



Maryland
Department of
the Environment

Leveraging High-Resolution Forest Carbon Science to Support Maryland's Net-Zero GHG Reduction Goal

December 14, 2022

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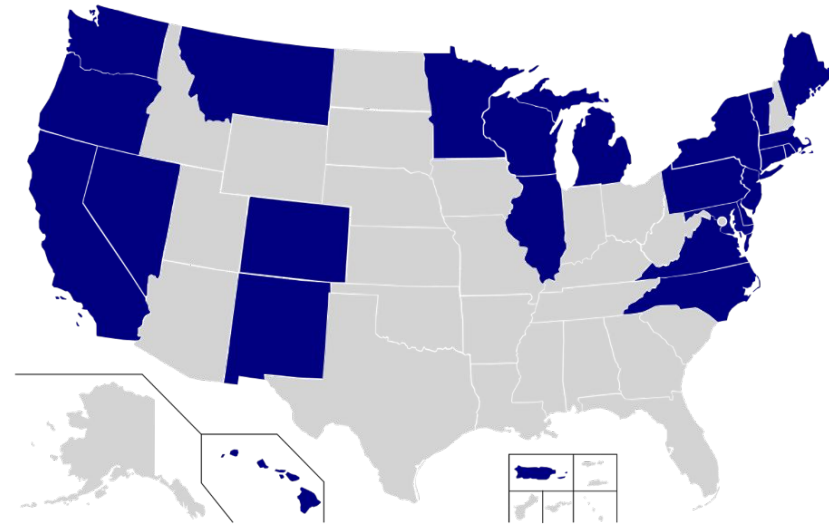
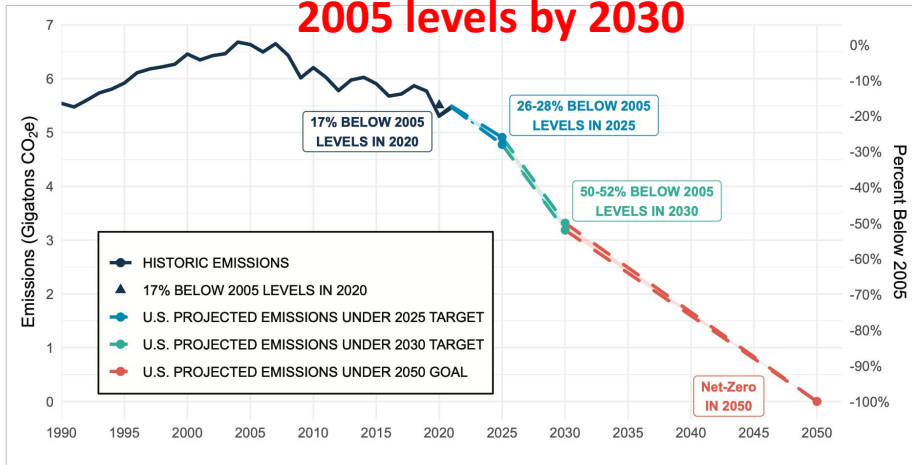
Maryland Department of the Environment,
University of Maryland College Park
Maryland Department of Natural Resources



