

An Update on Sea Level Rise Projections

Jayantha Obeysekera (Obey)

Chief Modeler

Hydrologic & Environmental Systems Modeling

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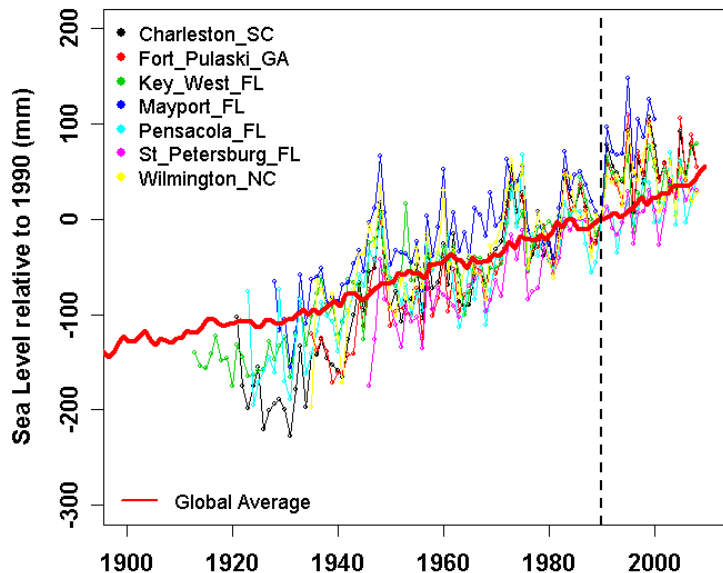
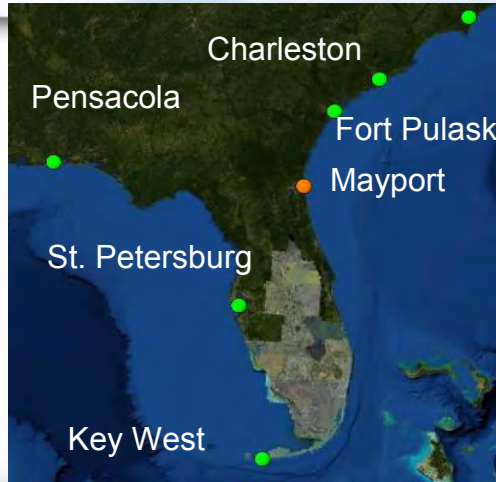
Direct impacts – Miami Beach

Sunny Day Flooding?



Accommodation?

Relative Sea Level Rise: Closer to home

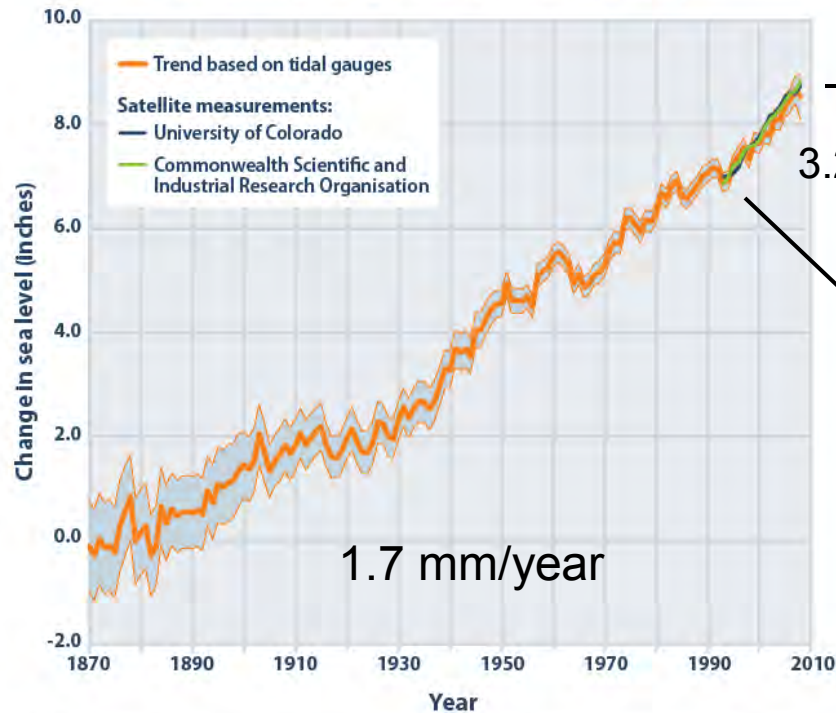


□ **Relative Sea Level**
(height above a local datum) depends on:

- ✓ **Global Mean Sea Level**
- ✓ **Vertical Land Movement**
(uplift/subsidence/post glacial rebound)
- ✓ **Regional Variability**
(ocean dynamics and salinity variations)

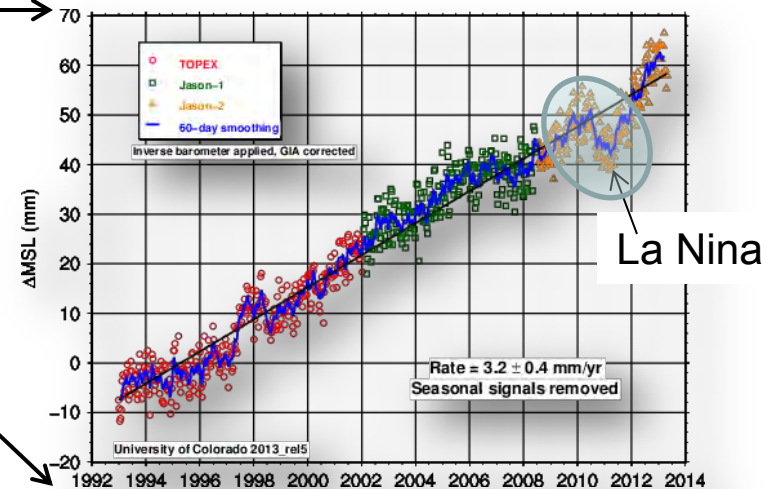
Global Average Sea Level Rise & Relative Sea Level Rise along US Coastline

Trends in Global Average Absolute Sea Level, 1870–2008



Data sources:
 - CSIRO (Commonwealth Scientific and Industrial Research Organisation), 2009. Sea level rise. Accessed November 2009. <http://www.cmar.csiro.au/sealevel>.
 - University of Colorado at Boulder, 2009. Sea level change: 2009 release #2. <http://sealevel.colorado.edu>.

For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climatechange/science/indicators.



