

# Resilience to Climate Change

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# Agenda

- Forests in the U.S.A.
- Tree Planting
- Climate Change and Forests
- Risk and Resiliency
- Current Policies and Tools
- Recent Initiatives



# Forestland, Woodland, and Timberland (FIA and FAO)

- Forestland—Land at least **120 feet (37 meters) wide** and at least **1 acre (0.4 hectare) in size** with at least **10 percent cover** (or equivalent stocking) by live trees.



# Forestland, Woodland, and Timberland (FIA and FAO)

- Woodland - Overall cover of **>10 percent woody** vegetation
  - At least **120 feet (37 meters)** wide
  - At least **1 acre (0.4 hectares)** in size
  - With **sparse trees** capable of achieving **16.4 feet (5 meters)** in height
  - With a **tree canopy cover of 5 to 10 percent**
  - Combined with **shrubs at least 6 feet (2 meters)** in height



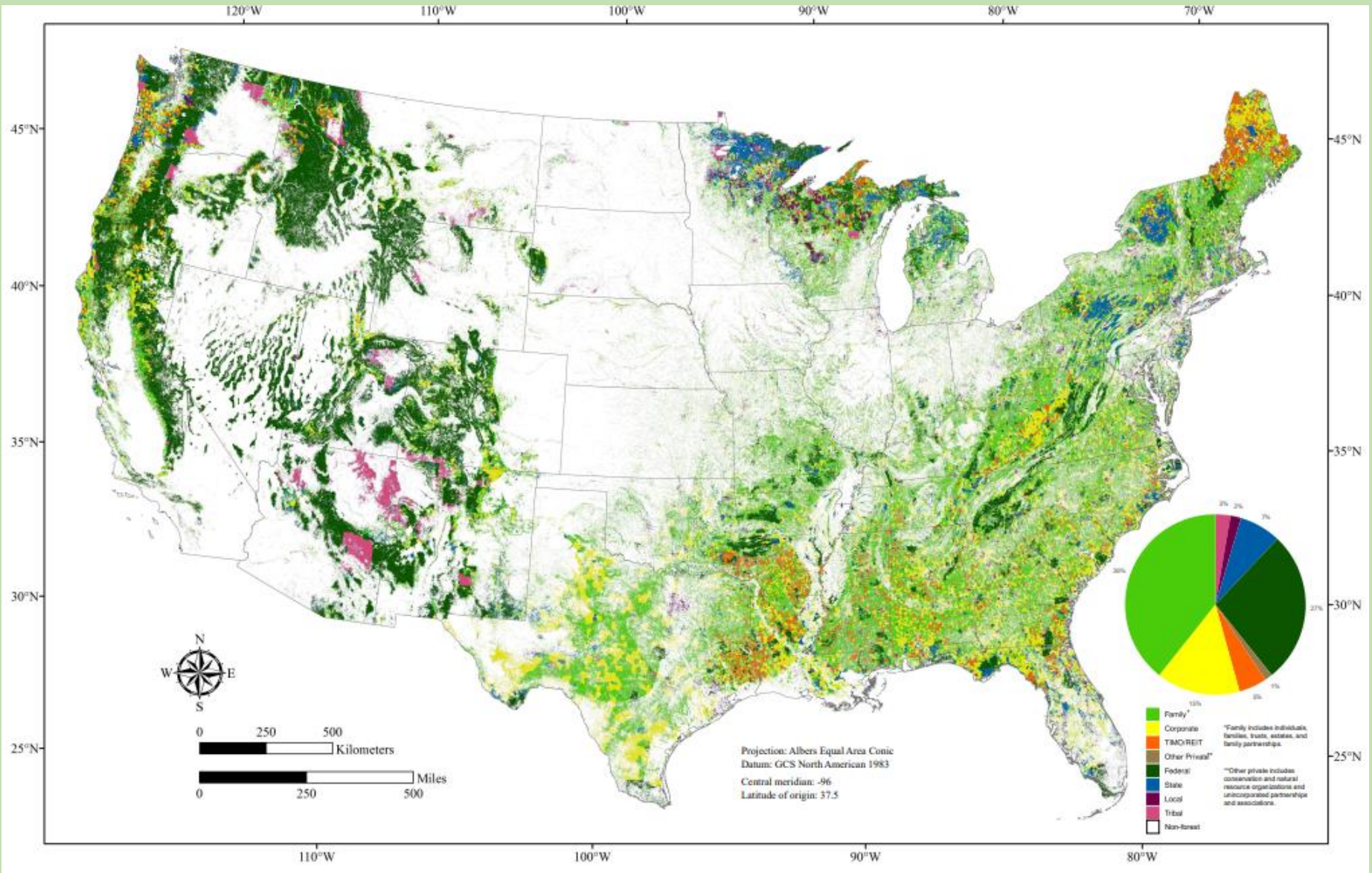
National  
Woodland  
Owners  
Association



# Forestland, Woodland, and Timberland (FIA and FAO)

- Timberland—**Forest land** that is producing or capable of **producing 20 cubic feet (~0.6 cubic meter) per acre or more per year** of wood at culmination of mean annual increment





**Forests and woodlands:**  
 >822 million acres (333 million ha)

58% of forest and woodland is privately owned

38% of forest and woodland owned by families, individuals, trusts, and estates

Map credit: Sass et al. (2017)

# Small Forestland Owners in the U.S.A.

- **Nonindustrial private forestland (NIPF) owners** – Private individual, group, association, corporation, Indian Tribe, or other private entity
  - Own less than 45,000 ac (18,210 ha)
  - Do not own/operate an industrial mill
  - **Family forest owners (FFOs)** – Families, individuals, trusts, and estates
    - 6.6 million own 1-9 ac (0.4-3.6 ha)
    - 4 million own 10+ ac (4+ ha)
  - **Small corporate** - Corporate, including private universities, foundations, and international companies
    - Own 70 million ac (28 million ha)



