

Estimating and reporting carbon stocks and stock changes on forest land in the US

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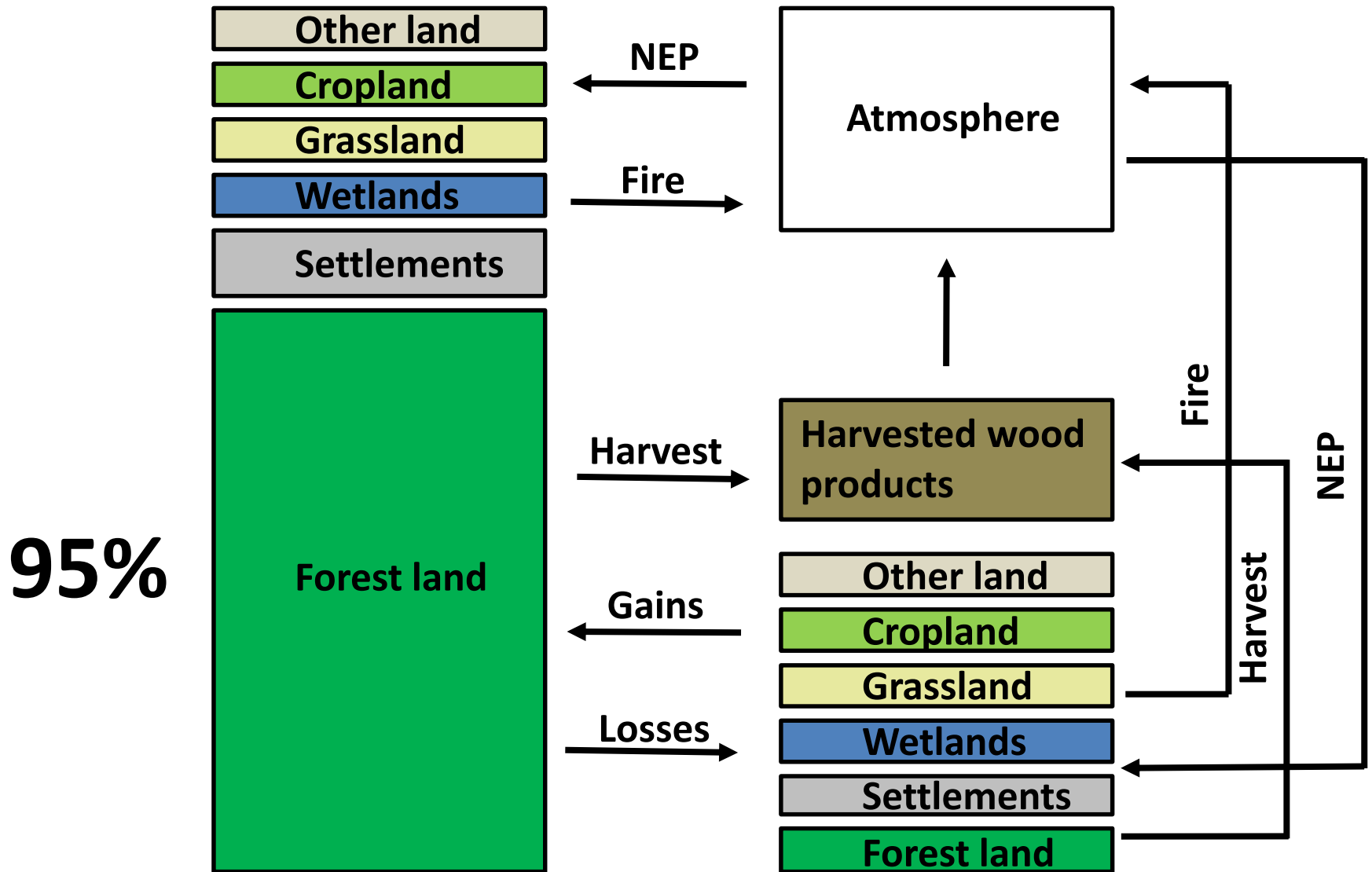
Mission...



...to advance the science, monitoring and reporting of greenhouse gas emissions and removals on forest land in the US



Why is this important?



