

Considerations for a Reserve Forestland Subcategory in Vermont's Use Value Appraisal Program

Submitted to: The House Committee on Natural Resources, Fish, and Wildlife

Submitted by: Michael C. Snyder, Commissioner

October 15, 2021

Revised to incorporate technical corrections January 14, 2022

VERMONT DEPARTMENT OF FORESTS, PARKS AND RECREATION
AGENCY OF NATURAL RESOURCES



Introduction

In the 2021 legislative session, the House Committee on Natural Resources, Fish, and Wildlife drafted legislation that would establish a new subcategory of the Forestland category in Vermont's Use Value Appraisal (UVA) program, also called "Current Use." In the draft legislation, this new subcategory called **Reserve Forestland** is defined as "land that is managed for the purpose of attaining old forest values and functions in accordance with minimum acceptable standards for forest management and as approved by the Commissioner (of the Department of Forests, Parks and Recreation)." In June of 2021, the Commissioner of the Department of Forests, Parks and Recreation (FPR) received a request by Committee Chair, Representative Amy Sheldon, to provide input on possible standards to implement this proposed new subcategory. In response, FPR developed this report that is divided into the following six sections:

- A. A. Major Factors Considered When Developing Potential Standards
- B. B. Existing UVA Requirements
- C. C. Reserve Forestland: General Concept and Eligibility
- D. D. Considerations
- E. E. Balancing the Primary Purpose of UVA and Reserve Forestland
- F. F. Conclusion
- G. Implementation

The Department appreciates the opportunity to provide additional details on the standards that would apply to a potential Reserve Forestland category in Vermont's UVA program.

Revision Notes: *After submission of this report in October of 2021, staff with Department of Forests, Parks, and Recreation recognized that the wrong map layer of Significant Natural Communities was used in the analysis to model which parcels could become eligible for a Reserve Forestland subcategory using the approach outlined in this report. In the approach outlined here, these features can contribute to the conditions that confer eligibility a Reserve Forestland subcategory. This mapping error resulted in an underestimation of parcels and acres that could become eligible. The report has been corrected, with the results of the new analysis presented that also included minor data cleanup, specifically, removal of approximately 40 parcels that since the initial analysis were determined to be ineligible for UVA enrollment (of 29,000 analyzed). Based on the revised analysis presented on pages 14 – 16, and 22 – 26, the number of parcels modeled to be eligible for the Reserve Forestland category increased by 2% and the acres eligible increased by 2.5%. We believe that these new results improve the accuracy of the analysis and this report, and we have concluded that the new results warrant no change in the discussion or conclusions contained in the report.*

Michael C. Snyder, Commissioner

A. Major Factors Considered When Developing Potential Standards

During the development of potential standards, FPR considered the following major factors:

1. Working Lands and Use Value Appraisal
2. Defining Old Forest
3. Values of Old Forest
4. Landscape Context of Old Forests
5. Old Forests as Part of a Strategy for Healthy Forests
6. The Role of UVA in Supporting a Diversity of Forest Conditions and Current Eligibility

These factors are considered because they provide the context necessary to evaluate how potential standards for a Reserve Forestland subcategory could be designed to meet the objectives of the subcategory to advance opportunities for attainment of old forest on UVA enrolled forestland while minimizing tradeoffs with the working lands purposes of UVA.

1. Working lands and Use Value Appraisal

Forests provide Vermonters with enormous benefits and a range of critical services and goods. A thriving forest economy, functioning natural systems, and Vermont's quality of life rely on maintaining healthy forests across Vermont's landscape. Forests provide a range of benefits, including water supply and water quality protection, flood control and protection, wildlife habitat and biodiversity, clean air, carbon storage and sequestration, and outdoor recreation and scenic beauty, all known as ecosystem services. These valuable services are often underappreciated because they are not always measured in economic terms.

The materials that Vermont's citizens and rural economy depend on are more recognizable, including timber, veneer, pulpwood, firewood, chips, and pellets, and can be quantified in dollars and jobs. Vermont's forest economy is estimated to generate nearly \$1.5 billion annually in the state and is an important part of our economy that helps private forest landowners cover ownership costs and subsidizes conservation practices on public and private lands.¹

Challenges in the forest economy threaten the forests of Vermont -- both working and wild and both public and private -- and the many priced and unpriced benefits and values accruing to all Vermonters from them. Across the northern region, declines in the number of forest product manufacturers started in 2000 and continued at a steep pace following the downturn in the housing market around 2006. A similar pattern is true in Vermont, with a 57% reduction in sawmills (23 closed) in the State since 1990 and more than a 60% reduction in regional pulp mills (11 closed) since 1999.

As the number of primary forest product processors declines, there is a point at which the number becomes too small to adequately provide the effective market diversity that loggers, foresters, and landowners require to sell the forest products that support their ownership and stewardship of the land. With a diminished forest economy there are fewer opportunities for jobs, subsidized conservation practices (restorative management, wildlife habitat enhancements, invasive plant control), and reduced capacity for the industry to respond to emergencies and emerging markets.

¹ 2017 Vermont Forest Action Plan, Vermont Department of Forests, Parks and Recreation, 2015, https://fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Vermont_Forests/Library/2017_VT_ForestActionPlan.pdf

Maintenance of Vermont's working forest landscape and a vibrant forest economy are among the State's most important strategies to keep forests forested and maintain and enhance the breadth of values that forests provide to Vermonters. One of the most important tools to advance these goals is the Forestland category in Vermont's UVA program.

The primary statutory purpose of UVA is to preserve the working landscape and the rural character of Vermont (32 VSA § 3750). Statute (§ 3751) further elaborates on the purposes to include:

- Keep Vermont's agriculture and forestland in production.
- Protect natural ecological systems.
- Prevent accelerated conversion to development.
- Achieve equitable taxation.
- Assist in preservation and protection of scenic resources.
- Assist Vermonters in planned orderly growth.

Amid the many stressors eroding the vibrance of Vermont's working landscape and the forests, economy, and culture it supports, the UVA program is a stabilizing force. For this reason, any changes to the program should be carefully designed to preserve the program's primary purpose and its role in sustaining the working landscape and rural character of Vermont.

It is with this in mind that we consider options for how the Commissioner's Minimum Management Standards may both preserve the primary purposes of the program while broadening program eligibility to include a Reserve Forestland subcategory.

2. Defining Old Forests

Old forests are biologically mature forests, typically in late-successional stages of development, having escaped stand-replacing disturbance for more than 100 years and exhibiting limited evidence of human-caused disturbance, though may be carefully managed silviculturally for old forest characteristics. Most if not all forestland in Vermont has experienced some level of human-caused disturbance, however those areas identified as old forest have well developed structural characteristics of an old forest. Old forests in matrix natural community types exhibit the following characteristics:

1. Native tree species characteristic of the forest type or natural community present in multiple ages; and
2. Complex stand structures including a broad distribution of tree diameters, multiple vertical vegetative layers, abundant coarse woody material (reflecting the distribution of diameters of the standing trees) in all stages of decay, numerous large standing dead trees, and when old forest patches are sufficiently large, natural canopy gaps.

Most matrix forest types exhibiting these characteristics contain trees exceeding 150 years old, though some forests may develop these conditions at different times. For instance, they may develop earlier in balsam fir (100 years), or later for Eastern hemlock (200 years).²

² Clarifications to Old Forest Ecologically Significant Treatment Areas (ESTAs) Eligibility in Use Value Appraisal Program Approved by Commissioner Snyder, 2021
https://fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Your_Woods/Library/Old%20Forest%20ESTA%20Standard%20Revision%205_7_20%20Final.pdf

Old forests in non-matrix natural community types like sub-alpine krummholz, can develop in extreme or unique edaphic conditions, natural disturbance dynamics, or other environmental variables that affect species composition, growth rates, or long-term survival of trees and as a result, may exhibit very different structural characteristics compared to matrix communities.

3. Values of Old Forests

Prior to European settlement, most of Vermont's landscape was old forest, and it is the original habitat condition for many species. The State's native flora and fauna are adapted to this landscape of old, structurally complex forests punctuated by natural disturbance-caused canopy gaps and dispersed natural openings such as wetlands or rock outcrops. The complex physical structure of old forests creates diverse habitats, many of which are absent or much less abundant in younger forests.

As a result of the persistent structural and vegetative complexity above ground, the diverse biome below ground, and associated complex biotic and abiotic relationships that develop over time, old forests can be hotspots for biodiversity, and are also particularly effective in protecting water supply and quality, sequestering and storing carbon, providing environmental conditions for species and forest ecosystems to adapt to climate change, and serving as ecological benchmarks against which to evaluate active management of Vermont's forests.³

Because there is variation among forests (soils, aspect, disturbance, and other factors), the values ascribed to old forests or the characteristics they exhibit are not equally true for all old forests. For example, some old forests experience frequent disturbance or have soil conditions preventing trees from attaining the large sizes often associated with old forests. Furthermore, while the values broadly attributed to old forest are significant and critical to Vermont, many are not exclusive to old forests. There is significant overlap among the forest-derived values provided by old and managed forests, and at the same time, depending on many factors, each forest condition -- young, maturing, and old, managed or unmanaged -- may have unique strengths in providing the functions, services, goods, and benefits that forests provide. For this reason, no management approach or forest condition with healthy soils dominated by native species should be viewed as "the best" and instead must be viewed as complementary conditions and management approaches to realize all the benefits that forests provide for Vermont.

