



Meeting Proceedings



Agenda

Day 1 Wednesday, November 20, 2013

- 9:00 a.m. **WELCOME REMARKS FROM SWRR:** SWRR Co-chairs, David Berry, SWRR facilitator
- 9:20 a.m. **SUSTAINABLE WATER RESOURCES ROUNDTABLE HISTORY:** John Wells, Co-chair
- 9:40 a.m. **ROUND OF BRIEF SELF-INTRODUCTIONS:** interest in sustainability and water, David Berry
- 11:00 a.m. **HIGHLIGHTS OF PREVIOUS MEETING IN FLORIDA:** Stan Bronson, Florida Earth Foundation
- 11:30 a.m. **SOFT WATER PATHS:** David Brooks, University of Victoria
- 12:15 p.m. **LUNCH**
- 1:15 p.m. **INITIATIVE ON NUTRIENTS IN WATER, OSTP /EPA/USDA:** Denice Shaw, US EPA
- 1:30 p.m. **PANEL ON MEASURES OF WATER SUSTAINABILITY:** Moderated by Peter Benenson
 - Update on Water Census:** Eric Evenson, US Geological Survey
 - Indicators & Water Footprint in the California Water Plan:** Rich Juricich, California Department of Water Resources
 - EPA's New Efforts on Sustainability, Including Information/Indicators:** Derry Allen, US EPA
 - Questions and Discussion**
- 3:10 p.m. **PRESENTATION ON ALLIANCE FOR WATER STEWARDSHIP – LESSONS FROM THE FIELD:** Lisa Downes, TNC, Nicole Tanner WWF
- 3:35 p.m. **FEEDBACK TO AWS:** Comments on potential solutions to challenges identified in the field
- 4:15 p.m. **SUMMARY DISCUSSION FOR THE DAY**
- 4:30 p.m. **ADJOURN**

Day 2 Thursday, November 21, 2013

9:00 a.m. WELCOME, RECAP, AND REVIEW OF GOALS FOR THE DAY

9:10 a.m. PANEL ON SUSTAINABILITY INITIATIVES: Moderated by Rhonda Kranz, Kranz Consulting
Initiatives at AWRA and the Delaware River Basin: Carol Collier, American Water Resources Association and Delaware River Basin Commission
ACWI Climate Adaptation Workgroup: Jeff Peterson, US EPA
National Research Council Water Science & Technology Board - Overview: Jeff Jacobs, NRC
Initiatives supported by the US Army Corps of Engineers: Ada Benavides, US ACE

11:00 a.m. NEW ENGLAND WATER ISSUES (location of next SWRR meeting):
Paul Susca, New Hampshire Department of Environmental Services

12:00 p.m. ADJOURN

1:30 p.m. FIELD TRIP TO BLUE PLAINS WASTE WATER TREATMENT PLANT ORGANIZED BY DC WATER

Day 1 Wednesday, November 20, 2013

Sustainable Water Roundtable Activities & History: John Wells, SWRR Co-chair

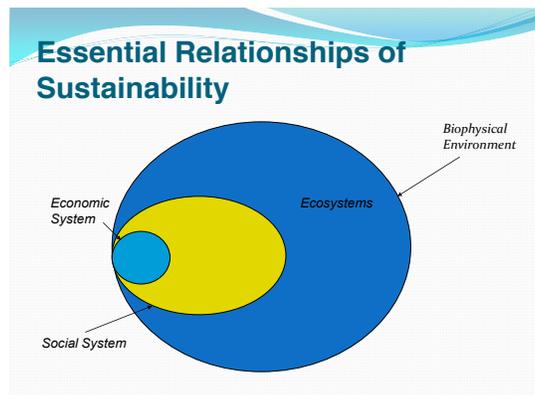
John Wells presented the SWRR mission as promoting sustainability of the nation's resources through evaluation of information, development and use of indicators, targeting of research, and engagement of people and partners. The Roundtable is a national collaboration of federal, state, local, corporate, non-profit and academic interests. It is organized as a sub-committee of the USGS Advisory Committee on Water Information.

SWRR meetings have involved about 750 participants with meetings in California, Colorado, Florida, Maryland, Michigan, Minnesota, Virginia and Washington, D.C. The SWRR website is located at <http://acwi.gov/swrr/index.html>. Three SWRR reports of note are its 2005 Preliminary Report http://acwi.gov/swrr/Rpt_Pubs/prelim_rpt/index.html, its 2010 SWRR Report http://acwi.gov/swrr/Rpt_Pubs/SWRRReportMarch2010.pdf and the 2013 SWRR Report on Understanding, Measuring, and Promoting Water Resources Sustainability through Innovative Strategies http://acwi.gov/swrr/Rpt_Pubs/EWRI_SWRR_finaldraft.pdf

Wells outlined the Principles of Water Sustainability developed by SWRR

1. *The value & limits of water:* People need to understand the value and appreciate the limits of water resources and the risks to people and ecosystems of unbounded water and land use.
2. *Shared responsibility:* Because water does not respect political boundaries, its management requires shared consideration of the needs of people and ecosystems up- and downstream and throughout the hydrologic cycle.
3. *Equitable access:* Sustainability suggests fair and equitable access to water, water dependent resources and related infrastructure.
4. *Stewardship:* Managing water to achieve sustainability challenges us while meeting today's needs to address the implications of our decisions on future generations and the ecosystems upon which they will rely Capital and System Capacities.

Capital is the capacity to produce value over time. Environmental, social and economic systems produce value through flows of services, experiences, or goods that meet human and ecosystem needs over time. We achieve sustainability by maintaining capital to meet needs.



Wells described the SWRR view of indicators of sustainable development. He said indicators are measures that present trends in information relevant to water sustainability in a readily understandable way.

The five elements of the SWRR Indicator Framework are

- Water availability
- Water quality
- Human uses and health
- Environmental health
- Infrastructure and institutions

<h3>Water Availability</h3> <ul style="list-style-type: none"> • Renewable water <ul style="list-style-type: none"> • Upper limit of water availability • Water in the environment <ul style="list-style-type: none"> • Water remaining after human uses • Water use sustainability <ul style="list-style-type: none"> • Degree to which water use meets current needs while protecting ecosystems and the interests of future generations 	<h3>Water Quality</h3> <ul style="list-style-type: none"> • Quality of water for human uses <ul style="list-style-type: none"> • Drinking, recreation, industry and agriculture, etc • Quality of water in the environment <ul style="list-style-type: none"> • Flora and fauna and related ecosystem processes • Water quality sustainability <ul style="list-style-type: none"> • Degree to which water quality satisfies human and ecosystem needs 	<h3>Human Uses and Health 1</h3> <ul style="list-style-type: none"> • Withdrawal and use of water <ul style="list-style-type: none"> • Amount of water withdrawn from the environment and the uses to which it is put • Human uses of water in the environment <ul style="list-style-type: none"> • Extent to which people use water resources for waste assimilation, transportation and recreation 
<h3>Human Uses and Health 2</h3> <ul style="list-style-type: none"> • Water-dependant resource use <ul style="list-style-type: none"> • Extent to which people use resources like fish and shellfish that depend on water resources • Human health <ul style="list-style-type: none"> • Extent to which human health may be affected by the use of water and related resources 	<h3>Environmental Health</h3> <p>Indices of biological condition</p> <ul style="list-style-type: none"> • Health of ecosystems <p>Amounts and quality of living resources</p> <ul style="list-style-type: none"> • Productivity of ecosystems 	<h3>Infrastructure and Institutions</h3> <ul style="list-style-type: none"> • Capacity and reliability of infrastructure <ul style="list-style-type: none"> • Capacity and reliability of infrastructure to meet human and ecosystem needs • Efficacy of institutions <ul style="list-style-type: none"> • Efficacy of legal and institutional frameworks in managing water and related resources sustainably 

Wells then outlined an interesting summary of several efforts around the country to analyze and implement water resource sustainability that were presented at recent SWRR meetings.

Army Water Security Observations

- Water management is largely compliance-driven
- Less attention is directed outward to sustainability of regionally shared water sources
- Long-term water projections currently not factored early into stationing decisions
- Chronic funding constraints means attention to Army-owned and Army-operated infrastructure tends to be reactive
- Long-term investment a challenge

Army Net Zero

- Energy Installation produces as much energy on site as it uses annually
- Water Installation does not deplete ground water and surface water quantity or quality
- Waste Installation converts waste streams to resource values with zero waste to landfill
- Installation captures and commercializes the resource value and/or enhances the ecological productivity of land, water and air

Water Sustainability at EPA

- Urban waters and sustainable community pilots
- Healthy Watersheds Initiative
- Climate-ready estuaries
- Effective utility management
- Green Infrastructure
- Value of water and ecosystem services
- Modeling climate impacts

Enhancing Watershed Stewardship at the US Forest Service

- How does climate and land use change shift water distribution?
- Likely consequences of these changes to plants, animals, and rural and urban communities?
- Scenarios for future forest disturbance regimes and aquatic ecosystems?
- Best metrics for measuring watershed condition?

