

PUBLIC WATER SUPPLY UTILITIES

– CLIMATE IMPACT WORKING GROUP

Task Group 1: Developing a Research Agenda

May 4, 2011





PURPOSE

- Identify Utility Needs for Climate Change related information
- Identify Available Tools to provide Utility needs
- Identify ongoing research that will provide Utility needs
- Identify Gaps where additional research is needed to provide Utility Needs
- Develop strategies to initiate additional research
- Pursue federal and state grant funding



Five Climate Research Areas

- Temperature Impacts
- Rainfall Impacts
- Storms/Hurricanes
- Sea Level Rise
- Carbon Emissions

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UTILITY RESEARCH AGENDA DRAFT

May-11

CLIMATE AREAS	UTILITY NEEDS	AVAILABLE TOOLS	RESEARCH NEEDS	CURRENT RESEARCH PROJECTS	ADDITIONAL RESEARCH NEEDS
Temperature Impacts	Seasonal Temp. Change	NOAA forecasts			
	Irrigation Demand Changes				
	1. How seasonal temp. forecasts impact irrigation demands				
	2. Proportion of water demand for irrigation				
	Cooling Demand changes				
	1. How could cooling water demand change with temp?				

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Rainfall Impacts	Regional rainfall predictions				
	1. Long term rainfall forecasts - 10, 20, 50 years, downscale global climate models to Florida regions	Global Climate models - AR4, NARCAST	Downscale models to Florida, calibrate w/ Fl data		
	2. Long term changes in rainfall patterns in Florida	Change in ENSO pre and post 1960			
	2. Short term forecasts for winter-spring dry season, available Jan 1 for 3/1-6/15	IASCLIP FORECAST FORUM - IFF, winter forecasts better			Better predictions in spring
	3. Length of wet or dry season	ENSO effects			

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Storms/Hurricanes	Predict Nos./ Likelihood of Florida hurricane impacts	Good models for total nos. of hurricanes			Predictions for nos. hurricanes to hit Florida
	Model inundation and damage	GIS inundation model	Climate Compact doing Action Plans		
	Storm surge impacts	Storm surge models			
	(regional or local)				
	Impact of Storm/inundation on salt water intrusion				Hydrodynamic model for salt water intrusion
	Forecast hurricane tracks with 10-15 day lead time				

Hurricane Ike

Hurricane Ike after landfall, 09.13.08



[Back](#)

198 / 273

[Next](#)

Debris covers Highway 146 at the Galveston County & Harris County line in the City of Seabrook, Texas on Saturday morning Sept. 13, 2008. Howling ashore with 110 mph winds, Hurricane Ike ravaged the Texas coast Saturday, flooding thousands of homes and businesses, shattering windows in Houston's skyscrapers and knocking out power to millions of people.

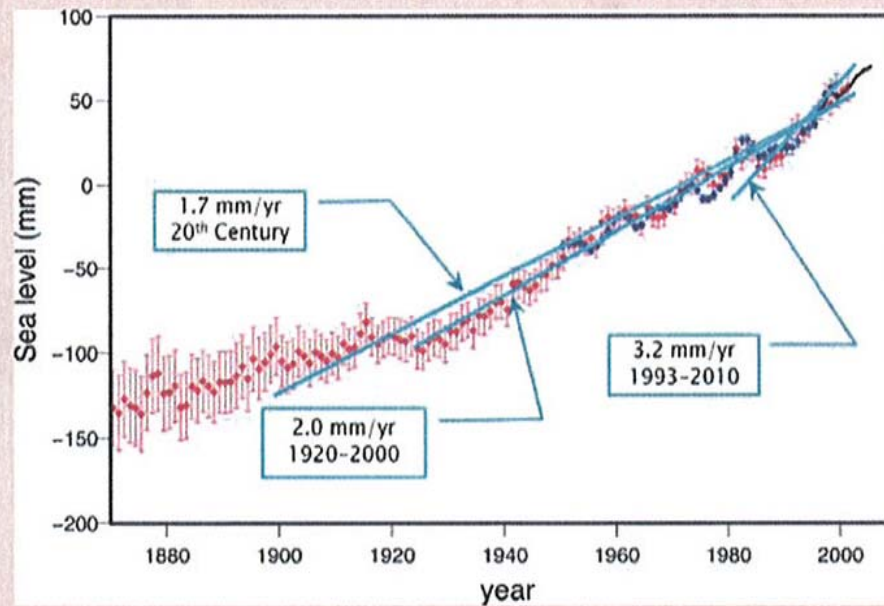
Kevin M. Cox GALVESTON COUNTY
DAILY NEWS