4. Landscape Context of Old Forests

It is estimated that old forests currently constitute less than 1% of Vermont's forestland.³ The conditions defining old forest and the resulting functions and values are on the natural trajectory for most Vermont forests, but land use history and continued forest management have largely prevented forests from developing the defining characteristics of old forests, and in some cases, the values they provide. Today's old forests represent a small fraction of what would be present in the absence of human caused changes to forest dynamics and function and use of the forest to meet basic needs for heating, electric generation, building materials, furniture, paper, packaging, medical supplies, musical instruments, etc. or historically, and perhaps more significantly, space for agriculture to grow food and fiber. This land use

³ Vermont Conservation Design - Technical Report Part 2: Natural Communities and Habitats Technical Report, 2018
<https://vtfishandwildlife.com/sites/fishandwildlife/files/documents/Conserve/VT%20Conservation%20Landscape-level%20Design/Vermont%20Conservation%20Design--Natural-Community-and-Habitat-Technical-Report-March-2018.pdf>

history and dependence on forests has been fundamental in the shaping of Vermont's culture, economy, and landscape.

Although certain active management strategies can accelerate development of old forest characteristics, if not the actual aging of the forest, the process takes time, with old forest characteristics beginning to develop at 100 - 150 years or more⁴, and most of Vermont's forests have not had the time to re-develop these characteristics or old forest conditions. Eighty-five percent of Vermont's forestland is in stand age classes between 40 and 100 years. Only 6% is over 100 years old.⁵

To achieve a goal of sustaining Vermont's natural heritage in the future, [Vermont Conservation Design](#) sets a target of approximately 9% or 419,000 acres of Vermont's forestland to be in an old forest condition within highest priority forest blocks distributed proportionally among biophysical regions and in a manner that is representative of matrix community forest types. It is estimated that about 218,000 acres will likely develop into old forests based on conservation easements, wilderness designation, or other status to remain unharvested.

5. Old Forest as Part of a Strategy for Healthy Forests

We are fortunate that in Vermont today 76% of our landcover is forest.⁶ In the mid-1800s, Vermont was mostly cleared of forests and now it is the 4th most forested state in the country.⁶ We have also benefitted from a citizenry that engages in wise and active management and a range of local professionals and businesses that create the marketplace that make it possible. Approximately 65% of privately owned land with >10 acres have a forest management plan -- one of the highest rates in the country.⁷ Management plans are ecologically based and are directly correlated with engagement with natural resource professionals, application of scientific principles, and long-term planning. Vermont has much to be proud of with respect to its forest stewardship. The significant recovery of Vermont's forests provides to the state and its citizens invaluable natural assets, underpinning our economy and enhancing our quality of life. We depend on forests for their material and economic contributions of timber, veneer, pulpwood, firewood, chips and pellets, (for both space heating and electric generation), and maple syrup, as well as the values and services forests provide, such as water supply and water quality protection, flood control and protection, wildlife habitat and biodiversity, clean air and carbon sequestration, outdoor recreation and scenic beauty. Planning and managing forests sustainably involves a recognition of the ecological, social and economic systems necessary to maintain forest health while providing benefits for this and future generations of people.⁸ As we advance our understanding of forests and prepare and adapt to changing climate conditions, invasive plants,

⁴ Hagan, J. M., & Whitman, A. A. (2004). Late-successional forest: a disappearing age class and implications for biodiversity. Brunswick, ME: Manomet Center for Conservation Sciences <https://www.manomet.org/wp-content/uploads/old-files/Hagan%20and%20Whitman.%202004.%20Late-successional%20Forest%20-%20A%20disappearing%20age%20class%20and%20implications%20for%20biodiversity.pdf>

⁵ Morin, Randall S, Butler, Brett J et al. 2020. Vermont Forests 2017. Resource Bulletin NRS-120. Madison, WI: U.S. Department of Agriculture, Forest Service, Northern Research Station 100 p. <https://doi.org/10.2737/NRS-RB-120>

⁶ Morin, Randall S, Butler, Brett J et al. 2020. Vermont Forests 2017. Resource Bulletin NRS-120. Madison, WI: U.S. Department of Agriculture, Forest Service, Northern Research Station 100 p. <https://doi.org/10.2737/NRS-RB-120>

⁷ Kilgore, Michael A.; Snyder, Stephanie A.; Eryilmaz, Derya; Markowski-Lindsay, Marla A.; Butler, Brett J.; Kittredge, David B.; Catanzaro, Paul F.; Hewes, Jaketon H.; Andrejczyk, Kyle. 2015. Assessing the relationship between different forms of landowner assistance and family forest owner behaviors and intentions. *Journal of Forestry*. 113(1): 12-19. <https://doi.org/10.5849/jof.13-059>.

⁸ Snyder, Michael C. (2015) 2015 Vermont Forest Fragmentation Report. Vermont Department of Forests, Parks, and Recreation. https://fpr.vermont.gov/sites/fpr/files/About_the_Department/News/Library/FOREST%20FRAGMENTATION_FINAL_rev06-03-15.pdf

fragmentation, pests and other stressors – which of course are fundamentally linked to forest pattern and process, there are opportunities to manage in ways that more fully express the breadth of healthy forest conditions to optimize the values forests provide and ensure forest integrity and landscape resilience in a changing climate.

As noted above, there is significant overlap among the important forest-derived values provided by old forests and managed forests. For instance, relative to most other landcovers or uses, regardless of whether a forest is managed or unmanaged, it will make exceptional – and far greater than any other landcover or use --contributions to carbon storage and sequestration, clean water, wildlife habitat, recreation, and the breath of values simply because it is a forest. And variability also has value. Each forest condition -- young, maturing, old, managed, and unmanaged -- all make unique contributions to the benefits that forests provide. For this reason, it must be acknowledged that no acre of forestland can maximize all values or functions. Both old and young forests provide critical wildlife habitat, but for different mixes of species. They serve different functions for climate adaptation. They respond differently to disturbance events (storms, pests, disease). They sequester and store carbon differently.⁹ And the management approaches to develop and sustain various forest conditions can result in different economic contributions. **An "all-forests approach" recognizes and acts on the fact that each forest condition and management strategy, when applied in the right place at the right time, is a critical part of Vermont's inclusive multiuse approach to keep its forests intact and healthy.**

6. The Role of UVA in Supporting a Diversity of Forest Conditions

Given that Vermont needs a diversity of forest conditions and management strategies to maintain and realize the full breadth of potential benefits from its forest, then it is appropriate to consider how Vermont's programs and policies help to achieve this goal. Furthermore, because 80% of Vermont's forestland is owned by private landowners, any strategies to achieve its forest-related goals can only be realized with the support of private landowners. UVA is the preeminent program in Vermont to incentivize conservation and sustainable management of its forestland. Nearly two million acres of forestland are enrolled in UVA, with enrolled forestland encompassing nearly 60% of all privately owned forestland and 70% of all eligible acres. Because the majority of Vermont's private forestland is enrolled in UVA, Vermont will only achieve the targets it has established for its forest conditions if the management strategies to attain them are eligible in UVA.

As established through Vermont Conservation Design (VCD), we have targets of (varying by region but on average): 9% of Vermont forestland in old forest condition, 3 – 5% in young forest condition, and the remainder (86-89%) in healthy intact, multi-aged forests. In UVA, young forest and multi-aged forests can be readily attained through active forest management. Where they exist, old forests are eligible for enrollment in UVA, as are certain strategies to achieve them. However, depending on the specifics of forest conditions and management proposed at a given site, some strategies to achieve old forest conditions may not be eligible under existing UVA standards, consequently limiting the ability to attain

⁹ Catanzaro, P. and D'Amato, A. (2019). Forest Carbon: An essential natural solution for climate change. Amherst, MA. University of Massachusetts, Amherst. https://masswoods.org/sites/masswoods.org/files/Forest-Carbon-web_1.pdf

old forest conditions on UVA enrolled land. The existing UVA requirements related to old forest are outlined and discussed below.

B. Existing UVA Requirements

For most forestland on productive soils (Sites I, II, and III, based on tree heights at a base year), the primary forest management objective must be the long-term production of forest products in accordance with established forest practices (hereafter referred to as "Productive Forestland"). Wildlife habitat, aesthetics, recreation, watershed protection, and many other landowner objectives are acceptable and supported on these lands when consistent with and complementary to forest management and program standards.

Lands where timber is not the principal objective may also qualify for UVA. These lands include Significant Wildlife Habitats, Special Places and Sensitive Sites, Miscellaneous inclusions of one acre or less, and 6 categories of Ecologically Significant Treatment Areas (ESTAs). These areas are defined in the [Minimum Acceptable Standards for Forest Management](#).

ESTAs provide enrollment options for landowners who want to manage their land to protect significant ecological sites, including existing old forests (one of the six ESTA categories). It's not required that ESTAs be managed for forest products, but they do require protective/conservation measures. However, ESTAs cannot cover all enrolled forestland within a parcel -- at least 20 acres of any forestland parcel must be enrolled as Productive Forestland and actively managed for sawtimber. Lands with documented occurrences of the following conditions are eligible for enrollment as ESTAs:

- Natural Communities of Statewide Significance
- Rare, Threatened, and Endangered Species
- Riparian Areas
- Vernal Pools with Amphibian Breeding Habitat
- Forested Wetlands
- Old Forests

Old forests are eligible as forestland under the Productive Forestland subcategory when the primary long-term management objective is for sawtimber or must be enrolled as an ESTA.

