Climate, Water, and Projected Changes

Water in an Atoll Environment

RMI National Water and Sanitation Summit

International Convention Center, Majuro, Marshall Islands

March 22-23, 2011

Republic of the Marshall Islands

Office of Environmental Planning & Policy Coordination

(OEPPC)

OFFICE OF THE PRESIDENT

Outline

- What is the RMI's overall climate change policy and strategy? And how does it address water?
- What are likely climate change impacts on our water resources?
- How can we plan for those impacts?
- "Water Adaptation" projects ongoing
- Final thoughts
- Questions for break out group

RMI Climate Change Policy Framework

- Nine Priority Areas
  - **Food and Water Security**
  - Energy Security and Conservation
  - **Biodiversity and Ecosystem Management**
  - **Human Resources Development, Education and Awareness**
  - **Health**
  - **Urban Planning**
  - **Disaster Risk Management**
  - **Land and Coastal Management**
  - Transport and Communication

RMI Climate Change Policy Framework

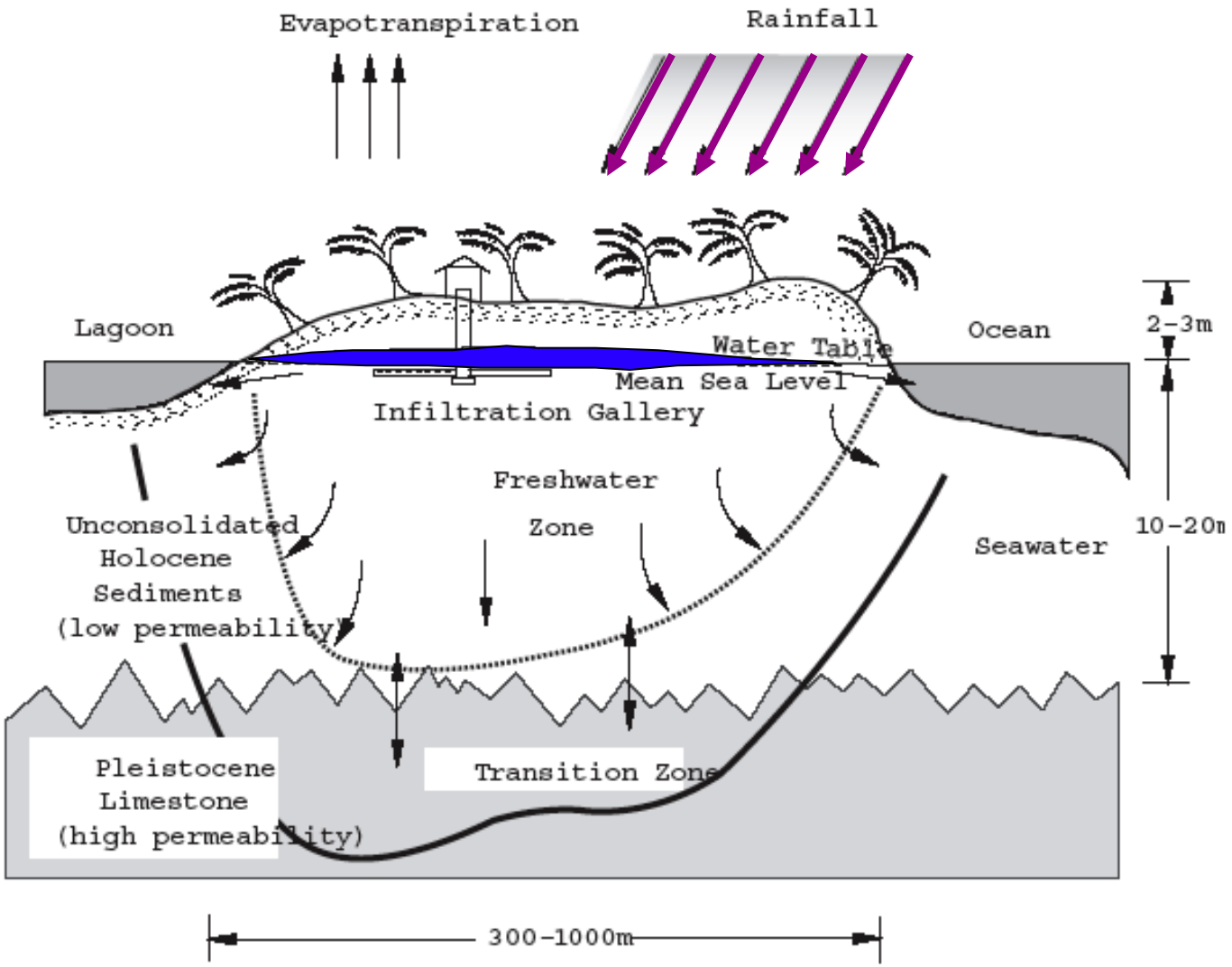
- Five Strategic Goals
  - Sustainable financing and institutional coordination for climate change
  - Energy security and low-carbon future
  - Adaptation for a climate-resilient future;
  - Disaster risk reduction preparedness and response capacity;
  - Building education and awareness, community mobilization, whilst being mindful of culture and gender.