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May-11

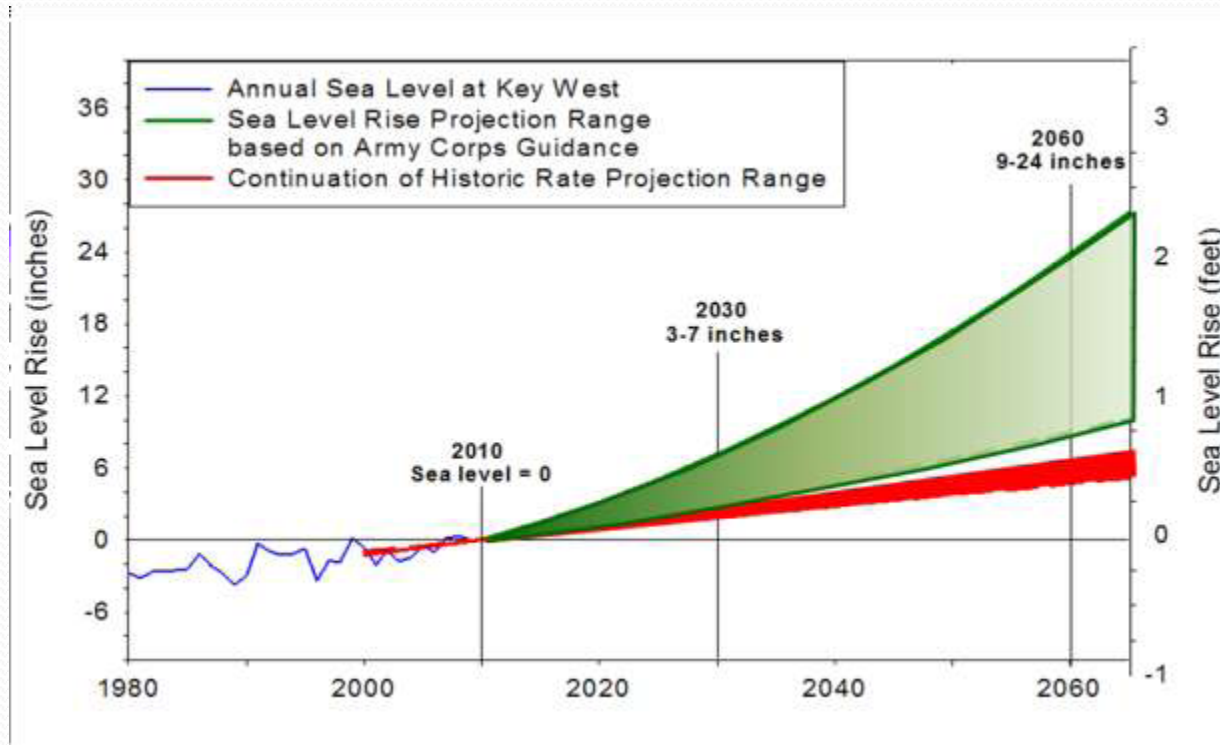
CLIMATE AREAS	UTILITY NEEDS	AVAILABLE TOOLS	RESEARCH NEEDS	CURRENT RESEARCH PROJECTS	ADDITIONAL RESEARCH NEEDS
Sea Level Rise	Monitor SLR data vs. models to develop statewide consensus	SE Climate Commission developing white paper			
	How do temp. and SLR forecasts correlate?				
	Florida SLR predictions	SE Climate Commission developing white paper			
	Salt water intrusion boundary	USGS has models			
	Building Coastal Construction Line	Available for coastal counties			Needs to be updated
	Drainage/Storm water impacts	Climate Compact developing Action Plan			