Management Compatibility: Old forest characteristics can be restored or carefully retained on most forestlands through ecological forestry. Ecological forestry is focused on sustaining complex ecosystems (rather than focusing on any singular objective) and often employs management strategies that develop large trees, recruit standing and down dead wood, and promote multiple age classes and species, often while producing goods and services.¹⁰ This approach to management is compatible with UVA requirements for forestland enrolled in either the Productive Forestland or the ESTA subcategories. Passive management (very limited or no vegetation manipulation) may also be used to maintain old forest only when the land is enrolled as a qualifying ESTA. For forestland to be enrolled as an old forest ESTA it must have achieved old forest conditions, and as acknowledged previously, most forest in Vermont has not achieved this condition.

¹⁰ Palik, B.J., D'Amato, A.W., Franklin, J.F., Johnson, N.J., Ecological Silviculture: Foundations and Applications. Illinois: Waveland Press, 2021.

Restorative or passive management can be an effective strategy to attain old forest conditions in forests that have not yet achieved them. However, from a UVA eligibility perspective, if growing forest products is not an objective for a stand, or if vegetation management is legally constrained, the stand is incompatible with the UVA requirement to manage for sawtimber. Passive management would not be an eligible strategy on enrolled lands that have not achieved old forest conditions that are not otherwise eligible for enrollment as ESTA. Because there are few options for managing for old forest in UVA and landowners depend on the property tax reductions that UVA provides, UVA creates a barrier for recruitment of old forests on UVA parcels and therefore a barrier on the majority of private forestland land across the state.

Parcel-scale Management Compatibility: With the approval of the Commissioner of FPR, any amount of eligible forestland may be enrolled in an ESTA, if a minimum of 20 acres of productive forestland is managed for sawtimber. Because of this requirement to have at least 20 acres of each enrolled parcel managed for sawtimber, in UVA, family-owned forestland is not eligible to be managed for old forest using passive management at the parcel scale.

C. Reserve Forestland: General Concept and Eligibility

The draft bill to establish a Reserve Forestland as a subcategory of Managed Forestland defines Reserve Forestland as "land that is managed for the purpose of attaining old forest values and functions in accordance with minimum acceptable standards for forest management and as approved by the Commissioner." The letter dated June 1, 2021, sent to the Commissioner, asks for specifics of what these standards may include.

When considering alternatives, FPR referenced what we understand are the two main objectives (while minimizing fiscal and administrative burdens):

- **Objective 1:** Maintain the primary purpose and outcome of the forestland category of UVA as: keep forestland in productive use.
- **Objective 2:** Reduce the barriers to achieving old forests on UVA enrolled forestlands at a scale and pattern that helps Vermont benefit from old forests' values.

Some parcels managed for sawtimber are more operable than others, and some have a stronger ecological basis for managing for values other than sawtimber. These were among the reasons for the establishment of ESTAs. A similar approach can be extended to the administration of Reserve Forestland. To maintain support of working forests, those parcels with the fewest barriers to or conflicts with sustainable management for forest products should continue to be managed for forest products. And those parcels with the greatest barriers to management for forest products and/or are those that have a strong ecological (or appropriate historical/cultural) basis for managing for values other than sawtimber could be those that would be eligible for Reserve Forestland. This approach would prioritize management for sawtimber on the most appropriate and operable sites and management for old forests at a scale and pattern that could enable significant progress towards old forest targets.

An Analysis of Eligibility Standards for Enrolling in Reserve Forestland

To realize this strategic approach that optimizes the balance between production of sawtimber and achieving old forest characteristics across the landscape, the following eligibility standards were considered for a Reserve Forestland subcategory.

Significant and Sensitive Conditions Selection for Reserve Forestland

Existing Subcategories for Reserve Forestland: Several Managed Forestland subcategories have been identified, defined, and used in the administration of UVA when eligible land:

1. Has site features that prevent timber management, or
2. Exhibits site features that provides a strong ecological (or appropriate historical/cultural) basis for managing for values other than sawtimber.

These Managed Forestland subcategories include:

- All existing Ecologically Significant Treatment Areas (ESTAs)
- Site IV lands (relatively poor growing sites)
- Special Places and Sensitive Sites (Unique geologic, cultural, historic, and archeological sites.)

Additional Subcategory for Reserve Forestland – Steep Slopes: Areas of steep slopes naturally occur throughout the landscape and can present barriers to management for forest products. Where they occur at a large scale, they can be a major impediment to and are often inoperable for machinery used in forest management. When they occur on UVA-enrolled land, they are often accepted as a natural component of eligible forestland and incorporated into the enrollment of the surrounding land. The presence of steep slopes ($\geq 35\%$) is easily identifiable through publicly available maps and is an efficient way to identify the places and parcels where slopes present a barrier to management. A new standard could be incorporated into the Minimum Management Standards to enable landowners to characterize and quantify the area of steep slopes $\geq 35\%$ slope or that are otherwise demonstrably inoperable.

TABLE 1: POTENTIAL ELIGIBLE SIGNIFICANT AND SENSITIVE CONDITIONS FOR RESERVE FORESTLAND

Potential Eligible Significant and Sensitive Conditions for Reserve Forestland	
Riparian Areas: Existing Standard	Most riparian areas are well suited for active forest management, and a clear justification will be needed for them to be approved as ESTAs. Riparian areas that have characteristics making them ecologically inappropriate for timber harvesting may be enrolled as ESTAs. The lands adjacent to streams, rivers, lakes, and ponds are specialized ecological areas that provide numerous functions, including protecting water quality and aquatic habitat, providing terrestrial wildlife travel corridors, supporting significant natural communities and adjacent wetlands, protecting channel-forming processes and channel stability, and minimizing soil erosion and the effects of heavy rainfall events. Riparian areas are generally managed according to Acceptable Management Practices (AMPs) to protect surface waters from harmful discharges, but some riparian zones may deserve special treatment to protect riparian functions. Factors to consider in evaluating the need for and width of riparian ESTAs include existing condition of the riparian area, stream channel size and character, steepness of slope, characteristics of soil, nature of special aquatic habitats, presence of concentrated terrestrial wildlife use, presence of seeps or other wetlands, presence of floodplains or other rare to uncommon shoreline natural communities, and presence of streams requiring special protection for maintaining channel stability.
Vernal pools with Amphibian Breeding Habitat: Existing Standard	Vernal pools are considered an uncommon (S3) natural community type and those with an occurrence rank of A, B, or C are considered state significant by the Vermont Fish and Wildlife Department (FWD). These state-significant vernal pools provide important amphibian breeding habitat. A state-significant vernal pool, along with a 100-foot protective buffer from the pool edge, is eligible for enrollment as an ESTA in UVA. Vernal pools are small (generally less than one acre), ephemeral pools that occur in natural basins within upland forests. Vernal pools typically have no permanent inlet or outlet streams and have very small watersheds. These temporary pools generally last only a few months (at least 2½ months) and then disappear by the end of summer, although some pools may persist even longer in wet years. During their dry period, vernal pool depressions may be recognized by sparse vegetation, by stained leaves marked by seasonal high water, and by soils that have more wetland characteristics than do the surrounding upland soils. The periodic drying means that there are no fish in vernal pools, but there is a unique assemblage of species that typically includes specialized insects (caddis flies), mollusks (fingernail clams), and other invertebrates (fairly shrimp) as well as amphibians (spotted salamanders) and sparse vegetation. Vernal pools typically lack trees but are shaded by trees growing in the surrounding upland forest. The vegetation that grows in vernal pools is highly variable in composition and abundance, although most pools have low abundance of herbs and shrubs.
Natural Communities of Statewide Significance: Existing Standard	A forested natural community that meets FWD standards for statewide significance or is previously mapped by FWD using these standards is eligible for enrollment as an ESTA. State-significant natural communities are as follows: S1 or S2 natural community types, with an occurrence rank of A, B or C. S3 natural community types with an occurrence rank of A or B.
Rare, Threatened and Endangered Species: Existing Standard	A rare (S1 or S2), state threatened, or state endangered species that has been mapped by FWD or that is identified on a property and meets the mapping standards of FWD is eligible for enrollment as an ESTA. Threatened and endangered species are protected by Vermont's Endangered Species Law (Title 10 VSA Chapter 123).

<p>Old Forest: Existing Standard</p>	<p>Old forests are biologically mature forests, typically in late-successional stages of development, having escaped stand-replacing disturbance for more than 100 years and exhibiting limited evidence of human-caused disturbance beyond ecological management emulating old forest conditions. Most forestland in Vermont has experienced some level of human caused disturbance, however those areas identified as old forest shall have well developed structural characteristics of an old forest. Old forests exhibit the following characteristics: 1) native tree species characteristic of the forest type or natural community present in multiple ages; and 2) complex stand structures including a broad distribution of tree diameters, multiple vertical vegetative layers, abundant coarse woody material (reflecting the diameters of the standing trees) in all stages of decay, numerous large standing dead trees, and when old forest patches are sufficiently large, natural canopy gaps. Most forest types exhibiting these characteristics will have trees exceeding 150 years old, though some forests may develop these conditions at different times. For instance, they may develop earlier in balsam fir (100 years), or later for Eastern hemlock (200 years).</p>
<p>Forested Wetland: Existing Standard</p>	<p>Forested wetlands that have characteristics making them ecologically sensitive to timber harvesting may be enrolled in UVA as ESTAs. These characteristics include, but are not limited to, deep organic soils, presence of groundwater seepage that prevents freezing of organic soils, presence of spring flooding from an adjacent river or lake, and well-developed hummock and hollow microtopography. Logging in these situations may create significant soil rutting that alters the wetland hydrology, changes flood flows, or alters microhabitats that change species composition and diversity.</p>
<p>Special Places and Sensitive Sites: Existing Standard</p>	<p>Unique geologic, cultural, historic, and archeological sites. Examples include waterfalls, gorges, eskers, cemeteries, evidence of historic quarries, homes or mills, and Native American sites (<i>sic</i>).</p>
<p>Site IV Lands: Existing Standard</p>	<p>Areas consisting of soils classified as Site IV with relatively poor tree growth potential by soils or site index.</p>
<p>Steep Slopes/Inoperable Reserve Forestland: DRAFT Standard</p>	<p>Forested steep slopes (35% slope or more) or inoperable areas that do not otherwise qualify as a significant or sensitive condition must be delineated on the UVA map as an overlay and enrolled as Reserve Forestland. These areas need not be described as separate management units, but the location and acreage of these qualifying conditions must be identified on the map. Steep slopes may be delineated using state developed GIS layers.</p>

Other Existing Subcategories Considered but not Included in Reserve Forestland: Three existing UVA enrollment subcategories were also considered for inclusion in this approach but, for reasons described below, were not included in our analysis of potential Significant and Sensitive Conditions for Reserve Forestland.

