Vermont's Forest Future:

Accounting for the full range of forest management benefits and impacts

Testimony on H566

Zack Porter
Director, Standing Trees

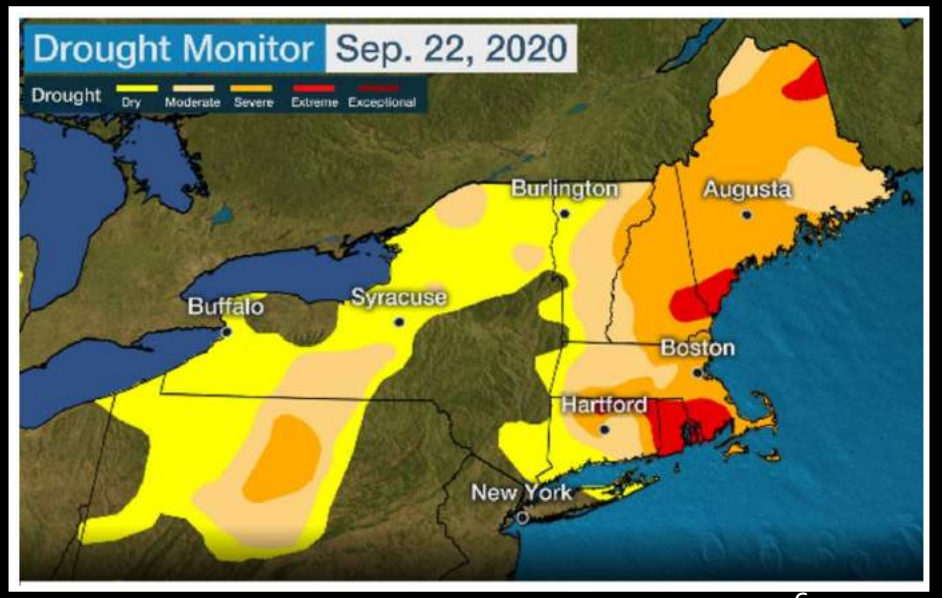
STANDING TREES

Home Forests for the Future Threats to Public Forests Get Involved Blog About Donate


“The forest is us. We have to treat it that way. It’s Family.”
- Rich Holschuh, Elnu Abenaki, Director of the Atowi Project

We are living through three great crises in VT:

- Extinction
- Water Quality
- Climate



VERMONT CONSERVATION DESIGN

PART 2: NATURAL COMMUNITIES AND HABITATS
TECHNICAL REPORT

INITIAL VERMONT CLIMATE ACTION PLAN

Vermont Climate Council
DECEMBER 2021

Natural Solutions

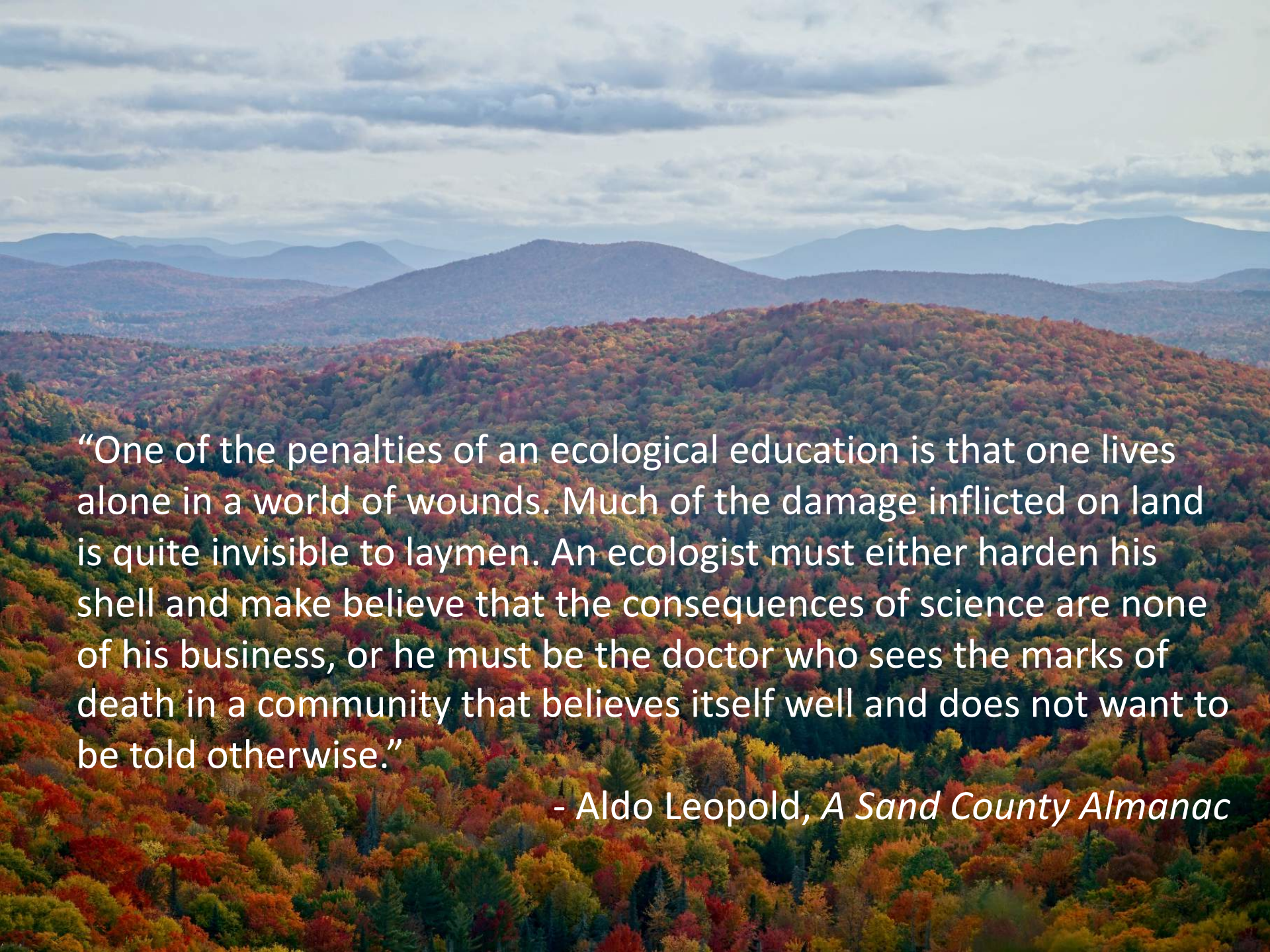
Phosphorus TMDLs for Vermont Segments of Lake Champlain

