

Vermont State Legislature. House Committee on Natural Resources, Fish & Wildlife

Testimony of Dr. William Keeton, Professor of Forest Ecology and Forestry at the University of Vermont,

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Thank you for the opportunity to testify today regarding proposed legislation that would update and revise Act 250. In my testimony this afternoon I will draw on expertise gained over more than 25 years of professional and academic experience related to forest management and policy, including 19 years at the University of Vermont as a Professor of Forest Ecology and Forestry. At UVM I direct the Carbon Dynamics Laboratory and am a Fellow in the Gund Institute for Environment. Outside of UVM I serve on the Board of Trustees for the Vermont Land Trust and have been an active participant for many years in the Vermont Roundtable on Forest Parcelization and Sprawl. Also I served as the UVM representative on the advisory committee to the Act 250 Commission. I have read the Report of the Act 205 Commission and the proposed legislations dated 1/7/2019 and will refer to both in my testimony.

I would like to start by singing some general praise for the work of the Act 250 commission and the recommendations that comprise the core of the proposed legislation. That this process was painstaking and deliberative is clearly evident in the depth and breadth of the report. The quality reflects the care with which the report considered the Commission's charge, public input, and a very large body of supporting materials on Vermont's development trends, demographics, economy, and environment.

The Commission's report and the proposed legislation put Vermont among just a handful of states nationwide that have put this much care and effort into envisioning how to sustain its iconic landscape and all the values it provides into the future. We have Act 250 to thank for the success already achieved, and yet as the report makes clear, habitat fragmentation continues apace. With the proposed revisions, Vermont will provide an example for other states to follow in terms of thinking holistically about landscape as a driver of economy and environmental quality, while taking climate change seriously and planning for the future.

As a scientist I find the report's recommendations to be largely consistent with the best available science on habitat fragmentation, ecosystem services, and climate change. That being said, in my read I noticed several points in the proposed legislation that may warrant further consideration, and I'd like to offer a few suggestions on those today.

Some specific points of feedback for discussion:

1. Expanded development review within mapped forest blocks
 - a. Strongly supported by the science because of the habitat value and ecosystem functions provided by large areas of unfragmented forest;
 - b. Generally the “avoid, minimize, mitigate” approach is well taken, but mitigation through acquisition still means a cumulative net loss of habitat over time;
 - c. To minimize net habitat loss in forest blocks and critical areas, consider a 2 for 1 offset requirement (i.e. must conserve 2 acres for every 1 acre impacted), like in the Puget Sound region of Washington State;
 - d. Restoration is not mentioned as a mitigation option. Consider adding this as a 2 or 3 for 1 option. But the devil is in the details. Restoration as mitigation must be robust and conform to high standards. Avoid the “duck pond” experience of some constructed wetlands. Judiciously applied restoration (as mitigation) within forest blocks, connectivity areas, and critical areas could result in a net increase in habitat availability and landscape function over time.
 - e. New scrutiny of development proposals in connectivity areas would have clear ecological benefits, but connectivity can be defined based on different criteria and thus will require careful thought and delineation. Connectivity and dispersal habitat requirements differ considerably by species. Key will be to develop a rigorous and scientifically defensible set of criteria for delineating connectivity areas.
2. Accounting and mitigation of greenhouse gas emissions from developments triggering Act 250 review (section 6086, 1B)
 - a. Intent is strongly support by the science. I commend the effort to integrate climate change mitigation into the development review process.
 - b. Must include emissions from vegetation disturbance – not just design and type of building materials. Maintaining carbon sequestration and storage in soils and vegetation onsite is critical and one of the best ways to minimize impact.
 - c. But the mitigation requirement or option through purchase of offsets will be challenging in terms of ensuring consistency and meaningful emissions reductions. Will have to involve offset purchase on the voluntary market, and these over-the-counter offsets vary widely in terms of meaningful effect and accounting frameworks.
 - d. The carbon accounting needed to determine development effects on emissions will be highly challenging and potentially burdensome. There are many different registries and standards for both the basic carbon accounting as well as offsets. Need for consistency and rigor. Will require further study and deliberation, good idea to hand this off to ANR for refinement.
 - e. Options for the carbon accounting range from highly sophisticated/comprehensive (and thus potentially expensive), such as the protocol required by carbon markets, to much more simple (e.g. a scorecard

approach based on multiple criteria, as in LEED certification of green buildings). A question for policy makers is how specific the legislation should be with respect to eligible accounting approaches.

3. Adaptation to climate change

- a. (Section 6086 2D and C). Should include planning to reduce effects of development footprint on hydrologic responses to extreme weather events. Consider expanding review to include layout and planning of development and roads/driveways to reduce landscape vulnerability to extreme weather. Important to address not just individual projects, but rather the cumulative effects of multiple developments on impervious surfaces, roads and driveways, and land-use changes.
- b. Consider adaptation to maintain a resilient landscape, not just resilient structures. Need to reduce vulnerability of the landscape to extreme weather, such as high precipitation events. This will require careful planning at landscape scales, rather than piecemeal, one development at a time.
- c. Consider new research showing the importance of structurally complex forests along streams. Would be stronger to require explicit setbacks from streams, like in the Chesapeake Bay region.
- d. Lowering the threshold triggering Act 250 review from 2,500 to 2,000 ft. elevation is consistent with the science around sensitivity to climate change within this elevational ecotone in the Green Mountains. Ecotones are where species inhabit the extremes of their ranges and climate tolerance. These areas are where the effects of climate change on species distributions and migration (in response to change) are most likely to be expressed. Thus, protecting forests above 2,000 feet elevation makes sense from an adaptation standpoint.

