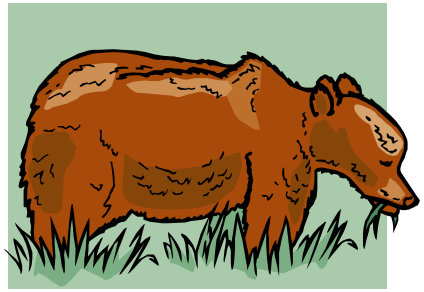
NEW ENGLAND FORESTS AT THE CROSSROADS

Tree-Fueled Biomass Energy Threatens Forests, Environment, Communities, Economy and Quality of Life

Recovering Forests

New England Forests Are Still Recovering From Historical Heavy Clearing. With The Return of Forests Have Come Many Important Benefits:

- Clean Water, Clean Air, Flood Control
- Recreation and Wilderness Opportunities
- Scenery and Nature Based Tourism Income
- Fish & Wildlife Habitat, Returning Species, Bear, Moose, etc.
- Soil Replenishment, Carbon Sequestration

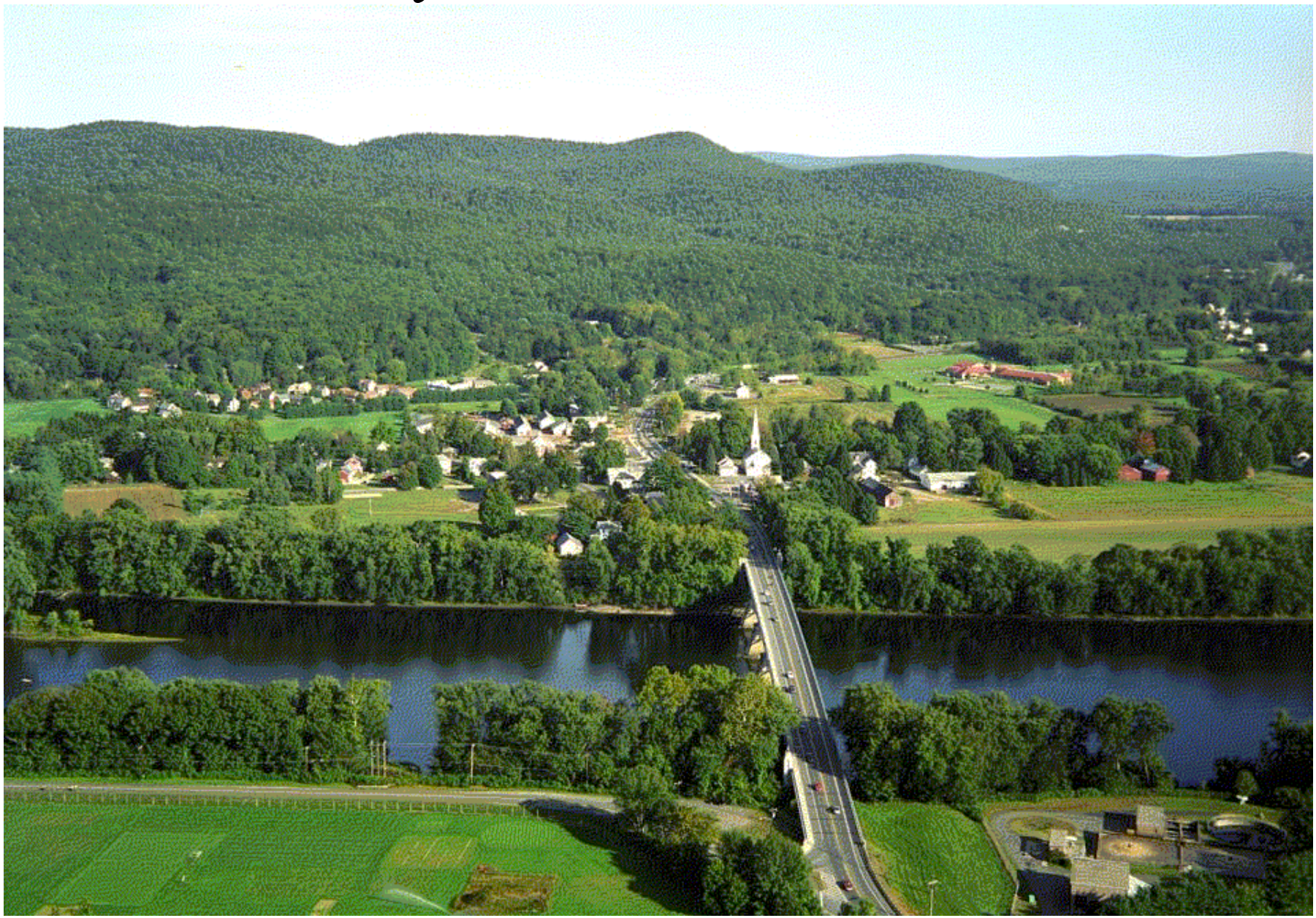


New England Currently Has Much Forested Area In Spite of A High Population Density, A Rare But Fortunate Combination

Following are Some Examples of the Forested Beauty That Has Returned to the New England Landscape

Deerfield River, Massachusetts

Mount Toby State Forest, Massachusetts



Quabbin Park, Massachusetts

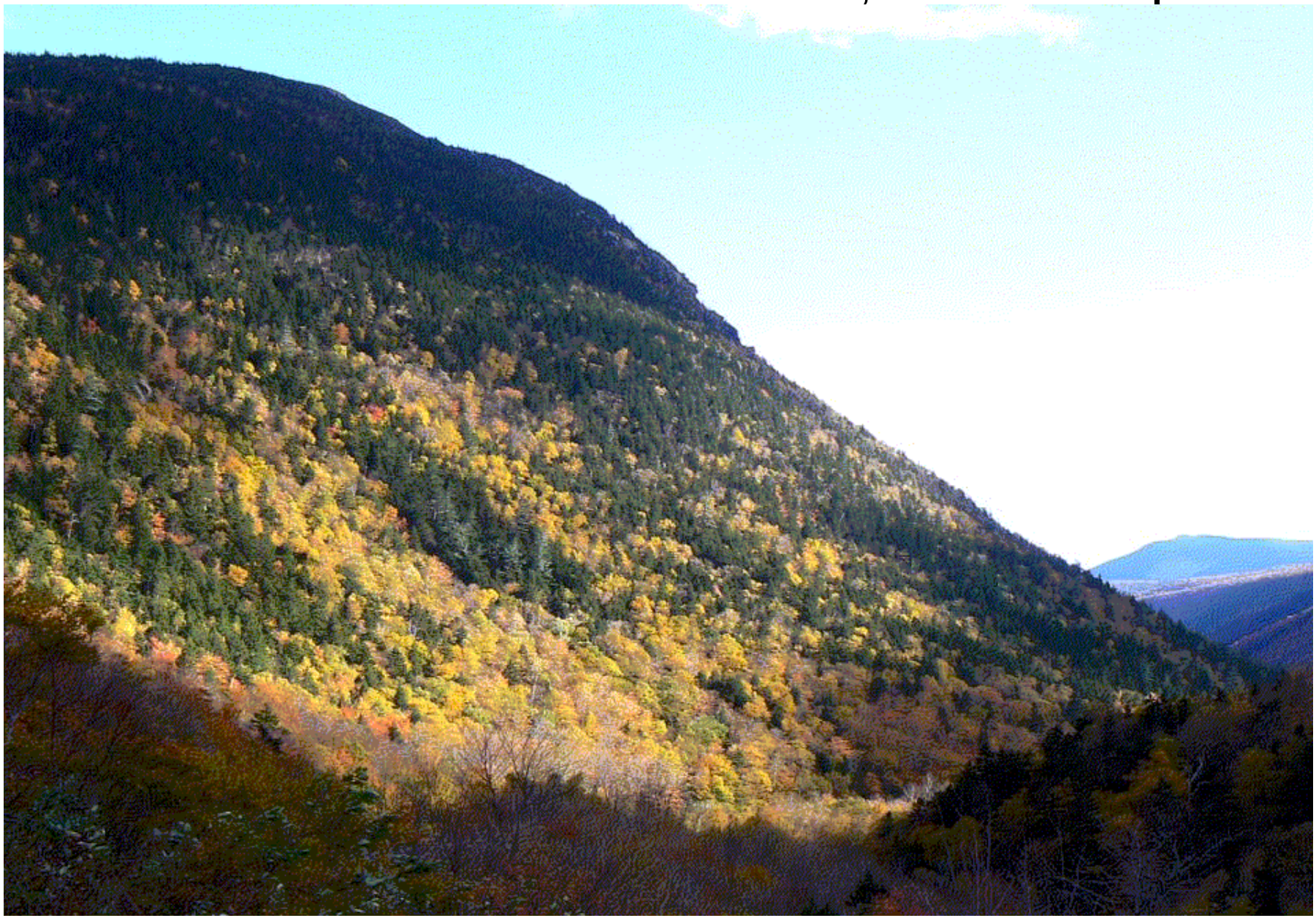
Quabbin Reservation, Massachusetts

Connecticut River Greenway, Massachusetts

Green Mountain National Forest, Vermont

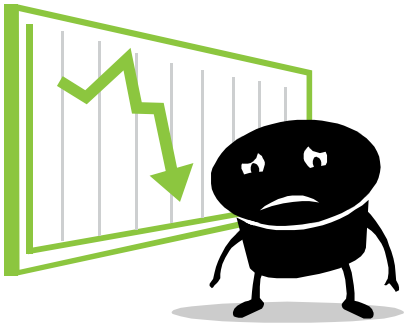
White Mountain National Forest, New Hampshire

