Ramping Up Land Conversation is Critical for Meeting Maryland's Greenhouse Gas Reductions

presented by Donald F. Boesch, University of Maryland Center for Environmental Science

Wednesday, May 20th, 2020

Lead Sponsor of Forever Maryland

Maryland Environmental Trust

Presenting Sponsor

Helena Foundation

James and Sylvia Earl

Webinar Champion

Ecosystem Investment Partners

Land Trust Alliance
Together, conserving the places you love

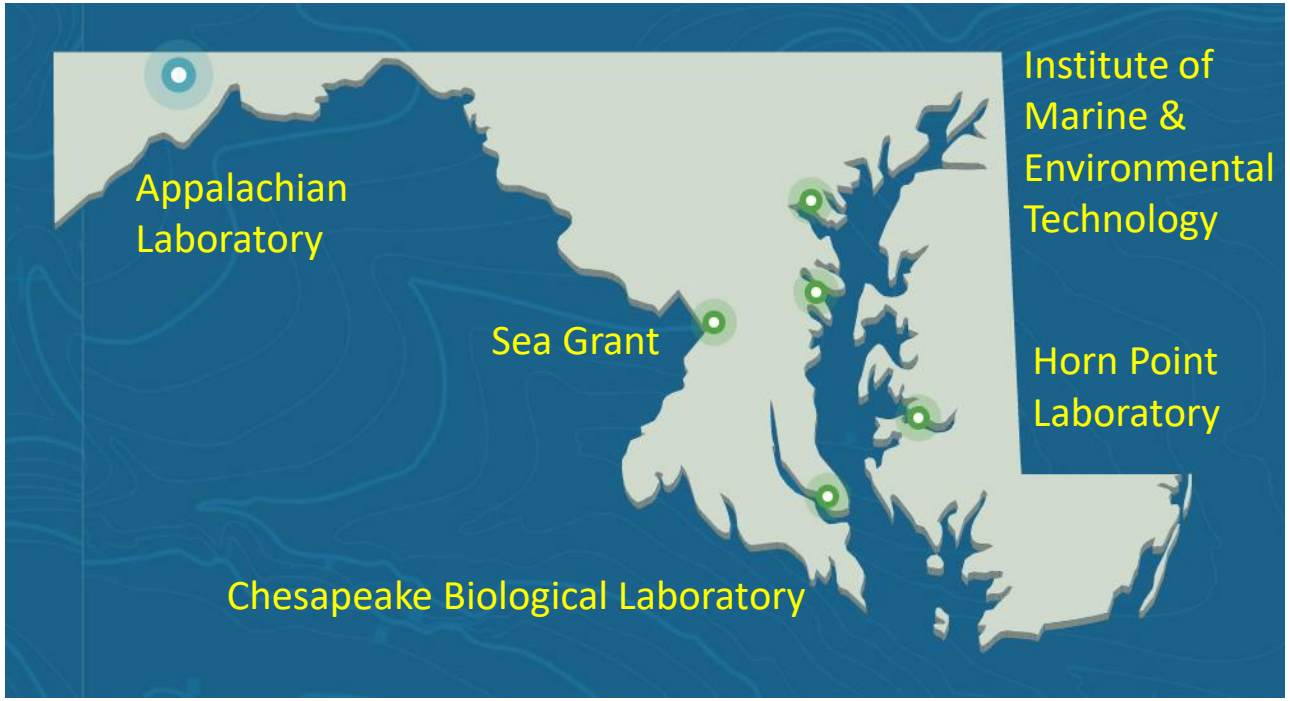
ecotone
ecological restoration

RMC
Rural Maryland Council

DUNKIN REAL ESTATE ADVISORS

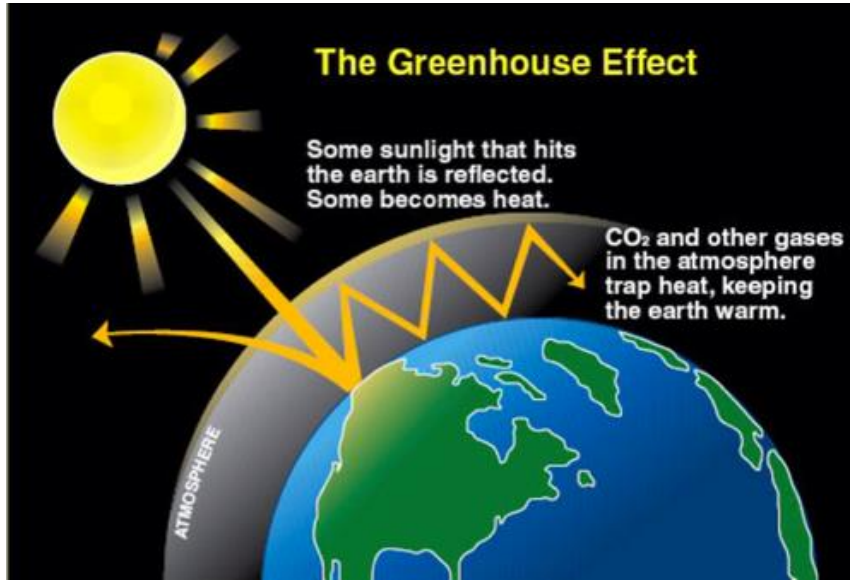
Merritt Pridgeon

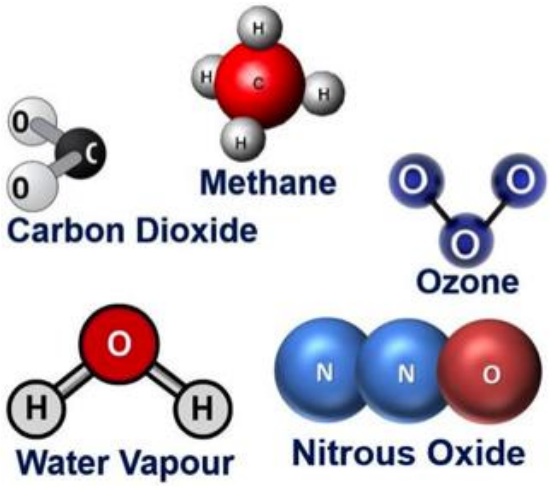
A Little on My Background



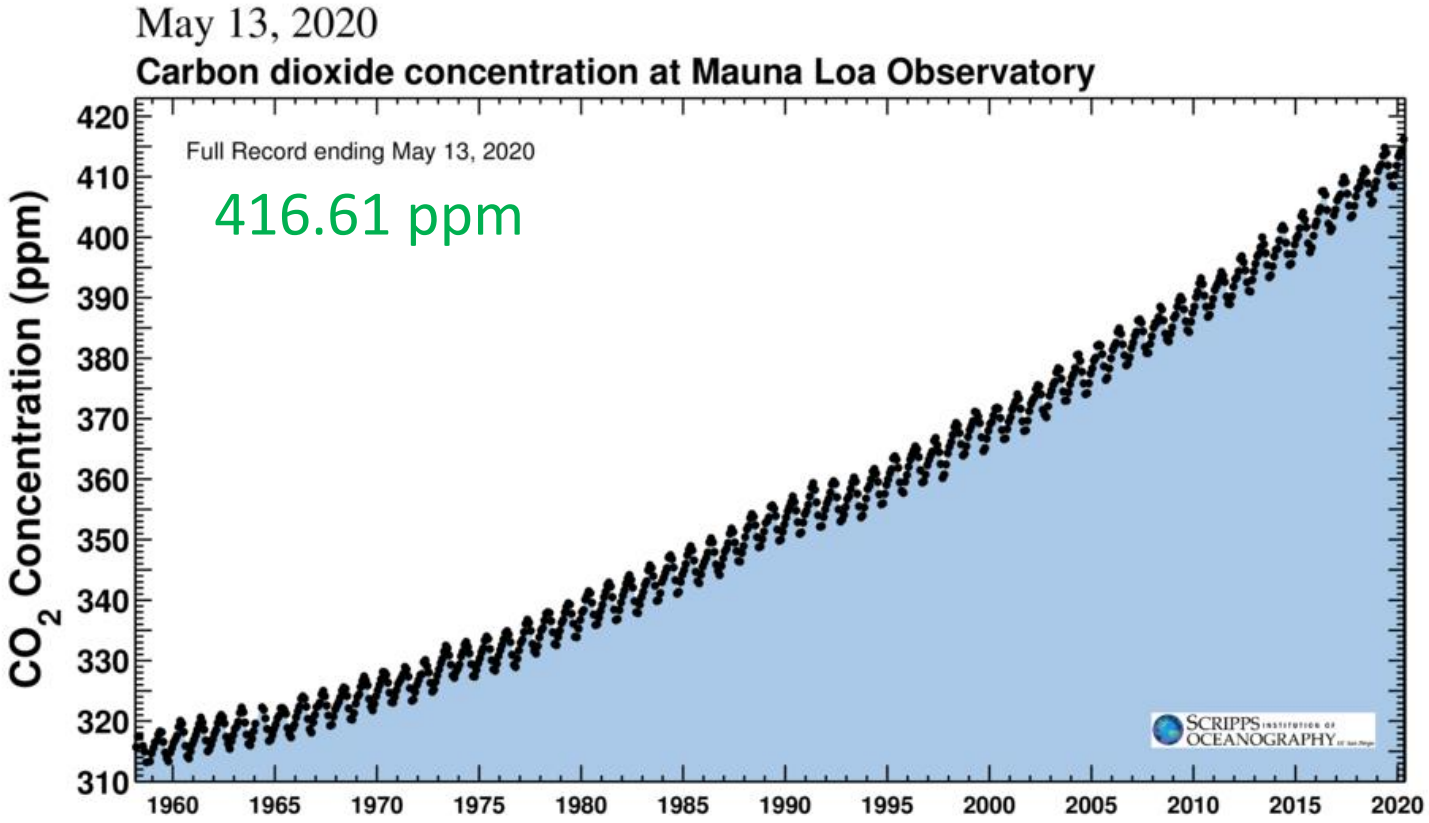
University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE

Greenhouse Gas Concentrations Increasing



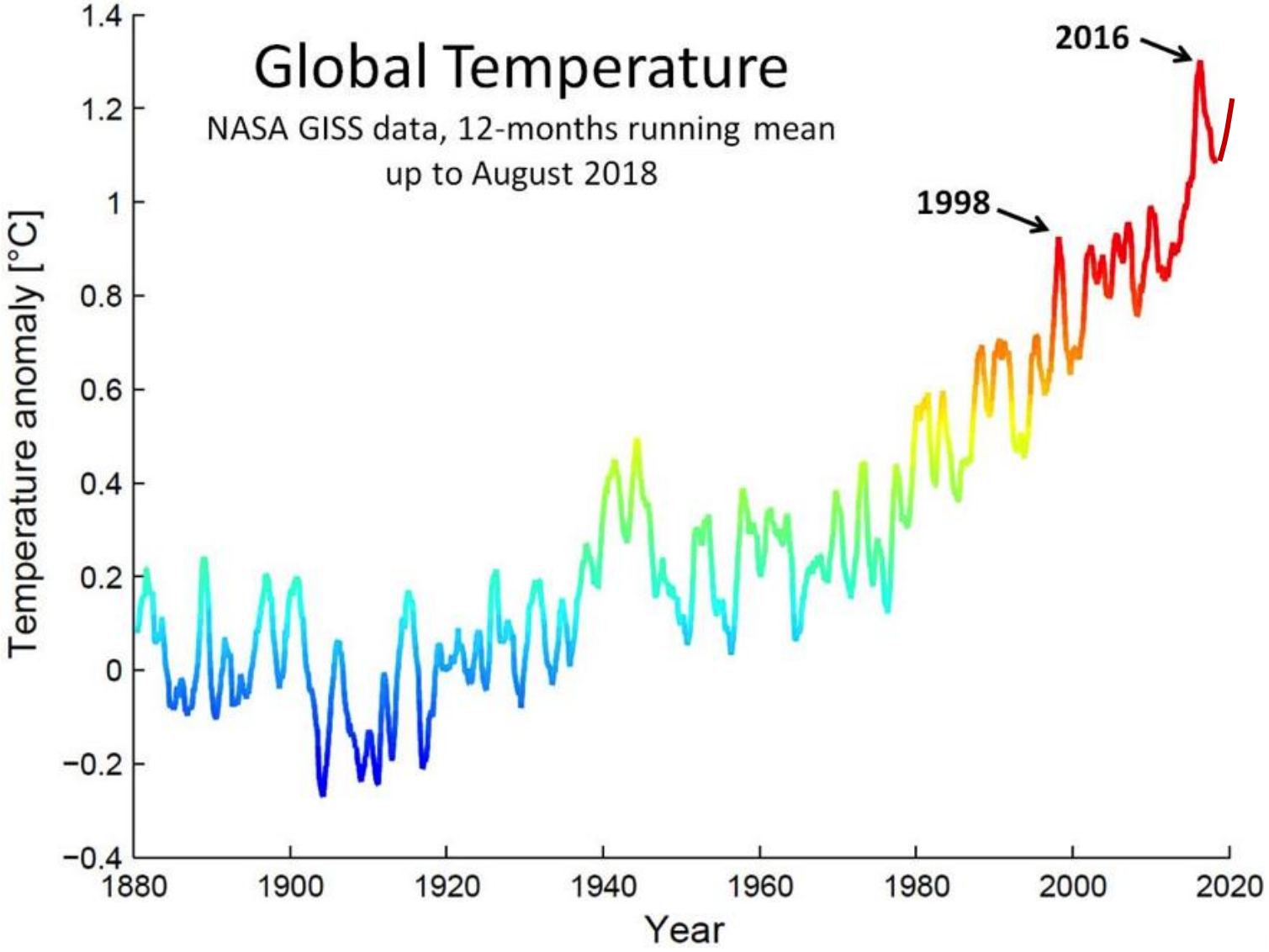


+49% since pre-industrial period



The Keeling Curve, Scripps Institution of Oceanography

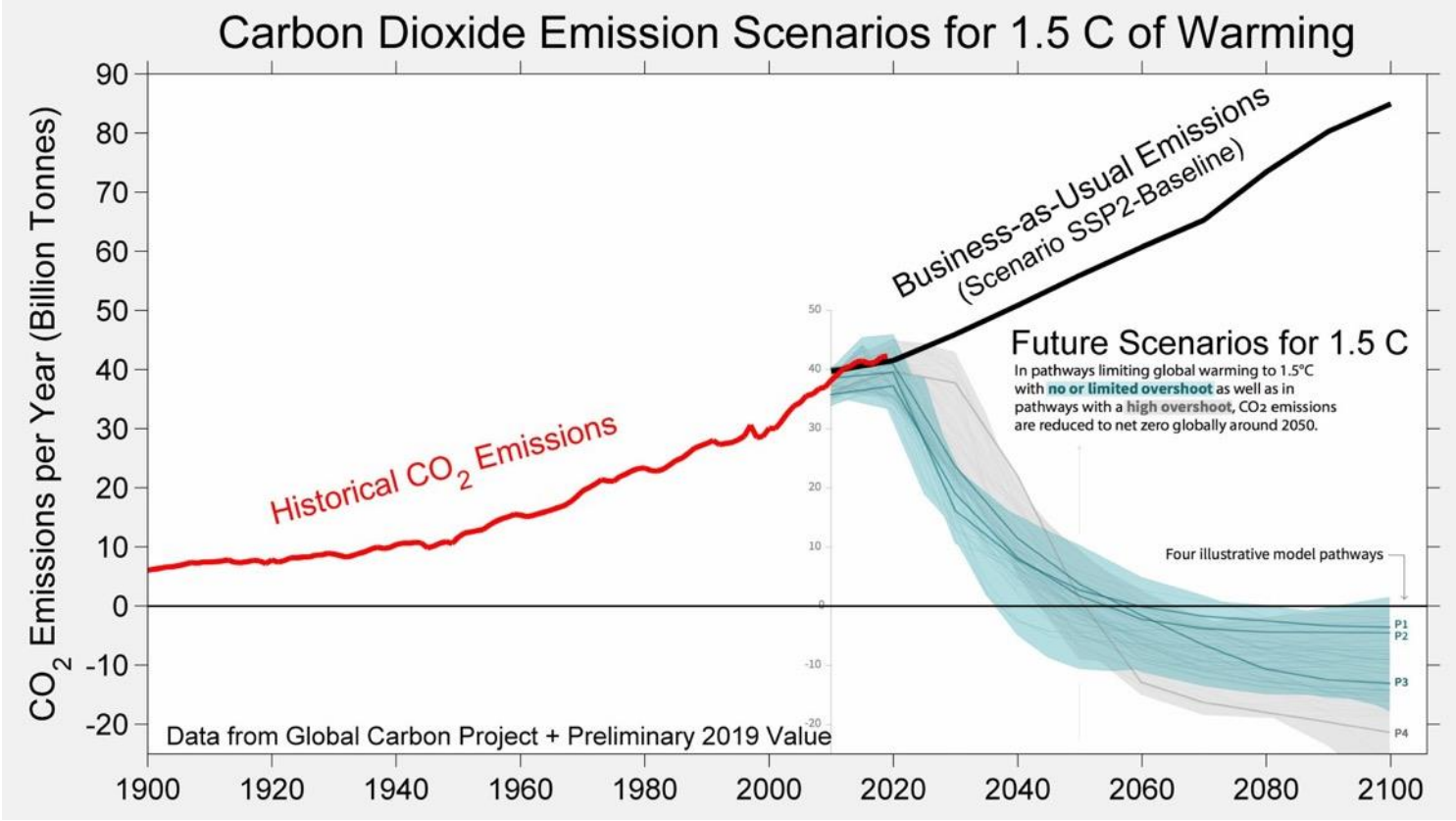
Global Temperature Rising



- Almost 1.4°C (2.5°F) warming since 19th Century
- 2016 warmest year on record, 2019 second
- 2020 could be new warmest
- Varies with climate cycles & volcano eruptions
- El Niño years (1998 & 2016) warmer