# Family Forest Owners in the U.S.A.

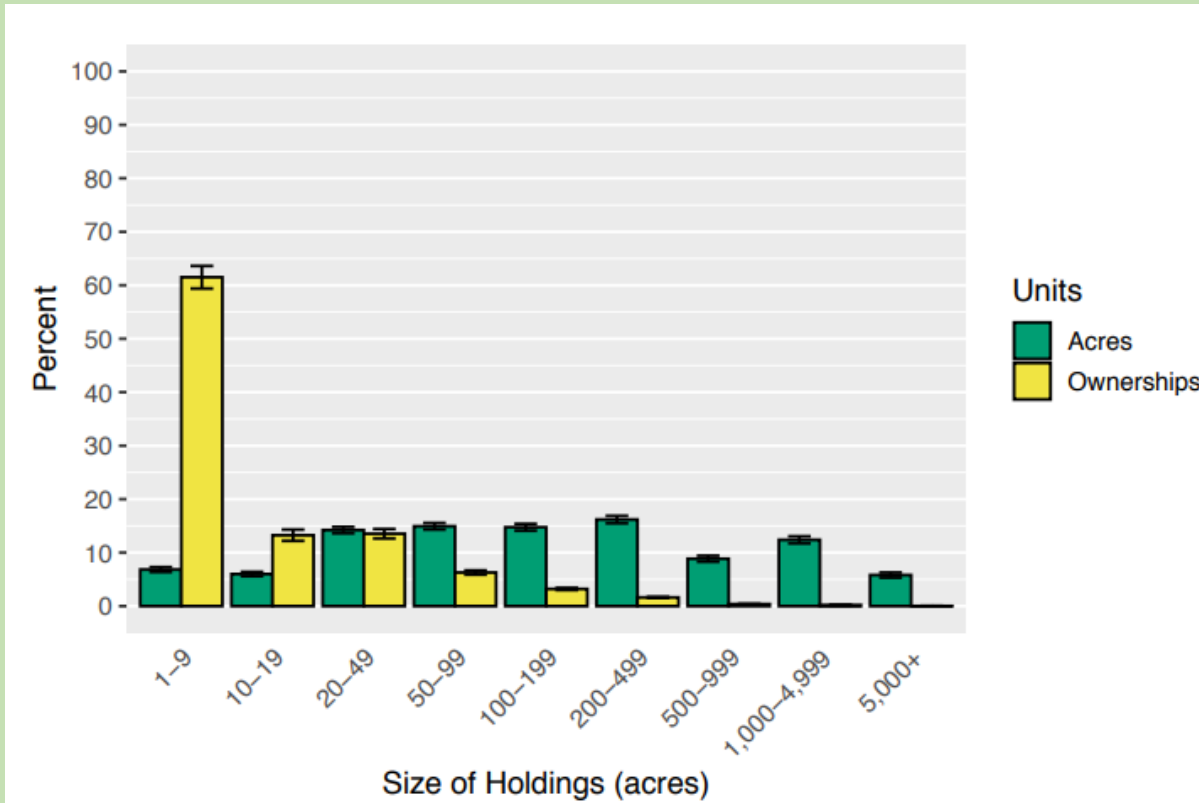


Figure 15.—Estimated percentage of family forest acres and ownerships by size of forest holdings, United States, 2018. Error bars represent 95 percent confidence intervals (i.e.,  $1.96 \times$  standard error [SE]).

Butler et al. (2021) Family forest ownerships of the United States, 2018: Results from the USDA Forest Service, National Woodland Owner Survey