What are likely CC impacts on our water resources?

- Historic data suggests:
  - Less rainfall, less groundwater
  - More salinity of groundwater
  - More C°/F°, more evaporation

- Historic data is being used to project future climate scenarios

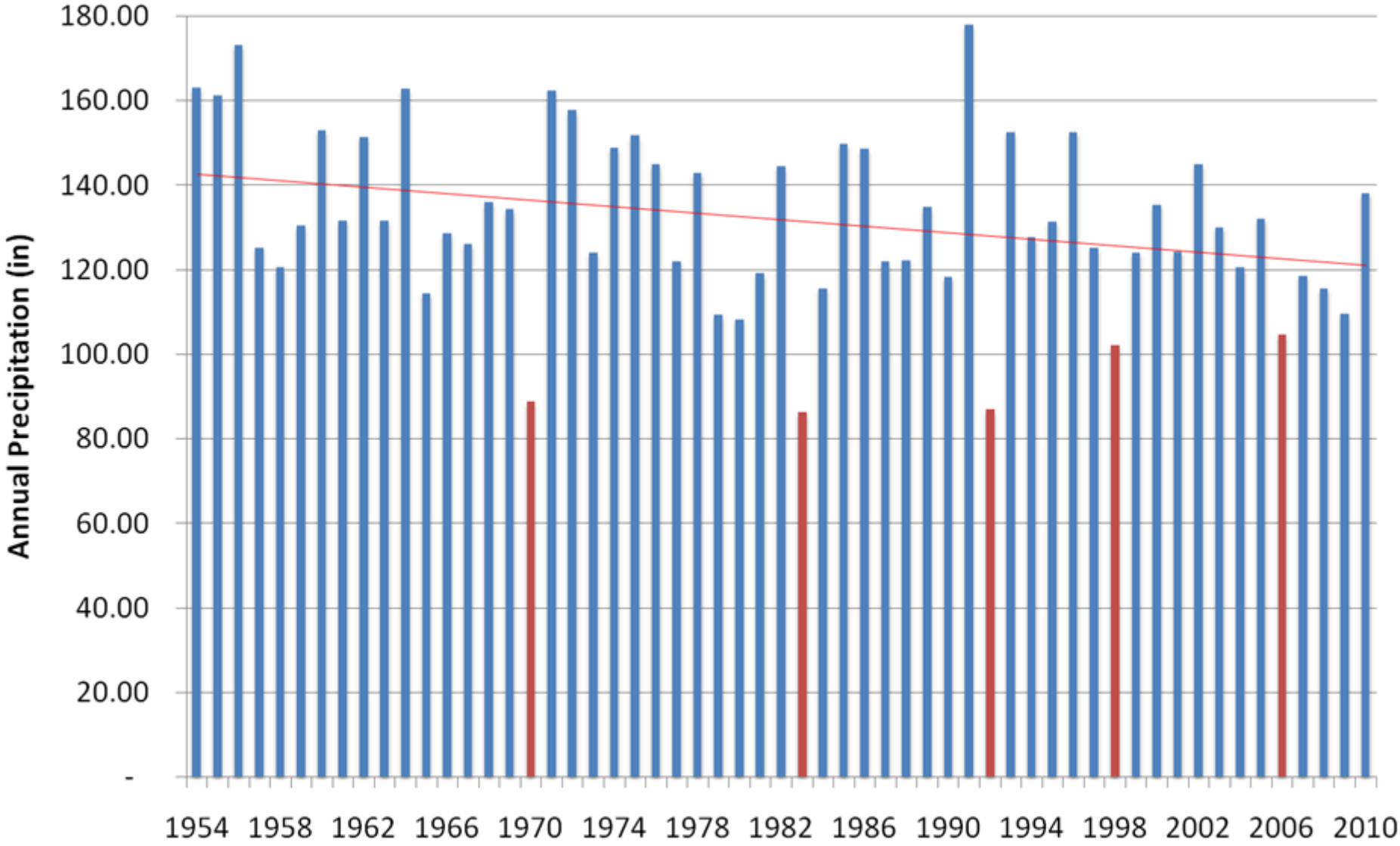