Sources of Sea Level Rise (Global & Relative)

What causes the sea level to change?

Terrestrial Water Input

Terrestrial water storage, extraction of groundwater, building of reservoirs, changes in runoff, and seepage into aquifers

0.12 mm/yr
0.38 mm/yr

Land-based Ice

- **Glaciers** 0.86 mm/yr
- **Ice Sheets in**
 - **Greenland** .33 mm/yr
 - **Antarctica** .27 mm/yr

Exchange of the water stored on land by glaciers and ice sheets with ocean water

Surface and deep ocean circulation changes, storm surges

As the ocean warms, the water expands

Subsidence in river delta region, land movements, and tectonic displacements

Thermal Expansion

0.8 mm/yr
1.1 mm/yr

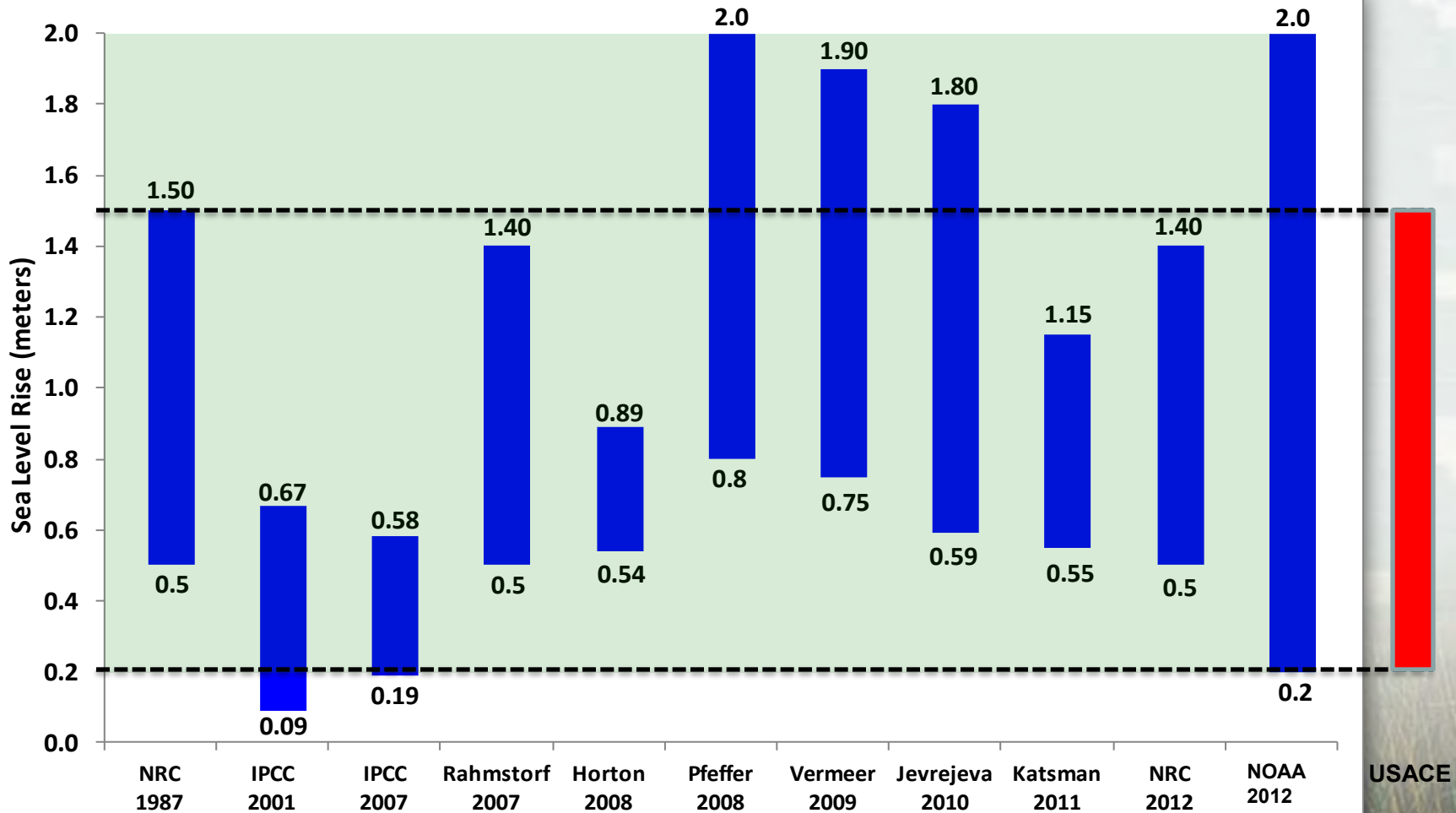
Vertical Land Movement

Key West: -0.50 mm/yr
Fernandina Beach -0.60 mm/yr
Mayport -0.59 mm/yr

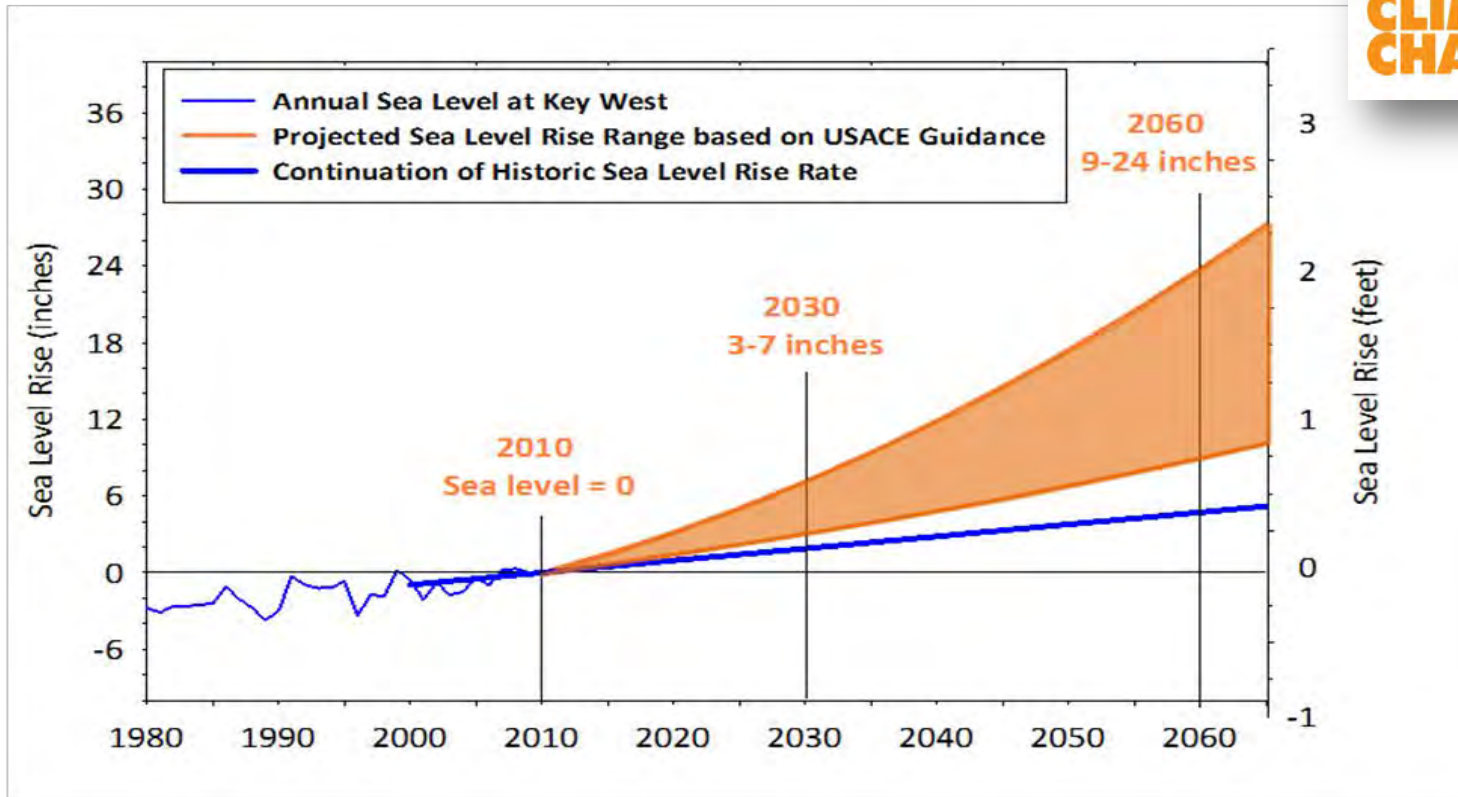
1971-2010 & 1993-2010

SYR - FIGURE 3-4

Comparison of Peer-reviewed Research Estimates: Global Sea Level Rise by 2100



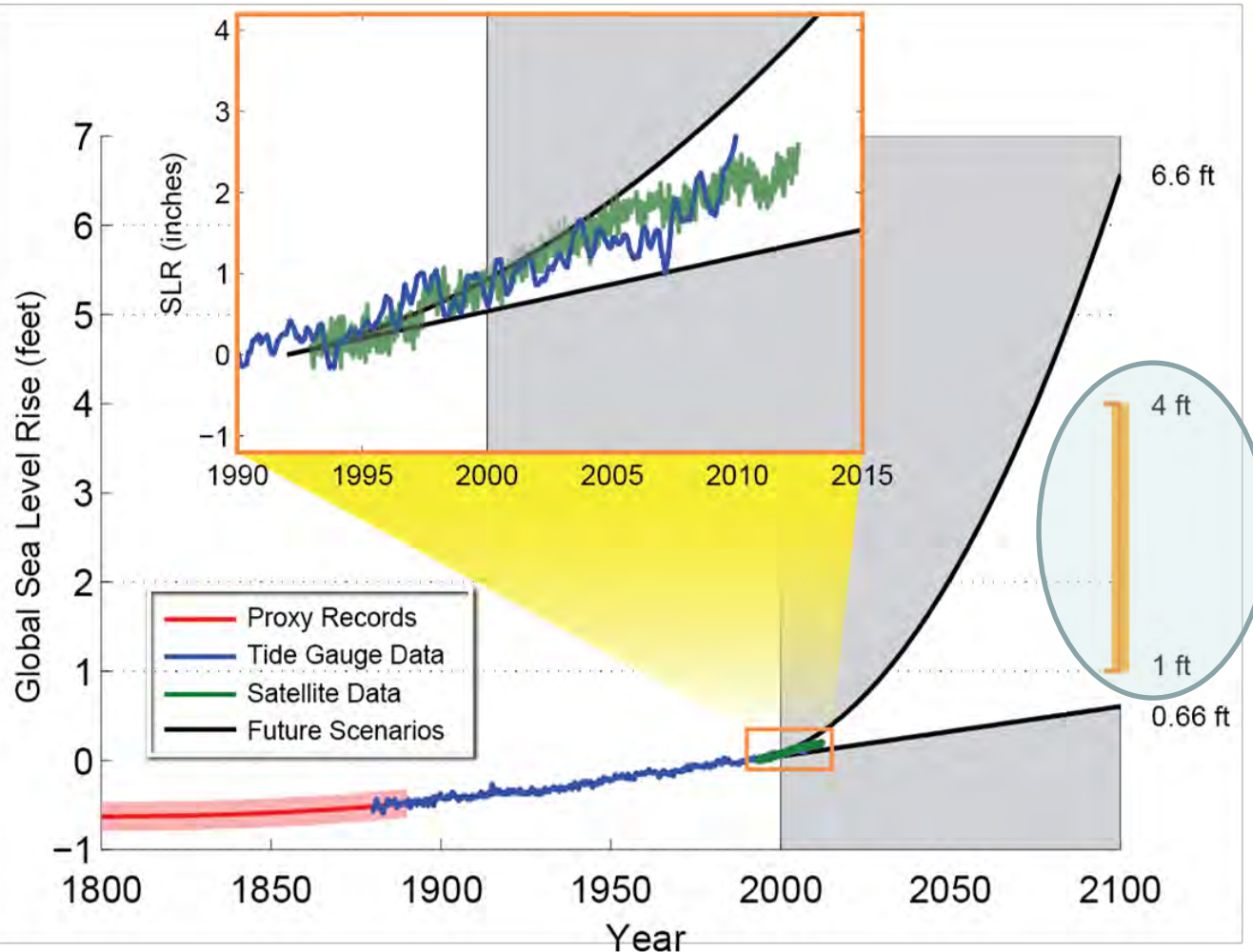
Unified SE FL Sea Level Rise Projection



Projected range of sea level rise (National Climate Assessment, 2013)

Global Sea Level Rise Scenarios for the
United States National Climate Assessment