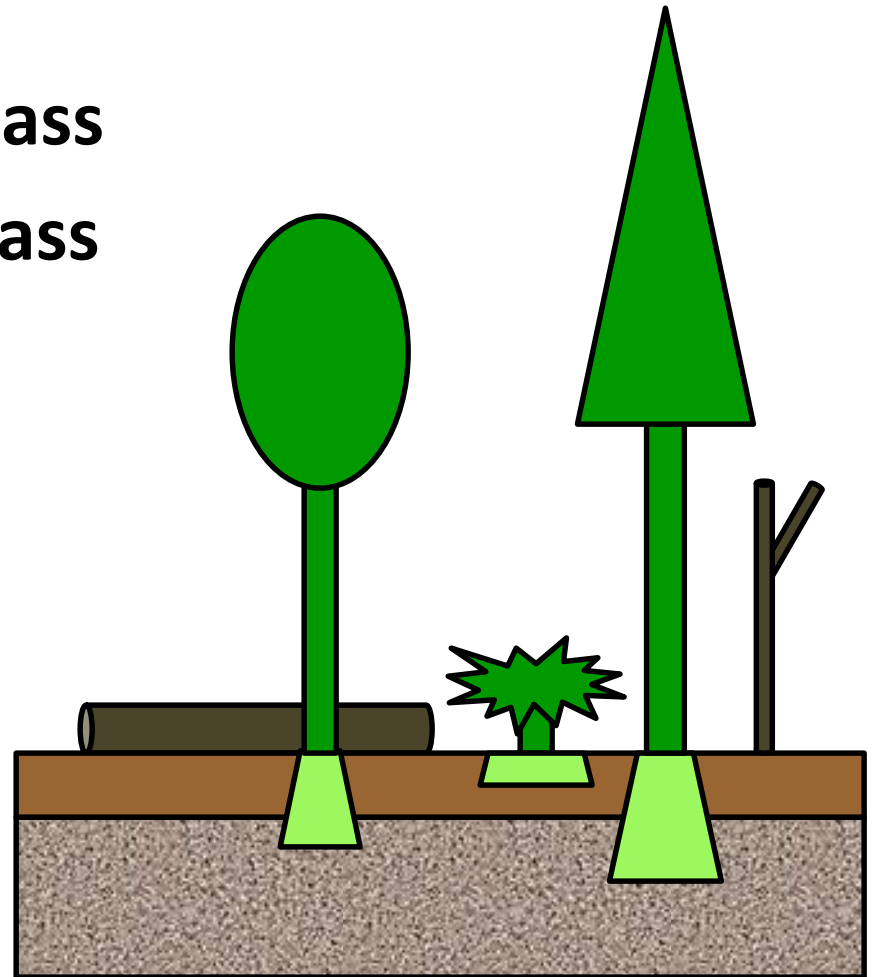
Draft 2017 NIR: (-648) MMT CO₂ eq.

Current efforts and contributions

- Ongoing R&D on carbon pool science, land use conversion dynamics, and integration of emerging data and technologies
- National GHG Inventory (2017 NIR)
- 2nd State of the Carbon Cycle Report (SOCCR-2)
- 4th National Climate Assessment (NCA-4)
- Forest biomass and carbon in the RPA
- 2016 USDA GHG Inventory
- State reporting in the Northern Region (24 states)
- USGS Federal Lands Carbon Report (forest land)
- Intergovernmental Panel on Climate Change (IPCC)

