

Tracking Parcelization in Forests to Inform Policy & Land Use Planning

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Forest Loss

- While 74% of the state is covered by forests, a closer look reveals that our forests are being converted and fragmented by rural sprawl.
- We are also outright losing our forests due to development and forestland conversion.
- According to the Forest Service's Forest Inventory Analysis, 12,548 acres of forestland are converted on average to nonforest every year.*

* Source: USDA Forest Service. 2023. Forests of Vermont, 2021.



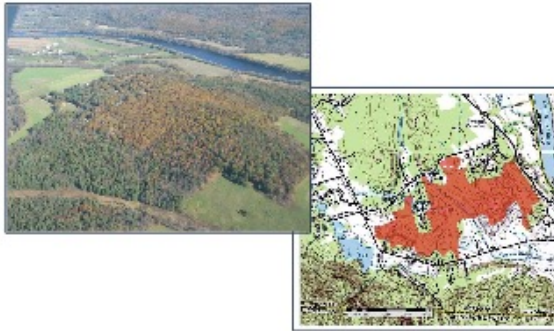
A. Blake Gardner

Forest Fragmentation



Intact Forest Blocks and Fragmentation

Vermont Habitat Blocks and Habitat Connectivity: An Analysis using Geographic Information Systems



Vermont Fish and Wildlife Department
April 2014

Eric Sorenson, Vermont Fish and Wildlife Department
Jon Osborne, Vermont Land Trust



VERMONT CONSERVATION DESIGN

MAINTAINING AND ENHANCING AN ECOLOGICALLY FUNCTIONAL LANDSCAPE



*Summary Report for
Landscapes, Natural Communities, Habitats, and Species*

February 2018

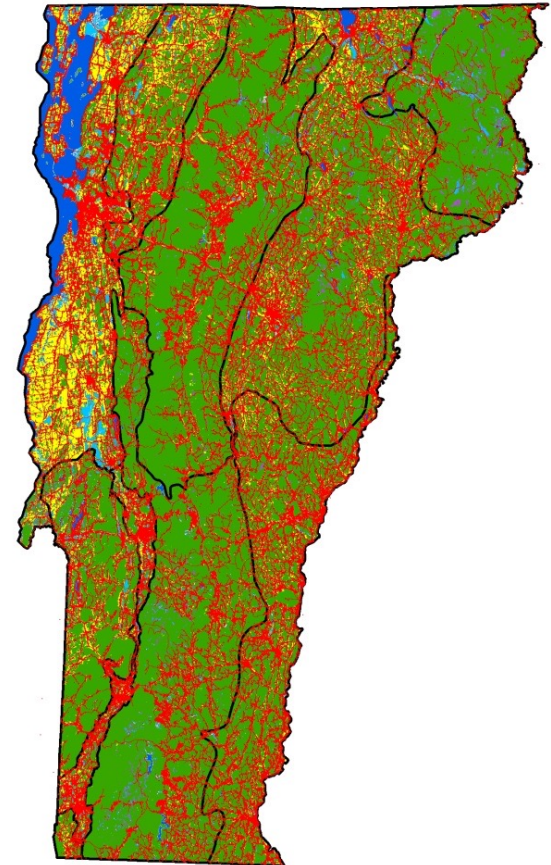
Eric Sorenson and Robert Zaino

Core Participants:

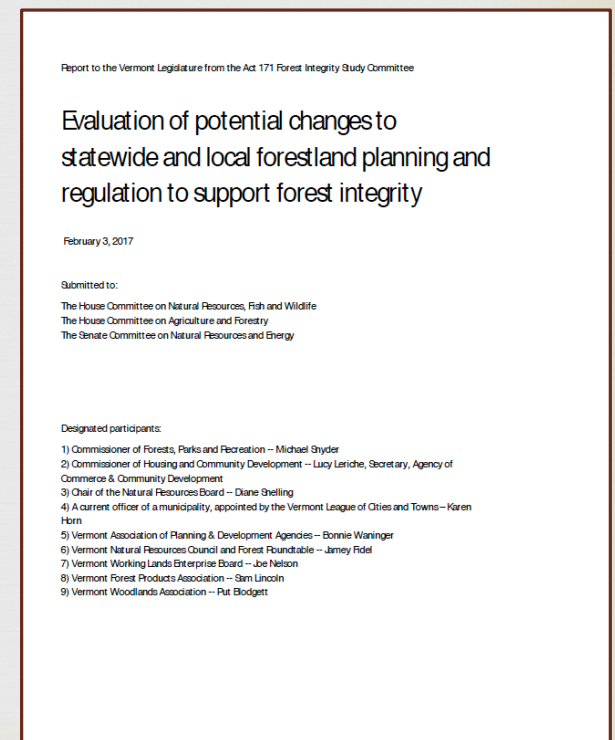
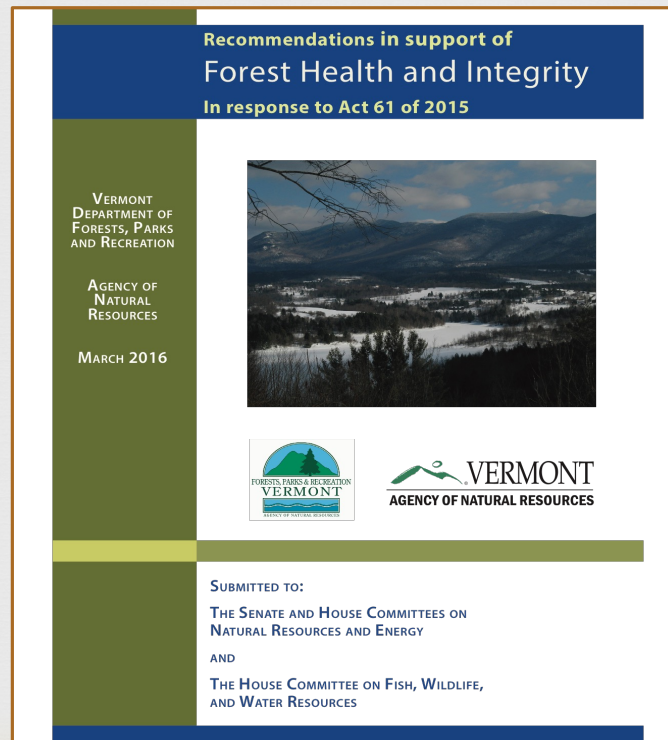
Jens Hilke, Doug Morin – Vermont Fish and Wildlife Department
Keith Thompson – Vermont Department of Forests, Parks and Recreation
Elizabeth Thompson – Vermont Land Trust



VERMONT
AGENCY OF NATURAL RESOURCES
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ANR Forest Fragmentation Reports for the Legislature



Parcelization

The breaking up of land into smaller and smaller parcels, usually through subdivision.

- Increased, potentially disjointed ownership of parent parcel;
- Step toward new development, housing and infrastructure that may fragment natural resources and intact forests depending on how it occurs;
- Less viable tracts for forestry; and
- Potential negative ecological impacts.