Centering Subnational Action



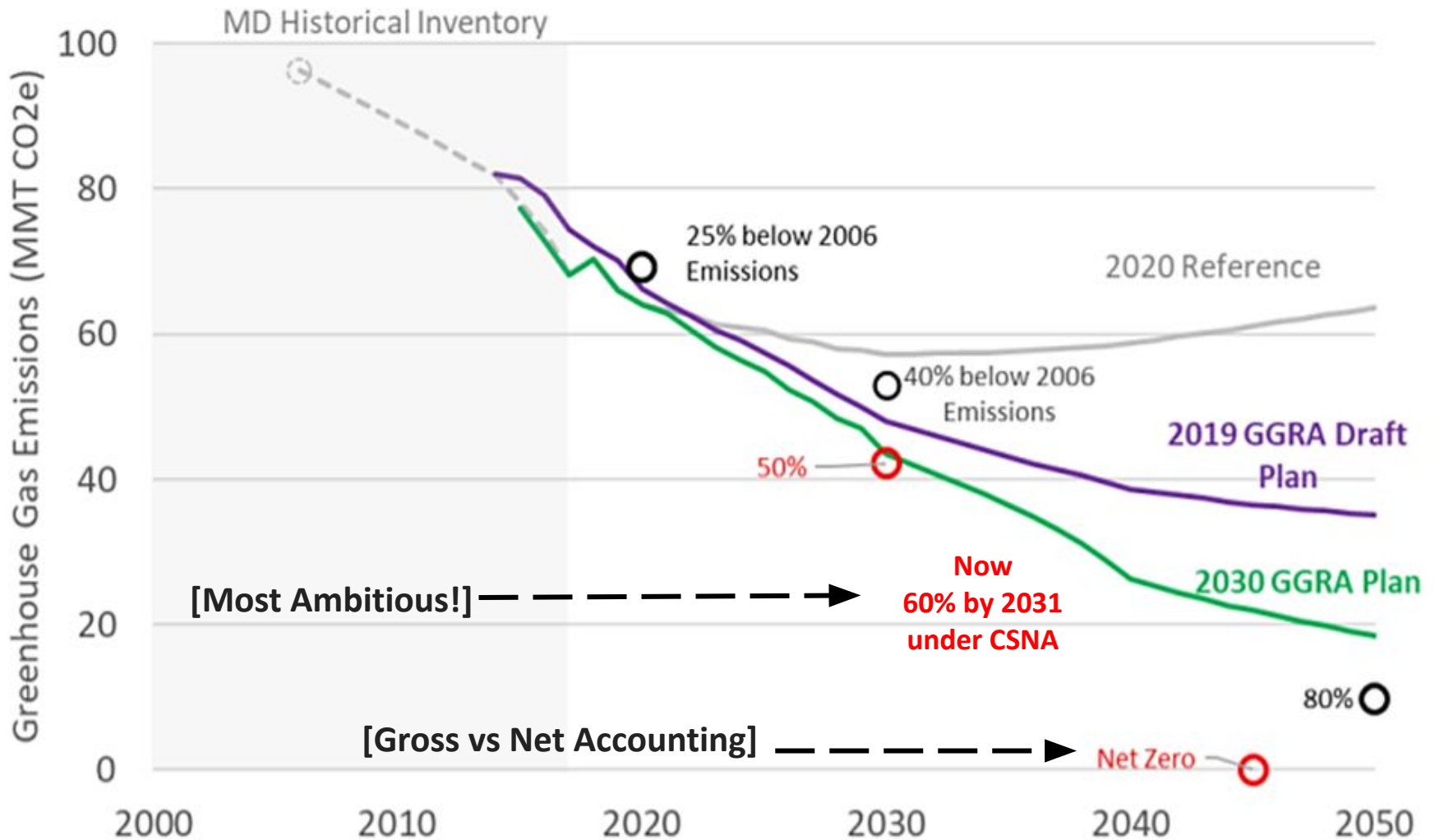
Recent U.S. – 50-52% net reduction from 2005 levels by 2030



- Ambitious GHG reduction goals
- Accelerating mitigation/resilience policy
- Centering equity, just transition
- Tracking and reporting progress
- Special focus on role of nature



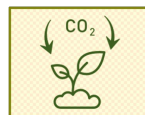
MD Greenhouse Gas Reduction Act





GGRA Tools

Natural and Working Lands (NWL)



Maryland Department of the Environment

The Greenhouse Gas Emissions Reduction Act

2030 GGRA Plan

Prepared for:

Governor Larry J. Hogan
State of Maryland

and the Maryland General Assembly

February 19, 2021

Planning Tool



Maryland Department of the Environment

Larry Hogan
Governor
Boyd Rutherford
Lieutenant Governor
Ben Crumles
Secretary

State of Maryland 2017 Greenhouse Gas Emission Inventory Documentation

July 26, 2019

Prepared by:
Maryland Department of the Environment

Assessment Tool

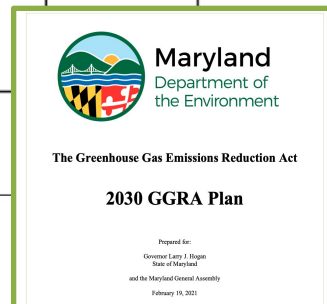


Informing GGRA Planning (Soft Targets)

Table 3.2-10. Summary of DNR GGRA Plan Projections.

