

Addressing Forest Fragmentation

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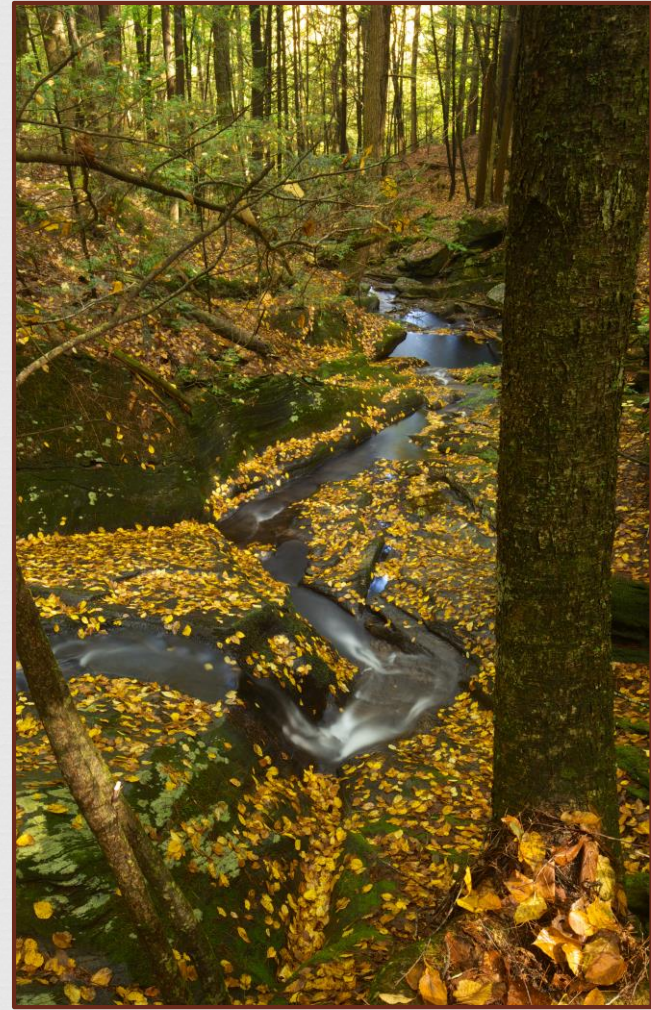


Brian Mohr / Ember Photo















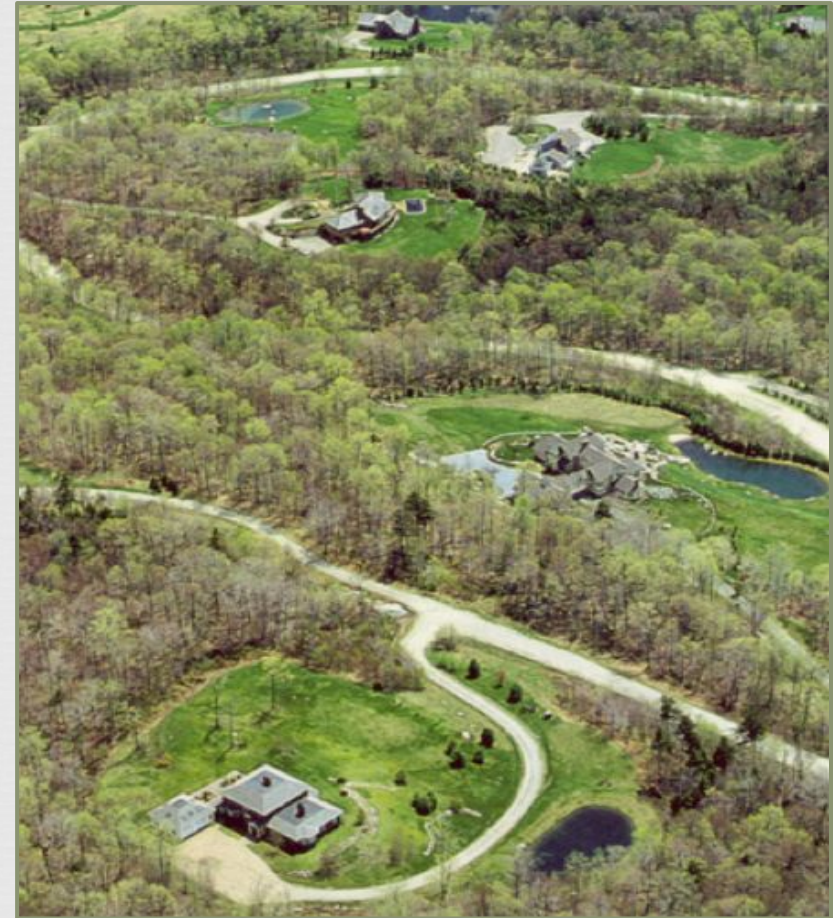




Parcelization

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

Forest Loss

- While close to 80% of Vermont is forested, forest cover is actually declining. According to the Forest Service, Vermont may have lost 102,000 acres of forestland from 2012 to 2017 (Morin et al (2017)).
- In order to minimize forest fragmentation and forest loss, it is necessary to understand where parcelization and subdivision are occurring, and the rate at which they are occurring.



A. Blake Gardner

Strategies to Address Parcelization & Fragmentation - Forest Roundtable

- An ongoing policy discussion on forest policy with a focus on parcelization and forest fragmentation.
- Bringing diverse interests together since 2006 to work on a common issue of concern (Over 200 interested members).
- Information sharing and networking.
- Testing new ideas.



Forest Roundtable

Consolidated List of Environmental Values

Theme	Value	Importance	Vulnerability
Ecological processes	Long-term ecological functioning (including ecological processes that maintain water, air, and soil productivity and quality; forest health; and forest productivity)	19	19
Structure	Habitat connectivity (including the maintenance of gene flow)	13	17
Composition	Maintain plant, fish, wildlife, and natural heritage (diverse native species)	12	9
Other	Environmental amenities (aesthetics, recreation, etc.)	6	2
Ecological processes	Carbon storage (to affect global climate change)	4	3

Consolidated List of Social Values

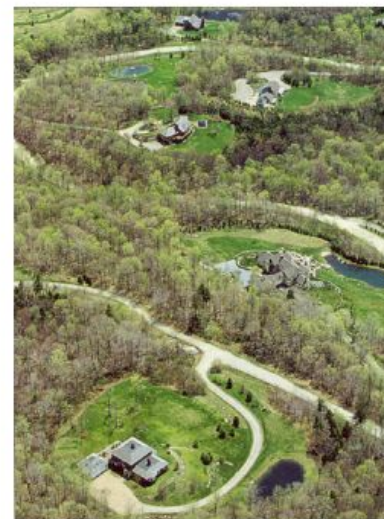
Theme	Value	Importance	Vulnerability
Values held by individuals	Forest ethics and sense of stewardship for diverse forest values	11	7
Sense of place	Rural remote sense of Vermont (including diverse habitat for wildlife and large remote tracts)	10	10
Values held by individuals	Diverse and wholesome recreational opportunities	8	2
Values for society	Intergenerational connection to forests	6	8
Values for society	Forest-based economy supporting a community and diverse society	4	5
Values for society	Traditional uses (hunting, fishing, etc.)	4	5

Consolidated List of Economic Values

Theme	Value	Importance	Vulnerability
Jobs	Primary forest-based jobs (industrial – logging, manufacturing, etc.)	15	16
Forest materials	Water (e.g., clean water)	11	10
Jobs	Secondary forest-based jobs (e.g., tourism, recreation, etc.)	8	7
Economic opportunities	Economic opportunities supported by forested landscape (including amenity dependent jobs)	6	2
Forest materials	Energy source	6	3
Forest materials	Sustainable resource flow (long-term)	5	9

ROUNDTABLE ON PARCELIZATION AND FOREST FRAGMENTATION

FINAL REPORT



MAY 2007

Recommendations from a roundtable of diverse participants.

*Primary Author: Jamey Fidel, Forest and Biodiversity Program Director,
Vermont Natural Resources Council*

2007 Forest Roundtable Report

ROUNDTABLE ON PARCELIZATION AND FOREST FRAGMENTATION

FINAL REPORT



MAY 2007

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Includes 27 strategies to address parcelization and fragmentation.

- Tax Policy
- Land Use and Conservation Planning
- Valuation of Ecosystem Services
- Long-term Sustainability of the Forest Products Industry

Examples of Forest Roundtable Recs.



Rec. # 9: Track annual rates of parcelization in Vermont.

Rec. #10: Utilize existing data and develop maps to identify and prioritize forest blocks for conservation.

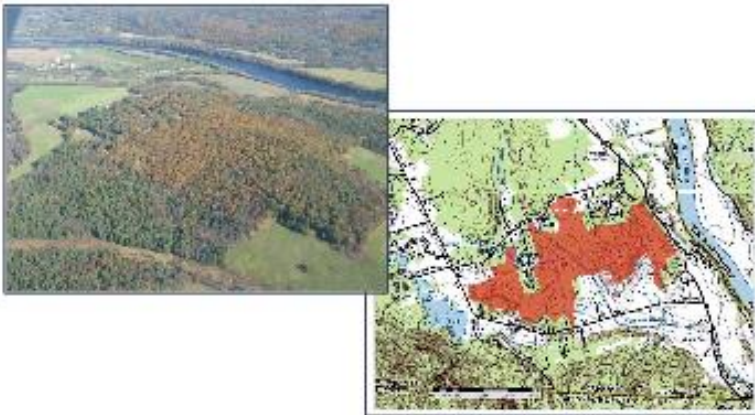
Rec. #11: Track and analyze rates and degree of forest fragmentation in Vermont.

Rec. #12: Integrate existing planning efforts at the local, regional and state level to better address fragmentation.

