USDA Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Forest Carbon Modeling Group

Entity Guidelines Workshop

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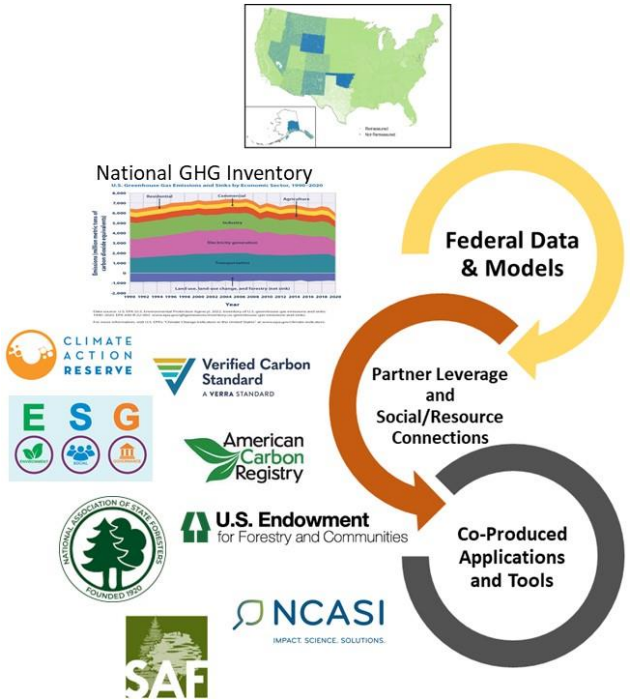
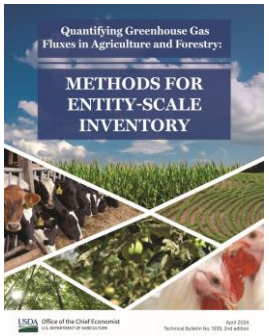
Policy and Program Environment in Need of Forest Modeling

- Bipartisan Infrastructure Law - Wildfire Crisis Strategy
- Executive Order on Mature and Old-Growth Forests
- Inflation Reduction Act Program Implementation
- Voluntary Carbon Markets and ESG
- Federal Greenhouse Gas Information System
- Growing Climate Solutions Act
- US International Commitments
- EU Green Deal



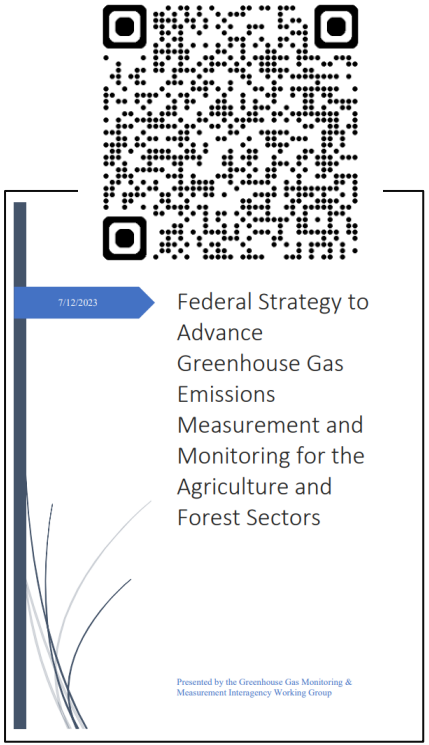
USDA Entity Guidelines Highlight Modeling Needs

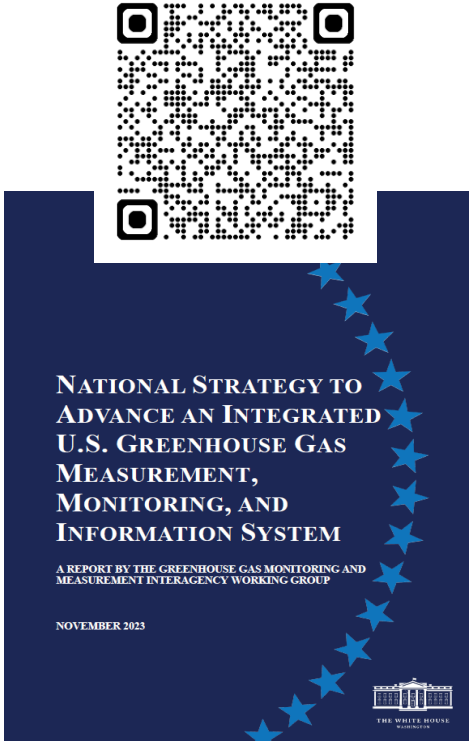
- All disciplines
  - –Fire
  - –Silviculture
  - –Harvested Wood Products
  - –Lateral Flows
  - –Attribution/Disturbance
  - –Remote Sensing
- Modeling Refinement Empowers
  - –Adaptative Practice Evaluation
  - –Dynamic Incorporation of Climate Change