Meeting Goals of Paris Climate Agreement

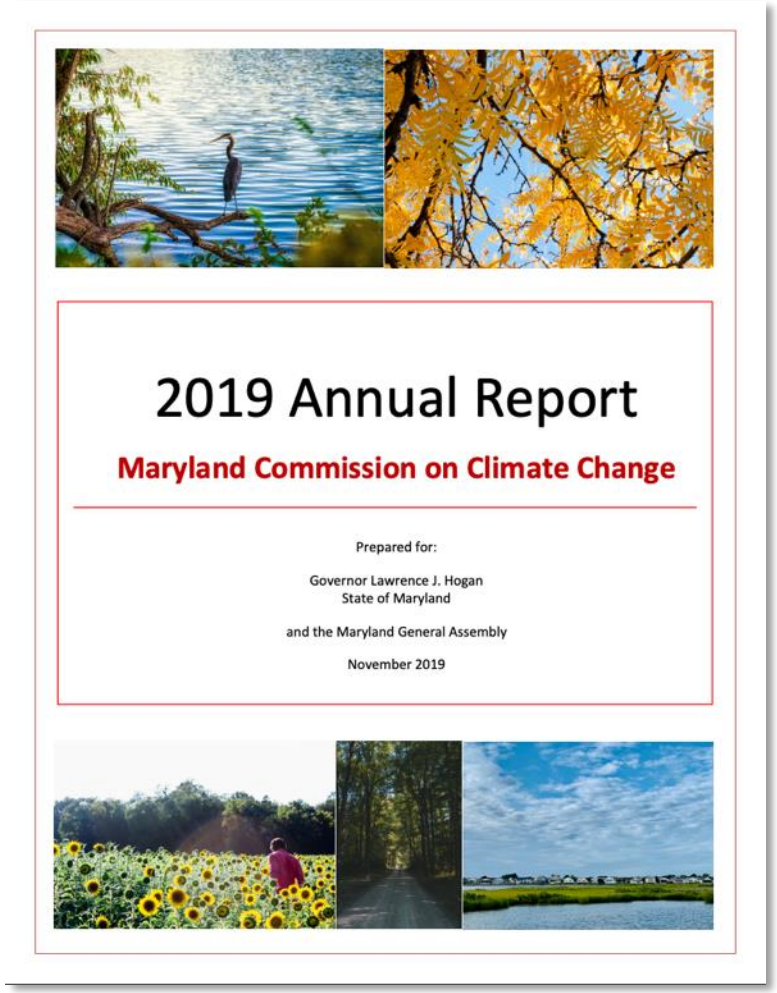
. . . strengthen the global response to the threat of climate change by keeping a global temperature rise this century ***well below 2 degrees Celsius*** *above pre-industrial levels and to pursue efforts to limit the temperature increase* ***even further to 1.5 degrees Celsius.***



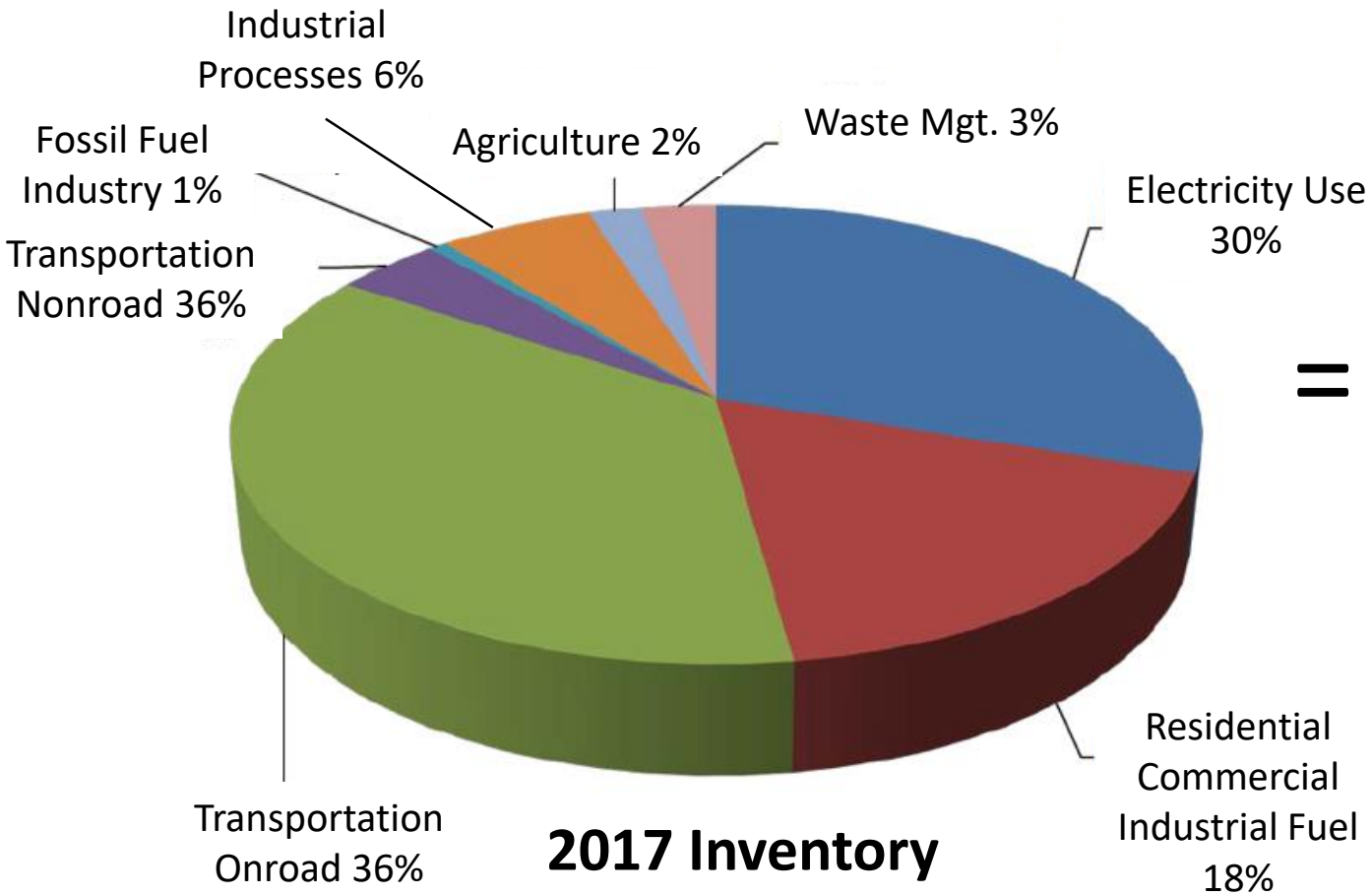
Must achieve net zero emissions by 2050 or soon thereafter (IPCC 1.5C Report).