Rec. #13: Identify and correct gaps in Act 250 and other land use regulations to attenuate the rate of parcelization and forest fragmentation in Vermont.

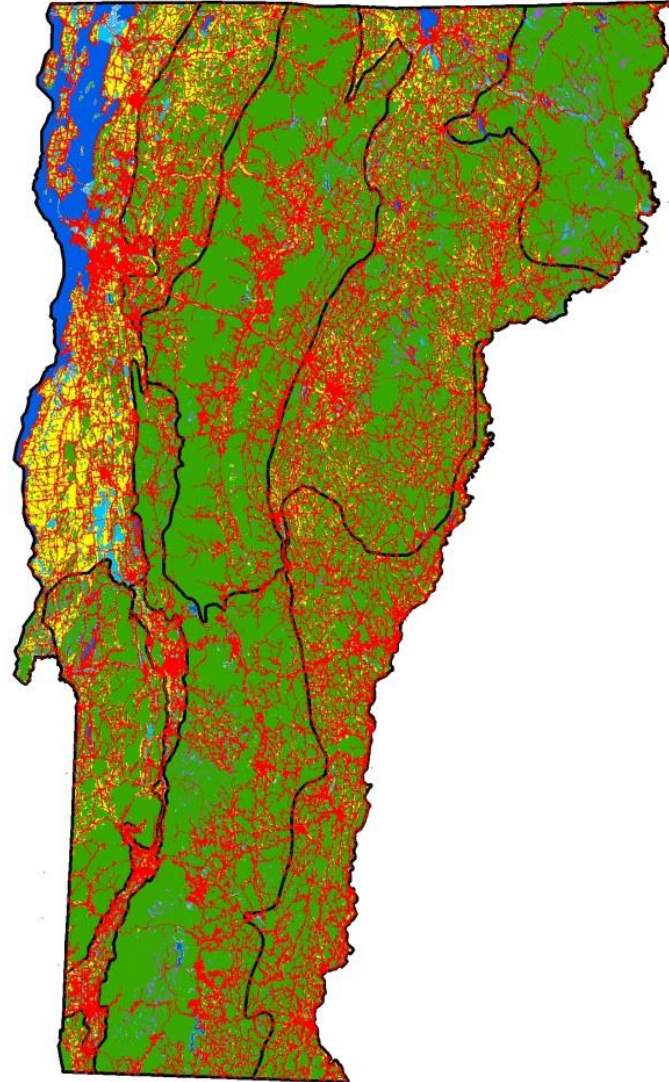
Prioritize Blocks and Track Fragmentation

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



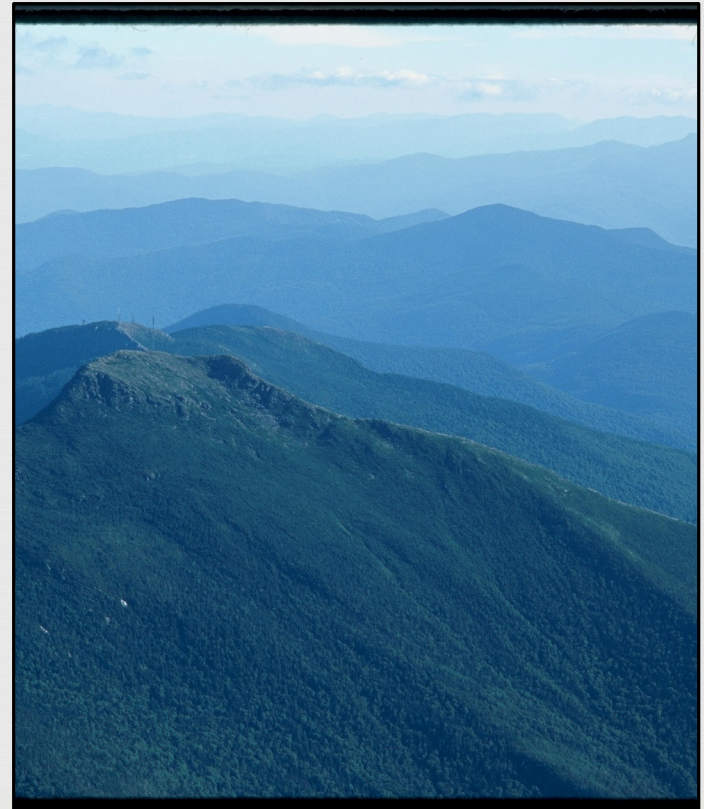
Vermont Fish and Wildlife Department
April 2014

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



Planning – Act 171 (Effective in 2018)

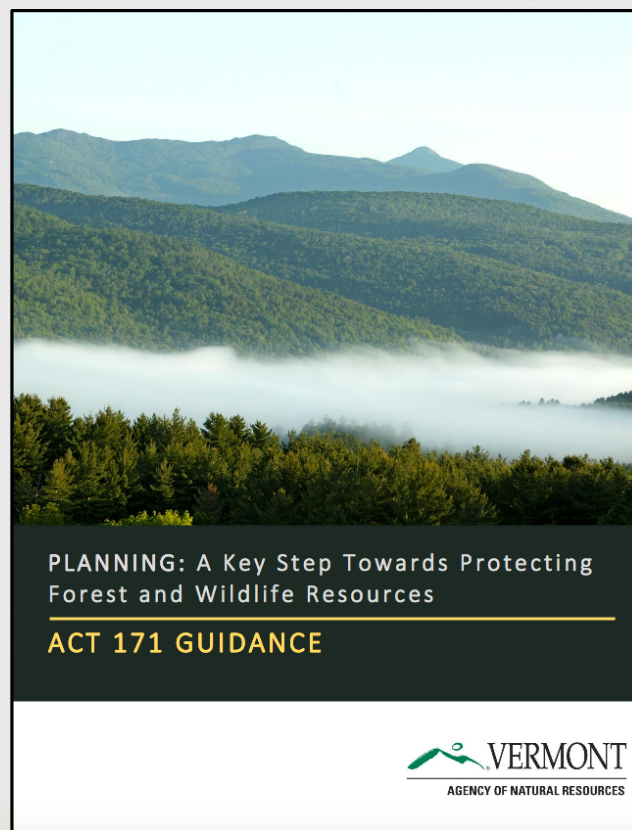
- New state land use planning goal to manage Vermont's forestlands so as to maintain and improve forest blocks and habitat connectors.
- Requires town and regional plans to indicate those areas that each town or region deems to be important or require special consideration as forest blocks and habitat connectors.
- Plan for land development in those areas to minimize forest fragmentation and promote the health, viability, and ecological function of forests.



Act 171 ANR Guidance Document

When Act 171 was signed into law in June of 2016, Governor Shumlin directed the Agency of Natural Resources to publish guidance to help communities.

<https://anr.vermont.gov/sites/anr/files/co/planning/documents/guidance/Act171Guidance.pdf>

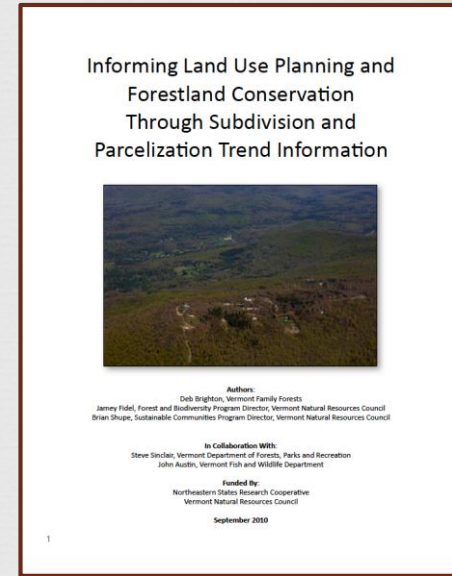
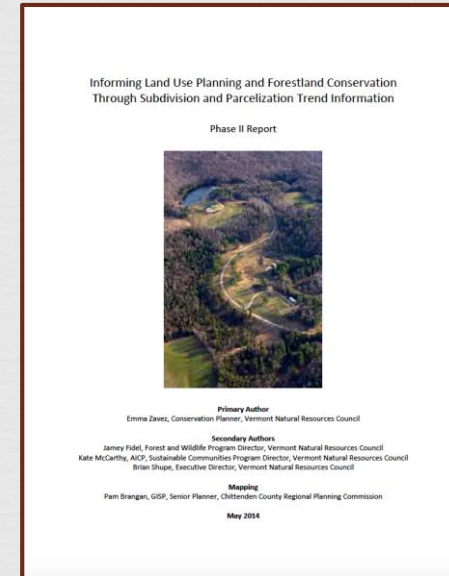


Background on VNRC Research

Phase 1 (2010) Statewide parcelization trends,
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 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*

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 are created?
 - What size are the lots created?
- 2,749 lots were created from 925 subdivisions.

Informing Land Use Planning and Forestland Conservation Through Subdivision and Parcelization Trend Information



Authors:

Deb Brighton, Vermont Family Forests
Jamey Fidel, Forest and Biodiversity Program Director, Vermont Natural Resources Council
Brian Shupe, Sustainable Communities Program Director, Vermont Natural Resources Council

In Collaboration With:

Steve Sinclair, Vermont Department of Forests, Parks and Recreation
John Auson, Vermont Fish and Wildlife Department

Funded By:

Northeastern States Research Cooperative
Vermont Natural Resources Council

September 2010

How many lots are created?

Finding:

On average, each subdivision resulted in 2-4 lots.

What does this mean?

- Subdivision is happening in small increments.
- The majority of subdivision is not triggering Act 250.
 - Only 1% - 2% of subdivisions in the case study towns were large enough to trigger Act 250.
- Local regulations, if they exist, are the only backstop to guiding subdivision patterns. Only half of municipalities have subdivision regulations. Act 171 is very helpful to address fragmentation, but it addresses planning, and not necessarily development review.

