
State-level progress towards the “30 by 30” land conservation goal



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Cover Image: 100-Mile Wilderness, Maine. Photo by Ian MacLellan

Executive Summary

The goal of protecting 30% of the world's land and oceans to conserve biodiversity and help address climate change (known as "30 by 30", and sometimes expanded to "50% by 2050") was first proposed in 2019 and has since been adopted by many countries and organizations, including the United States. As an advocate for land conservation in the northeastern United States for over a century, the Appalachian Mountain Club strongly supports this effort.

This study was undertaken to determine the status and trends of land conservation in the twelve states across AMC's region from Maine to Virginia. The study utilized digital data on conserved lands obtained from state GIS agency web sites and other sources to assess the current level of conservation in each state, as well as the rate of conservation since 2007 to determine the likelihood of each state reaching 30% by 2030.

The results present an optimistic picture in many regards and indicate that "30 by 30" is not an unrealistic goal for most states. Across the twelve-state region about 22.5% of land has been conserved. New Hampshire has already reached this goal with 35% of its land conserved, while six other states (Vermont, Massachusetts, Rhode Island, New Jersey, Maryland and Delaware) have conserved at least 25% of their land. At the other end, Connecticut, New York and Virginia have conserved only about 20% of their land. There is a wide diversity in the forms of conservation in different states, with federal, state, local (municipal) and NGO/land trust ownership and conservation easements all playing a role in different proportions in the different states.

In addition to New Hampshire, four states (Vermont, Massachusetts, Rhode Island and New Jersey) are on track to meet the 30% goal by 2030 or shortly thereafter if the recent rate of conservation continues. Two others (Maine and Virginia) are projected to reach 30% in mid-century and could reach it sooner if the pace of land conservation increases. Connecticut and Pennsylvania are not projected to reach the goal until the 22nd century, while the trend could not be determined for New York, Maryland or Delaware. In comparison to earlier years, the last 15 years have seen a significant increase in the role of nonprofit organizations and land trusts, and the use of conservation easements, as drivers of conservation.

Introduction

The goal of protecting 30% of the world's land and oceans to conserve biodiversity and help address climate change (known as "30 by 30") was first proposed in 2019¹ and has since been adopted by many countries and organizations, including the United States.² This is being extended by many parties to a goal of "50% by 2050". As an advocate for land conservation in the northeastern United States for over a century, the Appalachian Mountain Club strongly supports this effort.

This study was undertaken to determine the status and trends of land conservation in the twelve states across AMC's region from Maine to Virginia. The study utilized digital data on conserved lands obtained from state GIS agency web sites and other sources to answer the following questions:

- How much land has been protected in each state (total acreage and percent of land area)?
- What is the distribution of types of conservation (fee ownership, easement, etc.) for each state?
- What has been the average rate of land conservation since 2007?
- How much additional land needs to be conserved to reach 30% by 2030 and 50% by 2050?
- At the current rate, how long would it take each state to reach 30% or 50% of their land in conservation?
- How have the forms of conservation changed over the last 15 years?

2007 was chosen as the starting point for the trend analysis to reflect recent rates of land conservation, and to avoid skewing the results with the wave of very large conservation projects that took place across northern New England and New York during the late 1990s and early 2000s.

While the state-level data (which uses different names including "conserved", "protected" and "open space") is generally consistent in what it considers "conserved", there are some differences. The great majority of conserved land consists of fee ownership by public agencies or non-governmental organizations as well as land protected by conservation easements. These are lands permanently protected from development, but which may include altered lands (such as agriculture) and allow various levels of management including intensive timber management. However, the data may also include lands with some levels of development including recreational camps, developed parks, golf courses and even cemeteries, as well as lands with only partial or temporary protection. With minor exceptions (noted in Appendix A) we have not tried to address these differences but have accepted the data provided by the states without exclusions. In theory, the widely used "Gap Status" designation

¹ Dinerstein, E. et al. 2019. A global deal for nature: guiding principles, milestones and targets. *Science Advances* 5(4): eaaw2869. doi :[10.1126/sciadv.aaw2869](https://doi.org/10.1126/sciadv.aaw2869).

² "[Executive Order on Tackling the Climate Crisis at Home and Abroad](#)". The White House. January 27, 2021.

(which categorizes land by the strength and permanence of protection) would allow lands with less than full permanent protection to be excluded (e.g., “Gap status 4”) but this designation has not been consistently applied by the states and was not used. The data generally does not include military lands (some of which may have high conservation value, and some of which have been transferred to other agencies for conservation purposes) or lands owned by Native American tribes.

There are also on-going debates as to what should be included in the 30 by 30 goal, from stricter approaches that would only include permanent protection of natural ecosystems to broader approaches that include all land (including agricultural land and recreational open space) protected from development. Our approach represents a broad level of inclusion.

Methods

Data acquisition.

