FOREST FRAGMENTATION

Steven Sinclair, Director of Forests
Department of Forest, Parks and Recreation
FOREST  A biological community dominated by trees but also consisting of other plants, animals, and microorganisms, the associated physical environment and their combined interactions and processes.
Future changes in Vermont’s forestland base will depend on the pace of the land development, particularly in the northwestern and southern parts of the state.
## Ownership of Forests in Vermont

<table>
<thead>
<tr>
<th>Ownership Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family and Individuals</td>
<td>64%</td>
</tr>
<tr>
<td>Other Private</td>
<td>15%</td>
</tr>
<tr>
<td>Federal</td>
<td>11%</td>
</tr>
<tr>
<td>State</td>
<td>8%</td>
</tr>
<tr>
<td>Local</td>
<td>2%</td>
</tr>
</tbody>
</table>

**Private Landowners own 3.6 million acres**
The number of landowners is increasing, parcel sizes are decreasing and the age of owners is increasing.
FOREST VALUES

VERMONT’S FORESTS WORK FOR ALL

Photos © Susan C. Morse
Forest Products Economy

- $1.4 billion in economic output to Vermont’s economy
- Employs 10,555 people
- 8% of the state’s manufacturing value
Economics of Scenery, Fall Foliage, Tourism and Recreation

- $1.9 billion in annual sales from forest-based recreation
- 46% attributed to fall foliage
- 704 million in wildlife-based recreation activities
- 37,000 tourism jobs, accounts for 11.5% of state employment
- 10,050 forest-based recreation jobs
- 4,400 hunting and fishing jobs
Flood Protection, Clean Water Supply, and Clean Air

- Tempers frequency, intensity, and extent of flooding
- Lowers peak flows and volumes of runoff
- Filters waters impurities
- Removes significant amount of fine particulate matter from the air
- Reduces the need for costly infrastructure to clean water and air
Wildlife and Biodiversity

- Food resources
- Cover including shelters and structures
- Shading and cooling efforts to temper moisture fluctuations
- Space to access food, breeding areas, and safe travel pathways
- Habitats to sustain diverse populations of plants and animals
Climate Change Mitigation

- Remove and store massive amounts of greenhouse gas emissions
- Sequester 8 MMTCO$_2$e per year, almost as much as our emissions
- $16$ million in air pollution removal
Human Health, Quality of Life, and Cultural Heritage

- Improve human health including improved mood, blood pressure, and immune system
- **Contributes to quality of life**
- **Working landscape and recreation heritage is valued by Vermonters**
FOREST BLOCKS

Large areas of contiguous forest and other natural habitats, often spanning multiple ownerships and frequently un-fragmented by roads, development, or agriculture. Vermont’s forest blocks are primarily forests, but can also include wetlands, rivers and streams, lakes and ponds, cliffs, and rock outcrops.
FOREST FRAGMENTATION TERMINOLOGY

Intact

Parcelized

Parcelized and Fragmented
EFFECTS OF FOREST FRAGMENTATION

- Practicing forestry becomes operationally impractical, economically non-viable, and culturally unacceptable
- Continued flow of forest goods and services depends on maintained, healthy forests
- Dependent on private forestland for wood supply
EFFECTS OF FOREST FRAGMENTATION

- Degrades the recreational experience
- Increased likelihood of land-use conflicts
- Decline in public access to private lands for forest-based recreation including hunting and fishing
EFFECTS OF FOREST FRAGMENTATION

- Less soil infiltration and water filtration
- Increased water flow and erosive power
- Transportation of sediments and pollutants
- Warming of water and discharge into streams
- Reduced groundwater recharge
- Deprivation of water for some areas by ditch interception
- Increased evaporation

Forest products economy
Scenery, fall foliage, tourism, and recreation
Clean water and flood protection
EFFECTS OF FOREST FRAGMENTATION

- Releases carbon stored in soils and vegetation
- Reduced capacity to sequester and store carbon
- Reduced capacity to filter fine particulates and other pollutants in the atmosphere
- Reduced capacity to buffer severe weather impacts
EFFECTS OF FOREST FRAGMENTATION

- Mortality from road construction and vehicle collisions
- Modification of animal behavior
- Impacts interior-dependent species like salamanders, goshawks, bats, and flying squirrels
- Disruption of the physical environment
- Alteration of the chemical environment
- Spread of exotic species

Forest products economy
Scenery, fall foliage, tourism, and recreation
Clean water and flood protection
Clean air and climate mitigation
Wildlife and biodiversity

Photo © Susan C. Morse
Scenery, fall foliage, tourism, and recreation
EFFECTS OF FOREST FRAGMENTATION

- Forest products economy
- Scenery, Fall Foliage, Tourism, and Recreation
- Clean water and flood protection
- Clean air and climate mitigation
- Wildlife and biodiversity
- Human health, quality of life, and cultural heritage

- Reduces human health benefits from forests
- Increased incidence of Lyme disease
- Loss of rural nature valued by Vermonters
- Threatens the cultural underpinnings of what makes Vermont indeed Vermont
Recommendations

Support Outreach and Education on Forest Values and Benefits

Support landowner assistance and education

Provide technical assistance to towns, regional commissions and watershed groups

Promote livable downtowns

Engage schoolchildren
Recommendations

Increase Landowner Incentives to Keep Forests Forest

Support Use-Value Appraisal (UVA or “Current Use”)

Modernize Vermont's property tax system

Reduce tax burdens during intergenerational land transfer

Monetize ecosystem services
Recommendations

**Invest in Strategic Forestland Conservation**

Create a robust funding source for forestland conservation

Establish a common goal and clear conservation priorities

Enhance Forestland Conservation Tools and Programs
Recommendations

Promote Sustainable Forestry and the Vermont Forest Economy

Support & Improve Training for Loggers

Protect and improve infrastructure that supports the local wood industry

Expand modern wood heating in Vermont

Expand markets for Vermont wood products

Recognize and promote the value of forests in outdoor recreation and tourism
H. 789
- Require regional and municipal plans to consider forest blocks and connectivity.
- Establishes a study committee to look at Act 250 changes.

H.857- Forestry Bill
- Establishes a study committee to address intergenerational transfer and estate planning.
- Clarifies provisions in Chapter 117 related to ‘silvicultural’ exemptions to include forestry operations.