

# Reducing Forestland Parcelization Through Subdivision and Zoning Analysis

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This project analyzed subdivision trends in 14 case study towns to discern whether certain zoning districts and land use patterns promote or curtail parcelization in forestland. The results informed the development of a Forest Fragmentation Action Plan and technical assistance tools for municipalities and regional planners to combat forest fragmentation and parcelization through land use planning.

Funding support for this project was provided by 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.

<http://www.nsrcforest.org>

# Project Summary

This project studied the relationship of subdivision and land use change at the municipal level in fourteen case study towns in Vermont. Project partners compiled the research into a final report with subdivision trend analysis, case studies, and conclusions about effective and problematic zoning approaches for maintaining viable tracts of forestland.

The research from this project demonstrates that a majority of subdivision activity is not being reviewed by Act 250, Vermont's development review law, which means local municipalities must shape subdivision through local regulations. The research also demonstrates that conservation oriented zoning districts are effective in controlling subdivision patterns. Since the majority of subdivisions in the case studies occurred in rural residential type districts, municipalities should focus on developing effective strategies for reducing fragmentation in these districts.

Project partners coordinated with regional and local planning entities to discuss the research results and develop replicable strategies for planning and zoning to reduce parcelization in forestland. This outreach effort resulted in a technical assistance manual and an online community planning toolkit showcasing effective planning and zoning techniques and non-regulatory strategies for maintaining forestland. Project partners also developed a Forest Fragmentation Action Plan, which provides priority strategies to maintain forests. These materials should help inform other Northern Forest states as planners grapple with development pressure in forestland.

# Background and Justification

While close to 80% of Vermont is forested, forest cover is actually 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 the number of 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.

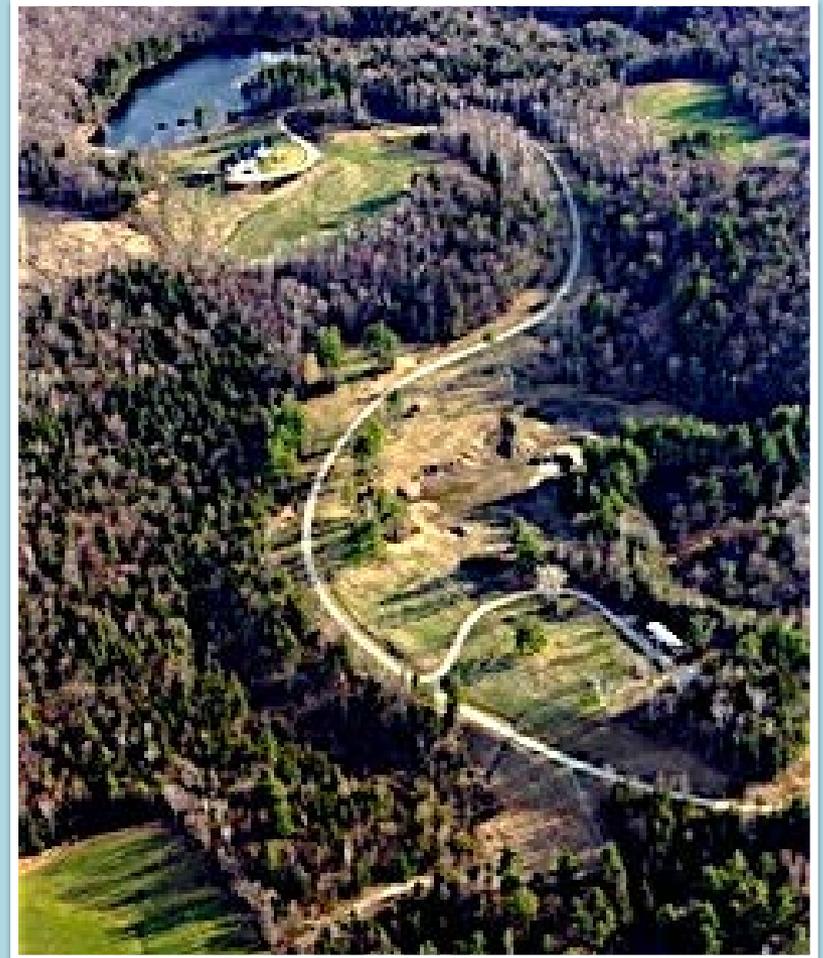


Photo: A. Blake Gardner

# Background and Justification

As a result of subdivision more parcels are being created in Vermont. For example, the number of parcels increased from 61,900 in 1983 to 88,000 in 2008. And housing development on previously undeveloped forestland is increasing too. In just the short period between 2003 and 2009, the amount of undeveloped forestland in parcels 50 acres or larger decreased by about 34,000 acres in Vermont.