Water Stewardship Tools at Large Great Lakes Industries

- Diverse set of tools useful but have implicit boundaries
- Risks in adapting tools for objectives not intended
- Other sustainability concerns are often missing
- No one tool addresses Great Lakes Compact/Agreement

The Bellemeade Walkable Watershed

- 5th grade students identified the priority walking routes to their school and community center
 - Strategies put in Richmond's Stormwater Plan
 - Developed a sense of community centered around the new school and the watershed
- Connected the neighborhood to the creek, the regional trail, and the James River
- Think beyond the project scale to a watershed-wide strategy connecting multiple benefits

International Water Stewardship

- The Alliance for Water Stewardship's *International Water Stewardship Standard* – Ed Pinero, Chief Sustainability Officer, Veolia Water North America
- To support water users in taking appropriate actions to evaluate and improve their impacts on watersheds

Next Steps for the SWRR

- Continue roundtable outreach
- Build regional connections
- Add new private, nonprofit & public sector partners
- Assist agencies in developing programs and in describing the need for programs to collect indicator information

Report on the Florida SWRR meeting: Stan Bronson, Florida Earth Foundation



Stan Bronson gave a summary of the most recent SWRR meeting at Wakulla Springs State Park near Tallahassee, Florida, March 6 - 7, 2013

Major Topics of the presentations

- Springs and Aquifer Degradation
- Water Choices Forums
- Everglades Restoration
- Government Policy and Practice
- University Programs on Teaching SWR
- Boat Field Trip to Explore the Springs

Springs and Aquifer Degradation

Stan Bronson told participants that Silver Springs has only one quarter of the flow it had in 1970. The Florida Water and Conservation Legacy project begun by Senator Bob Graham received 200,000 signatures which led to a state set aside for research and solutions on Florida's springs. Sink holes are a problem in Florida as is salt water incursion. A major focus in Florida is sea-level rise resiliency and adaptation.

Water Choices Forums

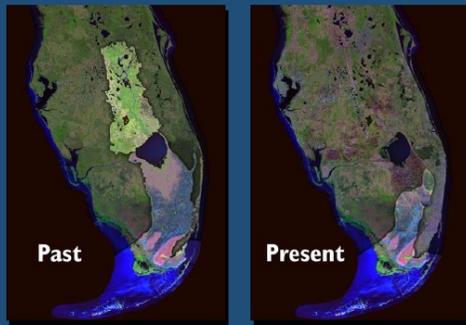
The Florida Earth Foundation as one of its domestic programs held one-day large think-tanks at universities all over the state. These were begun in 2010 at the University of Central Florida. Water Choices VI was held at Florida Atlantic University in August of 2013.

Comprehensive Everglades Restoration Plan

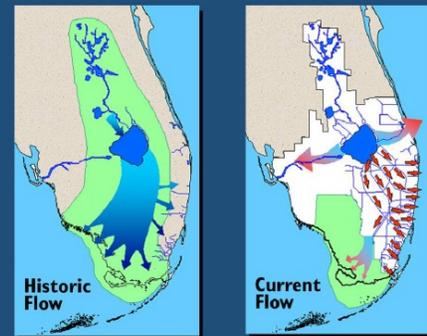
- Begun as the "Restudy" report in 2000
- 50/50 cost share between USACE and South Florida Water Management District
- First Adaptive Management Water Resources Development Act passed in 2000

The Everglades ecosystem is unique in all the world.

Over the last century, the vibrant ecosystem was altered



Everglades ecosystem was defined by the way the water flowed



Government Policy & Practice

- Consumptive Use Permitting
- Agriculture BMP's and Innovation in Public-Private
- Dispersed Water Resources Contracts
- Land Use Planning

University Programs in SWR

- Bob Graham Center at the University of Florida
- UC Santa Barbara Bren School
- USNC Academic Program

Water Soft Paths: Fresh Water and Ecological Security: David B. Brooks, Director, Soft Path Research, POLIS Project on Ecological Governance, University of Victoria

David Brooks presented the Vision of Soft Paths in which he reminded the participants that sustainability lies with restricting demand, not increasing supply! This is true not just for water but for other limited resources.

Four distinguishing principles of Water Soft Paths

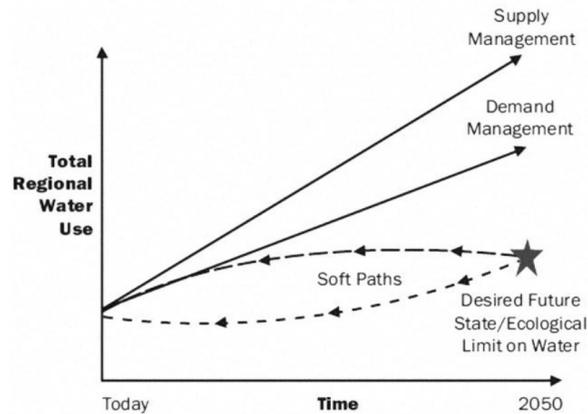
1. Treat water as a service, not an end
2. Make ecological security an absolute criterion
3. Match quality of water delivered to end use requirements
4. Plan backward - from future to present

A "soft" path requires less steel and concrete; solves natural resource problems through ingenuity and innovation; asks "Why" rather than "How"; and works with nature rather than against it. There are many differences between demand management and Soft Paths. Over time, the differences in total regional water use can be dramatic.

POLIS Project on Ecological Governance
watersustainabilityproject

Demand Mgmt vs. Soft Paths

• Efficiency Driven	- Triple Bottom Line
• Cost-Effectiveness Definitive	- Cost-Effectiveness Just One Criterion
• Environmental Econ	- Ecological Econ
• Reduce Use 1/3	- Reduce Use 2/3 +
• Low Risk	- Intermediate Risk
• Implementation Decentralized	- Decentralization + Lower Growth



David Brooks then presented a review of the Friends of the Earth, Canada Water Soft Path Policy Study. There were three components of the study. A study at the University of Waterloo in Ontario focused on the provincial level of water policy. Work at Acadia University in Nova Scotia focused on the watershed level and the POLIS Project at the University of Victoria in British Columbia focused on the municipal level.

There were also special studies on various sectors such as the pulp and paper industry, diet and water, and institutional barriers to changes.

Selected Results from the Studies

- Nova Scotia could cut water use by more than 50%
- Ontario could absorb industrial growth with no new water through at least 2031
- Urban water use can drop by 45% despite 50% growth in population
- Fully recycling Pulp & Paper Mills can cut water use by 95%
- Dietary changes can cut water use by over 1/3

Gaps & Limitations

- No change to existing economic or population growth projections
- Limited data on water use
- Agriculture included but there was no study of the large-scale agriculture of the Prairie Provinces
- Necessarily long term
- No control on export demands
- The first three limitations could have been avoided with more money, but the last two are inherent to the soft path methodology

Overall Conclusion: Not bad for a world first! Treat the results as indicative, not definitive.

Brooks concluded by going over next steps for work on Soft Water Paths.

To Do Right Now

- Go After Low-Hanging Fruit (homes)
 - Toilets (30% of household use)
 - Low / No Water Greenery (50% of household use in summer)
 - Porous parking lots and laneways
- Price All Water Use by Volume
- Price Wastewater by Volume & Quality
- Invest in Water Use Reporting

Thinking about the Soft Path for the Future

- Focus on avoided costs (80%)
- Propose conservation tariff structures
- Impose “no-new-water” policy for towns and cities
- Convert land-use decisions into water-use choices
- Protect environmental water

David Brooks’ presentation on the SWRR web site includes a list of sources.

Discussion

Soft Path decisions are made locally. Water quality requirements have been pushing cities forward. Sometimes what is seen as high cost by the industry is not if they set their minds to it.

As income goes up, energy use increases. Water use does not jump as much and eventually levels off. Water use trading is possible. Alberta has a water trading system but it is limited in that the government can hold back up to 10% of the water in an allocation transfer.

The Delaware River Basin has a water payment and audit. They are dealing with water quality issues including increasing TDS.

Infrastructure and regulations are key issues. Fire code requires 6” piping coming in to the house. It uses a high quantity of water. Smaller pipes with higher pressure would be more efficient.