Where are lots being created?

Finding:

Most land subdivision is taking place in rural areas, though conservation districts provide some protection.

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

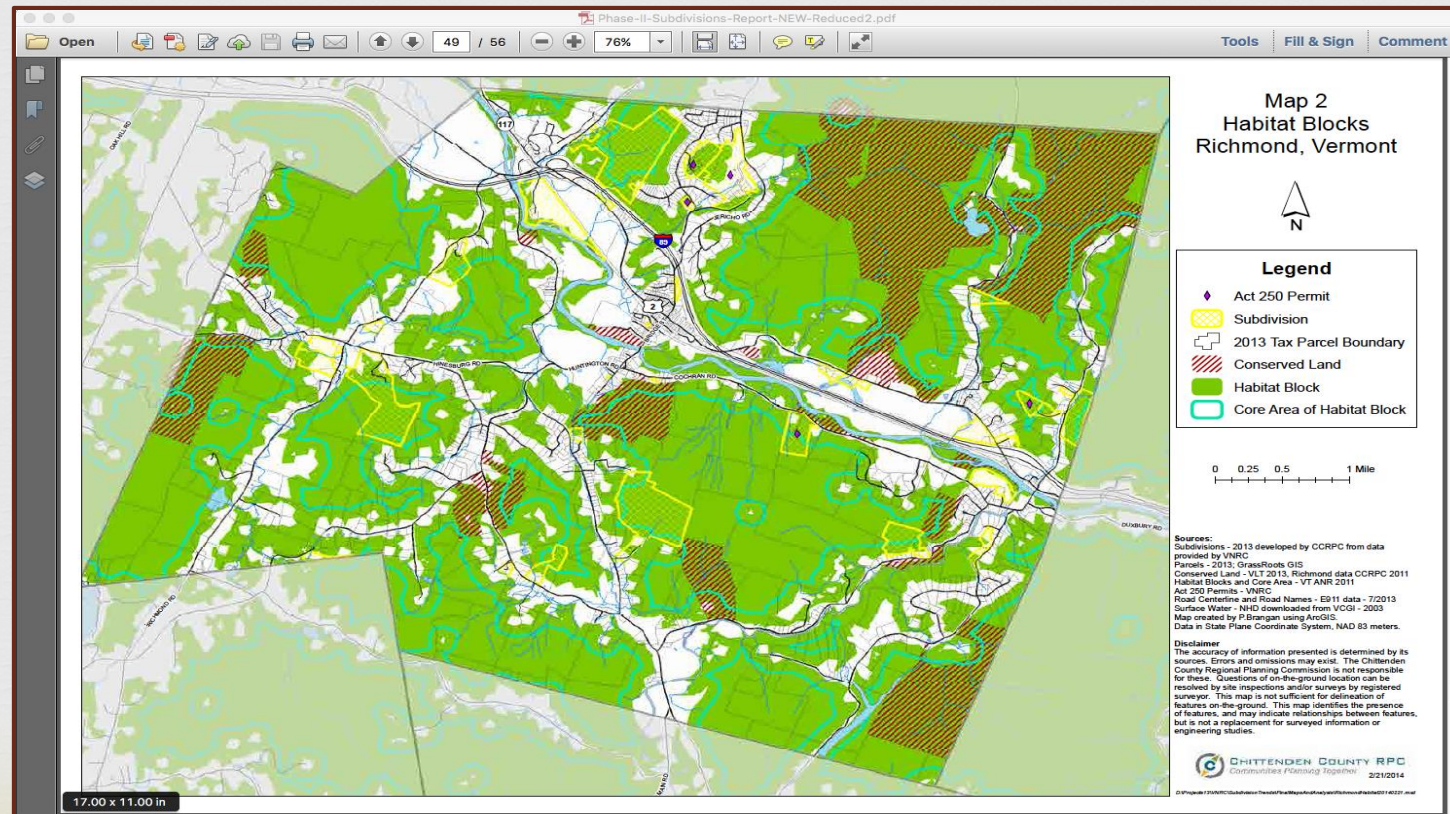
What does this mean?

- Natural resources in “default” districts – where most subdivision is happening – may be more vulnerable unless these districts include thoughtful approaches to development.
- Opportunity for improved site design and subdivision review in these areas

Where are lots being created?

Forest/habitat blocks are being parcelized by subdivision.

- Based on spatial analysis in four communities, between 50% and 68.8% of the subdivided acres were located within forest/habitat blocks mapped by the Agency of Natural Resources.



Goals for Phase 3 Research

- Quantify the degree to which subdivision is affecting the **viability of large parcels** for resource management and conservation;
- Quantify the extent to which **residential development** is occurring;
- Quantify the extent to which **large undeveloped woodland parcels** are declining; and
- Document trends that may be relevant for **policies and programs** that support resource management and/or minimize the fragmentation of land.

Methods

- **Vermont Department of Taxes Grand List**
Tax Years 2004 to 2016
- **Use Value Appraisal (Current Use) Data**
- **Designed Metrics to look at various trends within the data:**
 - Number of parcels
 - Acreage
 - Parcel Sizes
 - Parcel types
 - Dwellings
 - Land Values
 - UVA

Steering Committee & Partners

DATABASE DEVELOPER

- Brian Voigt, Fellow, Gund Institute for Ecological Economics (UVM Rubenstein School of Environment and Natural Resources)

WEBSITE DEVELOPER:

- Steve Sharp, GIS Operations Manager (Vermont Center for Geographic Information)

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- Jim Duncan, Director (Forest Ecosystem Monitoring Cooperative)
- Erik Engstrom, GIS Project Supervisor (Vermont Agency of Natural Resources)
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- Jens Hilke, Community Wildlife Program (Vermont Department of Fish and Wildlife)
- Elizabeth Hunt, Current Use Program Chief (Vermont Department of Taxes)
- Jon Osborne, GIS Director (Vermont Land Trust)
- Jennifer Pontius, Research Assistant Professor (UVM Rubenstein School of Environment and Natural Resources)
- Jill Remick, Director (Property Valuation and Review Division, Vermont Department of Taxes)
- Kim Royar, Wildlife Biologist (Vermont Department of Fish and Wildlife)
- Steve Sinclair, Director of Forests (Vermont Department of Forests, Parks, and Recreation)
- Keith Thompson, Private Lands Program Manager (Vermont Department of Forests, Parks, and Recreation)

Private Land Trends

In 2016, roughly 3,350,000 acres (70.4% of the land) were in parcels 50 acres or larger.*