White Mountain National Forest, New Hampshire



Eastern Forests are Declining Again

Mark A. Drummond and Thomas R. Loveland, USGS, in BioScience, Apr 2010

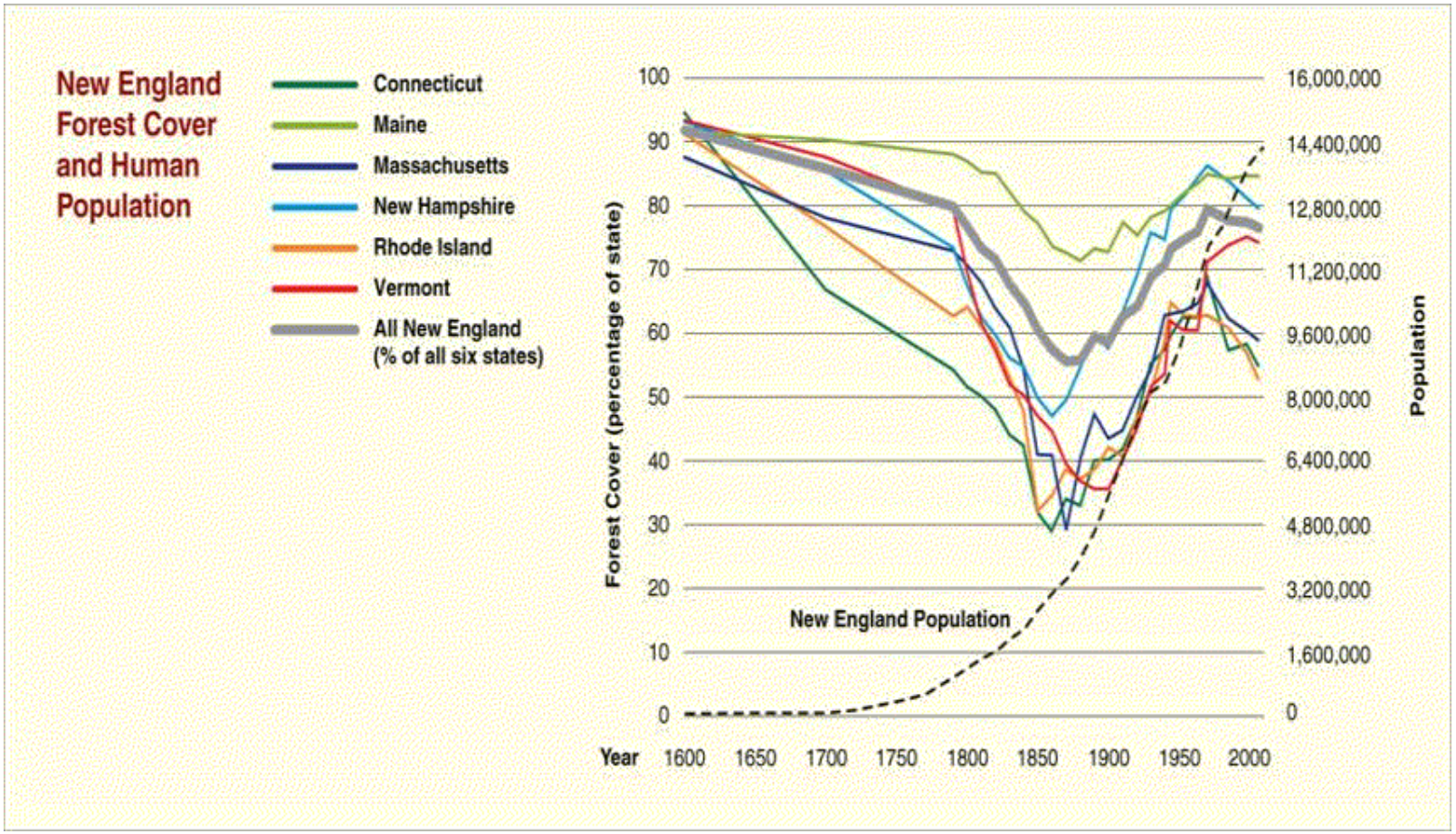


“After increasing during much of the 20th century, forest cover in the eastern United States in recent decades has resumed its previous decline.”

“Most net forest loss occurs as result of mechanical disturbance of forests for timber production, which keeps some land free of forest, and as a result of urban expansion, which is generally a permanent change.”

New England Forests Declining Again

New England Historical Forest Cover



The Big "Biomass" Energy Threat

An Explosion of Proposed Wood Fueled Energy

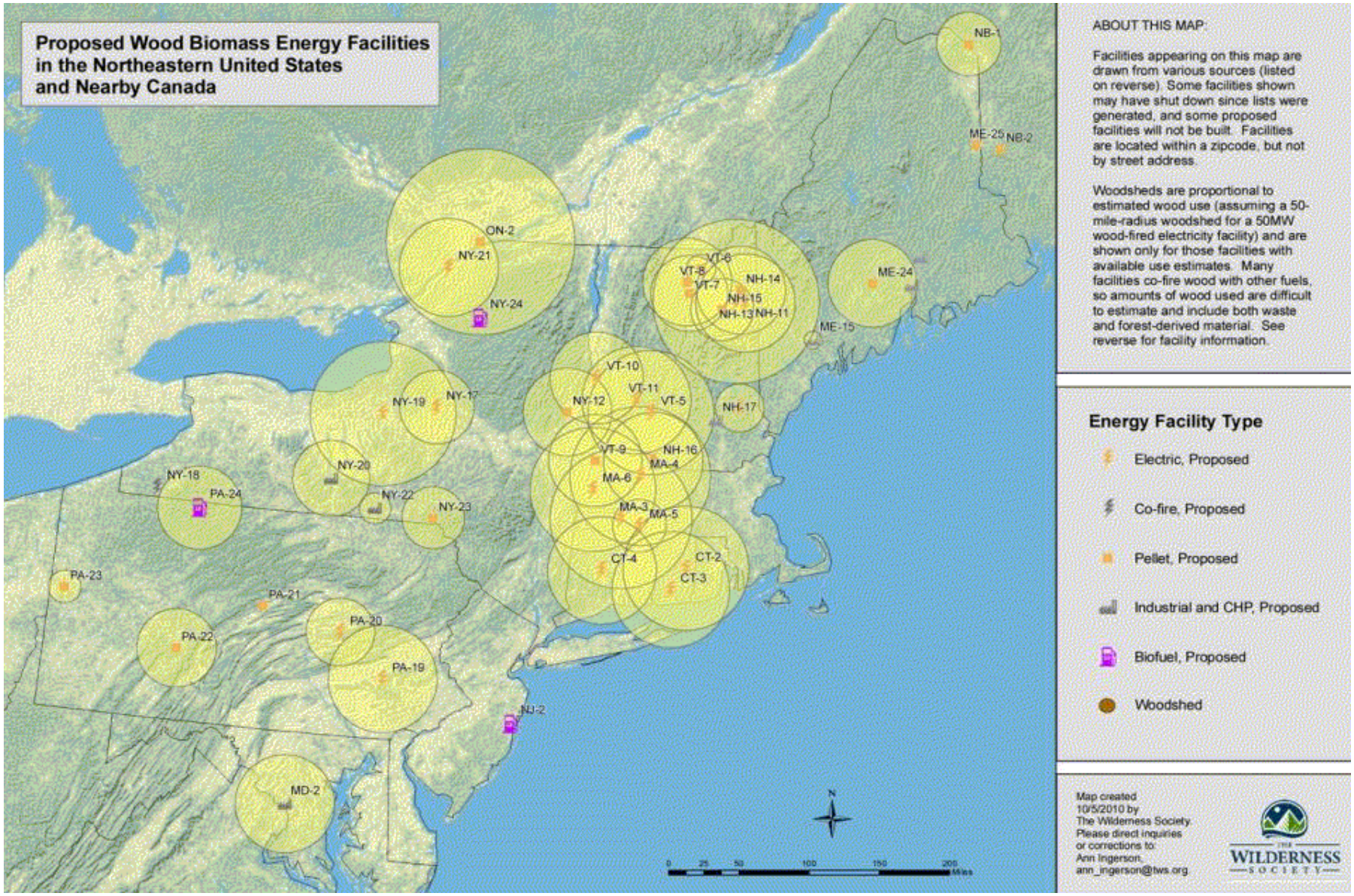
Berlin,	NH	70 MW
Winchester,	NH	20 MW
Henniker,	NH	20 MW
Barnstead,	NH	5 MW
Watertown,	CT	30 MW
Plainfield,	CT	30 MW
Uncasville,	CT	30 MW
Springfield,	MA	38 MW
Greenfield,	MA	47 MW
Fitchburg,	MA	15 MW
Russell,	MA	50 MW
Pittsfield,	MA	35 MW

Berlin,	NH	200,000 tons pellets
Whitefield,	NH	100,000 tons pellets
Portsmouth,	NH	47 MW (new online)
Island Pond,	VT	40,000 tons pellets
Brattleboro,	VT	5-25 MW
Sutton,	VT	200,000 tons pellets
Ludlow,	VT	25 MW
Pownal,	VT	29 MW + 100,000 tons pellets
Fair Haven,	VT	29 MW + 100,000 tons pellets
Lyndonville,	VT	150,000 tons pellets
Springfield,	VT	25 MW

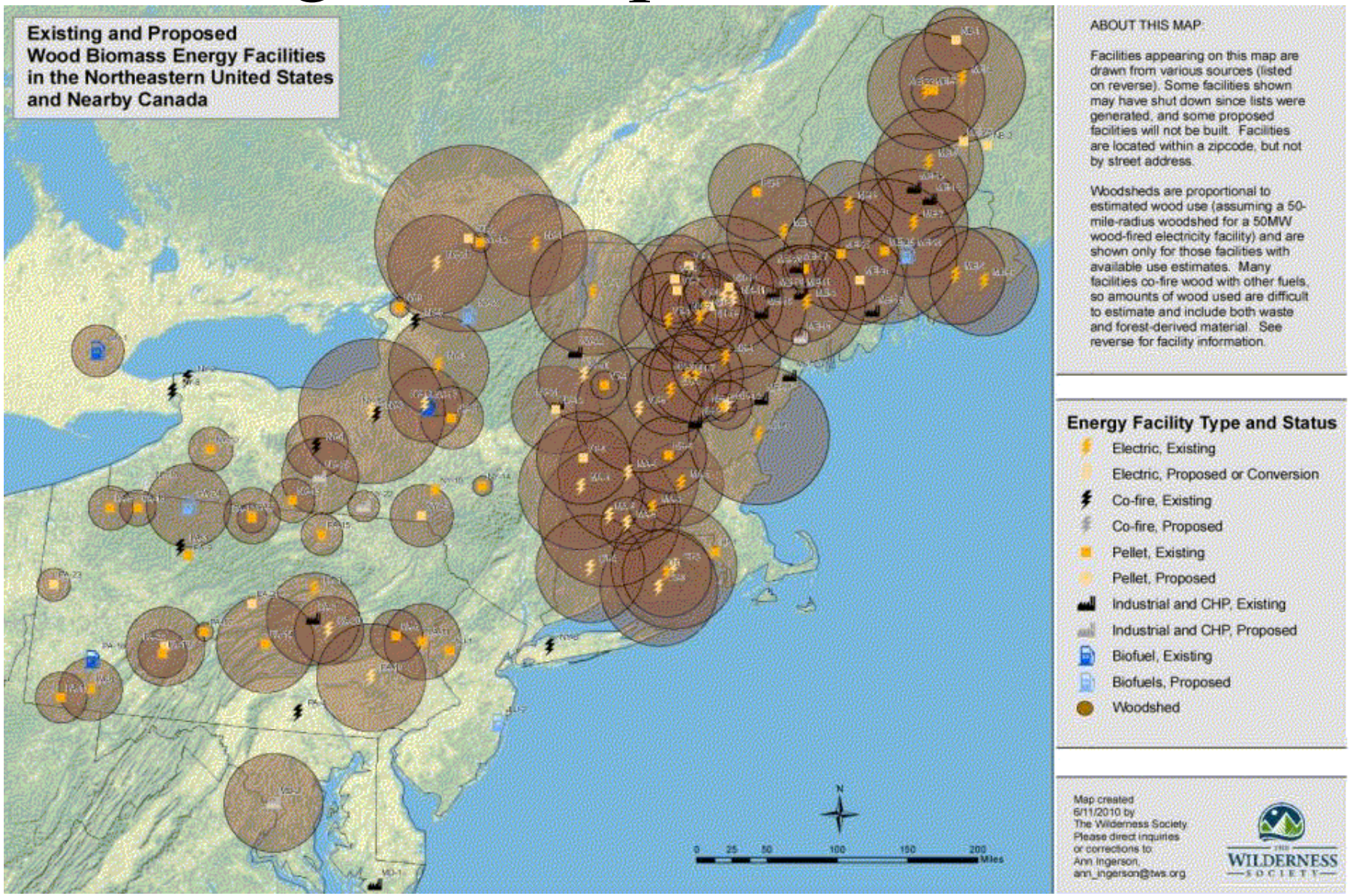
New Wood Demand ~9.2 Million Green Tons Per Year