- Significant Wildlife Habitat:** Significant Wildlife Habitat includes wildlife habitat mapped as significant by FWD. These habitats can include but are not limited to deer wintering areas; concentrated areas of American beech, oak, and cherry; bat habitats; vernal pools; wildlife corridors; and heron rookeries. While some significant wildlife habitats (heron rookeries, vernal pools) may be well-supported by passive or active management for old forest conditions, other significant habitats may be readily supported through traditional silvicultural practices or even

depend on them to maintain habitat values (connectivity habitat, concentrations of cherry). Furthermore, some of the mapped Significant Wildlife Habitat overlaps with otherwise eligible Significant and Sensitive Conditions, e.g., site IV soils (most wetlands), rare threatened and endangered (RTE) habitat, and forested wetlands. Because the conditions that make habitat significant are sometimes compatible with old forest management and sometimes not, Significant Wildlife Habitat was not included in one of the subcategories that would confer eligibility for Reserve Forestland.

- **Open Idle/Agricultural Land:** Because Open/Idle agricultural land is not forest, this enrollment subcategory was not included in one of the subcategories that would confer eligibility for Reserve Forestland.
- **Miscellaneous:** The Miscellaneous category allows passive management or other protective/conservation management on up to 1 acre and is limited to one occurrence per parcel. This subcategory is broadly defined, seldom used, and viewed as adding complexity without contributing meaningful value if included in the Significant and Sensitive Conditions list.

Other Features Considered

Vermont Conservation Design and Highest Priority Forest Blocks: The Agency of Natural Resources (ANR) has prioritized the attainment of old forest within its highest priority forest blocks. However, because the highest priority forest blocks cover an expansive area in the state, if forestland parcels became eligible for enrollment in Reserve Forestland solely due to their presence in these areas, it could make the majority of privately-owned forestland eligible for the category. Without any current way to estimate the resulting scale of enrollment in Reserve Forestland, such an approach would be successful at removing barriers for attainment of old forest but less successful at ensuring that forestland remains managed for forest products. And the balance between the two objectives would not be optimized. Furthermore, as noted in Vermont Conservation Design, "Patches of old forest that are smaller than the minimum preferred patch size also provide important ecological functions and contribute to the numerical goals for each biophysical region," and therefore, using the highest priority forest blocks as a filter for eligibility of Reserve Forestland would also reduce the potential to realize the benefit of old forest through UVA outside of these areas.

While highest priority forest blocks are not recommended for inclusion as an eligibility criterion, they do provide a valuable lens to evaluate how this approach would advance the state's old forest goals by comparing the co-occurrence of eligible parcels (as modeled based on the described approach) with matrix natural community forests or highest priority forest blocks. Due to capacity limitations and the complexity of the analysis, it has only been explored by FPR and FWD at a basic level. However, initial analysis suggests that this approach would result in the eligibility of thousands of parcels and hundreds of thousands of acres of land in highest priority forest blocks, with representation of significant acreage of matrix community forest types across biophysical regions. This suggests that if implemented and adopted by landowners, the approach could support significant progress towards ANR's goals as articulated in Vermont Conservation Design.

Conservation Easements: Conservation easements are an important tool for keeping forests as forest and advancing specific conservation objectives, including old forests. Public interest has been expressed in using the existence of conservation easements on a parcel to establish eligibility in Reserve Forestland

and that this approach could be a simple parallel to the existing UVA Conservation subcategory of Managed Forestland. Land eligible for the Conservation subcategory must be owned by a certified 501 (c)(3) in the business of conserving land. But the reality is more complicated. While the interest is understandable, there are a variety of factors that make eligibility of privately conserved land different from eligibility of 501(c)(3)s and would affect the efficacy and complicate the administration of using this strategy.

When private land is conserved under an easement, the terms of the easement and how they affect management can vary dramatically among parcels and even within parcels. To use easements as an eligibility criterion, standard language would need to be developed to ensure the land can be managed to achieve the intended old forest goals, and easements would need to be reviewed to confirm eligibility which would demand significant administrative capacity. Furthermore, across the UVA program, existence of an easement alone would be insufficient to reliably advance old forest goals in balance with goals for maintaining the potential to manage for forest products. Additional eligibility criteria and strategies would need to be employed to manage this balance, size of parcels, conditions eligible, and more. For these reasons, the Reserve Forestland approach described here does not include conservation easements as an eligibility criterion in and of itself. However, if Reserve Forestland were implemented as described, the approach would remove barriers to enrollment of parcels with “forever-wild easements” if the parcels are eligible and management standards are met. This approach would be consistent with the way Productive Forestland parcels with an easement are evaluated – the existence of the easement confers no eligibility benefits because eligibility is evaluated based on whether the land itself meets condition and management requirements of UVA, independent of the easement.

Threshold for Significant and Sensitive Conditions

To analyze an appropriate threshold for Significant or Sensitive Conditions that would confer eligibility for enrollment in Reserve Forestland, the percentage of forestland acres or percentage of a parcel acres (all parcel acres including forestland, agricultural land, open land, etc.) comprised by Significant or Sensitive Conditions were calculated for each UVA enrolled forestland parcel (Table 2) and for each unenrolled but potentially UVA eligible forestland parcel (Table 3). This modeling exercise is useful to estimate the number of parcels and acres that could become eligible for Reserve Forestland among UVA enrolled and potentially eligible parcels across a range of percent-thresholds of Significant and Sensitive Conditions.

TABLE 2. MODELED ELIGIBILITY OF FORESTLAND ACRES AMONG CURRENT UVA ENROLLED PARCELS WHEN RESERVE FORESTLAND ELIGIBILITY THRESHOLD IS CALCULATED BY SIGNIFICANT OR SENSITIVE CONDITIONS AS A PERCENT OF PARCEL (ALL PARCEL ACRES) OR FORESTLAND ACRES.

UVA Enrolled Parcels and Forestland					
Parcel			Forestland		
% Sig/Sen	Eligible Forest Acres	Parcels	% Sig/Sen	Eligible Forest Acres	Parcels
<10	1,945,066	15,716	<10	1,945,066	15,716
>10	1,669,404	12,074	>10	1,758,371	13,032
>20	1,108,725	7,725	>20	1,403,730	9,959
>30	629,899	4,326	>30	912,388	6,962
>40	353,158	2,384	>40	560,411	4,663
>50	187,608	1,319	>50	357,388	3,197
>60	104,357	790	>60	229,213	2,273
>70	64,717	492	>70	158,833	1,691
>80	44,899	330	>80	116,403	1,319
>90	25,140	223	>90	89,081	1,085
Total Analyzed	1,945,066	15,716	Total Analyzed	1,945,066	15,716

TABLE 3. MODELED ELIGIBILITY OF FORESTLAND ACRES AMONG PARCELS NOT ENROLLED BUT POTENTIALLY ELIGIBLE FOR UVA WHEN RESERVE FORESTLAND ELIGIBILITY THRESHOLD IS CALCULATED BY SIGNIFICANT OR SENSITIVE CONDITIONS AS A PERCENTAGE OF PARCEL ACRES OR FORESTLAND ACRES.

Not Enrolled, UVA Eligible (>25 total acres/>20 acres forest) Parcel and Forestland					
Parcel			Forest		
% Sig/Sen	Eligible Forest Acres	Parcels	% Sig/Sen	Eligible Forest Acres	Parcels
<10	766,873	12,859	<10	766,873	12,859
>10	601,434	9,326	>10	634,154	10,003
>20	391,670	6,077	>20	478,920	7,554
>30	230,210	3,561	>30	330,642	5,309
>40	132,725	2,003	>40	214,271	3,600
>50	75,736	1,140	>50	140,164	2,441
>60	41,081	691	>60	88,834	1,649
>70	25,864	441	>70	59,167	1,148
>80	18,035	310	>80	41,454	844
>90	12,237	210	>90	30,270	630
Total Analyzed	766,873	12,859	Total Analyzed	766,873	12,859

The modeling exercise showed that for any given percent threshold, more parcels and forestland would become eligible when Significant or Sensitive Conditions was assessed as a percent of forestland, as opposed to the parcel. For instance, when Significant or Sensitive Conditions are 30% of the forestland acres of UVA enrolled parcels, the model found that 912,388 acres of forestland and 6,962 parcels could be eligible. When the threshold is 30% of the parcel acres, 629,899 acres and 4,326 parcels could become eligible. Furthermore, it was found that at any given percentage threshold, the average area of forestland per parcel was greater when threshold for Significant or Sensitive Conditions was a percentage of the parcel and therefore could make a greater per-parcel contribution to old forest, when compared to a threshold based on the percentage of forestland (Table 4).