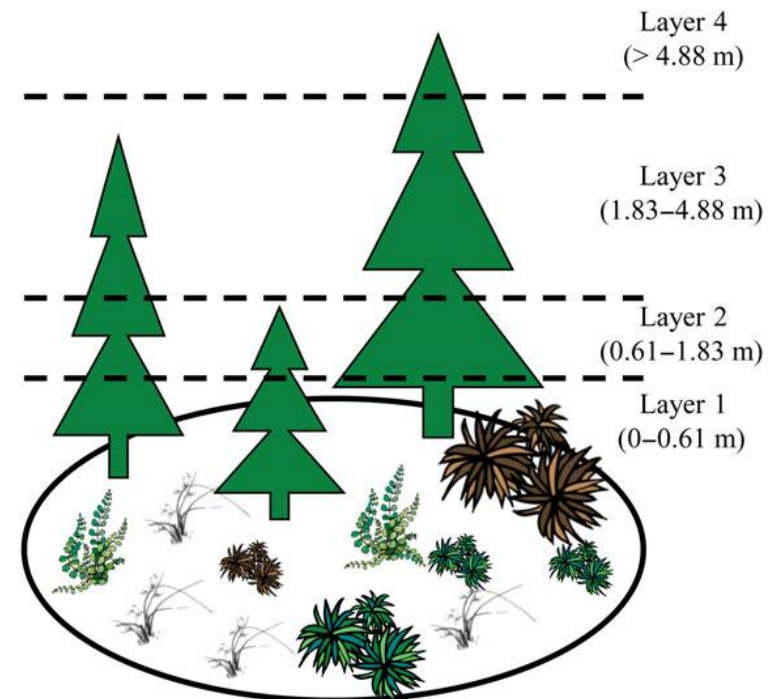
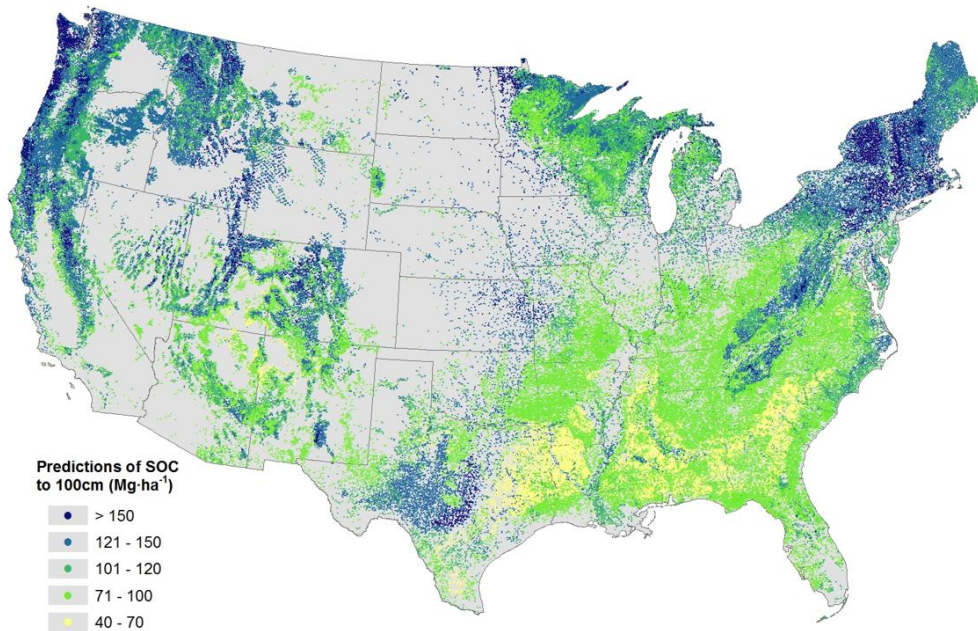
Forest ecosystem C pools

- Aboveground live biomass
- Belowground live biomass
- Dead wood
- Litter
- Soil organic matter
 - Mineral
 - Organic



Carbon pool improvements

- Litter and soil carbon models from in situ observations
- Understory vegetation model from in situ observations
- Belowground biomass model with climate coefficients
- Foliage model from legacy data



Clough, B.J., et al. 2016. Comparing tree foliage biomass models fitted to a multi-species, felled-tree biomass dataset for the United States. *Ecological Modelling*

Domke, G.M., et al. 2016. Estimating litter carbon stocks in forest ecosystems of the United States. *Science of the Total Environment*

Domke, G.M., et al. 2017. Estimating soil organic carbon stocks on forest land in the United States. *Ecological Applications*