Notes:
1. Does not include new Maine or NY facilities
2. Current MA, NH, VT, CT Commercial Timber Harvest ~ 5.3 million green tons
3. **This is a 2010 time "snapshot" that demonstrates the scale of new proposals. The list of proposed facilities is a moving target with some facilities in the permitting process, some under construction, others on hold, and new proposals being announced.**

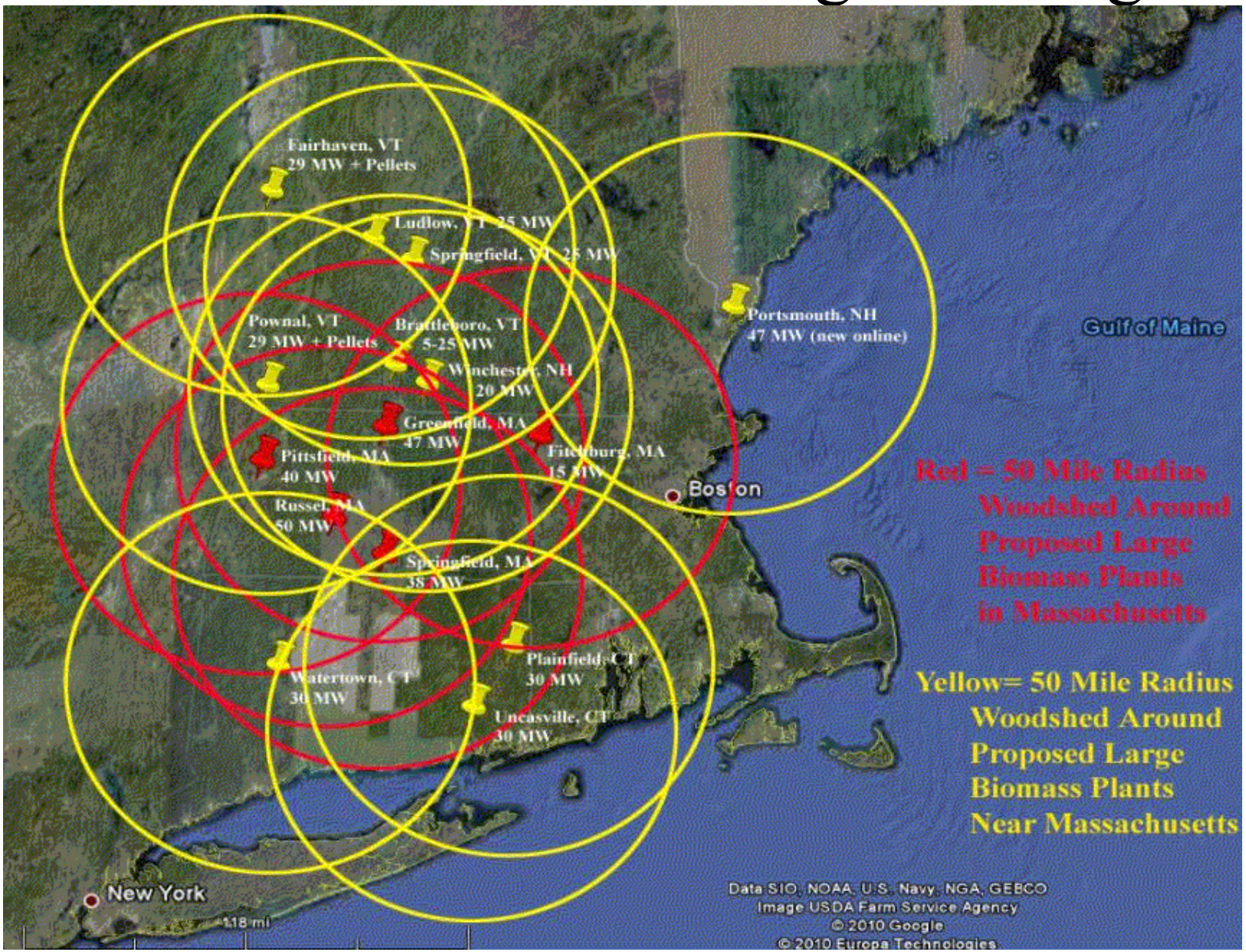
NE Biomass Energy– Proposed Large Facilities



Existing and Proposed NE Biomass

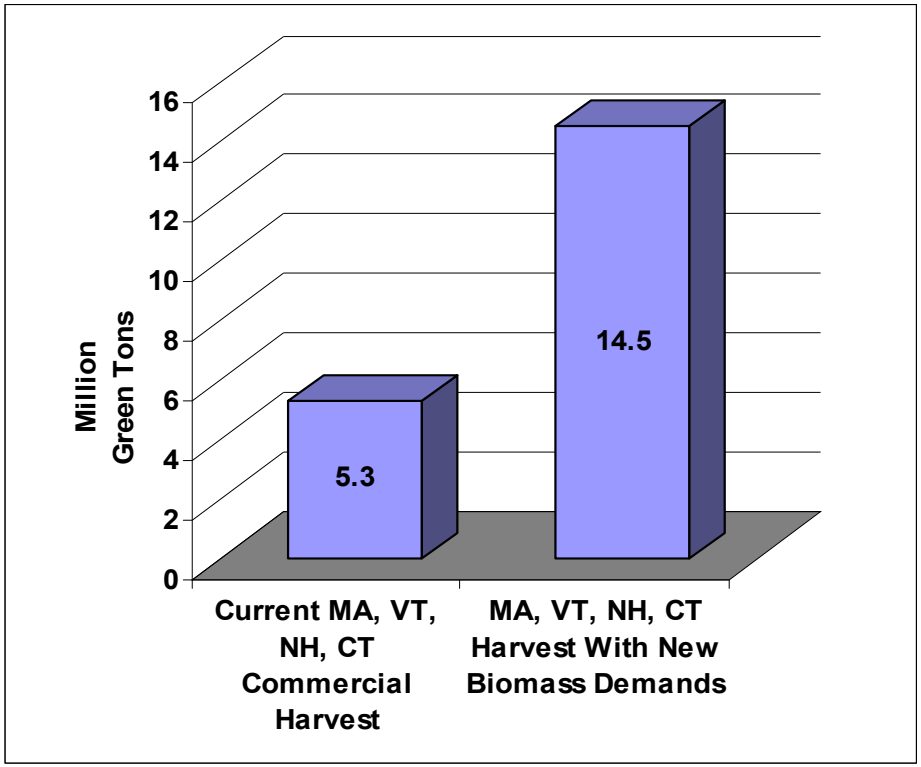


Central and Southern New England Targeted



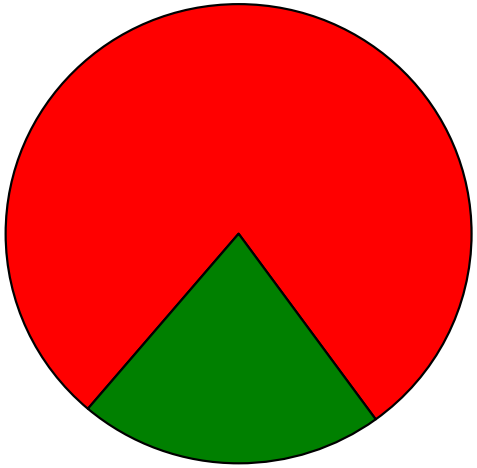
Forest Impacts, Increased Wood Demand

Proposed large bio-energy facilities alone would require an approximately 174% increase in commercial logging in VT, NH, MA & CT, from ~5.3 to ~14.5 million green tons per year.



New England Region Already Cutting Forests About at the "Sustainable" Limit

The New England Region Is Already Currently Cutting ~79% Of Net Forest Growth Each Year.



When Inaccessible Areas Such As Steep Slopes and Other Constraints Are Considered, **New England Is Already Cutting Forests About At the "Sustainable" Limit.**

What About “Waste” Wood?

The “waste” wood myth is often used to sell the public on the idea of biomass energy. There is very little “waste” wood available, and most of it is already spoken for. Almost all existing biomass facilities in New England use trees for fuel, although some have switched to burning more toxic construction and demolition debris when trees became less available or more expensive.

“A Report by RISI, the leading information provider for the global forest products industry, stated that [biomass] *operators, hungry for large volumes of wood, and frequently armed with government subsidies, are finding that the perceived overabundance of "waste wood" in the nation's forests is simply not there.”*

Trees Fuel Existing McNeil Biomass, VT

Trees Fuel Existing McNeil Biomass, VT

Stacked Whole Tree Stems Before Chipping, McNeil Biomass

Biomass Clearcut, Moretown, VT 2010

Biomass Clearcut, Worcester, VT 2010

Biomass Clearcut, East Topsham, VT 2012

Biomass Clearcut, Wendell State Forest, MA

“GREEN” ENERGY IN MAINE

“This past weekend I was on a hunting trip in Maine, Northwest of Moosehead Lake. While driving through some logging roads we came upon a clear cut the likes of which I had not seen in 15 years or so. While I have always been a supporter of sustainable forestry, this old practice of clear cutting was never part of that.

“When we found the piles of trees our concerns were confirmed. This clear cut was not for lumber or paper products, it was in fact a Biomass clear cut. (I had my hunting partner stand in front of the pile of trees to give others a reference of the size of it.) As we traveled down the other side of the mountain there were hundreds of more acres marked off to be cut in this manner.”

“When we talked to some of the locals about it, they actually laughed a bit and said it is amazing what you can get away with when you label something as "green energy". They explained that because now Biomass is called "green energy" they can take everything they can grind up to burn and nobody says a word.”