TABLE 4. AVERAGE FORESTLAND PER PARCEL AMONG UVA ENROLLED PARCELS POTENTIALLY ELIGIBLE FOR RESERVE FORESTLAND WHEN ELIGIBILITY THRESHOLD IS CALCULATED BY SIGNIFICANT OR SENSITIVE CONDITIONS AS A PERCENT OF PARCEL ACRES OR FORESTLAND ACRES.

Average Forestland Per Parcel Among UVA Enrolled Parcels Potentially Eligible for Reserve Forestland Enrollment				
Parcel			Forestland	
% Sig/Sen	Avg. Parcel – Acres		% Sig/Sen	Avg. Parcel – Acres
>10	138		>10	135
>20	144		>20	141
>30	146		>30	131
>40	148		>40	120
>50	142		>50	112
>60	132		>60	101
>70	132		>70	94
>80	136		>80	88
>90	113		>90	82

It was further observed that when the percentage of parcel acres was used to establish the eligibility threshold, as compared to the percentage of forestland acres, a higher percentage of parcels and forestland acres aligned with interior forest blocks as identified in Vermont Conservation Design (Table 5). In one example, when a threshold of 30% was applied to UVA enrolled parcel acres and compared to a threshold based on 30% of forestland acres on the same parcels, it was found that when percent of parcel was used, 76% of parcels, encompassing 87% of the forestland acres (547,919 of 629,899) of potentially eligible Reserve Forestland parcels coincided with interior forest blocks, while 71% of parcels encompassing 80% of potentially eligible forestland acres (729,993 of 912,388) aligned when percent of forestland was used as the threshold. To summarize, on average, more forestland per parcel and a higher percentage of parcels would be eligible for Reserve Forestland within VCD if the eligibility threshold were based on the percentage of parcel acres comprised by Significant or Sensitive Conditions as compared to a threshold based on a percentage of forestland acres on an enrolled parcel. This suggests that between the two threshold options presented, using percentage of parcel acres comprised

by Significant or Sensitive Conditions to establish eligibility for Reserve Forestland provides a modestly more efficient means of advancing old forest.

TABLE 5. COMPARISON OF ALIGNMENT OF PARCELS AND FORESTLAND ACRES WITH HIGHEST PRIORITY FOREST BLOCKS WHEN THE ELIGIBILITY THRESHOLD OF SIGNIFICANT OR SENSITIVE CONDITIONS IS 30% OF ENROLLED PARCEL ACRES OR FORESTLAND ACRES.

UVA Enrolled Parcels and Forestland Alignment with Vermont Conservation Design by Threshold Approach				
30% Eligibility of Parcel			30% Eligibility of Forestland	
% Parcels	% Forestland		% Parcels	% Forestland
76	87		71	80

It is not clear what percentage of eligible parcels landowners would choose to enroll in Reserve Forestland if it is administered as described. Anecdotally, some foresters have suggested that there will be extremely limited adoption of this enrollment option, while others suggest there will be overwhelming interest. Because of this uncertainty it is appropriate to choose a moderate eligibility threshold – one that would constitute significant progress towards old forest targets, but not so much that overwhelming interest would undermine the purposes of UVA related to maintenance of working forests. For this reason, and based on the analysis summarized here, to balance advancement of old forest and maintenance of working forests, a workable approach and the one presented here for consideration would be one in which **parcels become eligible for enrollment in Reserve Forestland when they demonstrate that 30% or more of the parcel acres (Forestland plus Agricultural Land) to be enrolled in UVA are comprised by Significant and Sensitive Conditions.**

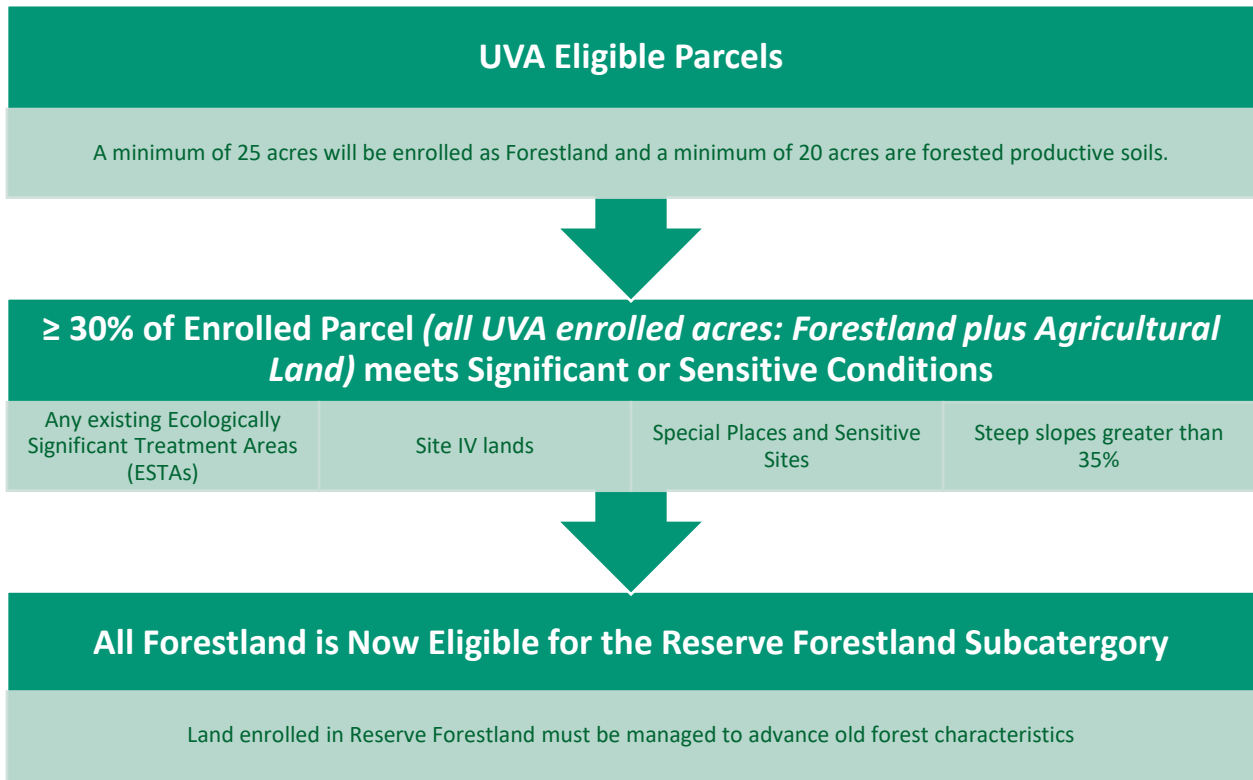


FIGURE 1: FLOW CHART DEPICTING POTENTIAL RESERVE FORESTLAND ELIGIBILITY

Eligibility Summary

- When 30% or more of the acres of a UVA parcel to be enrolled (all Forestland plus Agricultural land), in aggregate, qualify as being in a Significant and Sensitive Condition, then any naturally vegetated acres that are not enrolled as agriculture or open/idle agricultural land would become eligible for enrollment as Reserve Forestland (Figure 1: [Flow Chart Depicting Potential Reserve Forestland Eligibility](#)).
- Qualifying Significant & Sensitive Conditions for enrollment would include:
 - Any existing Ecologically Significant Treatment Areas (ESTAs)
 - Site IV lands
 - Special Places and Sensitive Sites
 - Steep slopes and Inoperable Areas
- With the exception of "steep slopes," each of these subcategories of Managed Forestland has existing enrollment requirements described in the Minimum Management Standards. Steep slopes are often enrolled as a component of Managed Forestland but do not have any specific enrollment standards and would need to be developed and adopted into the [Minimum Acceptable Standards for Forest Management](#).
- When quantifying the acreage of Significant and Sensitive Conditions, each acre would only be counted once. Therefore, if there were overlap among multiple conditions, the landowner would need to choose which qualifying condition would be demonstrated and mapped.

- To demonstrate the presence of these conditions for establishing eligibility for Reserve Forestland, they must be delineated on the UVA map accompanying a forest management plan, described in the management plan, and managed as consistent with existing standards.
- Land enrolled as a qualifying Significant or Sensitive Condition to establish eligibility of Reserve Forestland must be managed using protective/conservation management to advance old forest conditions and the values of the enrolled condition.

D. Considerations for Administration of Reserve Forestland Enrollments

While there are many other administrative considerations and details to address to fully implement a new subcategory in UVA, the list below is an early attempt to begin identifying some of the administrative considerations for this approach.

Mapping Standards

In addition to meeting existing [UVA mapping standards](#), maps of land where Reserve Forestland is proposed for enrollment would additionally need to:

- Delineate enrollment of Significant and Sensitive Conditions contributing to eligibility of Reserve Forestland (Figure 2).
 - As an overlay, delineate Steep Slopes and Inoperable Areas enrolled in Reserve Forestland.
- Delineate areas to be enrolled in Reserve Forestland as forest stands (for instance, a maturing hardwood stand would be delineated separately from a mature hemlock stand).
- In an acreage chart, demonstrate that the eligibility threshold for enrollment of Reserve Forestland has been met (Tables 6 and 7). Parcels become eligible for enrollment in Reserve Forestland when they demonstrate that 30% or more of the Forestland plus Agricultural acres to be enrolled in UVA are comprised by Significant and Sensitive Conditions.