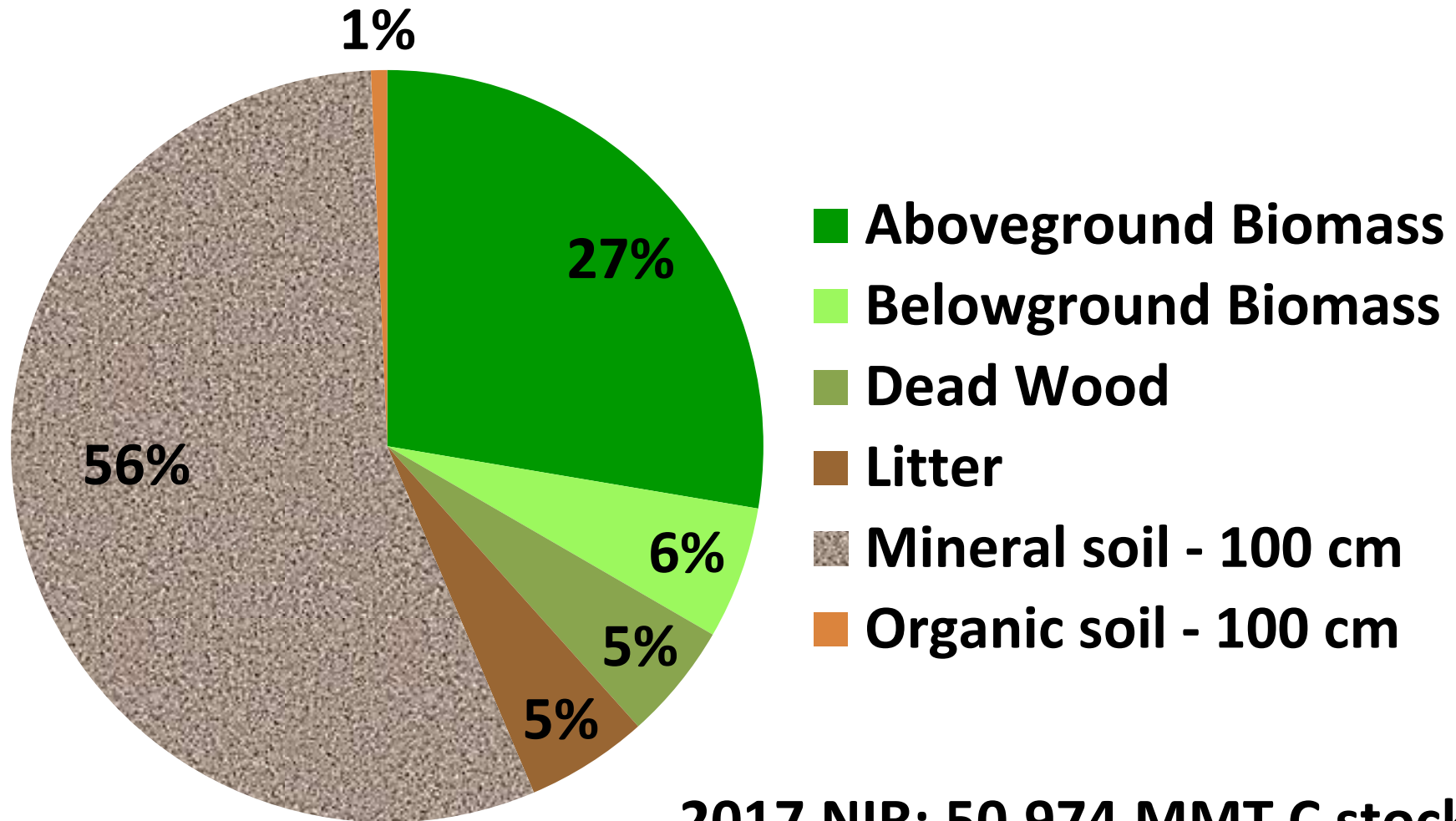
Johnson, K. et al. In review. Estimating understory vegetation carbon in the United States. *Environmental Research Letters*.