Initiative on Nutrients in Water, White House Office of Science and Technology Policy/US EPA/USDA: Denice Shaw, US EPA

Denice Shaw told the group about US EPA research initiatives through America COMPETES. The America COMPETES Act was enacted in 2007 and reauthorized in 2010. It is up for reauthorization again this year. More than 30 agencies are involved with challenges that support and promote innovation through funding for research. The program pays only for success and establishes an ambitious goal without having to predict which team or approach is most likely to succeed. The winners receive a cash prize.

Agencies and other partners are collaborating on nutrient challenges. OSTP led a grand challenge on nutrients in the Gulf of Mexico. There is a predictive modeling prize out now. This month, twenty-five people from federal agencies, the Joyce Foundation, Walton Family Foundation, Everglades Foundation, and others will meet to scope out areas for new challenges.

Past challenges include:

- EPA annual Campus RainWorks Challenge for college and university students
- National Nanotechnology Initiative
- A NASA online contest to devise a formula to predict solar flares, won by a retired radio engineer

You can find out about current challenges at Challenge.gov

PANEL ON MEASURES OF WATER SUSTAINABILITY – Moderated by Peter Benenson, Peter Benenson Consulting

Peter Benenson opened the panel by saying the mission of this Roundtable is to promote sustainability of the nation's water resources, in part through development and use of measures or indicators of water sustainability. The focus of this Panel, titled "Measures of Water Sustainability", is to help us understand whether and how indicators are used to assess water sustainability and how comprehensive an assessment actually is. The reasons for looking at these topics are that organizational missions are diverse, and so are their objectives for constructing indicators of water sustainability. To make matters a little more complicated, the word "sustainability" is sometimes used imprecisely.

Here are a few examples of how different organizational missions result in different objectives and different use of water indicators. Government agencies may use water indicators for planning decisions (e.g., inter-basin transfers, water allocation, wildlife habitat maintenance, estimation of dependency on foreign water resources, etc.). Corporations may want to ensure viability of operations given available water supply and to understand their dependence on scarce water resources in their supply chain. Environmental organizations may want to influence water policy and use toward some water-using activities and away from others. The armed services may require water self sufficiency irrespective of location and water availability. Water sustainability may not have been the primary focus in all cases.

In light of the diversity of objectives and imprecision in use of the word "sustainability", it is important to understand how the indicators are constructed, from what perspective sustainability is being measured, if at all, and how comprehensive the measurements are. More specifically, there are a number of factors we need to be aware of either when assessing water sustainability estimates made by others or when we embark on assessments of our own. A few examples are:

- direct and indirect water use;
- embodied water exports and imports;
- direct water transfers;
- included and excluded variables;
- the role of water quality and quantity standards in estimating water availability;
- distinctions between blue, green and grey water;
- computation methods, assumptions, and boundaries (e.g., geographical, organizational);
- temporal and
- spatial data resolution.

It is our objective that by describing their work the panelists will help you to be aware of the myriad factors involved in assessing water sustainability, which should in turn contribute to conducting your own or evaluating the assessments of others.

Three panelists discussed their work:

Eric Evenson from the United States Geologic Survey;

Rich Juricich from the California Department of Water Resources; and

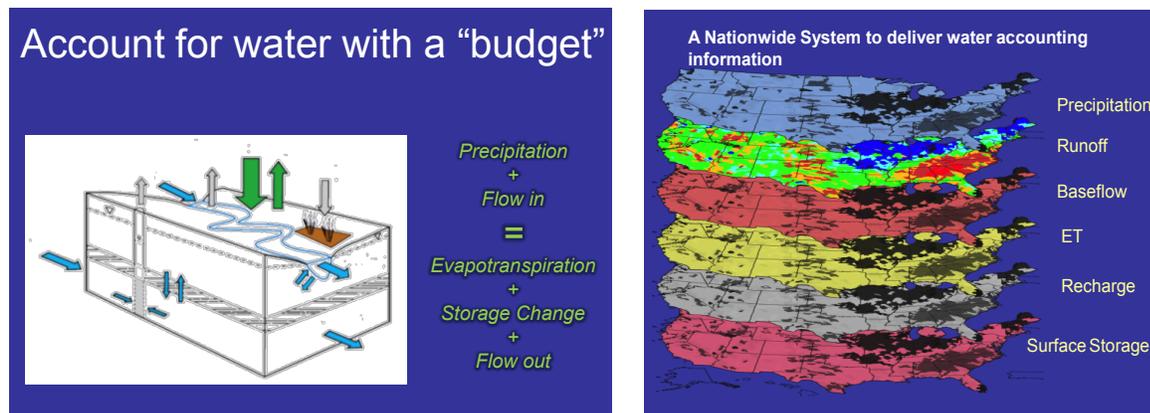
Derry Allen from the United States Environmental Protection Agency

Update on Water Census: Eric Evenson, US Dept. of the Interior, US Geological Survey

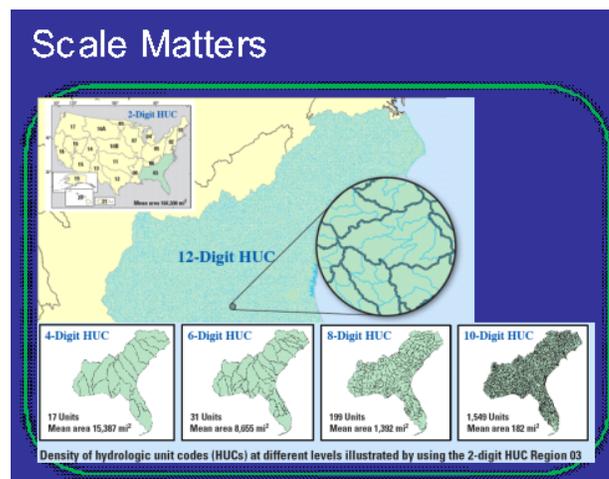
Eric Evenson said the objective for the Water Census is to place technical information and tools in the hands of stakeholders, allowing them to answer questions about water availability.

- Does the Nation have enough freshwater to meet both human and ecological needs?
- Will this water be present to meet future needs?

Water Availability Analysis is the process of determining the quantity and timing-characteristics of water, which is of sufficient quality, to meet both human and ecological needs. Types of information include technical, socio-economic, legal, regulatory and political.



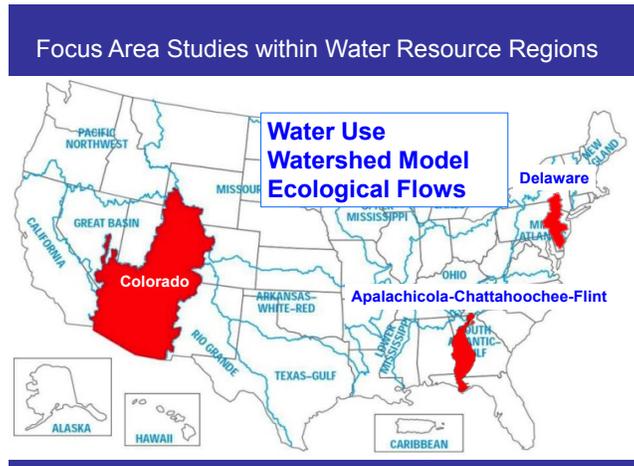
The Water Census provides a web application for delivering water availability information at scales that are relevant to the user. www.water.usgs.gov/watercensus



Five Areas of Nationwide Topical Work

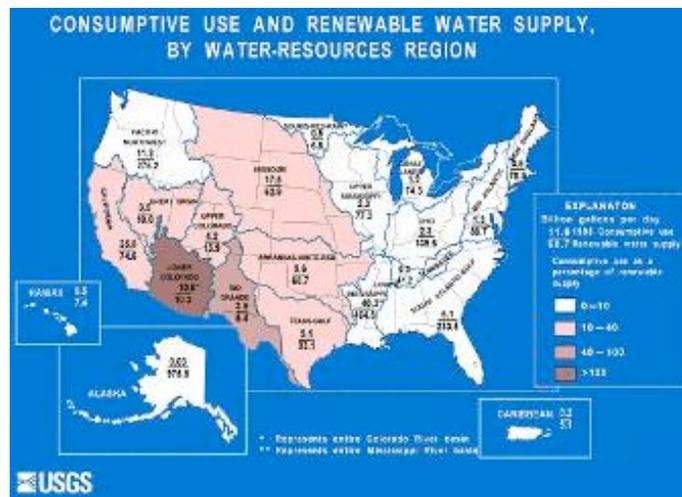
- Estimation of Flow at Ungaged Locations
- Groundwater Information
- Estimation of Evapotranspiration
- Water Use
- Ecological Water Science

Evenson told the participants that use of surface water models to estimate flows at ungaged locations allows estimating streamflow for periods where we don't have records or places without monitoring capabilities. He described three focus area studies in the Delaware watershed, the Colorado River and the Apalachicola-Chattahoochee-Flint watersheds.