Maryland Addresses Climate Change

- Clean Cars, Regional Greenhouse Gas Initiative, EmPOWER Maryland
- Commission on Climate Change (2007→)
- **Greenhouse Gas Reduction Act**
  - 2009 – 25% reduction by 2020
  - 2016 – 40% reduction by 2030
- Renewable Portfolio Standards (50 % of electricity generation by 2030)
- US Climate Alliance (now 24 states & PR)



Maryland Greenhouse Gas Emissions Inventory



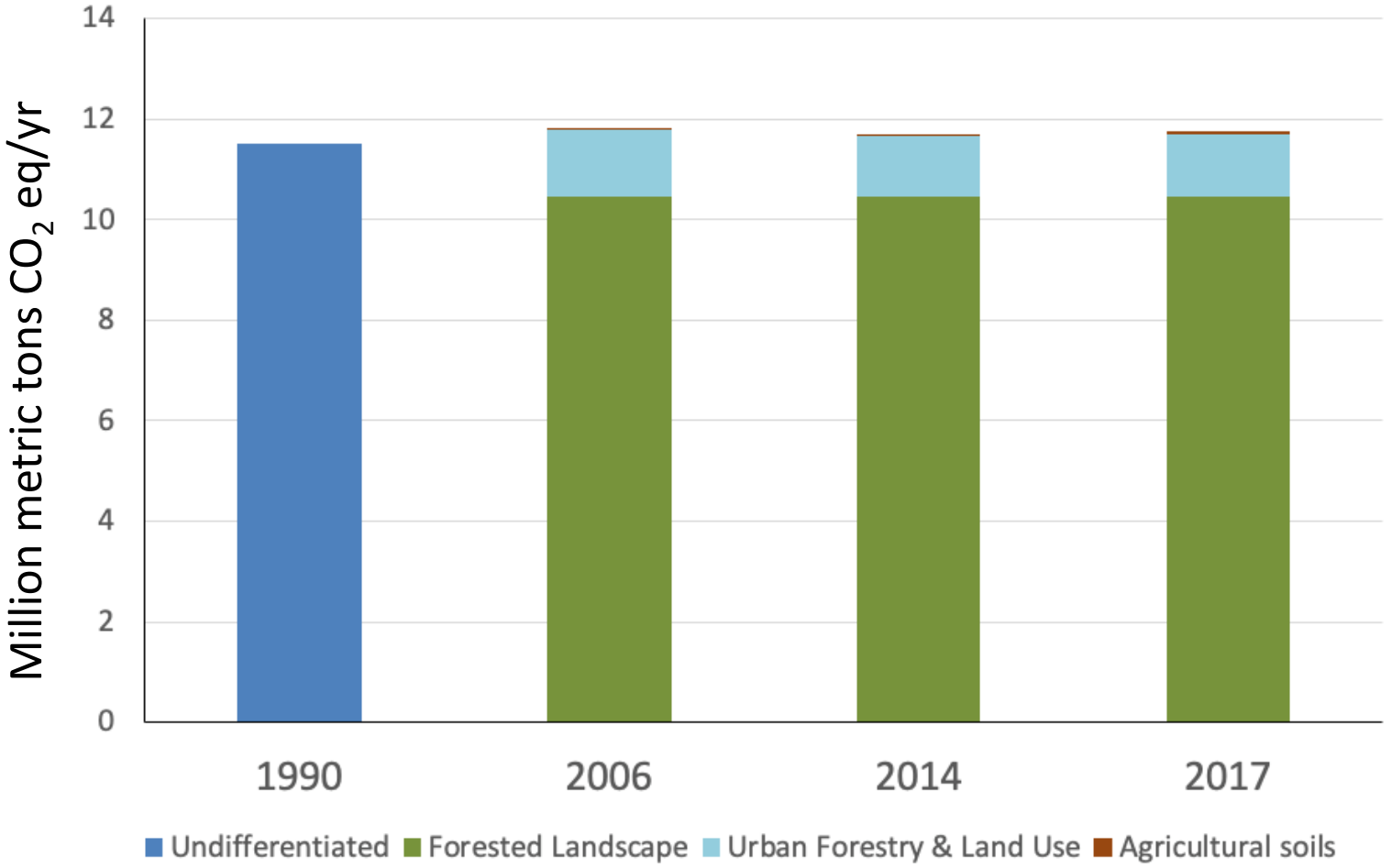
= + 78.5 million metric tons CO_2 eq

– 11.7 MMT Emission Sinks

66.8 MMT Net Emissions

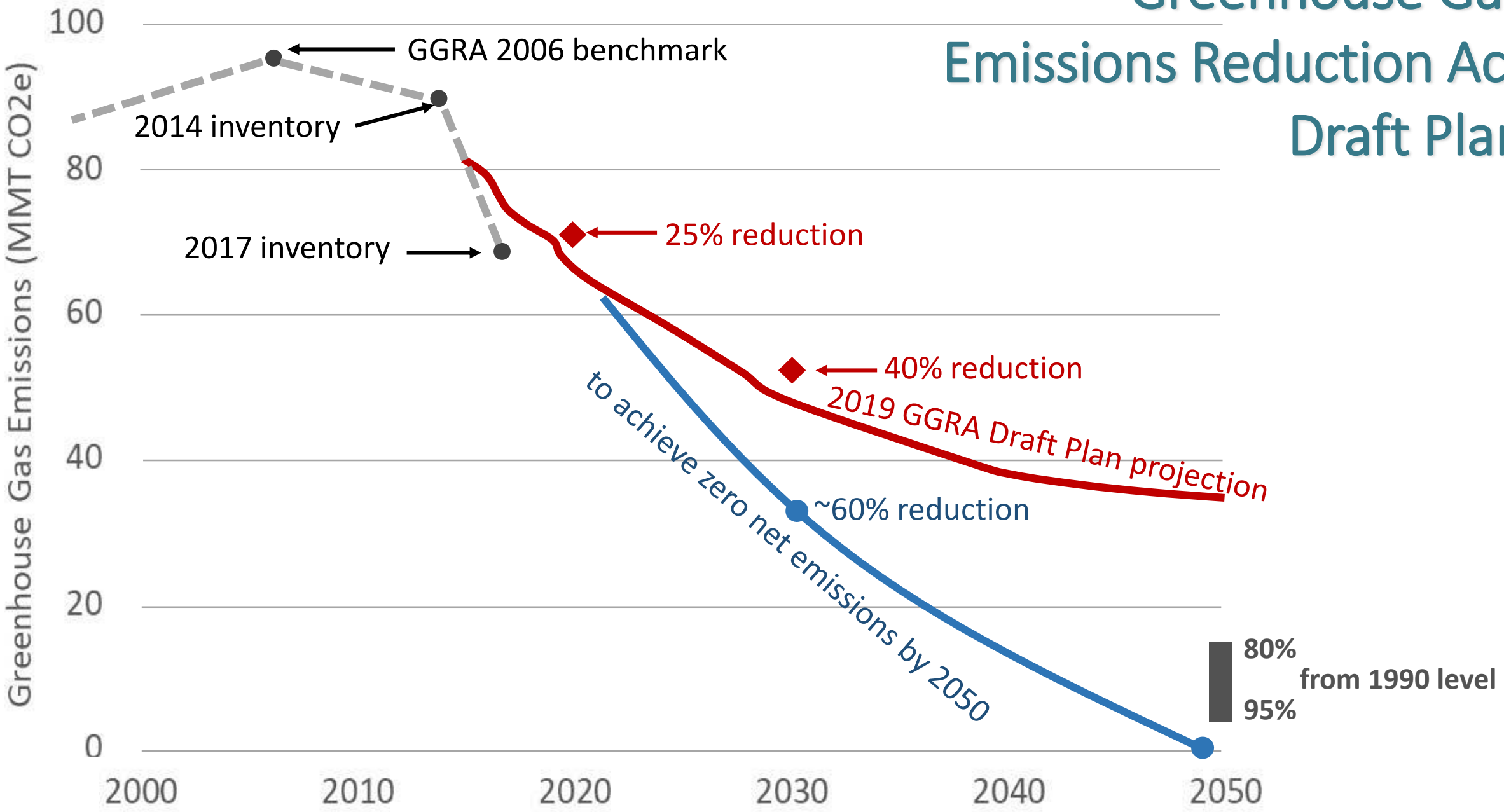
Sinks = ~15% of Gross Emissions!

What Are These Emission Sinks?