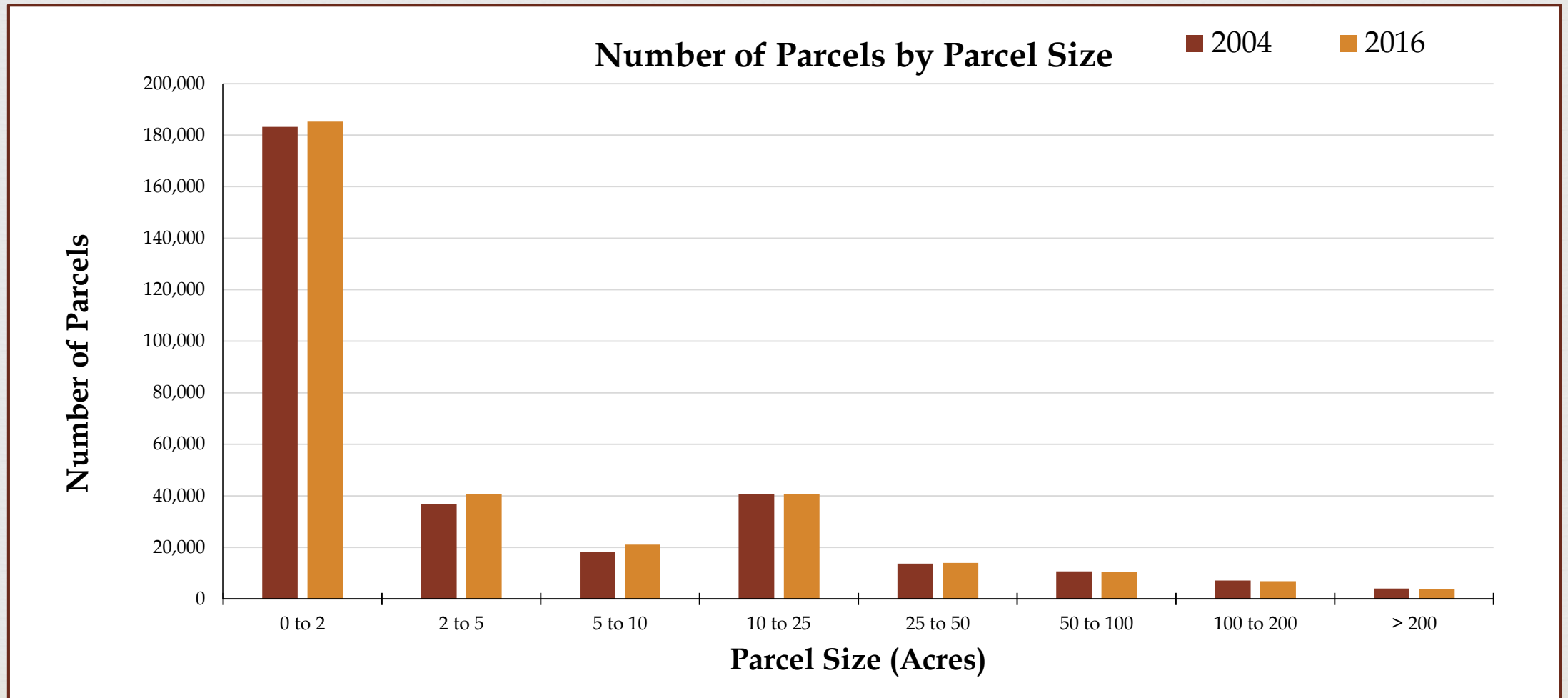
*residential 40.0%

*woodland 25.7%



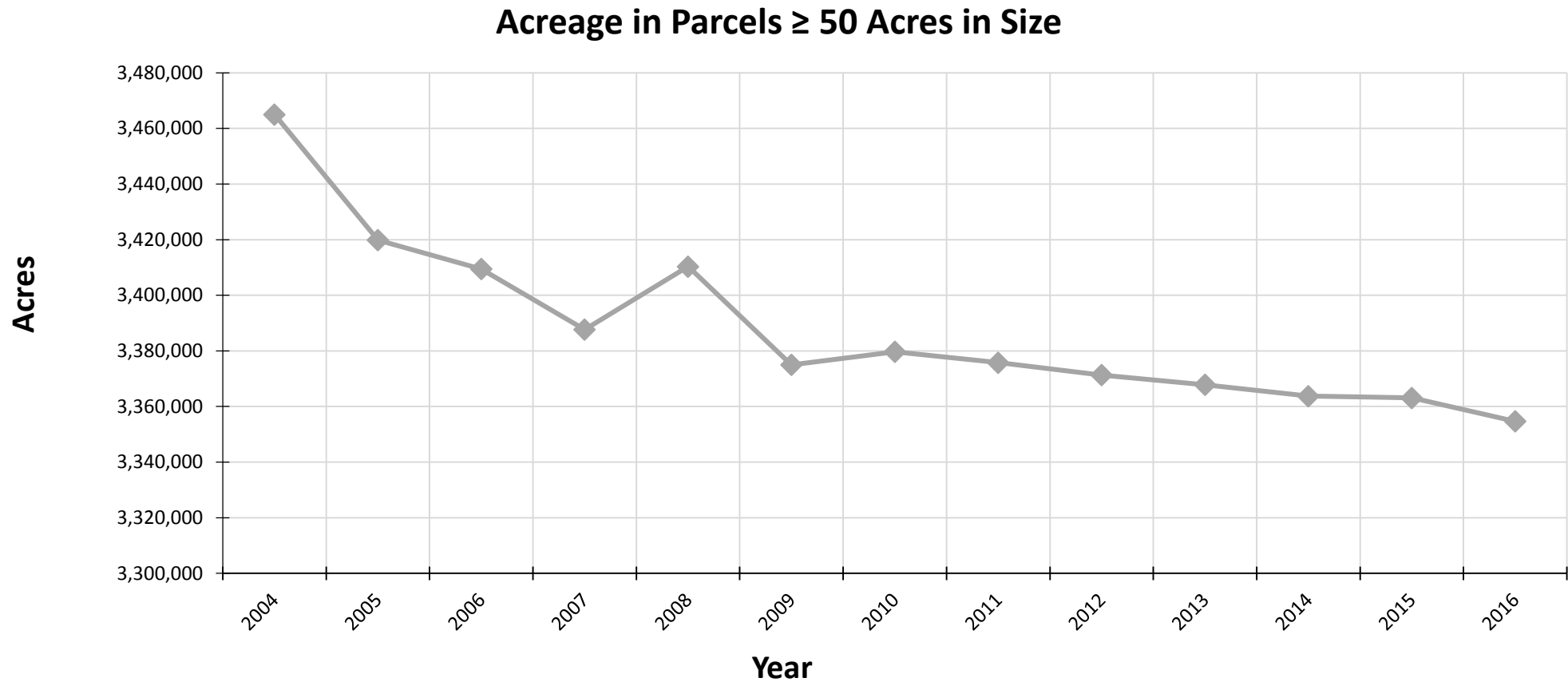
Number of Parcels by Parcel Size

Small parcels are increasing, especially in the 2-5 and 5-10 acre categories, a size commonly used for “rural residential” house lots.



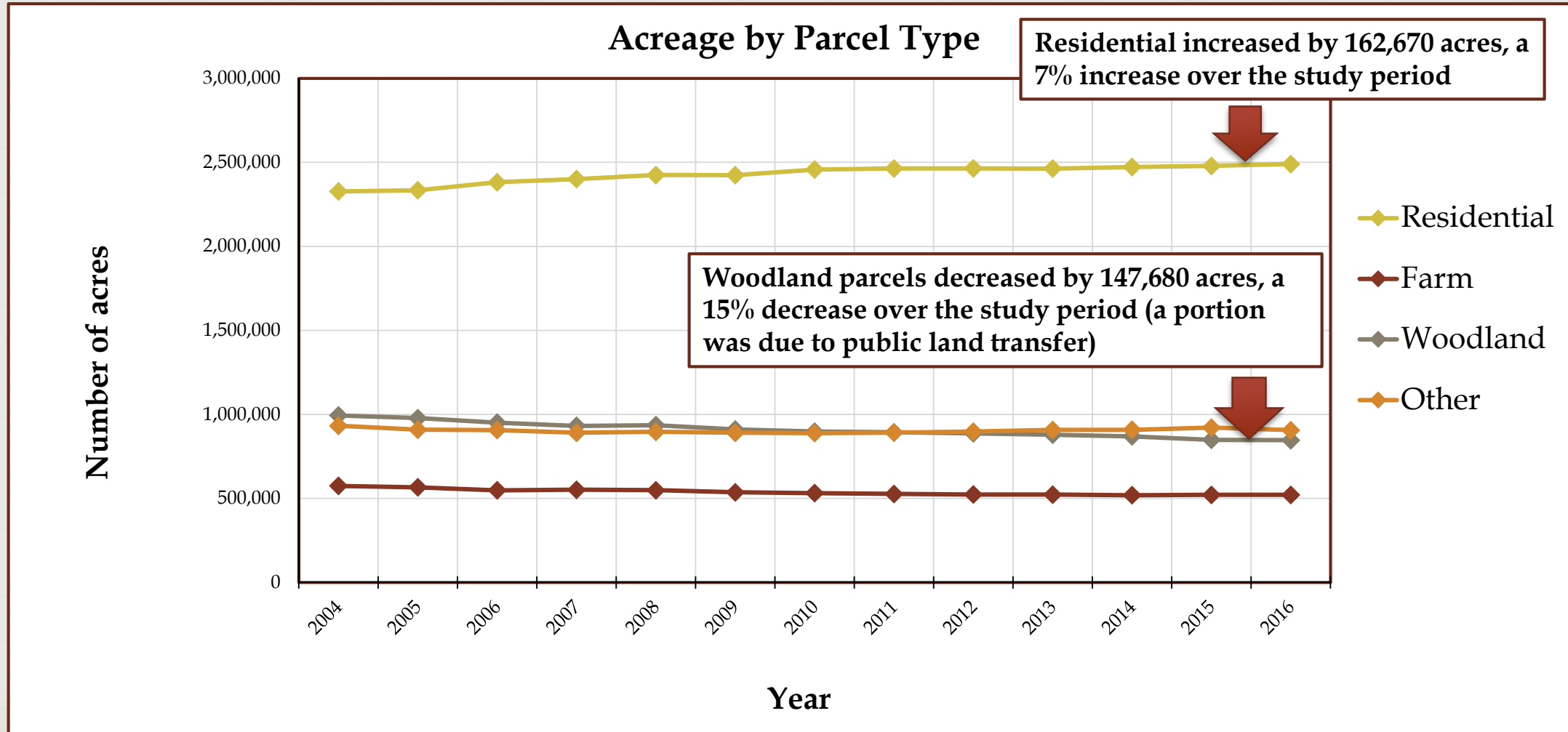
Acreage in Parcels ≥ 50 Acres in Size

Between 2004 and 2016, the amount of land in parcels 50 acres or larger declined by about 110,300 acres, or roughly 8,485 acres per year.