James L. Wallace, November 9, 2009
Executive Director, Gun Owners' Action League
www.goal.org

Biomass Clearcut, Near Moosehead Lake, Maine

Photo, James L. Wallace, Executive Director, Gun Owners Action League

Biomass Clearcut, Near Moosehead Lake, Maine

Photo, James L. Wallace, Executive Director, Gun Owners Action League

Forest Impacts, Single Large Facility Example

The Single 70 MW Biomass Electric Facility Currently Under Construction in Berlin, NH Will Require About 910,000 Tons of Wood Each Year, or:

- The Wood Equivalent of Clearcutting ~11,600 acres, or ~8,800 Football Fields, of Forest Each Year, or Cutting ~24 Football fields of Forest Every Day

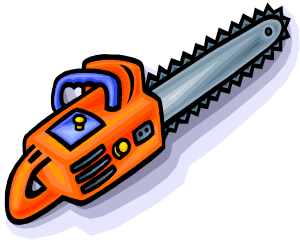
or cutting

- ~ 8 trees per minute
- ~ 11,400 trees per day
- ~ 4,193,000 trees per year

Biomass Electric Power Plants Burn at ~23% Efficiency, **77% of Cut Forests Go Up in Smoke.**

Forest Impacts, MA Detailed Example:

5 Proposed Western Massachusetts Biomass Electric Facilities



185 MW x 13,000 tons / MW = 2.4 million tons

"Waste" Wood (5 counties) ~ 0.4 million tons*

Wood required from forests = 2.4 – 0.4 = 2.0 million tons

Current MA Public and Private Logging = ~ 0.4 million tons

Requires Logging Levels More Than <u>Quadruple</u> in MA

* Waste wood claims are very doubtful. Existing 17 MW Pinetree plant already burns whole trees.

Forest Impacts, Massachusetts Example:

5 Proposed MA Biomass Facility Tree-Fueled Wood Demand

- The Wood Equivalent of Clearcutting ~25,600 acres, or ~19,000 Football Fields, of Forest Each Year, or ~53 Football Fields of Forest Every Day

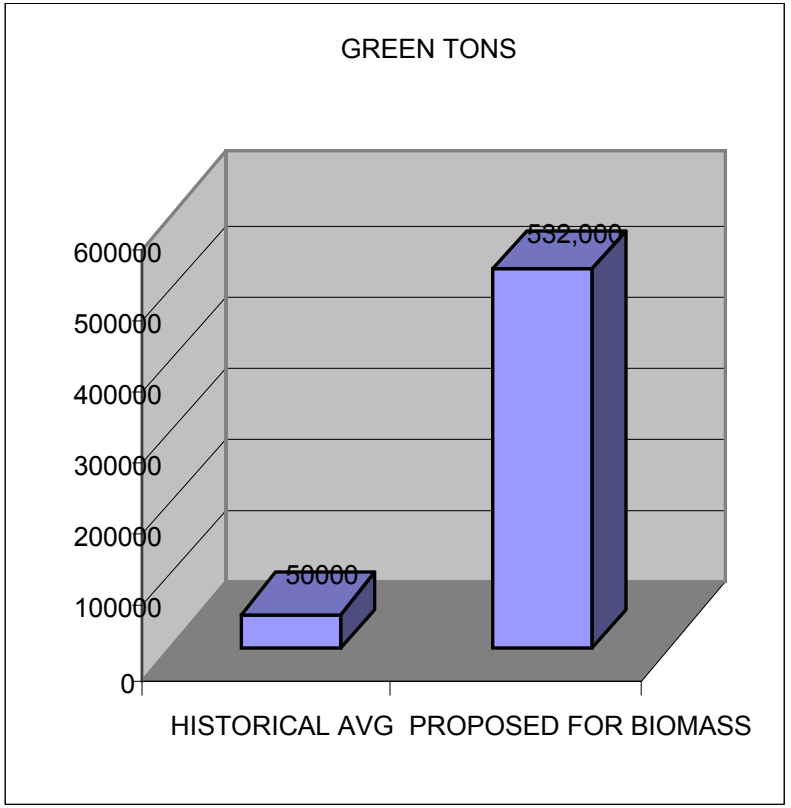
or cutting

- ~ 17 trees per minute
- ~ 25,250 trees per day
- ~ 9,216,000 trees per year

- Biomass Electric Burns at ~23% Efficiency, so 77% of These Cut Forests Would Go Up in Smoke.

Public Forests Targeted

A 2008 Massachusetts Department of Energy Resources Report Targeted State Public Forests To Provide 532,000 Green Tons of Wood Annually for Biomass Energy. This rate is more than ***Ten Times*** Higher Than the Historical Average of ~50,000 Tons.



Benefits of the 5 Proposed Massachusetts Biomass Proposals?

~ 1% More Electric Than Today

Today:	~13,700 MW
With 5 New Plants:	~13,885 MW

Forest Impacts, VT, NH, MA, CT Example

The Proposed Biomass and Pellet Facilities for VT, NH, MA & CT Would Require ~9,200,000 Tons of Wood Each Year, or:

- The Wood Equivalent of Clearcutting ~117,000 acres, or ~89,000 Football Fields, of Forest Each Year, or cutting 244 Football Fields of Forest ***Every Day***

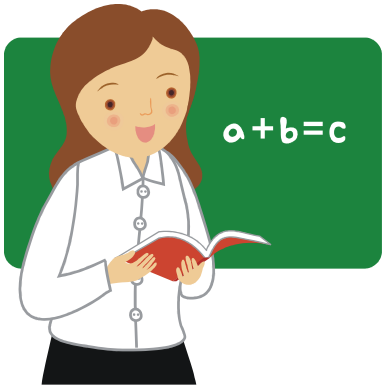
or cutting

- ~ 81 trees per minute
- ~ 116,000 trees per day
- ~ 42,396,000 trees per year

More New England Forest Threats

A Multitude of "Small" Tree-Fueled Biomass Heat and Combined-Heat And Power

A big effort to promote "small" tree-fueled biomass facilities, which can easily add up to an even larger problem than a few big facilities, is also being pushed by state and federal agencies.



In Vermont for example, the Comprehensive Energy Plan includes proposals that would increase cutting and burning of Vermont's forests by 1,300,000 tons, or ~5,900,000 trees each year, just for small thermal and CHP biomass.

More New England Forest Threats

Bio-Fuels From Trees

Large, taxpayer subsidized efforts are underway to develop bio-fuels from woody biomass from trees and other sources.

One day, not far in the future, a trip to the grocery store may mean cutting down more trees.

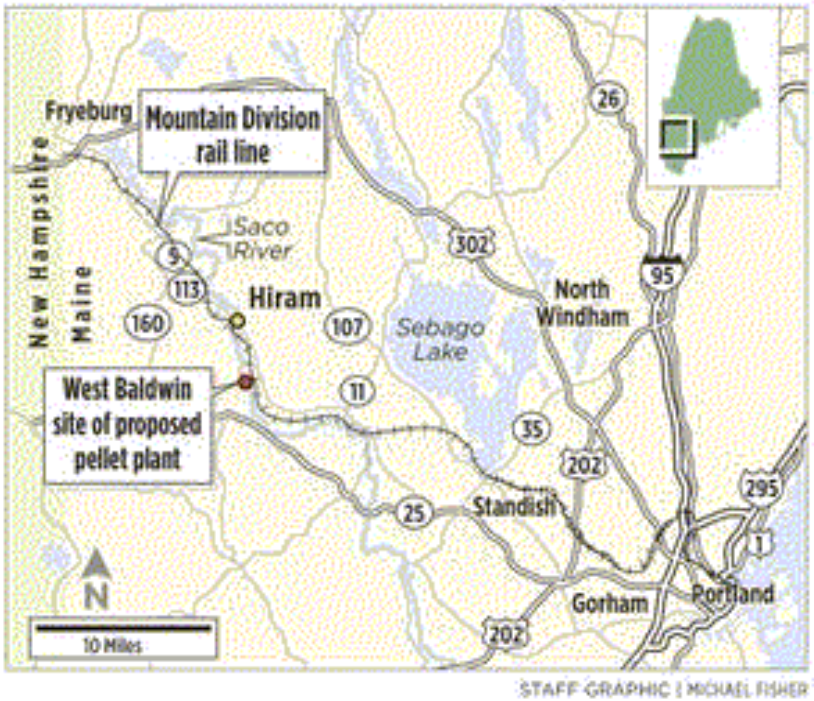
A taxpayer subsidized, biofuel project is moving forward in Pittsfield, MA that would require 300,000 green tons of wood per year for tiny amounts of fuel.

Biofuels sourced from trees are dramatically more carbon intensive than fossil fuels.

More New England Forest Threats

Exports

"A wood-products company in Baldwin, Maine plans to build an $80 million pellet manufacturing plant that would send most of its output 28 miles by rail to Portland, for export to Europe."



Maine Already Cuts More Forest Than it Grows

More Potential Forest Impacts

The Beetle and Ash Borer

"MA State Forests and Parks are at risk of severe damage from invasive species such as the Asian Longhorned Beetle and the Emerald Ash Borer. Help us protect your forests and parks by not transporting firewood."

Increased wood cutting for biomass fuel would also require a dramatic increase in the transportation of wood across the region, increasing the likelihood of spreading forest pests and pathogens.

Selling Logging to The Public

Instead of Admitting That Most Logging Occurs to Obtain Money and Wood, Industry and the State Agencies Use Exaggerated, Unfounded and False Claims To Sell Logging to the Public.

"It's hard to sell NEFF memberships on the notion that we harvest trees. We have to frame it that we protect land — we have to go at it obliquely."

The New England Forestry Foundation, May, 2010

Selling Logging to The Public

These comments suggesting how to sell logging to the public in the Forest Certification report for MA Public Forests are illuminating:

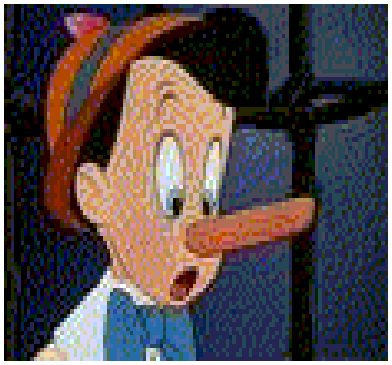
- ***"Planning effort should <u>frame timber harvest</u> in the context of maintaining plant and animal diversity, improving wildlife habitat, and protecting rare habitats"***
- ***"Good forestry means lower water rates. That slogan will sell in Boston"***
- ***I think a good image for DCR would be "keepers of the forest," and "growing trees for the future." I am quite sure that "DCR - the timber people—cutting trees for bigger budgets" would be a publicly unacceptable and politically unsupportable image."***

Selling Clearcutting to The Public

Bob Leverett
Forest Ecologist & Executive Director
of the Eastern Native Tree Society

"What is the recipe for getting people to accept unsightly practices like clear-cutting? Give them plausible sounding reasons: tell them that the forest is unhealthy, that red maple is taking over, that alien species are invading, that trees will fall on people, that there is an unacceptably high fire danger, that a hurricane will blow everything down. Sound familiar? Presumably, clear-cutting is needed to help avert such impending catastrophes. But if people aren't buying, what then? Push the "early successional habitat" argument. Win support from a naive public by insisting that we need more cottontails and game bird species, suggestive of a mid-1800s landscape. Have I missed any of the arguments?"

"By the way, I've been told in private, by foresters, that these are the standard talking points that state and federal forest agencies routinely use to soften up the public prior to an unpopular action."