Less Rainfall, Less Groundwater



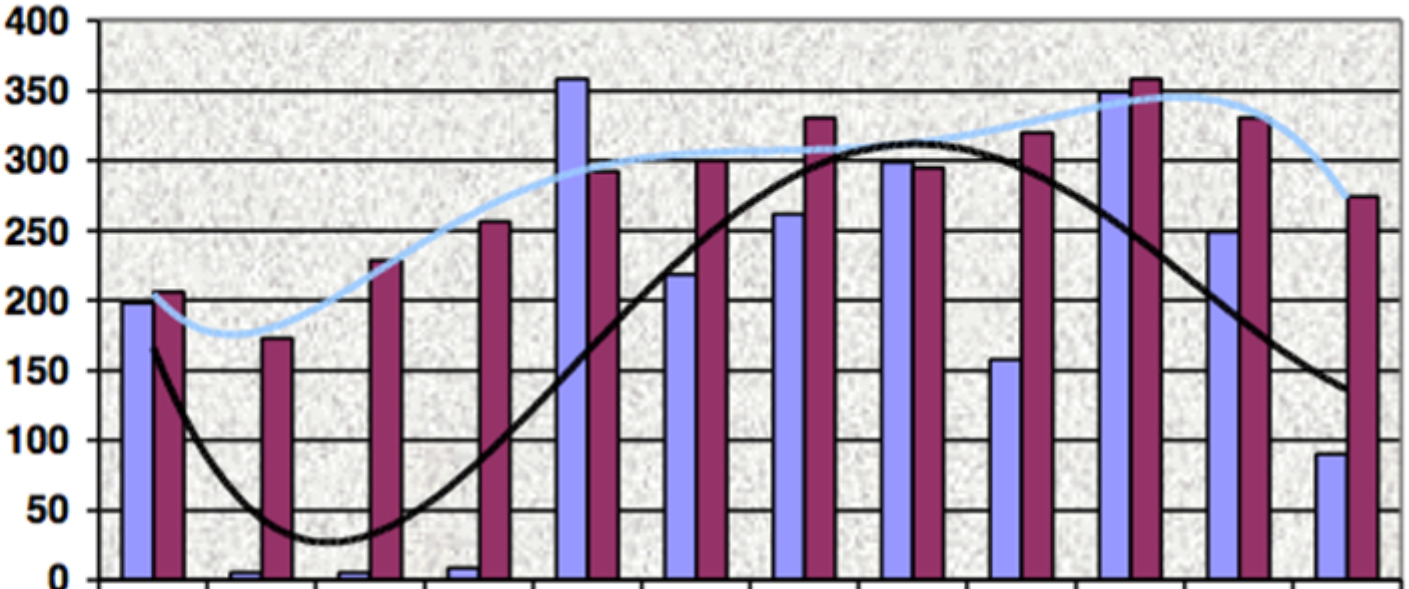
"... a 10% reduction in average **rainfall** by 2050 is likely to correspond to a 20% reduction in the size of the **freshwater lens**..."

- IPCC 2007

Annual Precipitation (Majuro)



Drought Periods (Majuro)