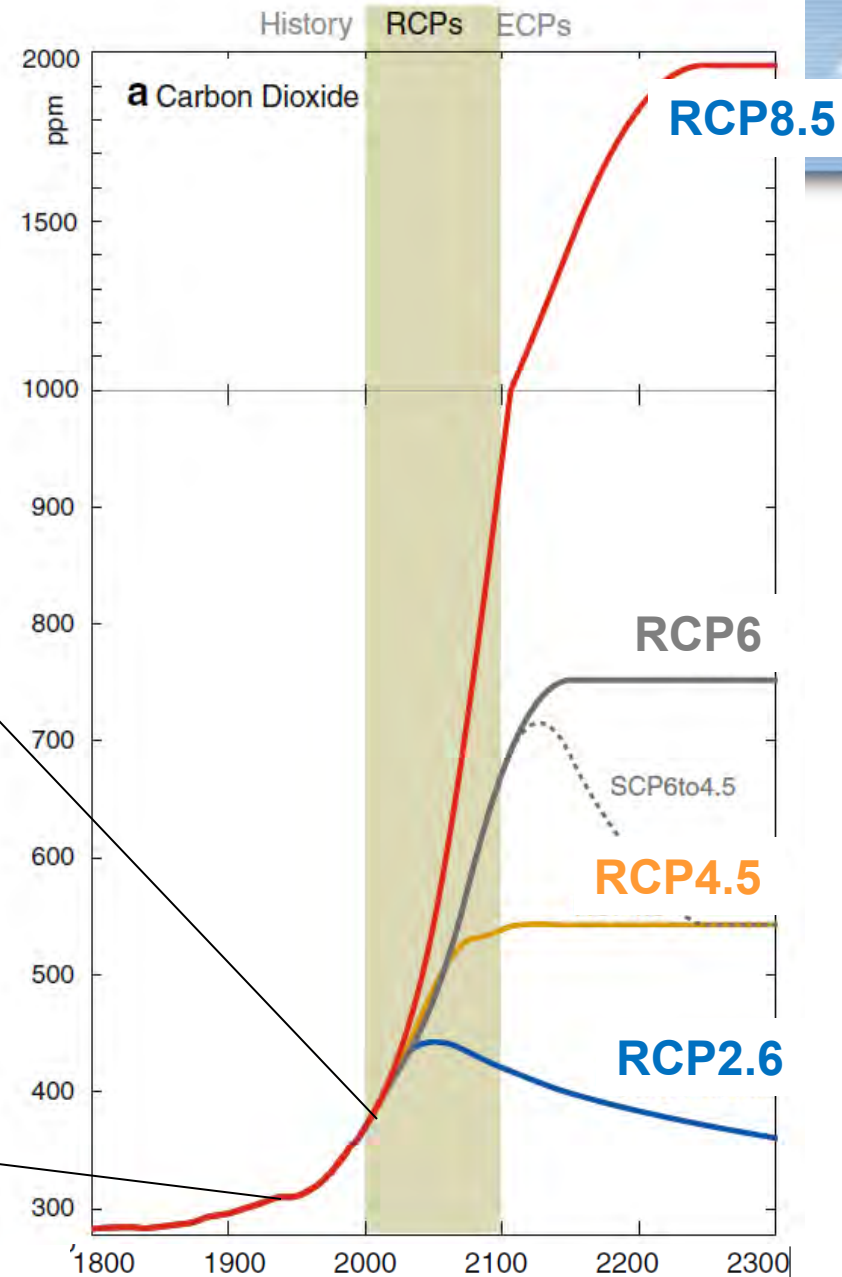
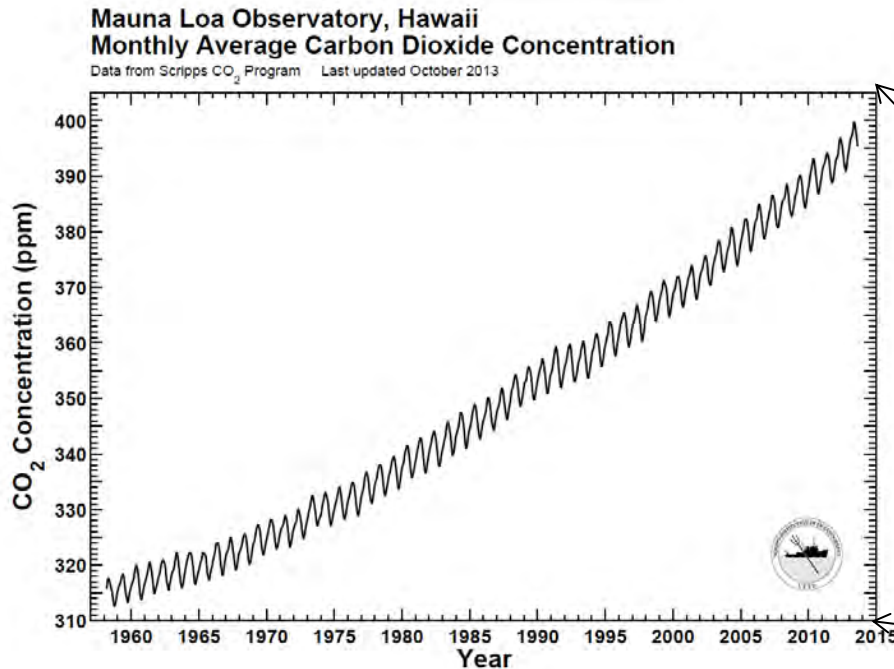
December 6, 2012