Logging Claims: Facts vs Fiction

Cutting Forests For "Forest Health"

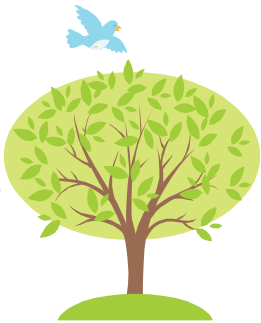
Dr. Orwig & Dr. Foster - Harvard Forest

"All evidence suggests that harvesting exerts greater impacts on ecosystem processes than leaving disturbed or stressed forests intact.

Not only is there sparse evidence that silvicutural approaches achieve their goals of increasing resistance and resilience, little evidence suggests that natural disturbances yield negative functional consequences. In many situations, good evidence from true experiments and "natural experiments" suggests that the best management approach is to do nothing."

Logging Claims: Facts vs Fiction

Clearcutting to Create "Early Successional Wildlife Habitat"



Dr. Lee Frelich, Forest Ecologist

"Clearcutting virtually never replicates the types of disturbances that created early successional habitat under the natural disturbance regime."

John Hutchinson, Wildlife Biologist

"The decline of each species is a multi-factoral function. More common reason for decline is wintering habitat and migration route hazards such as cities and cell towers. A clearcut in New England would provide a boost in nesting habitat for a few species, but the unintended consequence is degradation of woodland habitat, particularly dense forest land, which is a more critical habitat and provides optimal nesting for many more species and much needed shelter and food for species migrating further north."

Forest Stewardship Council

"The FSC Northeast Standard does not explicitly state that managers should be creating early successional habitat nor does it mention early successional being of importance."

Logging Claims: Facts vs Fiction

Cutting Forests to "Help" Water Quality

United States Environmental Protection Agency:

"Local impacts of timber harvesting and road construction on water quality can be severe, especially in smaller headwater streams."

"These effects are of greatest concern where silvicultural activity occurs in high-quality watershed areas that provide municipal water supplies or support cold-water fisheries."

600 Scientists Oppose Clearcutting

In support of the Save America's Forest Act, which would prohibit clear-cutting of National Forests, 600 leading biologists, ecologists, foresters, and scientists, including E.O. Wilson sent a letter to Congress stating:

"Clearcutting and other even aged silvicultural practices and timber road construction have caused widespread forest ecosystem fragmentation and degradation."

"The result is species extinction, soil erosion, flooding, destabilizing climate change, the loss of ecological processes, declining water quality, diminishing commercial and sport fisheries."

Will Forestry Laws Protect the Forests? **NO**

Claims are made that forestry laws will protect forests, however forestry laws allow clearcutting, including on public lands, and even the weak laws are often not followed or enforced. In Massachusetts for example, the following forestry regulations have been routinely ignored.

"Clear-cutting…..the maximum size shall be 10 acres unless the source of the regeneration is seeding from surrounding stands, in which case the maximum size shall be 5 acres" (Note: 1 acre = ~1 football field)

"Filter strips shall be left along the edges of all water bodies and Certified Vernal Pools. No more than 50% of the basal area shall be cut at any one time"

On Fish and Wildlife lands (20% of public lands) clearcutting is prohibited, but the agency skirts the law by renaming clearcuts with euphemistic labels.

"It shall be a condition of each contract for the cutting and sale of timber that clear-cutting timber on lands managed by the division is specifically prohibited"

Will Foresters or "Green" Certification Protect the Forests? **NO**

See Following Examples

- Most of the Following Clearcut Photos Are Taxpayer Subsidized, "Green Certified" and Forester Approved Logging On Public Forests, Watershed and Parks
- Much of the Logging in the Following Photos was Euphemistically Called "Shelterwood", "Patch Cuts", "Aggregate Retention", "Salvage" or "Seed Tree" Logging in Order to Avoid Using the "Sensitive" Word "Clearcut".
- Too Many Foresters, Who Often Have a Vested Interest in Logging, Make Unsupportable Claims That Logging Is Done for "Forest Health", to "Help" Wildlife, "Improve" Water Quality and for the Public "Benefit".