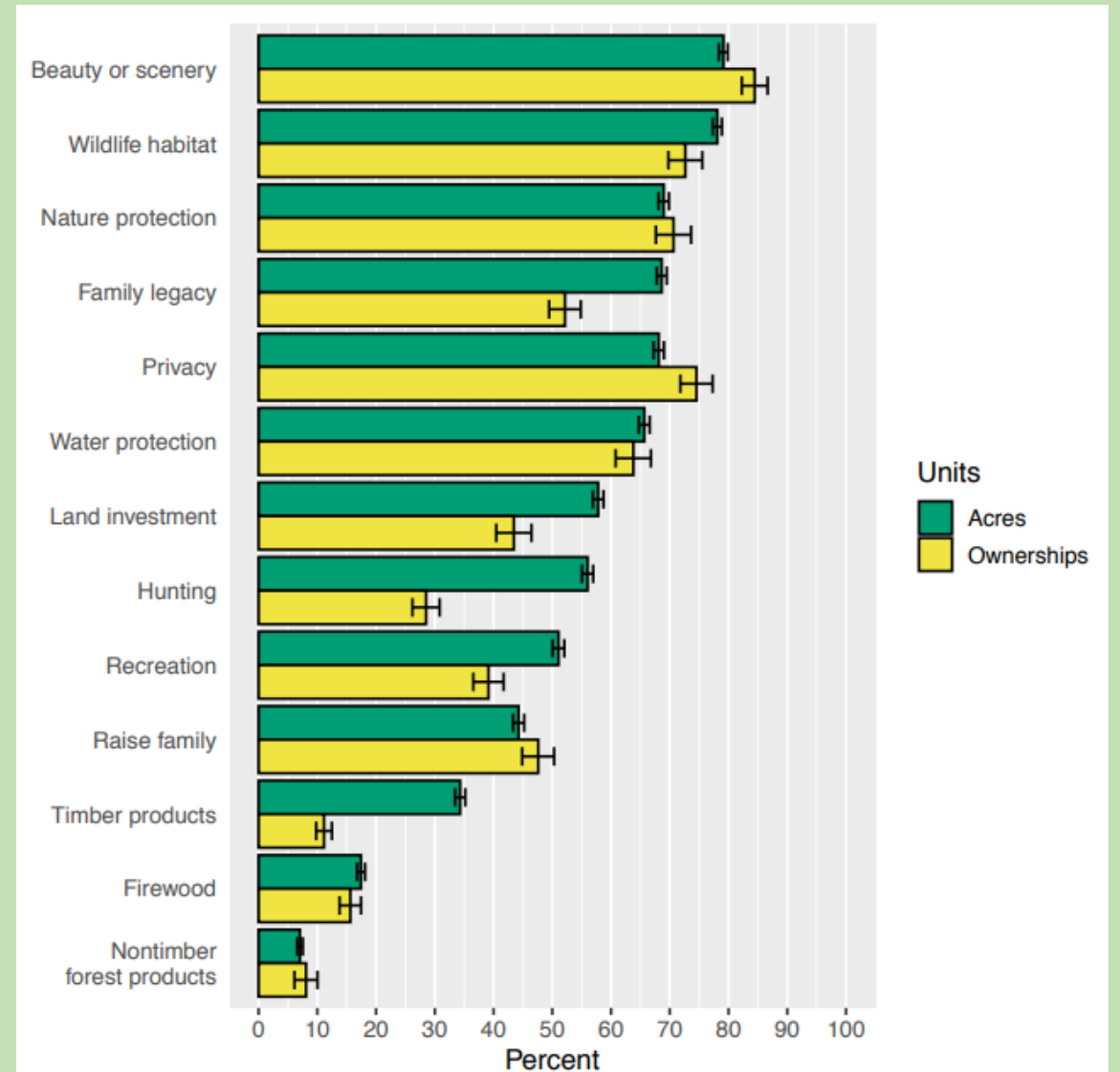


Figure 17.—Estimated percentage of family forest acres and ownerships (10+ acres of forest land) by reasons for owning forest land, United States, 2018. Values include ownerships who rated reasons as important or very important on a 5-point Likert scale. Error bars represent 95 percent confidence intervals (i.e.,  $1.96 \times$  standard error [SE]).



# Family Forest Owners in the U.S.A.

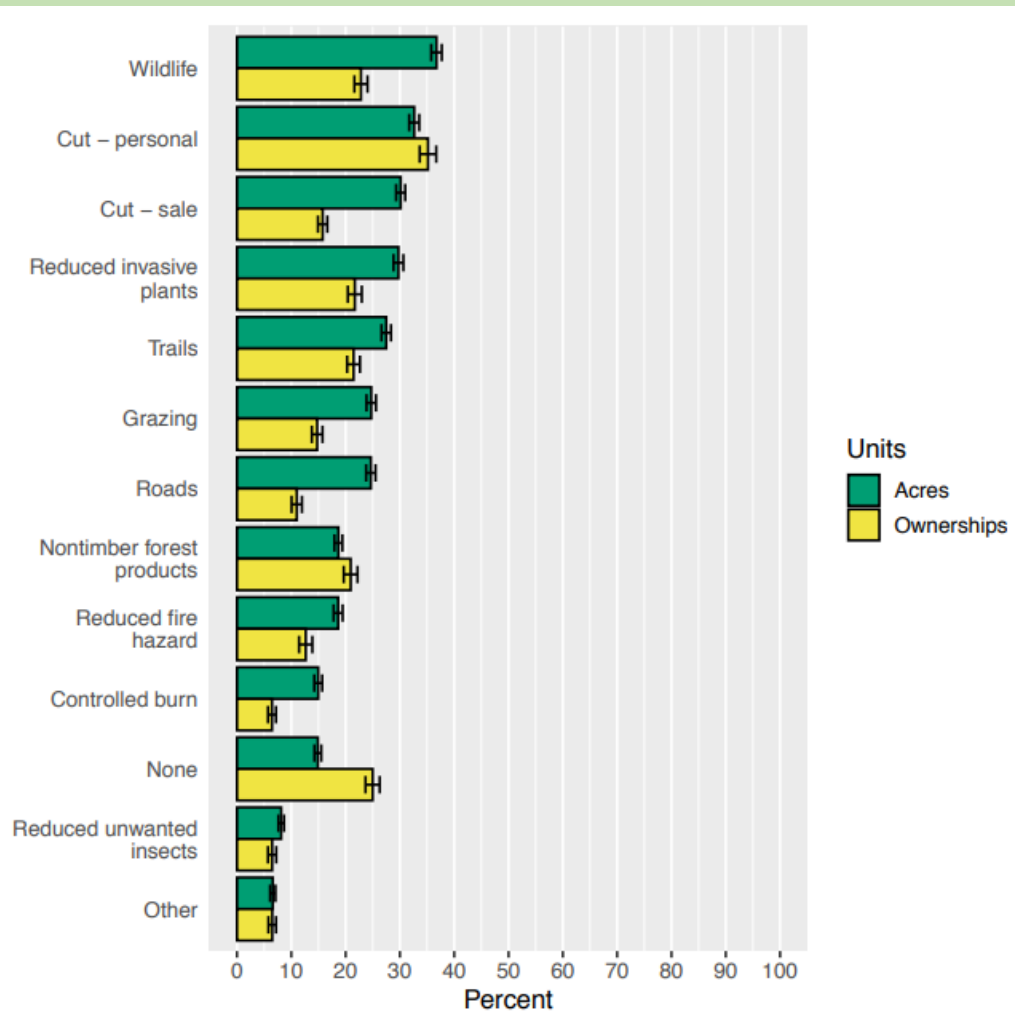


Figure 19.—Estimated percentage of family forest acres and ownerships (10+ acres of forest land) by management activities in the previous 5 years, United States, 2018. Error bars represent 95 percent confidence intervals (i.e.,  $1.96 \times$  standard error [SE]).