Evenson pointed out how all this factors into indicators.

- With complete water budget information, you can start relating all kinds of hydrologic factors and ratios to water availability
- Consumptive and Depletive Uses as a Percentage of Total Precipitation plus Imports minus Evapotranspiration
- Consumptive and Depletive Uses related to measures of Streamflow Variability
- Affects of Streamflow Variability on maintenance of Hydroecological classification



Sustainability Indicators and Web-based Reporting for the California Water Plan:

Rich Juricich, California Department of Water Resources

Presentation Overview

- Sustainability & the California Water Plan
- Water sustainability indicators framework
- Testing the framework through pilot studies
- Decision support tool
- Water footprint

Rich Juricich told the SWRR participants that the California Water Plan was first published in 1957. It has been updated nine times. The Department of Water Resources is required by the Water Code to update the Water Plan every five years. The most recent update just occurred in 2013. There is growing interest in the Water Plan from Legislators and stakeholders. It is not a mandate and does not include any appropriations.

California Water Plan

The plan is now the state's blueprint for integrated water management and sustainability. Juricich said it is imperative to act to keep pace with changes such as:

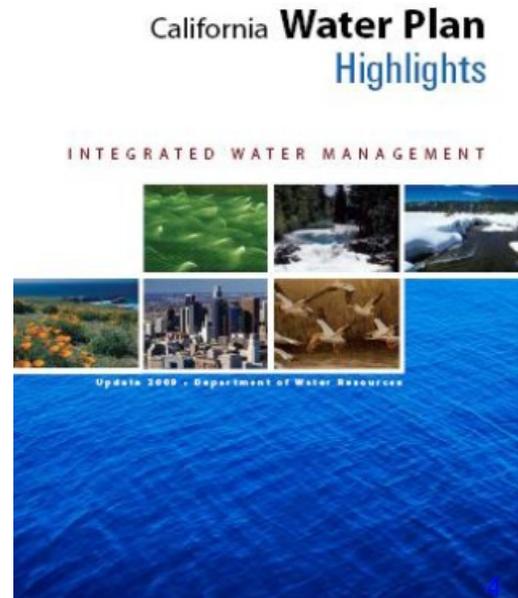
- Population growth and movement
- Shift to permanent crops
- Increasing flood risk
- Declining Delta & watersheds
- Impaired water bodies
- Climate Change profoundly impacting water systems
- Aging water & flood systems challenged by legal remedies & regulatory protections
- Growing economic & societal consequences of declining water reliability and degraded quality of surface and groundwater supplies

The Entire Water System – water & flood facilities, watersheds & ecosystems – has lost resilience and is changing in undesirable ways so there is an imperative to act.

The purpose of the California Water Sustainability Indicators is to quantitatively monitor progress to meeting water sustainability objectives through the development and application of an analytical framework. The California Department of Water Resources defines water sustainability as the dynamic state of water use and supply that meets today's needs without compromising the long-term capacity of the natural and human aspects of the water system to meet the needs of future generations.

The indicators are organized into a framework that includes several elements.

- Reliability
- Water Quality
- Ecosystem
- Health
- Social Benefits & Equity
- Adaptive & Sustainable Management



Criteria for Selecting Indicators

- Availability of high-quality data
- Data affordability
- System representation
- Ability to detect change over time
- Independence of indicators from one another
- Supports management decisions and actions
- Can be reported & understood in public arenas

Water Sustainability Goals

Goal 1: Maintain reliable and resilient water supplies and reduce dependency on imported water

Goal 2: Manage at the watershed scale for preservation and enhancement of the natural hydrology to benefit human and natural communities

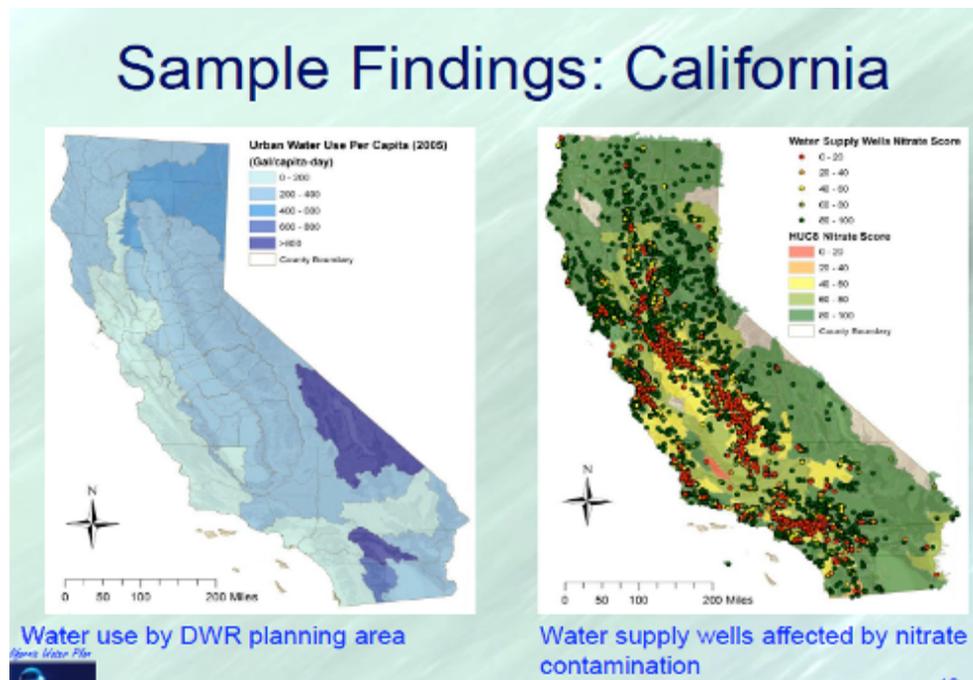
Goal 3: Preserve and enhance the ecosystem services provided by open space and habitat within the watershed

Goal 4: Protect beneficial uses to ensure high quality water for human and natural communities

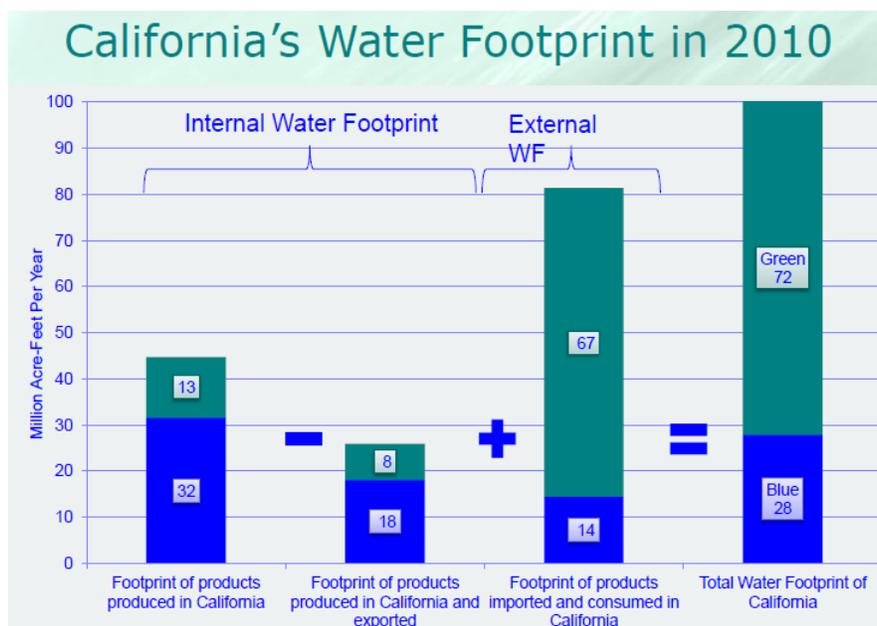
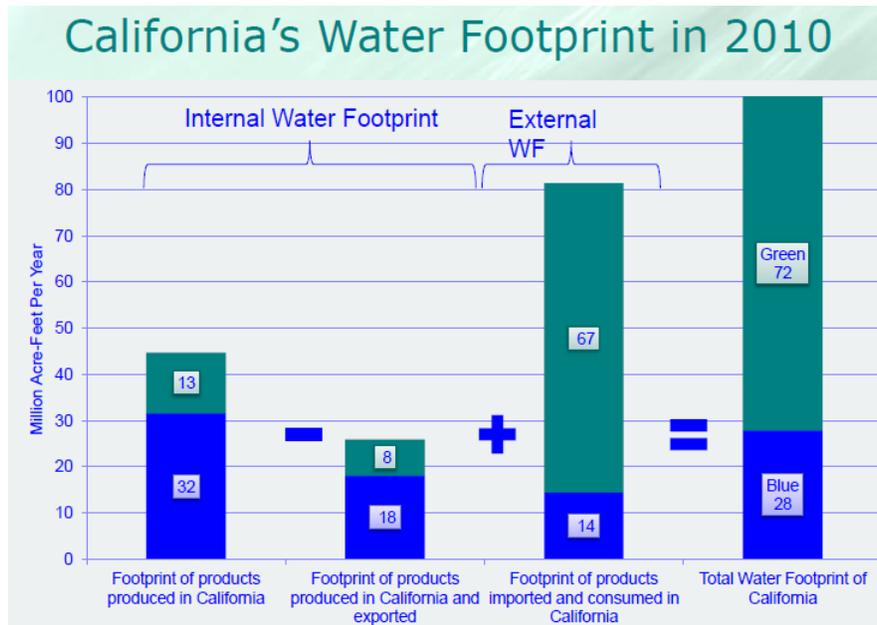
Goal 5: Accomplish effective, equitable and collaborative integrated watershed management in a cost-effective manner

Jurich told the group about applying the concepts in pilot studies at the state and hydrological region levels and the work to select sub-sets of indicators for status and trends analysis, and reporting. California also incorporated water footprint analyses into the studies.