Looking ahead, as this trend continues, the ability of forests to provide recreational access, watershed and flood protection, wildlife habitat, and quality wood products will decline. In addition, as forests succumb to development, they lose their ability to mitigate climate change by sequestering and storing carbon.

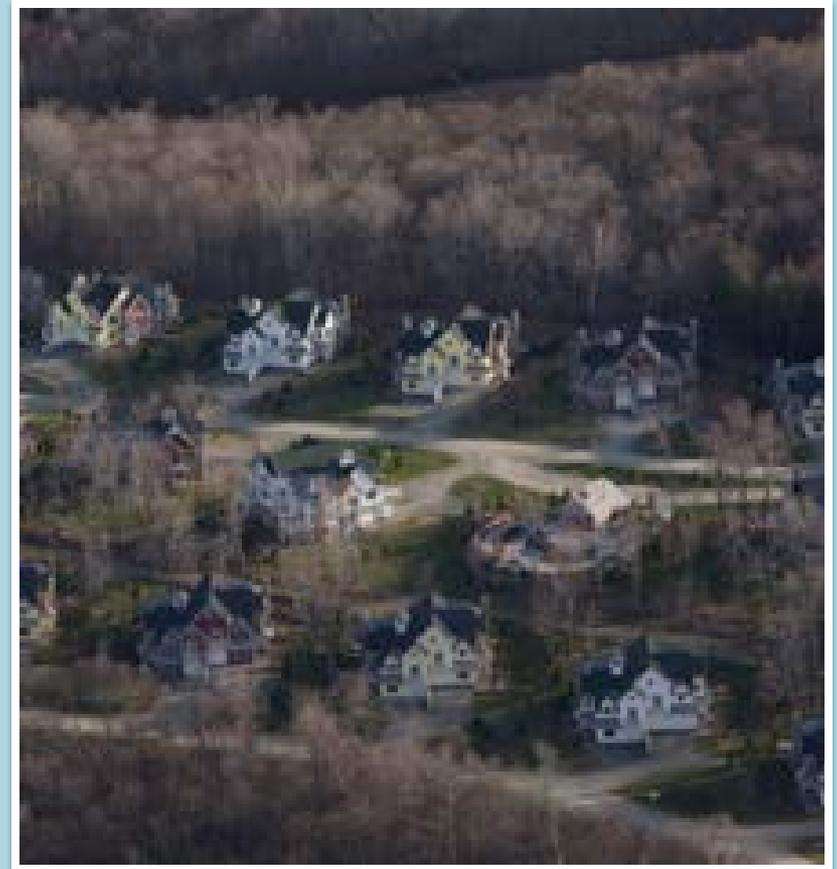


Photo: A. Blake Gardner

# Methods

- In September 2010, the Vermont Natural Resources Council (VNRC) published a report entitled “Informing Land Use Planning and Forestland Conservation Through Subdivision and Parcelization Trend Information.” The report sought to understand how zoning affects subdivision rates and it contained findings from an analysis in eight towns across Vermont. The Phase I report was funded by a NSRC grant and can be downloaded at: <http://www.vnrc.org/subdivisionreport/>.
- Now in Phase II of the project, VNRC has conducted a second round of analysis in fourteen additional towns: *Bolton, Brandon, Dorset, Fayston, Hardwick, Huntington, Jericho, Marlboro, Monkton, Morristown, Richmond, Shrewsbury, Tinmouth and West Windsor*. VNRC examined subdivision trends in each of these towns between 2002 and 2010 to ground truth findings from the Phase I report, and to build a better understanding about the relationship between zoning and subdivision in Vermont.