Draft report: <http://ncadac.globalchange.gov>

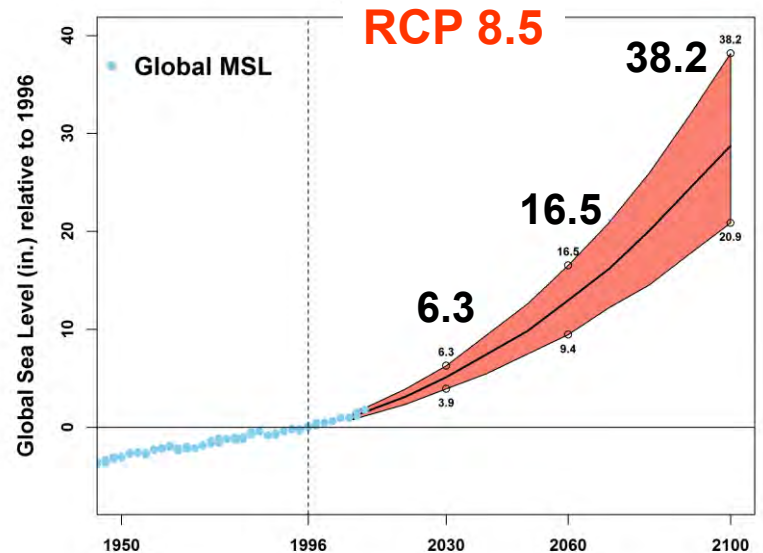
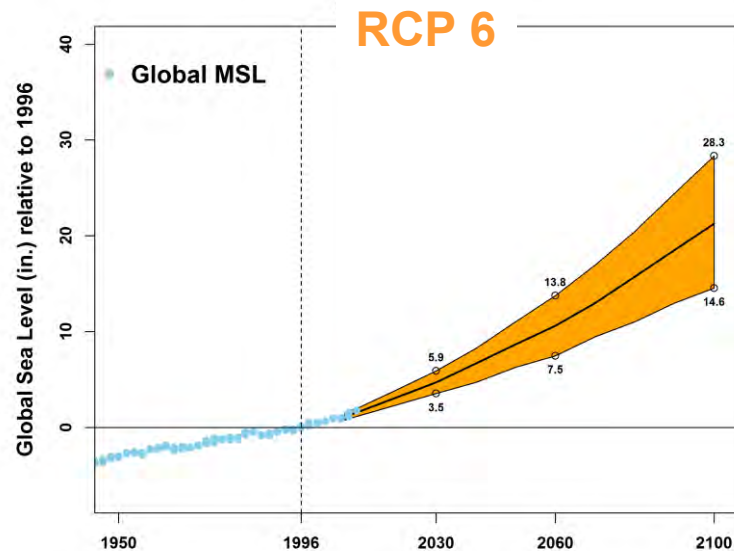
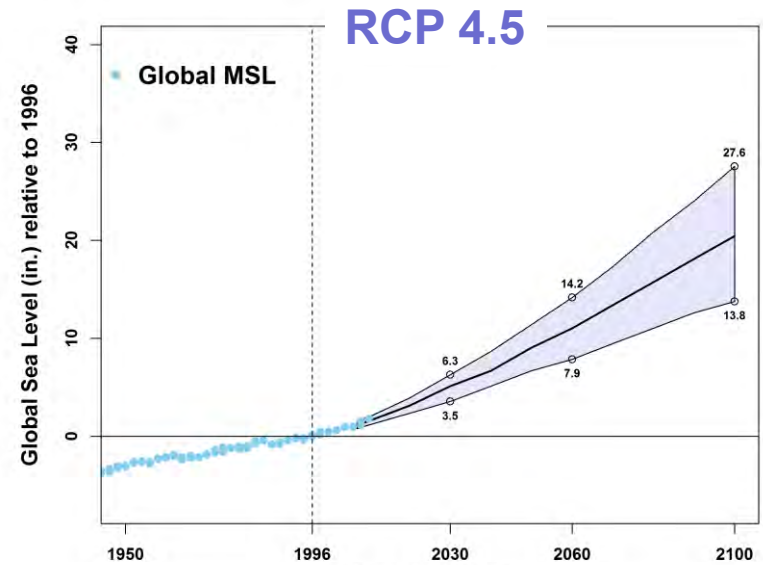
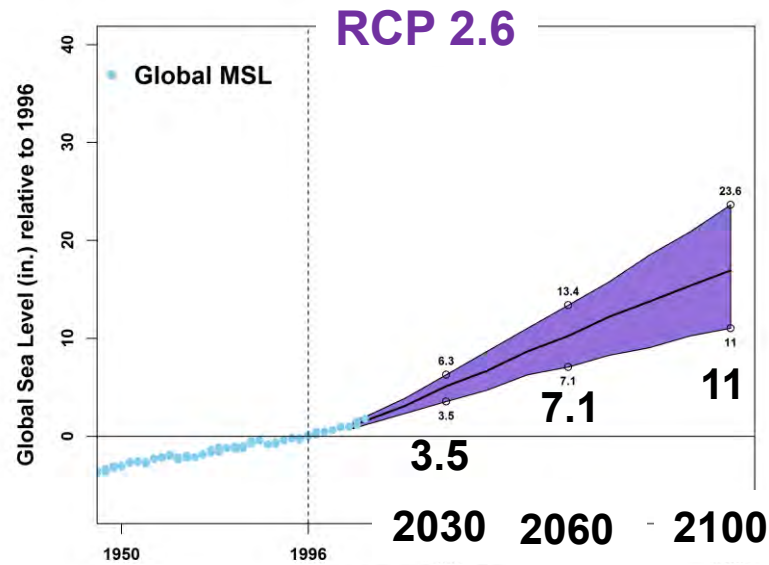
AR5: Representative Concentration Pathways