The most recent (as of summer/fall 2022) digital data on conserved lands across the 12-state region were obtained from each state’s Geographic Information Systems (GIS) agency³. Ideally this data would be provided in a single data layer (shapefile) that included a record for each conserved parcel including its size⁴, the type of conservation protection, the fee owner or easement holder, the type of owner (federal or state agency, land trust⁵, etc.), and the date the parcel was protected. While some states’ data meets this standard, others do not, with three primary issues:

- Complete data could not be obtained from state GIS agencies for three states, based on comparison with other data. These other sources included the national Protected Areas Database of the United States (PAD-US 3.0) maintained by the U.S. Geological Survey and described as “America’s official national inventory of U.S. terrestrial and marine protected areas”⁶ and the New England Protected Open Space (NEPOS) dataset maintained by Harvard Forest.⁷ These are largely derived from the state-level data but may include other sources as well such as federal lands data and the National Conservation Easement Database.⁸ The PAD-US data was used for Delaware and for federal lands and easements in New Jersey, and the NEPOS data was used for Connecticut (see Appendix A).

³ All states included data up to 2022 except for New Hampshire (2021), Vermont (2020), Rhode Island (2018) and Connecticut (2016).

⁴ Data often contained both the legally recorded acreage and the acreage determined from GIS calculation. Because the former was not consistently recorded, we used the GIS-determined acreages.

⁵ In the datasets, land protection by a non-governmental organization (NGO) such as a land trust or conservation organization is generally shown as “private” to distinguish it from land conserved by government agencies. In reporting the results, we have used the term “NGO/land trust” rather than “private” to avoid confusion with other private entities such as individuals, families or businesses.

⁶ [PAD-US Data Overview | U.S. Geological Survey \(usgs.gov\)](#).

⁷ [New England Protected Open Space | Zenodo](#)

⁸ [National Conservation Easement Database | NCED](#)

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- Three states (New York, Maryland and Delaware) did not include data on the conservation date of individual parcels and no trend analysis was possible. For other states, the information is missing for many parcels. We assumed that any parcel with a missing date was conserved before 2007. Examination of a range of parcels with missing data but a known date of conservation indicated that this was a reasonable assumption, but it does create uncertainty in the trend analysis by potentially underestimating the recent rate of conservation. To the extent that parcels with missing dates were conserved after 2007, it would increase the rate of recent conservation and shorten the time to meet the targets.
 - For some states the data was provided in multiple shapefiles, which in some cases included overlapping data, with some parcels included in more than one layer. Occasionally there were overlapping or double-counted parcels in a single data layer. This usually represented a parcel owned by one conservation entity but covered by an easement held by another entity. We carefully examined the data and worked to eliminate overlap as best as possible to avoid double-counting of parcels when the data was consolidated. Parcels were counted in the stronger ownership category (i.e., fee ownership rather than easement).

For all three of the issues, we believe the error is “on the margins” – while better data might refine the numbers, it should not change the overall picture or conclusions.

Information on the specific data layers used for each state is included in Appendix A.

Data analysis.

Current level of conservation. The total area of conserved land by category was calculated for each state. Categories included fee ownership (federal, state, municipal, NGO/land trust) and conservation easement. Other minor categories (deed restrictions, etc.) were included with easements. In a few cases this information was not given so was shown as Unknown. Because large water bodies were generally excluded from the conservation lands data, the proportion of each state that conserved was based on the state’s land area (obtained from Wikipedia).

Comparison with multi-state data sources. We compared the total conservation from the state-level data used in this analysis with the PAD-US and NEPOS data sets to ensure that our results were consistent with these other sources.

Rate of conservation since 2007. For the nine states for which data was available, the total extent of conservation in 2006 was determined by summing the acreage of all parcels shown as having been protected before or in 2006, as well as parcels with missing data information. For each year since 2007, the total area conserved in that year was calculated. The annual rate of recent conservation (acres/year) was calculated as the average amount of land conserved each year since 2007. Data from 2022 was excluded from the trend analysis as it did not represent a full year.

Progress towards 30 by 30 goal. Two metrics were developed. The first was the rate of conservation (acres/year) necessary to achieve the goal of 30% conserved land by 2030, as well as the ratio of this rate to the calculated rate from 2007 to the present. The second was the year in which 30% conservation would be achieved if the rate of conservation from 2007 to the

present were continued. These metrics were also developed for the goal of 50% conserved by 2050.

Results

Current level of conservation

Across the twelve-state region about 22.5% of land has been conserved, ranging from 19.5% of New York to 35.1% of New Hampshire (Table 1, Fig. 1). Seven states have conserved at least 25% of their land but only New Hampshire has reached the 30 by 30 goal. (The NEPOS data shows Massachusetts as also being above 30%. This is primarily due to their inclusion of open space properties with no protection that we have excluded).

Conservation land data sets are complex and not always consistent in their definitions or how up to date they are, so it is not surprising that different sources of land conservation data differ somewhat. However, the data developed for this study matches the other sources we examined relatively closely. This gives us a greater degree of confidence that our analysis is not out of line and that using the other sources would give similar results.

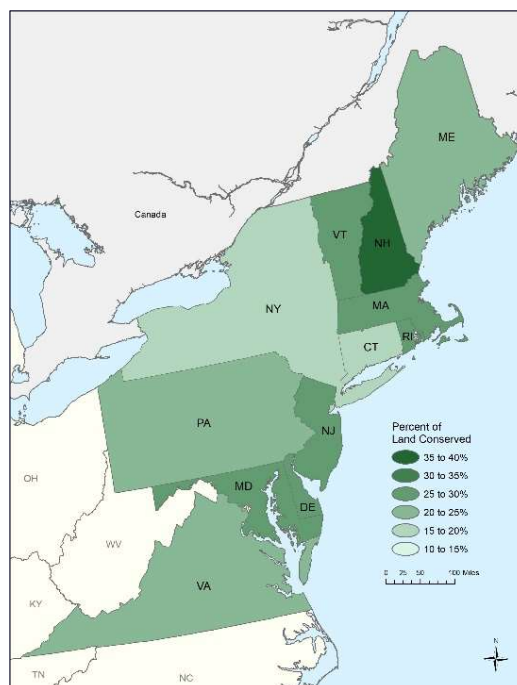


Figure 1. Percent of land conserved by state across AMC's region.