# Methods

- The Phase II study sought to understand whether there is a correlation between certain types of zoning districts and subdivision patterns. To answer this question, VNRC examined the zoning districts and their corresponding characteristics in all fourteen towns, created a typology that describes “Natural Resources Districts” and “Rural Residential Districts,” and then analyzed subdivision trends accordingly.
- VNRC also examined key questions such as the degree to which Act 250 applied to subdivisions, and the implications of subdivision activity on the Use Value Appraisal (UVA or Current Use) Program.
- In addition, VNRC commissioned a spatial analysis of four case study towns to examine the impact of subdivision activity on wildlife habitat blocks. The Phase II spatial analysis overlaid habitat blocks (ANR data layer), zoning district boundaries, and parcels that were subdivided during the study period (2002-2010).

# Methods

- VNRC shared the results of the subdivision analysis with 36 participants at a day-long workshop with regional planners and state government officials to prioritize land use planning strategies to address forest fragmentation and parcelization. Workshop participants ranked the effectiveness of 28 strategies in addressing forest parcelization. The nine highest rated strategies were selected and workshop participants developed specific action steps to be implemented at the local, regional, and statewide level.
- VNRC conducted three additional workshops with 63 participants from municipal planning and conservation commissions and local government organizations to seek additional input on priority strategies. Workshop feedback was integrated into a Forest Fragmentation Action Plan.
- In addition, VNRC convened a steering committee of professional planners and natural resource experts to provide feedback on the most effective regulatory and non-regulatory land use planning strategies for addressing forest parcelization. This feedback was used to develop strategies for an online community toolbox, and a technical assistance manual called *Community Strategies for Conserving Vermont's Forests and Wildlife: A Guide for Local Action*, which was distributed to every planning and conservation commission in Vermont.

# Results/Project Outcomes

## A final report on subdivision research in 14 case study towns found that:

- 1,580 lots were created from 544 subdivisions on a total of 46,272 acres of land.
- The vast majority of subdivisions occurred in rural residential zoning districts.
- A much smaller percentage of subdivisions occurred in natural resource related zoning districts.
- Only seven of the 555 subdivisions (1%) triggered original jurisdiction under Act 250 review.
- Subdivisions are lowering the amount of land that is eligible to be enrolled in the Use Value Appraisal (Current Use) Program, but increasing the number of parcels that can be enrolled.

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

### Phase II Report



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#### Mapping

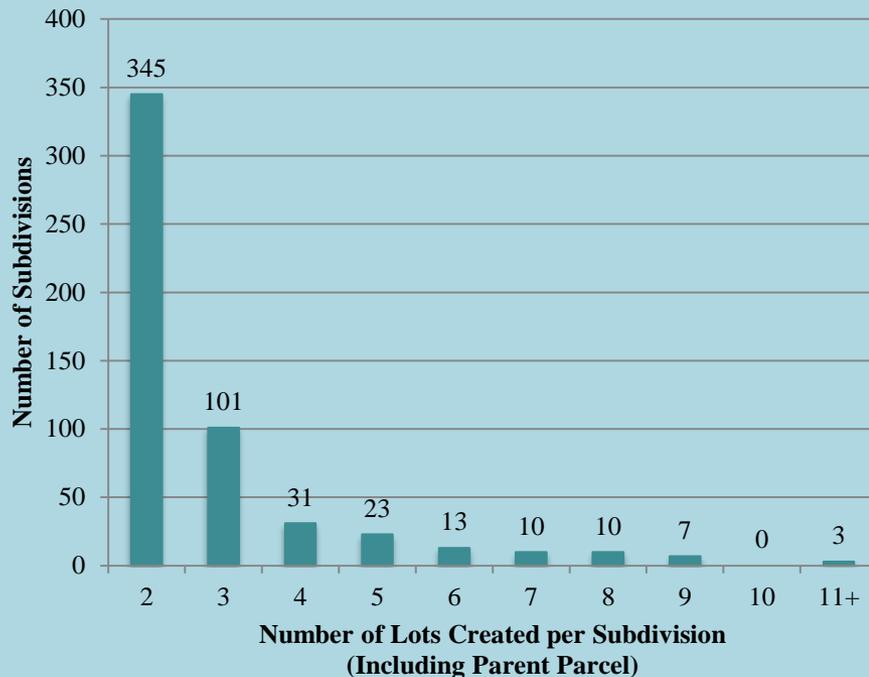
Pam Brangan, GISP, Senior Planner, Chittenden County Regional Planning Commission

May 2014

# Results – Subdivision Analysis

The average subdivision resulted in between 2.1 - 3.9 lots (including the parent parcel).