June 17, 2016

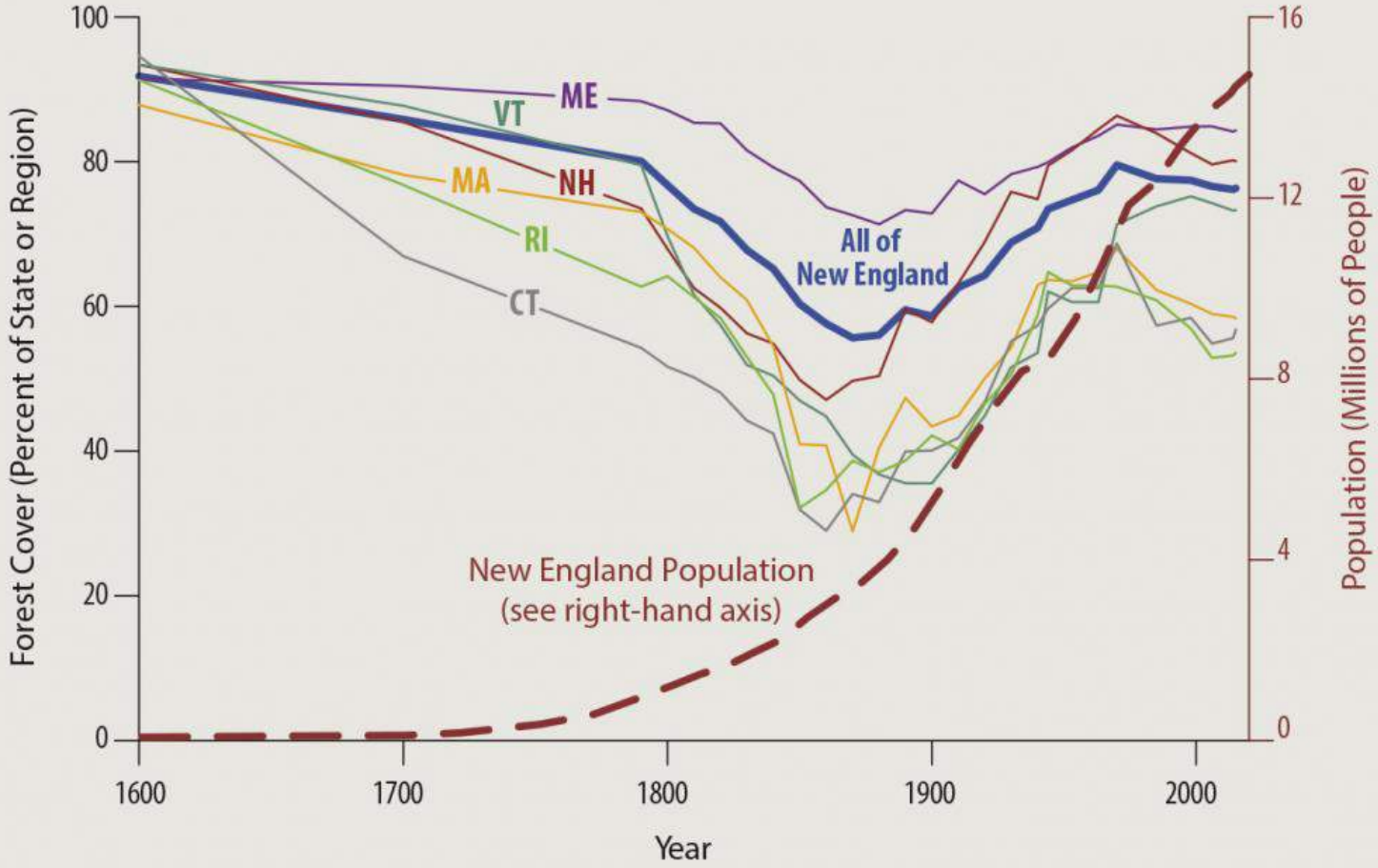
VERMONT STRONGER

2018 Vermont State Hazard Mitigation Plan

Making Vermont safer and more resilient in the face of climate change and natural disasters

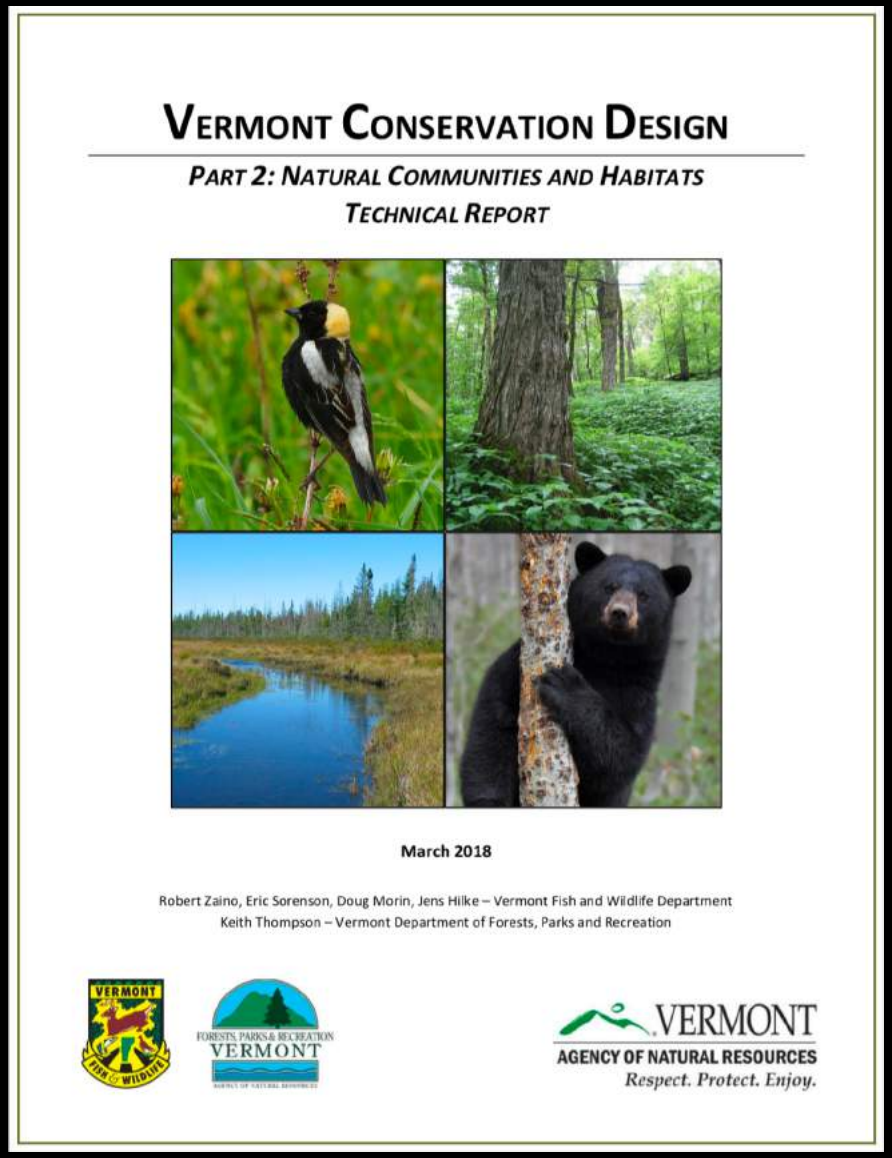

“One of the penalties of an ecological education is that one lives alone in a world of wounds. Much of the damage inflicted on land is quite invisible to laymen. An ecologist must either harden his shell and make believe that the consequences of science are none of his business, or he must be the doctor who sees the marks of death in a community that believes itself well and does not want to be told otherwise.”
- Aldo Leopold, *A Sand County Almanac*

New England Forest Cover and Human Population



The second wave of forest loss now under way in New England jeopardizes the region's environmental success story, which has been characterized by the return of forests following the decline in agriculture in the East.

Source: "Wildlands and Woodlands"



"The native species of Vermont evolved in a landscape dominated by old forest…the closer the target is to the historic old forest condition, the greater the likelihood that the landscape will support all of Vermont's native forest species and fully provide the forest's ecological services."

"Although there are small patches of old growth scattered around the state, old forest is absent in Vermont as a functional component of the landscape. In most forests, passive restoration will result in old forest conditions."