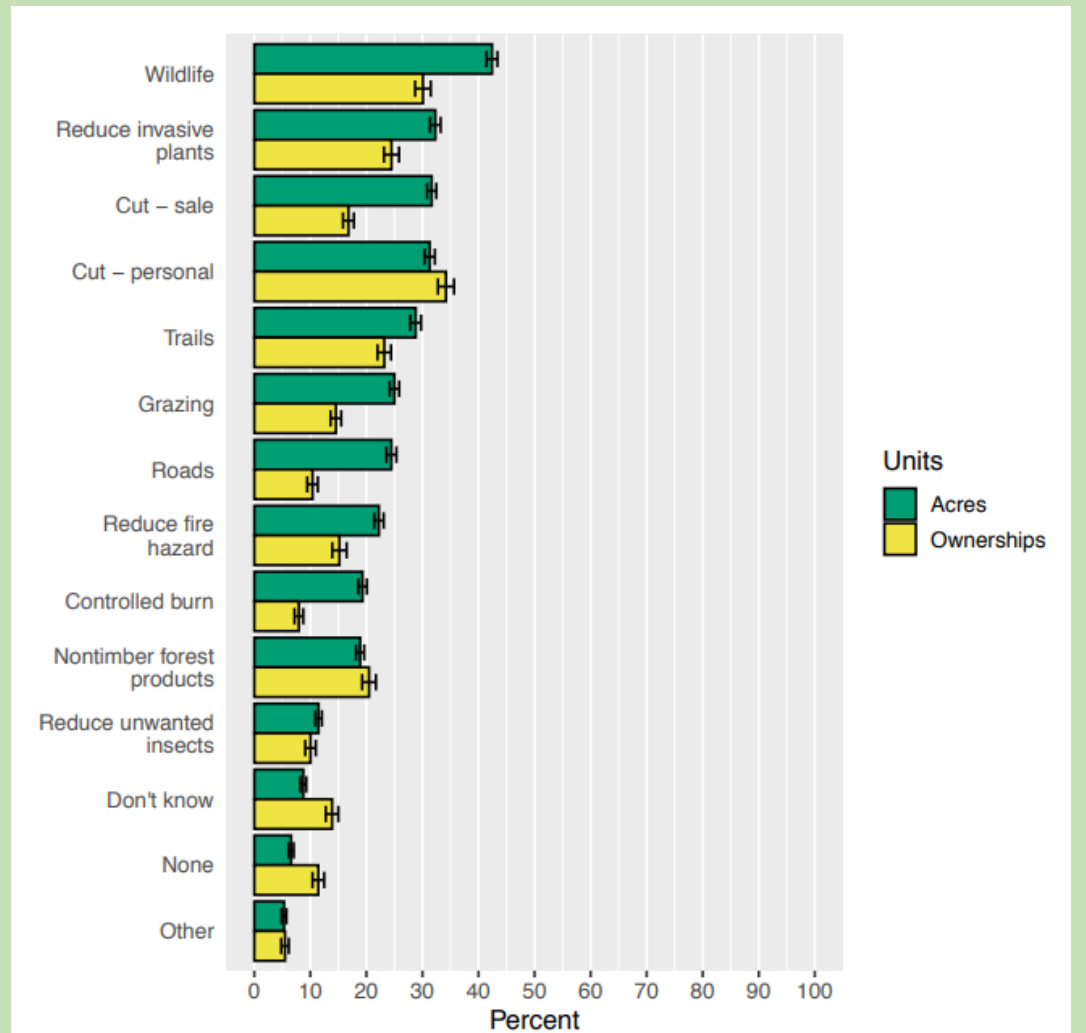
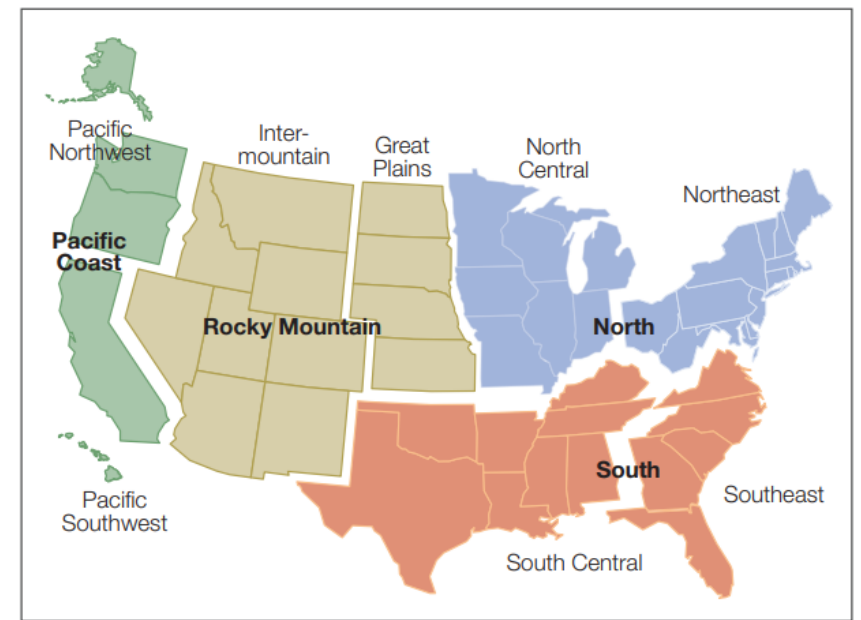
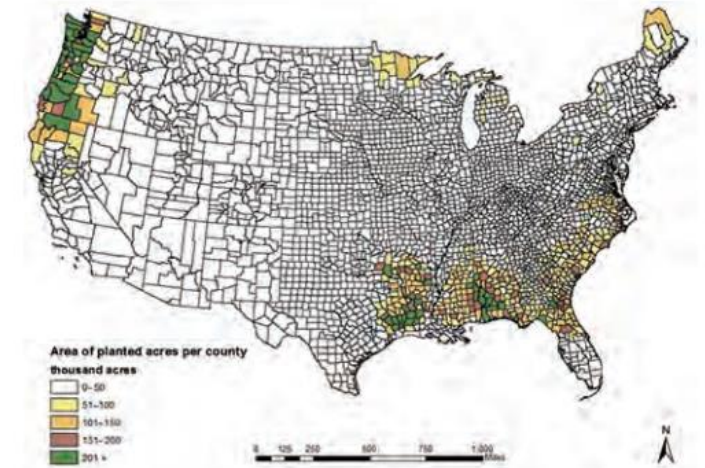


Figure 20.—Estimated percentage of family forest acres and ownerships (10+ acres of forest land) by intended management activities in the next 5 years, United States, 2018. Error bars represent 95 percent confidence intervals (i.e.,  $1.96 \times$  standard error [SE]).