Savoy State Forest, MA -2008

SEE NEXT SLIDE FOR GROUND VIEW AT RED ARROW

Savoy State Forest, MA - 2008

GROUND VIEW FROM PREVIOUS SLIDE

Savoy State Forest, MA -2008

Savoy State Forest, MA -2008

Savoy State Forest, MA -2008

Savoy State Forest, MA -2008

H.O. Cook State Forest, MA -2008

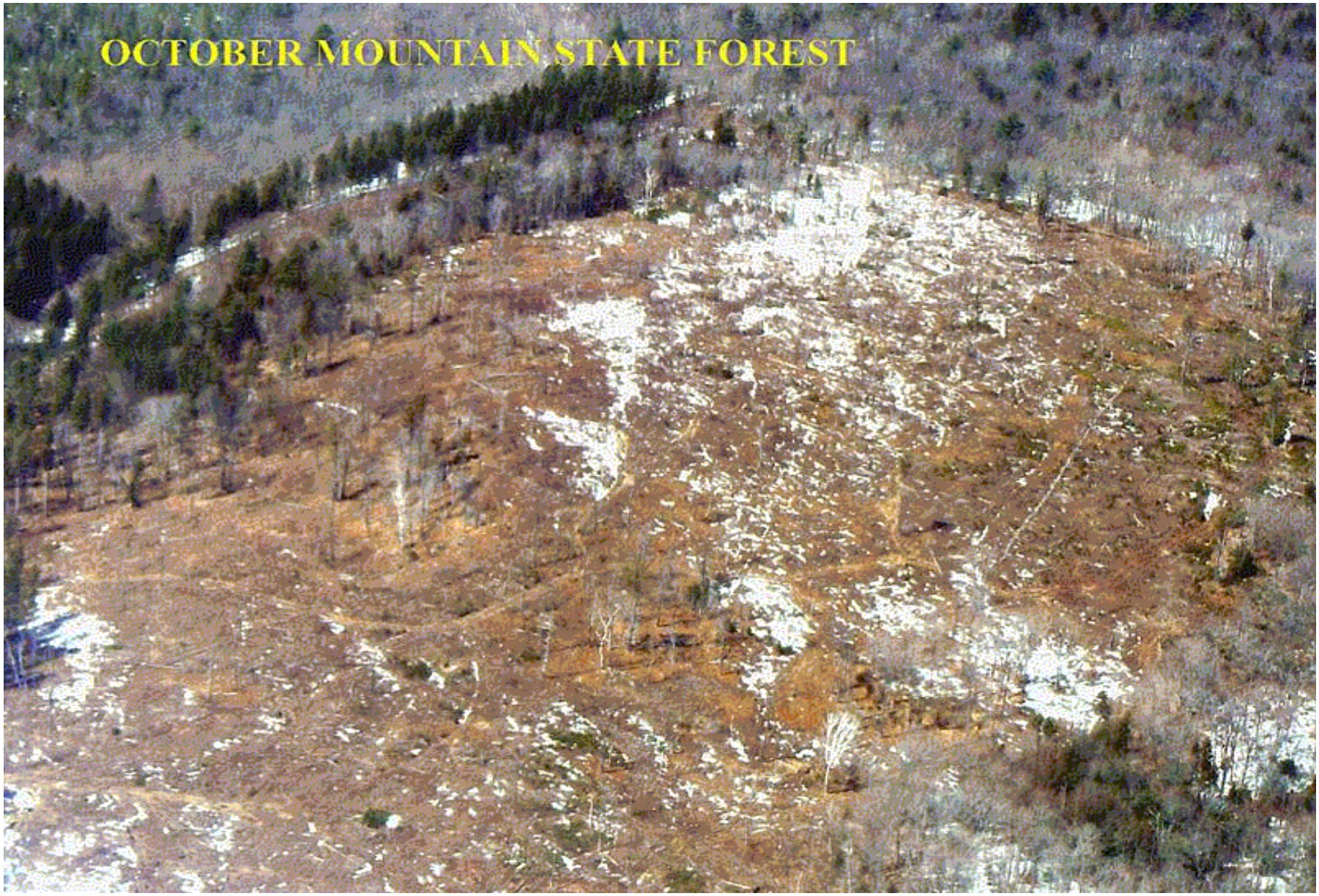
Peru Wildlife Area, MA - 2008

Peru Wildlife Area, MA -2008

Windsor Jambs State Park, MA -2008

Windsor State Forest, MA -2008

October Mountain State Forest, MA 2008



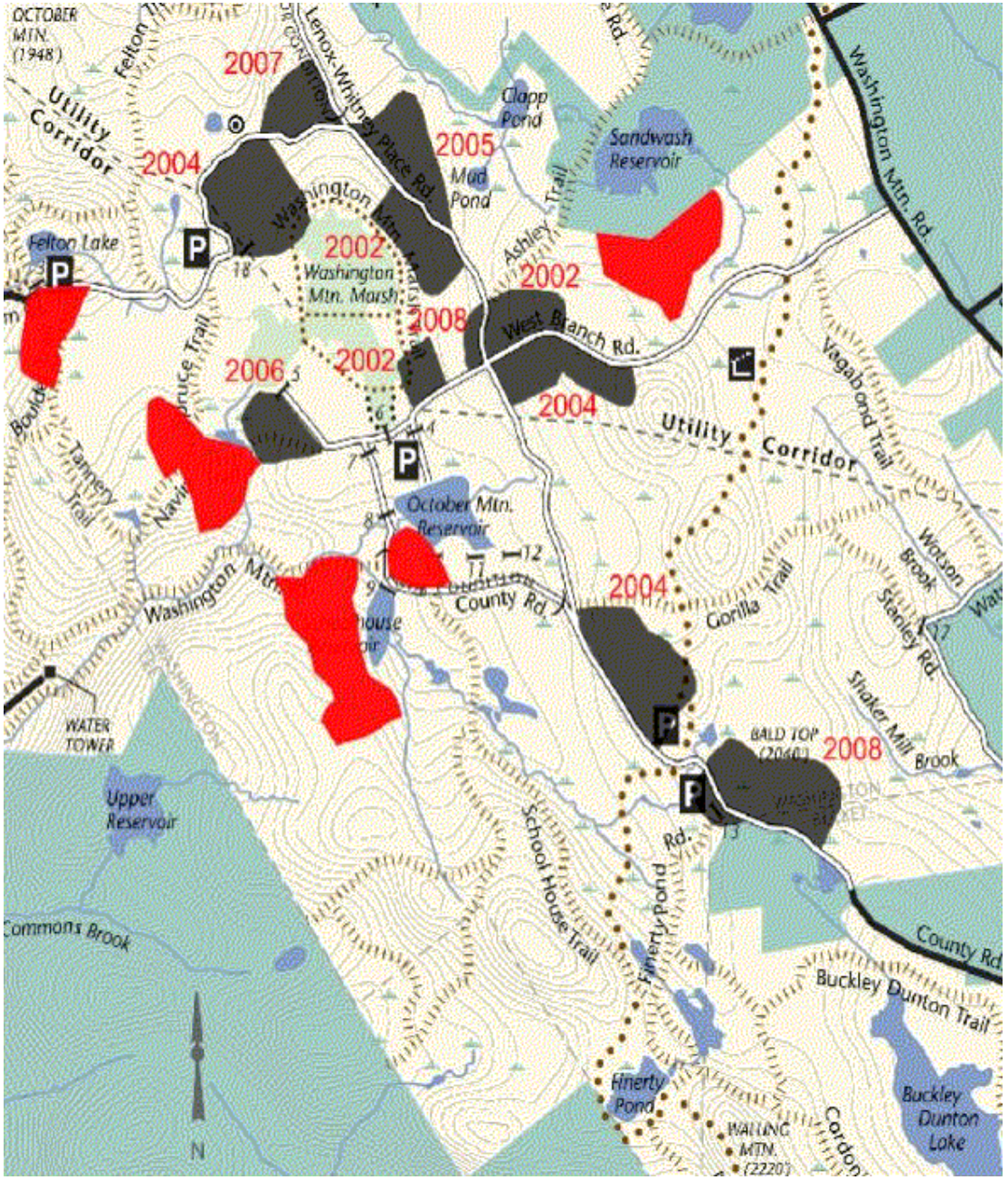
October Mountain State Forest, MA 2008

ILLEGAL 50 ACRE CLEARCUT

October Mountain State Forest, MA 2008

October Mountain State Forest

Recently Logged And Proposed Logging Areas



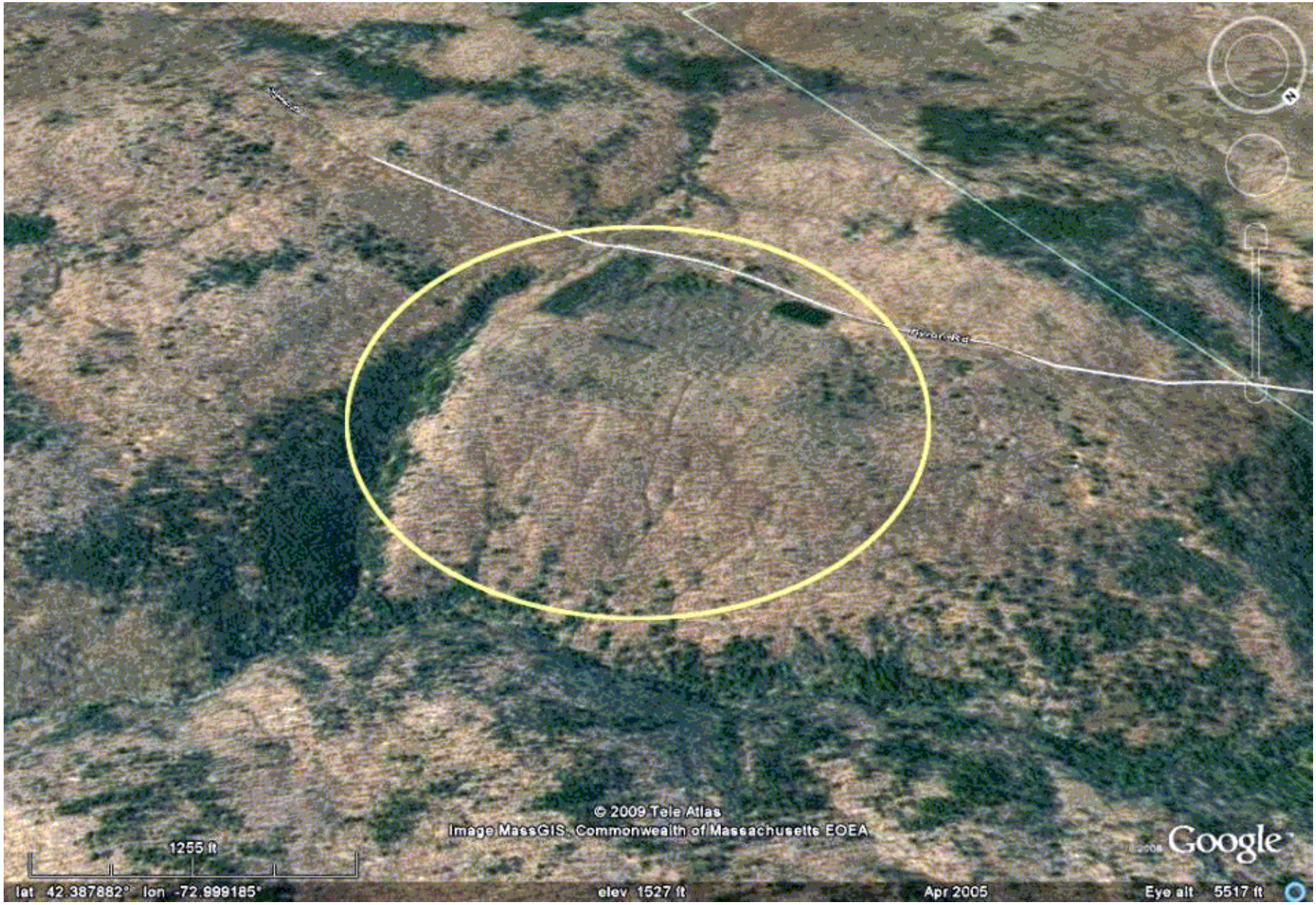
Most State Forest Logs Sent To Quebec

Chester Blandford State Forest, MA- 2008

Chester Blandford State Forest, MA -2008

ILLEGAL CLEARCUT TO EDGE OF POND

“Before”-Fox Den Wildlife Area, , MA -2005



“After”-Fox Den Wildlife Area, MA -2008

Quabbin Reservation, MA - 2009

Watershed for Boston's Drinking Water Supply

Quabbin Reservation, MA - 2009

Quabbin Reservation, MA - 2010

Quabbin Reservation, MA - 2009

Boston's Drinking Water Behind Thin Line of Trees

Quabbin Reservation, MA - 2010

Quabbin Reservation, MA - 2009

Quabbin Reservation, MA – "Before"

Google Earth View, April 2005

Quabbin – Same Location – "After"

Google Earth View, September 2010

Quabbin Reservation, MA – "Before"

Google Earth View, April 2005

Quabbin – Same Location – "After"

Google Earth View, July 2008

Quabbin Reservation, MA - 2010

Quabbin Reservation, MA - 2010

Quabbin Reservation, MA - 2010

Quabbin Reservation, MA - 2010

Major Invasive Problem Exacerbated By Logging

Chesterfield Gorge State Park, MA - 2009

THE ZIMMER TRACT

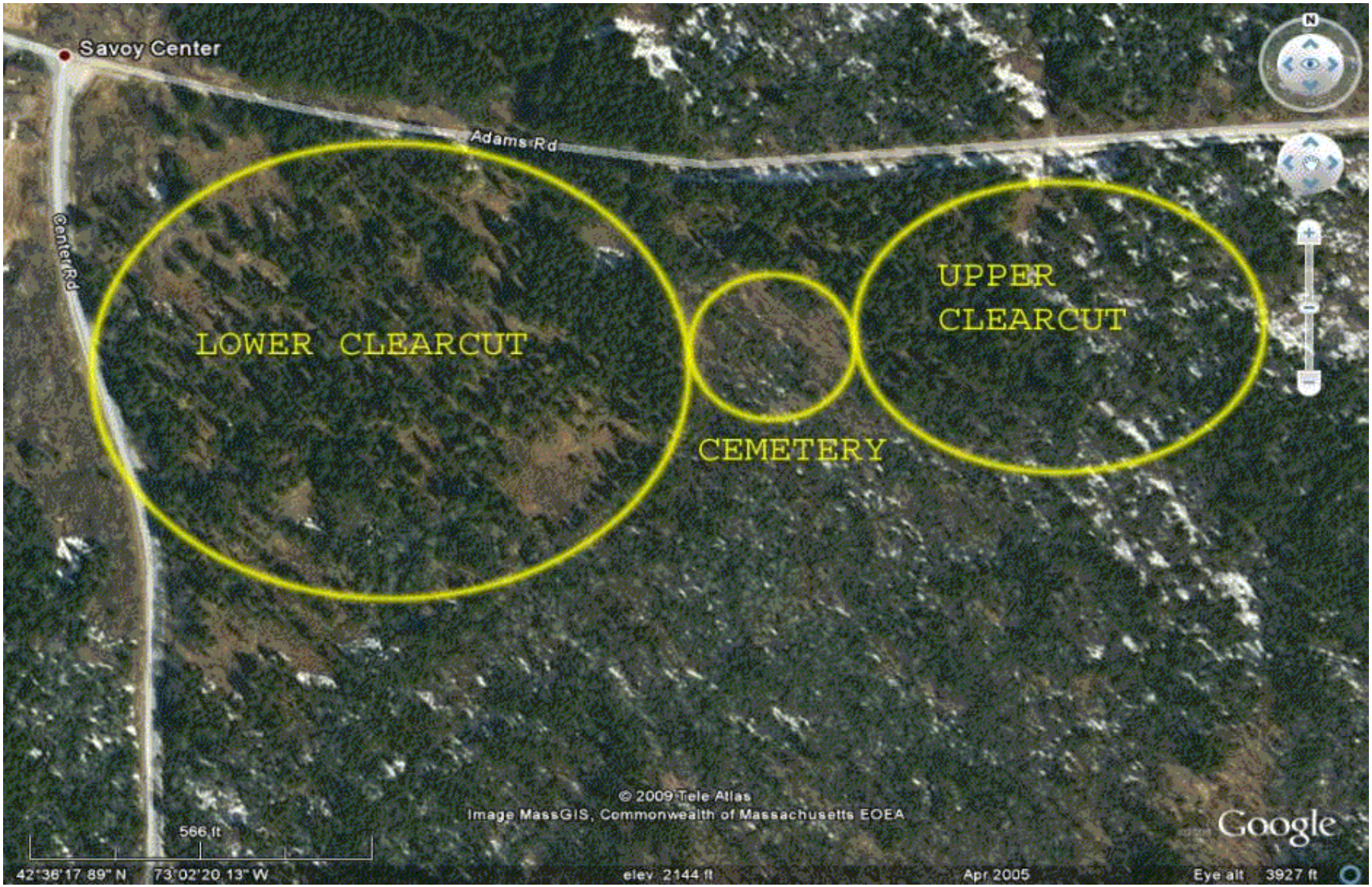
Donated by Raymond Zimmer "For Conservation Purposes Only"