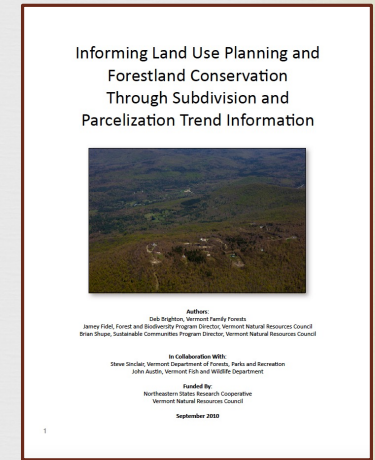
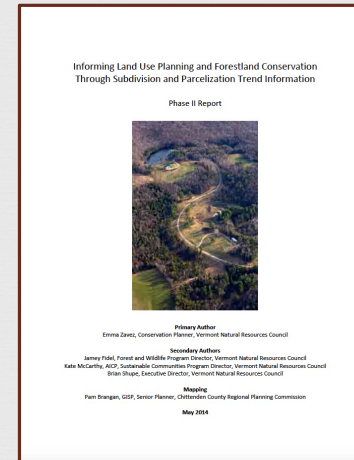
A. Blake Gardner

Background on VNRC Research

Phase 1 (2010) Statewide parcelization trends based on Grand List data, 2003-2009.

Phase 2 (2014) Subdivisions in 22 case study towns.

Phase 3 (2018) Parcelization trends, 2004-2016
(state, regional planning commission, county, & town levels).



Funded by the Forest Ecosystem Monitoring Cooperative, the Northeastern States Research Cooperative (NSRC), a partnership of Northern Forest states (New Hampshire, Vermont, Maine, and New York) in coordination with the USDA Forest Service, and other partners

Background on VNRC Research

Phase 4 (2023) Updated trends through 2020.
Examined new data such as property transfer tax returns.

This phase was funded by the Forest Ecosystem Monitoring Cooperative and Vermont Natural Resources Council.

Key contributors and partners included:

Jamey Fidel, Deb Brighton, Brian Voigt, Kayla Patel, Mary Perchlik, Vermont Agency of Natural Resources, Vermont Department of Taxes – Division of Property Valuation and Review, Vermont Center for Geographic Information, and Bindu Panikkar and Jarlath O’Neil of the University of Vermont.

Tracking Parcelization Over Time to Inform Planning and Policy

Phase IV: Executive Summary – By Vermont Natural Resources Council

Background and Methods

Parcelization, or the breaking up of land into smaller and smaller parcels, typically occurs through subdivision. Parcelization is gaining momentum, and development that often occurs as a result is causing forest cover to decline in Vermont. According to the U.S. Forest Service, up to an estimated 12,469 acres are being converted on an annual basis to development.¹ Depending on how parcelization and development occurs on the landscape, the following impacts can result:

- Forest fragmentation and land conversion, which can negatively affect plant and animal species, wildlife habitat, water quality, recreational access, and the ability of forests to sequester and store carbon.
- The loss of large ownership and management of forest parcels, which can reduce their productivity and contribution to the working lands economy.
- An increase in the number of parcel owners, which may result in new housing, and infrastructure (roads, septic, utility lines, etc.), which can diminish the economic and ecological viability of forests depending on how it is designed.



A. Blake Gardner

To minimize forest loss and fragmentation, and to promote smart growth housing opportunities, it is necessary to understand where parcelization and subdivision are occurring, and the rate at which they are occurring. This project responded to this need by building a database to examine trends on private land in Vermont by using Grand List (tax) land classification and Use Value Appraisal Program data from 2005 to 2020. In addition, we created a [parcelization website](#) to examine trends at the town, county, regional planning commission, and state level to inform land use planning and state policy.

The key findings in this Executive Summary are based on trends that were calculated from 2005 to 2020, and in some circumstances, 2010 to 2020 to provide a more recent snapshot. This Executive Summary builds on three previous parcelization studies, which can be found on the parcelization website. A glossary of terms can be found in the [Phase III Report](#) of this project.

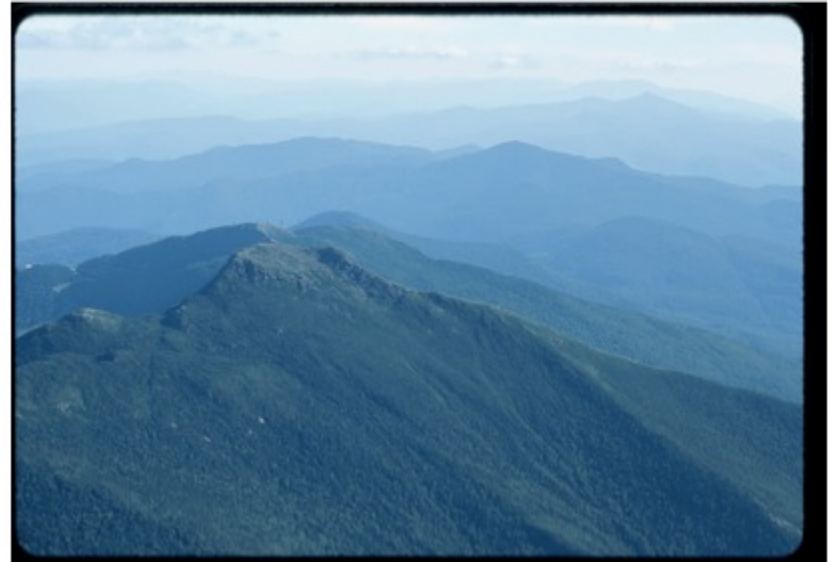
Key Findings

- *The number of acres in the “residential” category is increasing, while “farm” and “woodland” acreage is decreasing, with “woodland” parcel acreage decreasing the fastest.*

¹ USDA Forest Service. 2021 Forests of Vermont, 2020. Resource Update FS-227. Madison, WI: U.S. Department of Agriculture, Forest Service. <https://doi.org/10.33735/04-2021> It is important to note that an estimated 3,439 acres of [openland](#) revert back to forest annually so there some gain in forestland acknowledged in the Forest Service FIA data.

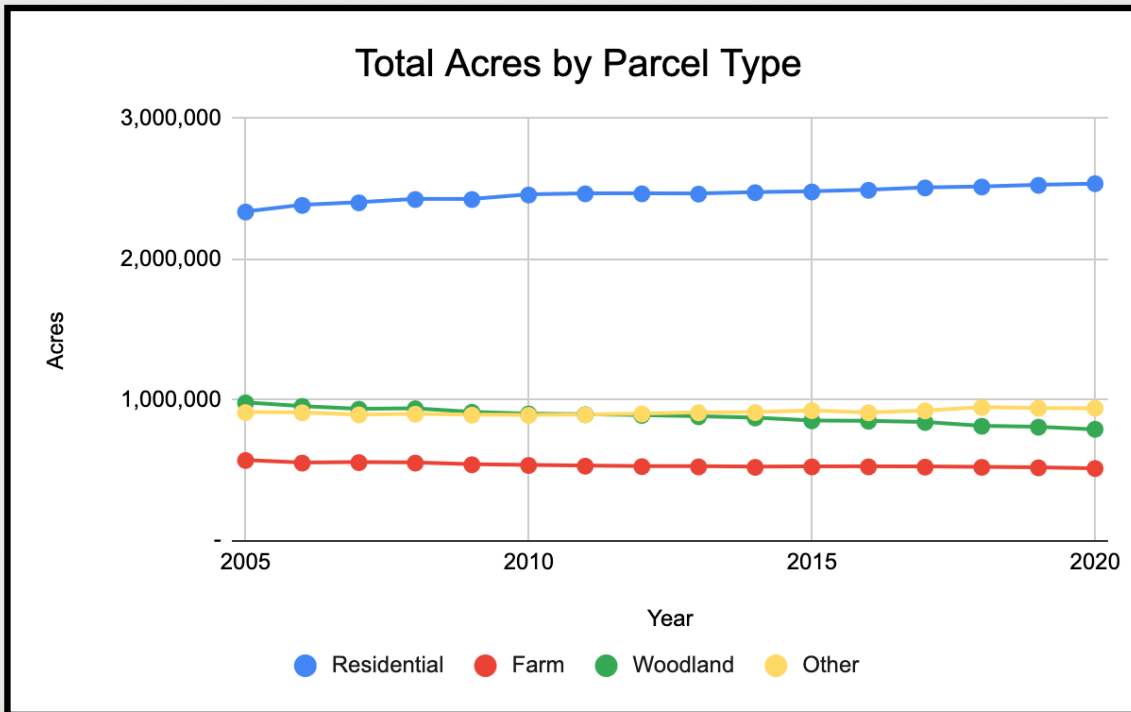
Private Land Trends

In 2020, just over 70% of the privately owned acreage in Vermont is still represented in parcels over 50 acres.



