

Forest Dynamics data and information developed for the 2020 Resources Planning Act (RPA) Assessment^{1,2} and related efforts, for use by the USDA Forest Service and others. These data can be used for numerous applications by private and public land management and research constituents. Examples include carbon stocks and flows in forested ecosystems in the U.S. and the potential for sequestration. The statistics and summaries of forest resources in the United States are provided here based on data from the Forest Inventory and Analysis³ (FIA) program. Trends in forest ownership is also included which provides insight into who owns forests lands (e.g., private, family, tribal, state, federal) which affect landscape-scale, land management objectives. All datasets are available as tabular summaries with select datasets available in raster format.

DATA DESCRIPTION	UNITS	SPATIAL EXTENT	SPATIAL RESOLUTION	TEMPORAL DOMAIN	POTENTIAL USE*
<u>Current and Recent Past</u>					
<u>Forest Resource Statistics³</u> 2017 RPA Resource Tables	Varies <i>depends on specific variable</i>	United States	Summarized by RPA region, RPA subregion, and State	2011-2017	National-level to Broad-level. Resource tables present estimates of forest area, volume, mortality, growth, removals, and timber products output in various ways, such as by ownership, forest type, region, or State. Current resource data and trends are analyzed and placed within the context of changes since 1953. Additional analyses look at the resource from an ecological, health, and productivity perspective. Statistics are based on data collected through FIA.
<u>Greenhouse Gas Emissions and Removals from Forest Land, Woodlands, and Urban Trees in the United States^{†,4,5,6}</u> Land use, Land-use change, and Forestry	MMT C <i>million metric tons carbon</i> MMT C yr ⁻¹ <i>million metric tons carbon per year</i> MMT CO ₂ -eq yr ⁻¹ <i>Million metric tons of carbon dioxide equivalent per year</i>	Conterminous U.S. and Alaska	Summarized Nationally and by State	1990-2020 <i>Annual timestep</i>	National-level to Broad-level applications. Carbon stocks and greenhouse fluxes from land use, land- use change, and forestry. Estimates are reported by ecosystem carbon pool in the forest land category. Information is also available on N ₂ O emissions from fertilization, emissions from drained organic soils, fire area and emissions estimates, and emissions/ removals associated with harvested wood products. Data can be used to estimate at a coarse-level: 1) the amount of carbon stored on rangelands and other non-forested land cover types or 2) changes in carbon (fluxes) associated with land use and land cover change, such as conversion to or from forest.

DATA DESCRIPTION	UNITS	SPATIAL EXTENT	SPATIAL RESOLUTION	TEMPORAL DOMAIN	POTENTIAL USE*
Forest Ownership ⁷	Classes	Conterminous U.S.	250 m	2018 <i>Static</i>	National-level to Mid-level applications. Provides context on ownership of forested lands with implications for forest management. Can be used to summarize forest inventory characteristics. Ownership is classed into the following categories: Corporate (excluding TIMO/REIT), TIMO/REIT, Family, Other Private, Tribal, Federal government, State government, Local government, Non-forest.
Gross Changes in Forest Ownership ⁸	Acres in transition classes	Conterminous U.S.	Summarized by Nation, RPA region, and State	Change from 2007 to 2017	National-level to Broad-level applications. Provides context on changes in ownership with implications for future forest management. Summarizes the total change from one ownership class to another (e.g., Family-owned to Corporate-owned). Classes include Corporate (including Small Corporate, TIMO/REIT, and Large Corporate), Family, Other Private, Tribal, Public (including federal, state, and local), and Non-forest.
Net Changes in Forest Ownership ⁸	Acres in ownership classes	Conterminous U.S.	Summarized by Nation, RPA region, and State	Change from 2007 to 2017	National-level to Broad-level applications. Ownership is classed into 6 categories: Corporate (including Small Corporate, TIMO/REIT, and Large Corporate), Family, Other Private, Tribal, and Public (including federal, state, and local).
<u>National Woodland Owner Survey</u> ⁹	Area (acres) & Ownerships (numbers)	United States <i>except interior AK</i>	Summarized by Nation, RPA region, 43 States	2002-2006, 2011-2013, & 2017-2018	National-level to Broad-level applications. Dataset covers surveys from three time periods and provides data on ownership (family, private, corporate, etc.), reasons for owning land, land characteristics, land ownership history, uses, and demographics. Can aid in understanding the demographics, values, and management patterns of private woodland owners surrounding the forest to provide social and cultural context. Can also be used to prepare public engagement that aligns with the demographics and interests of woodland owners surrounding a National Forest or other land management area.