Table 1. Proportion of land conserved by state.

State	Total Land (Acres)	Total Conserved Land - this Study (Acres)	Proportion of state conserved		
			This study	PAD-US	NEPOS
Maine	19,751,680	4,389,364	22.2%	21.6 %	21.6%
New Hampshire	5,729,696	2,009,985	35.1%	33.1 %	33.8%
Vermont	5,898,662	1,687,534	28.6%	23.2 %	26.5%
Massachusetts	4,992,038	1,453,232	29.1%	27.3 %	30.6%
Rhode Island	661,638	171,588	25.9%	22.1 %	24.1%
Connecticut	3,099,110	618,513	20.0%	19.5 %	20.0%
New York	30,160,896	5,867,995	19.5%	20.4 %	
New Jersey	4,706,701	1,394,180	29.6%	28.8 %	
Pennsylvania	28,635,328	6,113,276	21.3%	19.3 %	
Maryland	6,212,633	1,562,879	25.2%	23.4 %	
Delaware	1,247,066	343,579	27.6%	27.6 %	
Virginia	25,273,658	5,118,524	20.3%	17.0 %	
Total Region	136,369,106	30,730,648	22.5%	21.1 %	

Form of conservation

Across the region state ownership is the dominant form of land conservation followed by conservation easements (Table 2, Appendix B). However, there is considerable variation in the types of conservation that have been used in the different states (Fig. 2). Federal ownership is most prominent in states with national forests (New Hampshire, Vermont, Virginia and Pennsylvania to a lesser extent), while state ownership is most dominant in New York, New Jersey and Pennsylvania. Municipal ownership is most prominent in Massachusetts, Connecticut and New Jersey, while ownership by NGOs and land trusts is most prominent in Maine, Rhode Island and Connecticut. Maine is the only state where over half of the conserved land consists of conservation easements, though Maryland, Delaware, Vermont and Rhode Island have over a third of their conserved land in the form of easements.

Table 2. Proportion of conserved land by form of conservation

State	Fee ownership				Total fee	Easement/ other	Unknown
	Federal	State	Municipal	NGO/land trust			
Maine	6.3%	23.4%	1.5%	14.4%	45.6%	54.4%	0.0%
New Hampshire	40.0%	12.2%	7.0%	9.8%	68.9%	30.5%	0.5%
Vermont	27.5%	26.1%	4.1%	4.6%	62.4%	37.5%	0.1%
Massachusetts	4.3%	42.0%	26.4%	12.4%	85.1%	14.9%	0.0%
Rhode Island	1.3%	32.0%	11.0%	17.5%	61.8%	38.2%	0.0%
Connecticut	1.7%	37.9%	23.0%	19.7%	82.2%	13.8%	3.9%
New York	1.3%	73.9%	4.4%	2.5%	82.1%	17.9%	0.0%
New Jersey	7.7%	55.1%	21.8%	5.2%	89.7%	10.3%	0.0%
Pennsylvania	11.5%	66.8%	4.6%	2.0%	85.0%	15.0%	0.0%
Maryland	6.7%	31.4%	11.5%	2.3%	52.0%	42.4%	5.7%*
Delaware	7.4%	30.3%	12.8%	6.7%	57.3%	42.7%	0.0%
Virginia	54.6%	10.4%	2.8%	5.4%	73.1%	26.9%	0.0%
Total Region	17.7%	42.0%	6.4%	6.1%	72.2%	27.4%	0.4%

* Primarily parcels protected by the Rural Legacy program; data does not distinguish between fee and easement.

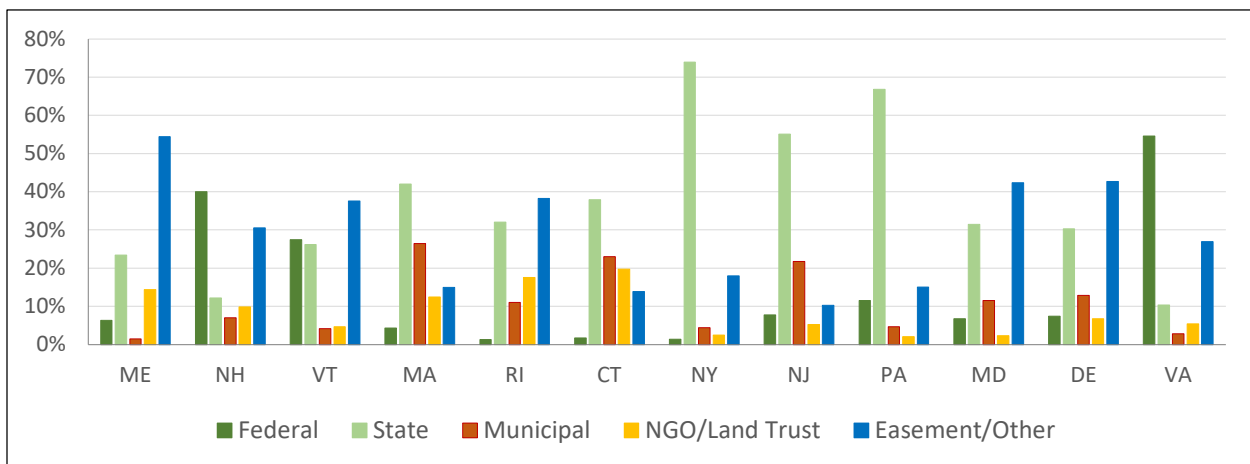


Figure 2. Proportion of conserved land by form of conservation.