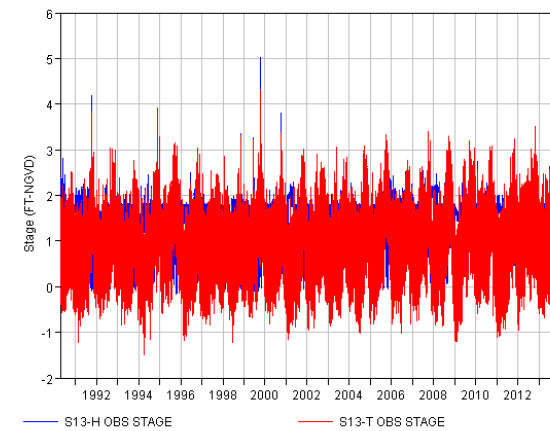
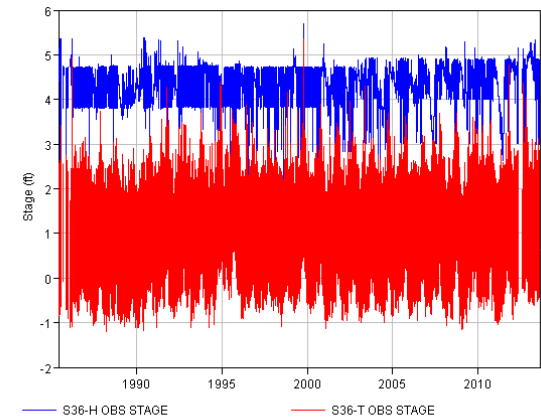
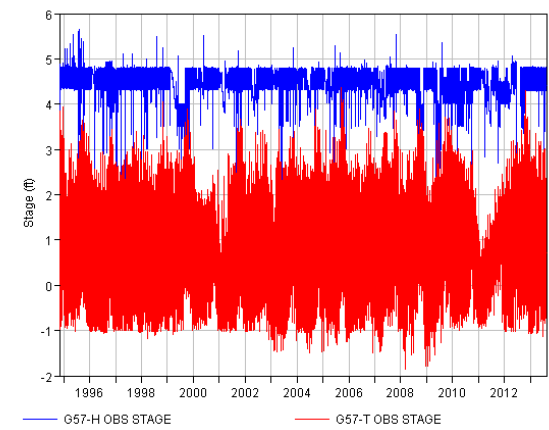
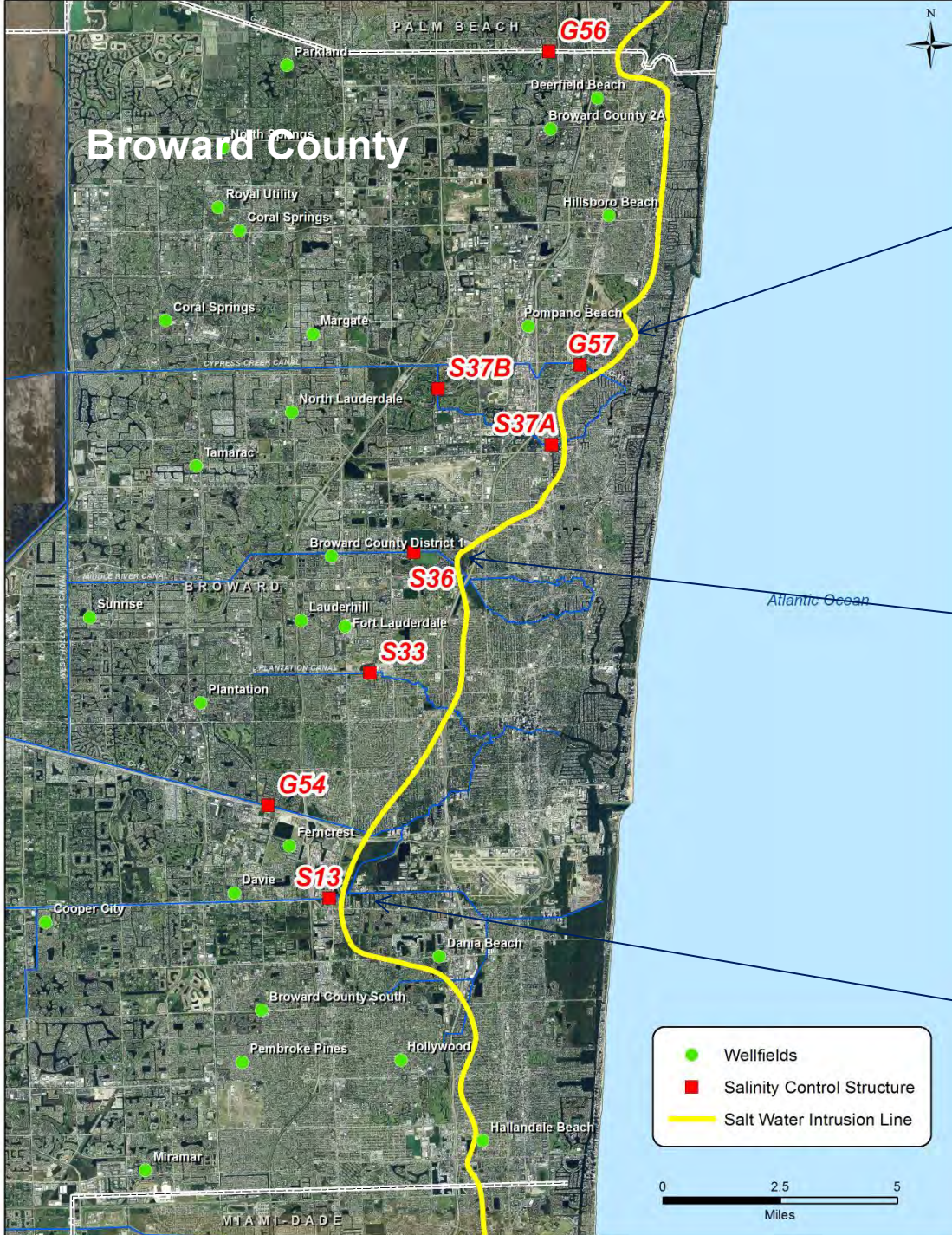
New IPCC (AR5) Approach for Greenhouse Gas Scenarios*

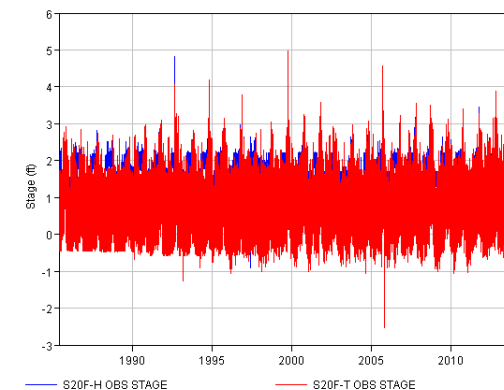
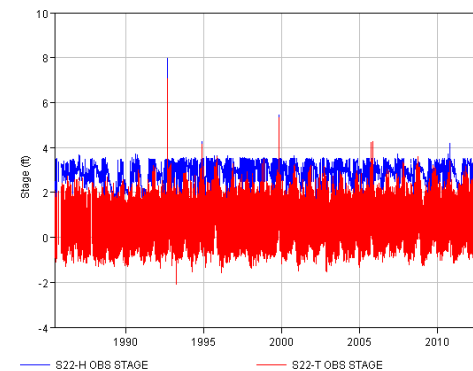
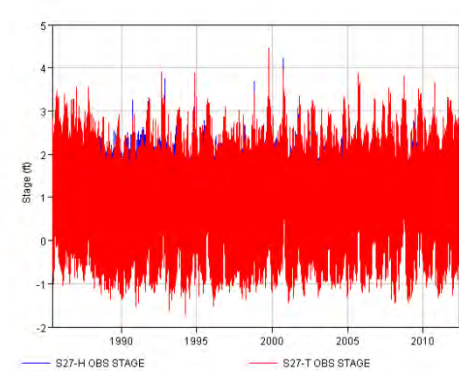
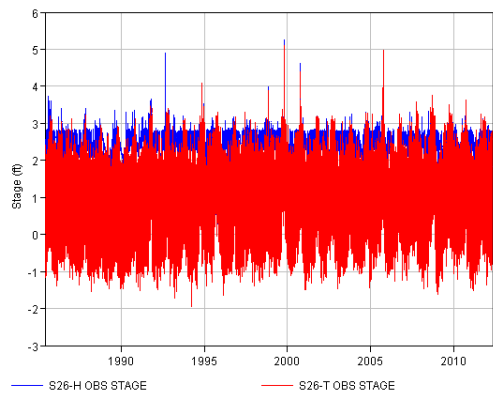