Qualitative to Quantitative

Summary of DNR GGRA Plan Projections	Avg. Annual 2020-2030 Low	Avg Annual 2020-2030 Medium	Avg. Annual 2020-2030 High	Avg. Annual 2020-2030 DNR Target		2030 Low	2030 Medium	2030 High	2030 DNR Target
Forest Management, public lands	1,500	2,000	3,000	1,600	Acres per year	0.020	0.020	0.021	0.020
Forest Management, private lands	35,000	50,000	60,000	38,000	Acres per year	0.86	1.04	1.16	0.92
Planting Forests	2,000	3,000	4,000	2,550	Acres per year	0.28	0.32	0.36	0.30
Urban Tree Canopy	150,000	350,000	500,000	265,000	Trees planted per year	0.003	0.004	0.005	0.0035
Avoided Forest Conversion	500	800	1,300	800	Acres per year	0.10	0.15	0.24	0.15
Tidal Wetland Restoration	100	250	500	300	Acres per year	0.008	0.011	0.016	0.011
Total (MMtCO ₂ e per year)						1.27	1.54	1.80	1.40



known state and federal programs + potential scale of implementation + projected C benefits



GGRA Progress Report (Program Metrics)

Metric

Trees and Forests

Acres of afforestation and reforestation, acres under forest management, and number of urban trees.

Goal

DNR estimates an average annual target of 550 acres of afforestation, 600 acres of reforestation, between 150,000 and 500,000 urban trees planted, and sustainable forest management on 38,000 acres of private land.

Metric

Tidal Wetlands

Acres of restored wetlands.

Goal

230 acres of tidal wetland restored per year by 2030.





GGRA Progress Report (Program Metrics)

Progress

Table 1. Afforestation, reforestation, forest management and urban tree planting activities in Maryland over the past three years relative to the GGRA of 2016 baseline in 2006.¹¹ (Click table to expand).

Forest activities	2006	2019	2020	2021
Afforestation acres	1233.9	272.3	402.6	337.8
Reforestation acres	3318	254.2	312	234.6
Forest management acres	30,629.7	43,566	45,096	50,327
Urban trees planted	665,628	179,398	271,431	218,923

actual/known program
implementation

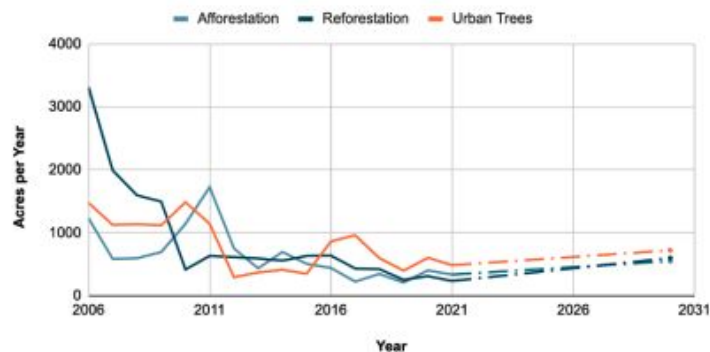


Figure 26. Implemented acres of afforestation, reforestation and urban tree planting¹² from the GGRA of 2016 baseline year of 2006 through 2021 and the estimated acreage target for each practice in 2030 based on the 2030 GGRA Plan. (Click figure to expand).

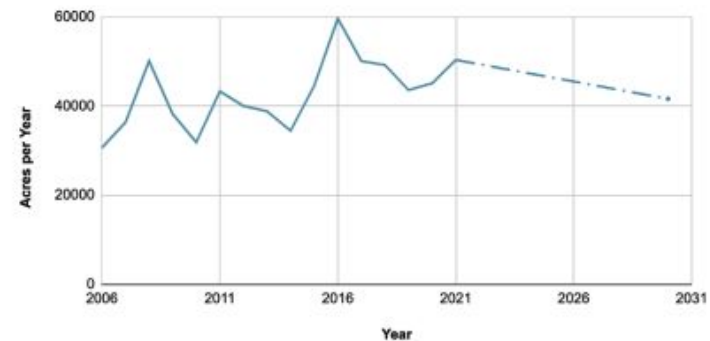


Figure 27. Acres under forest management in Maryland from the GGRA of 2016 baseline year of 2006 through 2021 and the estimated acreage target for 2030 based on the 2030 GGRA Plan. (Click figure to expand).