Inherent Component of MMRV Federal Plans

- USDA Ag/Forest Sector
  - –Forest modeling broadly highlighted with specific identification of FVS
- White House Strategy
  - –GHGMMIS
  - –Focused on fossil fuel emissions
  - –Forest modeling identified
- Forest MMRV Workshop
  - –Explore integration of modeling approaches (bottom-up and top-down)

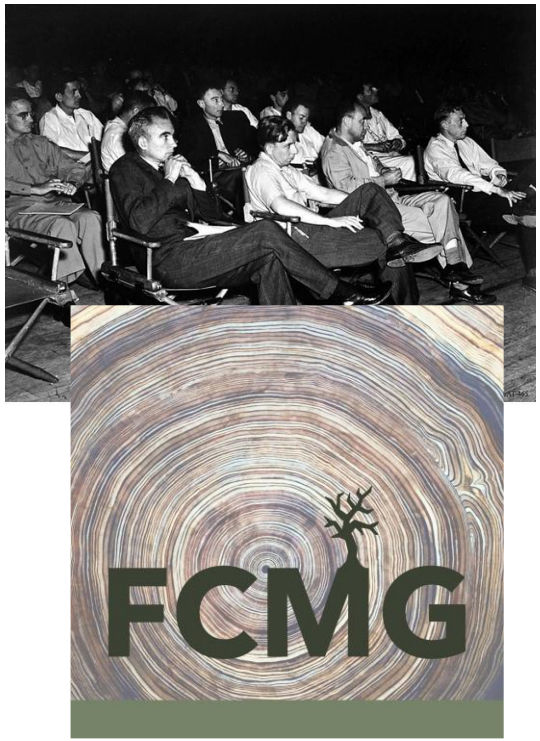




FCMG: A Manhattan Project of Forest Carbon Modeling

- **Background**
  - –USFS and NCASI Partnership to Advance Biometric Models
  - –Growing Demands (EOs, C Markets, Deforestation-Free Trade, Adaptive Mgmt)
  - –How do we maximize impact across diverse land base (old growth to industrial plantations) and society (National Forests to private to states)?

- **Key Engaging Questions**
  - –What are the primary needs in forest carbon modeling for natural climate solutions?
  - –What biometrical platforms are needed to specifically address the primary needs in forest carbon modeling and how does a tool such as FVS fit?