Acres by Parcel Type - Phase 4 - 2020

The number of acres in the “residential” category is increasing, while “farm” and “woodland” acreage is decreasing, with “woodland” acreage decreasing the fastest.



Residential increased by 8.64%



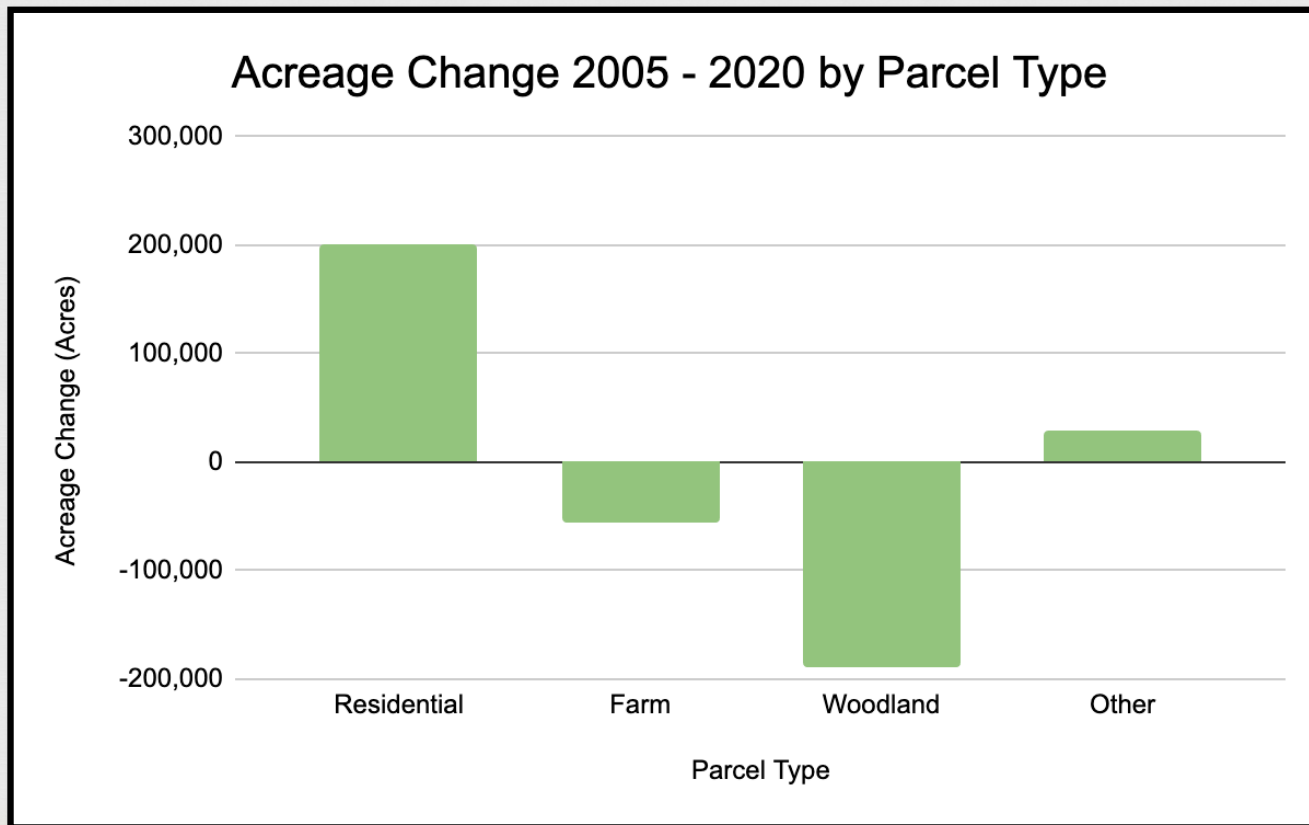
Woodland decreased by 19.32%

Acres by Parcel Type

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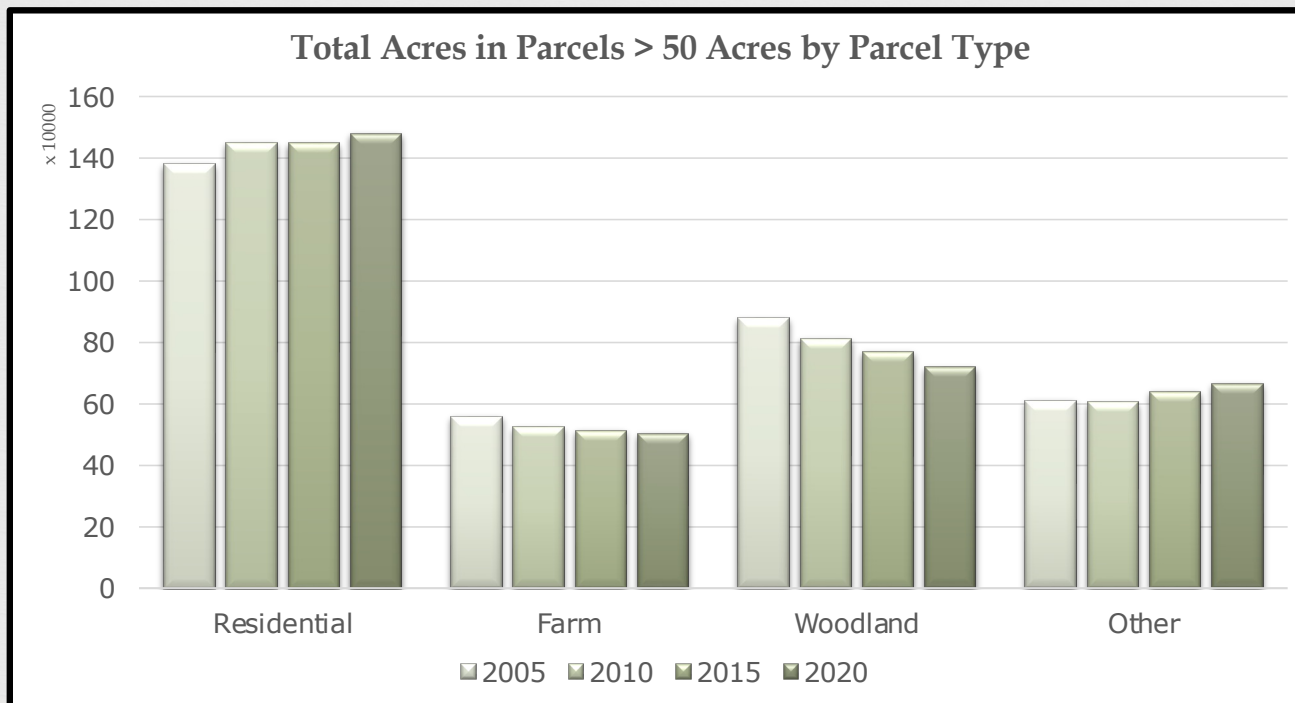
Parcel Type	Acreage Change	2005 Acreage	2020 Acreage	Percent Change
Residential	201,804.56	2,334,333.38	2,536,137.94	8.64
Farm	-55,940.18	566,652.45	510,712.27	-9.87
Woodland	-189,003.18	977,956.97	788,953.79	-19.32
Other	30,020.30	908,674.92	938,695.22	3.30