Flux Assessment via GHG Inventory

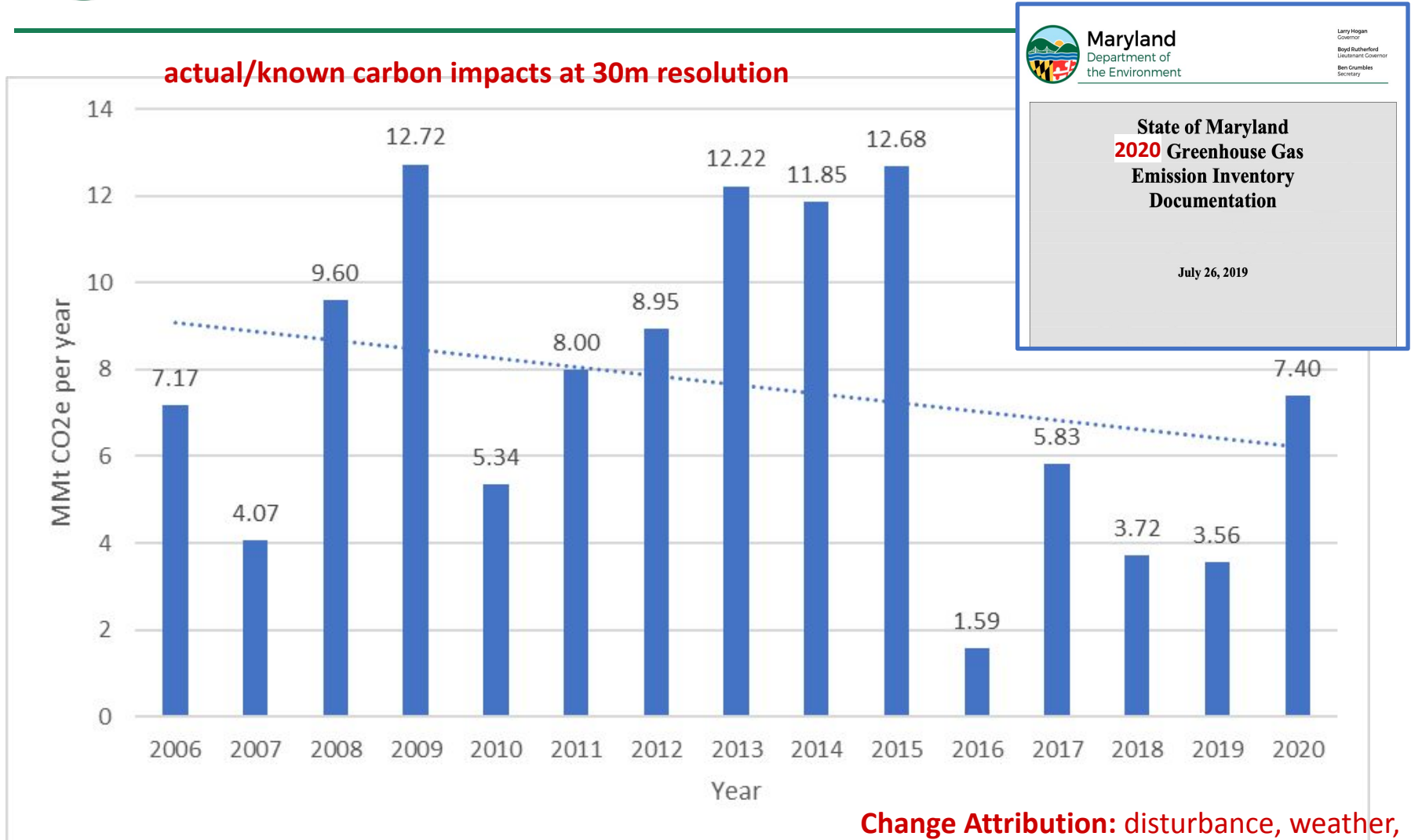


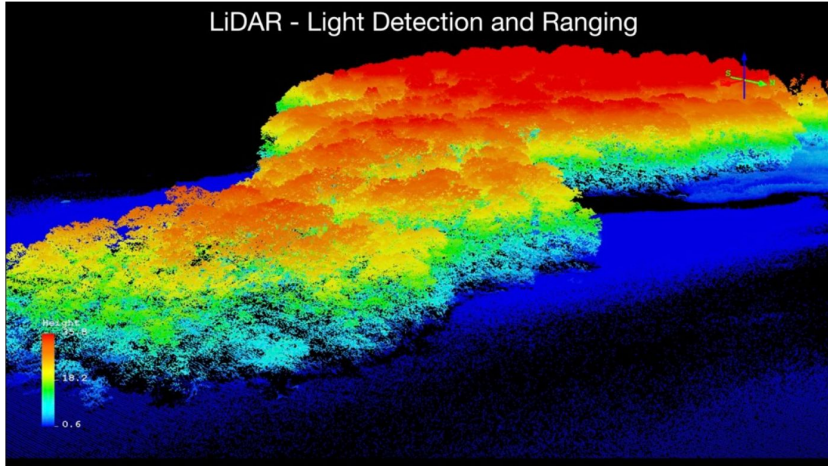
Figure 1. Trend of Forest Ecosystem Carbon Sequestration Per Year Over Time.