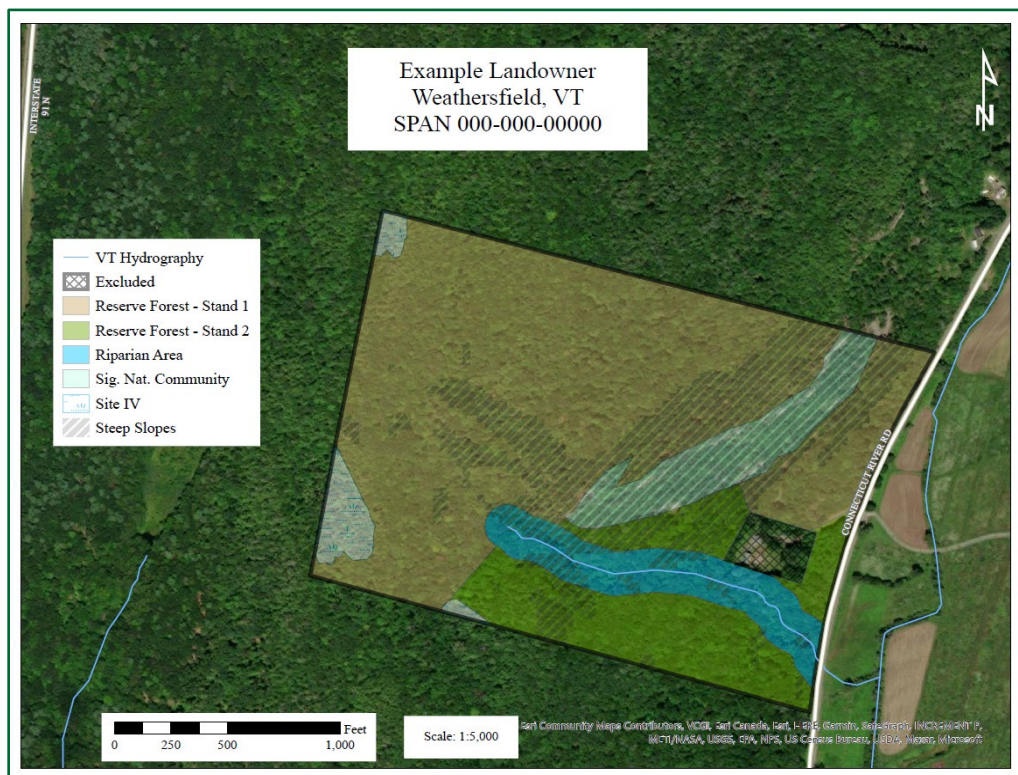


FIGURE 2: EXAMPLE RESERVE FORESTLAND MAP (FOR SIMPLICITY OF ILLUSTRATION, THIS EXAMPLE DOES NOT SATISFY ALL UVA MAPPING REQUIREMENTS INCLUDING LOCUS MAP, PREPARER, ET.AL.)

TABLE 6: SAMPLE ACREAGE CHART

Sample Acreage Chart for Enrollment of Reserve Forestland			
Area	Description	Total Acres	Significant Sensitive
1	Riparian Area	7.7	7.7
2	Site IV	2.6	2.6
3	Significant Natural Community	7.2	7.2
4	Reserve Forestland Stand 1 (inclusive of Steep Slope)	56.6	*14.1
5	Reserve Forestland Stand 2 (inclusive of Steep Slope)	15.3	*4.1
	Total Forestland	89.4	
	Total Agricultural Land	0	
	Total Enrolled Land	89.4	
	Total Significant & Sensitive + Steep Slope Overlay		35.7
	Excluded Acres	2.0	-
	Grand List Acres	91.4	
<i>*Steep Slope Contribution</i>			
<i>(Prorate Factor = 1.0)</i>			

TABLE 7: SAMPLE RESERVE FORESTLAND ELIGIBILITY THRESHOLD

Sample Reserve Forestland Eligibility Percent		
Reserve Forestland Chart	Acres	Percent
Total Enrolled Land (Forestland + Agricultural Land)	89.4	
Total Significant & Sensitive + Steep Slope Overlay	35.7	
% Significant or Sensitive Conditions of Total Forestland		40%

Plan and Management Standards

- Primary Objective:** Reserve Forestland must be managed with a primary objective of attaining old forest conditions and functions.
- Plan Requirements:** Reserve Forestland must be described in a forest management plan and managed for old forest characteristics and conditions. The plan must identify and prescribe management to restore ecological degradation -- most commonly related to invasive plants and legacy erosion -- though other circumstance may apply. The plan would need to be updated on a 10-year cycle as with all forestland enrollments.
- Management Standards:** Active management that advances old forest characteristics and conditions will be considered consistent with Reserve Forestland standards and approvable. Passive management would be an eligible management strategy where it does not conflict with restoration of historic or future degradation. Land enrolled as Reserve Forestland would be described in forest management plans on a stand unit basis, similar to productive

forestland and require inventory and evaluation to quantify and characterize stand conditions, species composition, forest structure, invasive plants, and more.

Restoration Plan Elements

To advance old forest conditions and characteristics of land enrolled in the Reserve Forestland subcategory, we recommend that the landowner would need to engage in restorative management to address harms on the landscape, including managing invasive plants and correcting water quality and soil erosion concerns.

- **Invasive Plants¹¹:** Forest management standards would be refined to describe invasive plant presence more objectively and consistently in forest stands to establish a baseline against which to measure success. Refined standards would apply to all enrollment conditions where invasive plant information is required. In Reserve Forestland, forest stands would need to be managed to increase the relative abundance of native species over invasive plants in all vegetative layers over each plan cycle. Restorative management prescriptions would need to be included in the forest management plan, reference applicable management guides, and demonstrate a reasonable likelihood of success. What constitutes a reasonable management goal will vary by site. In some places prevention and eradication is reasonable and will be expected, whereas areas dominated by invasive plants already may focus on securing native regeneration and survival amidst invasive plants.
- **Legacy Erosion and Acceptable Management Practices (AMPs):** Forest roads (truck roads, skid roads and trails) and landings on Reserve Forestland will need to be evaluated for AMP deficiencies (i.e., undersized culverts, missing waterbars). Deficiencies will need to be identified in the plan by stand. The plan will need to articulate how roads will be addressed to either bring roads into compliance with AMPs or close them out allowing them to revert to forest. Where passive management is proposed, restoration may be required in the first ten-year planning cycle. Where active management is planned, if conditions are stable, FPR may approve restorative management to coincide with management entries.

Enrollment Process

Land that meets the UVA eligibility requirements, and plan and management standards, may be enrolled in any qualifying category. This means that if forestland were currently enrolled in the Productive Forestland category and the landowner demonstrated eligibility as Reserve Forestland and standards were met through a revision of the forest management plan and maps, **any qualifying portion** of that land would be eligible to be enrolled and managed as Reserve Forestland. Alternatively, if the land were enrolled as Reserve Forestland and the landowner wished to transition enrollment to Productive Forestland, they would need to meet the plan and management standards for this category.

The initial enrollment process for land in the Reserve Forestland category would be comparable to enrollment of any privately owned land in any other subcategory. It's important to note that the process

¹¹ A plant that is both non-native and able to establish on many sites, grow quickly, and spread to the point of disrupting plant communities or ecosystems.

for qualifying non-profit conservation organizations to enroll land in the Conservation subcategory is unique and not addressed here.

New Enrollment

For new enrollment of any managed forestland, including Reserve Forestland:

1. **UVA Application:** Apply to Property Valuation & Review (PVR) at the Department of Taxes (Tax) by September 1 for enrollment starting April 1 of the following year.
2. **Forest Management Plan:** Submit to FPR a forest management plan meeting program standards with required maps by October 1. FPR will forward maps to PVR for their evaluation.
3. **Enrollment Date:** Enrollment would begin on April 1 of the year following application if approved by PVR and FPR.

Existing Enrollment

To transition enrollment from one forestland subcategory to another (including Productive Forestland to Reserve Forestland):

1. **Management Plan:** Update and submit a forest management plan and required maps that meet program standards to FPR for approval. This process can occur at any time through an amendment to the existing plan or during the 10-year plan update when new plans and maps are required.
2. **Enrollment:** Once approved by FPR, FPR will forward maps to PVR for final evaluation and approval.

Additional Considerations

- **Base Eligibility Criteria:** To ensure that if this approach were implemented, it would result in only a negligible expansion of parcels eligible for enrollment in UVA (and thus avoid increasing potential financial and administrative costs beyond that which could be incurred if eligible unenrolled parcels were to enroll), only those parcels that have a minimum of 25 total enrolled forestland acres and 20 acres of forested productive soils (Site Class I, II, or III) would be eligible for enrollment of Reserve Forestland. This effectively ensures that the base eligibility criteria for all forestland parcels regardless of the intended management sub-category (Productive Forestland, Reserve Forestland, or others) would be consistent. In this way eligibility for enrollment in Reserve Forestland is almost exclusively available to those parcels that are already eligible for enrollment of forestland in UVA. This would mean that only a very limited expansion of eligibility would occur by making eligible those parcels that are currently prevented from enrolling due to existence of a forever wild easement, that also satisfy the acreage thresholds, AND meet the Significant Sensitive Conditions threshold. Though there has not been a parcel by parcel accounting, it is likely that the number of additional parcels that meet these criteria, and would become eligible if this approach were implemented, is in the single digits.
- **Aggregation Threshold Exemption - Impacts of changing parcel size or forestland conditions on Reserve Land eligibility:** If Reserve Forestland eligibility were to be based on a percent of enrolled land, then when parcels are subdivided or aggregated, the percent enrolled land

comprised by Significant and Sensitive Conditions might change. To avoid deterring aggregation, if forestland is enrolled as Reserve Forestland when parcels are aggregated the percent of qualifying Significant and Sensitive Conditions is reduced below the 30% threshold among the aggregated parcels, the aggregation alone would not make the enrolled Reserve Forestland ineligible. This would be considered an Aggregation Threshold Exemption, and at the time of the aggregation, land enrolled as Reserve Forestland would remain eligible while it remains enrolled as Reserve Forestland. However, the eligibility of additional Reserve Forestland would not extend to any new forestland simply as a result of the aggregation of a parcel with Reserve Forestland. However, if the minimum threshold stops being met as a result of other factors unrelated to parcel aggregation, including exclusion of land from enrollment, subdivision, or forestland conversion, then Reserve Forestland would cease to be eligible.

