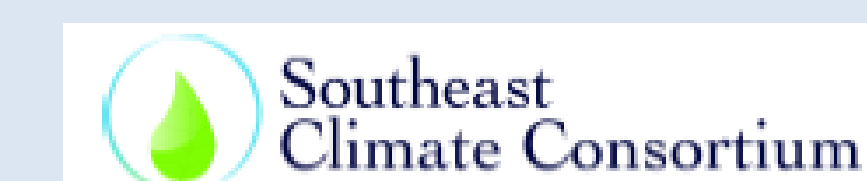


TWO-SIDES OF THE SAME COIN: COMMUNICATING CLIMATE CHANGE SCIENCE TO STAKEHOLDERS IN FLORIDA AND HAWAII

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BACKGROUND

Coastal regions such as Florida and Hawaii share similar climate-related risks and impacts, including the protection of freshwater supplies in often fragile or diminishing aquifers. Decision makers in both states are actively seeking out information on how to best make decisions incorporating uncertain and projected climate data and effects on water supply, identifying the most relevant and useable information and working with physical and social scientists to identify barriers.

In Florida, the UF Water Institute and Southeast Climate Consortium (SECC) formed a Working Group with 6 major Water Utilities and 3 Water Management Districts, focused on increasing the relevance of climate data for the specific needs of public water providers. In Hawaii, the Pacific Regional Integrated Sciences & Assessments (RISA) program characterized freshwater stakeholders on Oahu via a multi-method approach of interviews, collaborative workshops, and a survey. Commonalities of each group include a highly educated demographic interested in how sea level rise and climate will affect hydrological planning, and a desire for downscaled data at local spatial and temporal scales. Although similar issues and barriers were raised by each stakeholder group, different methods of communication and collaboration were utilized.



Hawaii: Jacques Desclotres, MODIS Land Rapid Response Team, NASA GSFC

CLIMATE-RELATED RISKS AND ISSUES

Florida and Hawaii share current and potential climate hazards, such as impacts of SLR; vulnerable coastal infrastructure; beach erosion; saltwater intrusion; groundwater depletion; storms and surge; demographic pressures; tourism; and fragile ecosystems.

In Hawaii, thematic content analysis of the interview transcripts revealed that the overall challenge for stakeholders was to decide how to meet the fresh water needs of diverse users in future decades. Across sectors, decisions focused on fresh water management, conservation, planning, and climate-change impacts assessment.



In Kihei, Maui, a rainier than normal La Niña winter season in January of 2011 coupled with intense storms caused beach erosion while flooding damaged road infrastructure. Photos by Victoria Keener.

In Florida, Water Utilities listed needed climate information and desired outcomes in facilitated workshops. Examples of decisions and concerns are shown in **Table 1**, below. Stakeholders are interested in similar types of climate data, and both groups stress a focus on practical and actionable information.

Item	% scoring correctly
In your view, do most scientists agree or disagree with one another about whether climate change is happening? [agree]	72.1%
Assuming climate change is happening, do you think it is caused mostly by things people do, mostly by natural causes, or by both? [people]	65.1%
Weather changes from year to year [true]	90.7%
Climate changes from year to year [false]	65.1%
Climate means the average weather conditions in a region [true]	81.4%
Ocean currents carry heat from the equator toward the north and south poles [true]	86.0%
The greenhouse effect keeps the earth from being as cold as outer space [true]	83.7%
The temperature of the earth is affected by whether the earth's surface is light or dark colored [true]	76.7%
A major cause of climate change is pollution/emissions from business and industry [true]	74.4%
A major cause of climate change is the use of aerosol spray cans [false]	62.8%
A major cause of climate change is electrical generation from fossil fuels such as coal [true]	79.1%
If we were to stop burning fossil fuels today, the amount of carbon dioxide in the atmosphere would decrease almost immediately [false]	79.1%
If we were to stop burning fossil fuels today, global warming would stop almost immediately [false]	93.0%
Climate change will cause some places to get wetter, while others will get drier [true]	97.7%
Climate change will increase crop yields in some places, and decrease it in others [true]	93.0%
Climate change will cause temperatures to increase by roughly the same amount in all countries [false]	93.0%