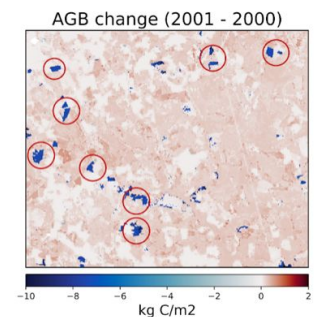
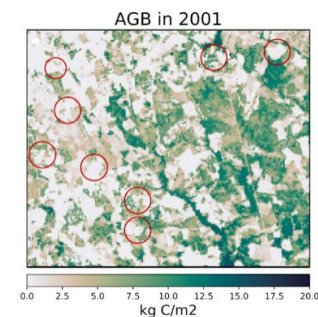
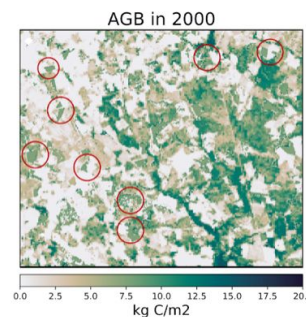
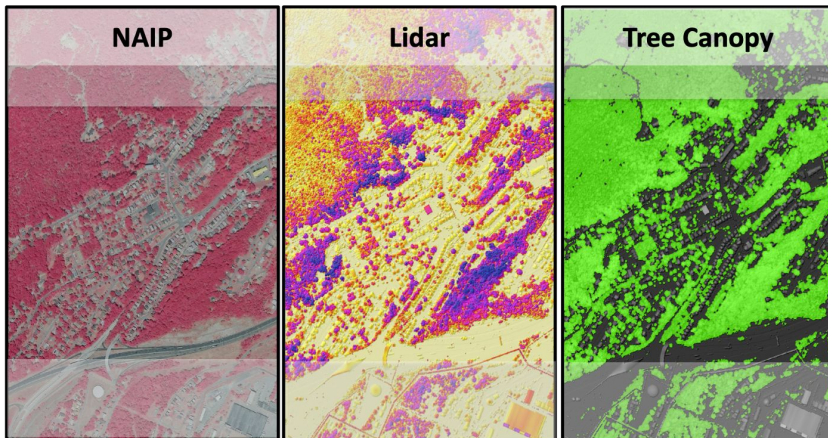
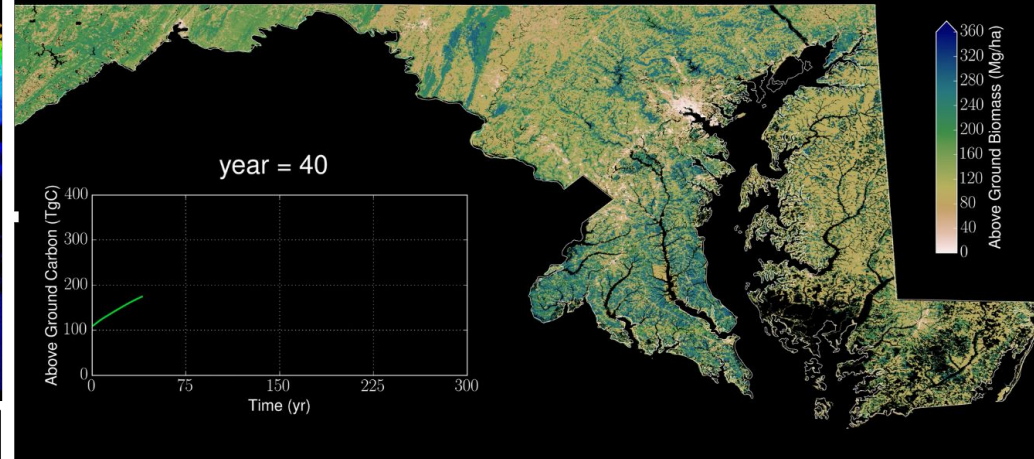
Connection to Global Science