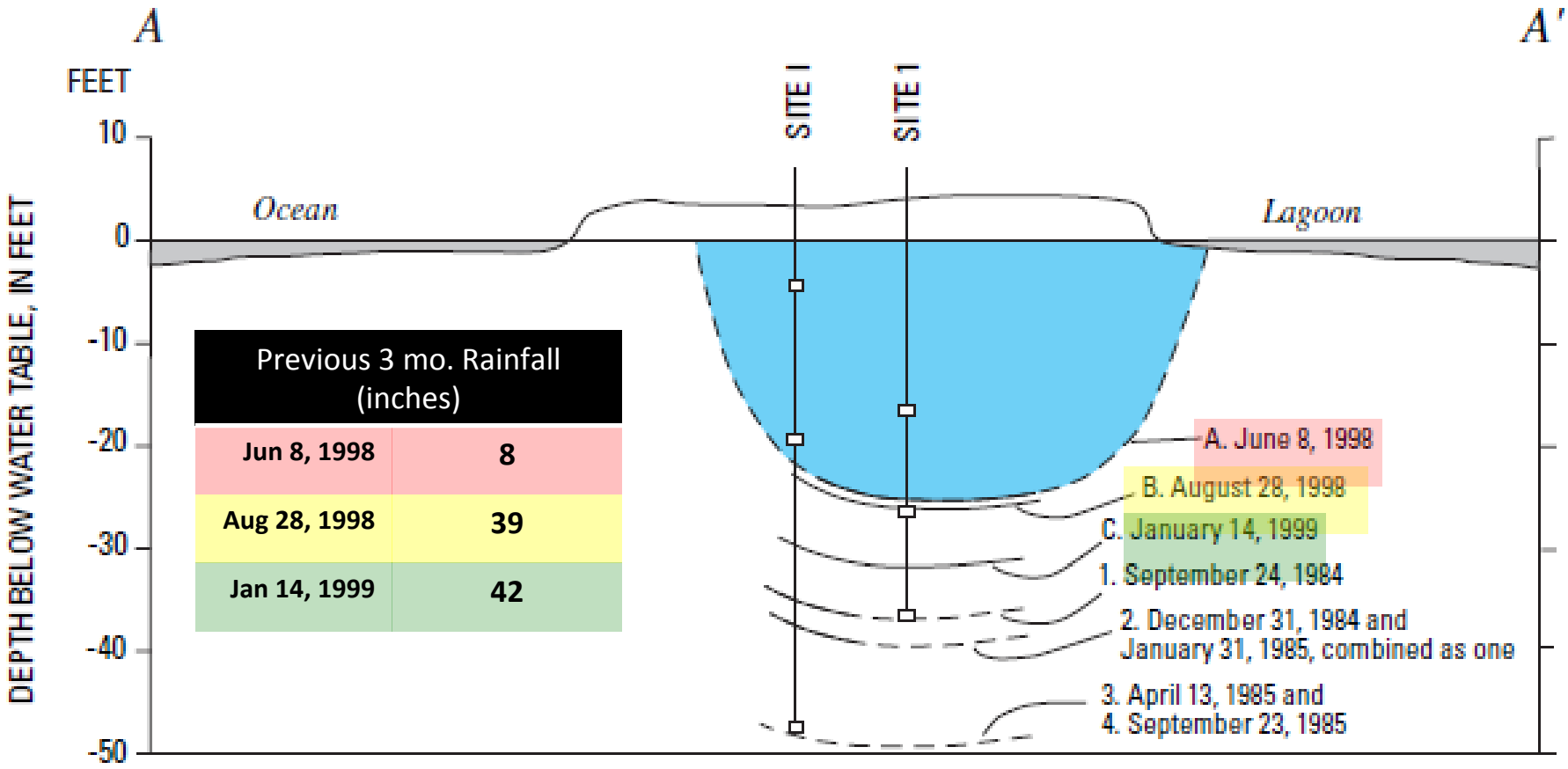


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Typical Drought Year	198.12	5.08	5.08	8.89	358.14	218.44	261.62	298.45	157.48	349.25	248.92	90.17
Average Rainfall	205.74	172.72	228.6	256.54	292.1	299.72	330.2	294.64	320.04	358.14	330.2	274.32

Figure 2: Average Rainfall compared with Typical Drought Year Rainfall in Millimetre for Majuro Atoll

Water Supply for Majuro, Republic of Marshall Islands A Technical Appraisal for Feasible OptionsSOPAC/ Water Resource Unit Edited and Compiled by Harald Schölzel *SOPAC Technical Report 258*