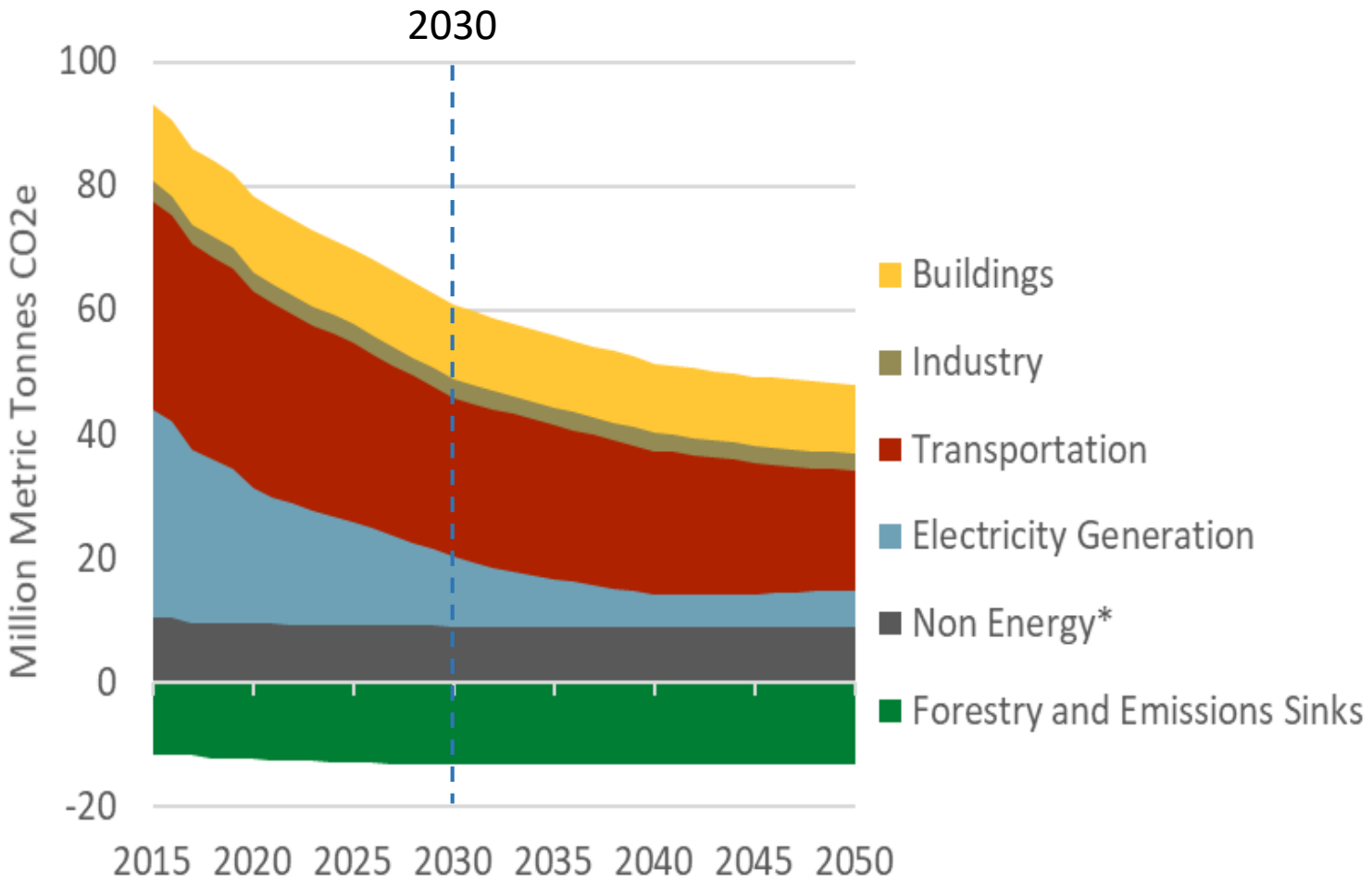


- Basis of estimates not included in Draft Plan, other than 2.5 million acres of forest cover.
- In inventories carbon sinks have barely changed, but forest cover declined ~1.3% over decade.
- Dominated by non-urban forested landscapes, consistently at 10.45 MMT CO_2 eq. from 2006 to 2017.
- Agricultural soils are trivial sink ~0.4% of net sinks.

Greenhouse Gas Emissions Reduction Act Draft Plan



GGRA 2019 Draft Plan Projections



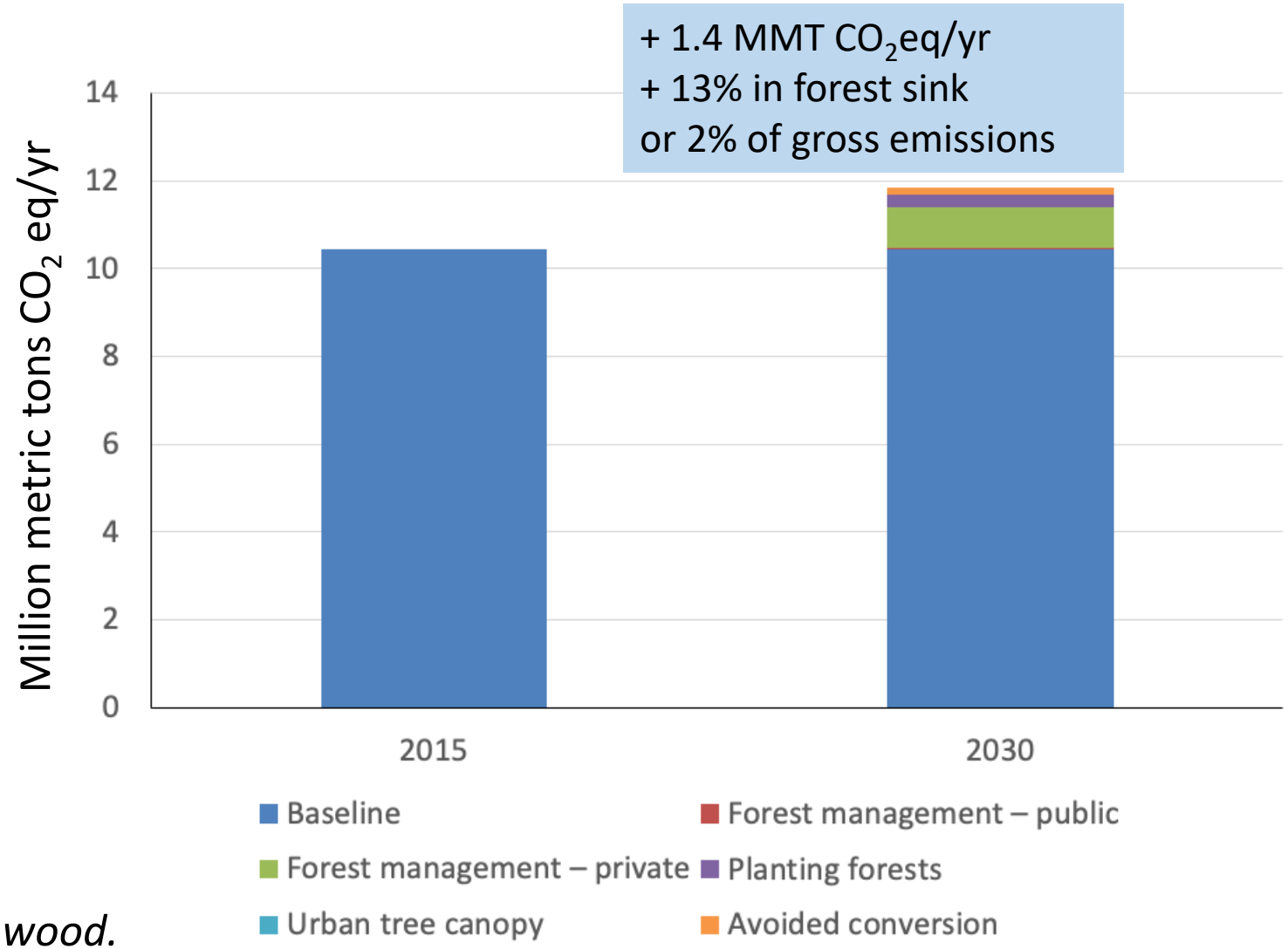
**Non Energy includes Agriculture, Waste Management, Industrial Process and Fossil Fuel Industry.*

- Most emission reductions come from electricity generation, but still well above zero in 2050.
- Only small reductions in emissions by 2050 from buildings, transportation and non-energy sources (industrial processes, waste management, agriculture).
- Very modest increase in emission sinks such as forests.
- Incorporates few fundamental shifts, e.g. assumes vehicle miles traveled will grow 30% by 2050.
- Such shifts will take decades to implement.