Progress toward 30 by 30 goal

Of the nine states for which recent conservation rates could be estimated, one (New Hampshire) has already surpassed 30% of its land conserved, and four (Vermont, Massachusetts Rhode Island and New Jersey) are in line to reach the goal if current rates continue. Two others (Maine and Virginia) have relatively low levels of total conservation (22% and 20% respectively) but have very high rates of recent conservation and could reach 30% by mid-century. Finally, two (Pennsylvania and Connecticut) won't reach it until the 22nd century (a relatively meaningless projection) (Table 3, Fig. 3). Only New Hampshire has a realistic chance of reaching the goal of 50% of its land conserved by 2050; it is projected to reach this level in 2060 if current rates continue.

Table 3. Progress of states towards the 30 by 30 goal.

State	Conserved since 2007 (acres/year)	Year 30% conserved reached at current rate	Necessary rate to reach 30% by 2030 (acres/year)	Increase in rate needed to reach 30 by 30	Year 50% conserved reached at current rate	Necessary rate to reach 50% by 2050 (acres/year)	Increase in rate needed to reach 50 by 50
ME	65,225	2047	191,939	2.9x	2107	195,923	3.0x
NH	22,274	2007	N/A	N/A	2060	29,478	1.3x
VT	16,197	2025	8,254	N/A	2098	42,076	2.6x
MA	14,178	2025	5,547	N/A	2098	37,242	2.6x
CT	1,877	2181	22,197	11.8x	2519	27,370	14.6x
RI	2,137	2031	2,300	1.1x	2093	4,998	2.3x
NJ	8,253	2024	2,229	N/A	2138	34,256	4.2x
PA	21,443	2139	309,665	14.4x	2406	293,014	13.7x
VA	71,980	2057	307,624	4.3x	2127	268,419	3.7x

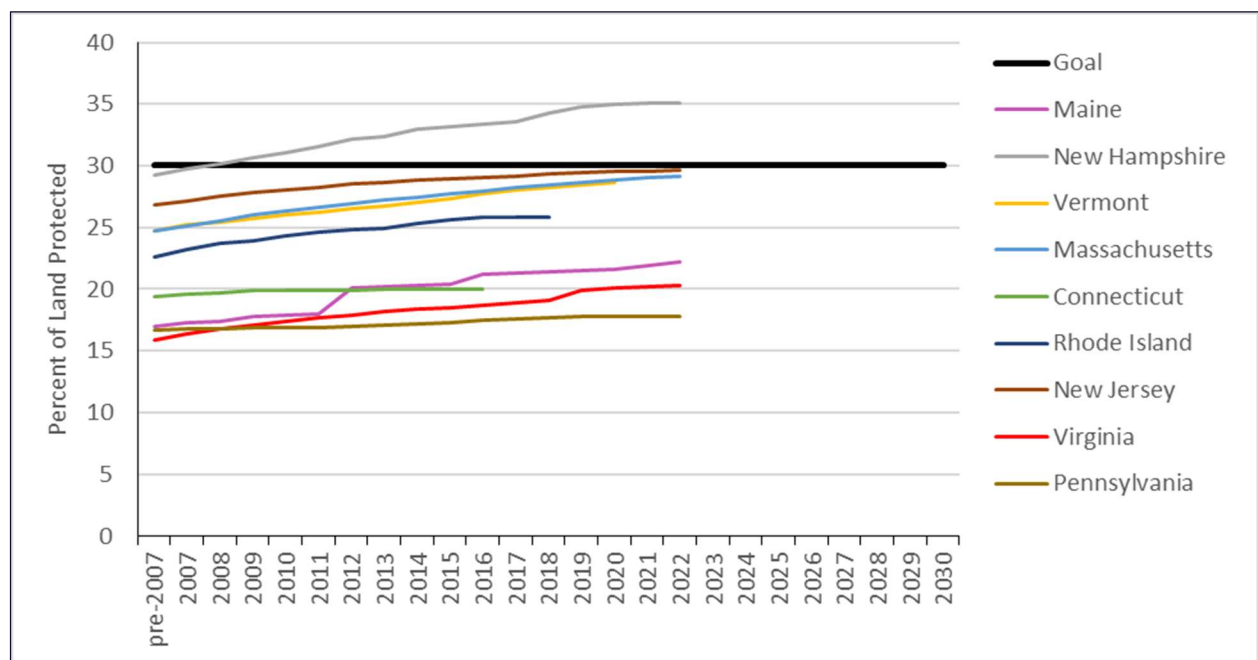


Figure 3. Recent state-level trends in land conservation.