Hurt et al 2019, ERL
Ma et al 2021, ERL
Tang et al 2021, ERL
Hurt et al 2022, in prep

LiDAR - Light Detection and Ranging



Carbon sequestration potential in Maryland, 90m resolution

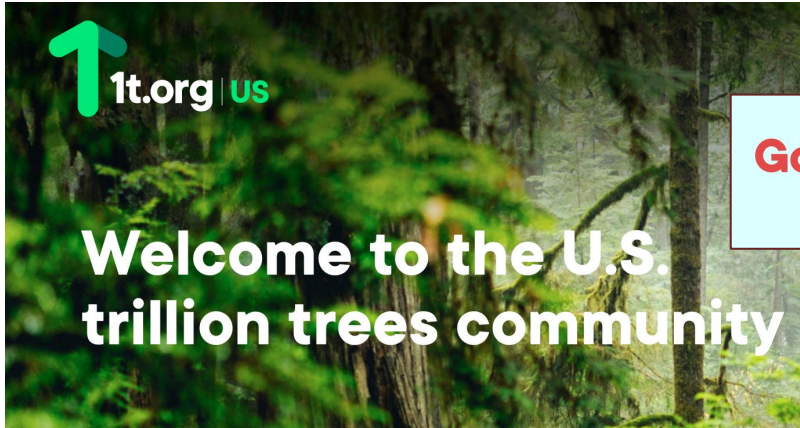


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Connection to Global Goals



Goal: One trillion trees conserved, restored and grown globally by 2030.



Maryland
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Pledge by State of Maryland

State of Maryland - Growing Five Million Trees by 2030

Total Trees Pledged: 5,000,000

Supporting actions: Sustainable Forestry, Avoided Deforestation, Nursery Development, Data and Technological Tools, Science and Technical Assistance, Tree Protection through Management, Forest Product Markets and Innovation, Workforce Development, Environmental Education, Conservation Finance



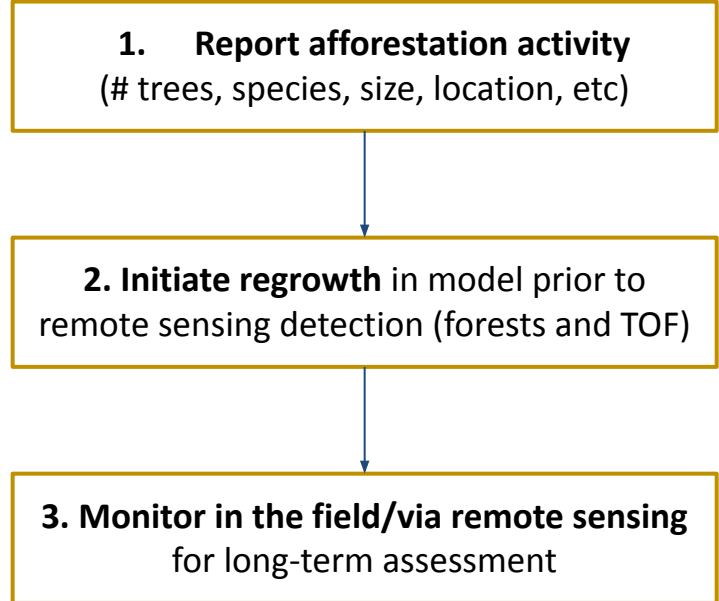
Opportunity for Science Alignment

The Tree Solutions Now Act of 2021

Final Plan for Growing 5 Million Trees in Maryland



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SCIENCES



lidar and tree cover refresh?



Iterate Process with New Net Zero Target

Progress Report: Does actual implementation align with what was planned? Why or why not?

GHG Inventory: How do our carbon sinks support our GHG goals? What are the dominate factors affecting change?

New 2031 Climate Plan: Given these assessments, do we need additional programs or policies to reach existing (or new) targets?

- *Establish formal NWL GHG targets for 2045?*
- *Connect to complementary goals for certain sectors?*



**Example: 10% of new trees must be planted
in underserved urban areas
(equity and EJ)**

****relevance for spatial planning****



Challenges and Opportunities

- Clarify role of NWL in a decarbonized future
- Align planning tools with assessment tools
- Evaluate carbon progress in context of complementary goals
- Maximize range of data/tools (field data, modeling, and RS)
- Communicate intervention opportunities (where, when, how)
- Expand framework to other sinks (e.g., ag soils / tidal wetlands)





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