These are a few sample findings for the state and for the Santa Ana Watershed Project Authority.



Jurichich then gave a summary of the major findings of California's Water Footprint done by Heather Cooley and Julian Fulton of the Pacific Institute at UC Berkeley <http://www.pacinst.org/>



In his closing thoughts, Jurichich suggested that sustainability's answers require

- Systems Thinking
- Holistic Approach
- Awareness of Time Horizons, Scales, Trajectories
- Managing Risk & Uncertainty
- New Tools
- Discovering Common Ground for Solutions
- Continuous Education

EPA's New Efforts on Sustainability, Including Information/Indicators:

Derry Allen, US EPA

Derry Allen described a new sustainability project at EPA. The work was initiated in response to a 2011 National Academy of Science report, "Sustainability in USEPA", which suggested sustainability should be incorporated more fully in to agency activities. He described two of the actions being taken by the agency.

1. Making sustainability a part of the strategic plan.
 - On November 19, the draft 2014-2018 strategic plan was published on-line for public review and comment.
 - Sustainability is throughout the plan in five major crosscutting goals: climate change/air; water; communities/sustainability; chemicals/pollution prevention; enforcement/compliance; as well as a cross-cutting strategy and an agency priority goal.
2. Improving the use of sustainability information and indicators to inform Agency decisions in and across different media.
 - The initial focus will be to help EPA promote sustainable use and management of energy, water and materials in its diverse day-to-day decisions within and across media, by showing how to improve and apply existing information about the life cycle impacts of energy, water and materials. Information includes, *inter alia*, indicators, metrics, goals, frameworks, tools and analyses.
 - During FY 2014 EPA will also draft plans for further progress on the use of sustainability information and indicators during FY 2015-2018. EPA hopes to select indicators that track with those used by states, other federal agencies, the international community and others.

Questions and Discussion

Rich: The water foot print includes what is consumed in the state. Water to make wine is an example. If it is consumed elsewhere it becomes the other state's water foot print. We don't want to double count. If it is produced in CA it becomes an issue of where you set the boundaries.

Derry: It is the same issue as material flow accounting. It is very complicated.

Derry: We are grappling with how best to think about issues of scale. National indicators can mask issues that are important at the local scale

Rich: We are looking at indicators of what has happened. But what about indicators of what might happen in future? Are we headed to where we want to be?

Eric: The 1978 Water Resource Council water assessment included three projections of where water use would go in the future. All projected a steep increase. In fact it began to level off and decline. We can't replace good data.

We constantly run models with new data and we will develop new models as time goes on. The census will on in perpetuity and not ever be "done". The five topical areas are not the end game. We will include more in future when we have the budget.

Beth Moore: DOE's overarching sustainability plan has a matrix for performance in energy, water uses, and wastes. A lot has been developed to incentivize contractors and partners to actually get there. How do we link indicators and matrix to be performance based?

Rich: We need to capture this in the goals up front. We need indicators of how well we are meeting our goals. To make them useful we will need policy. Where we are now is to demonstrate it as a tool and then use it as a sales pitch to policymakers.

Eric: For indicators on the quantity side, one of the most dramatic is diversion from one basin to the next. It is common practice in the US and has been done on a grand scale. But it has not been kept track of. The last report was 20 years ago.

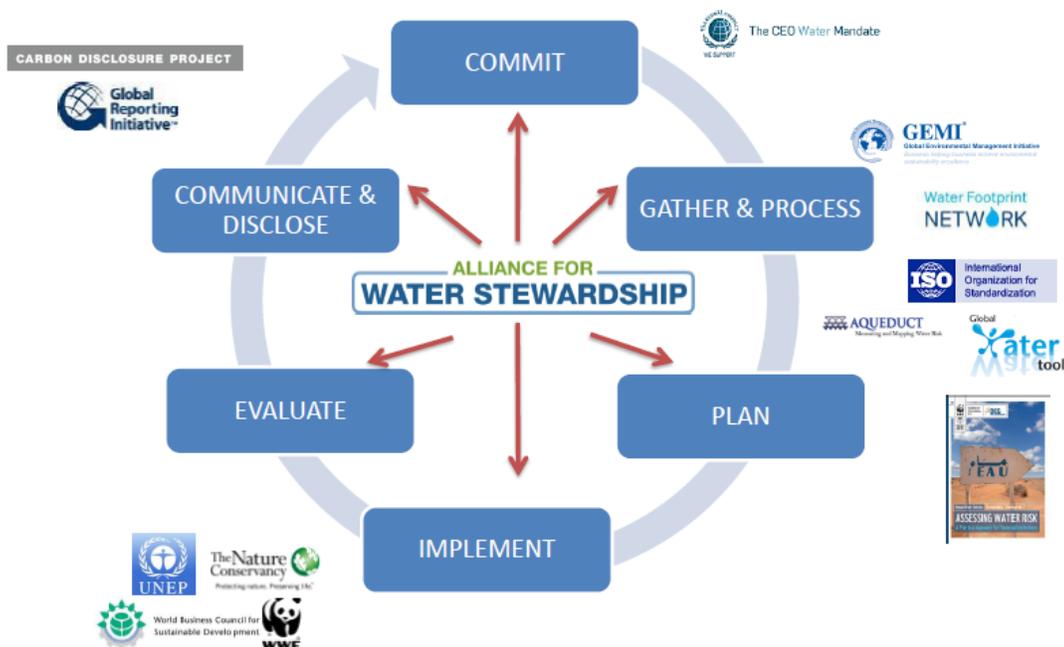
Alliance for Water Stewardship - Lessons from the Field: Lisa Downes, The Nature Conservancy; Nicole Tanner, World Wildlife Fund.

Lisa Downes and Nicole Tanner said the Alliance for Water Stewardship promotes socially equitable, environmentally sustainable and economically beneficial use of water, achieved through a stakeholder-inclusive process that involves site-and catchment-based actions.

The Alliance is creating an International Water Stewardship Standard to address the need for:

- International consistency around a definition of what constitutes “responsible” water stewardship
- Recognition of leaders
- A process for brands to manage supply chain risks
- Companies to validate claims and protect their brands
- A framework to make sense of other tools
- A mechanism to simplify water risk mitigation in investment community

The Landscape of Water Stewardship: Information, Tools & Programs



A site, facility or organization is motivated to use the AWS Standard in order to:

- Save money
- Limit liability
- Protect their brand
- Mitigate supply chain water risk
- Increase client loyalty & grow “eco-focused” customers
- Differentiate their brand
- Address remaining water risks when all site-level options have been exhausted

Downs and Tanner told the participants that the first draft Standard was launched at the World Water Forum. Since the launch, over 400 comments have been received from stakeholders in 26 countries at stakeholder consultation events across the globe. Desktop field trials have been conducted. The steps to implementation are:

STEP 1: COMMIT

- Leadership commitment
- Water stewardship policy

STEP 2: GATHER & UNDERSTAND

- Physical scope
- Socio-economic scope
- Regulatory requirements
- Site & catchment water balance
- Site & catchment water quality
- Site & catchment IWRA
- Begin on indirect water use
- Identify catchment plan
- Analyze water impacts & risks

STEP 3: PLAN

- Ensure legal compliance system
- Water stewardship plan
- Notify catchment authority of your plans

STEP 4: IMPLEMENT

- Comply with legal requirements
- Maintain/improve site water balance
- Maintain/improve site water quality
- Maintain/improve site IWRAs
- Participate in catchment governance
- Drive improved indirect water use in the catchment