# Planted Forests in the U.S.A.

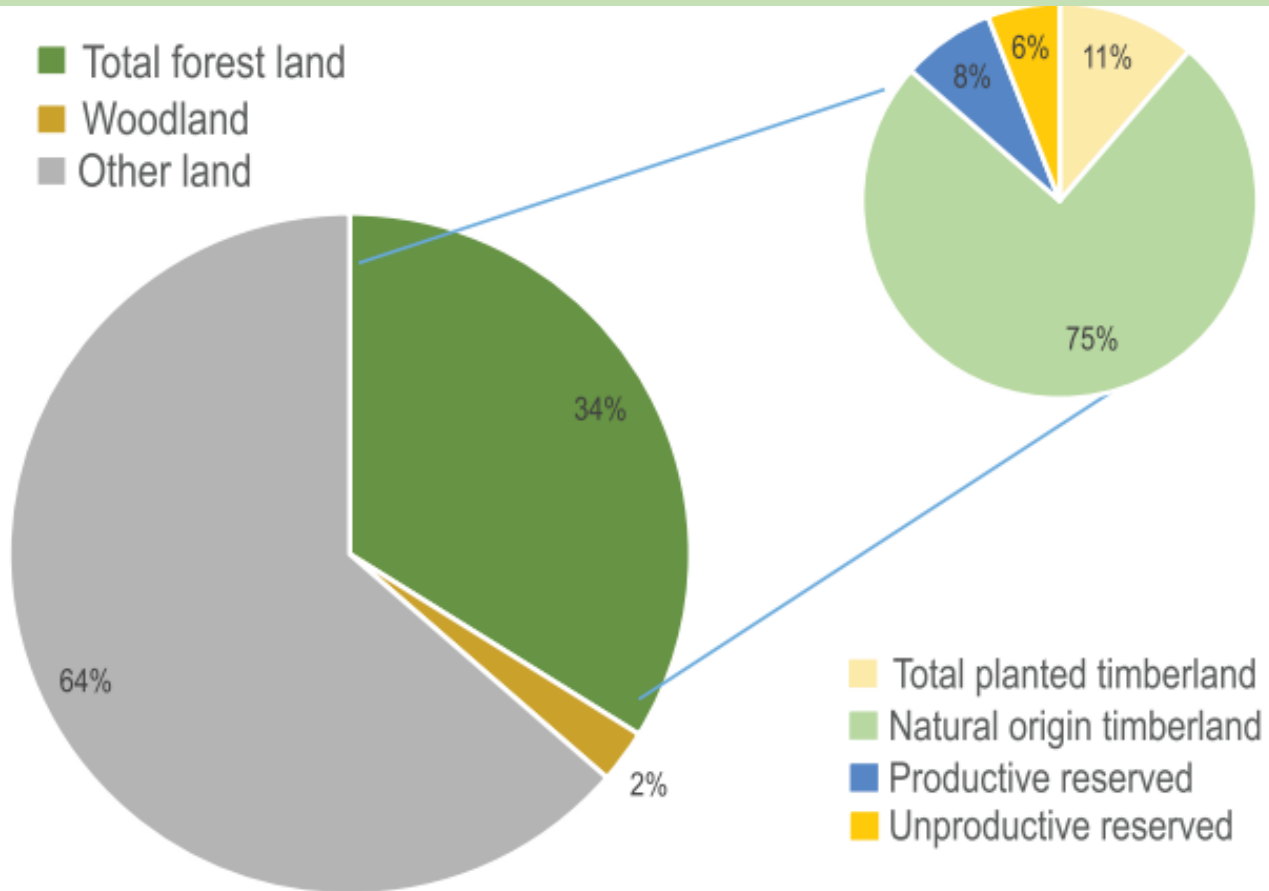


**Figure I-1.** RPA regions and subregions in the United States.



Source: Forest Inventory and Analysis data

**Figure 5-1.** Area of planted acres per county in the conterminous United States.



**Figure 1-1.** Proportion of U.S. land by major land use with a breakout of total forest land by stand origin.

# Tree Planting in the U.S.A.

- Forest Plantations: 3 Phases
  - Initiation
    - Colonial period (1492-1700s) through WWII (1945)
    - Limited tree planting
    - Limited support from government policies until the Great Depression (1930s)
  - Acceleration
    - Post WWII to 1976 (National Forest Management Act)
    - Favorable economic conditions (strong demand and high prices for fiber)
    - Wave of government support
  - Steady Growth
    - 1977 to 1999
    - Transition of timber supply from public lands to private lands

# Historical Re/Afforestation Programs

- **Civilian Conservation Corps (1932-1941)**
  - Part of the New Deal
  - Focus on public lands
  - Built dams, beautified state parks, cleared roadsides
  - Planted >3 billion trees
  - Established Shelterbelts in the Great Plains to mitigate effects of the **Dust Bowl**

85 years ago: FDR's forest army planted 3 billion trees in national forests, shelter belts

April 3, 2018 by [Benjamin Alexander](#) — 3 Comments

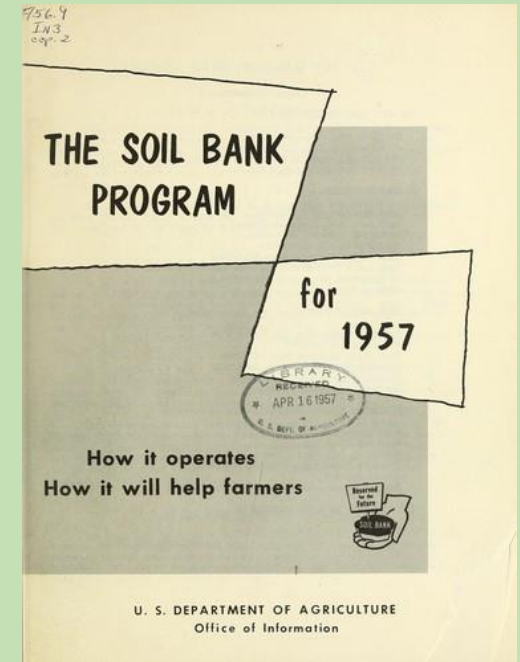


CCC members planted 3 billion trees, earning the nickname "Roosevelt's tree army." Photo: National Archives



# Historical Re/Afforestation Programs

- **Soil Bank Program** (Title 1 of the Agricultural Act of 1956)
  - Reduce production of basic crops
  - Maintain farm income
  - Conserve soil
- Immediate (Acreage Reserve Program) and long-term (Conservation Reserve Program) reduction of surplus commodities
- CRP: transition cropland to pasture, range, **forest (2 million acres or 809,000 ha), and wildlife (310,000 acres or 125,000 ha) uses**
  - Cost-share reimbursements to incentivize land use change
  - Tree planting concentrated in the Southeastern states