DATA DESCRIPTION	UNITS	SPATIAL EXTENT	SPATIAL RESOLUTION	TEMPORAL DOMAIN	POTENTIAL USE*
<u>Future Projections</u>					
Forest Inventories <i>Projections by RPA Scenario¹⁰</i>	Varies <i>depends on specific variable</i>	Forest land in conterminous U.S.	FIA forest plots	2020-2070 <i>10-year timestep</i>	National-level to Broad-level. Tabular data sets with multiple realizations of imputed forest inventories representing future forest conditions. These inventories will include state, forest group type, ownership, stand origin, volume, removals, fire mortality volume, and age. The projections should be examined at the regional scale and broader. Data can be used to examine the influence of climate change, population growth, and land use change on forest conditions at broad scales.
Forest Carbon[†] <i>Projections</i>	MMT C <i>Million metric tons carbon</i> MMT C yr ⁻¹ <i>Million metric tons carbon per year</i>	Conterminous U.S.	Summarized by RPA region and RPA scenario (wood products carbon is summarized nationally)	2020-2070	National-level applications. Projections can be used to provide broader context about the influence of climate change, population growth, and land use change on forest ecosystem carbon and carbon stored in harvested wood products and solid waste disposal sites.

* A description of FS business applications by spatial scales is available in Table 1-1 of the [Existing Vegetation Classification, Mapping, and Inventory Technical Guide, v2.0](#)

† Denotes corresponding datasets exist in both the *Current and Recent Past* and *Future Projection* sections of the table

References and Footnotes:

- ¹ Coulston, John W.; Brooks, Evan B.; Butler, Brett J.; Costanza, Jennifer K.; Walker, David M.; Domke, Grant M.; Caputo, Jesse; Markowski-Lindsay, Marla; Sass, Emma M.; Walters, Brian F.; Guo, Jinggang. 2023. Forest Resources. In: U.S. Department of Agriculture, Forest Service. 2023. Future of America's Forest and Rangelands: Forest Service 2020 Resources Planning Act Assessment. Gen. Tech. Rep. WO-102. Washington, DC: xxx-xxx. Chapter 6.
<https://doi.org/10.2737/WO-GTR-102-Chap6>
- ² The RPA website provides links to current and past RPA Assessments, as well as supporting data, technical reports, and webinars:
<https://www.fs.usda.gov/research/inventory/rpaa>
- ³ Oswalt, Sonja N.; Smith, W. Brad; Miles, Patrick D.; Pugh, Scott A., coords. 2019. Forest Resources of the United States, 2017: a technical document supporting the Forest Service 2020 RPA Assessment. Gen. Tech. Rep. WO-97. Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. 223 p. <https://doi.org/10.2737/WO-GTR-97>

-
- ⁴ Domke, Grant M.; Walters, Brian F.; Nowak, David J.; Greenfield, Eric. J.; Smith, James, E.; Nichols, Michael C.; Ogle, Stephen M.; Coulston, John. W.; Wirth, Tom C. 2022. Greenhouse gas emissions and removals from forest land, woodlands, urban trees, and harvested wood products in the United States, 1990-2020. Resource Update FS 382. Madison, WI: U.S. Department of Agriculture, Forest Service, Northern Research Station. 10 p. <https://doi.org/10.2737/FS-RU-382>
- ⁵ Walters, Brian F.; Domke, Grant M.; Greenfield, Eric J.; Smith, James E.; Nowak, David J.; Ogle, Stephen M. 2022. Greenhouse gas emissions and removals from forest land, woodlands, and urban trees in the United States, 1990-2020: Estimates and quantitative uncertainty for individual states, regional ownership groups, and National Forest System regions. Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2022-0052>
- ⁶ Updated carbon information and Emissions and Removals Resource Updates are available here: <https://www.fia.fs.usda.gov/forestcarbon/>
- ⁷ Butler, Brett J.; Butler, Sarah M.; Caputo, Jesse; Dias, Jacqueline; Robillard, Amanda; Sass, Emma M. 2020. Family forest ownerships of the United States, 2018: results from the USDA Forest Service, National Woodland Owner Survey. Gen. Tech. Rep. NRS-199. Madison, WI: U.S. Department of Agriculture, Forest Service, Northern Research Station. 52 p. <https://doi.org/10.2737/NrS-GTR-199>
- ⁸ Sass, Emma M.; Markowski-Lindsay, Marla; Butler, Brett J.; Caputo, Jesse; Hartsell, Andrew; Huff, Emily; Robillard, Amanda. 2021. Dynamics of Large Corporate Forestland Ownerships in the United States. Journal of Forestry. 119(4): 363-375. <https://doi.org/10.1093/jofore/fvab013>
- ⁹ Butler, Brett J.; Hewes, Jaketon H.; Dickinson, Brenton J.; Andrejczyk, Kyle; Butler, Sarah M.; Markowski-Lindsay, Marla. 2016. USDA Forest Service National Woodland Owner Survey: national, regional, and state statistics for family forest and woodland ownerships with 10+ acres, 2011-2013. Res. Bull. NRS-99. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 39 p. <https://doi.org/10.2737/NRS-RB-99>
- ¹⁰ Langner, Linda L.; Joyce, Linda A.; Wear, David N.; Prestemon, Jeffrey P.; Coulson, David; O'Dea, Claire B. 2020. Future scenarios: A technical document supporting the USDA Forest Service 2020 RPA Assessment. Gen. Tech. Rep. RMRS-GTR-412. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 34 p. <https://doi.org/10.2737/RMRS-GTR-412>