STEP 5: EVALUATE

- Evaluate performance against plan
- Evaluate emergency incidents
- Consult stakeholders on performance
- Update water stewardship plan

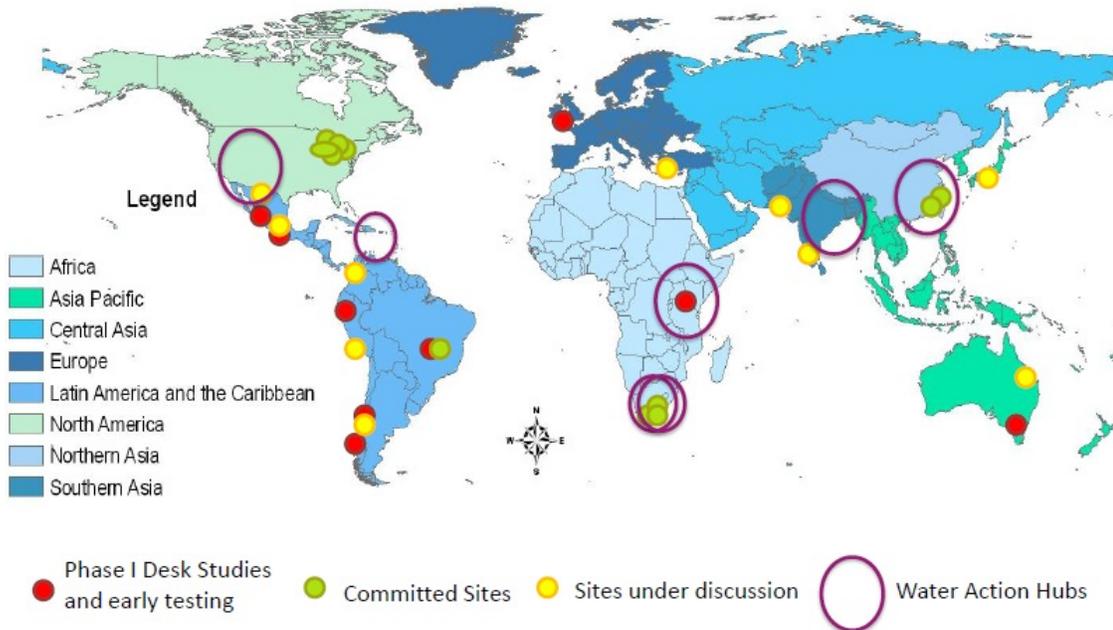
STEP 6: COMMUNICATE & DISCLOSE

- Disclose internal water governance
- Disclose annual water plans
- Disclose annual water-related impacts, risks and opportunities
- Disclose compliance
- Increase water awareness within your site

Notes from the Field

- Thematic challenges
 - Data
 - Stakeholder Engagement
 - Funding
 - Boundary Definition
 - IWRAs
- Opportunities
 - Improved data quality
 - Improved data availability
 - Collective action
 - Big picture
- Can we re-allocate saved water for eflows?
- Can impact issues like gulf hypoxia?

Field Testing the Beta AWS Standard



Downes and Tanner asked the participants if their organization would find value in becoming a member of AWS and how AWS could provide value to their organizations? Participants were invited to review and comment on the AWS Beta International Water Stewardship Standard and to begin to implement the Beta standard at one or more facilities. They also invited the participants to become members of AWS and support the creation of the standard.

Discussion

Question - how cost effective is it? Socially yes. Economically is the question.

Short term cost more up front. Longer term, up front is high but over time it is less to maintain. In the long term it provides structure of sustainability planning; making sure to have access to quality and quantity to maintain the facility. It also provides value from risk mitigation;

Question - Internationally they might say you are pushing western values. Gender issues for example.

We want to be global but our staff is limited. The committee of stakeholders develops standards that are more globally balanced. Our new structure has more regional representation.

The focus is an international standard. A facility or a farm, whatever we assess to be good water stewards, and we provide guidance that will be locally relevant. Gender issues are important in the stakeholder survey and we don't discount gender, but stewardship should be gender blind. Ways to address gender might be tailored for a specific region. For example in Australia some indigenous birth rights are integral to water. In Kenya women gather water and that impacts education.

Question – what is the viability of the program?

The program is supported now by TNC and WWF staff with some corporate funders. Once the standards are in place there will be some revenue from memberships, training, verification associated with standards, etc. There will be a full audit every three years and spot audits. These will depend on the risk of the sector.

Question – is the focus on water a benefit or drawback?

The standard focuses on water but it does include criteria on energy preparedness, climate change, biodiversity, etc.

Question - have you linked with existing certification programs such as home depot forest certification?

Guides for water are linked to specific parts of other standards. AWS is an internal certification that is site based not product based. There is standard fatigue and we want to minimize that. We want to train auditors within the company so they know what to ask while working on other standards.

Day 2 Thursday, November 21, 2013

PANAL ON SUSTAINABILITY INITIATIVES – Moderated by Rhonda Kranz, Kranz Consulting

Initiatives at AWRA and the Delaware River Basin: Carol R. Collier, President AWRA, and Delaware AICP Executive Director

Carol Collier began by telling the participants that the mission of the American Water Resources Association is to advance multidisciplinary water resources education, management and research.

AWRA produces several regular publications

- Journal of the American Water Resources Association (JAWRA) - peer reviewed, refereed scientific journal
- Water Resources IMPACT - AWRA's bi-monthly magazine featuring practical solutions to current water resource issues.
- Connections - AWRA's monthly e-newsletter
- Catalyst – Specifically for State Sections and Student Chapters
- Reports and Webinars

AWRA Meetings & Conferences

◆ Annual – November 3-7, 2013 – Portland, Oregon

◆ Technical Meetings - specific water resources themes

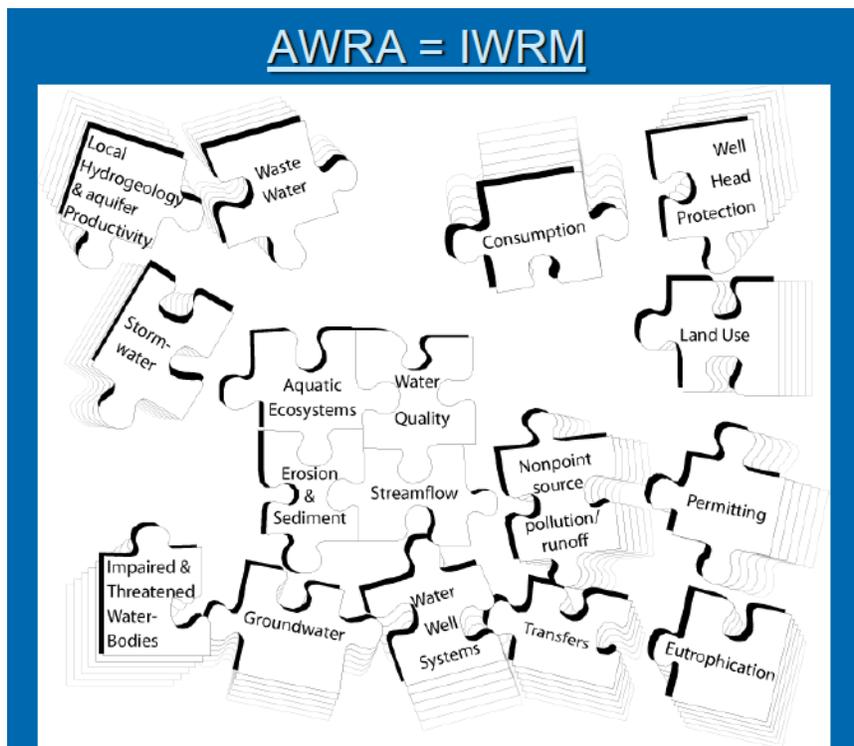
- ◆ Environmental Flows
- ◆ Healthy Forests = Healthy Waters
- ◆ Water for Mega Cities - Beijing, China

◆ 2014 Technical Meetings

- ◆ Spring - GIS and Water – Snow Bird, May
- ◆ Summer - IWRM Application, Reno, Late June

2014 – 50th Anniversary Annual Conference – November
Washington, DC

AWRA has an Integrated Water Resources Management focus. It was recently given a US Army Corps of Engineers contract to develop a national IWRM awards program and a national IWRM certification program.



Planning for the Future of the Delaware River Basin

In the second part of her presentation, Carol Collier talked about the Delaware River Basin

- Over 15 million people (about 5% of the U.S. population) rely on the waters of the basin
- Drains 13,539 mi² , or 0.4 of 1% of the continental U.S. land area
- Longest undammed river east of the Mississippi
- Daily water withdrawal in the DRB = 8.7 BGD

Collier said that the Delaware River Basin is a critical resource and an economic driver.