Drought and Underground Water



Previous 3 mo. Rainfall (inches)	
Jun 8, 1998	8
Aug 28, 1998	39
Jan 14, 1999	42

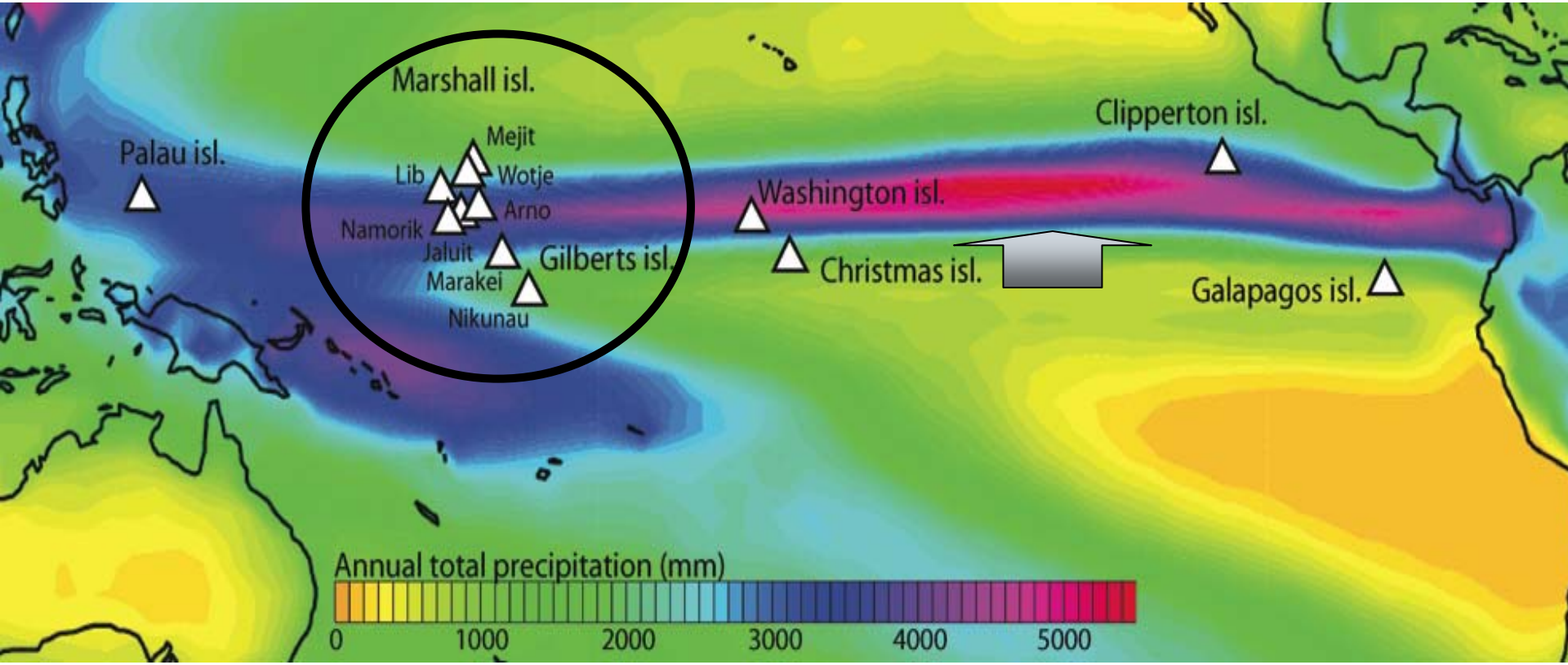
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1997	5.44	6.95	6.57	14.54	21.33	8.19	4.93	11.69	19.09	10.91	*7.93*	*7.63*
1998	***1.57***	***0.34***	***0.27***	***0.64***	***6.59***	10.51	16.29	12.05	9.30	19.45	13.57	11.48
1999	7.23	3.82	10.15	5.32	8.20	13.07	8.94	10.99	11.35	17.85	17.27	9.85

Sea Level Rise and Groundwater

Historic:	5cm by 2010 (since 1993)
Projected:	30cm by 2050?
Projected:	90cm by 2100?
Projected:	100cm by 2150?

Change in Rainfall Patterns

Has the ITCZ “rain band” really moved
300 miles North since 1630 A.D.?