VNRC Subdivision Study - Phase 4



Acres by Parcel Type – Large Parcels

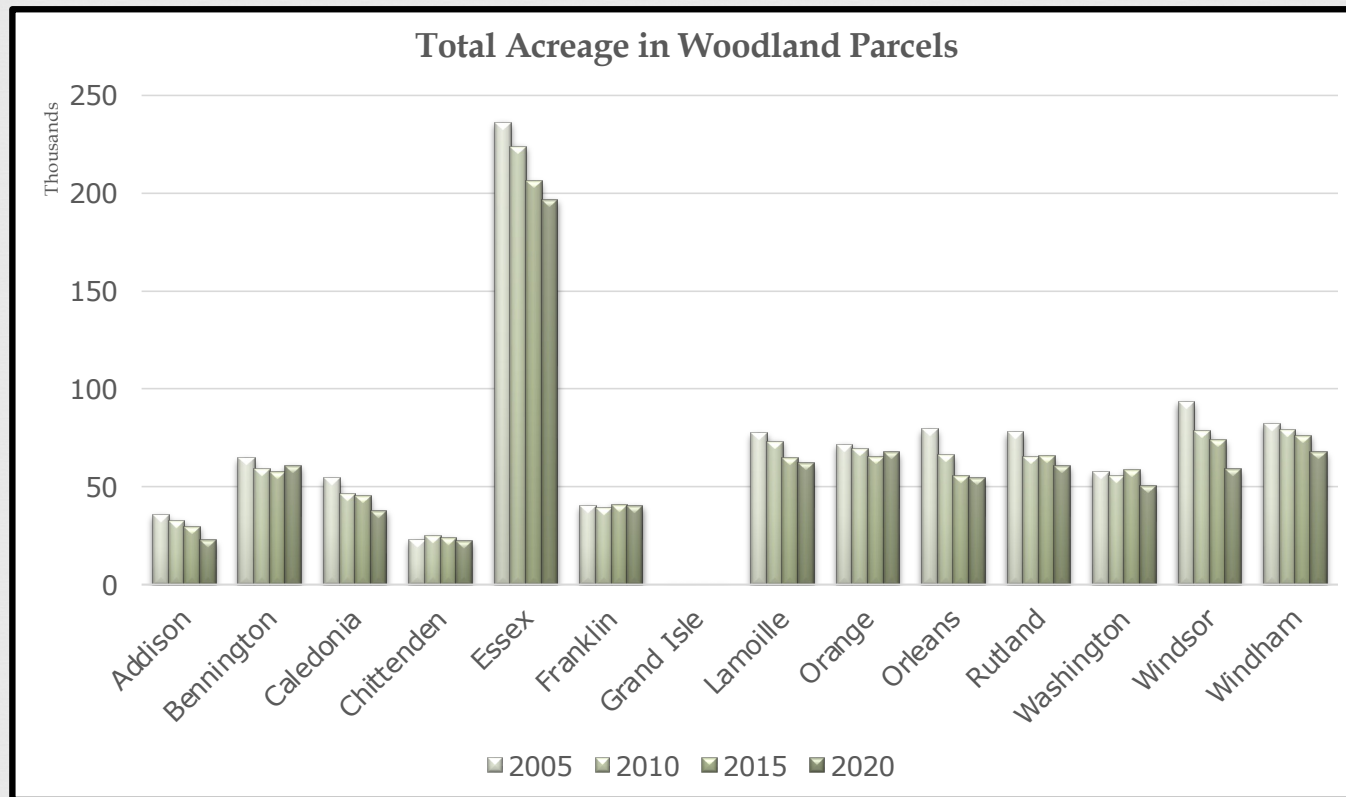
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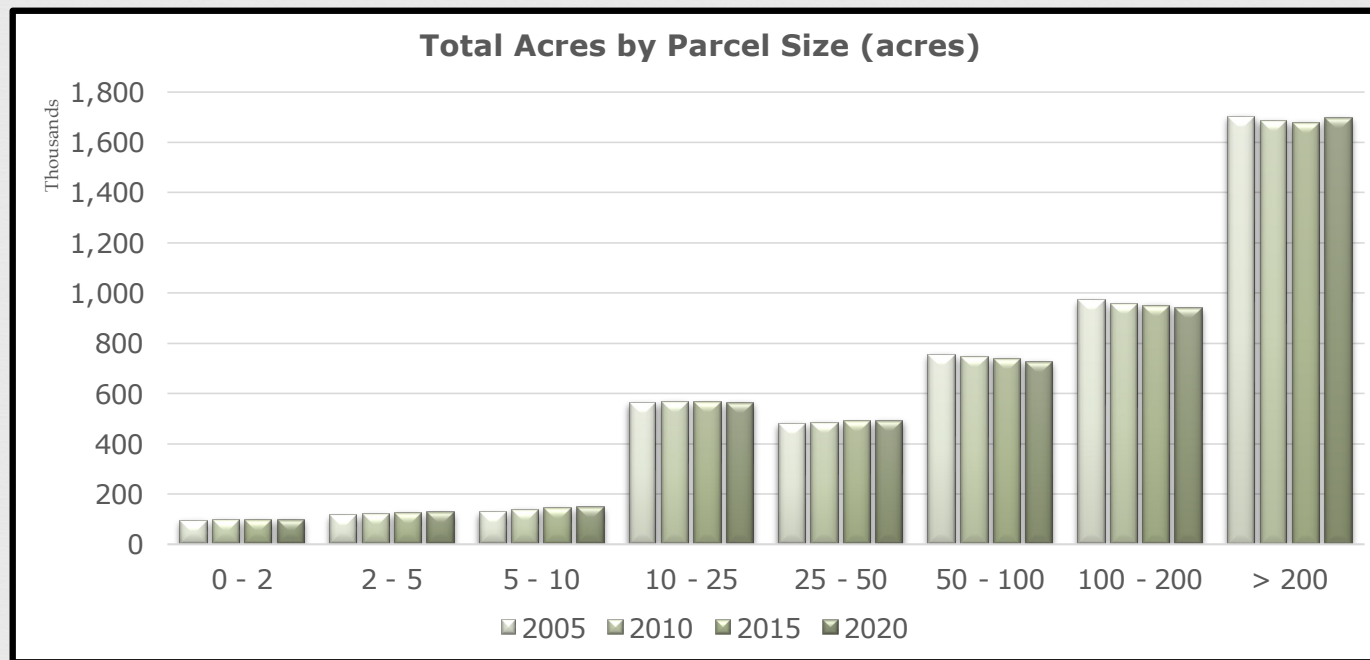
Acres by Parcel Type - Large Parcels

Acres in 50+ Acre Parcels	Residential	Farm	Woodland	Other
2005	40.29%	16.26%	25.65%	17.80%
2020	43.97%	14.89%	21.37%	19.77%