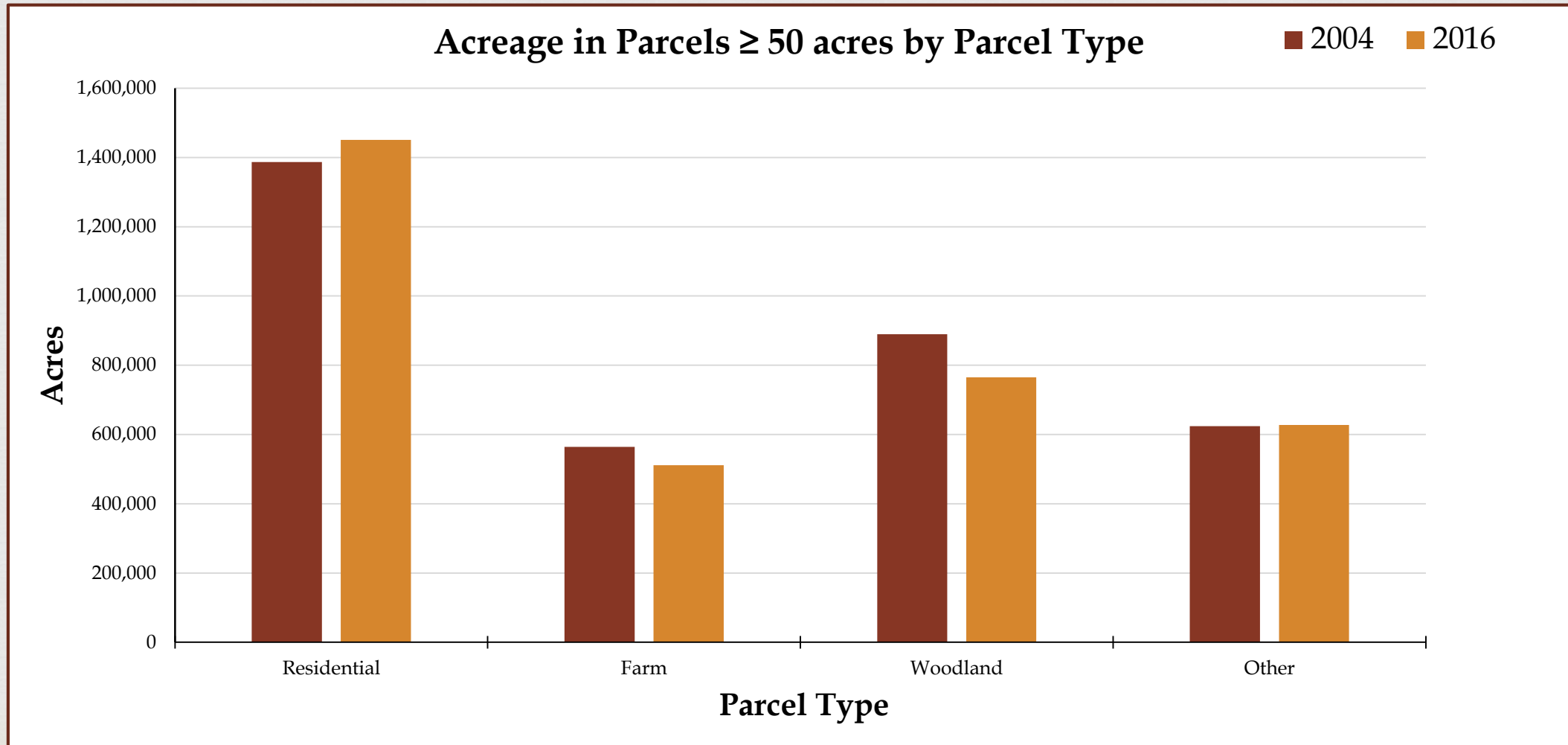
Acreage by Parcel Type

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



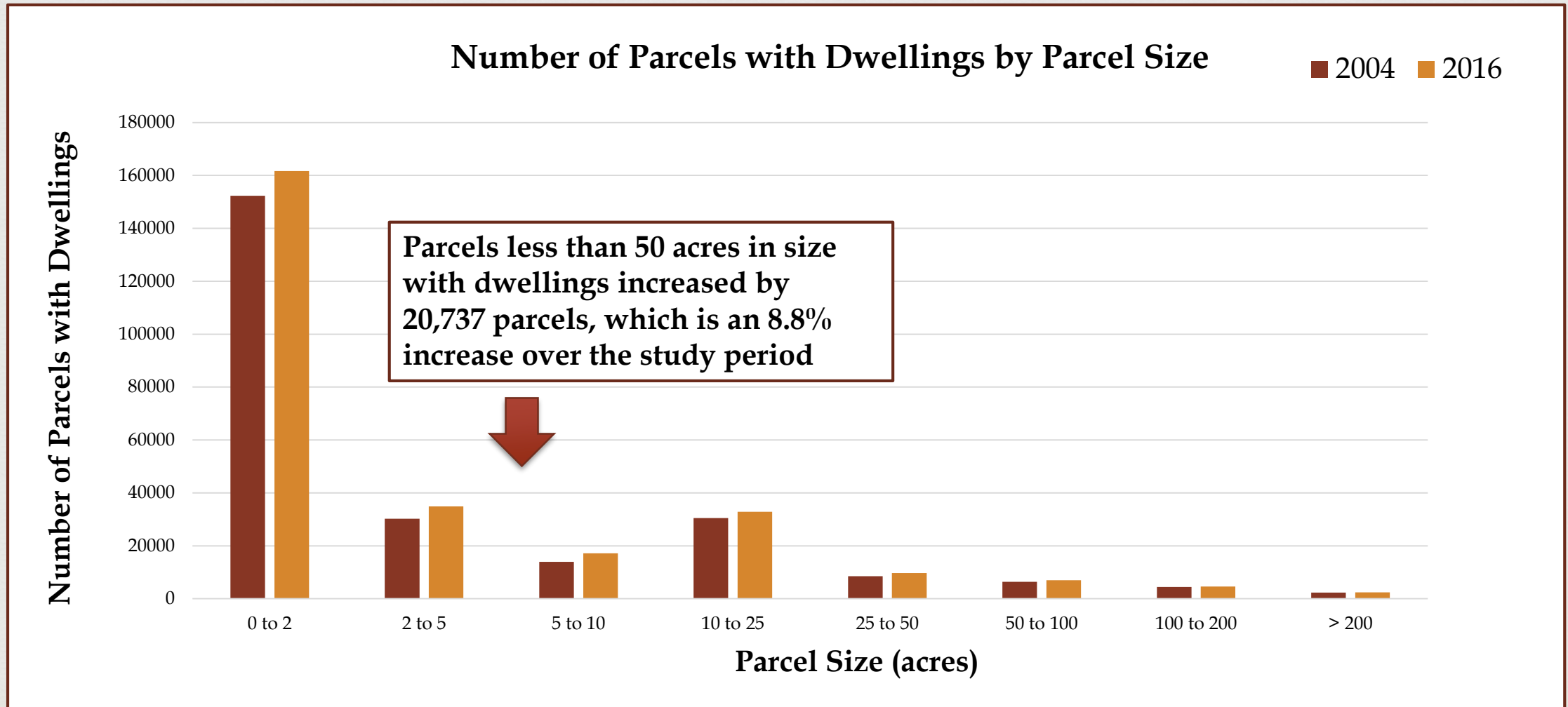
Acreage in Parcels ≥ 50 Acres by Parcel Type

The loss of large (50+ acre) woodland parcels outpaced the loss of large parcels in general.



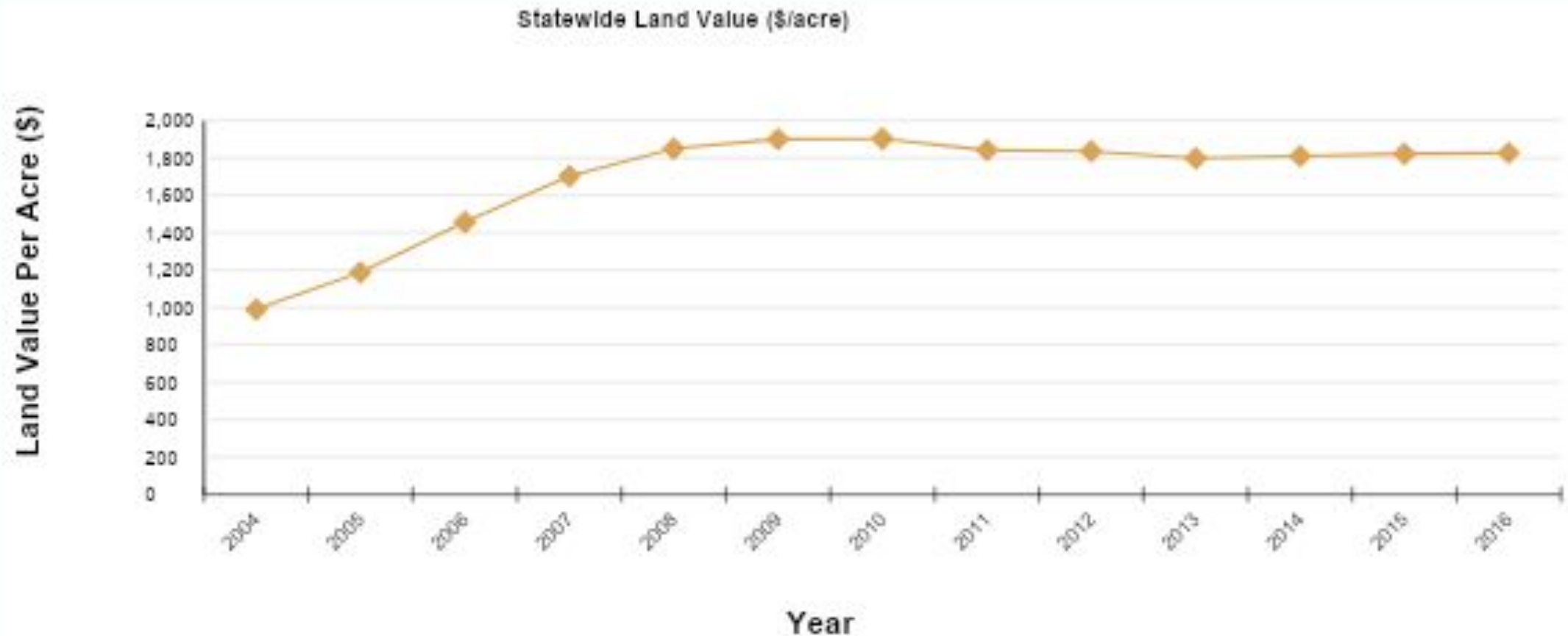
Number of Parcels with Dwellings by Parcel Size

Most dwellings are built on smaller parcels compared to larger parcels.