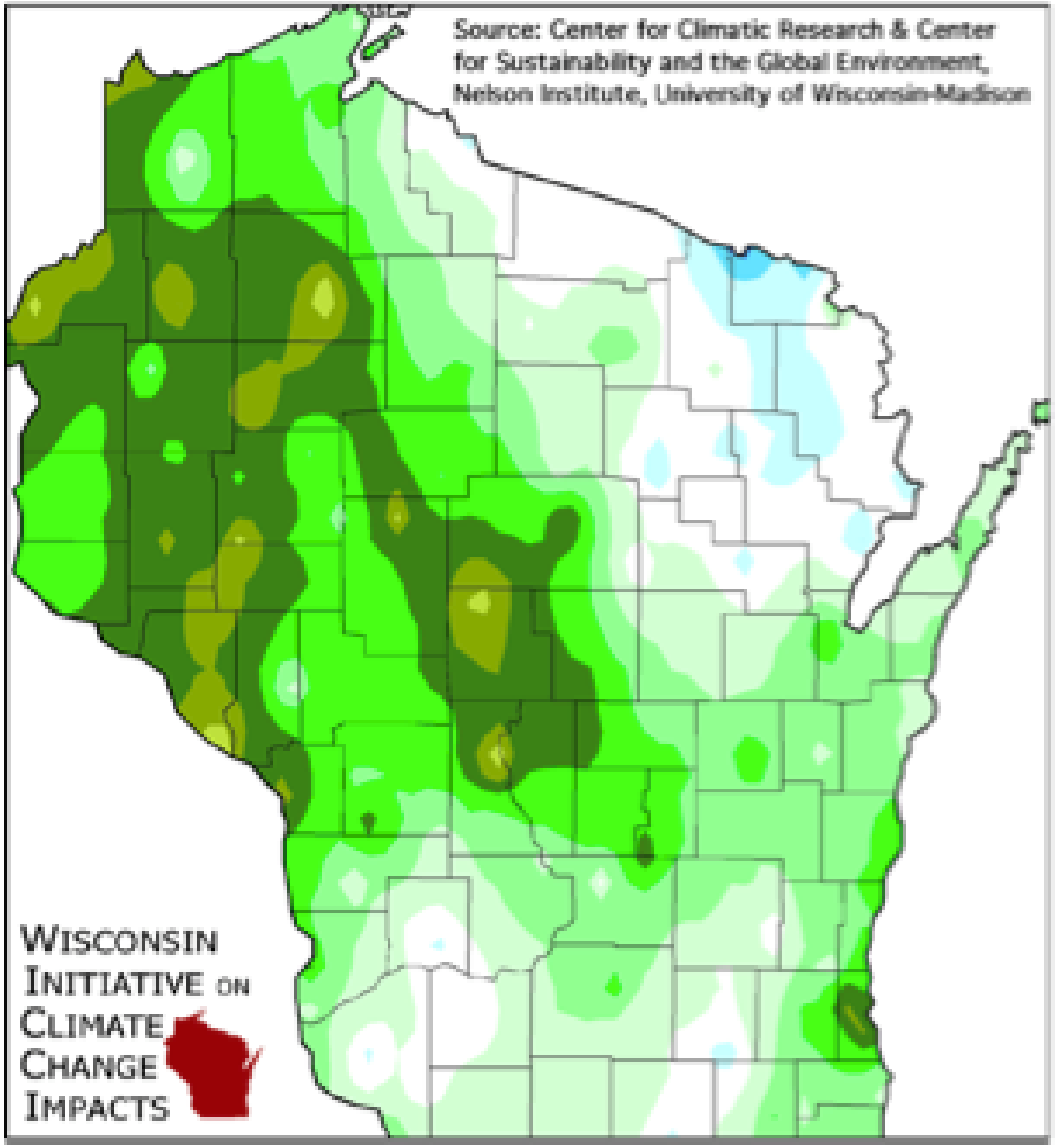


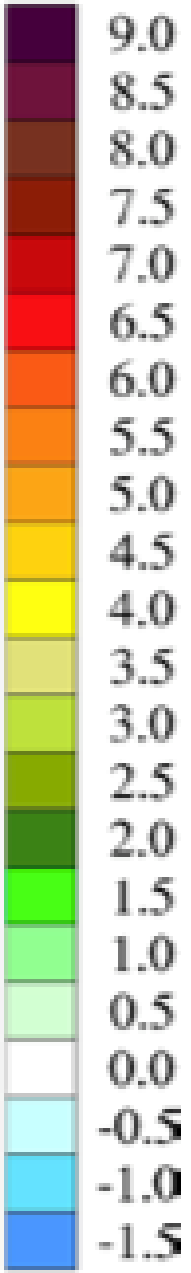
Wallace, Mitchell & Lau: Legates/MSU Mean Annual Rainfall ‘79-’96, http://jisao.washington.edu/legates_msu/

What are the scenarios by 2030?
What are the scenarios by 2090?