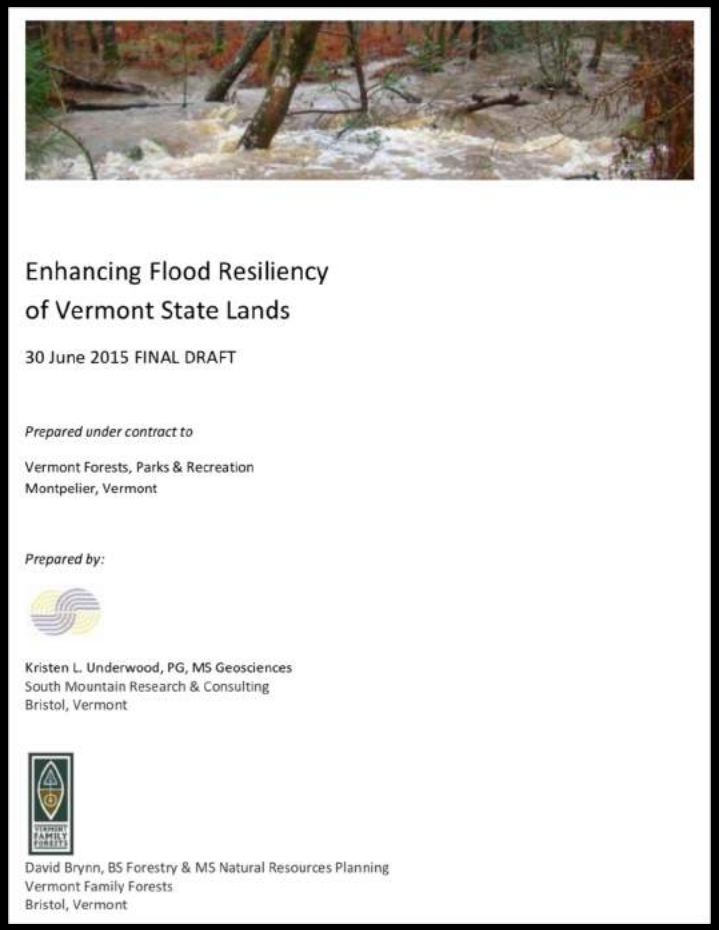
PRIMARY RESEARCH ARTICLE

WILEY Global Change Biology

The climate sensitivity of carbon, timber, and species richness covaries with forest age in boreal–temperate North America

Dominik Thom[1,2] | Marina Golivets[1] | Laura Edling[1] | Garrett W. Meigs[3] | Jesse D. Gourevitch[1,2] | Laura J. Sonter[4] | Gillian L. Galford[1,2] | William S. Keeton[1,2]

"[Older forests] simultaneously support high levels of carbon storage, timber growth, and species richness. Older forests also exhibit low climate sensitivity…compared to younger forests… Strategies aimed at enhancing the representation of older forest conditions at landscape scales will help sustain [ecosystem services and biodiversity] in a changing world."



Enhancing Flood Resiliency
of Vermont State Lands

30 June 2015 FINAL DRAFT

Prepared under contract to

Vermont Forests, Parks & Recreation
Montpelier, Vermont

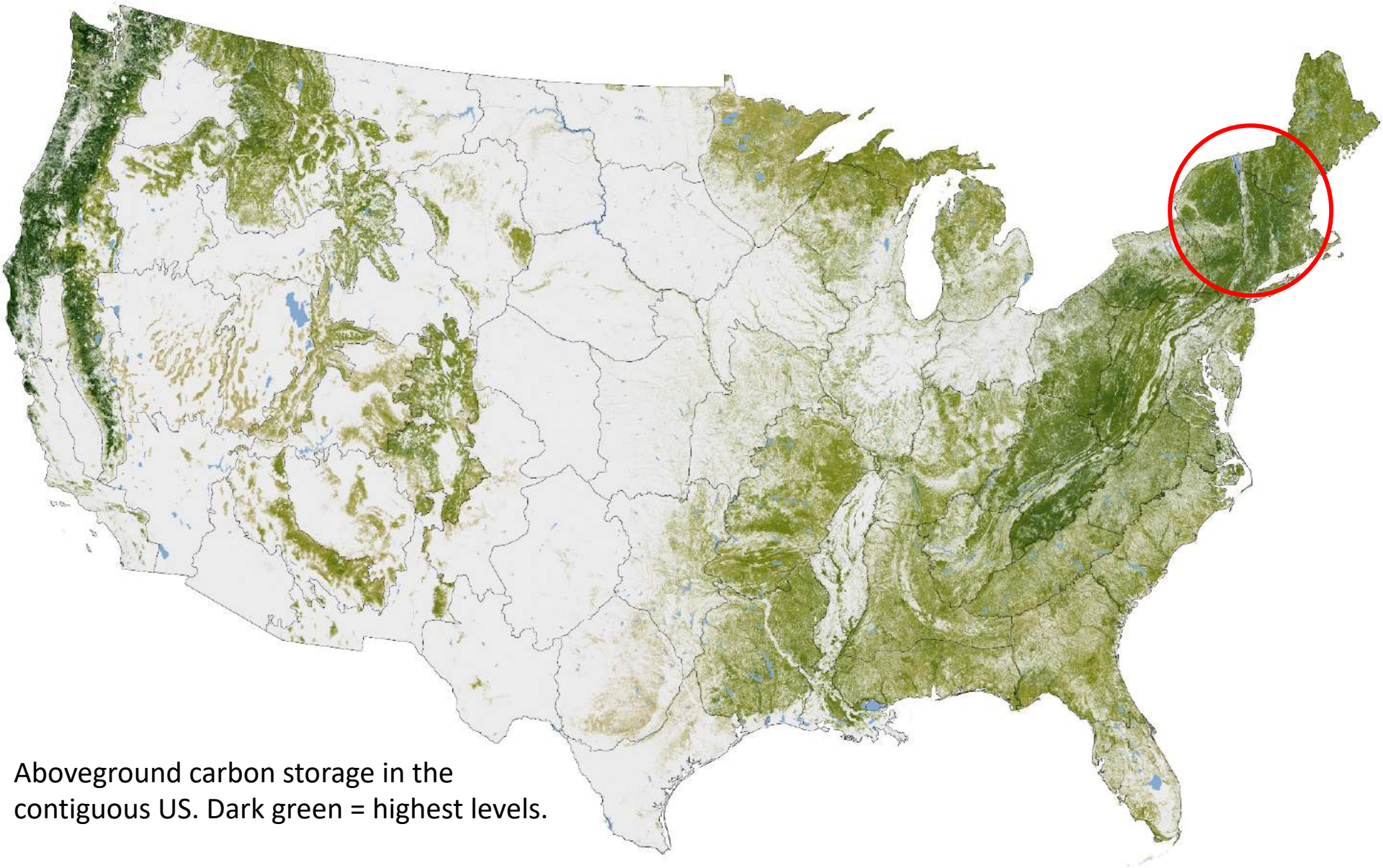
Prepared by:

Kristen L. Underwood, PG, MS Geosciences
South Mountain Research & Consulting
Bristol, Vermont

David Brynn, BS Forestry & MS Natural Resources Planning
Vermont Family Forests
Bristol, Vermont