Acreeage by Parcel Type - Woodland

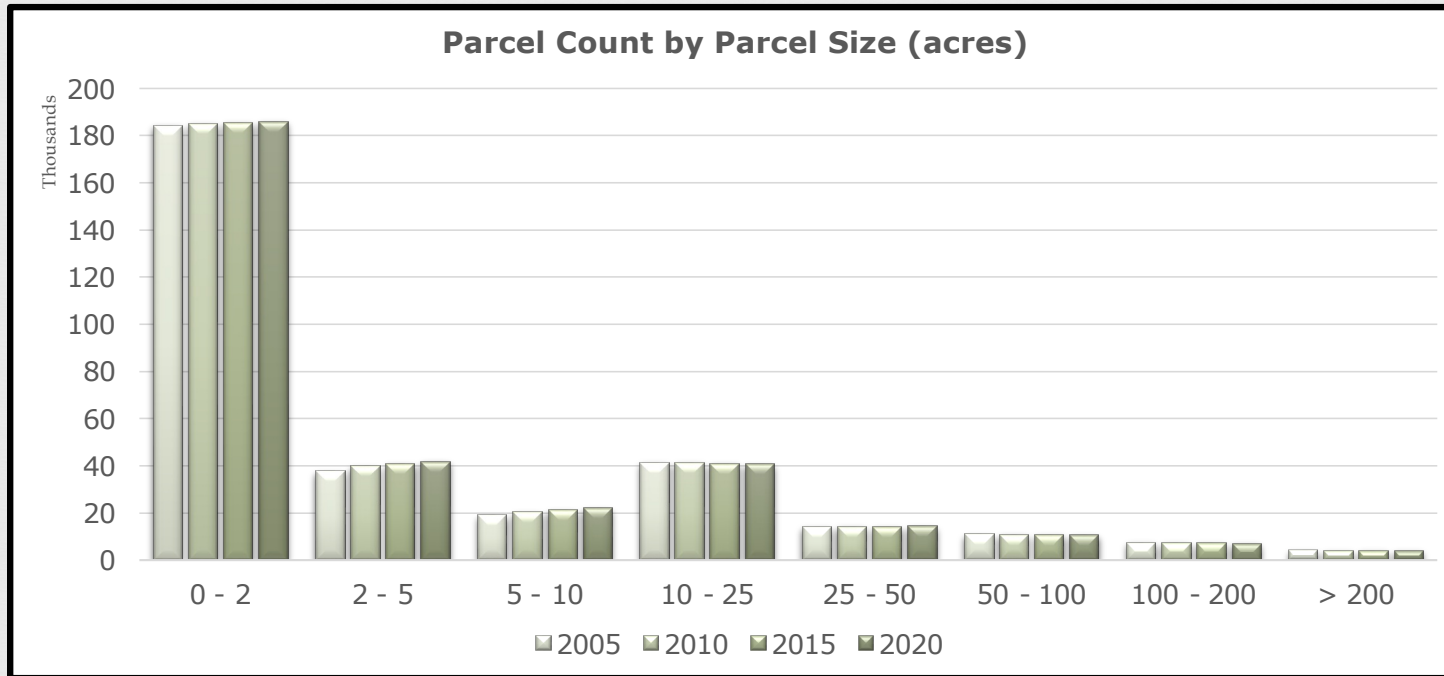


Acres by Parcel Size



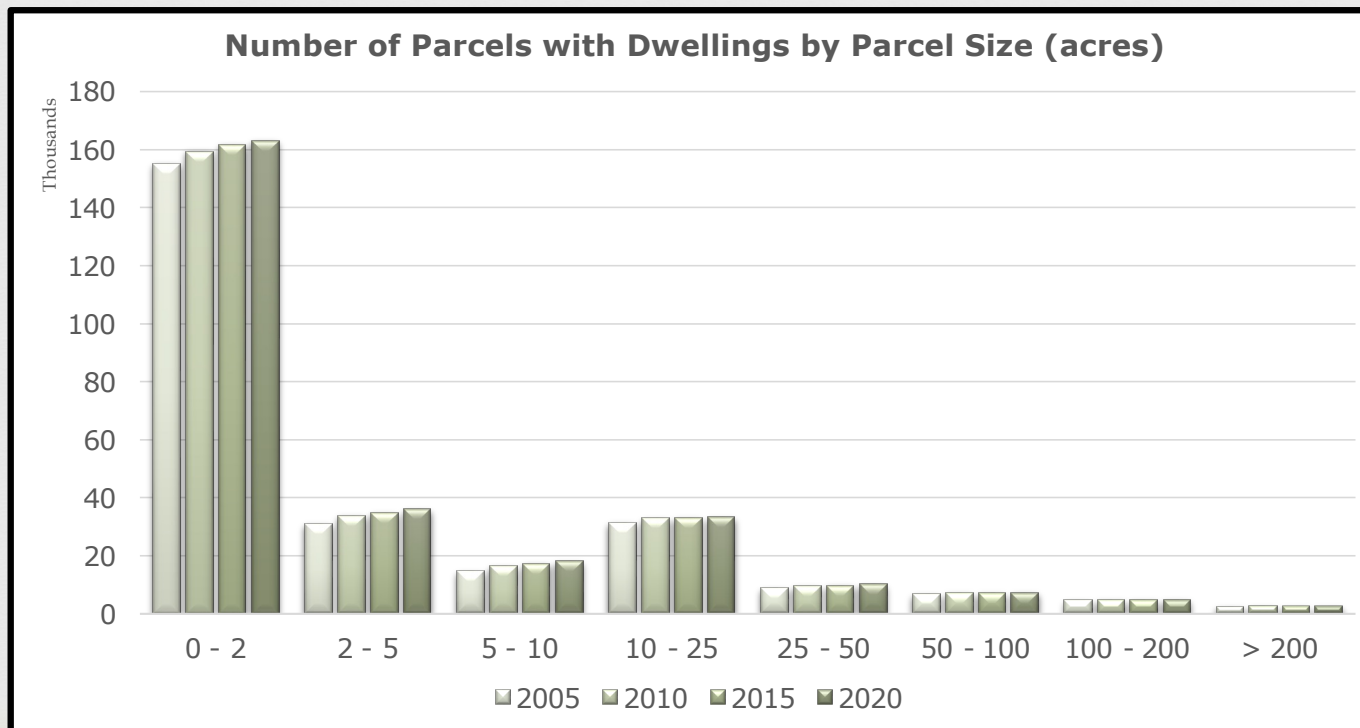
Parcel Count by Parcel Size

The number of parcels in the 2-5 and 5-10 acre size categories increased by 11.2% and 16.3% respectively.