GGRA 2019 Draft Plan for Increasing Forest Sequestration

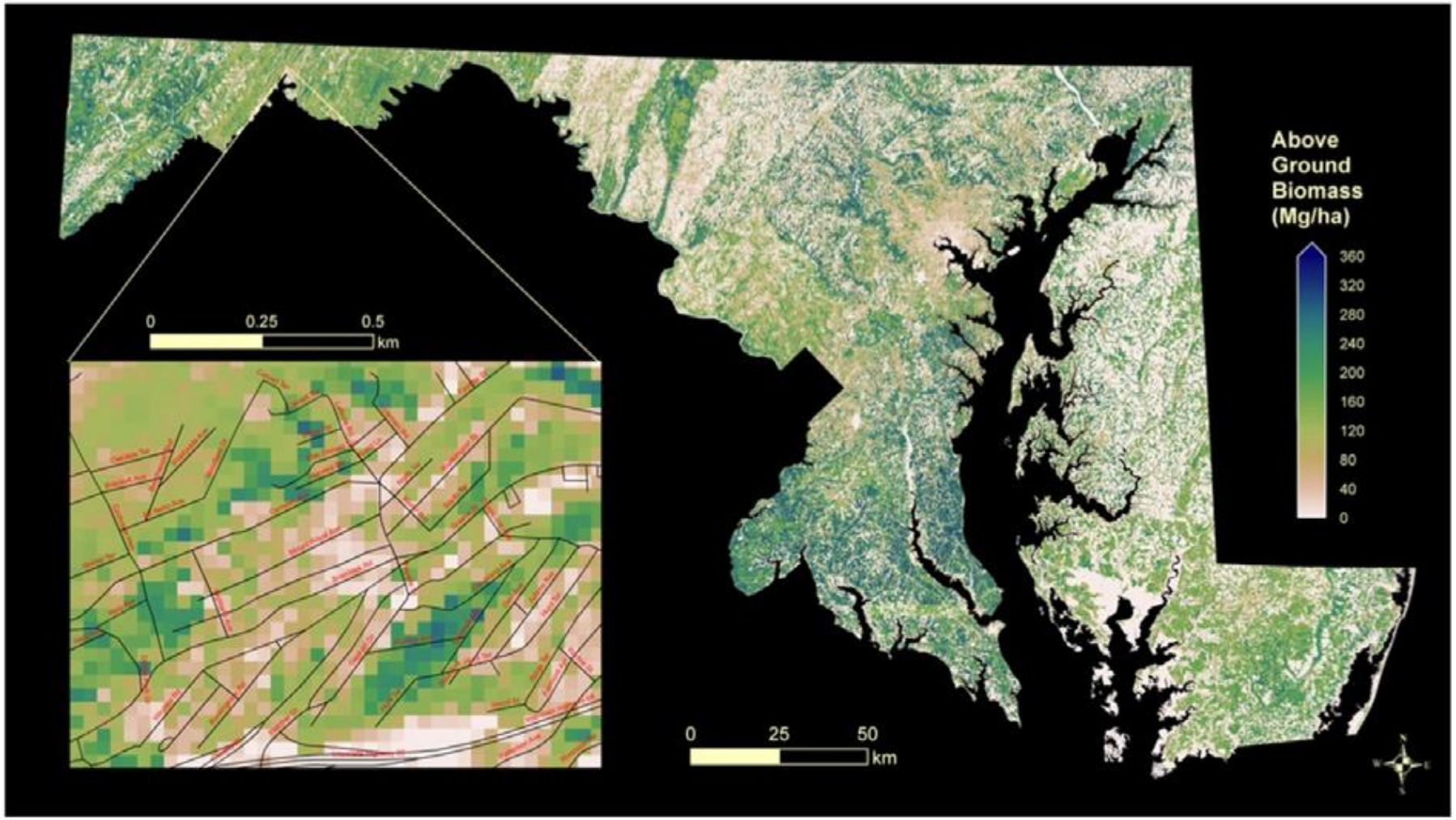
- **Forest Management, public lands** certified sustainable management on 200,000 acres
- **Forest Management, private lands** improve sustainable management on 30,000 acres
- **Planting Forests** on 43,000 acres
- **Urban Tree Canopy** plant 265,000 trees per year
- **Avoided Forest Conversion** on 800 acres

Includes carbon stored in above-ground and below-ground biomass, litter and harvested wood.



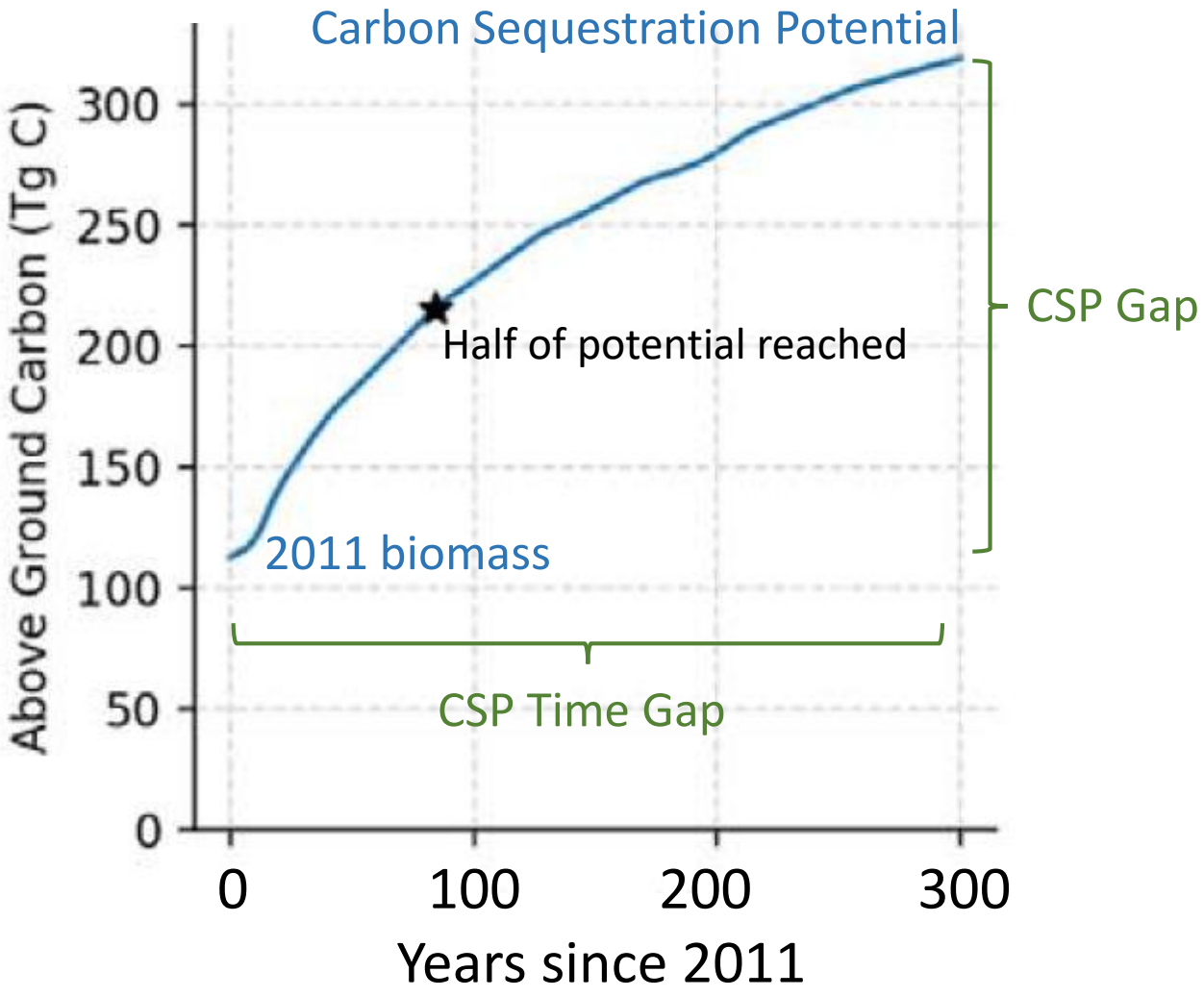
Estimating Forest Carbon Sequestration Potential

- High resolution (90 m) maps of above ground biomass (Lidar)
- Ecosystem demography model
- Historic climatological data
- Changes in biomass projected into future



Hurtt et al 2019 *Environ. Res. Lett.* 14 045013

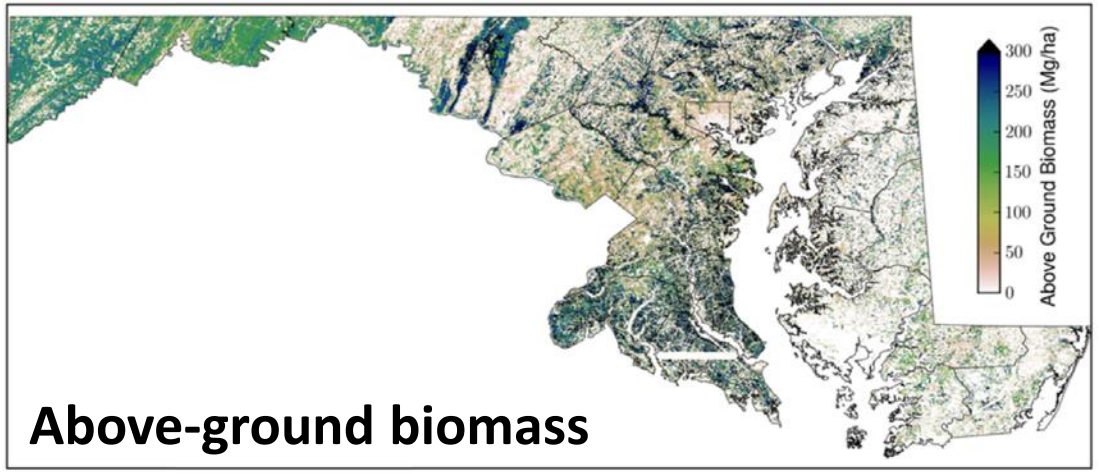
Above-ground Carbon Sequestration Potential for Maryland