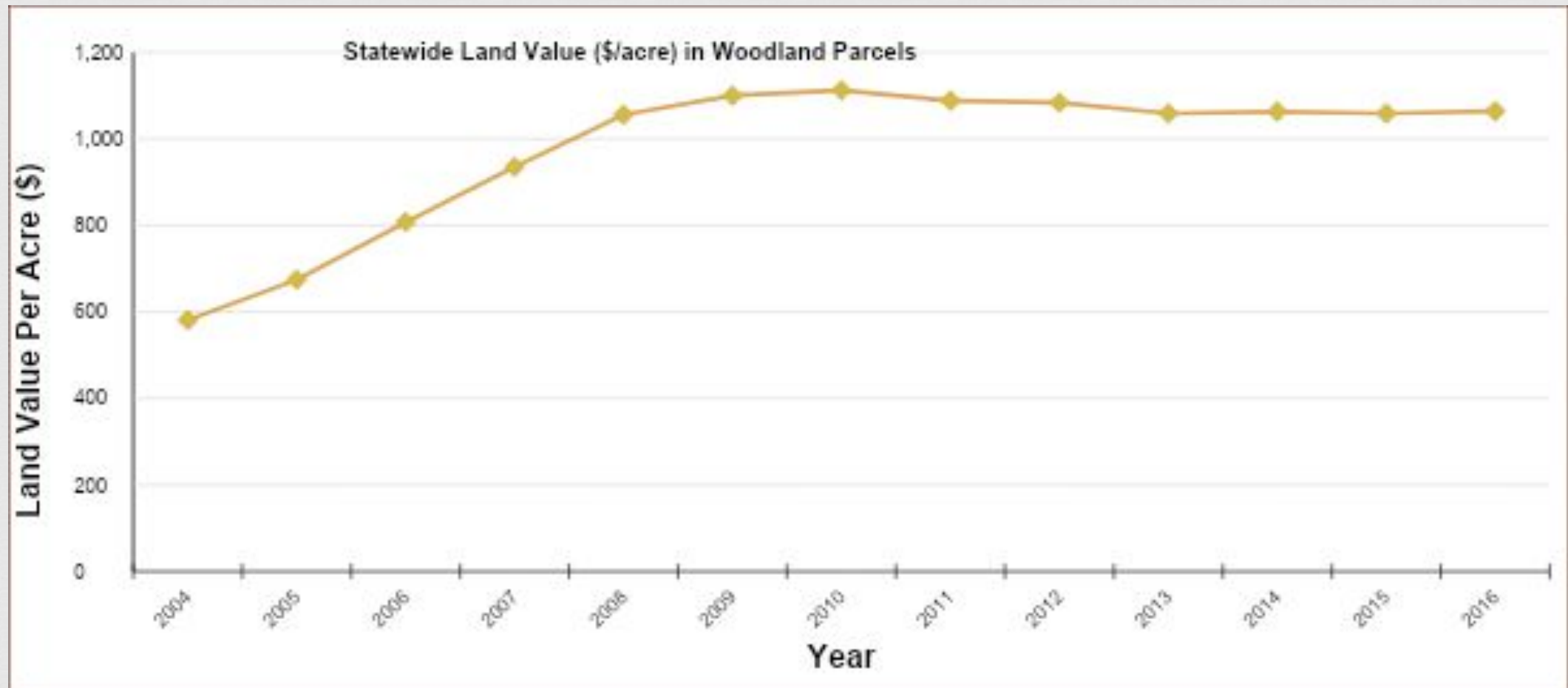
Land Values

The per-acre value of land in Vermont nearly doubled during the study period.



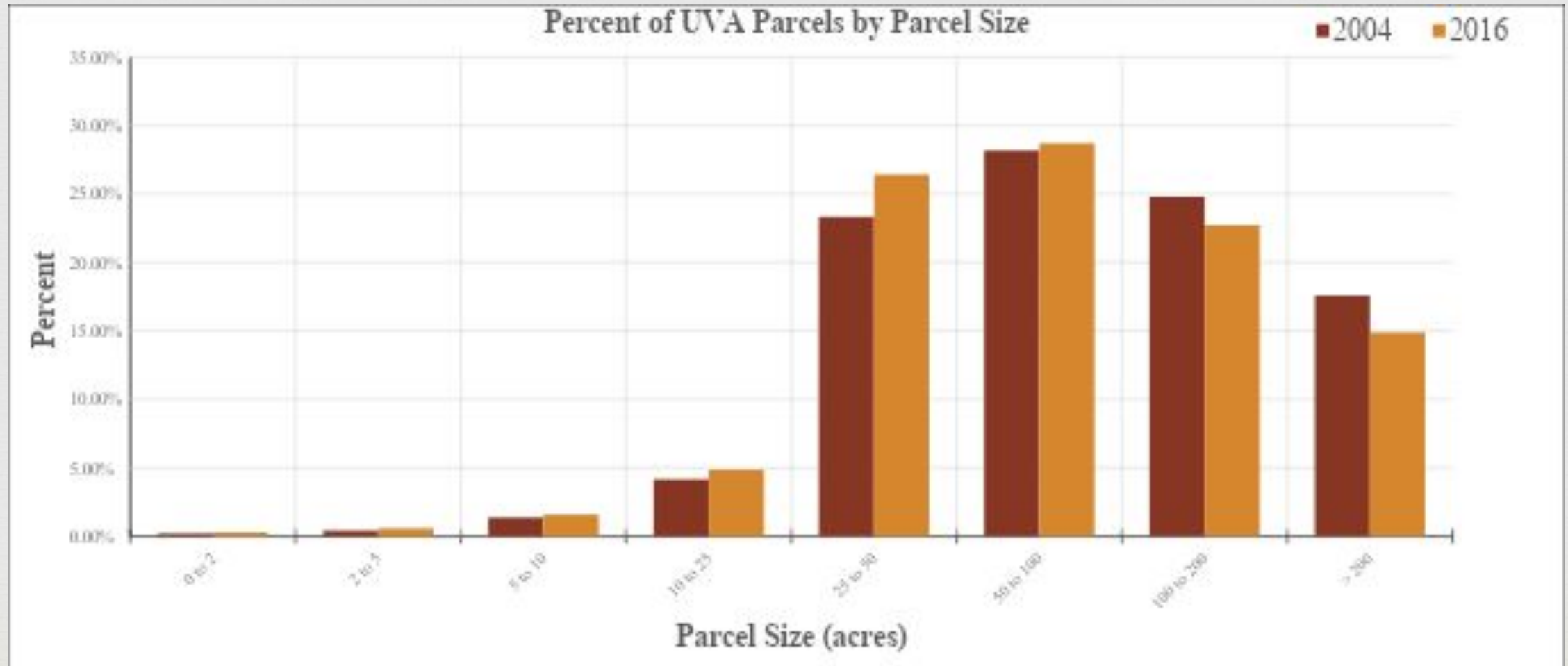
Land Values – Woodland Parcels

The per-acre value of woodland also nearly doubled, though on average woodland remains less expensive per acre than land in general.



Percent of UVA Parcels by Parcel Size

Enrollment in UVA is increasing most in the 25-50 acre category, while enrollment of 100+ acre parcels is decreasing.



UVA Helps Retain Woodland

UVA is playing a role in protecting large woodland parcels: Of the woodland in parcels over 50 acres, 84% of the woodland enrolled in UVA remained woodland by 2016; by contrast, only 73% of non-UVA woodland remained.

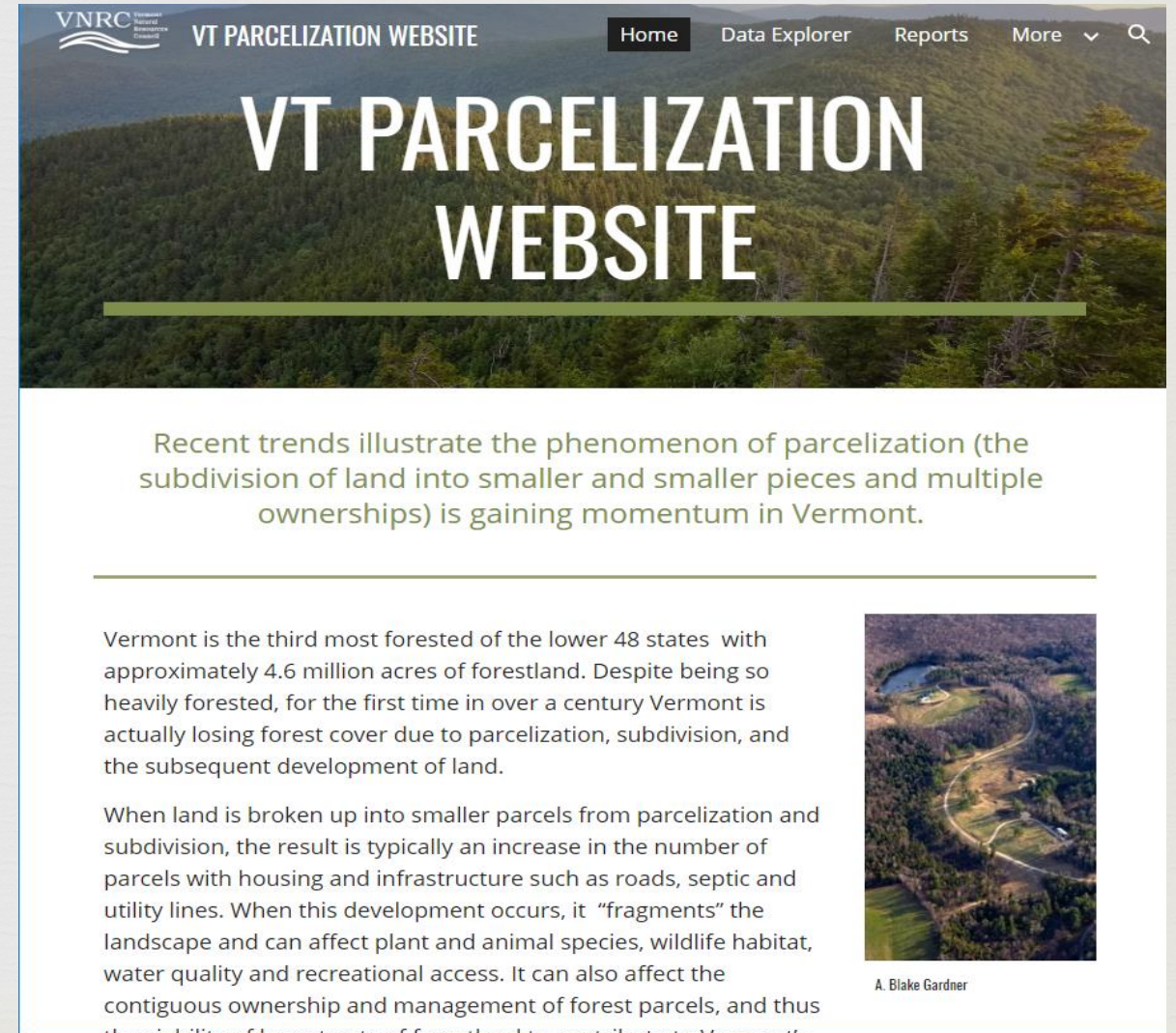
Woodland in parcels \geq 50 acres	In UVA in 2004	Not in UVA in 2004
Remained as Woodland in (2016)	84.16%	73.15%
No Longer Woodland in (2016)	15.84%	26.85%