Russell, M.B., et al. 2015. Climate-derived estimates of tree coarse root carbon in forests of the United States. *Carbon Balance and Management*

Annual reporting responsibilities

- Forest Land Remaining Forest Land
 - Forest ecosystem carbon*
 - Forest fire emissions
 - Emissions from drained organic soils*
- Land Converted to Forest Land*
 - Forest ecosystem carbon
 - Emissions from drained organic soils*
- Forest Land Converted to Land*
 - Cropland, Grasslands, Settlement, Wetland, Other Land
- Harvested Wood Products

Forest C stocks by pool in the US

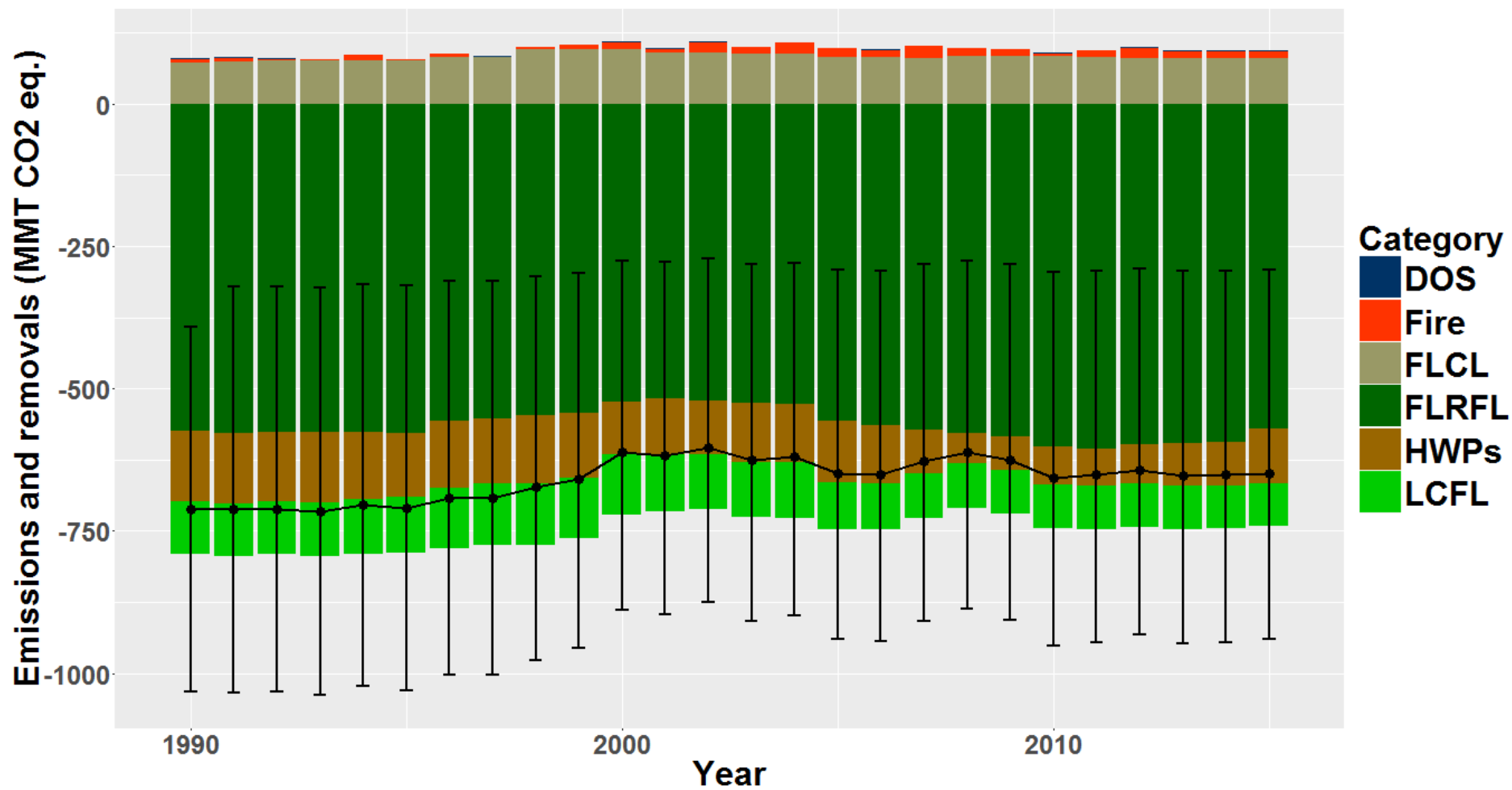


2017 NIR: 50,974 MMT C stocks

Land use and land use change

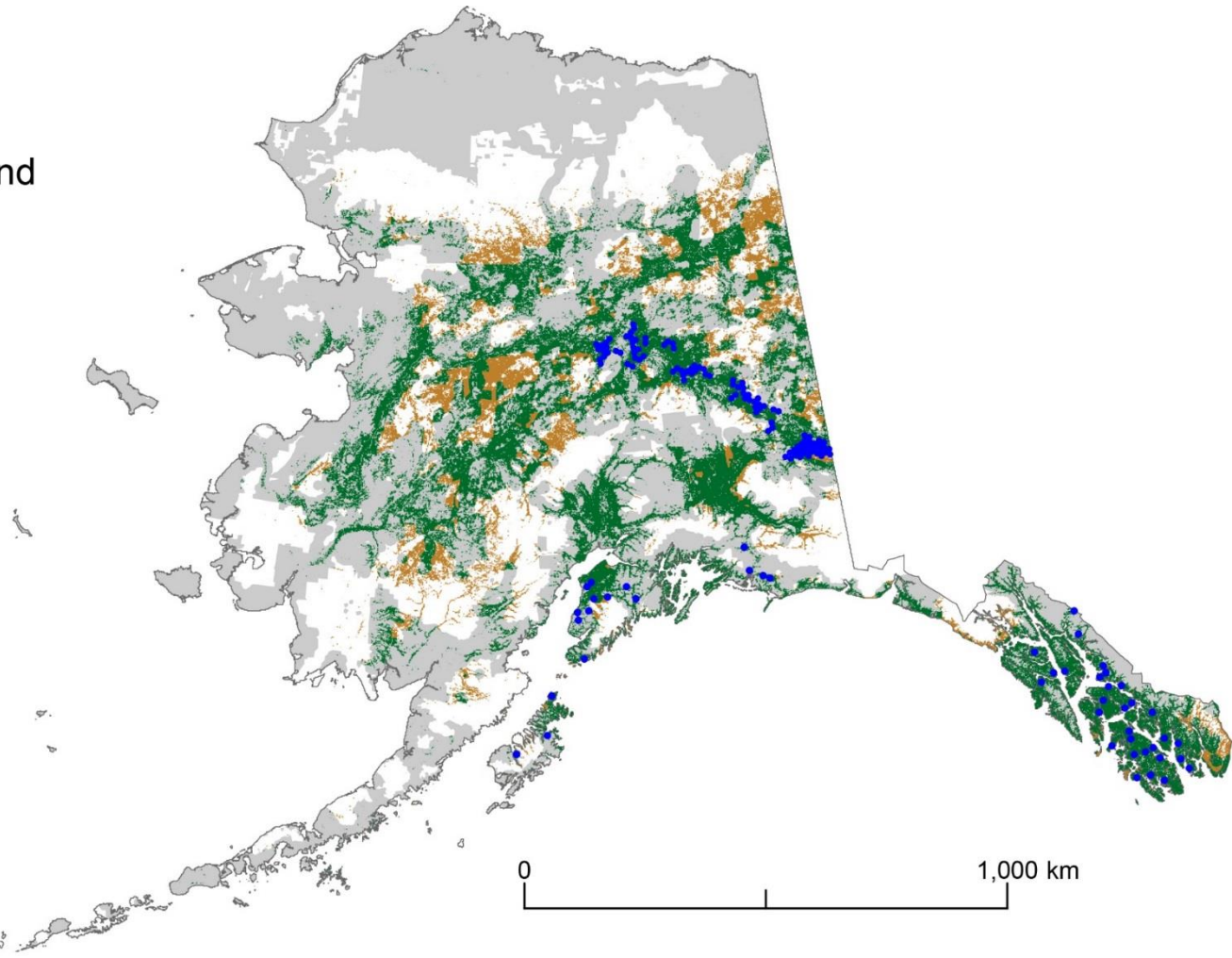
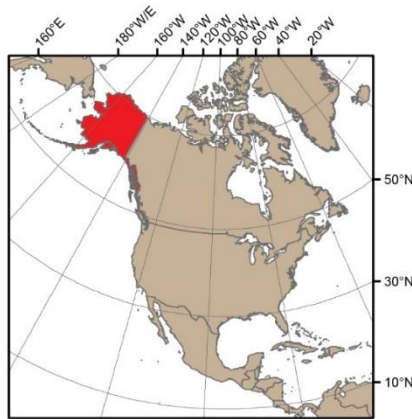
	Forest land	Cropland	Grasslands	Settlement	Wetlands	Other Land
Forest land	FRF	FCC	FCG	FCS	FCW	FCO
Cropland	CCF	CRC	CCG	CCS	CCW	CCW
Grasslands	GCF	GCC	GRG	GCS	GCW	GCO
Settlement	SCF	SCC	SCG	SRS	SCW	SCO
Wetlands	WCF	WCC	WCG	WCS	WRW	WCO
Other land	OCF	OCC	OCG	OCS	OCW	ORO