And now I'll offer a few general thoughts about the importance of unfragmented forests and a vibrant, intact working landscape...

The proposed revisions to Act 250 would strengthen review of development proposals in the forest blocks that have been mapped statewide. As you know these are our state's last and best remaining areas of unfragmented habitat. Tightening review in core habitat, connectivity, and flood hazard areas, while reducing the regulatory burden in village growth centers, makes of lot sense ecologically and from a forestry standpoint. Conserving large intact blocks of forestland is not only consistent with, but in fact required to maintain the conditions needed for economically robust and sustainable forest management. Having read the proposed legislation carefully, I see nothing that would in any way impede forest operations, rather the opposite is true because these activities would remain deliberately and clearly exempted from review or restrictions below 2,000 feet elevation. The proposed Act 250 changes would be an investment in the kind of landscape needed to keep a thriving forest-based economy in place, and one that will encompass the full range of forest uses and benefits including timber, wildlife, water, sugaring, tourism, and recreation.

In 2010 a group of 20 scientists, myself among them and led by Harvard Forest, published a report entitled “*Wildlands and Woodlands, a Vision for the New England Landscape*.” We released a follow up report focused on communities and economic vitality in 2017. In these reports we showed that for the first time in 150 years, all six New England states are losing forest cover, due almost entirely to sub-urban and rural sprawl. In *Wildlands and Woodlands*, we outlined a number of reasons why parcelization and fragmentation from rural sprawl are harmful to working forests, and we presented evidence why working forests are so fundamental to the economy, ecology, and cultural fabric of the region. Reasons why sprawl is harmful to working forests include the increasing difficulty of managing both timber and non-timber resources as property size diminishes. Though forest stewardship on small non-industrial private forests in Vermont is not only very important but often of exceptional quality, the fact remains that forest management on large properties often benefits from greater flexibility and efficiency. These include more flexible timber harvest scheduling, integration of a broader range of uses, and economic efficiencies gained through economies of scale. Commodity production on larger properties is able to compete more effectively in often challenging market conditions, particularly as the effects of globalization within the wood products industry continue to buffet the region.

For these reasons, the *Wildlands and Woodlands* report, representing the consensus view of some of the best forest scientists in the region, recommended that policy makers, such as this committee, consider a broad range of options to conserve large tracts of working forests. These included both market and incentive-based approaches, as well as the type of development review considered in the Act 250 legislation. Our view was that incentive-based and regulatory approaches, working together, would help maintain the viability of working forests if they contributed to landscapes dominated by forests, not rural sprawl. In Vermont we have clearly seen how the vast majority of rural subdivisions do not trigger Act 250 review because of the 6 and 10 lot thresholds. If proposed revisions were to address this loophole, particularly in forest blocks, connectivity areas, and critical resource areas, it would be a major step forward.

I'll mention one other reason why large forest blocks are important from a forestry perspective. Much of my work these days focuses on how to help landowners gain access to rapidly developing domestic and international carbon markets. These have great potential for providing an additional revenue stream for conserved and working forests in Vermont, as shown in our recently completed feasibility study for the state. My research has showed that properties larger than roughly 1,000 acres in size have a huge advantage over smaller properties in terms of making carbon projects financially viable. In addition, under voluntary markets, groups of medium sized properties (in the 200 to 500 acre range) can “aggregate” themselves into larger carbon projects, making them work financially that way. The take home message is that for carbon projects to work in Vermont – which represents a considerable opportunity to add value to working forests while also fighting climate change – we have to keep large blocks of forests intact, and best that this be on larger parcels.

To say there is scientific consensus that fragmentation poses significant risks to forest biodiversity and ecosystem services is a very large understatement. Almost 50 years of research have clearly documented these risks across a wide range of temperate forest ecosystems, like ours here in Vermont. The science is clear that as housing – and especially roads – perforate the forest and increase in density, the viability of habitats for interior dwelling species declines. Roads, developments, and yards vector or facilitate the movement of invasive species, especially noxious exotic plants of which Vermont has many. Habitat generalists often increase with fragmentation, either out-competing or in some cases predating upon interior-dwelling species. That is why large unfragmented blocks of forest, connected by contiguous dispersal habitats, are essential to the survival of many species. I am sure all of know you that increasing development in headwater areas, like many of the forest blocks the proposed legislation considers, can alter hydrologic functioning, potentially increasing the “flashiness” of peak flows during flood events. Road densities especially have been implicated in this regard by a large body of research. That’s why review and mitigation are so important in light of recent data that show a clear trend of increasingly intense precipitation events in Vermont.

Though Vermont has seen its fair share of parcelization in the last 20 or 30 years, particularly from development of second home and vacation properties, we have yet to see the population pressures that led to the “build out” experienced in parts of our neighboring states to the south. Some have predicted that we may see more development pressure in the future with the phenomena of “climate refugees.” In my view this represents a golden opportunity to be proactive. We can learn from other parts of the eastern U.S. that have lost significant areas of rural landscapes over the last 50 years, to avoid the kinds of incremental parcelization and fragmentation that slowly, cumulatively undermine the very qualities that draw people here in the first place.

I have participated in the Vermont Forest Roundtable since its inception more than a decade ago. One thing has been clear all along, as exemplified in the consensus reports the Roundtable has produced. That is, essentially every constituency with a stake in Vermont’s forests wants those forests to remain as forests. The proposed legislation would go a long way towards achieving that outcome. It provides a clear path toward achieving a future in which our grandchildren will enjoy the same benefits from an open, unfragmented landscape that our generation has enjoyed.

I commend you for considering this legislation and would be happy to take any questions.



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