**Lots Created By Subdivision**



- The vast majority of subdivisions occurred in rural residential zoning districts.
- 79% of all subdivisions and 84% of the total acres subdivided were located either partially or fully within a “rural residential” type district.
- This means forest resource features are more vulnerable to impacts from development in towns that do not have adequate resource protection standards in rural residential districts.

# Results – Subdivision Analysis

- Very little subdivision activity (both in terms of the number of subdivisions and total acreage) took place fully or partially within natural resource related zoning districts.

- Only 15% of all subdivisions and 22% of the total acres subdivided were located either partially or fully within a natural resource related zoning district.

- Natural resource zoning districts appear to be effective in limiting subdivision; however, this could be for various reasons including the fact that these districts often include steep slopes, a higher percentage of conserved land, and higher minimum lot sizes.

- Wildlife habitat is being parcelized by subdivision.
- Based on spatial analysis in four Phase II communities, between 50% and 68.8% of the subdivided acres were located within wildlife habitat blocks mapped by the Agency of Natural Resources.

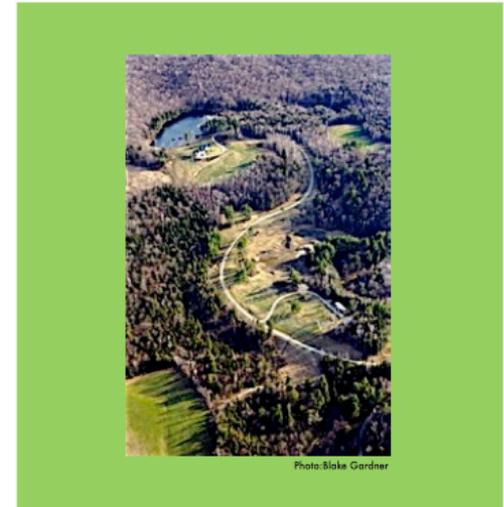
- Subdivision increased the number of parcels potentially eligible for the Use Value Appraisal Program (Current Use), but decreased the number of acres eligible.
- In the 100+ acre category: before subdivision, all 97 parent parcels were eligible for Current Use. After subdivision, 137 parcels were eligible – an increase of 40 lots.

# Results – Outreach/Technical Assistance

## 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.
- Outreach included:
  - Regional & State Workshop in Randolph, VT (10/16/2013). Audience: Regional Planning Commissions (RPCs) & State Participants (ANR, ACCD).
  - Regional Workshops in Craftsbury (10/29/13), Brandon (11/7/13), Westminster (11/12/13). Audience: Local Planning & Conservation Commissions, Selectboards, RPCs.
  - Final webinar to present Action Plan and subdivision trends analysis to partners.

## Forest Fragmentation ACTION PLAN



### 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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### Planning Process