- There is not enough water for all uses during drought conditions
- Water needed for other uses – navigation, ecological flows, recreation, wastewater assimilative capacity
- More Complex – it is the boundary of four states
- Holistic basin management is a necessity!

Three quarters of the non-tidal portion of the Delaware River has a Federal Wild and Scenic River designation. The whole non-tidal river and its watershed are designated Delaware River Basin Commission Special Protection Waters. The Mainstem is the longest stretch of anti-degradation waters in US. Under this protection there has been no measurable change in water quality.

Collier listed the main issues “knocking on the door”

- Natural Gas Drilling
- Population Shifts
- Energy Production – Water Use
- Ecological Flows / Human Use
- Sea Level Rise
- More Intense Storms
- Summer Droughts

Will We Have Enough Water?

- More water needed to control salt line
- Existing reservoirs will not be as effective with intense storms. Green and grey infrastructure solutions
- DRBC Strategy for Sustainable Water Resources – 2060
- Develop resiliency
- Short-term vs long-term needs

Collier said there is a need to look holistically at the water system, the geography, the stakeholders, how the upstream impacts on downstream and how downstream needs drive upstream management. What is needed are basin-wide solutions that can be created by planning basin-wide and implementing locally.



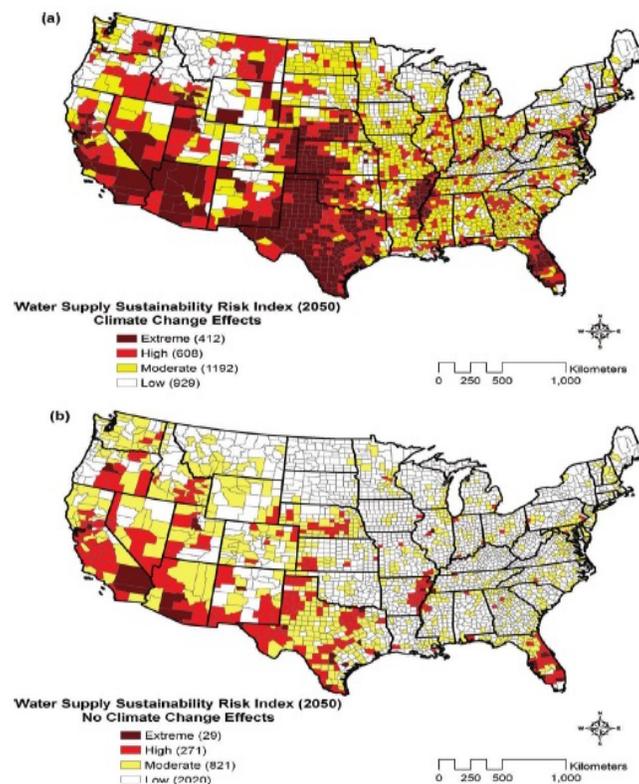
Federal Government Response to Climate Change Impacts on Water Resources: Jeff Peterson, US EPA

Jeff Peterson began by quoting the US Global Change Research Program 2009 report:
“Climate change has already altered, and will continue to alter, the water cycle affecting where, when, and how much water is available for all uses.”

He listed some water-related effects of climate change

- Warmer water temperatures
- Changing patterns of precipitation
- Earlier snowmelt
- More extreme weather events
- Increased drought
- Sea level rise and storm surges
- Coastal impacts and ocean acidification

Water Supply Sustainability Index 2015; S.B. Roy et al 2012



The Federal Government has many responses to climate change

1. President's Climate Action Plan/Executive Order
2. National Climate Assessment
3. Interagency Climate Adaptation Coordination
4. National Action Plan: Managing Freshwater Resources in a Changing Climate
5. Advisory Committee on Water Information (ACWI) Climate Change Workgroup

Peterson listed many diverse approaches to mitigation and adaptation.

Stronger Communities and Infrastructure

- Climate Resilient Investments (e.g. Service Risk Framework or SRF)
- New State/Local Task Force
- Boost Resilience of Infrastructure
- Rebuild and Learn from Sandy

Protect Economy and Natural Resources

- Conserve Land and Water Resources
- Manage Drought
- Reduce Wildfire Risks
- Prepare for Future Floods

Sound Science to Manage Climate Impacts

- Assessing Climate Impacts in US (i.e. National Climate Assessment; expected March 2014)
- Launch Climate Data Initiative
- Toolkit for Climate Resilience (e.g. Stormwater Calculator)

Climate Preparedness Executive Order

- Modernizing Federal programs for climate resilient investment
- Natural resources assessment/timeline
- Information, data and tools portal
- Federal agency coordination council
- State/tribal/local task force

National Climate Assessment

- Draft released January 2013
- Water Resources Chapter
- Other Chapters Related to Water
- Water Energy and Land Use
- Urban Systems, Infrastructure, and Vulnerability
- Decision Support
- Adaptation
- Climate Regions; water assessments for each
- Final Assessment: April 2014

Interagency Climate Change Adaptation Task Force

- Chaired by CEQ, NOAA, and OSTP
- Participation from diverse other Federal agencies (e.g., HUD, DOT, DOE, State as well as DOI, EPA, DOD)
- Comprehensive Reports in 2010 and 2011
- Agency Adaptation Planning
- Executive Order 13514 set sustainability goals for Federal agencies
- Implementing Instructions: March 2011
- Crosscutting Strategies
- Water Resources
- Coastal/Ocean
- Fish/Wildlife/Plants

National Action Plan: Priorities for Managing Freshwater Resources in a Changing Climate

- Published October 2011 by Interagency Climate Change Adaptation Task Force
- Key Recommendations
 - Establish Planning Process
 - Improve Water Information
 - Strengthen Vulnerability Assessments
 - Expand Water Use Efficiency
 - Support Integrated Water Resources Management
 - Support Training and Outreach

Advisory Committee on Water Information (ACWI)

- New Climate Workgroup
- Created in June 2012
- EPA Office of Water co-chairs with Water Environment Federation
- 40 stakeholder organizations and Federal agencies (including NIWR)
- Supports implementation of National Action Plan

ACWI Climate Workgroup

- Functions
 - Review/comment on implementation of National Action Plan
 - Foster intergovernmental coordination
 - Inform and coordinate with other ACWI Subgroups
 - Coordinate with Climate Strategies related to coasts and fish/wildlife/plants
 - Encourage training and education related to climate change and water

Directions for ACWI Climate Workgroup

1. Develop 2014 work-plan
2. In-person meeting – February 2014
3. Support implementation of President's Climate Action Plan and Executive Order
4. Advise and assist federal agency climate and water adaptation
5. Participate in interagency work to implement
 - National Freshwater Action Plan
 - National Ocean Policy: climate change recommendations
 - National Fish/Wildlife/Plants Strategy implementation

Other Federal Collaborations

- CCAWWG (Climate Change and Water Working Group including NOAA, DOI, Army Corps of Engineers, EPA, others)
- Subcommittee on Water Availability and Quality (SWAQ)
- Floodplain Management Task Force
- National Ocean Council
- Regional Integrated Sciences and Assessment (RISAs)
- Landscape Conservation Cooperatives (LCCs)
- Climate Science Centers (CSCs)

Jeff Peterson; EPA; 202-564-3745 http://acwi.gov/climate_wkg/index.html

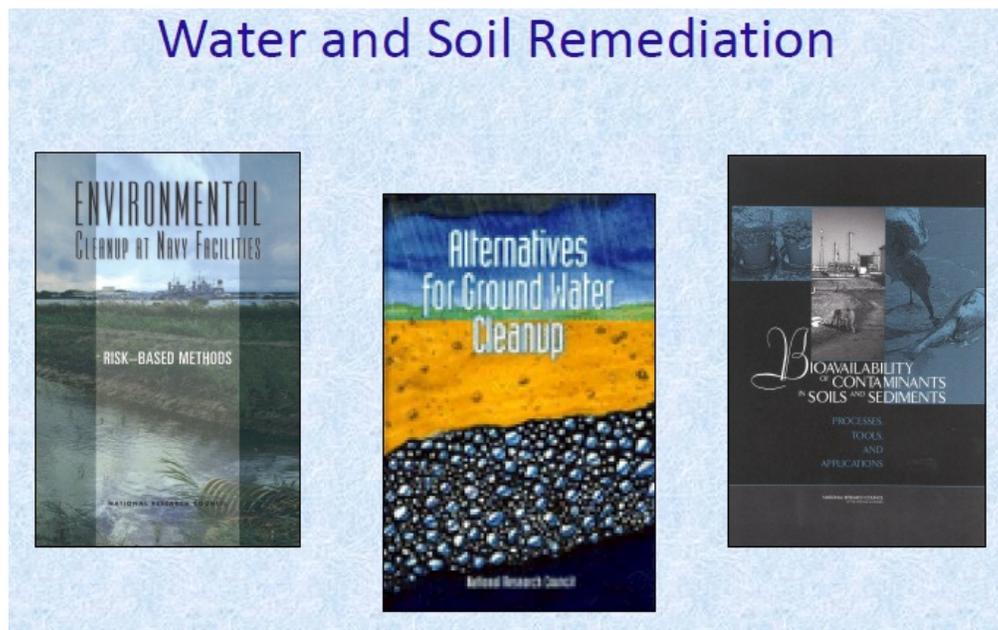
The National Research Council and Water Science and Technology Board:

Jeff Jacobs, Director Water Sciences, National Research Council

Jeff Jacobs began with an overview of the National Academies; the National Academy of Science was founded in 1863, the Institute of Medicine founded in 1970, National Academy of Engineering founded in 1964 and the National Research Council founded in 1916.