Sea level rise since 1870 per IPCC*



Source: IPCC-AR4-2007

SEA LEVEL RISE PREDICTIONS



VULNERABILITY ANALYSIS

- Regional Compact Technical Committee was tasked with analyzing impacts of 1, 2, and 3 foot sea level rise using SFWMD's inundation grids (50ft cell size); Broward County has completed initial analysis
- *Regional Vulnerability Planning Workshop*
- ☐ Ports/Airports ☐ Railroads
- ☐ Wastewater Treatment Plants
☐ Wellfield Protection Areas
- ☐ Landfills ☐ Hospitals
- ☐ Emergency Shelters
Routes ☐ Evacuation
- ☐ Schools ☐ Population (2010
BEBR)
- ☐ Taxable value of property ☐ Miles of road
- ☐ Endangered Species ☐ Future Land Use
- ☐ Habitat/Land Use Land Cover

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Carbon Emissions	Utility methods to reduce carbon footprint	WERF research - Utility reduction methods			
	Nitrous oxide impacts from ww plants on climate				How to measure nitrous oxide emissions



WERF WORKSHOP

THE FUTURE OF RESEARCH ON CLIMATE
CHANGE IMPACTS ON WATER

WET WEATHER & FLOODING

Research Needs

1. Decision Processes
2. Vulnerability of existing infrastructure
3. How to build public support for funding
4. Frequency & magnitude of extreme events
5. Update extreme precipitation & hydrologic data
6. Testing climate models using real data
7. Create federally supported hydrologic design standards
8. Extreme hydrologic events and their impacts
9. Appropriate level of redundancy and safety factors



WATER QUALITY

1. Climate Ready Regulation
2. Trigger Points for Water Quality Planning
3. Quantify Value of Ecosystem Functions
4. Track long-term change in Environmental Drivers & WQ
5. Effectiveness of BMPs under Climate Change
6. Project WQ Changes under Future Climates
7. Models for WQ & climate change decision making
8. When does Climate Change matter to WQ Decisions?
9. Robust Treatment Alternatives & flexible planning for changing climate
10. Quality Consequences of Current Actions

COASTAL ZONE MANAGEMENT

1. Integrated adaptation planning
2. Risk Communication
3. Integration to enhance robustness (Centralized systems connected to each other & small systems)
4. Costs & benefits of adaptation
5. Managing WQ & availability for coastal climate change
6. Integrated adaptation & mitigation in the coastal zone
7. Converting emerging science into design paradigm
8. Institutional management, planning & legal frame works
9. Regional climate change projections
10. Meeting data needs (topographic, HOWL, SLR, etc.)

WATER SUPPLY WORKGROUP

1. Closing the water balance knowledge gap
2. Assessment of the El Nino Southern Oscillation
3. Time & spatial resolution of temperature & precipitation projections
4. Ecosystem services
5. Climate change impacts on aquifers
6. [DownscaledData.gov](#)
7. Indirect effects of climate on demand
8. Non-structural approaches to water supply management
9. Decentralized infrastructure effects on resilience
10. Adaptive decision support tools for planning

ENERGY-WATER NEXUS

1. Update 1996 EPRI energy intensity for water & ww
2. Integrate multi-sector basin-wide planning
3. Communicate to stakeholders the need to invest in future reliability of energy & water supply
4. Planning tool for integrated water energy demand
5. Water quantity & quality requirements for energy
6. Energy generation within water & ww utilities
7. Demographic shifts resulting from climate change
8. How water energy nexus is addressed by integrated utilities



WORKSHOP FEEDBACK