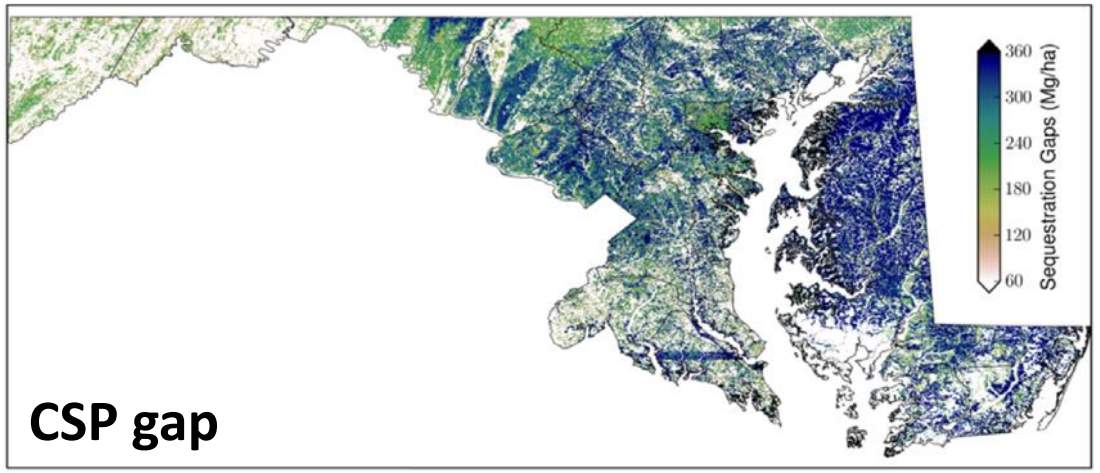


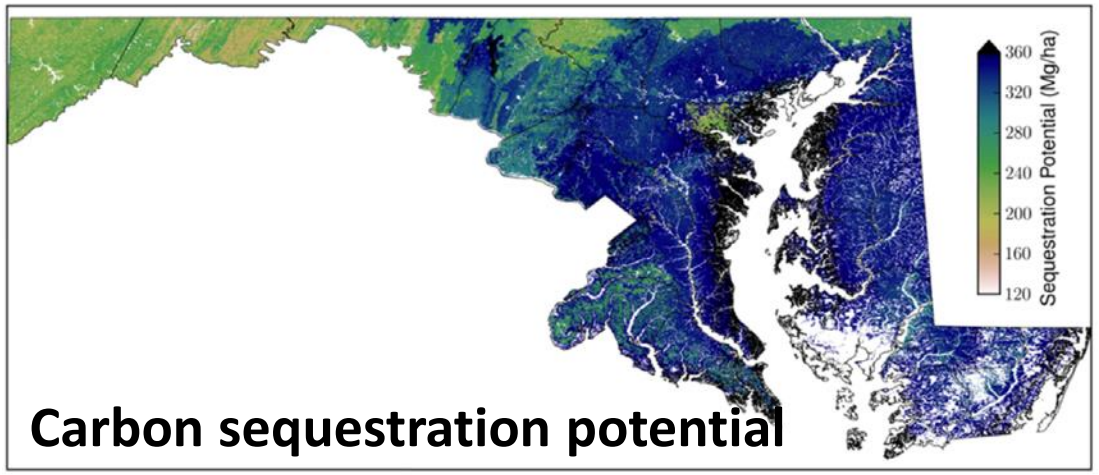
- Currently at 1/3 of above-ground carbon sequestration potential
- ~80 years to double above-ground storage
- 228 years to reach 95% of full potential
- Below-ground storage not included, may double sequestration potential
- "Forests have potential to sequester 12 Tg CO_2/yr, 2/3 of that from reforestation."

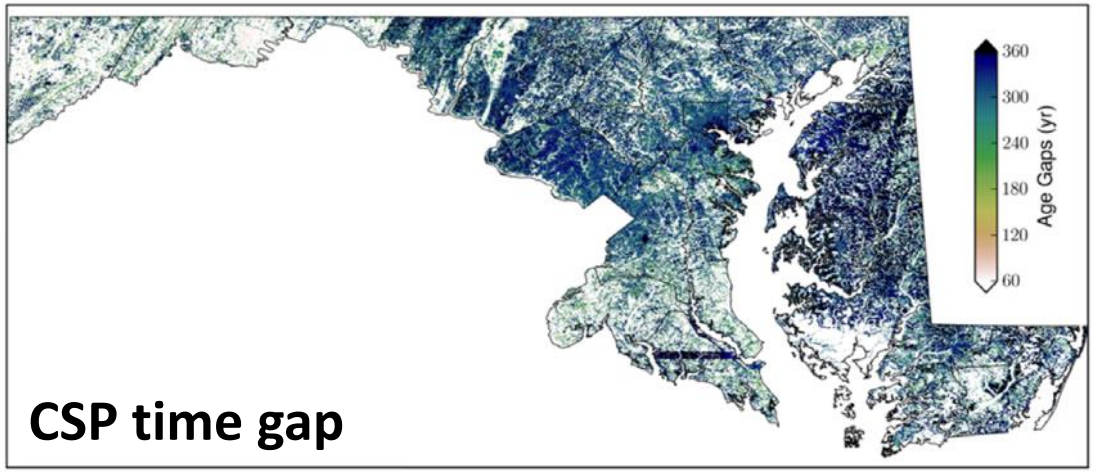
Hurtt et al 2019 *Environ. Res. Lett.* 14 045013