The National Research Council

- 35 Boards
- 250 Reports/year
- 650 Committees
- 6,500 Volunteers
- \$330 Million annual budget
- all from contracts and grants, no direct appropriations
- about 85% of funding comes from the federal government
- "501 (c) (3) nonprofit" designation



Recent reports related to water include

- Water and Soil Remediation
 - Navy Cleanup
 - Groundwater Cleanup
 - Bioavailability
- Water Supply and Sanitation
 - Desalination
 - Drinking Water Distribution Systems
 - Safe Water
 - Potable Reuse
- Hydrologic Hazards
 - Risk Analysis Flood Damage Reduction
 - American River Flood Frequency
 - Hurricane Protection System
- Large River Systems
 - Mississippi River Water Quality
 - Water Resources Planning for the Upper Mississippi
 - Missouri River Planning

- Ecosystem Restoration
 - Restoring the Everglades
 - Louisiana Coastal Protection
- Water Science and Research
 - Confronting the Nations Water Problems
 - Hydrologic Science
 - NSF's Environmental Observatories

Sample WSTB Study Sponsors

FEDERAL:

Departments of the U.S. Army, and U.S. Navy
 Federal Emergency Management Agency
 National Aeronautics and Space Administration (NASA)
 National Science Foundation
 U.S. Army Corps of Engineers
 U.S. Department of Agriculture (Forest Service; NRCS)
 U.S. Department of the Interior (Fish and Wildlife; NPS; Reclamation; USGS)
 U.S. Environmental Protection Agency

STATE:

California Department of Water Resources
 Edwards Aquifer Authority (San Antonio TX)
 St. Johns Water Management District (FL)
 South Florida Water Management District
 Southern Nevada Water Authority
 Texas Water Development Board
 Washington State Department of Ecology



PRIVATE SECTOR AND FOUNDATIONS:

American Water Works Company, Inc.
 McKnight Foundation (MN)
 The Water Institute of the Gulf (LA)
 Walton Family Foundation (AK)

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

Jacobs said the NRC and WSTB statements of task cover a range of topics and questions including program reviews, analytical and decision methods; scientific, technological, and science-policy questions and issues; and review of draft reports.

Regular Program reviews, analytical & decision methods

- Reviews of USGS Water Resources Division, National Water Quality Assessment (NAWQA) Program
- Reviews of U.S. Army Corps of Engineers Planning Methods, Analytical Procedures
- Reviews of restoration plans in Florida's Greater Everglades Ecosystem

Scientific, Technological, and Science-Policy questions and issues

- Missouri River sediment and decision making
- Scientific aspects of FWS and NMFS Biological Opinions – California Bay-Delta, Klamath River
- Implications of proposed irrigation water withdrawals for Columbia River salmon survival

Draft report/study reviews

- Reviews of St. Johns River Water Supply Impact Studies
- Reviews of U.S. Army Corps Feasibility Studies for the Upper Mississippi River and Illinois Waterway
- Reviews of draft reports from the Interagency Performance Evaluation Review Team (IPET) of New Orleans hurricane protection system performance during Katrina

Jeffrey Jacobs Director Water Science and Technology Board jjacobs@nas.edu

Initiatives supported by the US Army Corps of Engineers: Ada Benavided, USACE

Ada Benavided discussed USACE's Integrated Water Resources Management (IWRM) programs and other initiatives.

These include:

- Federal Support Toolbox for IWRM. Collaborations among 50 states and 24 fed agencies and international nations.
- IWRM Certification program for Projects. Principles of holistic management and planning.
- IWRM Awards program for Projects. Compete against the criteria.
- IWRM proof of concepts. Delaware River Basin and Potomac River Basin pilot.

She suggested that what we need is a comprehensive national water security strategy. She believes it is all about education and leadership.

USACE is undertaking a transformation in several areas, planning process, budget development using a watershed systems-budgeting, methods of delivery and infrastructure strategy. It is moving towards a watershed systems based approach. Changes are taking place in infrastructure and in alterative financing. The agency is taking a more streamlined approach.

New Hampshire Lives on Water: Paul Susca, N.H. Department of Environmental Services

Paul Susca gave the group some background on New Hampshire

- New Hampshire is water rich
- Tourism is important
- There is no water withdrawal permitting
- The state is accustomed to high population growth but the future is murky
- The state is highly rural with many small public water systems and private wells
- New Hampshire is fiscally conservative and has no water resource planning unit

Water Sustainability Commission charge

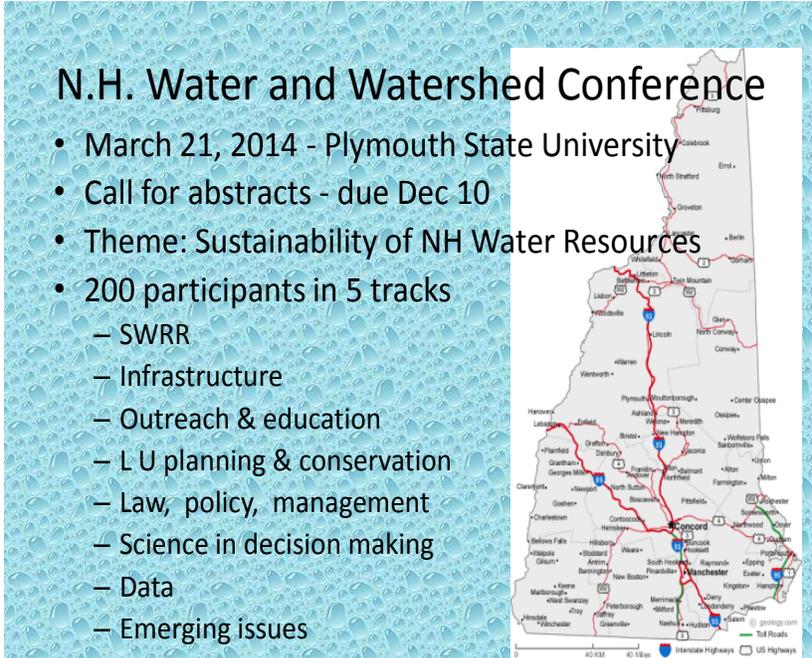
- To ensure that quality and availability of water in 25 years will be as good as or better than today (see handout)
- Education - fully informed and engaged public
- Infrastructure investment
- Future-focused management
- Data and management

Susca talked about a previous study the NH Water Resources Primer published in 2008 which looked at land use, climate change, infrastructure and data, Other work includes the Water

Infrastructure Sustainable Funding Commission in 2013, the Flood Commission, the Stormwater Commission, the Land Use Commission and a Climate Change Action Plan

What's Next?

- Planning for collective impact
- Goals
 - Build broad-based coalition
 - Shared agenda
 - Non-governmental
 - Self-sustaining
 - Backbone organization



N.H. Water and Watershed Conference

- March 21, 2014 - Plymouth State University
- Call for abstracts - due Dec 10
- Theme: Sustainability of NH Water Resources
- 200 participants in 5 tracks
 - SWRR
 - Infrastructure
 - Outreach & education
 - L U planning & conservation
 - Law, policy, management
 - Science in decision making
 - Data
 - Emerging issues

Challenges

- Commission fatigue
- Few acute problems
- Non-overlapping interests
- Engaging business & industry
- Lack of funding
- Fear & mistrust

Susca concluded by summarizing what New Hampshire hopes to gain from SWRR

- Assistance in structuring SWRR track at the N.H Water and Watershed Meeting in March 2014
- How to engage business & industry
- National & international perspectives (speakers & other participants) & ideas
- Enhanced visibility of & interest in NH water issues among NH stakeholders