Parcelization Website

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

Available at:

www.vtforesttrends.vnrc.org

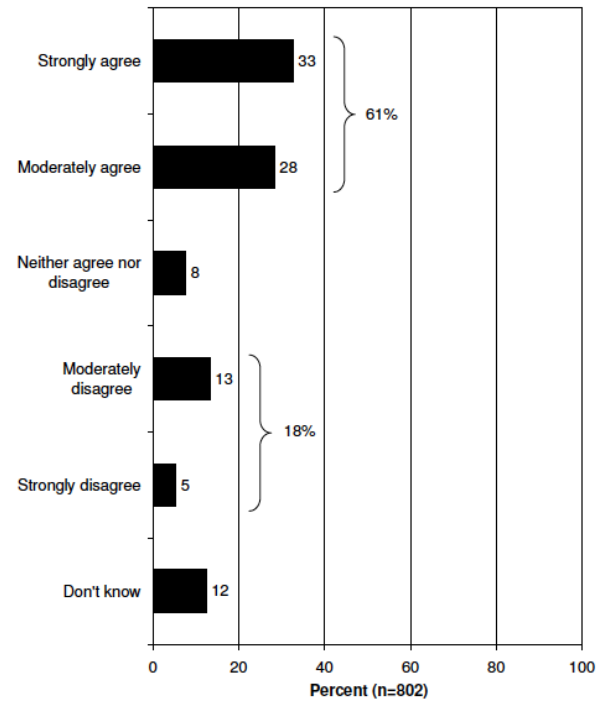


Forest/Habitat Fragmentation

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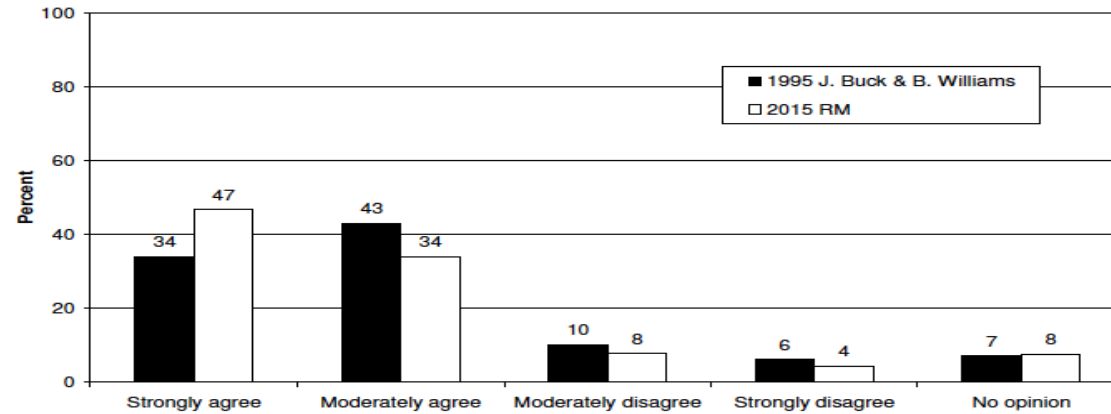
Responsive Management

Q38. Forest fragmentation and loss is a problem in Vermont.
(Vermont residents.)

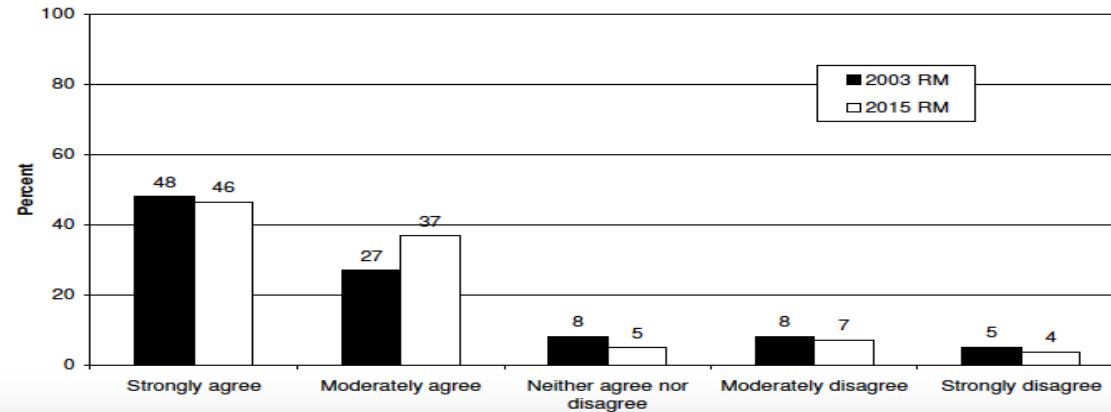


Forest/Habitat Fragmentation

Q44. Wildlife habitat must be protected even if it reduces the land use options of some landowners and developers. (Vermont residents.)

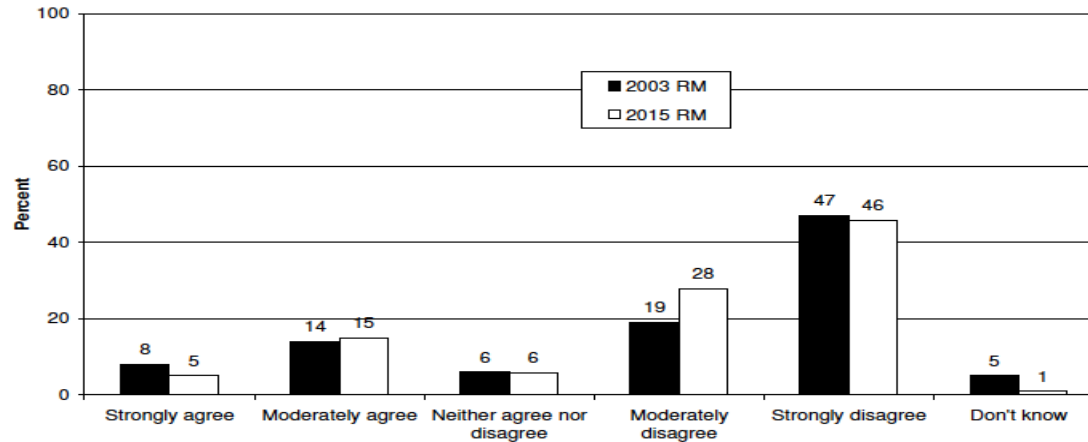


Q45. The use and development of land should be restricted to protect fish and wildlife. (Vermont residents.)

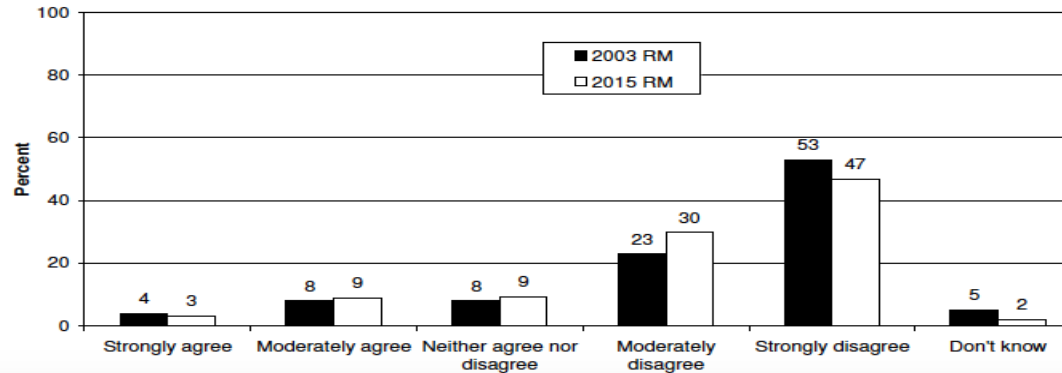


Forest/Habitat Fragmentation

Q46. Landowners should be allowed to develop their land regardless of its impact on wildlife. (Vermont residents.)



Q47. If it came down to a choice between preserving wildlife habitat or providing land for new homes, we should always side with providing new homes for the residents of our state. (Vermont residents.)



Action Planning

Forest Fragmentation Action Plan

- A roadmap for implementing nine priority strategies for reducing forest fragmentation and parcelization.
- Outlines concrete action steps for planning and zoning, conservation, education and advocacy strategies at the local, regional and state level.



Why Vermont Needs a Forest Fragmentation Action Plan

While close to 80% of the state is forested, for the first time in over a century, forests are declining in Vermont. Development is responsible for this trend and forests are increasingly becoming fragmented across Vermont.