Chesterfield Gorge State Park, MA - 2009

THE ZIMMER TRACT

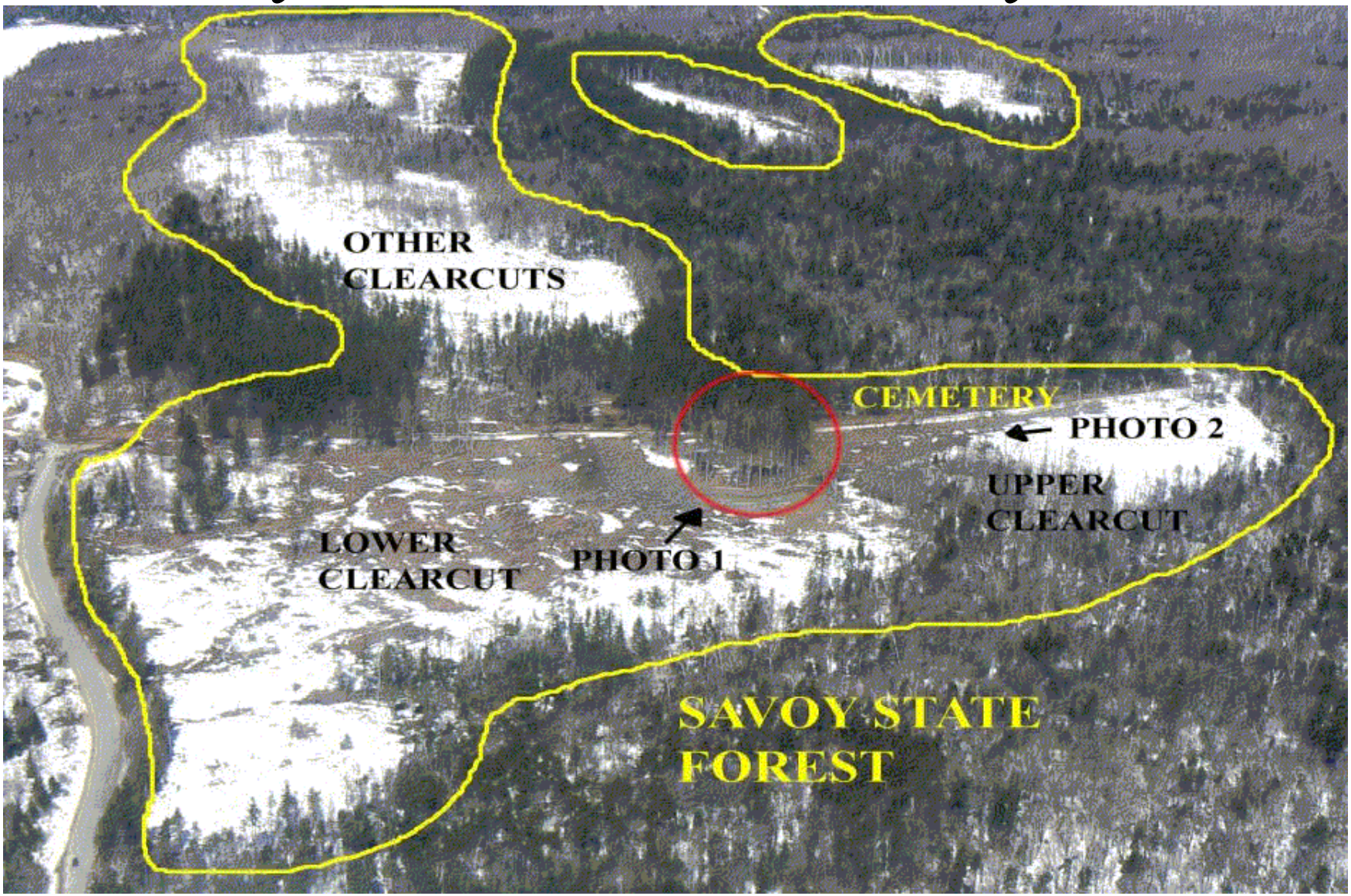
Donated by Raymond Zimmer "For Conservation Purposes Only"

Savoy State Forest Cemetery, MA - 2005



"BEFORE"

Savoy State Forest Cemetery-2008



"AFTER"

Savoy State Forest Cemetery-2008

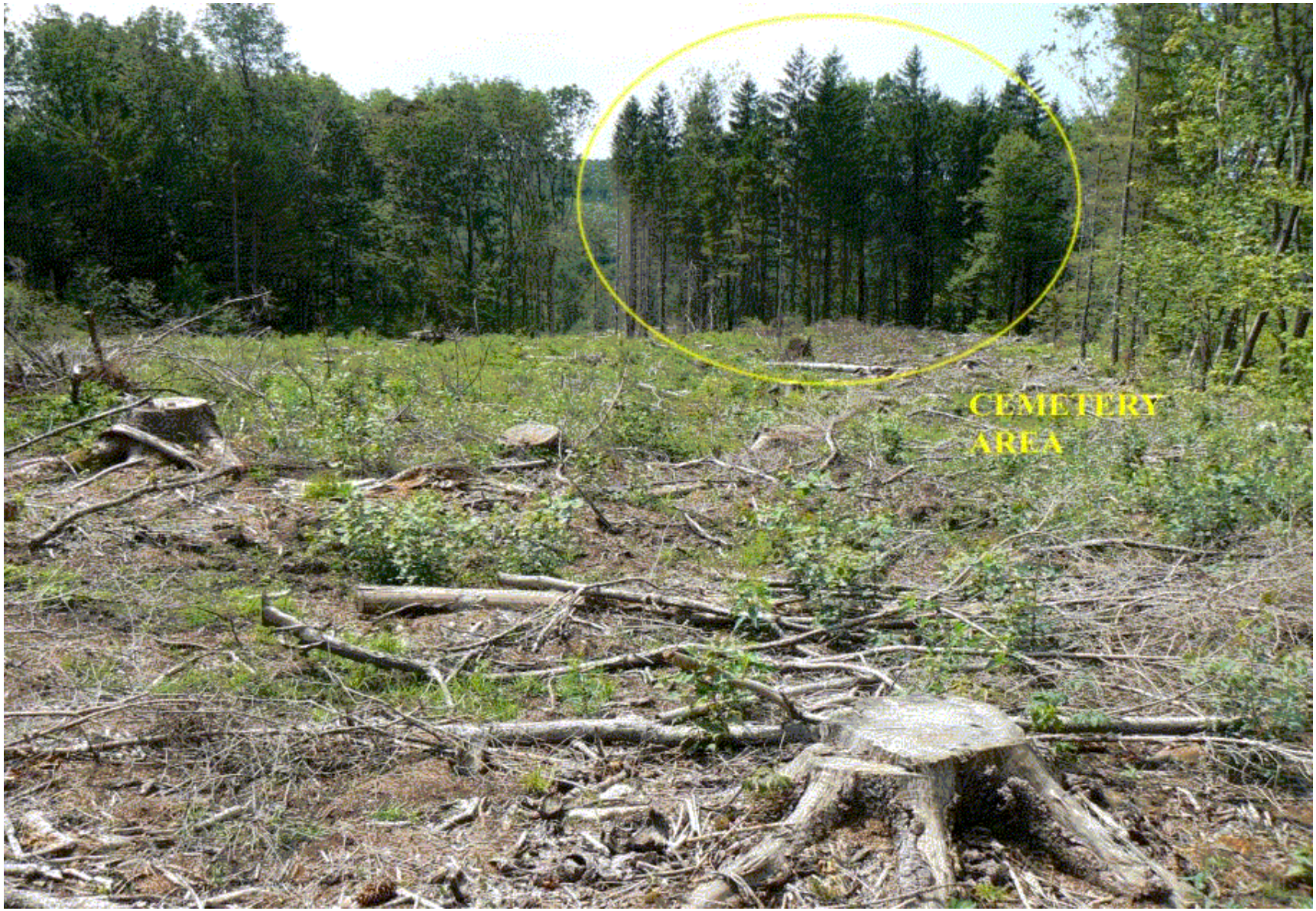


PHOTO VIEW 2 – MAY 2008 – Trees Are Still Alive

Savoy State Forest Cemetery-2009

PHOTO VIEW 1 – MAR 2009 – Trees Are Now Dead

Savoy State Forest Cemetery-2009

Looking Out From Cemetery

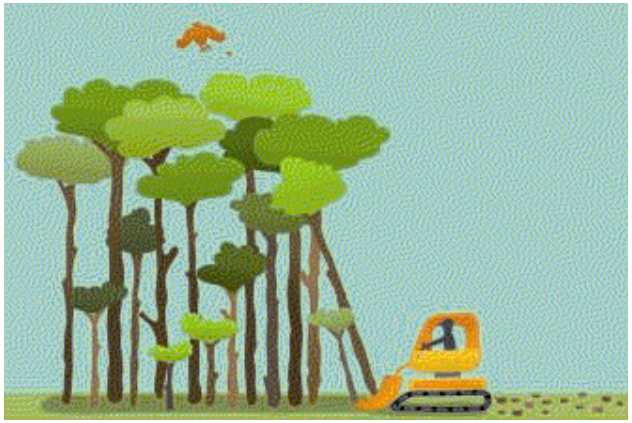
Savoy State Forest Cemetery-2009

*"SCS investigated the sites of concern raised by Massachusetts stakeholders….
This investigation included site inspections of most of the sites in question. SCS felt confident that the DCR lands in question were in conformance with the FSC standards."*

White Mountain National Forest

The Agencies That Manage The White Mountain National Forest Are Supposed To Protect These Public Forests, But Most Citizens Don't Know That They Are Being Clearcut

WMNF Managers Even Allow Clearcutting In Roadless Areas, Near Principle Tourist Locations And Along The Kancamagus Highway, Arguably, The Most Scenic Highway In The Northeast.



Clearcutting White Mountain National Forest

Near North Woodstock, Google 2009

Clearcutting White Mountain National Forest

West of Twin Mountain, NH, Google 2009

Clearcutting White Mountain National Forest

Kancamagus Scenic Byway, Google 2009

Clearcutting White Mountain National Forest

Chandler Brook, Google 2009

Clearcutting White Mountain National Forest

Near Bretton Woods, Google 2009

Clearcutting White Mountain National Forest

One of the Many “Near Bretton Woods”, Google View Cuts (Previous Slide), 2010

Clearcutting White Mountain National Forest

Ground View of One “Near Bretton Woods” Google Cuts, Tintah, 2011

Clearcutting White Mountain National Forest

"Protecting riparian values, maintaining and protecting habitat for proposed threatened and endangered species, and maintaining a healthy and resilient watershed into the future have been and will continue to be the primary considerations in management of the Tintah project area."