[The soil bank program for 1957 \(1957 edition\) | Open Library](#)

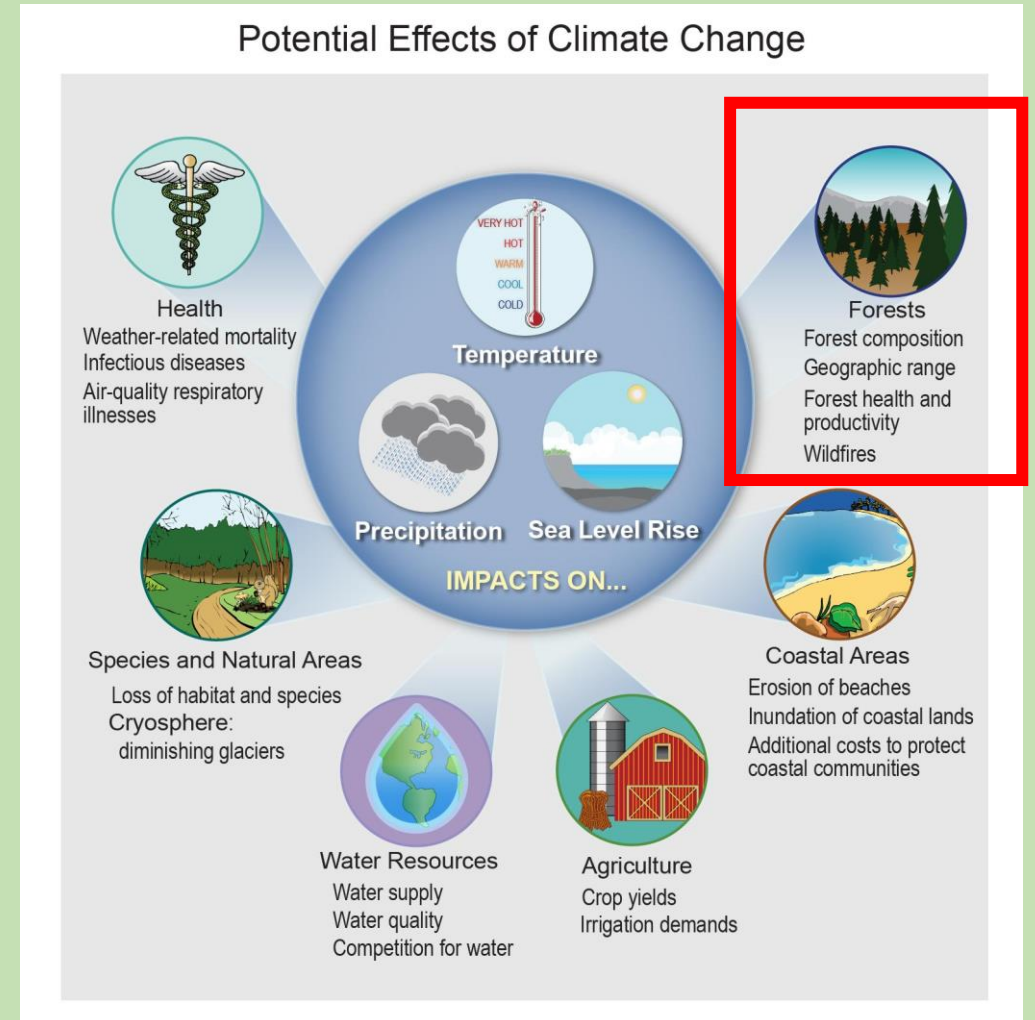
# Historical Re/Afforestation Programs

- **Conservation Reserve Program**

- 1986: Convert highly erodible cropland to less intensive uses, including tree planting
  - 2.3 billion seedlings planted nationwide
- 1996: Expanded CRP increased tree planting opportunities
- New Climate-Smart Practice Incentive – Sequester carbon and reduce emissions
  - Establishment of trees and permanent grasses, wildlife habitat, and wetland restoration
- Climate Change Mitigation Assessment Initiative – Quantify climate outcomes of the program

# Climate Change and Forests

- Climate change can influence:
  - Forest health
  - Wildfire risk
  - Water quantity and quality
  - Wildlife
  - Timber production
  - Soil productivity
  - Emerging forest-based bioproducts and technology