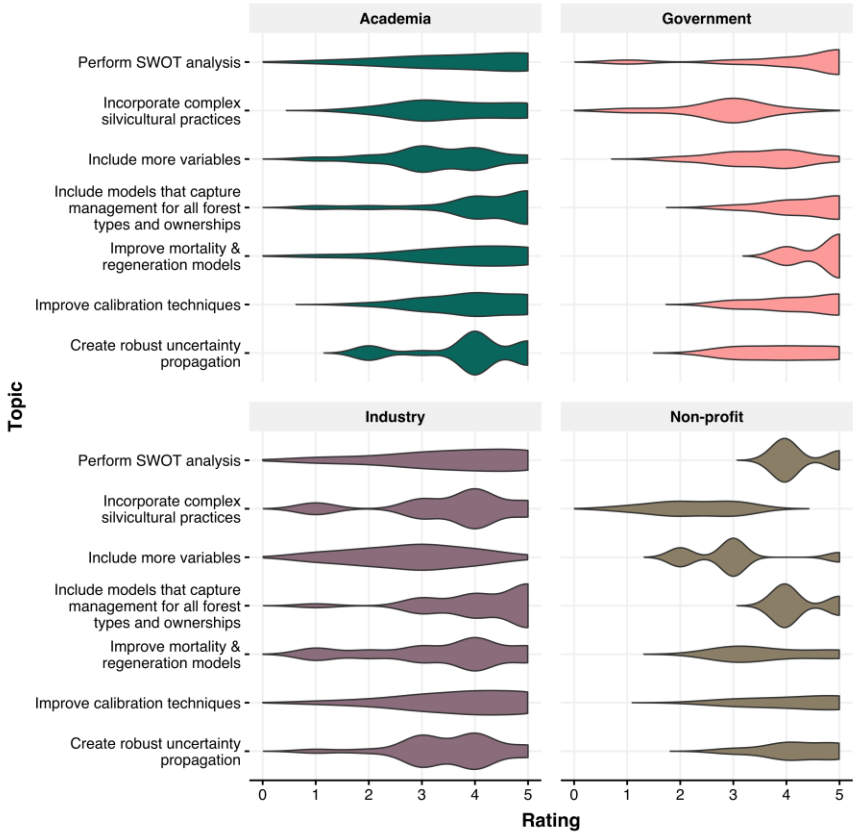
FCMG Progress

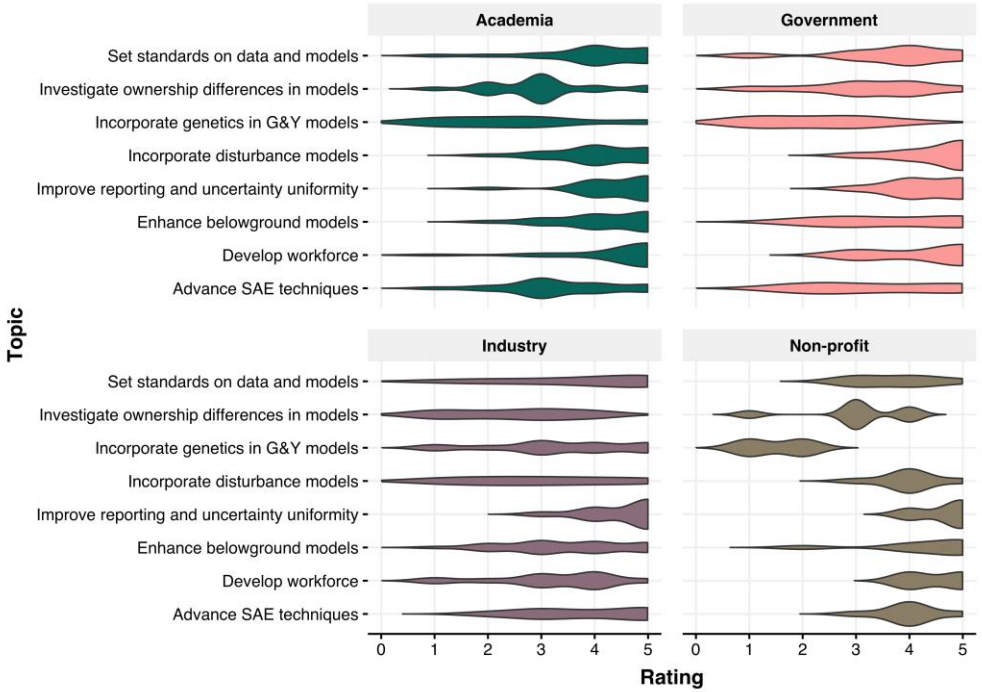
- Convened biometricians across sectors to identify and meet emergent forest carbon modeling needs
- Progress To-Date
  - –Facilitated discussions towards strategic plans
  - –Article series developed and submitted
  - –$1.9 million Cooperative Agreement executed September (2024) and aligned with Partnership for Small Area Estimation
  - –Staffed FVS R&D Liaison

PotlatchDeltic
Weyerhaesuer
NCX
Roseburg Forest Products
Seven Islands Land Company
U of Florida
NAFO
Campbell Global
U of Alabama
Mass Dept of Conservation
TTG Forestry Services
NC State U
U of Maine
Stephen F Austin State U
RMS
U of Tennessee
Three Trees Consulting
US Endowment
International Paper
BTG Pactual
MS State U

SUNY ESF
UGA
TNC
Va Tech
Rayonier
ArborGen
American Forests
Ecotrust
UBC
Paul Smith's
Maine FS
U of Alberta
Mason Bruce and Girard
OSU
Green Diamond
Molpus Woodlands Group
U New Brunswick
Timberland Investment Resources
F&W Forestry Services
Michigan State U
Southern Cross Biometrics
CARB

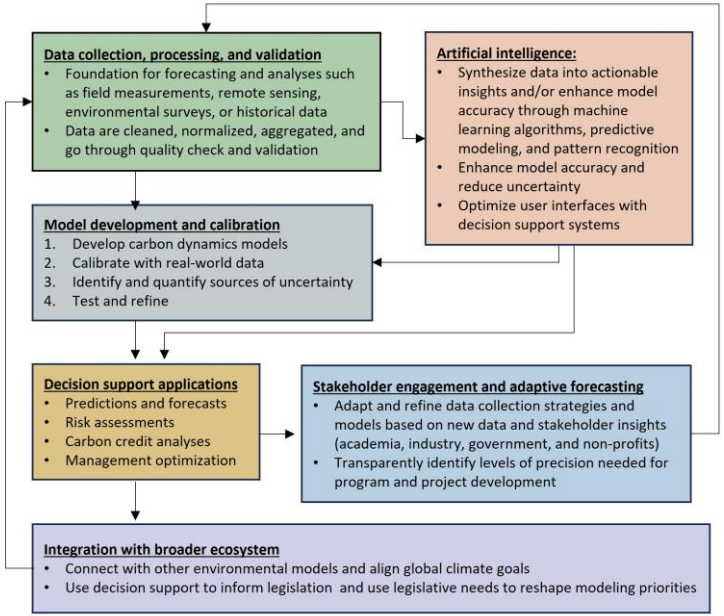
FCMG Identified Forest Modeling Priorities