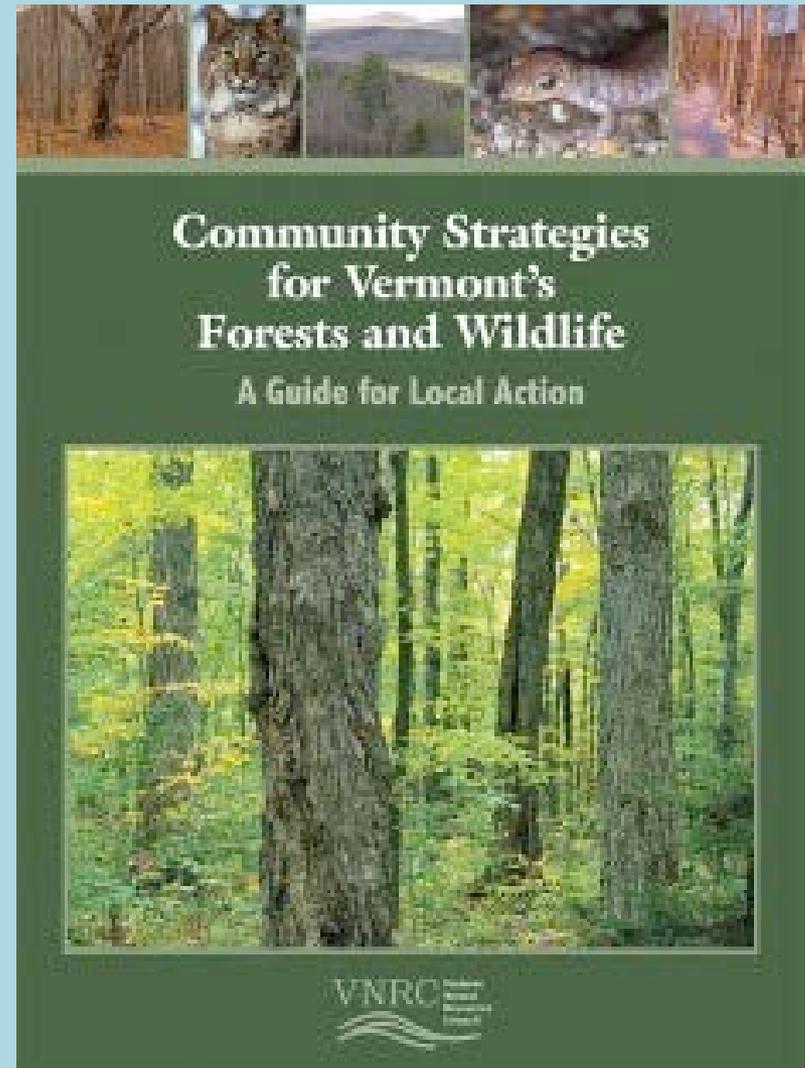
This plan was developed by the Vermont Natural Resources Council (VNRC) with input from many partners including local planning and conservation commissions, selectboards, regional planning commissions, the VT Dept. of Forests, Parks and Recreation, the VT Fish and Wildlife Dept., the VT Dept. of Housing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

# Results – Outreach/Technical Assistance

## **Community Strategies for Vermont's Forests and Wildlife: A Guide for Local Action**

- Provides introductory chapters on the status of forestland in Vermont and the role of conservation planning.
- Provides 15 individual chapters on regulatory and non-regulatory strategies for communities to sustain forests and wildlife at the local and regional level.
- Includes case studies, examples of definitions and regulatory standards to conserve forest resources, illustrations of effective site design, and a resources section.
- Was distributed to every local planning and conservation commission and regional planning commission in VT.
- Available online at <http://vnrc.org/programs/forests-wildlife/guide/>



# Results – Community Planning Toolbox

The screenshot displays the VNRC website's 'Forest Fragmentation' module. The header includes the VNRC logo, navigation links (HOME, CONTACT US, E-NEWS SIGN UP), a search bar, and a DONATE button. The main content area features a title 'Forest Fragmentation', social sharing options, and an 'IN BRIEF' section. The 'IN BRIEF' section contains a paragraph: 'Over 100 years ago, approximately 75 percent of Vermont's landscape was clear cut for pasture, timber, potash and fuel. Since that time, the land has healed and the forest has returned – approximately 80% of Vermont is now forested. While Vermont's forests no longer face the prospect of clearing for agriculture as they did 100 years ago, today Vermont's forests face a new threat: forest fragmentation, which is the result of scattered, poorly planned rural subdivision and development.' Below this is a 'THE ISSUE' section with two paragraphs. The first paragraph states: 'Vermont's forest covered hills and mountains are a key component of the state's identity. Vermonters value forests for a multitude of reasons: they provide wildlife habitat, clean water, recreational opportunities, and thousands of jobs in the forest products sector. From sugar making to leaf peeping, hiking, hunting, watching wildlife, or managing a woodlot, the opportunities to use and enjoy Vermont's forests are endless.' The second paragraph explains: 'In order to continue to enjoy the benefits offered by the forest, it is crucial that large forest blocks remain intact. When forestland is broken up into smaller parcels it is referred to as "parcelization" and the result is typically an increase in the number of people who own the original piece of land. This land ownership pattern can result in new housing and infrastructure development (roads, septic, utility lines, etc.).' An image of a forest landscape is shown to the right of this text. On the right side of the page, there is an illustration of a bear and a deer in a forest, and a list of 'Related Tools' and 'Related Case Studies'. The 'Related Tools' list includes: Forest District, Natural Resources Overlay District, Conservation Zoning District, Subdivision Regulations, Conservation Easement, Road and Trail Policies, and Conservation Developments. The 'Related Case Studies' list includes: Forest Reserve District – Bennington, Forest Zoning Districts in Five Vermont Towns, and Wildlife Corridor Overlay Zone – Shrewsbury.