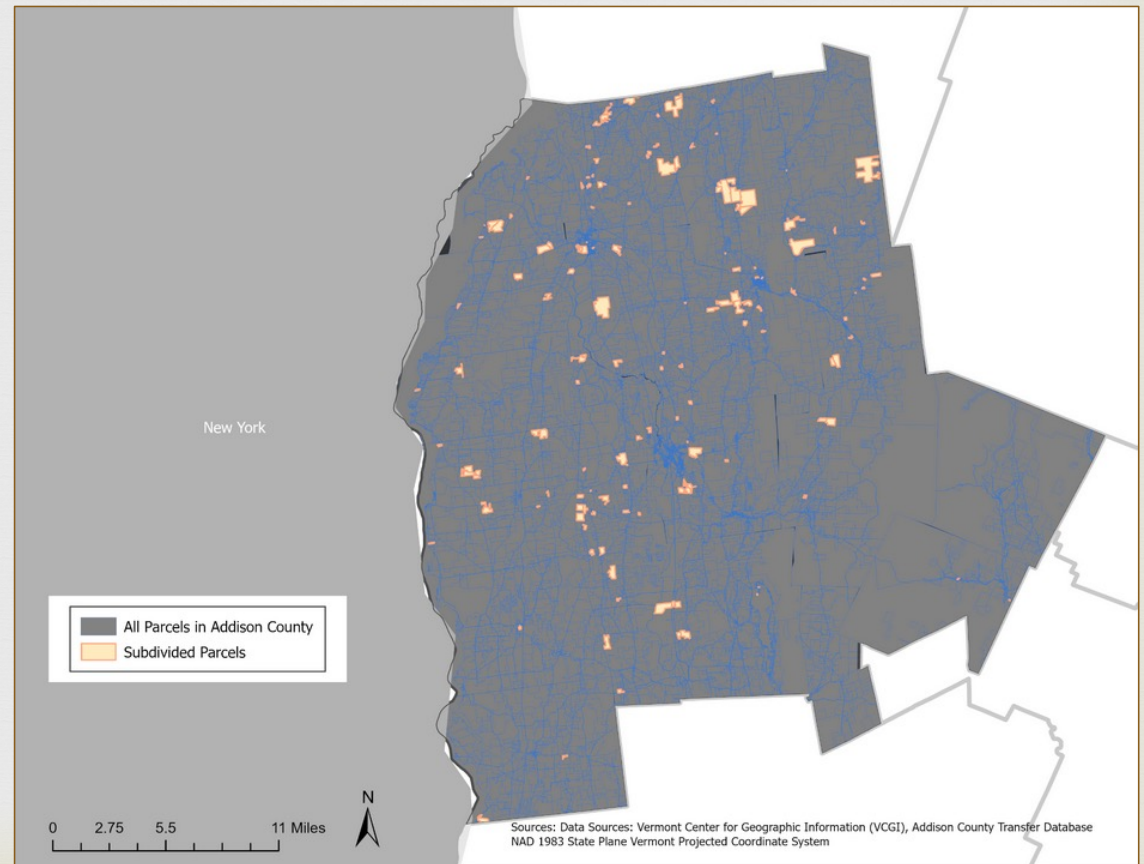
Parcels with Dwellings

Parcels less than 50 acres in size with dwellings increased by 19,612 parcels from 2005 to 2020, which is an increase of 8.2% over the study period.



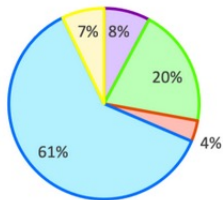
VNRC Subdivision Study – Phase 4

There are 18,678 Parcels in Addison County and 125 parcels subdivided from 2018 through 2021 (about 0.5% Parcels).



VNRC Subdivision Study – Phase 4

Parcel Count by Land Use



- Forestland and Conservation/Floodplain
- High Density Residential
- Regional Center with Mixed Res/Com
- Rural and Agriculture
- Village with Mixed Res/Com

Proposed Land Use Designations of Subdivided Parcels in Addison County, VT 2018-2021

- Proposed Future Land Use
- Forestland and Conservation/Floodplain
 - High Density Residential
 - Regional Center with Mixed Res/Com
 - Rural and Agriculture
 - Village with Mixed Res/Com

Parcel Count by Land Use

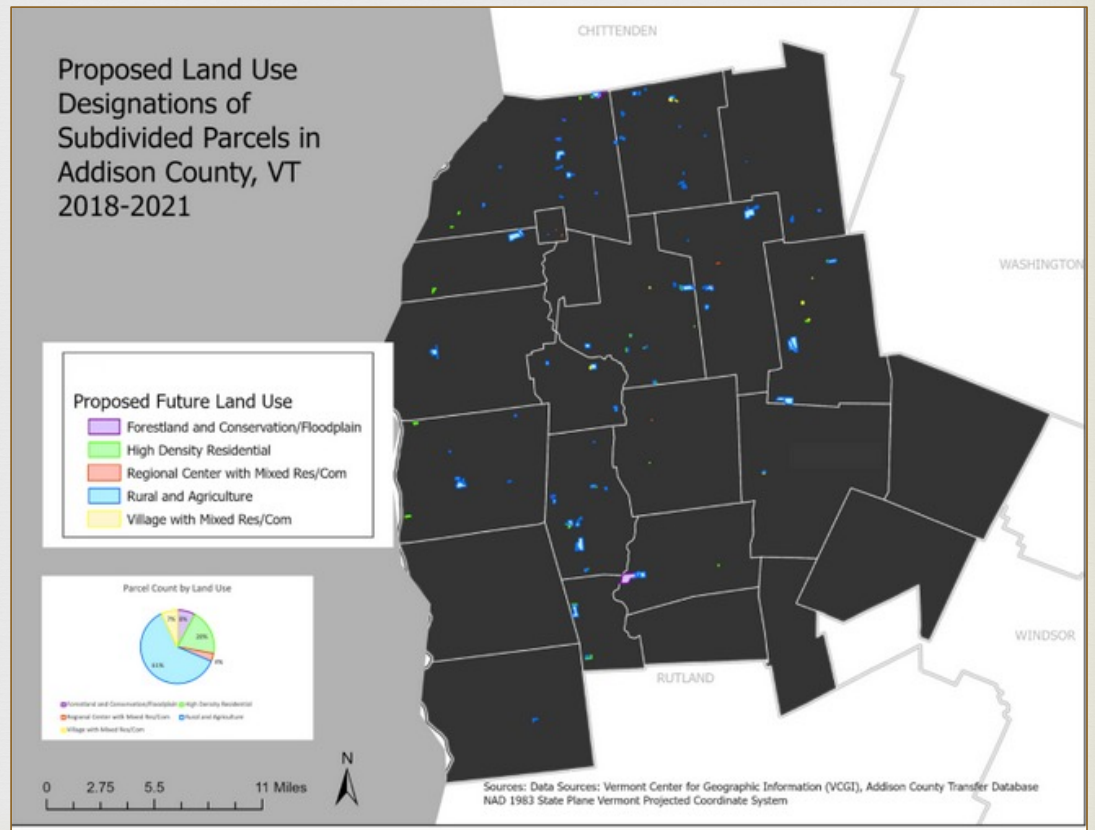


- Forestland and Conservation/Floodplain
- High Density Residential
- Regional Center with Mixed Res/Com
- Rural and Agriculture
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0 2.75 5.5 11 Miles



