

7-8-2011 Workshop

1. Discussion Session #1: What impacts will climate change have on fresh water resources in Hawai'i, especially the Central Oahu Watershed, in the next 10-50 years?

- Is anyone looking at projections of water use across all sectors: population, ag, industry, ecosystem?
- What is demand for water use over time?
- What is impact on sustainable yield (SY) in Central Oahu?
- Because of variations due to natural cycles, the time period we look at is important. Current underlying drying trend because in negative cycle of PDO. Must take into account trends as well as natural/decadal variability. "Signal to noise ratio" – one can drown out the other, or additive effects.
- Development of central Oahu will cause loss of watershed/recharge area.
- CWRM is looking at ways to capture excess runoff from increased high-intensity events – adaptation strategy to augment natural recharge. Possibilities for capturing surface runoff.
- BOWS has new staffer with expertise in reclamation.
- For BOWS, Central Oahu is last area to develop for water resources. Hands off on North Shore and Windward side. Currently new project with USGS. When Ewa Shaft comes online, need to see impact of shaft in that region.
- NRCS concerned with soil erosion – increased high-intensity events cause more erosion, which dictates management practices on land.
- Is there anywhere in Hawaii that could be wetter in the future?
- Yes there is possible increase in precip, or drying in some areas and wetter in others. New study mapping these trends is occurring.
- If trade winds are decreasing, are systems like Kona lows increasing? Possibly yes, but also lots of countervailing impacts.

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- Kauai implications: storm tracks will move northward, less frontal rainfall in northern islands.
- If central Oahu development is last for wells, what is the practical implication? Waipahu/waiawa aquifer is the most significant buffer. BOWS initiatives – aggressive conservation program fixing pipeline leaks, use of recycled water to replace potable use.
- Geographic area of Pearl Harbor aquifer: S of Mililani/Kunia, bounded to Waimalu. Last area for development is Waipahu/Waiawa area, east of Kunia and west of Waimalu. Last because it has the most SY left in central Oahu region.
- Seeing significant problems in Waimalu area because of overpumpage – higher chloride. Waiawa could have same issues in future.

2. Discussion Session #2: What do we need to know to effectively prepare for and address these impacts? Who is collecting needed information now? What additional information/analysis is needed?

- USGS- Spatial distribution of rainfall projections and ET.
- Precip data collected at less than 300 stations, down from high of 800, continuing to decrease. Same for stream level stations. Large issue for Hawaii.
- How does this impact ability to make forecasts? Hard to maintain funding for monitoring. In HI, most rain gages were privately maintained by plantations. Currently USGS, BOWS, NWS, NOAA, research networks. Most important to maintain long-term sites.
- Streamflow by DLNR, USGS. Similar situation to rainfall. PAC-IOOS is planning to find funding to reinstate stream gages- need to discuss how to prioritize.
- Legislature- impacts, degree of certainty of impacts, actions and consequences of actions and inactions.
- Always lots of uncertainty in climate info. Are worst-case scenarios effective?
- Worst case and most probable case scenarios valuable.
- How do we think about risk and uncertainty, and how do we address those when talking about impacts?
- Natural/cultural resources- narrower bounds on uncertainty, and confidence level to make site-specific decisions knowing that there will always be uncertainty. Method for determining confidence level varies by agency and regulations and available information. Narrowing range of futures and boosting confidence level will help decision making now.
- What info needs do we have, and how do we treat the information that is available in regard to confidence and uncertainty?
- Are there current thresholds/tipping points that people are nearing currently within legal/policy frameworks?
- 2010 drought period may have hit some thresholds for ag or ecosystems. Conditions of extremity can show thresholds explicitly.

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- Focus on impacts/indicators that we can monitor.
- Evacuation thresholds: i.e. gauge levels, county initiates evacuation.
- Location of residences or other structures in flood hazard areas – use FEMA maps. These areas could change with SLR.
- Erosion patterns/inundation monitoring: NOAA. Number of wave buoys limited.
- Lots of modeling occurring in HI- funded by multiple entities, but coordination exists between them. Finer-scale projections and mapping should be available in next few years.
- Civil Defense- Need better estimates of possible SLR in order to change flood hazard/inundation areas, i.e. in order to ensure safe evacuation. Spillway 80.5 feet initiates evacuation in Wahiawa. Civil defense supports policy change, but does not initiate.
- Dept of Ag- trend mid-level (regions within indiv island) area-specific precip rates to plan reservoirs, stormwater runoff, & other capital improvements, make decisions with farmers about crop planting and/or destruction, how to make decisions in order to maintain water levels and support farmers.
- Lower precip would initiate discussions w farmers to stop expanding acreage
- Where to build ANOTHER reservoir? Does it support state vision of food sustainability?
- Do we want to deny new irrigation permits? Based on past use and reservoir levels. How much land should be put into ag production?
- Time to develop a new reservoir: D Ag- decade? \$30 mil on a reservoir is a big investment
- Liability associated with state recommendation of more water efficient crops being planted.
- NRCS works w farmers to improve irrigation systems (efficiency & water use)
- Extent to which these impacts could constrain urban development.
- As part of EIS, developer must address concerns. State-wide scale: under Hawaii Water Plan, counties are responsible for developing their own plans,

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including water needs/development in all sectors, 20-30 year horizon. Also ID strategies to meet needs in development areas. Need to match development plans with water sources/availability.