Recent form of conservation

The data for seven states allowed a comparison of the forms of conservation before and after 2007. Across most states there are significant differences in the major forms of past versus recent conservation. There is a notable decrease in the proportion of land conserved through public ownership, and a corresponding increase in the proportion of land conserved through NGO and land trust ownership and conservation easements (Fig. 4). (Though it must be noted that public funding remains critical to continued land conservation even if actual public acquisition has declined.) The cutoff of 2007 is arbitrary, and this shift undoubtedly began earlier; private land conservation organizations became increasingly important in the latter third of the 20th century and the national Land Trust Alliance was formed in 1982 in response to the growing land trust movement.

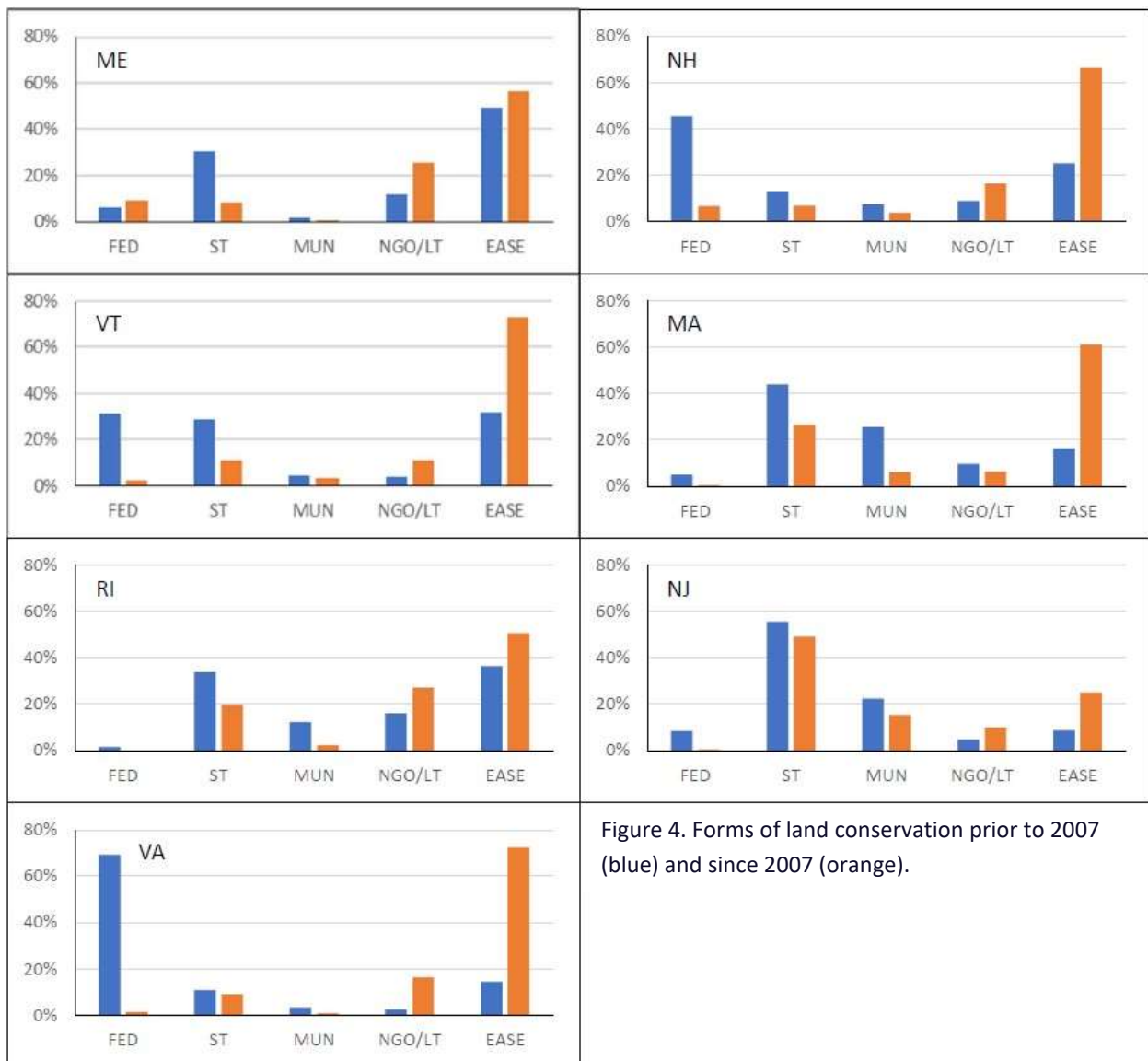


Figure 4. Forms of land conservation prior to 2007 (blue) and since 2007 (orange).

Conclusions

Protecting 30% of all land by 2030 sounds like a daunting task, but this study provides reasons for optimism. New Hampshire has already reached that goal, with Vermont, Massachusetts and New Jersey on pace to do so and Rhode Island close behind. Maine and Virginia are on pace to reach the goal by mid-century and could reach it earlier if their pace of land conservation increases. (Maine in particular would seem to have a realistic chance because of the presence of many large undeveloped private ownerships in the northern part of the state.) Delaware and Maryland are currently over 25%, though no trend analyses were possible. Connecticut, New York and Pennsylvania appear to be the farthest from reaching this goal. We hope that presenting this data can help leaders and activists in states that are not currently on pace see that 30 by 30 is an achievable goal and inspire them to continue to push for an increase in the rate of land conservation in their states.