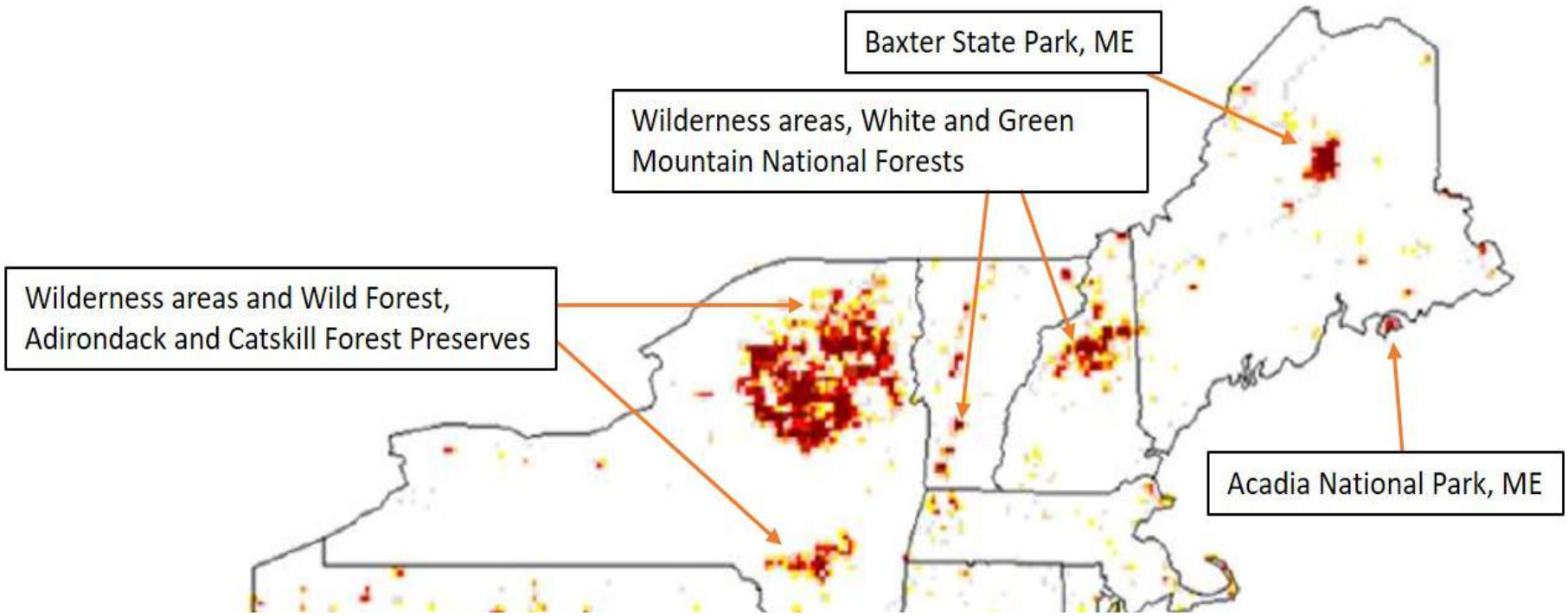
"There may be a tendency to assume that lands in forest cover are resilient to the effects of flooding simply by virtue of their forested status. **However, forest cover does not necessarily equate to forest health and forest flood resilience**. *Headwater forests of Vermont include a legacy of human modifications that have left certain land areas with a heightened propensity to generate runoff, accelerate soil erosion, and sediment streams. These legacy impacts affect forest lands across the state [emphasis added]...*

"The quality of [today's] forests is not the same as the pre-Settlement old growth forests. *The legacy of early landscape development and a history of channel and floodplain modifications continue to impact water and sediment routing from the land [emphasis added]."*



Aboveground carbon storage in the contiguous US. Dark green = highest levels.

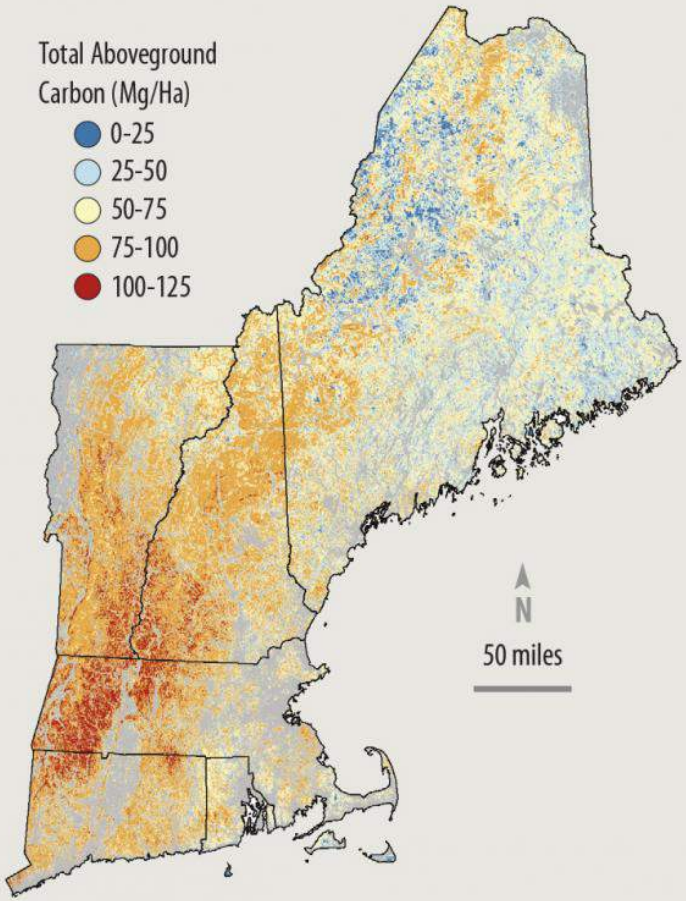
Source: Woods Hole Research Center



30% of *all* aboveground carbon in the Northeastern US is stored in just **5%** of the land area

From "A Contemporary Carbon Balance for the Northeast Region of the United States." (Lu et al 2013)

Forests Store Carbon



New England's forests provide a vast store-house of carbon that helps mitigate global climate change. Variation in the amounts of carbon, wood, and the size of trees across the region is largely due to the history of timber harvesting. Data are not represented for gray areas that are predominantly agricultural or densely populated.

Source: *Wildlands and Woodlands 2017*

VT Forest Carbon Facts:

- Vermont forests sequester an amount of carbon each year equal to approximately half of the state's annual emissions

- Studies by UVM researchers show that New England's forests could store ***2-4 times more*** carbon than present levels if allowed to grow old.