E. Balancing the Primary Purpose of UVA and Reserve Forestland

Though management for old forest and sawtimber closely align during the first several decades of stand development, a landowner cannot simultaneously maximize sawtimber production and progress towards old forest conditions in perpetuity. This does not suggest that they are incompatible within the program, but a balancing is necessary to pursue both goals on a parcel or across the landscape. The approach to administer the Reserve Forestland subcategory described here is designed to seek this balance while continuing to realize one of the primary purposes of UVA, which includes keeping forestland managed for forest products. This would be achieved in multiple ways.

- **All Productive Forestland Would Continue to be Eligible for Active Management:** Under this approach, active management for sawtimber would continue to be an eligible approach on all eligible productive forestland in UVA.
- **Eligibility for Reserve Forestland created for a Limited Subset of Program Eligible Acres:** Enrollment of forestland as Reserve Forestland would be an option on some land, approximately One third of UVA-eligible acres (among both enrolled and not enrolled, eligible acres). With few exceptions, the remaining two-thirds of qualifying parcels would continue to be eligible if actively managed for sawtimber.
- **Reserve Forestland Eligibility Focused on Parcels Exhibiting Barriers to Active Management:** The third of lands eligible for Reserve Forestland would be those parcels that exhibit barriers to active management or Significant or Sensitive Conditions that justify alternative management objectives across significant portions ($\geq 30\%$) of all UVA enrolled acres on a parcel (as demonstrated by the landowner in the forest management plan and approved by FPR).
- **Land Enrolled in Reserve Forestland May be Less Than Total Eligible Land:** While it is difficult to estimate exactly how many parcels would be enrolled in Reserve Forestland, it is unlikely that all lands eligible for the category would be enrolled. The closest parallel we have to this in which a category allows for management for objectives other than sawtimber, was the establishment of the ESTAs in 2008. Of hundreds of thousands of acres eligible for ESTAs, slightly more than 11,000 acres are currently enrolled as ESTA more than 10 years after establishment of the subcategory. Another indicator of the degree that this category might be utilized is landowner objectives. In Vermont, the family forest owners of nearly 80% of parcels reported that timber

products were moderately important, important, or very important objectives for their land¹². Therefore, it is likely that not all landowners of parcels eligible for Reserve Forestland will choose to take advantage of this category.

- **Reserve Forestland Can Be Compatible with Active Management, by Owner's Choice:** Not all Reserve Forestland would go unmanaged. Though sawtimber management would not be required in Reserve Forestland, it would not be precluded. On most sites, management for old forest characteristics is compatible with and often advanced by carefully applied active management strategies to restore forest structure, diversity, and degradation from past land use. This can be done in ways that utilize contractors, produce wood products, and at times, generate landowner revenue. In these ways, and given landowner interest in timber objectives, land enrolled in Reserve Forestland would have the potential to continue to directly contribute to Vermont's forest economy.
- **Adaptive Management and Enrollment Flexibility:** It must be further considered that enrollment of land in the Reserve Forestland category and management for old forest within UVA would not permanently preclude the landowner from future choices to resume management for sawtimber or moving enrollments from Reserve Forestland to Productive Forestland. In fact, in many cases, forests (not already old) managed for sawtimber and old forest characteristics would share a common trajectory for decades. Because of this shared trajectory among well managed forests, and the ability to pursue and adapt management objectives over time, land managed for old forest in the Reserve Forestland category, unless otherwise legally restricted from active management, would retain potential, and likely increasing potential, to be effectively managed for sawtimber. There is precedent in the program for comparable changes in management. Land managed for early successional species like quaking aspen or paper birch using even-aged management, with FPR approval, could shift objectives and then, using uneven-aged management, be managed for shade tolerant species like sugar maple. Or, land enrolled as Productive Forestland can shift categories with approval and subsequently be enrolled in the Conservation category or ESTAs. The inverse is also true, where land enrolled as an ESTA or Conservation land can transition to Productive Forestland if standards are met.

This reversibility may cause concern among some because it can undermine the security of old forest as a management objective in this category. However, when land is enrolled in UVA such reversals would occur in advancement of other state goals. Should the landowner choose to protect against such reversals, they may choose to donate or sell an easement.

Analysis

In the Spring of 2021 and minor revisions in January of 2022, we investigated the impacts of this approach through a modeling exercise. Using GIS mapping of significant natural communities, steep slopes, riparian areas (100' on blue line streams), rare threatened and endangered species, wetlands, and vernal pools, we modelled the percentage of each UVA enrolled or eligible parcel comprised by Significant or Sensitive Conditions. Based on a 30% Significant/Sensitive threshold establishing eligibility

¹² Caputo, J. and B. Butler. National Woodland Owner Survey Dashboard (NWOS-DASH) version 1.0. Accessed 2021-08-31.

for Reserve Forestland, we evaluated metrics that are important for considering how the approach could affect working forests, and how it may remove barriers to achieving old forest.

TABLE 8: EVALUATION OF PRODUCTIVE FORESTLAND WITH A RESERVE FORESTLAND SUBCATEGORY

Evaluation of Productive Forestland with a Reserve Forestland Subcategory								
UVA Status	Number of Parcels Meeting Threshold	Total Number of Parcels	Percent of Parcels Eligible	Total Acres of Significant Sensitive	Acres of Forestland Eligible for Reserve Forestland	Percent of Forest Landbase Eligible	Percent Significant Sensitive Eligible	Acres of Productive Forest Tradeoff
Enrolled UVA Parcels	4,326	15,716	28%	339,673	629,899	32%	54%	290,226
Eligible UVA Parcels	3,561	12,859	28%	143,049	230,210	30%	62%	87,161

Table Descriptions

- **Number of Parcels Meeting Threshold:** Of approximately 16,000 UVA parcels, 4,326 currently enrolled parcels would be eligible for enrollment in the Reserve Forestland category as would 3,561 of the nearly 13,000 forest parcels that appear generally eligible for UVA but are not enrolled.
- **Total Number of Parcels:** Total parcels captured in analysis of UVA enrolled forestland parcels (15,716) and potentially eligible UVA forestland parcels (12,859).
- **Percent of Parcels Eligible:** Estimated percent of parcels of the total number of parcels among enrolled UVA parcels and potentially eligible UVA parcels that the modeling suggests would become eligible for enrollment in Reserve Forestland subcategory when using this approach.
- **Total Significant Sensitive Acres:** Modeling suggest that UVA enrolled parcels encompass 339,673 acres of Significant and Sensitive Conditions. The potentially eligible UVA parcels encompass 143,049 acres of these conditions.
- **Acres of Forestland Eligible for Reserve:** Total modeled number of forestland acres that could become eligible for Reserve Forestland using a Reserve Forestland Eligibility Threshold of 30% or more of the enrolled parcel comprised by Significant and Sensitive Conditions. The UVA enrolled parcels encompass 629,899 acres of enrolled forestland and the potentially eligible parcels encompass 230,210 forestland acres.
- **Percent of Forestland Base Eligible:** The forestland base is the total number of forestland acres encompassed by the parcels analyzed among UVA enrolled forestland parcels (1,945,066 acres) and potentially eligible UVA parcels (766,873). The estimated percentage of forestland base that could become eligible for Reserve Forestland using this approach is 32% for UVA enrolled forestland parcels and 30% for UVA eligible forestland parcels.
- **Percent Significant and Sensitive Eligible:** Total percentage of the acres of forestland eligible for reserve that is comprised by Significant and Sensitive Conditions.

- **Productive Forest Tradeoff:** Estimate of the total acres of enrolled and operable land that could become eligible for management for old forest conditions that are not Significant and Sensitive Conditions and therefore not otherwise currently known to be eligible in UVA while managed for objectives that don't necessarily include sawtimber (ESTA, Site IV, steep slope inclusions in productive forestland).

F. Conclusion

First, Vermont needs forests. We need both more old forest and to maintain working forests. While there can be tension between these goals, if thoughtfully pursued, they are not just compatible, they can be complimentary. In the face of climate change, development/conversion pressure, changing landowner demographics, challenges in the forest economy, and increasing costs of owning and managing land, the risk of forestland conversion and threats to forest health are significant and Vermont needs landowners to have a diversity of options to affordably keep forests as forest, maintain the productivity of a large working forest land base, and increase overall forest health and resilience. No singular management objective or management strategy can effectively advance the diversity of forest conditions and outcomes that generate the breadth of benefits that Vermont needs from its forests. The challenge is how to effectively pursue potentially divergent and conflicting objectives in ways that minimize trade-offs and optimize outcomes among a diversity of management goals, so they are most compatible and complimentary as well as practical and realistically achievable.