The individual state data shows the diverse forms that land conservation has taken across the across the region. Some states benefited from the first wave of conservation prior to World War II that created many large national and state forests and parks. On-going conservation since then has taken many forms. While the creation of large new national forests and parks is unlikely, some increases in federal ownership have occurred, including infilling within or expansion of previously established units and the creation of some new units (for example, the Umbagog and Conte National Wildlife Refuges and the Katahdin Woods and Waters National Monument.) However, while federal conservation funding will remain critical, acquisition of land by both state agencies and NGOs or land trusts, as well as the widespread use of conservation easements, are likely to be the dominant forms of land conservation in the coming decades.

Continuing and increasing funding for land conservation from many sources will be critical to this effort. This includes federal programs (e.g., Land and Water Conservation Fund, Forest Legacy Program, North American Wetlands Conservation Act, Highlands Conservation Act), state land conservation bonds or programs, and private philanthropic sources. Many states have seen significant conservation from targeted open space protection programs.⁹ Several states, including Massachusetts, Pennsylvania and Maryland (and likely others) have had programs dedicated to protecting agricultural land. Carbon offset markets provide a potential source of revenue for land conservation that are likely to see increasing use in the future.¹⁰

While the total level of conservation is important, it cannot be the sole measure of success, and if that is all we focus on we will fall short of our goals as an organization. The type of conservation is also important; lands permanently protected from development may vary

⁹ The Trust for Public Land's Conservation Almanac provides descriptions of federal, state, and local conservation programs and policies; see [Conservation Programs – Conservation Almanac](#).

¹⁰ To ensure that forest conservation is creating real greenhouse gas reduction benefits, offsets must be developed under recognized protocols that meet internationally accepted standards for additionality, leakage, permanence, and verification.

widely in how well they protect important ecological and social values. A recent report from the Wildlands, Woodlands, Farmland and Communities initiative identified only 3.3% of New England as permanently protected natural areas (“Wildlands”).¹¹ These natural areas provide important biodiversity and climate mitigation benefits that are not always realized on less protective conservation lands such as working forest easements.

The spatial distribution of conservation land also matters, both ecologically and culturally. Current conservation land networks do not encompass the full range of ecological diversity, nor are they well-enough buffered and connected to maintain ecological resilience in the face of climate change. In addition, access to open space has traditionally been a privilege that environmental justice communities have been excluded from. Therefore, an equally important goal is making sure that the land that does get conserved is distributed in a manner that creates more equitable access to nature, with an emphasis on conserving natural areas that can benefit those for whom it has not always been available. Assessing the geographic distribution of protected lands within a state was outside of the scope of this study but is an important area of on-going research.

¹¹ [Wildlands in New England: Past, Present, and Future - Wildlands & Woodlands \(wildlandsandwoodlands.org\)](https://wildlandsandwoodlands.org/)

Appendix A: Data used in analysis

Maine

Website: [Data Catalog \(maine.gov\)](https://datacatalog.maine.gov)

Data layer: Maine Conserved Lands

Description: “The conserved lands layer is an inventory of Maine’s terrestrial protected areas that are dedicated to the preservation of biological diversity and to other natural, recreation and cultural uses, and which are managed for these purposes through legal or other effective means. Conserved Lands contains conservation lands ownership boundaries at 1:24,000 scale for Maine land in federal, state, municipal and non-profit ownership with easements.”

Adjustments/notes: The data layer contains all necessary information, although the date of conservation was missing for many parcels.

New Hampshire

Website: [NH GRANIT \(unh.edu\)](https://nhgranit.unh.edu)

Data layer: New Hampshire Conservation/Public Lands

Description: “The GRANIT Conservation/Public Lands data layer contains a digital record of parcels of land of two or more acres that are mostly undeveloped and are protected from future development. Smaller parcels that adjoin previously mapped parcels or represent unique features, such as a bog or state-owned boat ramp, may also be included.”

Adjustments/Notes: The data layer contains all necessary information, although the date of conservation was missing for many parcels.

Vermont

Website: [Vermont Open Geodata Portal](https://opengeodata.vermont.gov)

Data layer: Vermont Protected Lands Database

Description: “The Vermont Protected Lands Database (VPLD) is a geospatial database, or GIS layer, of parcels that are currently protected from development through public ownership, private ownership, or protection mechanisms such as easements.”

Adjustments/Notes: The data layer contains all necessary information, although the date of conservation was missing for many parcels.

Massachusetts

Website: [MassGIS Data Layers | Mass.gov](https://massgis.com/DataLayers.aspx)

Data layer: Protected and Recreational Open Space

Description: Conservation and outdoor recreational facilities owned by federal, state, county, municipal, and nonprofit enterprises are included in this data layer... Not all lands in this layer are protected in perpetuity, though nearly all have at least some level of protection.”

Adjustments/Notes: 1) The data layer contains all necessary information, although the date of conservation was missing for many parcels. 2) This data is broader than other states' data and includes unprotected open space parcels (e.g., scout camps or private golf courses). We eliminated all parcels where the Level of Protection field (LEV_PROT) equaled "None".

Rhode Island

Website: [RIGIS](#)

Data layer 1: State Conservation Areas

Description: "Conservation Lands protected by the State of Rhode Island through Fee Title Ownership, Conservation Easement, or Deed Restriction."