Mind the Gap: Where Sequestration Can Be Increased



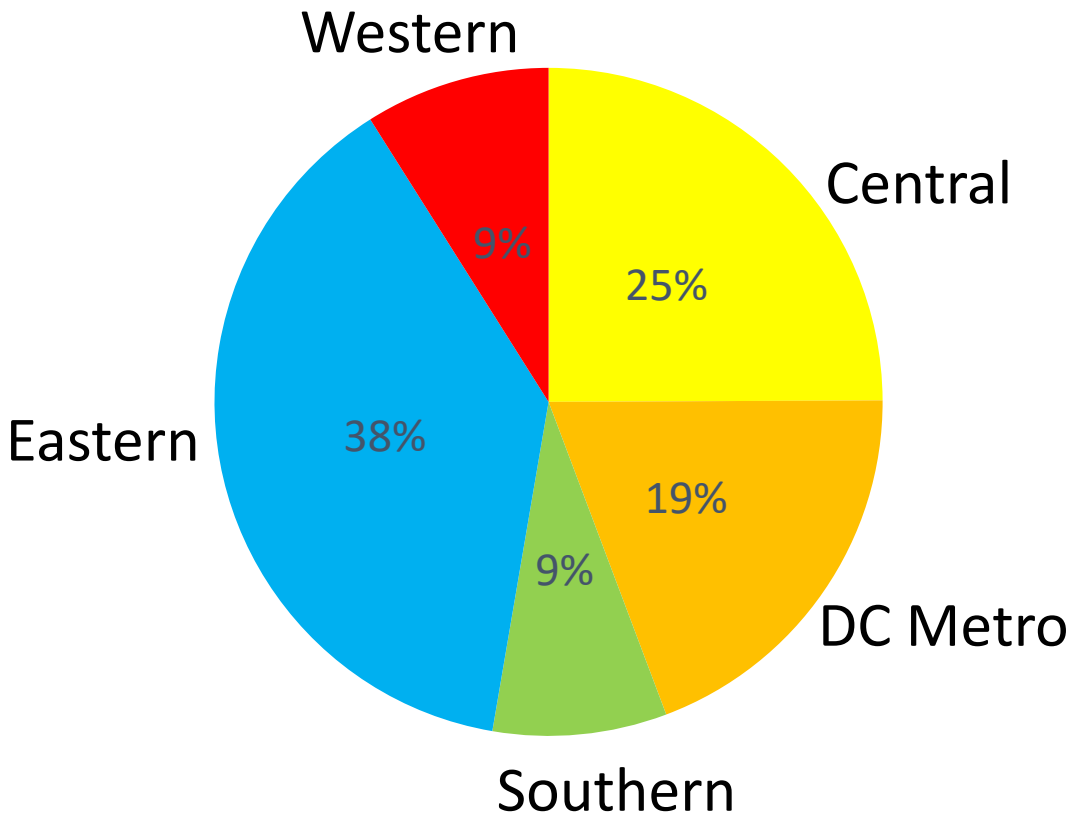


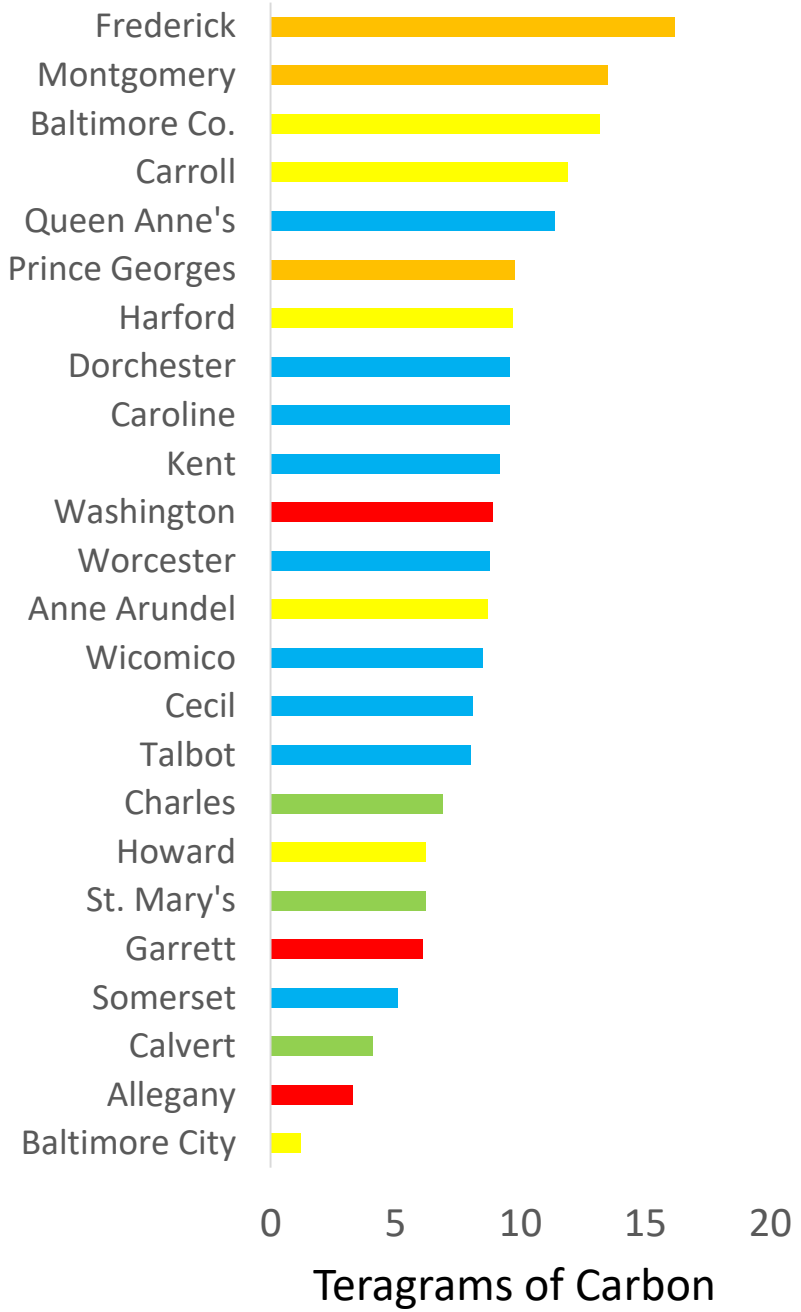




Hurtt et al 2019 *Environ. Res. Lett.* 14 045013

Carbon Sequestration Potential Gap

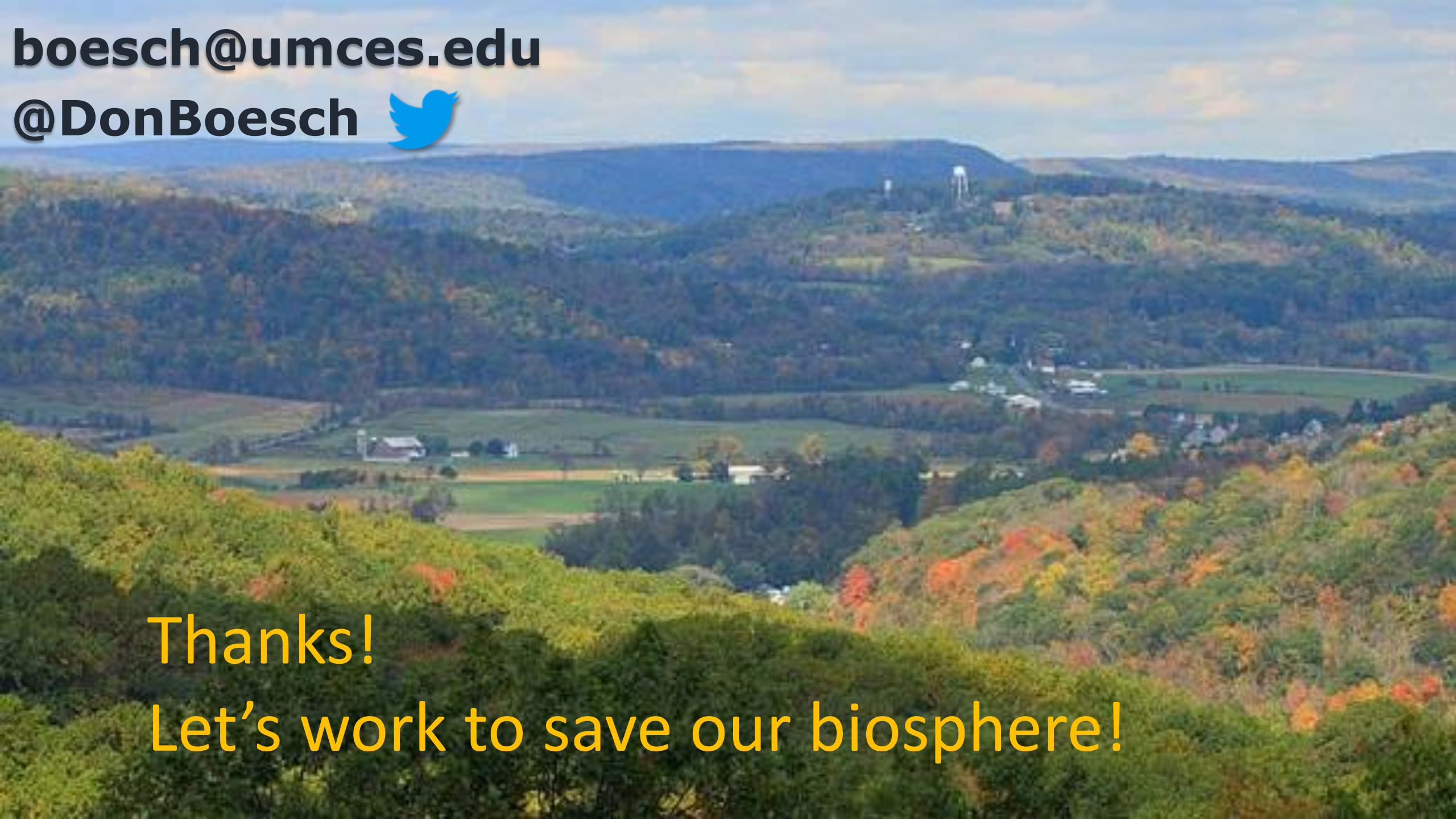




Hurtt et al 2019 *Environ. Res. Lett.* 14 045013

Carbon Sequestration: A New Driver for Forest Conservation

boesch@umces.edu
@DonBoesch



Thanks!

Let’s work to save our biosphere!

Thanks to Our Sponsors!

Lead Sponsor of Forever Maryland

Maryland Environmental Trust

Presenting Sponsor

Helena Foundation

James and Sylvia Earl

Webinar Champion

Ecosystem Investment Partners

Webinar Advocate

Land Trust Alliance
Together, conserving the places you love

Webinar Supporter

ecotone
ecological restoration

RMC
Rural Maryland Council

DUNKIN REAL ESTATE ADVISORS

Webinar Backer

Merritt Pridgeon