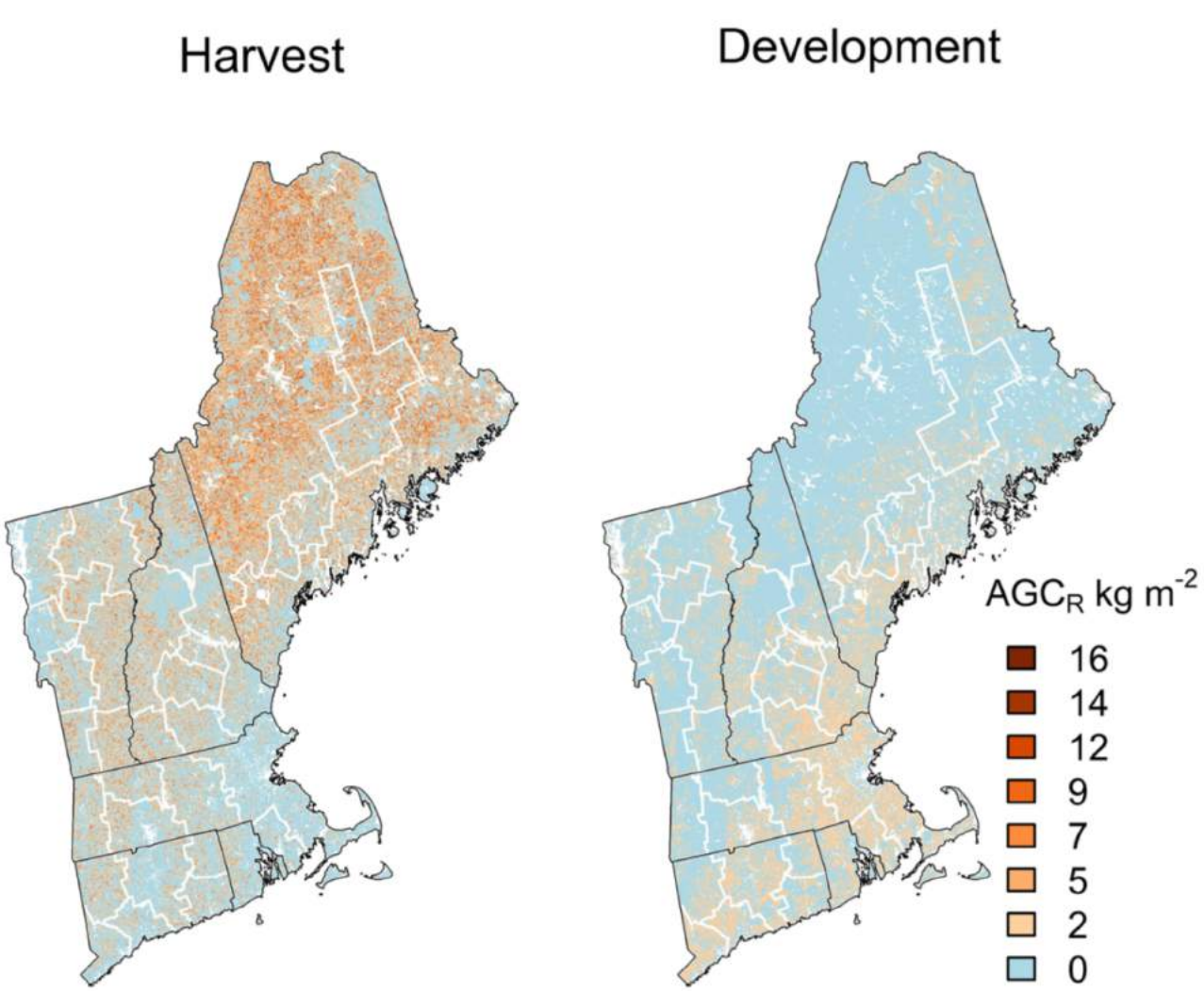


Fig. 6. Map of land-use intensity from harvesting and development. Land-use intensity represents cumulative removals from 2010 to 2060 under the climate change scenario. Sites that were not affected by each respective land use are represented in blue. White and black lines delineate sub-region and state boundaries, respectively. AGC_R = Aboveground Carbon Removed (kg m^{-2}).

"Among land uses, timber harvesting [had] a larger effect on [aboveground carbon] storage and changes in tree composition than did forest conversion to non-forest uses… Our results demonstrate a large difference between the landscape's potential to store carbon and the landscape's current trajectory."

Duveneck and Thompson 2019

esa

ECOSPHERE

Timber harvest as the predominant disturbance regime in northeastern U.S. forests: effects of harvest intensification

MICHELLE L. BROWN [1,4,†] CHARLES D. CANHAM,[2] LORA MURPHY,[2] AND THERESE M. DONOVAN[3]

[1]Ver

[3]U.S. Geological

Harris et al. Carbon Balance Manage (2016) 11:24
DOI 10.1186/s13021-016-0066-5

Carbon Balance and Management

Citation: Br
disturbance r

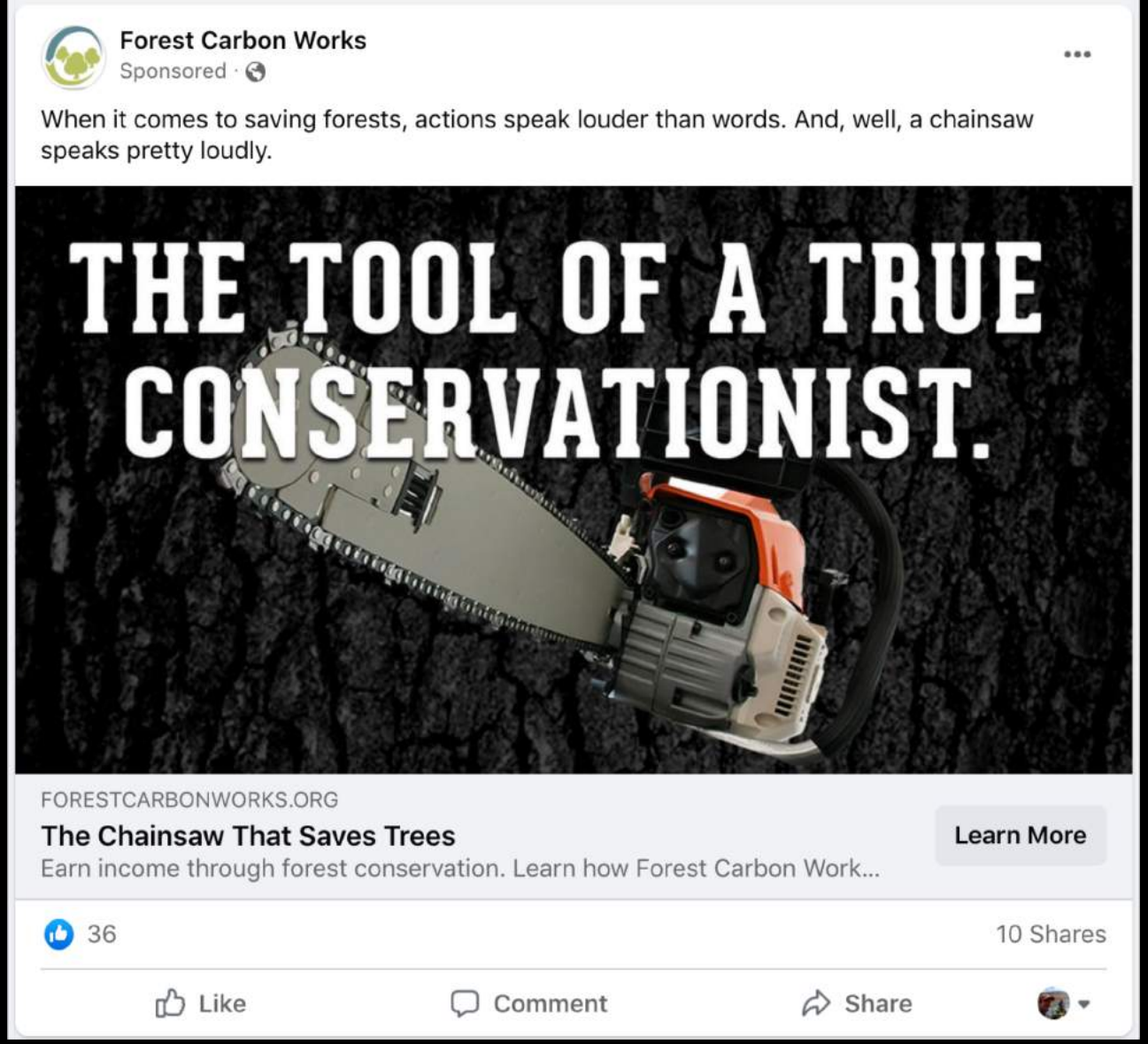
RESEARCH Open Access

Attribution of net carbon change by disturbance type across forest lands of the conterminous United States

N. L. Harris[1,5*†], S. C. Hagen[2†], S. S. Saatchi[3], T. R. H. Pearson[1], C. W. Woodall[4], G. M. Domke[4], B. H. Braswell[2], B. F. Walters[4], S. Brown[1], W. Salas[2], A. Fore[3] and Y. Yu[3]

86%

of all carbon lost from forests per year in the Northeast US
is from timber harvest.