Fragmentation doesn't happen all at once - in fact, it's incremental, which is why it's so hard to notice on a day-to-day basis. It usually starts with subdivision, the division of a parcel into two or more smaller lots. The result is typically an increase in parcel owners, which leads to new housing and

infrastructure development (roads, septic, utility lines, etc.). When this development occurs, it "fragments" the landscape and diminishes the economic and ecological viability of forests.

Subdivision activity in Vermont does not look like that commonly seen in other parts of the country and usually portrayed by the media. Indeed, the term "subdivision" usually conjures up images of suburban neighborhoods with identical houses situated side-by-side. Because of the discrepancy between how the public collectively imagines subdivision and the reality, Vermonters are susceptible to thinking that subdivision is not a problem.

But subdivision and other types of land development are cumulatively impacting the viability of Vermont's forests. This is why we need a coordinated land use plan to reduce forest fragmentation, and it needs to occur at the local, regional, and state levels.

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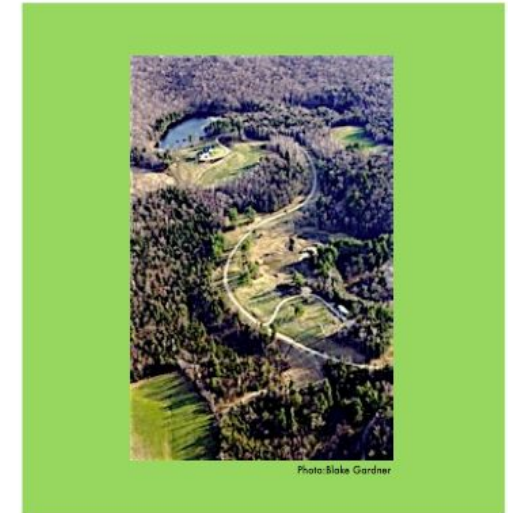
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Planning Process



This plan was developed by the Vermont Natural Resources Council (VNRC) with input from many partners including local planning and conservation commissions, selectboards, regional planning commissions, the VT Dept. of Forests, Parks and Recreation, the VT Fish and Wildlife Dept., the VT Dept. of Housing and Community Development, the VT Planners Association, and UVM Extension.

More than 36 individuals participated in a statewide workshop in Randolph, and more than 63 individuals participated in three regional workshops that took place in Craftsbury, Brandon, and Westminster. VNRC gathered feedback on different conservation strategies from the participants through discussion, ranking exercises, voting, and comment cards.



Priority Strategies

Planning & Zoning

1. Map and inventory natural resources related to forests and wildlife; use these to develop local plan maps and policies.
2. Improve the quality of existing zoning and subdivision regulations.
3. Incorporate specific standards into existing zoning and subdivision regulations to reduce forest fragmentation.

Conservation Programs

4. Increase the acreage of lands permanently protected from development through conservation easements.
5. Increase acres enrolled in the Use Value Appraisal program ("Current Use") or a local tax stabilization program.
6. Provide education and training for local board members.

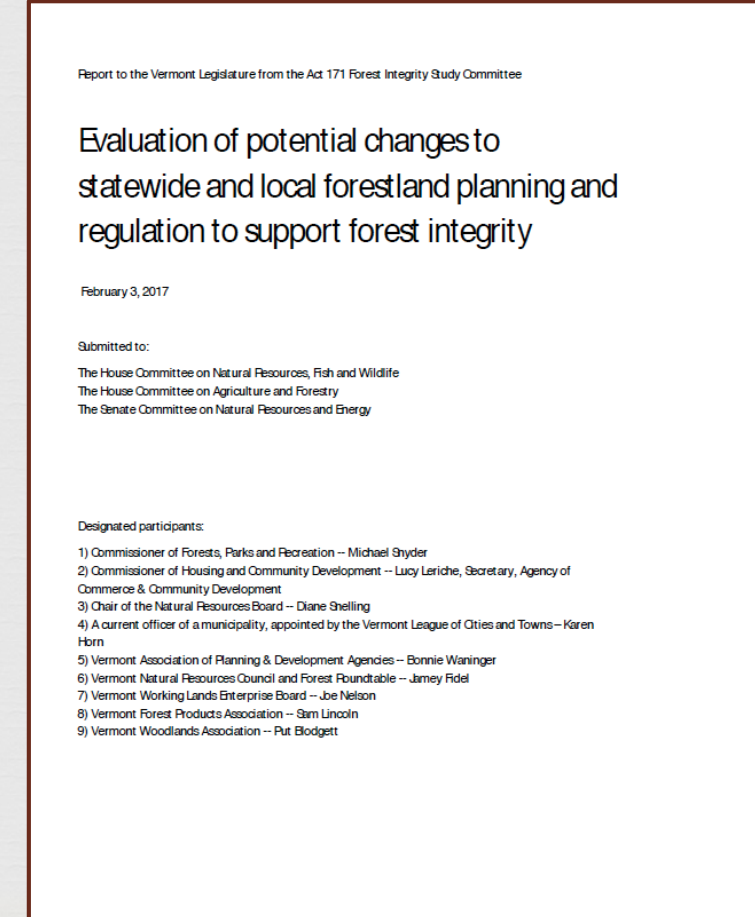
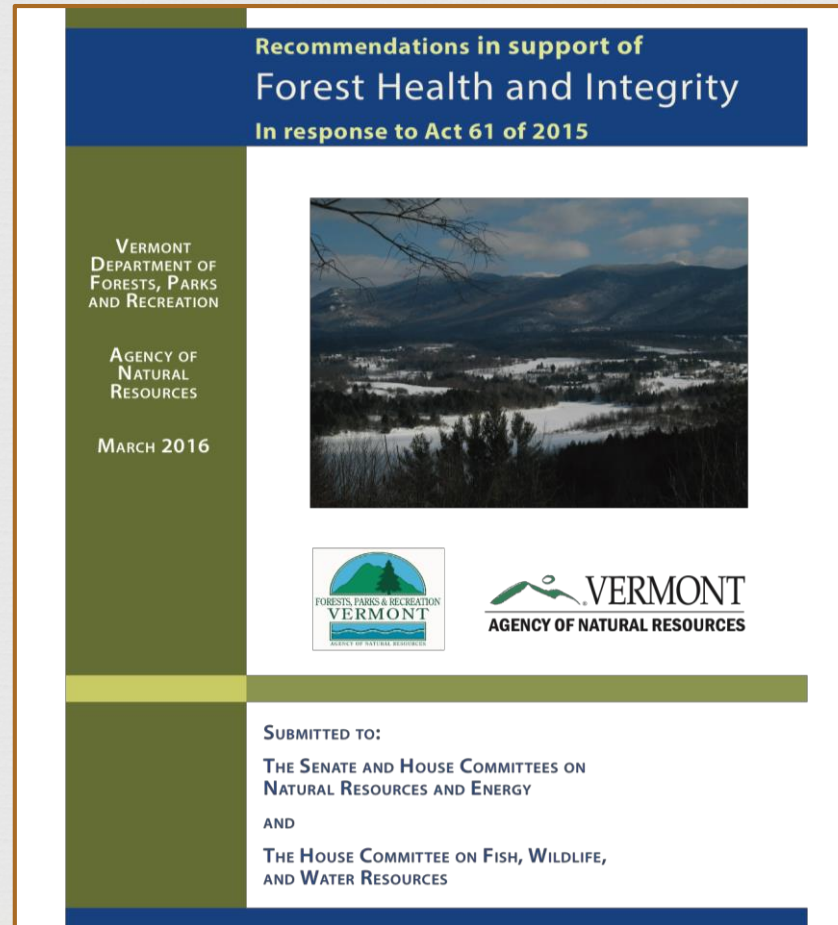
Education

7. Educate private landowners and the general public.
8. Promote estate planning.

Advocacy

9. Pursue legislative changes at the state level.

ANR Forest Fragmentation Reports for the Legislature



ANR Intergenerational Transfer Report for the Legislature

Intergenerational Transfer of Forestland Working Group Recommendations
In response to Act 171 of 2016

February 6, 2017

Developed by:
Intergenerational Transfer of Forestland Working Group

Submitted by:
Vermont Department of Forests, Parks and Recreation
Michael C. Snyder, Commissioner

- Today, more than 2.9 million acres or 62% of Vermont's forestland is owned by families and individuals.
- Males over the age of 55 comprise over 65% of the population of forestland owners.
- Fifteen percent of Vermont's forestland is owned by people over the age of 75 (Butler et al 2015). As landowners age, the way that they transfer their land to younger generations will, at least in part, determine the future of Vermont's forests.
- According to surveys conducted by the Sustaining Family Forests Initiative, more than 17% of Vermont landowners (owning more than 10 acres) plan to transfer or sell their land in the next 5 years.

Recommendations for State Policy

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.
- Increase support to woodland landowners for succession planning to minimize the subdivision of land.
- Continue to support working forests, including 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 the implementation of Act 171 through robust technical assistance and regional and statewide coordination.
- Address the gaps in Act 250 and strengthen it to play a more meaningful role in reviewing the impacts of development on forestland.

Recommendations for Local Action and Research

Recommendations for local actions

- Municipalities that have zoning and subdivision regulations should review and strengthen natural resource policies to reduce forest fragmentation, with a particular focus on their rural residential type districts.
- Municipalities that do not have subdivision regulations should adopt them in order to minimize the fragmenting impacts of subdivision on forestland.

Recommendations for future research

- Conduct additional research to understand how dwellings and associated infrastructure impact the functions and integrity of forests.
- Utilize digital parcel maps, future LIDAR and other remote sensing data, and available modeling to understand any relationships between subdivision of land and subsequent development and forest loss/fragmentation.
- Maintain and enhance the parcelization website on an annual basis to aid land conservation, land use planning, technical assistance, and policy making.