy

Samuel described how DOE’s Office of Policy supports the National Conference of State Legislatures

(NCSL) and National Association of State Energy Officials (NASEO) to draft three policy white papers addressing energy-water nexus federal and state policy connections:

1. Water use in electricity generation (NCSL)
2. Energy performance of water infrastructure (NASEO)
3. Lifecycle water responsibility in oil and gas production (NCSL)

Overall questions each of the white papers seeks to answer are:

4. What are the key issues, and where do they occur?
5. Who are the key decision makers who are grappling with these issues?

6. How do state and/or federal policies affect the decisions made by the decision makers?
7. How and where do state and federal policies interact?

White papers are currently being circulated to internal and external experts for review.

Summary and Opportunities for Collaboration

- DOE can collaborate with states to address emerging issues, improve policy understanding, and better integrate energy and water policy and decisionmaking.
- Interest in the energy-water nexus from states, Congress, water organizations, and the Administration suggests that the time may be ripe to prioritize these efforts.
- DOE's Office of Policy has a set of state-oriented policy and data resources that it is working to align and position for maximum impact.



- We would welcome discussion about possible connections and collaborations with other agencies.

Question for Sam Bockenbauer:

Bob Wilkinson: Is the water use data based on 5-year USGS data? USGS most recent data is 2005.

Sam: EIA and USGS have different data collection policies. They are working to integrate data for energy and water.



Stan Bronson said the merger of Florida Earth Foundation and The University of Florida was creating a new kind of organization:

- Multi-disciplinary in engineering, planning, science, business, policy, natural resources, agriculture, law, architecture
- Merger of Academics and Professional with focus on resilience
- Focus on Social Impact principles
 - Funding
 - Specific projects of SI partners
 - Engagement of Investors
- Connection to the private sector in everything we do including having an advisory council of corporate partners

The programs for 2018 include:

- USNC Pro – September 4-8, Delft, The Netherlands
- SWRR and the Gulf – October 25-26, New Orleans
- The Water and Resilience Module – November 7 & 8, Gainesville
- SWRR in DC – January 22, Hyatt Regency Crystal Spring
- USNC Academic Program – May 14-June 4, Delft
- USNC Pro – May 28-June 1
- USUK Pro – March 26-29, London, England
- SWRR at Cal Water – April TBA, California TBA
- USNC knock-off in Jakarta – December

The US-Netherlands Connection's Professional Program (USNC Pro) brings together people from the corporate, academic and government worlds. Dutch partners in the program include the Netherlands Embassy in DC and Consulate in Miami, the Deltares Institute, Province Zeeland, City and Port of Rotterdam, Rijkswaterstaat. Global Partners include the European Investment Bank (EIB), Rand Corporation, CH2M, and Arup. Partners in the US include several National Labs, the Battelle

Institute, the US Army Corps of Engineers, NASA, and the Scripps Oceanographic Institute. Academic Partners are the University of Florida, U of Illinois-Urbana, Florida Gulf Coast U, and several universities in The Netherlands.

Last year's USNC Pro program was held in September 2017. Delft was the home base and the 21 participants visited various other places in The Netherlands. The Task Force Goal was the Development of a Global Knowledge Exchange Platform in Water Resources

- Focus on water, sustainability and resilience
- Bridge the gap between "knowledge producers" and "knowledge users"
- Provide a clearinghouse function to match producers and users, i.e., research institutions and business/government

This year's program will be Monday through Friday, June 18-22, 2018 again mainly at Delft.