Hawaii	Florida
<ul style="list-style-type: none"> What fresh water will be available in the long-term (amount, when, for how long, where)? How can water managers prevent brackish water intrusion into the potable water supply? What well distributions and pumpage rates are best for drier conditions in the future? What in-stream flow standards will maintain or improve the critical habitat for endangered species in coming decades? What alternative water sources will be needed in 50 years (e.g., desalination)? What alternative energy sources will be best under future climate conditions? How can we prevent disruption to the water supply used to irrigate crops? How should county development and watershed management plans be revised to take into account projected changes in rainfall, temperature, and other climate variables? 	<ul style="list-style-type: none"> What are effects of climate on hydrology at a local scale? Predictions (rainfall, temperatures, extreme events and sea level rise) are needed at space, time and event scales relevant to operations (3-12 months), permitting (20 years) and capital planning (20-50 years). ENSO and variability of the Atlantic warm pool in the summer are two important climate variations that would be relevant What is the degree and timing of impact of sea level rise on well fields? What are local climate related socio-economic and demographic projections? Focus needs to be on a product utilities can use and rely on, not simply an academic/scientific exercise. One size does not fit all...we need different solutions for different parts of the state. What are the regional strengths/limitations of current climate models?

METHODS USED FOR COLLABORATION AND CLIMATE COMMUNICATION

- Working Groups/Collaborative Learning (FL)
- Collaborative Research (FL and HI)
- Freshwater Stakeholder Workshops (HI)
- Identifying Useful Climate Data (FL and HI)
- Academic Presentations (FL and HI)
- Case-Study Presentations (HI)
- Beach Management Planning (HI)
- In-Depth Interviews (FL and HI)
- Surveys (FL and HI)
- Radio Education (FL)
- Video "Documoments" (HI)



Counter-Clockwise from top: Freshwater stakeholders from Oahu participate in a roundtable discussion in July, 2011; Additional observers from American Samoa Power Authority were present; Representatives from Florida Water Utilities, Universities, and Water Management Districts at the first Working Group Meeting in September, 2010.



Three 'Climate Matters' Documoments were filmed in Hawaii. Each clip focuses on a different aspect of how climate information matters to people of different professions around the islands. Far left: Presidents of Kyo-Ya Company, Greg Dickens, describes changes in the Waikiki Beach shoreline over the last 50 years. Left: Independent cattle rancher Michelle Galimba talks about how drought affects locally produced food.

HAWAII SURVEY RESULTS

In Hawaii, an online survey was conducted (9/7/11– 10/20/ 11). Following email or telephone invitations, 50 people (34% response rate) responded to the survey online. Analyses were conducted on the 43 completed surveys received. Results of the 16 question climate literacy section is above (**Table 2**).

Overall, climate literacy was high (mean = 12.98, sd = 2.64). A striking finding was the high percentage who believed there was still a lot of disagreement among scientists about whether or not climate change is happening (# 1) and that a major cause of climate change is the use of aerosol spray cans (#10).

SUMMARY AND NEXT STEPS

Freshwater stakeholders in Hawaii and Florida have identified similar needs and barriers to successfully incorporating relevant climate information into their planning processes. Groups in both states desired local projections of rainfall, temperature, SLR, and extreme events at spatio-temporal scales useful for planning timelines and policy. Stakeholders are generally very informed with respect to climate knowledge, are aware of high levels of uncertainty in predictions and expressed interest in planning with "most likely" and "worst case" scenarios. The Florida peninsula and Hawaiian Islands are both in geographical regions that make accurate downscaling of Global Circulations Models very difficult, which is frustrating for stakeholders that see other regions getting climate data on the scale they are interested in. As we work with the groups in the future, it will be necessary to identify alternative methods of providing future projections while waiting for downscaling.

ACKNOWLEDGEMENTS

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Information from Florida reflects the collaborative efforts of the Public Water Supply Utilities-Climate Impacts Working Group since initiation in September 2010 (and recently funded NOAA CSI-water grant). Contact: Lisette M. Staal, (lstaal@ufl.edu) http://waterinstitute.ufl.edu/workshops_panels/PWS-U-CIWG.html