California Water Plan 2013 Plenary Session: Sustainability Indicators
September 13, 2012
10:00 am – 12:15 pm

Meeting Summary

Welcome and Greetings

Josh Biggs, Session Facilitator from Montgomery-Watson-Harza, opened the Breakout Session on Sustainability Indicators, and reviewed the agenda. He introduced Abdul Khan, the Lead for the California Water Sustainability Indicators Framework, to the session attendees.

California Water Sustainability Indicators Framework: Overview

Abdul Khan, Department of Water Resources (DWR) and Lead for the Sustainability Indicators initiative for the Water Plan Update 2013, provided an overview of the initiative. Mr. Khan explained the objective of the initiative and provided status of the planned deliverables. He stated that the major objective was to develop an analytical and quantitative framework that would allow us to assess progress towards water sustainability in California by looking at conditions and trends of a set of indicators encompassing all three aspects of sustainability – economics, environment, and social equity. The deliverables include an analytical framework, two Pilot studies – one at the Hydrologic Region scale rolled up to state level and the other at regional level, and gap analysis to identify deficiencies in the framework and data interpretation and reporting methods. The deliverables also include the development of a Decision Support Tool that will allow querying data and results in a web-based GIS environment. He noted that Dr. Fraser Shilling from UC Davis, the Science Lead of the project, would provide more details on the analytical framework and initial ideas on the Decision Support Tool.

Mr. Khan indicated that the Framework also included California's water footprint estimation. He noted that as the Pacific Institute had already started on a water footprint estimation project, DWR decided to team up with the Pacific Institute to further refine water footprint estimation for California, including inter-regional water flow estimation, trend and error analysis, and a business case for water footprint as an index of water sustainability. He also stated that Ms. Heather Cooley of the Pacific Institute would be discussing the water footprint concept and preliminary water footprint estimates for California during her presentation.

Mr. Khan noted that the Sustainability Indicators initiative was a collaborative project among DWR, US Environmental Protection Agency (USEPA) Region 9, and UC Davis. The project is funded by DWR and USEPA Region 9.

The entire presentation is available online at
http://www.waterplan.water.ca.gov/docs/meeting_materials/plenary/2012-09-12.13/26-1-PPT-Sustainability_09132012Plenary-AKhan.pdf

Question:
Are the pilots already done or to be done??

Response:
Pilot studies are yet to be done. For the state level pilot study, we have come up with an initial set of indicators and conducted some analysis, but those will not be shared in this session. Currently, we are working with Santa Ana Watershed Project Authority on the regional pilot study.

California Water Sustainability Indicators Framework: Status

Dr. Fraser Shilling from UC Davis, the Science Lead of the project, provided a status update on the various project deliverables. He explained in detail the flow of information and analysis in the Framework. The Framework starts with a water sustainability vision that feeds into developing goals which are refined into more specific objectives measured by indicators. The flow continues through measurement of conditions and trends in indicators to track progress of how the current resource management strategies are meeting goals that embody social, environmental and economic aspects of sustainability. The quantitative analysis is followed by reporting of performance that is expected to lead to expansion in knowledge, change in public policy, and better decisions.

Dr. Shilling then discussed the status of two pilot studies. The state scale/Hydrologic Region scale pilot study uses data collected at the Hydrologic Region (HR) level. The data could also be organized at other spatial scales such as county, IRWM regions, or Hydrologic Unit Code-12 of USGS which then can be rolled up to state scale. He then discussed six preliminary indicators selected from the list of 86 indicators included in the Framework, which are a subset of approximately 1,800 indicators used in the global literature. He also explained the linkage of the preliminary set of six indicators to the eight sustainability goals and the corresponding objectives. He stated that for the regional pilot study, DWR and UC Davis teamed up with Santa Ana Watershed Project Authority. In the first round of the project, the agency identified stakeholders, and contacted them for information and research contributing to the understanding of the watershed. Currently, the project is in its second phase: deciding on goals and objectives, and corresponding indicators.

Dr. Shilling then discussed the purpose and potential features of the envisioned Decision Support Tool (DST). The DST will allow users to access the original data sets used in the analysis, provide policy-relevant planning and implementation information based on sound scientific reasoning, and facilitate data querying in a web-based GIS environment.

The entire presentation is available online at
http://www.waterplan.water.ca.gov/docs/meeting_materials/plenary/2012-09-12.13/26-2-PDFforPres--SustainabilityIndicators-09132012-Plenary-Status.pdf

Question:
Does the working diagram on slide 3 showing the flow of information and analysis related to indicators apply to the entire state or just the delta region?

Answer:
The diagram applies to the entire state.

Question:
Is Goal 1 on slide 5 only for future generations, not for present generations?