It's critical to be aware of greenwashing.

New England forests are healthiest when left unlogged.

McNeil Biomass Electricity Facility

Source: *Vermont Digger*

- Vermont's single largest source of carbon emissions is the McNeil Biomass Power Plant
- This facility has talked about increasing its efficiency for forty years but has failed to do so
- Biomass power plants produce ***1.5x the amount of carbon as a coal-fired power plant*** for an equivalent amount of electricity
- Encircled in red, above, are whole trees waiting to be burned at McNeil.

Allergy & Asthma Network

American Academy of Pediatrics
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aafa Asthma and Allergy Foundation of America

NACCHO
National Association of County & City Health Officials

NATIONAL ENVIRONMENTAL HEALTH ASSOCIATION

PSR
PHYSICIANS FOR SOCIAL RESPONSIBILITY

September 13, 2016

Dear Senator/Representative:

The undersigned public health, medical and nursing organizations urge you to oppose policies that would encourage or expand the use of biomass for electricity production. Biomass is far from "clean" – burning biomass creates air pollution that causes a sweeping array of health harms, from asthma attacks to cancer to heart attacks, resulting in emergency room visits, hospitalizations, and premature deaths.

Biomass uses fuel sources, or feedstocks, whose combustion harms human health, including wood products, agricultural residues or forest wastes, and highly toxic construction and demolition waste. Burning biomass from any source generates immediate dangerous air pollution that puts health at risk.

Among the most dangerous of these emissions is particulate matter, also known as soot. These particles are so small that they can enter and lodge deep in the lungs, triggering asthma attacks, cardiovascular disease, and even death.[i] Particulate matter can also cause lung cancer.[ii]

Full letter available here: http://www.naccho.org/uploads/downloadable-resources/Policy-and-Advocacy/Health-organizational-letter-health-impacts-of-biomass.pdf

To: Rep. Kathy Castor, Chair, House Select Committee on the Climate Crisis
Rep. Frank Pallone, Chair, House Energy and Commerce Committee
Rep. Raúl Grijalva, Chair, House Natural Resources Committee
Rep. Collin Peterson, Chair, House Agriculture Committee
Sen. Lisa Murkowski, Chair, Senate Committee on Energy and Natural Resources
Sen. John Barrasso, Chair, Senate Committee on Environment and Public Works

From: Scientists concerned about climate and biodiversity impact of logging

Date: 13 May 2020

Dear Members of Congress,

As forest and climate change scientists and experts, we are writing to urge you to oppose legislative proposals that would promote logging and wood consumption, ostensibly as a natural climate change solution, based on claims that these represent an effective carbon storage approach, or claims that biomass logging, and incinerating trees for energy, represents renewable, carbon-neutral energy.

We find no scientific evidence to support increased logging to store more carbon in wood products, such as dimensional lumber or cross-laminated timber (CLT) for tall buildings, as a natural climate solution. The growing consensus of scientific findings is that, to effectively mitigate the worst impacts of climate change, we must not only move beyond fossil fuel consumption but must also substantially *increase* protection of our native forests in order to absorb more CO_2 from the atmosphere and store more, not less, carbon in our forests (Depro et al. 2008, Harris et al. 2016, Woodwell 2016, Erb et al. 2018, IPCC 2018, Law et al. 2018, Harmon 2019, Moomaw et al. 2019).

Furthermore, the scientific evidence does not support the burning of wood in place of fossil fuels as a climate solution. Current science finds that burning trees for energy produces even more CO_2 than burning coal, for equal electricity produced (Sterman et al. 2018), and the considerable accumulated carbon debt from the delay in growing a replacement forest is not made up by planting trees or wood substitution (noted below). We need to increase growing forests to more rapidly close the gap between emissions and removal of CO_2 by forests, while we simultaneously lower emissions from our energy, industrial and agricultural sectors.

Full letter available here: https://sites.tufts.edu/gdae/files/2020/05/Forest-Letter-to-Congress.pdf

The logging and wood products industries suggest that most of the carbon in trees that are logged and removed from forests will simply be stored in CLT and other wood products for buildings instead of being stored in forest ecosystems. However, this is clearly incorrect. Up to 40% of the harvested material does not become forest products and is burned or decomposes quickly, and a majority of manufacturing waste is burned for heat. One study found that 65% of the carbon from Oregon forests logged over the past 115 years remains in the atmosphere, and just 19% is stored in long-lived products. The remainder is in landfills (Hudiburg et al. 2019).

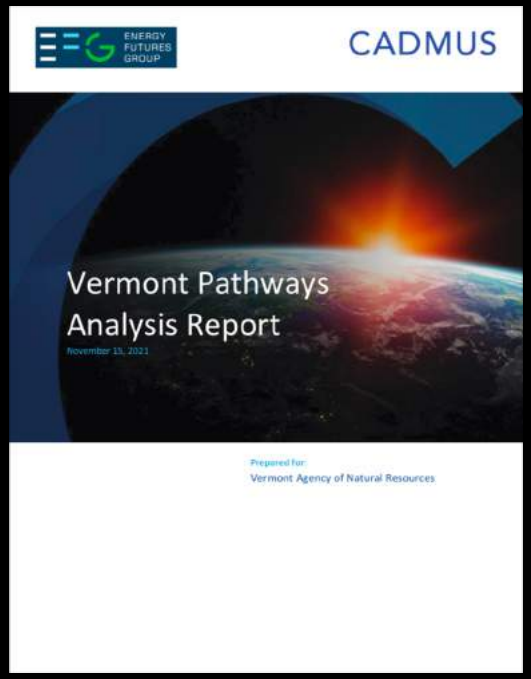
The wood products industry claims that substituting wood for concrete and steel reduces the overall carbon footprint of buildings. However, this claim has been refuted by more recent analyses that reveal forest industries have been using unrealistic and erroneous assumptions in their models, overestimating the long-term mitigation benefits of substitution by 2 to 100-fold (Law et al. 2018, Harmon 2019). The climate impact of wood is even worse if the reduced forest carbon sequestration and storage caused by nutrient loss and soil compaction from logging is included, as discussed above.