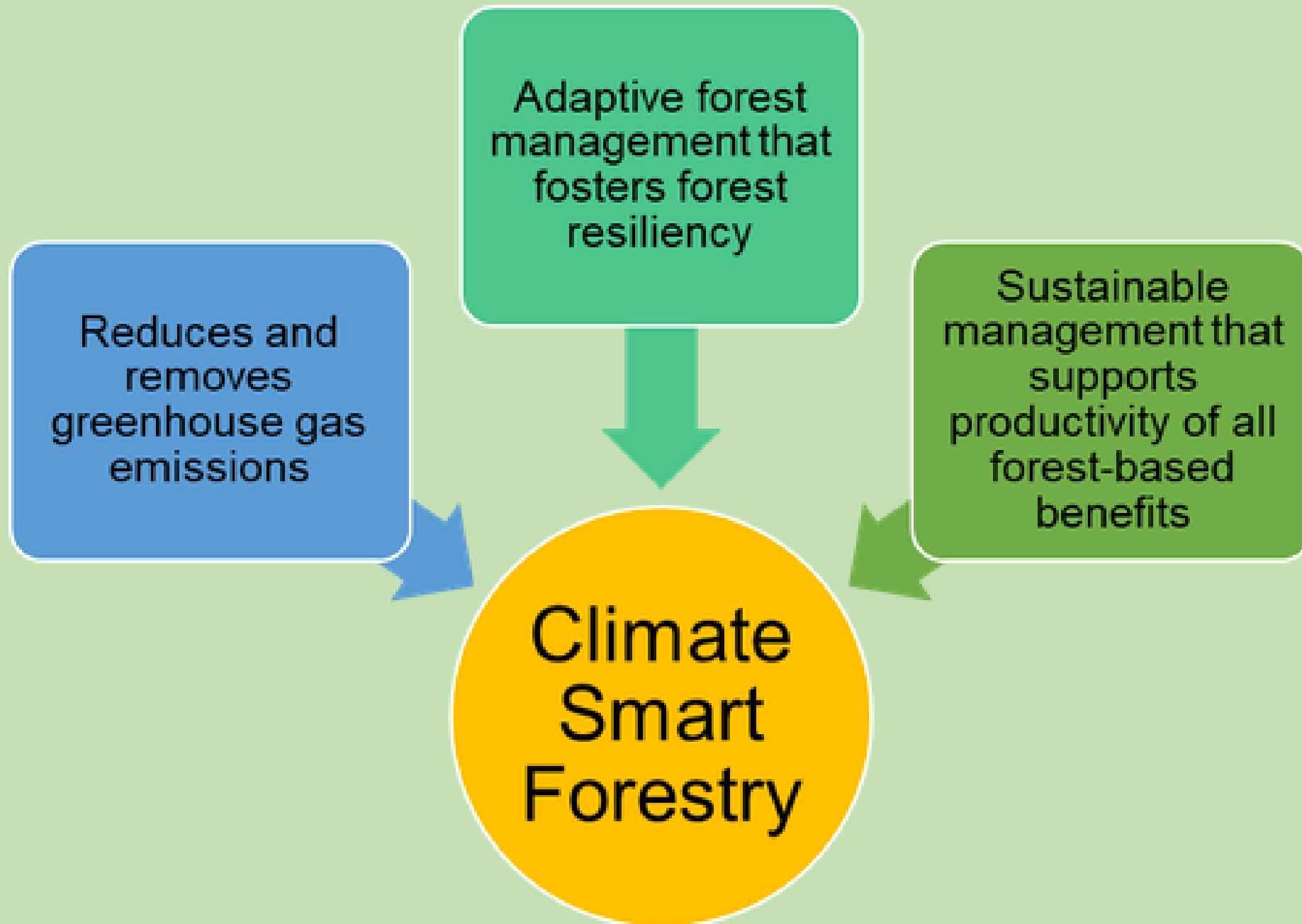
# Risk and Resiliency

- **Resilience** – Capacity of a forest to withstand external pressures and return to its pre-disturbance state over time
- Plantations generally face greater risk from climate change than primary forests due to reduced diversity (biodiversity, genetic, structural, etc.)
- Risks can partly be mitigated through **climate-smart forestry (CSF) practices**



# Climate-Smart Agriculture and Forestry

- Climate-smart commodities: Produced using agricultural practices that reduce GHG emissions or sequester carbon.
- Mitigation categories:
  - Soil Health
  - Nitrogen Management
  - Livestock Waste Management
  - Grazing Land Management
  - Agroforestry, Forestry, and Upland Wildlife Habitation
  - Restoration of Disturbed lands
  - Energy, Combustion, and Electricity Efficiency
  - Rice Production



# Climate-Smart Forestry (CSF)

- Some of the common forest management practices that are consistent with CSF strategies include:
  - Thinning and harvesting operations
  - Prescribed fire applications
  - Site preparation practices
  - Planting diverse mixture of species or genetic traits

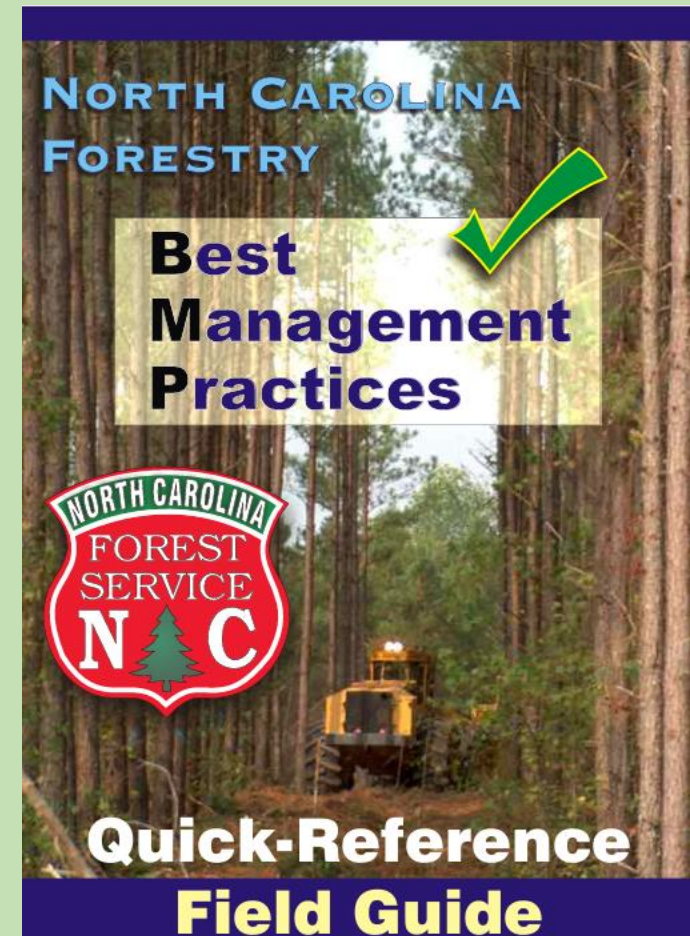
# Current Policies and Tools

- Farm Bill programs (i.e., Conservation Stewardship Program, Environmental Quality Incentives Program)
  - Cost-share funding for forest management practices
  - Conservation easements and annual rental payments
- Emergency Forest Restoration Program
  - Cost-share funding to reimburse expenses associated with damage from natural disasters such as hurricanes and wildfires



# Current Policies and Tools

- State-level incentive programs for forest management
  - Cost-share funding for tree planting, site and stand improvement, and recovery measures after disaster
  - Reduced property taxes
- State forestry practices act
  - Encourage or mandate best management practices to protect air, soil, and water resources



# Current Policies and Tools

- Certification schemes
  - American Tree Farm System
  - Forest Stewardship Council Family Forests Program
  - Sustainable Forestry Initiative Small Lands Group Certification Module
- USDA Climate Hubs (by region)
  - Provide educational resources and tools
  - [Welcome to the USDA Climate Hubs | USDA Climate Hubs](#)
- [USFS Climate Change Resource Center](#)
  - Education, adaptation, and tools

# Challenges for Small Landowners

- Requirement for programs
  - Acreage
  - Land title
  - Up-front capital
- Technical and economic barriers
  - Lack of knowledge and awareness → Low participation
  - Economies of scale (management activities)
    - Landscape-scale opportunities?