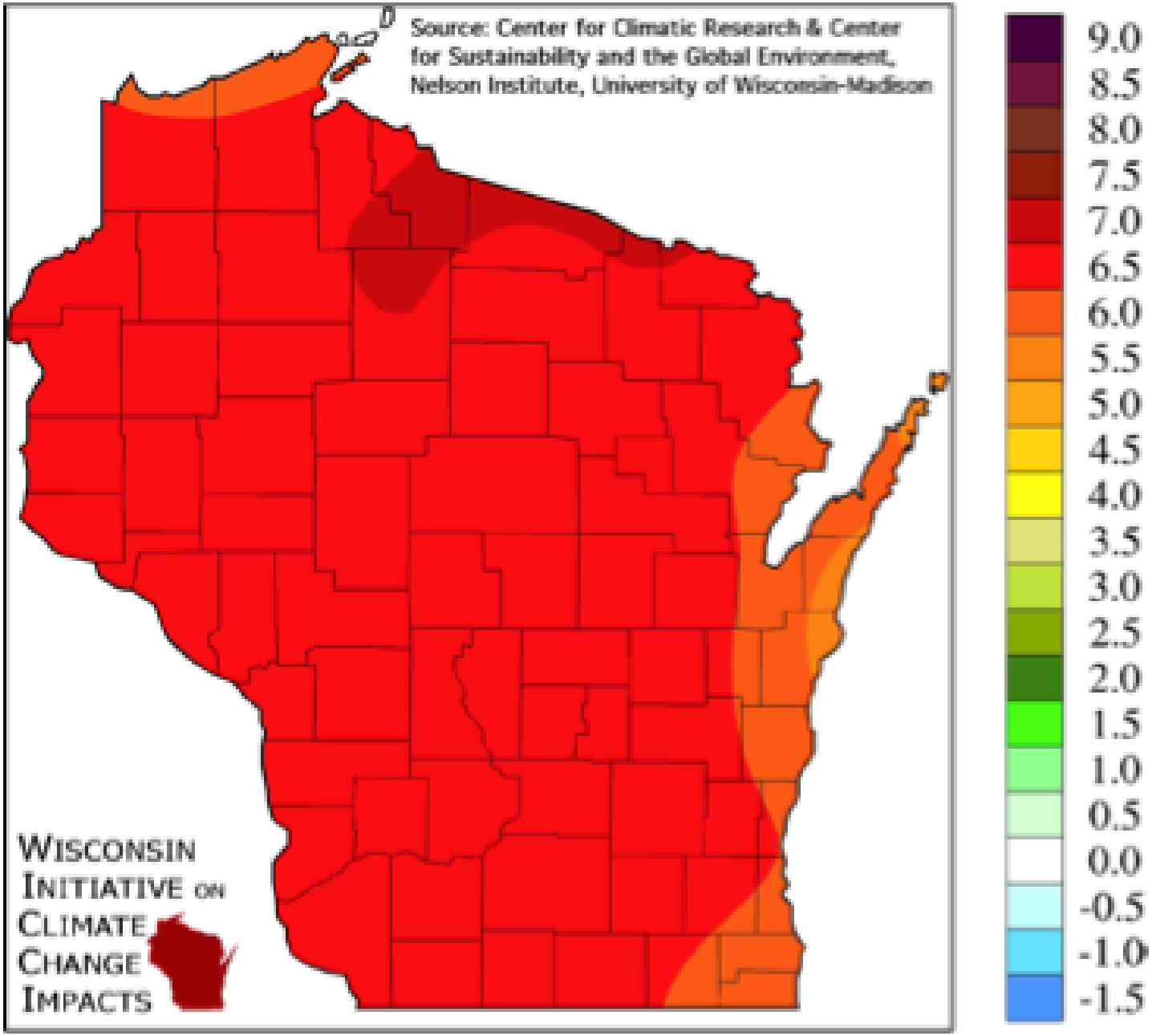
- Vulnerability Assessment
  - Based on local historic climate data and Global Circulation Models (GCMs) used by the IPCC
  - Climate models being developed through the following projects:
    - Sustainable Land Management (SLM)
    - UNFCCC Second National Communication (SNC)
    - ADB TA 7394-REG
    - CMI conducting wave and inundation modeling
  - Wisconsin example