Data layer 2: Local Conservation Areas

Description: " Non-State Conservation lands are real property permanently protected from future development by fee simple ownership, conservation or other restrictive easements, or deed restrictions held or enforceable by recognized land protection organizations other than the State of Rhode Island."

Adjustments/Notes: 1) These data layers contain most necessary information, although the date of conservation was missing for many parcels. 2) The protection entity (federal, municipal, NGO) in the Local data had to be derived from the entity's name. 3) There was some degree of overlap between the two layers where one conservation entity held fee title to a parcel (shown in one layer) and another held an easement (shown in the other layer). To avoid double-counting, parcels were counted under fee ownership, while eliminating the record showing the easement.

Connecticut

Website: [New England Protected Open Space | Zenodo](#)

Data layer: New England Protected Open Space

Description: "...a compilation of existing open space datasets in the New England region including The Nature Conservancy's Secured Areas, National Conservation Easement Database, Protected Areas Database of the U.S., and data provided by states and land trusts."

Adjustments/Notes: Connecticut's Protected Open Space Mapping project is a work in progress, and accurate data is not available for all towns.¹² As a substitute we used a New England-wide data set developed and maintained by Harvard Forest. This data layer contains all necessary information, although the date of conservation was missing for many parcels.

¹² See [Protected Open Space View | Protected Open Space View | CT DEEP GIS Open Data Website \(arcgis.com\)](#).

New York

Website: [Welcome to the New York Protected Areas Database \(NYPAD\) | NYPAD](#)

Data layer: New York Protected Areas Database

Description: “Protected lands are defined as those lands which are protected, designated, or functioning as conservation lands, open space, natural areas, or recreational areas through fee ownership, easement, management agreement, current land use, or other mechanism... While the database has ‘Protected’ in its name, we use that term broadly. Lands in NYPAD may be public or private, open or closed to public use, permanently protected from development or subject to future changes in management.”

Adjustments/Notes: 1) The database has three components – fee-owned lands, easements and proclamation areas. Only the first two were included in the analysis, as the proclamation areas do not represent actual conservation land but rather the boundaries of broader areas within which conservation is authorized. 2) The data does not contain usable date of protection for individual parcels so no trend analysis was possible.

New Jersey

Website 1: [NJGIN Open Data \(arcgis.com\)](#)

Data layer 1: State, Local and Nonprofit Open Space of New Jersey

Description: “This New Jersey Open Space dataset contains Green Acres encumbered and unencumbered protected open space and recreation areas. The Green Acres encumbered lands are owned in fee simple interest by either the state, county, municipality, or a nonprofit agency and have either received funding through the Green Acres State or Local Assistance Program or are listed on a Green Acres approved Recreation and Open Space Inventory (ROSI).”

Website 2: [PAD-US Data Overview | U.S. Geological Survey \(usgs.gov\)](#)

Data layer 2: Protected Area Database of the United States (PAD-US), version 3.0

Description: “PAD-US is America’s official national inventory of U.S. terrestrial and marine protected areas that are dedicated to the preservation of biological diversity and to other natural, recreation and cultural uses, managed for these purposes through legal or other effective means... The database was originally designed to support biodiversity assessments; however, its scope expanded in recent years to include all public and nonprofit held lands and waters. Most are public lands owned in fee; however, long-term easements, leases, agreements, Congressional (e.g., 'Wilderness Area'), Executive (e.g., 'National Monument'), and administrative designations (e.g., 'Area of Critical Environmental Concern') documented in agency management plans are also included.”

Adjustments/Notes: 1) The NJ open space data does not include federal ownership or conservation easements. This information was obtained from the PAD-US data. 2) Usable date of protection info was available for all categories except PAD-US federal lands. However, missing date information was more extensive than for other states. We assumed that all parcels with missing date of protection were conserved prior to 2007, though due to the extent of missing information there is significant uncertainty in the trend analysis.

Pennsylvania

Website: [Pennsylvania Spatial Data Access \(psu.edu\)](https://psu.edu)

Data layer 1: PA Conserved Lands - State

Description: "This dataset contains land owned by the state and managed by state government agencies (includes state parks, state forests, game lands, Historic & Museum Commission properties, and Fish & Boat Commission properties)."

Data layer 2: PA Conserved Lands - Federal

Description: "This dataset contains land owned by the federal government and managed by federal government agencies (includes US Forest Service, US Fish & Wildlife Service, National Park Service, Department of Defense, and Army Corps of Engineers)."

Data layer 3: PA Conserved Lands - Local

Description: "This dataset contains county- or municipal-owned open space, including local parks."

Data layer 4: PA Conserved Lands – Privately Owned

Description: "This dataset contains privately conserved land and nature preserves owned in fee by land trusts."

Data layer 5: PA Conserved Lands – Conservation Easements

Description: "This dataset contains conservation easements, which are held by both governments and private land trusts."

Data layer 6: PA Conserved Lands – Farmland Preservation Easements

Description: "This dataset contains farmland preservation easements. Most of these easements are funded through the Pennsylvania Agricultural Conservation Easement Purchase Program."

Adjustments/Notes: 1) Data layers were checked for overlap (i.e., parcels present in more than one data layer) – none was found. 2) The Local conserved lands data was the only set that did not include a date of conservation. Local lands comprise about 8% of all conservation land. The trend analysis was conducted with the assumption that these lands were conserved at the same rate as other lands. (Whether or not local lands are included does not significantly change the trend analysis).