# Challenges: Agroforestry and Property Taxes

- Agroforestry: Enhance climate change mitigation and adaptation
- Adopters face barriers such as preferential property tax programs for agriculture and forestry
- Preliminary analysis (5 pilot states): Agricultural tax assessments welcome a mixed agriculture-forestry interface more
- Limiting Factors: Eligibility requirements (acreage, productivity, income)

# Recent Initiatives and Moving Forward

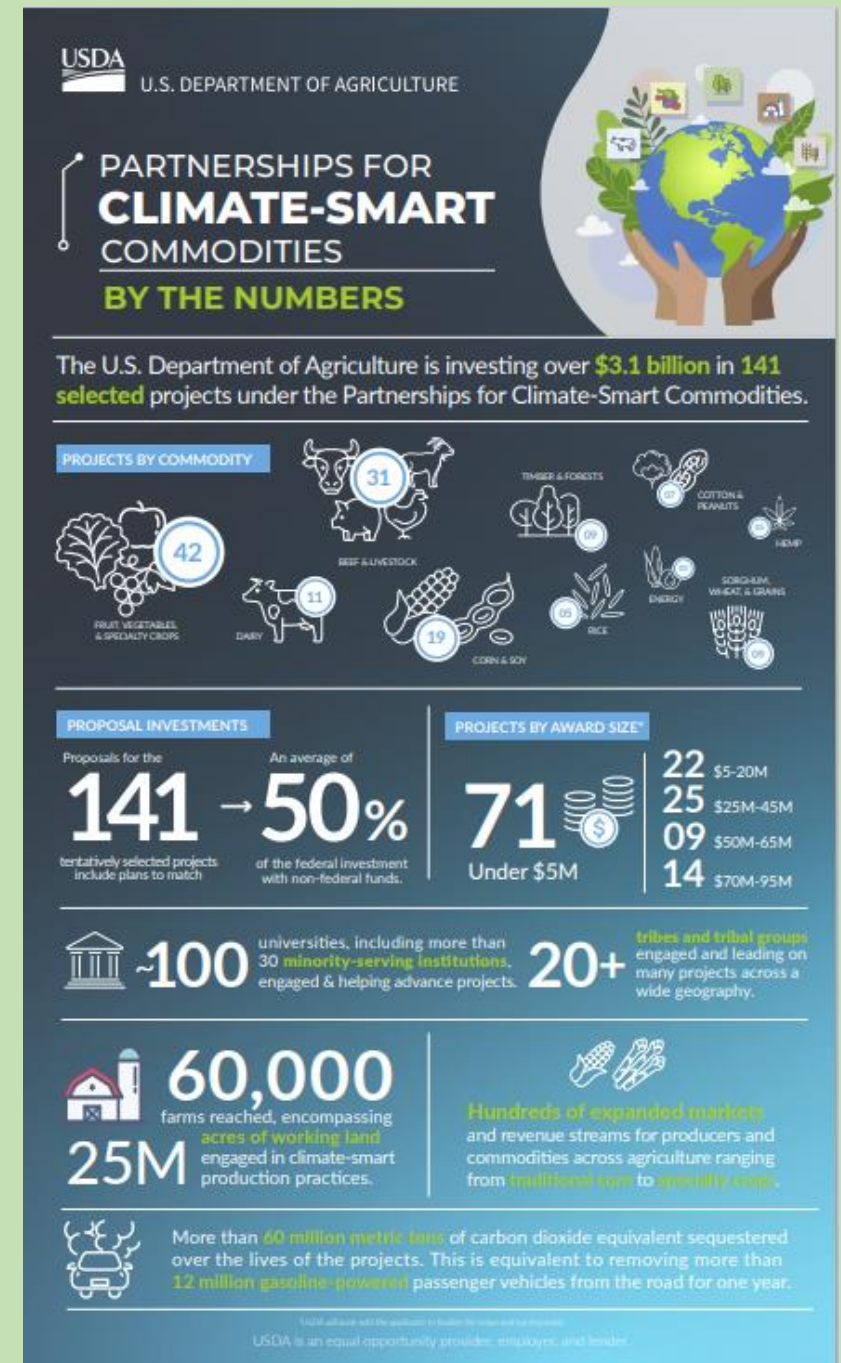
- Carbon markets targeted to small landowners
  - Family Forest Carbon Program by The Nature Conservancy and American Forest Foundation pays landowners for climate-smart forestry practices
  - Natural Capital Exchange (NCX): landowners can enroll as few as 1 acre
  - CORE Carbon by Finite Carbon
  - Forest Carbon Works





# Recent Initiatives and Moving Forward

- USDA Climate-Smart Agriculture and Forestry Partnership and Climate-Smart Commodities Programs
  - Producer access to markets for climate-smart commodities
  - Financial and technical assistance to support practice implementation
- Both funding pools: Total \$3.1 billion for 141 pilot projects
- Second pool focused on small and underserved producers





# Recent Initiatives and Moving Forward

- Appropriations from the Infrastructure and Inflation Reduction Acts
  - Infrastructure Investment and Jobs Act: \$1.5 billion for state and private forestry (wildfire risk reduction and ecosystem restoration)
  - Inflation Reduction Act: \$550 million for competitive grants to non-Federal forest landowners (prioritizes underserved and small forest landowners in climate mitigation and forest resiliency)
    - \$20 billion to Natural Resources Conservation Service (including Farm Bill programs)
    - “Most aggressive action on tackling the climate crisis in American history”

# Concluding Remarks

- Family forest and woodland owners: 38% of forest and woodland area
- Legacy of tree planting with support from government
- Climate change resiliency is based on risk reduction
  - Existing programs provide financial and technical assistance
- Despite existing programs, challenges still exist for small landowners
  - Recent initiatives may help provide a path forward
  - Utilizing a suite of support mechanisms may be the best option

**Thank you for your time**

Questions?

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