If implemented, by expanding management options for UVA enrolled land, this approach could expand landowner interest in enrolling in UVA, but it would not make any parcels eligible for enrollment in UVA that do not already meet the basic eligibility requirements of parcel size and forest cover. Among UVA enrolled forestland parcels and potentially eligible, enrollable parcels, this approach would make an estimated 860,000 acres of forestland eligible for enrollment (630,000 acres of which are currently enrolled) in a potential Reserve Forestland subcategory among nearly 8,000 parcels (4,326 parcels of which are currently enrolled). This means that about 30% of UVA eligible parcels and forestland (among currently enrolled and not enrolled, eligible parcels) could be managed for old forest and would be eligible for enrollment in this category. Those lands eligible for enrollment in Reserve Forestland would be those that exhibit site features that prevent management for forest products or provide a strong ecological (or appropriate historical/cultural) basis for managing for values other than sawtimber. All UVA-eligible forestland would continue to be eligible to be managed for sawtimber, and about 70% of parcels would need to be managed for sawtimber at some scale, though exceptions for ESTAs, Site IV lands, and other subcategories would still apply. These parcels that would need to be managed for sawtimber would be those with the fewest operational barriers or ecological or cultural conflicts with management for forest products, and thus, in many respects, offer the greatest potential for successful this kind of forest management.

The Reserve Forestland concept analyzed here could provide a strategically balanced and workable approach to continue to support working lands while removing barriers to old forests at a scale and in a pattern that could support significant progress toward old forest targets – and benefits -- in Vermont.

G. Implementation

If authorized through statute, there are several implementation considerations that would need to be considered:

Easy Out

Implementation of this approach would probably not need to be accompanied by an easy-out (allowance for a no-penalty withdrawal from UVA) because it expands enrollment options with very limited new responsibilities or expenses for existing enrollments. New responsibilities resulting from implementation of this approach would be limited to adherence to refined and clarified standards to ensure consistency among forest management plan elements common across enrollment categories (invasive plant descriptions and management prescriptions, Old Forest ESTA stand descriptors and Reserve Forestland descriptors etc.).

Financial Considerations

General Fund and Education Fund

Shifts of enrollment from Productive Forestland to Reserve Forestland among already enrolled forestland (which appear most likely) would have de minimis impact on General Fund or Education Fund costs or foregone revenue because, as considered here, the approach would apply the same use value to the enrolled land regardless of subcategory. However, any new enrollment resulting from this change would add expenditures to the General Fund through increases to the hold harmless payments that the State makes annually to municipalities to offset tax revenue they would otherwise lose through enrollment of land in UVA. In 2020, this hold harmless payment totaled more than \$17 million. Additionally, the tax savings that landowner benefit from result in unrealized potential revenue for the Education Fund, which in 2020 totaled nearly \$48 million. This approach would not make more than a few (single digits) parcels eligible that, based on parcel size, physical conditions, and legal constraints are not already eligible today. What is more difficult to assess is the degree to which the addition of this enrollment option would increase enrollments among currently eligible but unenrolled parcels due to increased interest in UVA. FPR is unable to make estimates on adoption levels among not-enrolled, eligible parcels, and is therefore unable to provide estimates on financial impacts for the General Fund and Education Fund.

Forest Economy

As noted throughout this report, the design of the approach for implementation of a Reserve Forestland subcategory sought to balance the opportunities for attainment of old forest conditions on UVA enrolled forestland with the need to keep a significant amount of UVA enrolled forestland managed for forest products. It is certain that if the approach is implemented, some forestland that would otherwise be managed for sawtimber will not be. However, what is less certain and difficult to assess is how this would impact the forest economy. To evaluate this, one would need to know:

1. Which parcels will enroll in Reserve Forestland and not be harvested (as opposed to applying restorative management).
2. When and how those parcels would have been managed for sawtimber (to assess the forgone forest product supply and associated jobs)

3. The degree to which reduced forest product supply or job opportunities from one parcel in Vermont is, or is not, provided by another parcel in Vermont.
4. Furthermore, it would need to be understood how restorative management efforts on Reserve Forestland would or would not create new job opportunities.
5. Other important factors may include future shifts in enrollment categories, old forest contributions to forest health and forest resilience beyond old forest “boundaries,” or factors related to recreation, tourism, water quality, or others that could be impacted positively or negatively by establishment of a Reserve Forestland category.

The complexity of conducting such an assessment and the number of assumptions that would be necessary to arrive at any estimate of benefit or cost to the economy would likely make such an analysis impractical at this early stage. For this reason, given capacity limits, what remains valuable at this stage is ensuring that any approach considered to advance old forest on UVA enrolled land is balanced with maintenance of working forestland.

FPR Implementation

If this approach for implementing a Reserve Forestland subcategory were authorized through statute, FPR implementation of this approach would require:

Initial Lift (Occurs in year 1 prior to acceptance of applications for Reserve Forestland)

1. **UVA Program Coordination**
Coordination between PVR and FPR and the Current Use Advisory Board (as necessary) to adjust forms, data and enrollment management tools, applicable rules or standards and more, to ensure smooth application process and administration of the new enrollment subcategory. *(PVR will have input on specific implementation requirements that are not addressed here).*
2. **Engagement**
Consultation of foresters, landowners, and members of the forest economy to inform development and refinement of clear standards to be incorporated into the Minimum Acceptable Standards for Forest Management (32 V.S.A. § 3752) that achieve the objective of the Reserve Forestland subcategory in balance with the working forests purposes of the UVA program.
3. **Finalize and Adopt Reserve Forestland Standards**
The Commissioner of FPR would finalize and adopt Minimum Acceptable Standards for Forest Management for the subcategory consistent with statute.
4. **Refine Outreach Materials**
Refinement of FPR outreach materials for landowners and consulting foresters (website, brochure, landowner letters, public presentations and more).

Ongoing Support (Development occurs in years 1 and 2 with ongoing delivery)

5. **Administrative Trainings**
Development and delivery of consulting forester trainings for Reserve Forestland standards and process for enrolling land in the Reserve Forestland subcategory.
6. **Trainings for Old Forest Restoration**
Development and delivery of consulting forester and landowner trainings and workshops for restoration of old forest conditions and managing lands in the Reserve Forestland subcategory.

Enrollment Administration (Ongoing, with greater volumes in years 3 – 10 as landowner and forester familiarity leads to adoption)

7. Plan Amendments

Review and processing of forest management plan amendments shifting enrollments from Productive Forestland to Reserve Forestland or vice versa (information to inform volume estimate not available).

8. New Enrollments

Review and processing of forest management plans for new enrollments resulting from increased interest in enrollment in UVA due to Reserve Forestland enrollment option (information to inform volume estimate not available).

Items 1- 6, associated with the “Initial Lift” and “Ongoing Support,” are a fixed volume of work, in that they are necessary for effective program implementation regardless of the degree to which the Reserve Forestland category is adopted by landowners. Collectively, these items are estimated to require .3 FTE for the first 2 years, and .1 FTE each year thereafter.

Items 7 and 8, associated with Enrollment Administration could be a more significant administrative cost, though there is insufficient information to estimate likely demands on capacity, however, potential scenarios can be explored.

Forest management plan review and processing is the primary administrative cost associated with implementing this enrollment category among currently UVA enrolled lands, because there are few new administrative duties. Therefore, if all currently enrolled parcels only enrolled in the Reserve Forestland category at the time that their forest management plan update was due (once every 10 years, and likely the most common scenario), then transition of enrollment categories from Productive Forestland to Reserve Forestland would require limited additional administrative work for plan review. However, because some landowners will amend plans to enroll in Reserve Forestland, or (eventually) revert enrollment from Reserve Forestland to Productive Forestland outside of the 10-year update schedule, it is possible that on the high end, 75 - 100 additional forest management plan amendments could be processed annually by FPR staff, requiring .1 FTE annually. This would require some corresponding administration within PVR for handling of maps and updating records and more. Potential associated costs for PVR are not accounted for here. This also does not account for documentation of Significant and Sensitive Conditions could create capacity demands among FWD staff for confirmation of ESTAs. These estimates are independent of external factors that could incentivize early amendments of forest management plans (i.e. financial carbon storage/sequestration related incentives).

For every **new** 200 enrollments, for FPR staff to conduct associated plan reviews, inspections, enforcement actions, outreach and education, and associated administration, approximately .2 FTE are required at the time of enrollment and each year thereafter. If 15% (526 parcels) of UVA-eligible unenrolled parcels enrolled as a result of the creation of the Reserve Forestland subcategory (15% is not an informed estimate of likely enrollments, just a potential scenario), then an additional .5 FTE would be necessary in FPR for administration of the additional enrollments.

In the absence of information that would inform a reliable estimate of landowner adoption of a potential Reserve Forestland enrollment category, the numbers provided here should be considered a starting point for considering administrative costs associated with implementing this new enrollment

subcategory. Based on this possible scenario, total potential FTE would be 1 FTE for the first 2 years and .7 FTE thereafter.

While these FTE scenario estimates are not overwhelming and could, ultimately, be lower (or higher) than considered here, it is important to stress that even at this scale there is not the capacity within FPR to absorb additional UVA administrative responsibility without added capacity. For context, since 2003 there has been a 43% increase in UVA enrolled forestland acres (1.4 million in 2003 and 2 million today), and a 70% increase in parcels (9,000 in 2003 and 16,000 today). With the exception of recent and ongoing administrative system improvements, virtually all of FPR's increased cost of program administration have been absorbed by existing staff through reductions in landowner education, technical assistance, UVA inspections and on-the-ground field time necessary to support forest stewardship and ensure UVA program integrity. A [legislative report](#) submitted in 2016, though somewhat dated, provides valuable context and an in-depth analysis of county forester capacity to deliver the UVA program and may be useful when considering how program changes can affect program administration.