Maryland

Website: [Maryland's GIS Data Catalog](https://maryland.gov)

Data layer: Maryland Protected Lands - DNR Owned Properties and Conservation Easements

Description: This layer includes land owned by the Maryland Department of Natural Resources as well as DNR-held conservation easements.

Data layer: Maryland Protected Lands - Protected Federal Lands

Description: "The Federal Lands data consists of land areas that are run and maintained by United States Governmental authorities and are considered protected."

Data layer: Maryland Protected Lands - Local Protected Lands

Description: This layer includes lands primarily owned by county and municipal governments.

Data layer: Maryland Protected Lands - Private Conservation Lands

Description: “The Private Conservation data layer is a collection of properties that are protected from development by a Private Conservation group or society either through ownership or conservation easement.”

Data layer: Maryland Protected Lands - Rural Legacy Properties

Description: “The purpose of the Rural Legacy Program is to protect Maryland's best remaining rural landscapes and natural areas through the purchase of land or conservation easements.”

Data layer: Maryland Protected Lands - MD Agricultural Land Preservation Foundation Easements

Description: “MALPF’s primary purpose is to preserve productive agricultural land and woodland to provide for the continuing production of food and fiber for the citizens of Maryland. This is accomplished by landowners voluntarily applying to sell an easement on their property through a competitive State-wide application process.”

Data layer: Maryland Protected Lands - MD Environmental Trust Easements

Description: "The Maryland Environmental Trust (MET) is a statewide local land trust governed by a citizen Board of Trustees. Since its creation by the General Assembly in 1967, MET's main goal is the preservation of open land, such as farmland, forest land, and significant natural resources. The primary tool for doing this is the conservation easement.”

Data layer: Maryland Protected Lands - Transfer Development Rights and Purchase Development Rights

Description: These programs encumber properties with no-development easements.

Adjustments/Notes: 1) All layers were checked for parcels included in more than one layer. This was only significant for the Rural Legacy and MD Environmental Trust layers, where a significant number of parcels (representing 10-15% of the area) were also included in a different layer based on the fee ownership. These parcels were eliminated from the easement layer to avoid double-counting. 2) The data on Rural Legacy Properties does not allow for separation into fee ownership versus easement. 3) The data does not contain the date of protection information so no trend analysis was possible.

Delaware

Website: [PAD-US Data Overview | U.S. Geological Survey \(usgs.gov\)](#)

Data layer: Protected Area Database of the United States (PAD-US), version 3.0

Description: “PAD-US is America’s official national inventory of U.S. terrestrial and marine protected areas that are dedicated to the preservation of biological diversity and to other natural, recreation and cultural uses, managed for these purposes through legal or other effective means... The database was originally designed to support biodiversity assessments; however, its scope expanded in recent years to include all public and nonprofit held lands and waters. Most are public lands owned in fee; however, long-term easements, leases, agreements, Congressional (e.g., 'Wilderness Area'), Executive (e.g., 'National Monument'), and administrative designations (e.g., 'Area of Critical Environmental Concern') documented in agency management plans are also included.”

Adjustments/Notes: 1) While the state’s GIS data portal (FirstMap) does include data layers on conservation lands, the data that could be located contained significantly less

conservation land than the PAD-US data. 2) The PAD-US data includes a “date established” field, but the info was missing for the great majority of parcels so no trend analysis was possible.

Virginia

Website: [Conservation Lands Shapefiles & Metadata \(virginia.gov\)](https://www.virginia.gov/conservation-lands-shapefiles-metadata)

Data layer 1: Conservation Lands Database (Conslands)

Description: “Includes lands in public and private protective management (excludes conservation easements).”

Data layer 2: Conservation Lands Database (Easements)

Description: Conservation easements

Adjustments/Notes: 1) There were some parcels included in the fee ownership (Conslands) and Easement data layers; these parcels were eliminated from the Easement layer to avoid double-counting. 2) These data layers contain all necessary information, although the date of conservation was missing for many parcels.

Appendix B: Conserved land by type of conservation (acres)

State	Fee ownership				Total fee	Easement/ other	Unknown
	Federal	State	Municipal	NGO/land trust			
Maine	276,104	1,028,086	64,071	631,433	1,999,694	2,388,964	706
New Hampshire	803,795	244,841	140,121	197,088	1,385,845	613,937	10,203
Vermont	463,334	441,263	69,708	78,194	1,052,499	633,270	1,764
Massachusetts	62,314	610,137	383,803	180,777	1,237,032	216,170	30
Rhode Island	2,209	54,895	18,910	30,030	106,044	65,544	0
Connecticut	10,325	234,662	141,950	121,715	508,653	85,637	24,223
New York	78,283	4,338,082	256,197	144,192	4,816,754	1,051,241	0
New Jersey	107,190	767,520	303,364	72,994	1,251,068	143,099	13
Pennsylvania	705,261	4,084,924	282,836	123,749	5,196,770	916,506	0
Maryland	105,425	491,054	179,829	35,747	812,054	662,397	88,427*
Delaware	25,496	104,134	44,123	23,072	196,825	146,754	0
Virginia	2,795,929	529,867	141,239	275,567	3,742,601	1,375,922	0
Total Region	5,433,460	12,919,494	1,970,149	1,865,149	22,188,252	8,417,036	125,359

*Primarily parcels in the Rural Legacy data layer; data does not distinguish between fee and easement.