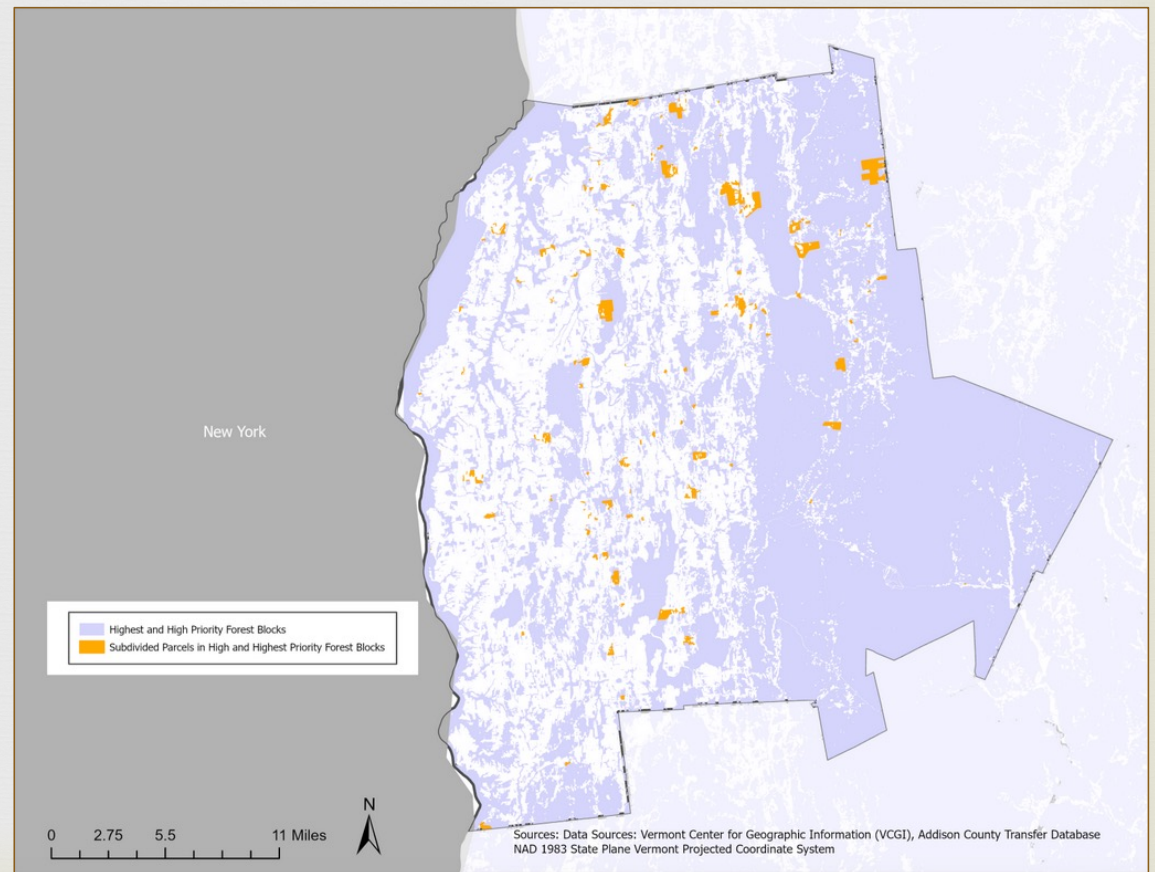
Sources: Data Sources: Vermont Center for Geographic Information (VCGI), Addison County Transfer Database NAD 1983 State Plane Vermont Projected Coordinate System



VNRC Subdivision Study – Phase 4

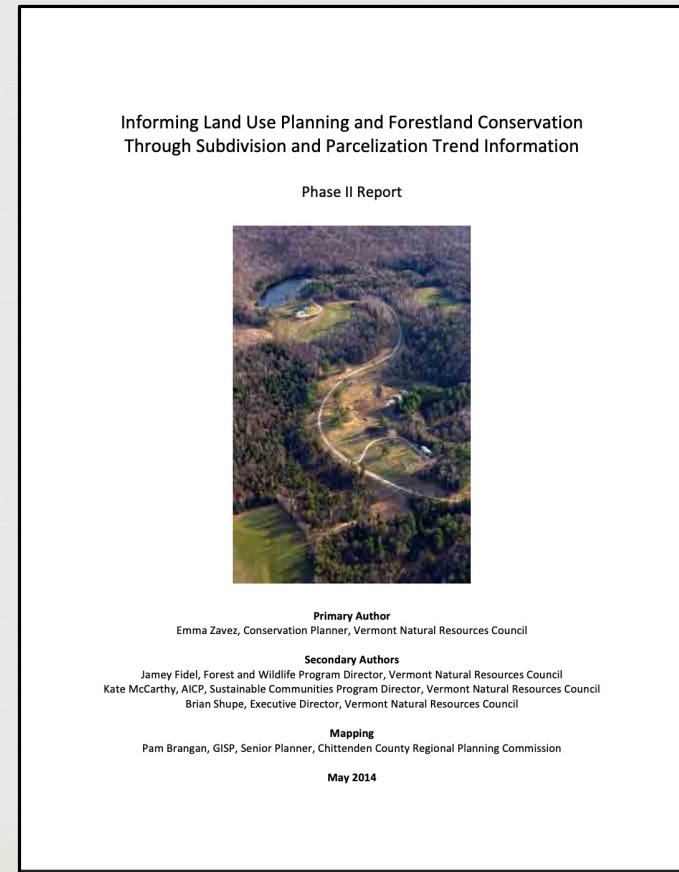
This map shows that 114 of 125 subdivided parcels (91%) intersect with areas designated as forest blocks.

Furthermore, 43% were partially within the highest ranking priority forest blocks.



VNRC Subdivision Study – Phase 2

- Reviewed records of subdivisions in 22 case study towns
- Total subdivision activity, by zoning district, from 2002 through 2009
- When land is subdivided...
 - How *many* lots were created?
 - What *size* were the lots?



How many lots were created?

Findings:

- 2,749 lots created from 925 subdivisions affecting a total of 70,827 acres of land.
- On average, each subdivision resulted in 2-4 lots.
- Based on spatial analysis in four Phase II communities, between 50% and 68.8% of the subdivided acres were located within forest blocks mapped by the Agency of Natural Resources.

What Were The Lot Sizes?

Findings

- Median lot sizes: 2.4 – 12.15 acres
- Size of original lot (“parent parcel”) matters

Size of original parcel	Subdivisions resulting in at least one 50+ acre parcel
100+ acres	97%
50-100 acres	57%

What does this mean?

- Resulting parcels may be too small to support long-term forest management goals.
- Multiple owners can lead to fragmented land management.

Where Were The Lots Created?

Finding:

Most land subdivision is taking place in rural residential districts versus conservation districts.

	In Rural Res. districts	In Natural Resource districts
% of total subdivisions	79%	15%
% of total acres	84%	22%

What does this mean?

- Natural resources in “default” districts – where most subdivision is happening – may be more vulnerable to fragmentation.
- Opportunity for improved site design and subdivision configuration in these areas.

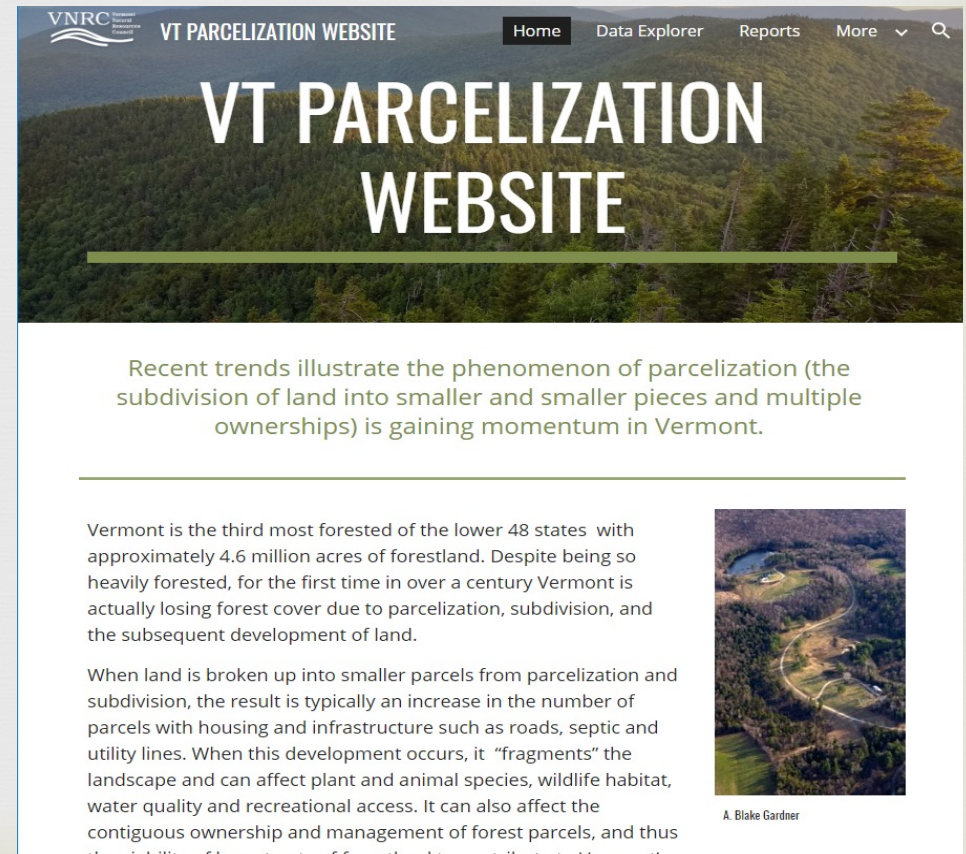
Relevance to Act 250?