- The online community planning toolbox is an online series of modules for local decision makers that provides:
  - overviews of planning and Land Use Law;
  - modules on land use strategies, tools, and case studies to address forest fragmentation; and
  - case studies of communities who've used the tools.
- The toolbox was updated with modules on forests and wildlife, built from *Community Strategies for Vermont's Forests and Wildlife*.
- Available at [www.vnrc.org/resources/community-planning-toolbox/](http://www.vnrc.org/resources/community-planning-toolbox/)

# Implications and Applications in the Northern Forest Region

- The subdivision analysis in the case study communities suggests that subdivision activity is limited in “natural resources” type zoning districts. Land use planning and implementation in the region should promote greater use of these districts.
- Subdivision activity is occurring predominately in “rural residential” type districts, which include large blocks of forestland. Land use planning in the region should focus on implementing zoning and subdivision standards in rural residential type districts to reduce forest fragmentation.
- The outreach and technical assistance tools developed through this project provide replicable models for land use planning throughout the Northern Forest region.

# Questions for future research

- *How do subdivision trends compare in towns that have both zoning and subdivision regulations and those that do not?* This project analyzed subdivision trends in municipalities that have zoning bylaws and subdivision regulations. In Vermont only half of all municipalities have subdivision regulations. Since many towns do not have effective regulations to influence subdivision, future research should compare subdivision trends and impacts in towns that have zoning and subdivision regulations and those that do not to flesh out the effectiveness of utilizing subdivision regulations.
- *Where are new buildings, driveways, and roads being sited on subdivided parcels?* While local subdivision decisions provide evidence of parcelization, they do not demonstrate fragmentation, which takes place after the fact, once new buildings, driveways, roads, and other infrastructure are constructed. A more in-depth spatial analysis could measure the specific location of infrastructure to inform the development of proactive subdivision site design.

# Questions for future research

- *Who influences subdivision design and layout?* It is important to understand who is responsible for influencing subdivision design and lot layout. For example, do engineers and site technicians drive subdivision design based on landowner input, or other factors such as proximity of house sites to existing utilities or septic capacity? Do real estate agents or lending institutions influence subdivision decisions? What about landowners? What resources do they have to make proactive decisions about subdivision design and forest resources? A future study could examine these questions to target future outreach efforts.

# List of products

## **Final Subdivision Report**

Fidel, J., McCarthy, K., Shupe, B., & Zavez, E. (2014) *Informing Land Use Planning and Forestland Conservation Through Subdivision and Parcelization Trend Information: Phase II Report*. Montpelier, VT: Vermont Natural Resources Council. Available at <http://vnrc.org/programs/forests-wildlife/subdivision-reports/>

## **Manual for land use planners, local and regional planning commissions**

Fidel, J., McCarthy, K., & Muray, S. (2013) *Community Strategies for Vermont's Forests and Wildlife: A Guide for Local Action*. Montpelier, VT: Vermont Natural Resources Council. Available at <http://vnrc.org/programs/forests-wildlife/guide/>

## **Forest Fragmentation Component of On-line Community Planning Toolbox**

Vermont Natural Resources Council. Available at <http://vnrc.org/resources/community-planning-toolbox/>

## **Forest Fragmentation Action Plan**

Fidel, J., & Zavez, E. (2014) *Forest Fragmentation Action Plan*. Montpelier, VT: Vermont Natural Resources Council. Available at <http://vnrc.org/programs/forests-wildlife/forest-and-habitat-fragmentation-campaign/forest-fragmentation/>

# List of products

## Regional Workshops

- Regional & State Workshop in Randolph, VT (10/16/2013). Audience: Regional Planning Commissions (RPCs) & State Participants (ANR, ACCD). 36 participants.
- Regional Workshops in Craftsbury (10/29/13), Brandon (11/7/13), Westminster (11/12/13). Audience: Local Planning & Conservation Commissions, Selectboards, RPCs. 63 participants.

## Webinar

- (5/28/2014). Audience: Regional Planning Commissions (RPCs), State Participants (ANR, Natural Resources Board), professional planners, conservation organizations, local government officials. 25 participants.

## Leveraged Funds

- \$110,000. Jessie B. Cox Charitable Trust
- \$33,000. Vermont Fish and Wildlife Department
- In kind support from graduate students and VNRC membership