Answer:
Goal 1 applies equally to present and future generations. The wording will be revised to reflect that.

Question:
Is Goal 2 on slide 5 focused on improving or sustaining water supply reliability to meet human needs?

Answer:
Goal 2 is focused on sustaining, not necessarily improving water supply reliability. The wording will be revised to reflect that.

Question:
Does the phrase "naturally functioning delta" under Goal 3 on slide 5 refer to a delta without any facilities and no human interaction?

Answer:
No, "naturally functioning delta" includes co-equal goals and activities. The goals and objectives are defined in further detail in the draft California Water Sustainability Indicators Framework.

Question:
The representative indicators' list on slide 8 is lacking an indicator highlighting social disparity? Gini co-efficient, index of how information is transmitted through various groups of society, might be a useful indicator to include.

Answer:
This list only includes six of the 86 indicators used in the Sustainability Indicators Framework.

Question:
What indicator can we use for Goal 8 listed on slide 10?

Answer:

1. Measuring how readily information is available by surveying different agencies whether or not they are connected to the data exchange system.
2. Measuring the number of watersheds receiving any attention.
3. Looking at the type of participation from different groups involved in the decision making process in addition to amount of participation.

Question:
Assume that data for the indicator corresponding to Goal 6 on slide 10 are collected at the watershed level which is very tied to ecosystem, yet the water system in the state involves transferring across regions. When you are deciding on an indicator to what extent are you looking for an interaction between what your goal is and how you are collecting data?

Answer:
The indicator used in Goal 6 – public support for water systems investment – is based on surveying people selected at random across California, so the indicator applies to the entire state. However, the goal is much broader than just water systems. Other potential indicators that could be attributed to Goal 6 include public participation rate, number of environmental restoration projects established and successfully completed, etc. Currently, we do not have access to such information primarily because the access to data is not centralized, nor data are easily accessible.

Question:
Goals 3, 5 and 7 all share a common indicator – impervious (developed) surfaces. Does that mean that the goals are not distinct enough since they have the same indicator?

Answer:
These goals and objectives were decided upon by a wider stakeholder community and included in the CWP Update 2009. We need to transform these goals into a smaller set that is more exclusive to avoid duplicating an indicator among different goals. One suggestion is to combine the "human" aspect of Goal 3 and 5 into one goal and the "environmental and ecological" aspect into another goal.

Question:
An objective includes a measureable quantity and is measured by change in that quantity over time. On the contrary, an indicator measures the quantity at a specific period of time. Is the change in impervious surfaces between 2001 and 2006 used as an indicator in regional pilot study an appropriate indicator?

Answer:
It depends on the definition of the term "indicator." Although a useful indicator allows one to measure change over time and is not a direct measure of change in quantity over time, data might only be collected limited number of times in certain instances which makes it hard to measure the indicator over successive periods of time. That is why we are using the change in quantity over time as an indicator in this instance.

Comment:
It would be nice to have DWR conduct case studies in areas that do not have all of the information collected already.

Answer:
We agree that we should use places as Pilots where data are not readily available. We attempted that in the Central Valley and made some progress with indicator selection process. A strong resistance from a group of farmers brought the project to halt.

Question:
Is the water flowing into Santa Ana River watershed imported water?

Answer:
Yes, the water is imported from the Colorado River and the State Water Project.

Statewide Water Footprint Estimation: Methodology and Preliminary Calculations

Ms. Heather Cooley of the Pacific Institute discussed the water footprint concept and preliminary water footprint estimates for California. She noted that water footprint was one of the indicators being considered for the Sustainability Indicators Framework. She explained that California's water footprint is the total volume of water required to produce goods and services consumed by the Californians and that water footprint analysis look at the flow of goods and services in and out of the state and water consumed in production of those goods and services to determine the flow of water in and out of the State of California. She clarified definitions of terms used in the water footprint analysis, explained the methodology and data used to calculate California's water footprint, presented preliminary results by geographical location and products consumed, and presented ideas about how the current analysis could further refined.

Ms. Cooley explained that there were three different types of water considered in the water footprint analysis - green water is the volume of precipitation or soil moisture that is consumed in an activity such as growing crops; blue water is the volume of surface and ground water we consume and/or use in an activity; and grey water is the volume of water used to dilute the pollutants to meet the regulatory requirements. She also explained the concept of internal water footprint and external water footprint - the internal water footprint is the volume of water consumed to produce goods and services produced and used within the State of California whereas the external water footprint is the volume of water consumed in production of goods and services used by Californians, but produced outside of the State of California.

