Update on Sea Level Rise & Climate Science

Scientific and Technical Working Group
Maryland Climate Change Commission

Don Boesch
Coast Smart Council Meeting
September 1, 2016
Maryland Climate Change Commission

- Created by Executive Order in 2007
- Maryland *Climate Action Plan* in 2008
- Greenhouse Gas Emission Reduction Act 2009
- Commission codified into law in 2015
- Recommendations basis of GGRA 2016
- Provides recommendations for reducing greenhouse gas emissions and adapting to impacts of climate change
- 26 members, including, MDE, DNR, MDOT secretaries, Treasurer & UMCES President
- Working Groups: Mitigation, Adaptation & Response, Scientific & Technical, Education-Communication-Outreach
Global Warming Continues Without Pause

Anomaly from 1880-1899 baseline °C

GISTEMP LOTI (incl. 2016 prediction)

- 1°C above pre-industrial
- 1998 strong El Niño
- 2016 prediction
As Atmospheric Greenhouse Gases Increase

Latest CO$_2$ reading
August 15, 2016

401.41 ppm

Carbon dioxide concentration at Mauna Loa Observatory

Full Record ending August 15, 2016

43.5% increase over pre-industrial concentrations
How Much Will Earth Warm?

It mainly depends on how much greenhouse gases we emit.

Global average surface temperature change (relative to 1986–2005)

- Unrestrained growth in emissions (RCP 8.5): 7.2°F (3.6°C)
- Rapid emissions reductions (RCP 2.6): 3.6°F (2.0°C)
Sea-Level Has Been Rising Since 19th Century

Baltimore tide gauge

8574680 Baltimore, Maryland

3.14 ± 0.13 mm/yr

- Linear Mean Sea Level Trend
- Upper 95% Confidence Interval
- Lower 95% Confidence Interval
- Monthly mean sea level with the average seasonal cycle removed
Rate of Global Sea-Level Rise Increased

Tide gauge and satellite data

Satellite data

http://www.columbia.edu/~mhs119/SeaLevel/
Sea-Level Projections: Scenario Approach

SE Virginia sea level rise scenarios

- highest
- high
- low
- historic

Maryland 2013 update

VIMS 2013 (modified from National Climate Assessment)
Probabilistic Sea-Level Projections

Baltimore, Maryland

RCP 8.5

High Emissions

 Likely: 17th-83rd percentile

2.2-4.1 feet

Compared to five DOD sea-level rise scenarios, adjusted for vertical land movement

RCP 2.6

Low Emissions

< 2°C warming

1.4-2.8 feet

Bob Kopp, Rutgers University, based on Kopp et al. 2014. Earth’s Future
Wild Card: Antarctic Ice Shelves

WOW, the climate change evidence-faking has gotten really elaborate...

WEST ANTARCTIC ICE SHEET

A RISING TIDE LIFTS ALL MOATS!
Comparison of Maryland 2013 update, probabilistic estimates under low (RCP 2.6) and high (RCP 8.5) emissions scenarios, and Corps of Engineers 2013 Regulation (H, I, L)
Global Emissions Will Have Large Effect

Climate Central *Surging Seas*  [http://sealevel.climatecentral.org/maps](http://sealevel.climatecentral.org/maps)
Global Emissions Will Have Large Effect

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Tidal Flooding Not the Only Climate Risk

Ellicott City

Lessons from Summer 2016

Louisiana
Questions or Comments?

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