New IPCC AR5 Projections by Scenario (Reference Year – 1996)*

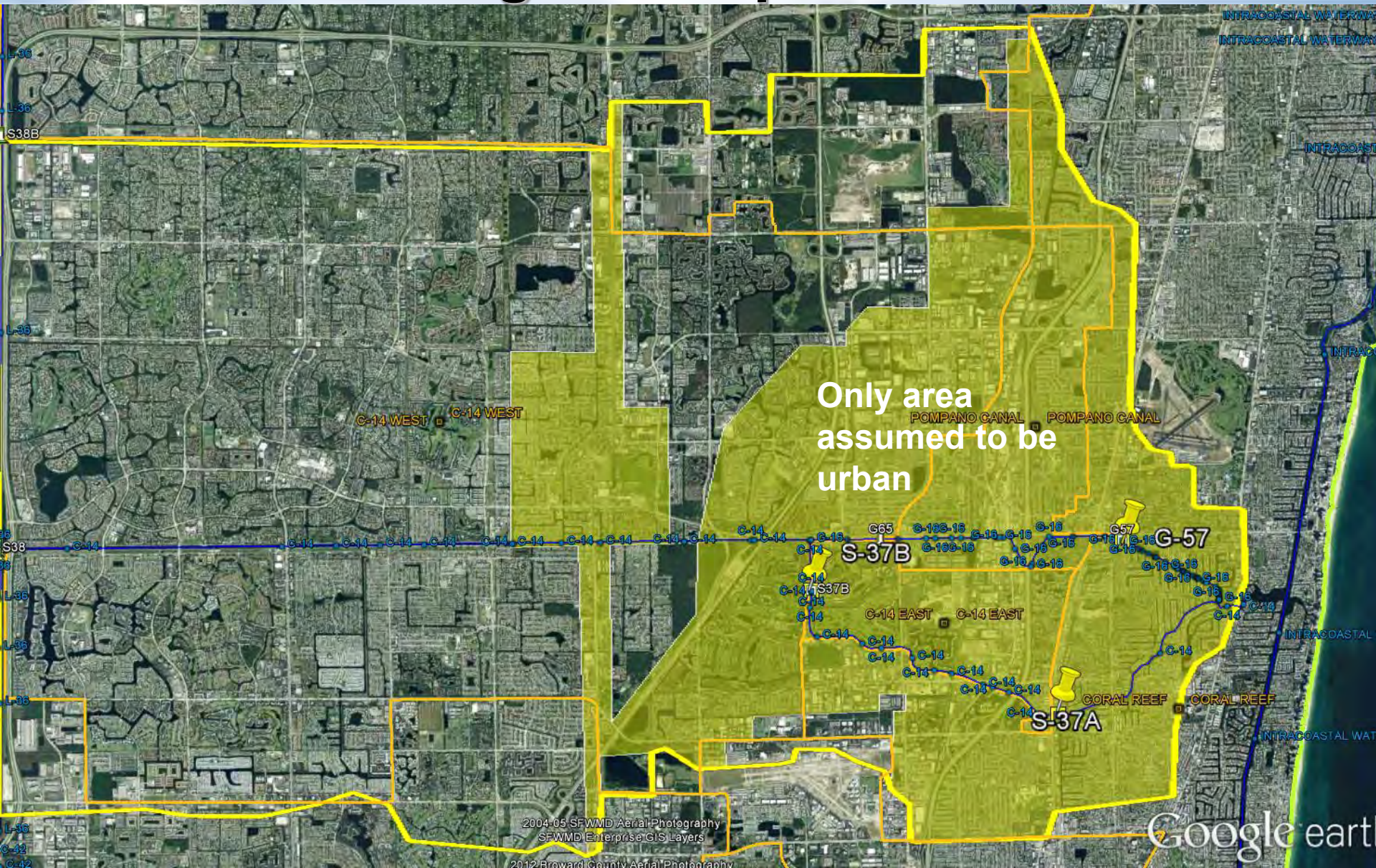
*produced using data in AR5 draft



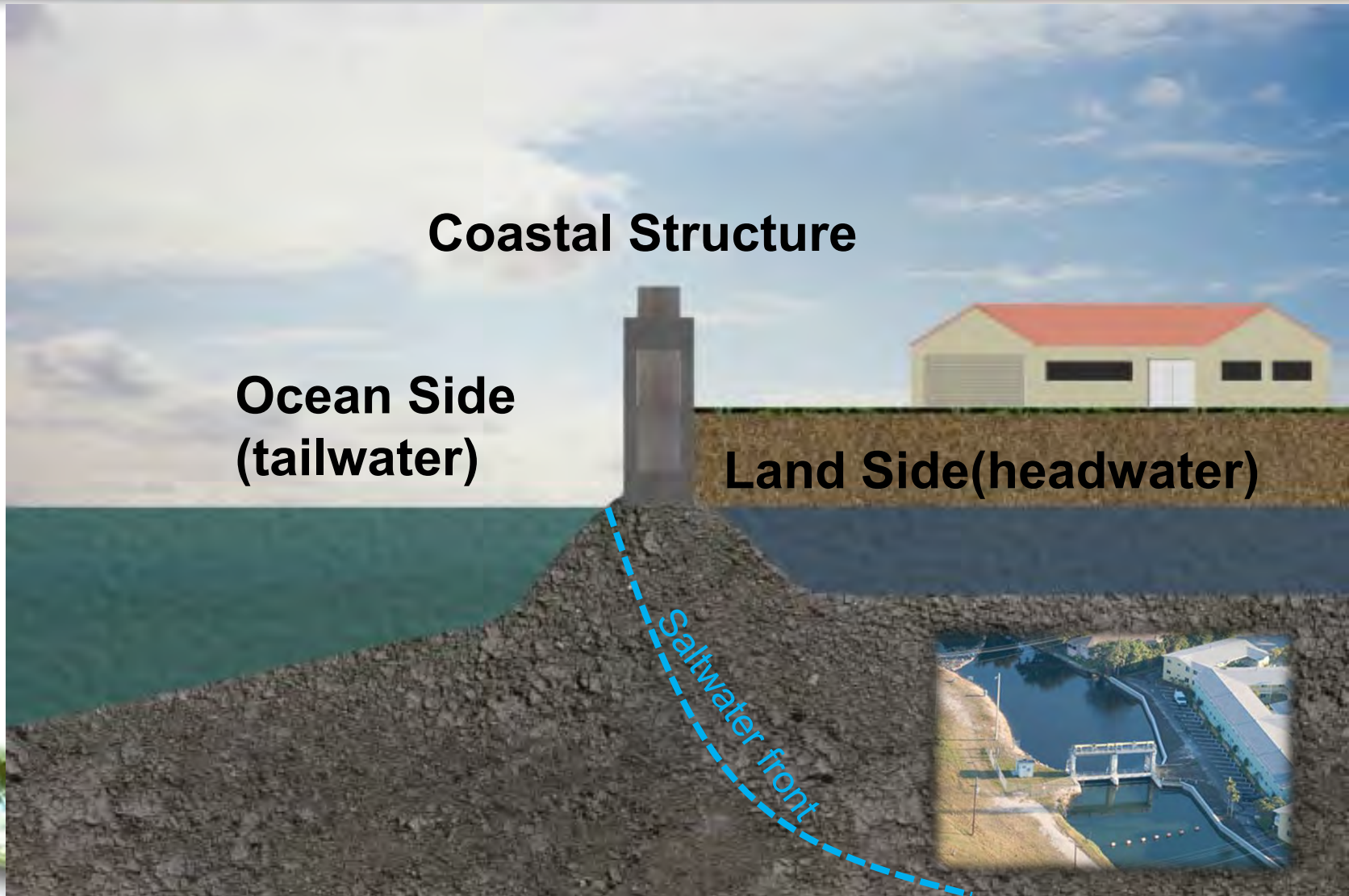




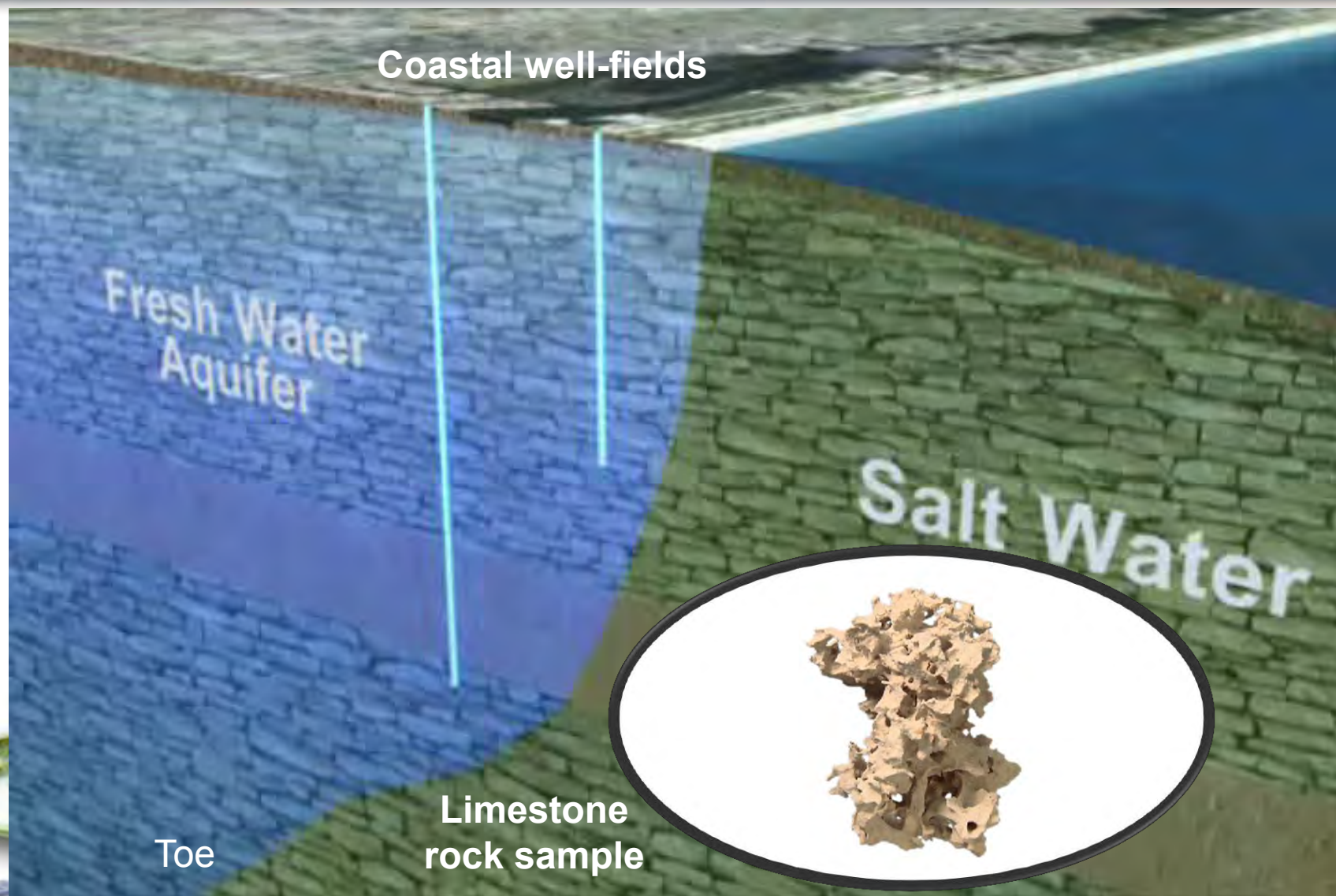
C&SF System: 1950s Planning Assumptions versus now!



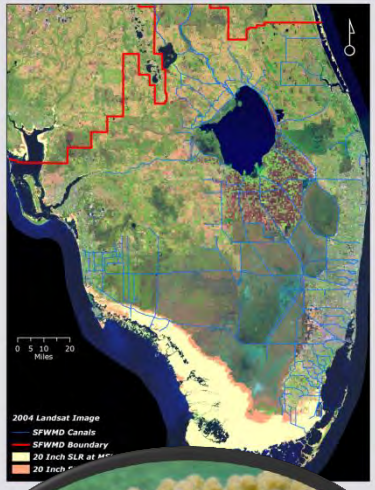
Coastal Infrastructure – Flood Control



Water Supply: Saltwater Intrusion



Exposure: Inundation & Collapse of Freshwater Wetlands



Questions?