- The majority of subdivision activity is not triggering Act 250.
- Only 1% - 2% of subdivisions in the case study towns were large enough to trigger Act 250.
- A small number of subdivisions, but a larger amount acreage, was subject to Act 250 under amendment jurisdiction, meaning the land was already under Act 250.

VNRC Parcelization Website

- To make parcelization data more accessible
- To visualize change spatially.
- To generate geographically-specific reports

Visit <https://vtforesttrends.vnrc.org> for interactive data tools, parcelization reports, a glossary of terms, and additional info about this project.



VNRC Vermont Natural Resources Council
VT PARCELIZATION WEBSITE

Home Data Explorer Reports More

VT PARCELIZATION WEBSITE

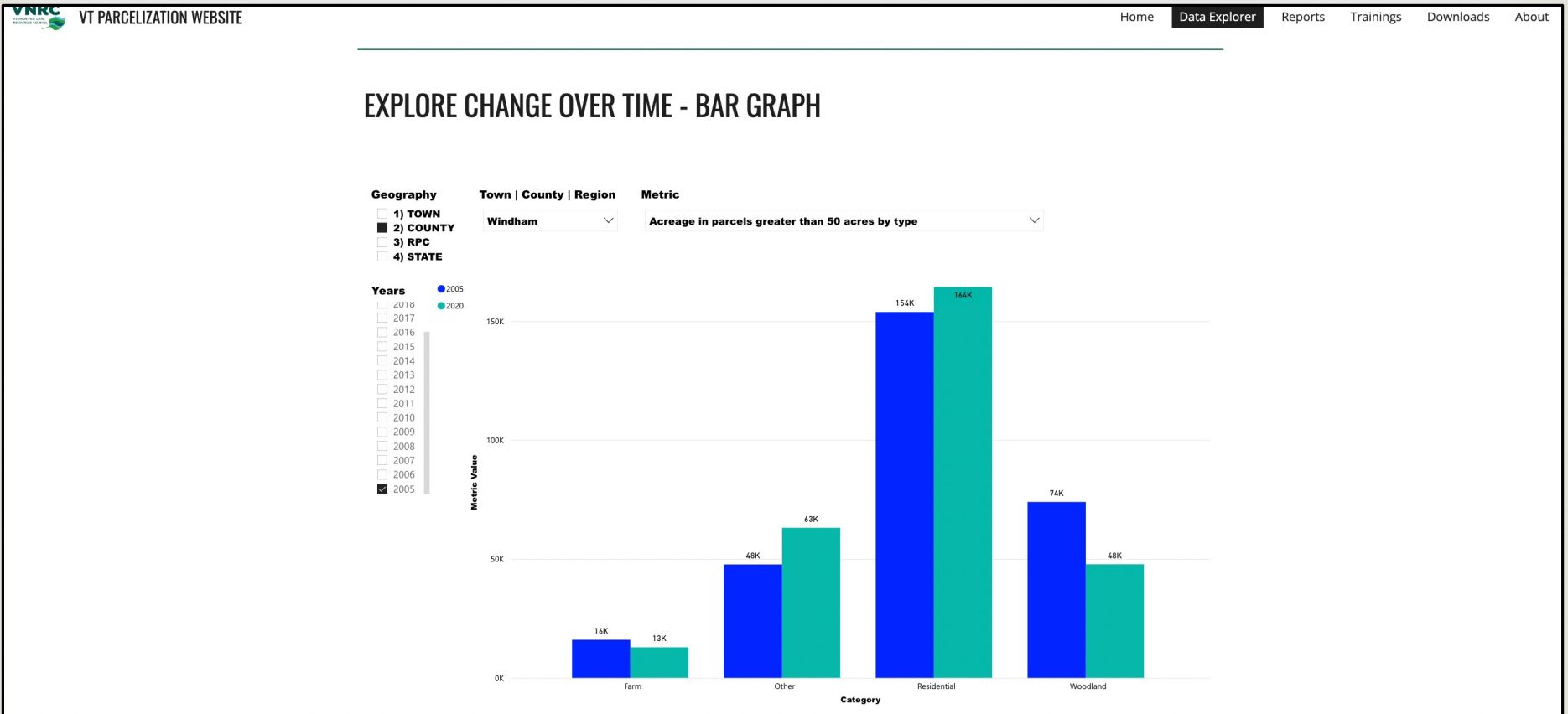
Recent trends illustrate the phenomenon of parcelization (the subdivision of land into smaller and smaller pieces and multiple ownerships) is gaining momentum in Vermont.

Vermont is the third most forested of the lower 48 states with approximately 4.6 million acres of forestland. Despite being so heavily forested, for the first time in over a century Vermont is actually losing forest cover due to parcelization, subdivision, and the subsequent development of land.

When land is broken up into smaller parcels from parcelization and subdivision, the result is typically an increase in the number of parcels with housing and infrastructure such as roads, septic and utility lines. When this development occurs, it "fragments" the landscape and can affect plant and animal species, wildlife habitat, water quality and recreational access. It can also affect the contiguous ownership and management of forest parcels, and thus the viability of large tracts of forestland to contribute to Vermont's

A. Blake Gardner

VNRC Parcelization Website



Recommendations for State Policy

Tracking Parcelization Over Time to Inform Planning and Policy

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² <https://doi.org/10.2723/1546-332>. It is important to note that an estimated 3,439 acres of [openlands](#) revert back to forest annually so there some gain in forestland acknowledged in the Forest Service FIA data.

Key Recommendations

Recommendations for state policy and investments

- Support diversified strategies to reduce the pressures on landowners to subdivide land.
- Boost investment in land conservation and landowner incentives for conservation easements.
- Support statewide efforts to conserve 30% of Vermont’s land by 2030, and 50% by 2050.
- Increase support to woodland landowners for succession planning to minimize the subdivision of land.
- Continue to support working forests by funding the Current Use Program and the administration of new forestland enrollment.
- Provide full statutory funding for the Vermont Housing and Conservation Board (VHCB), and adequate funding for the Working Lands Enterprise Initiative.
- Support outreach efforts and public policy to encourage the aggregation of land for conservation purposes.
- Support incentives and policies to encourage housing in smart growth locations.
- Modernize Act 250 to support housing development in smart growth locations, while strengthening it to play a more meaningful role in reviewing the impacts of development on forestland.
- Support funding to develop water and sewer infrastructure in smart growth locations.

Recommendations for local actions

- Strengthen policies to reduce forest fragmentation in municipalities that have zoning and subdivision regulations, with a particular focus on reducing fragmentation in conservation and rural residential districts.
- Support the adoption of subdivision regulations in municipalities that do not have land use regulations to minimize the fragmenting impacts of subdivision on forestland.
- Encourage the establishment of municipal conservation funds to leverage state and federal dollars to conserve forest land and create/expand town forests.

Data and process recommendations

- Support local listers and trainings in order to ensure data quality and consistency across municipalities.
- Standardize approaches to parcel data collection and improve the connection of the Grand List to land use parcelization trends, land transfer data, and GIS parcel data to examine spatial trends.