FCMG Strategy

- Prioritizing Opportunities to Empower Forest Carbon Decisions through Strategic Investment in Forest Modeling Capacity
- Scalable, hierarchical, and transdisciplinary design that can address short-term needs (e.g., improved tree regeneration modeling) and drive long-term scientific advances (e.g., albedo and lateral flux modeling) with science delivery to inform strategic deployment of NCS across landscapes while empowering GHG measurement, monitoring, reporting and verification.



Workflow of Forest Carbon Modeling in Support of Natural Climate Solutions

FCMG Tactics

Growth, Mortality, and Regen Models with Application to Silviculture	• Dynamic equation calibration process
Genetics and G&Y Models	• Calibrate public versus industrial/proprietary models
Belowground Carbon	• Explore fractal root models
Natural Disturbances	• Model-data integration to constrain uncertainties
Carbon Reporting and Uncertainty	• Establish uncertainty reporting best practices
Carbon Tools and Applications	• Standards for code transparency
Forest Vegetation Simulator	• Error estimates for secondary effects such as height growth

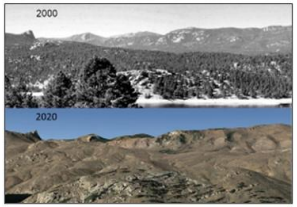
- Seven strategic areas identified
- Examples of tactical research and applications

Application: European Union Deforestation Regulations

- Future of forest carbon quantification is scalable, transparent, co-produced, and data intensive
- Future of ag/forest trade may become inextricably linked to the ecosystem from where it came and the GHG intensity of the supply chain
- Forest C models may become driver of future trade

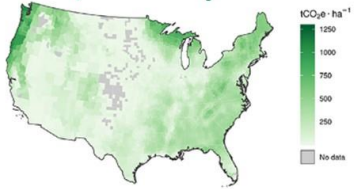
Definitions

Forests & Degradation

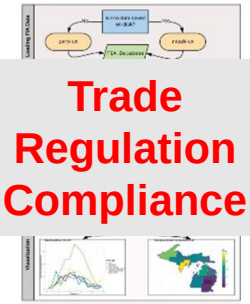


Monitoring Data and Science

National Plot Networks
Remotely Sensed Obs
Algos/Models
Experiments
State/Industry Data



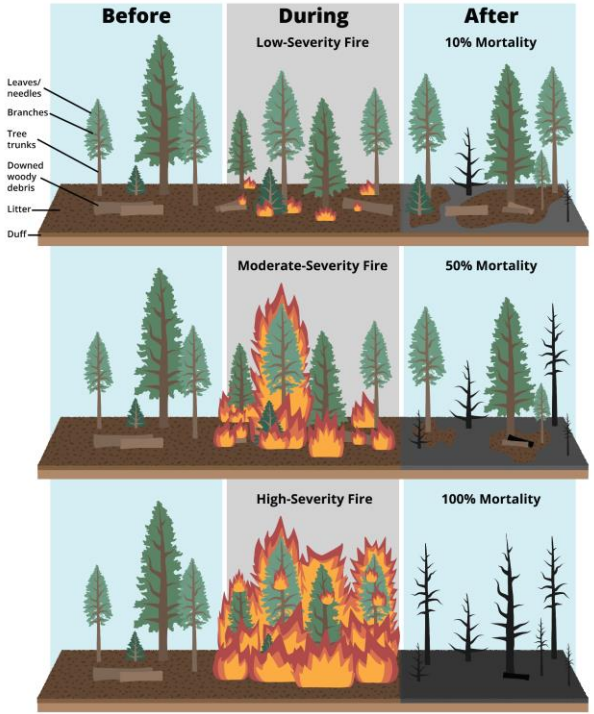
Data Architecture Tools Transparency



Trade Regulation Compliance

Closeout

- Forest modeling highlighted in strategic plans from White House to USDA to Partners
- Public/Private Partnerships codified to advance modelling improvements
- IRA/BIL funding serves as a down payment on collaborative partnerships to advance modeling refinements
- Emerging Efforts such as MMRV, GCSA, and Entity Guidelines V3.0 will necessitate modeling advances and draw upon the FCMG



USFS 2024 Entity Guidelines Fire Emission Modeling

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