- Which populations are most vulnerable to climate change impacts?
- SSRI researching this topic.
- USGS did survey for American Samoa now-20 years in future- population growth vs. water availability is alarming.
- ICAP will be looking at climate change impacts on native Hawaiian communities throughout state.
- 2004 SSRI/Dept of Meteorology Drought risk and vulnerability assessment- most vulnerable populations are on private catchment water, no access to reliable water supply.
- Site-specific and sector-specific indicators very important
- Both physical side and non-scientific impacts of CC: political decisions, individual perceptions of impacts, economic indicators such as loss of income due to drought.
- Economic indicators of drought impacts: USDA Risk Management Agency has info on crop loss, Natl Agricultural Statistic Service. Data collection not extensive. Independent collection efforts. National Drought Mitigation Center- online drought reporter. USDA Farm Service Agency publishes report by county on ag gains, losses, livestock.
- USGS climate projections and native plant distribution on Big Island, has impacts on ET and recharge.
- US Forest Service, Institute of Pacific Islands Forestry.

3. Discussion Session #3: What barriers to effective information gathering and analysis do we face? What should priority remedies be?

- Funding for long-term monitoring continues to decline. Institutional unwillingness to fund long-term monitoring. No gov agencies do long-term monitoring, only small projects which aren't integrated.
- Federal agencies have 1-year budget, not continuing funds. Barrier to long-term monitoring projects.
- Barriers relating to targeting and tailoring info to make it actionable.
- Barrier to access to info to make it accessible, usable.
- Lack of communication on how to make info more decision-relevant.
- Create awareness of and interest in available info among policy-makers.
- Duplication of efforts and lack of coordination discourage decision-makers from using info.
- Who is effective in managing and disseminating info?
- NWS- communicates complex info to variety of audiences.
- Climate Service should be repository of info and facilitate dissemination.
- At what point does info become compelling enough to incorporate into regular day-to-day planning?
 - For the legislature- when there is (1) crisis, (2) public outcry, (3) personal outreach most compelling.
 - New regulation/rule required to force action. Voluntary action difficult because of funding, lack of manpower.
 - Level of uncertainty is prohibitive to utilizing info to make decisions and influence planning. May use info when it is more certain.
 - How reversible the decision/policy being made is, i.e. short-term vs. long-term.

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- Need to create context for adaptive management, will allow for info utilization. E.g., Legislature could give agencies flexibility to make and reverse decisions.
- Some policies currently in place prevent making decisions about fresh water, i.e. dam maintenance policies.

4. Discussion Session #4: What organizational, capacity, political, and other barriers do we confront addressing the impacts of climate change on fresh water resource management? How can we overcome these barriers?

Overcoming barriers:

- Case studies on effective use of info by decision-makers as model, with actionable information/best practices.
- Specify probabilities of events in technical reports.
- Increase education and outreach efforts to bridge gap between scientists and decision/policy-makers. How?
- Remove info from academic realm into real-world situations- important for Legislature to make decisions. Credible backing of forum, for instance, provides support necessary to create policy.
- RISA is one program which is specifically designed to bridge the climate science – societal decision-making gap by making actionable suggestions.
- Future forum is proposed in order to bring together climate info producers and users on a regular basis to dialogue and provide immediate feedback. Forum will be hosted by the Pacific Climate Information System (PaCIS) and organized by PaCIS partners.
- Hawaii Energy Policy Forum- potential model for forum.
- Currently non-profits and foundations are playing active policy role, in issue of fisheries management specifically. i.e. Pew Foundation in NW Hawaiian Islands. However this process is not as transparent, more difficult to create awareness.
- PICCC model of stakeholders as steering committee of organization- closed-loop model where stakeholders both receive benefits from organization and contribute to organizational planning, and organization both provides grants to stakeholders and solicits their input for organizational development.
- Consultants can play this translation role, in some places they are the primary source of info for decision-makers. Organizations can reach out to consultants to disseminate info, since they work so closely with stakeholders.

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- Legislators- organize “informational briefings”. Recent successful briefing was on geothermal (hot topic) and powerful speakers. Need multi-week notice, hour plus or minus in length primarily depending on strength of speaker.

5. Discussion Session #5: Next Steps

- Email notes within next week. Please review for accuracy, edits, additions. Provide feedback.
- Integrate results of interviews, workshops, and survey into final compilation report. Will be completed closer to end of year and sent to participants in preliminary format for review.
- Feed results into NCA as technical input by March 1, 2012.
- By end of year do dialogues to determine technical information about water resources. Use as input for future forum.
- Future RISA outreach: topic-centered short fliers/fact sheets, short reports for policy-makers translating science into usable information for decision-makers, more workshops/trainings/dialogues, inventory of current projects through PaCIS website.
- Facilitate easy conversation between RISA and participants: will create listserv in future connected to RISA website www.PacificRISA.org, in the meantime contact any RISA staff at any time with questions/concerns.
- RISA is happy to come to stakeholder meetings to present, speak on specific topic, etc.