Forest land emissions and removals



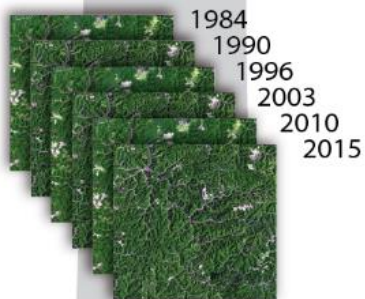
Managed forest land

- Managed Land
- Managed Forest Land
- Unmanaged Forest Land
- FIA Plot

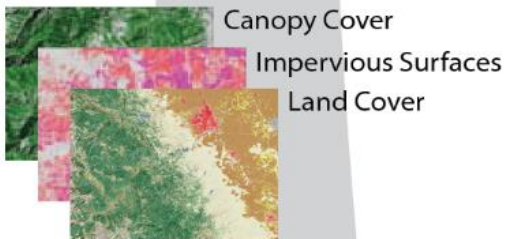


Remotely Sensed Data

Landsat Time Series



National Land Cover Database



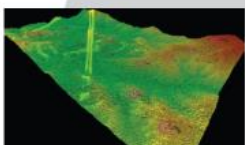
NAIP Imagery



MODIS Imagery



LiDAR



MTBS

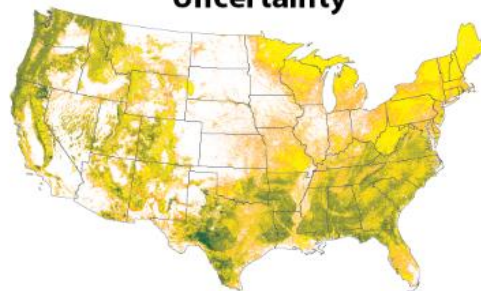


Carbon Accounting System

Forest Carbon Stocks & Uncertainty



Forest Carbon Stock Change & Uncertainty



Land Cover, Land Use and Land Use Change



FIA Data

Annual Inventory



Periodic Inventories

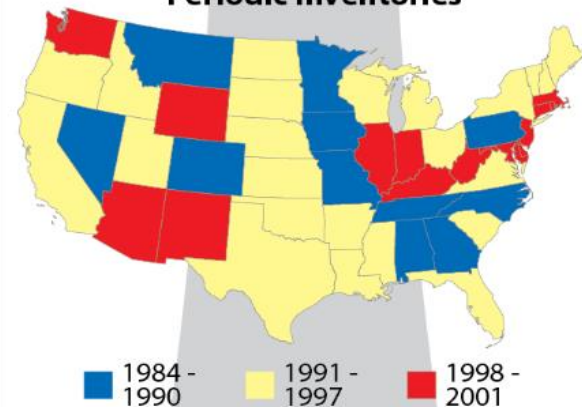
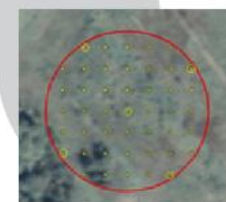


Image-based Change Analysis

Time 1



Time 2



Final thoughts



- FIA data remains the foundation of GHG estimation and reporting
- Growing need for more spatially and temporally resolved information on GHG emissions and removals
- Work is on-going to improve and expand capabilities - collaboration and partnerships are essential
- Better inform policy and management decisions

Thanks!

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FIA carbon: <http://www.fia.fs.fed.us/forestcarbon/>