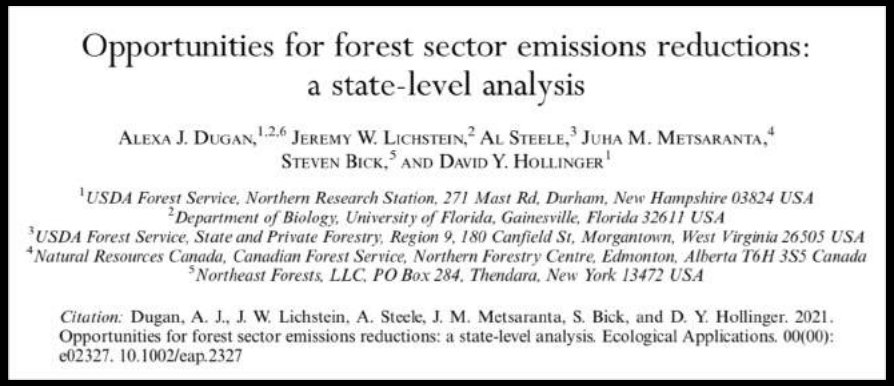
Full letter available here: https://sites.tufts.edu/gdae/files/2020/05/Forest-Letter-to-Congress.pdf

INITIAL VERMONT CLIMATE ACTION PLAN

Vermont Climate Council

DECEMBER 2021





Opportunities for forest sector emissions reductions: a state-level analysis

Alexa J. Dugan,[1,2,6] Jeremy W. Lichstein,[2] Al Steele,[3] Juha M. Metsaranta,[4] Steven Bick,[5] and David Y. Hollinger[1]

[1]*USDA Forest Service, Northern Research Station, 271 Mast Rd, Durham, New Hampshire 03824 USA*
[2]*Department of Biology, University of Florida, Gainesville, Florida 32611 USA*
[3]*USDA Forest Service, State and Private Forestry, Region 9, 180 Canfield St, Morgantown, West Virginia 26505 USA*
[4]*Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta T6H 3S5 Canada*
[5]*Northeast Forests, LLC, PO Box 284, Thendara, New York 13472 USA*

Citation: Dugan, A. J., J. W. Lichstein, A. Steele, J. M. Metsaranta, S. Bick, and D. Y. Hollinger. 2021. Opportunities for forest sector emissions reductions: a state-level analysis. Ecological Applications. 00(00): e02327. 10.1002/eap.2327

Flawed science in Vermont's Climate Action Plan:

- Considers biomass electricity and timber harvest as low carbon or even carbon neutral
- Overstates the amount of carbon that can be stored in wood products, and the benefits of substituting wood for other building materials or energy sources
- Erroneously suggests that sequestration rates are declining, and misleadingly asserts that sequestration rates are more important than the total amount of carbon that is stored in forests
- Fails to analyze a pathway or scenario that puts a significant portion of Vermont forests (at least 10%, as proposed in Vermont Conservation Design) into wildlands management.

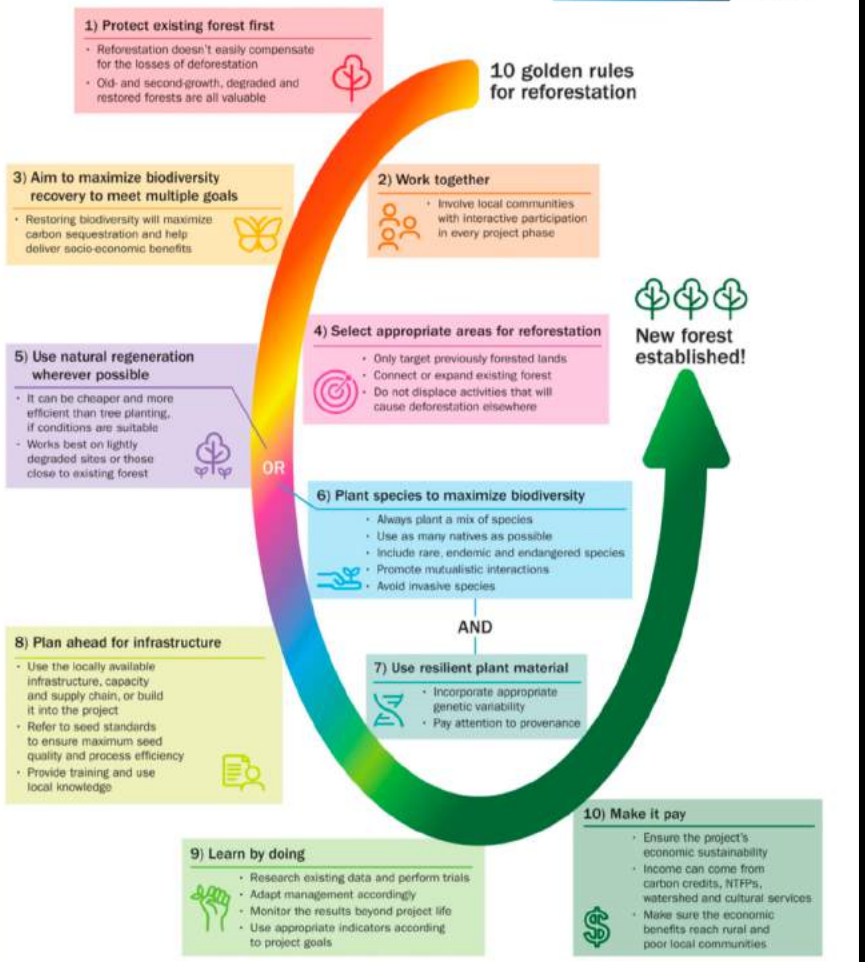


FIGURE 2 Ten golden rules for a successful reforestation project. The order of the rules matches the order in which tasks should be considered during project planning and implementation, although some are interdependent and should be considered in parallel. See text for details

nature climate change

PERSPECTIVE

https://doi.org/10.1038/s41558-021-01198-0

Check for updates

Protect, manage and then restore lands for climate mitigation

Susan C. Cook-Patton[1]✉, C. Ronnie Drever[2], Bronson W. Griscom[3], Kelley Hamrick[1], Hamilton Hardman[1], Timm Kroeger[1], Pablo Pacheco[4], Shyla Raghav[3], Martha Stevenson[4], Chris Webb[5], Samantha Yeo[1] and Peter W. Ellis[6]

Limited time and resources remain to constrain the climate crisis. Natural climate solutions represent promising options to protect, manage and restore natural lands for additional climate mitigation, but they differ in (1) the magnitude and (2) immediacy of mitigation potential, as well as (3) cost-effectiveness and (4) the co-benefits they offer. Counter to an emerging preference for restoration, we use these four criteria to propose a general rule of thumb to protect, manage and then restore lands, but also show how these criteria explain alternative prioritization and portfolio schemes. This hierarchy offers a decision-making framework for public and private sector actors to optimize the effectiveness of natural climate solutions in an environment in which resources are constrained, and time is short.

Received: 25 August 2020 | Accepted: 13 October 2020

DOI: 10.1111/gcb.15498

GCB REVIEWS

Global Change Biology WILEY

Ten golden rules for reforestation to optimize carbon sequestration, biodiversity recovery and livelihood benefits

Alice Di Sacco[1] | Kate A. Hardwick[1] | David Blakesley[2,3] | Pedro H. S. Brancalion[4] | Elinor Breman[1] | Loic Cecilio Rebola[1,5] | Susan Chomba[6] | Kingsley Dixon[7,8] | Stephen Elliott[9] | Godfrey Ruyonga[10] | Kirsty Shaw[11] | Paul Smith[11] | Rhian J. Smith[1] | Alexandre Antonelli[1,12,13]


Clearcut logging in Vermont's Groton State Forest. Does this look like management for the greatest good, for the greatest number, in the long run?

- Trees grow easily in Vermont. Growing forests is something entirely different.
- A forest does not produce high levels of ecosystem services until it begins to acquire the characteristics of an older forest, on average ***after*** 100-125 years of age.