Change in Annual Average Temperature (°F) from 1950 to 2006





Projected Change in Annual Average Temperature (°F) from 1980 to 2055

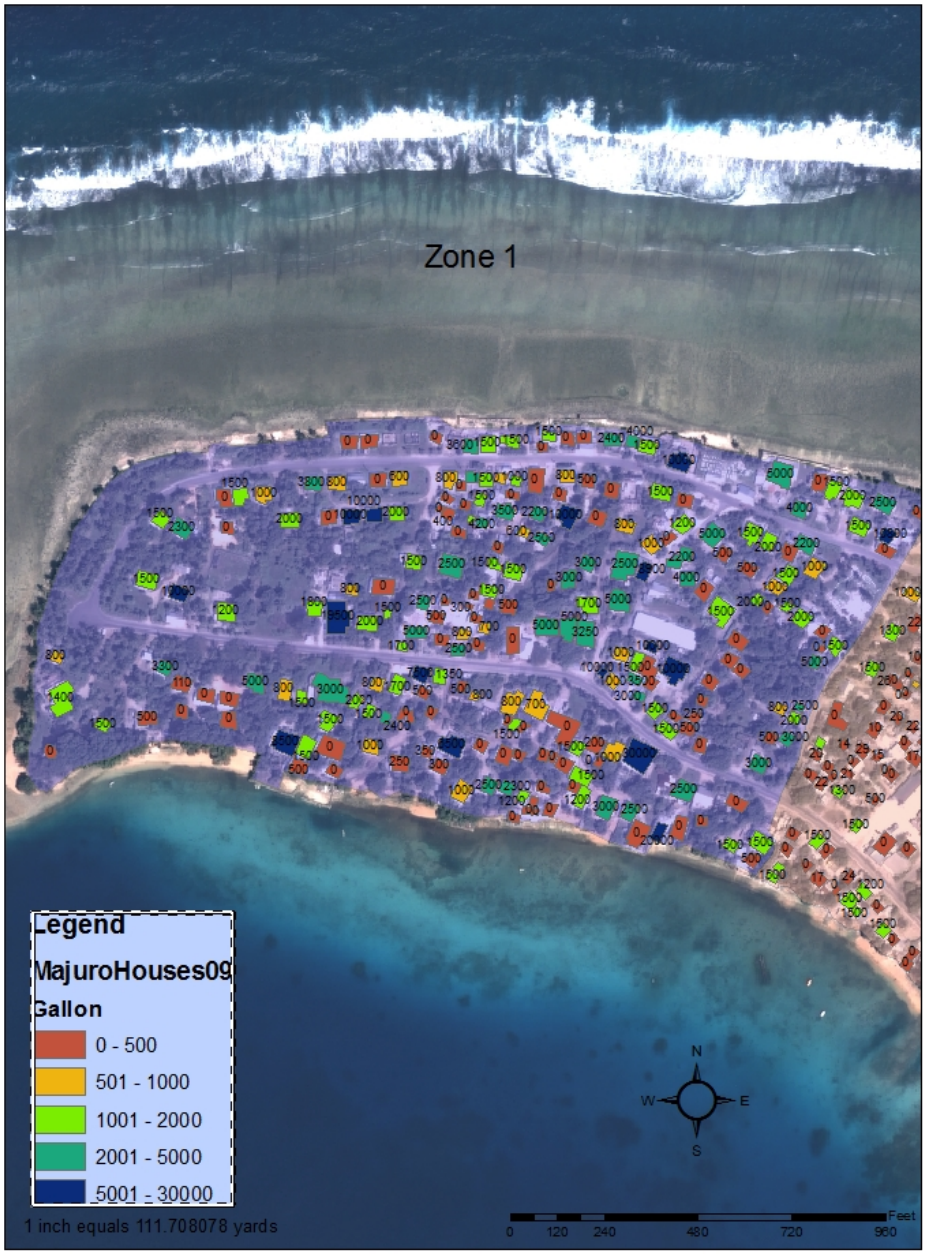


“Water Adaptation” projects ongoing

- Second National Communication (SNC)
  - Conduct a national climate impacts and vulnerability assessment (incl. rainfall)

- ADB TA 7394-REG
  - Build up the airport water catchment resilience 2012-2015
  - Build capacity in use of GIS by combined utilities

Use of GIS…


Zone 1
Legend
MajuroHouses09
Gallon
0 - 500
501 - 1000
1001 - 2000
2001 - 5000
5001 - 30000
1 inch equals 111.708078 yards
N
W
E
S
0
120
240
480
720
960
Feet

“Water Adaptation” projects ongoing

- Pacific Adaptation to Climate Change
  - Reduce leakage and provide cover to reduce water loss from evaporation at Majuro reservoirs 2013

  - Improve household water management and supply in Laura to reduce impacts on underground water system 2013

"Water Adaptation" projects ongoing

- SLM
  - Extra water catchments in Laura to reduce impacts on underground water system 2013
  - Profiling atoll from Arrak to Peace Park
  - GIS capacity building
  - Technical Training on agro-forestry with RND employees
  - Demo project on Ebeye for agro-forestry and climate adaptation with RND and KALGOV, Traditional Leadership

Final thoughts

- Climate change is likely to reduce and redistribute the availability of natural fresh water resources in the Marshall Islands

- Large-scale impacts to a variety of sectors
  - Agriculture, Coastal Fisheries, Health, Etc.

Key questions for the breakout group

- How can internal relocation affect resource consumption? Who/where will be most affected?
- Can sufficient rainfall be collected to supply demand, or must other options for water supply be utilized?
- Can we enhance our weather prediction capabilities using traditional ecological knowledge?
- How can we improve water conservation?
- Are the current water awareness programmes sufficient and effective?
- How can we improve water storage and its maintenance both in the outer islands, Kwajalein, and in Majuro?