Ms. Cooley explained that in this analysis, the results on blue and green water were presented together and results from grey water were presented separately because grey water did not reflect consumption. She then discussed preliminary findings of the California Water Footprint analysis:

- The State of California uses 40 million acre-feet of water annually to produce goods and services; half of those goods and services are exported out of the state, therefore, are not included in California's water footprint;
- California imports about 45 million acre-feet of water annually in goods and services and consumed by the Californians which makes the state a net importer of water;
- In total, the state's annual water footprint is 63M acre-feet where two-thirds of the water is green water; and
- On per capita basis, an average Californian consumes roughly 1,500 gallons of water per day which is slightly less than the national average, but almost the double of the global average of 845 gallons per capita per day.

Ms. Cooley also mentioned that additional work being contemplated for the water footprint include refining water footprint estimation for California, estimating inter-regional water flow analysis, conducting trend and error analysis, and establishing a business case for water footprint as an index of water sustainability.

The entire presentation is available online at http://www.waterplan.water.ca.gov/docs/meeting_materials/plenary/2012-09-12.13/26-3-PPT-PI_WaterFootprint-091312.pdf

Question:
Isn't some of the grey water reused and then doesn't it become blue?

Answer:
Right now, we're looking at blue and green water separately from grey water without any consideration of grey water becoming blue water.

Question:
How do you account for the agricultural applied water that recharges and runoff?

Answer:
We only look at the water consumed.

Question:
How does the analysis account for the carbon footprint resulting from transportation of goods?

Answer:
The virtual water footprint incorporates the amount of water required at various steps of the entire process, so in theory, the water footprint numbers encapsulate the carbon footprint from transportation of goods as well.

Comment:
The definition of "grey" water presented in the water footprint analysis differs from the widely used definition of "grey" water - reusing water generated from domestic activities.

Answer:
Yes, in the virtual water footprint literature, "grey" water is defined as the amount of water needed to dilute the pollutants to meet the regulatory standards regardless of whether or not the regulations are met.

Question:
Have you considered any other term besides "grey" water to define the water used to dilute pollutants to meet regulatory requirements in order to avoid confusion?

Answer:
This analysis uses terminology that used in the global literature pertaining to water footprint analysis.

Question:
Are you going to include figures from areas other than agriculture (referring to slides 3 and 4) in your final report such as industrial, commercial, and residential areas?

Answer:
Yes, a figure is already included in the report.

Question:
Does the analysis account for water used for landscaping purposes?

Answer:
Yes, it is captured under the commercial, residential and industrial direct water use category.

Question:
Why are the exported goods and services excluded from the water footprint analysis?

Answer:

1. They are excluded from the State of California's water footprint because it is part of footprint of the region importing goods and services exported out of California.
2. The water footprint by definition is based on the consumption of goods and services, therefore, we only look at the goods and serviced consumed within the State of California, and not at the goods and services that are not consumed within the state.

Question:
Why chocolate's water footprint so high (2,100 gallons/pound) and how is it calculated?

Answer:
The water footprint analysis looks at the water required to produce a commodity including the intermediate steps required to produce the final product. A group based in Netherlands assigned a factor to every single product produced in countries around the world. In case of chocolate, the group would look at where coffee is grown and then assign a factor to each of those countries based on plant requirements and evapotranspiration requirements taking into account the regional climate.

Question:
How do you address the water footprint at global level when many companies have global operations?

Answer:
The water footprint for California only includes water consumed on producing goods and providing services produced within the State of California and imported into, and not on producing goods and providing services exported out of California.

Question:
How does DWR plan to use water footprint?

Answer:
As water sustainability indicator to identify water reliance for vulnerable regions and recognize the need to address water related issues that may result from the strain on water use in the state.

US EPA Region 9's California Sustainability Indicators Suite

Mr. Don Hodge of USEPA Region 9 presented a summary of the California Sustainability Indicators Suite project, which includes four components – water footprint, ecological footprint, plant growth index from MODIS and AVHRR GIMMS satellite data, and groundwater availability from GRACE satellite data. Water footprint results will be developed through the collaborative effort of DWR, USEPA Region 9, UC Davis, and the Pacific Institute. USEPA Region 9 partnered with Global Footprint Network to estimate ecological footprint; with California State University at Monterey Bay and NASA Ames Research Center to work on plant growth index; and the NASA-JPL to estimate groundwater availability. The results from the water footprint and the other three components of USEPA Region's Indicators Suite will be part of the Decision Support Tool discussed previously.

The entire presentation is available online at
http://www.waterplan.water.ca.gov/docs/meeting_materials/plenary/2012-09-12.13/26-4-PPT-AMI-CaSustainabilityIndicators-Plenary091212.pdf

Next Steps and Adjourn

Mr. Rich Juricich of DWR thanked everyone for attending, thanked the presenters, and adjourned the meeting.