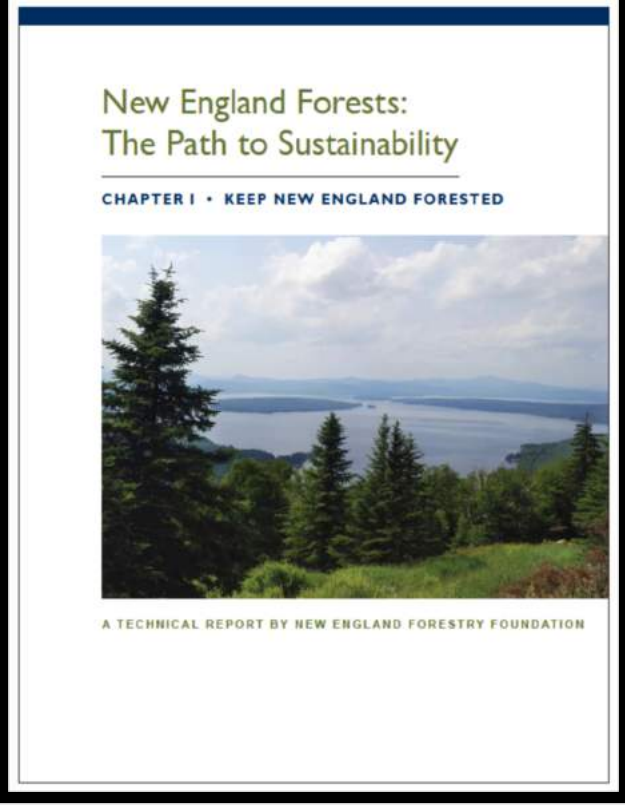
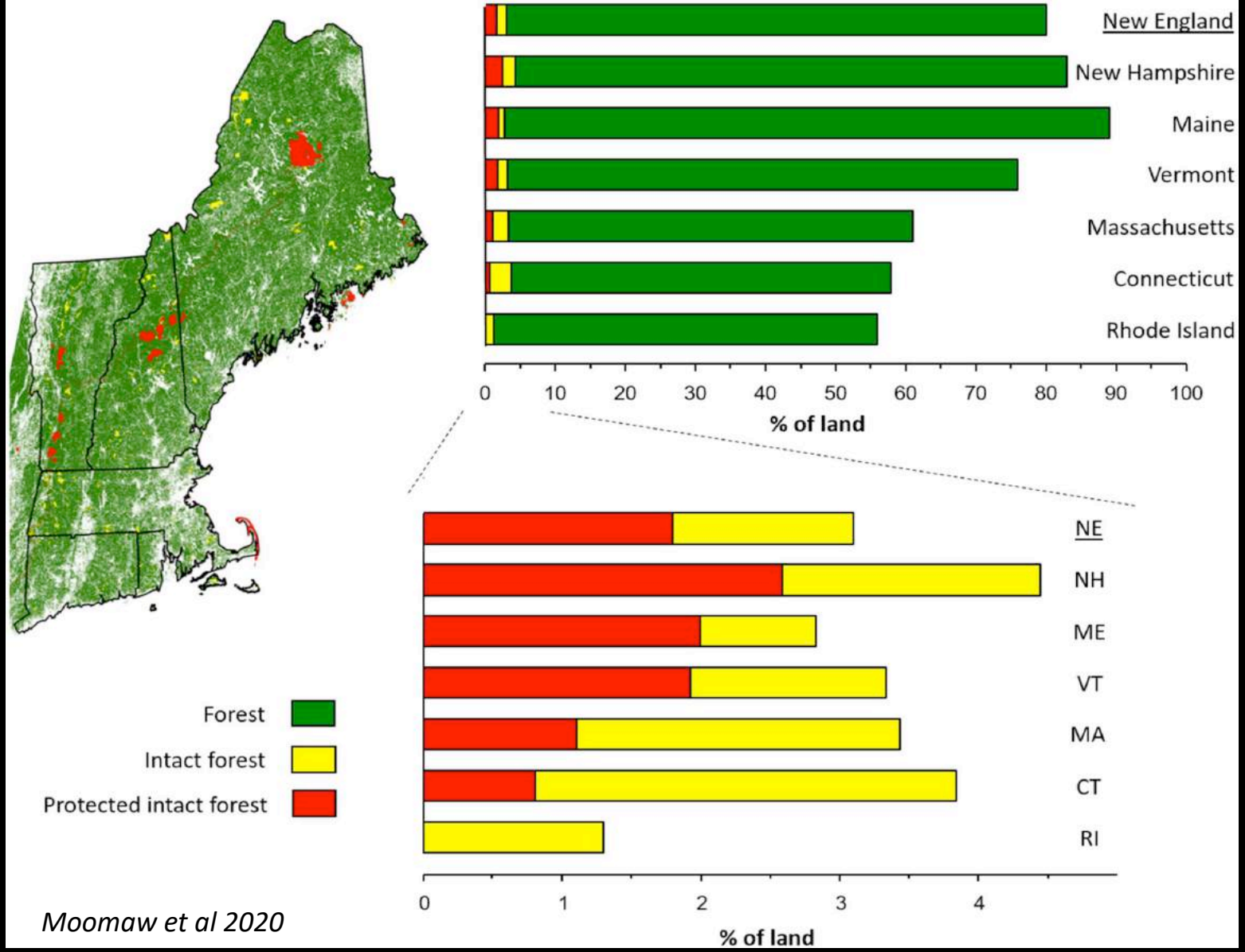


Table 2. The potential working forest lands of New England (acres)

State	Total Forest*	Unproductive forest*	Forests which are withdrawn from timber management **	Parcels which are unworkably small*	Total forest land not generally available for timber management	Total forest land available for timber management	Percentage of forest land available for timber management
Connecticut	1,711,749	16,107	119,425	253,000	388,532	1,323,217	77.3%
Maine	17,660,246	174,566	770,800	396,000	1,341,366	16,318,880	92.4%
Massachusetts	3,024,092	45,164	188,651	562,000	795,815	2,228,277	73.7%
New Hampshire	4,832,408	35,369	603,215	222,000	860,584	3,971,824	82.2%
Rhode Island	359,519	2,100	31,172	98,000	131,272	228,247	63.5%
Vermont	4,591,280	17,541	260,681	190,000	468,222	4,123,058	89.8%
Region Total	**32,179,294**	**290,847**	**1,973,944**	**1,721,000**	**3,985,791**	**28,193,503**	**87.6%**



- Only 3% of Vermont land is managed to restores Vermont's natural forests.
- 10% of New York is managed to restore its natural forests.
- Climate and biodiversity scientists suggest at least 30% should be managed in this way

Policy Considerations:

- Vermont's Forest Future Plan should be implemented in coordination with the goals of ***Vermont Conservation Design*** and the latest science on forest carbon

- Good stewardship of our forests involves ***using fewer – not more – wood products from live trees***. The Forest Future plan should seek to dramatically increase efficiency in how we use and reuse wood products to reduce consumption

- Future forest management in Vermont should ***seek greater balance*** between forests managed for wood products and those managed as wild forests. Current Use should be amended to allow wild forests. Public lands should be managed to emphasize public goods like clean water, flood risk reduction, carbon storage, and quality wildlife habitat, ***not*** wood products.

- Where active management is practiced, ***Vermont policies should focus on encouraging ecological forestry***

Thanks

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