Tintah Timber Project
November 2011

Clearcutting White Mountain National Forest

"Before" Batchelder Brook, South Carr Roadless Area, Summer 2008

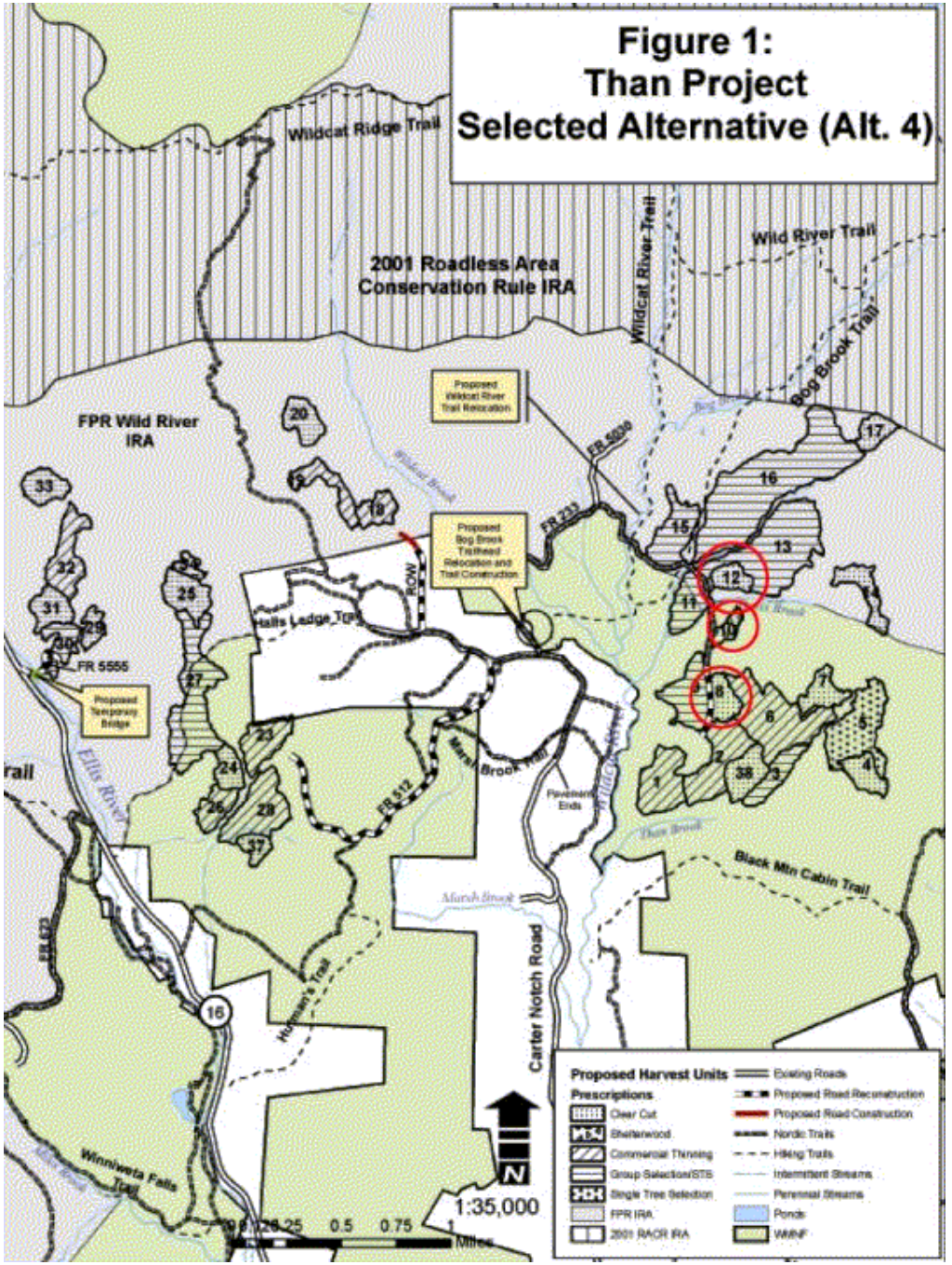
Photo, Mollie Matteson

Clearcutting White Mountain National Forest

"After" Same Location, Batchelder Brook, Fall 2008 Photo, Mollie Matteson

Than Brook Timber Sale, In The Wild River Roadless Area Of White Mountain National Forest

Units 8, 10 & 12
Shown In Red Circles



Decision Notice and Finding of No Significant Impact

Than

Forest Resource Management Project

Saco Ranger District
White Mountain National Forest
Town Of Jackson
Carroll County, New Hampshire

Clearcutting White Mountain National Forest

Before”

Than Brook, Unit 12
Wild River Roadless
Area, Summer 2008

Photo, Frank Robey

Clearcutting White Mountain National Forest

“Before”

Than Brook, Unit 12
Wild River Roadless Area, Summer 2008

Photo, Frank Robey

Clearcutting White Mountain National Forest

“After”

Than Brook, Unit 12, Wild River Roadless Area

Clearcutting White Mountain National Forest

"After", Than Brook, Unit 12, November 2010

Clearcutting White Mountain National Forest

“After”

Than Brook,
Unit 12,
November 2010

Clearcutting White Mountain National Forest

"After", Than Brook, Unit 12, Spring 2010

Photo, Frank Robey

What About the Big "Green" Groups?

While the groups differ, too many have gotten too cozy with the corporations, industries and government agencies they were once watchdogs over. This is particularly true for groups that receive funding, either directly or indirectly, from corporations and government agencies.

These Statements from the Concord Monitor, are regarding the "Than" logging project (shown in the previous photos) and another clearcut logging project, in White Mountain National Forest:

"***A federal judge has rejected a challenge by environmental groups to two logging projects in New Hampshire's White Mountain National Forest"***

Some "green" groups, as expected, tried to stop these clearcut logging projects from going forward to protect the National Forest:

"The Sierra Club, Wilderness Society and Vermont Forest Watch *argued the plan was not reviewed adequately and that the logging and road building needed for it would ruin a unique forest environment."*

But the **Audubon Society of New Hampshire** and the **Appalachian Mountain Club** argued ***in favor*** of allowing these clearcut logging projects to proceed.

What About the Big "Green" Groups?

This photo shows recent Clearcutting near Pickwacket Pond in Adirondack Park.

This land was purchased from a timber company by **The Nature Conservancy** who then sold it to a pension fund, to be managed by a timber investment group. TNC said logging would be ***"selective cutting"*** and ***"minimize harm to water quality"***

What About the Big "Green" Groups?

"Nature Conservancy Loggers Accused of Damaging Adirondack Park Trout Stream"

Nature Conservancy loggers were served a notice of violation by the NY State DEC for polluting two streams, including a protected trout stream, in Adirondack Park

What About the Big "Green" Groups?

The Chairman of the Board for The Nature Conservancy was previously a lobbyist for the timber industry. The President of The Nature Conservancy, was previously a partner and investment banker with Goldman Sachs.

The Nature Conservancy president earns more than $500,000 per year and TNC has more than 20 employees who earn more than $200,000 per year.

MA Audubon receives payments from the state agencies including the Department of Fish and Wildlife (DFW). MA Audubon recently stated that "*Mass Audubon supports DFW's approach to habitat management*". DFW has been illegally clearcutting state forests for "habitat management" and ignoring a state law that prohibits them from clearcutting. MA Audubon would not respond to repeated public inquiries asking if "*MA Audubon supports DFW clearcutting public forests*".

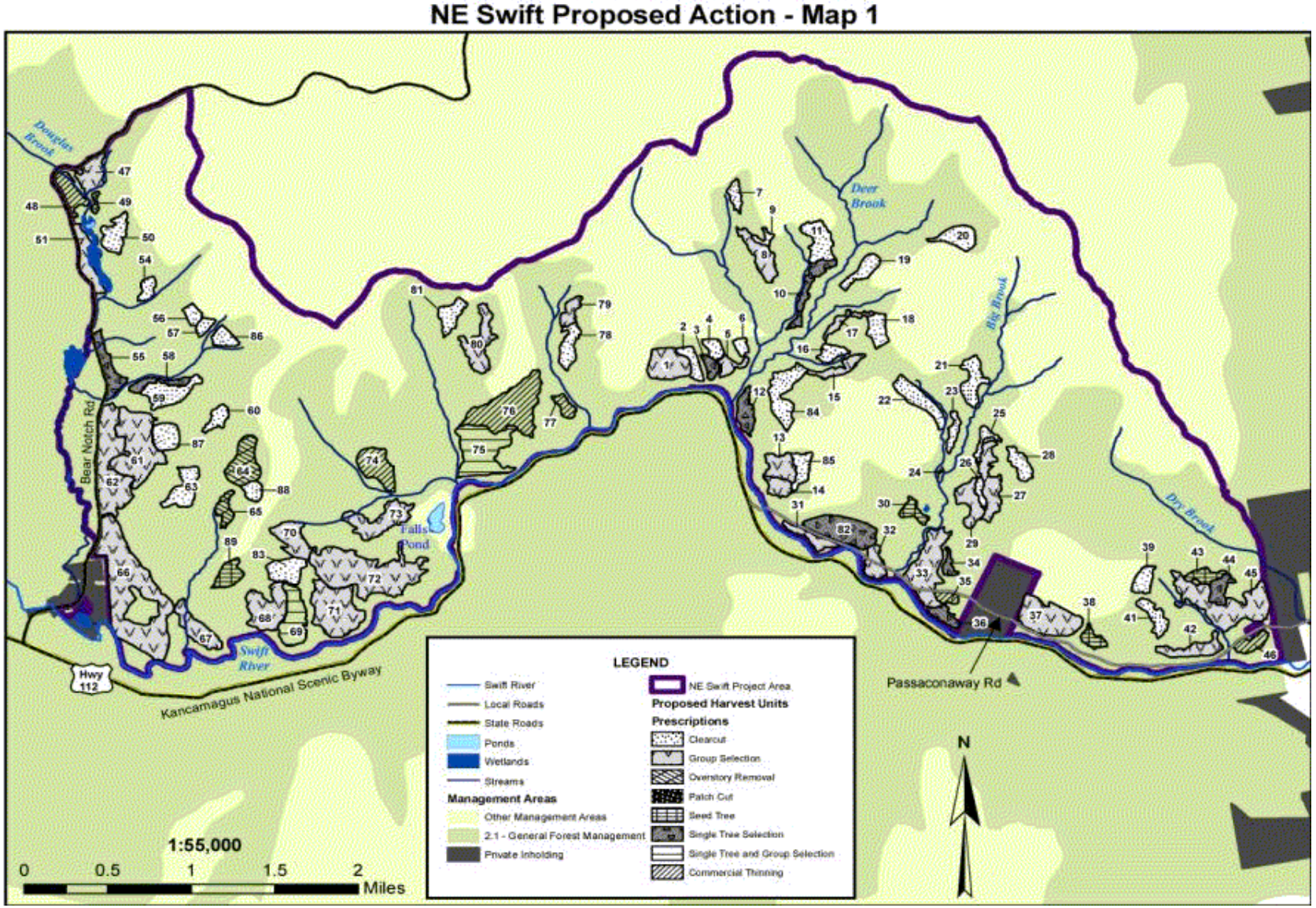
The MA Sierra Club was one of the first "green" groups to oppose large biomass facilities and has worked hard to limit subsidies for tree-fueled biomass energy. However, a member of their Executive Committee, and previous chair of Public Lands and Forestry Committee, was previously the Executive Director of the Massachusetts Forest Landowners Association, a timber industry group. In her position with the Sierra Club, she defends clearcutting and commercial logging of MA public forests, including in Boston's drinking water supply area, and was recently quoted stating:

> ***"I'm still trying to plug away at subverting the usual paradigm at the Sierra Club. Recently I took a group of retired people out to the Montague Plains for a forest walk. It went okay, no major offense was taken over forestry operations."***

Proposed Clearcutting Area WMNF

NE Swift River Timber Sale Area, Along Kancamagus Scenic Highway

Proposed Logging Plan WMNF

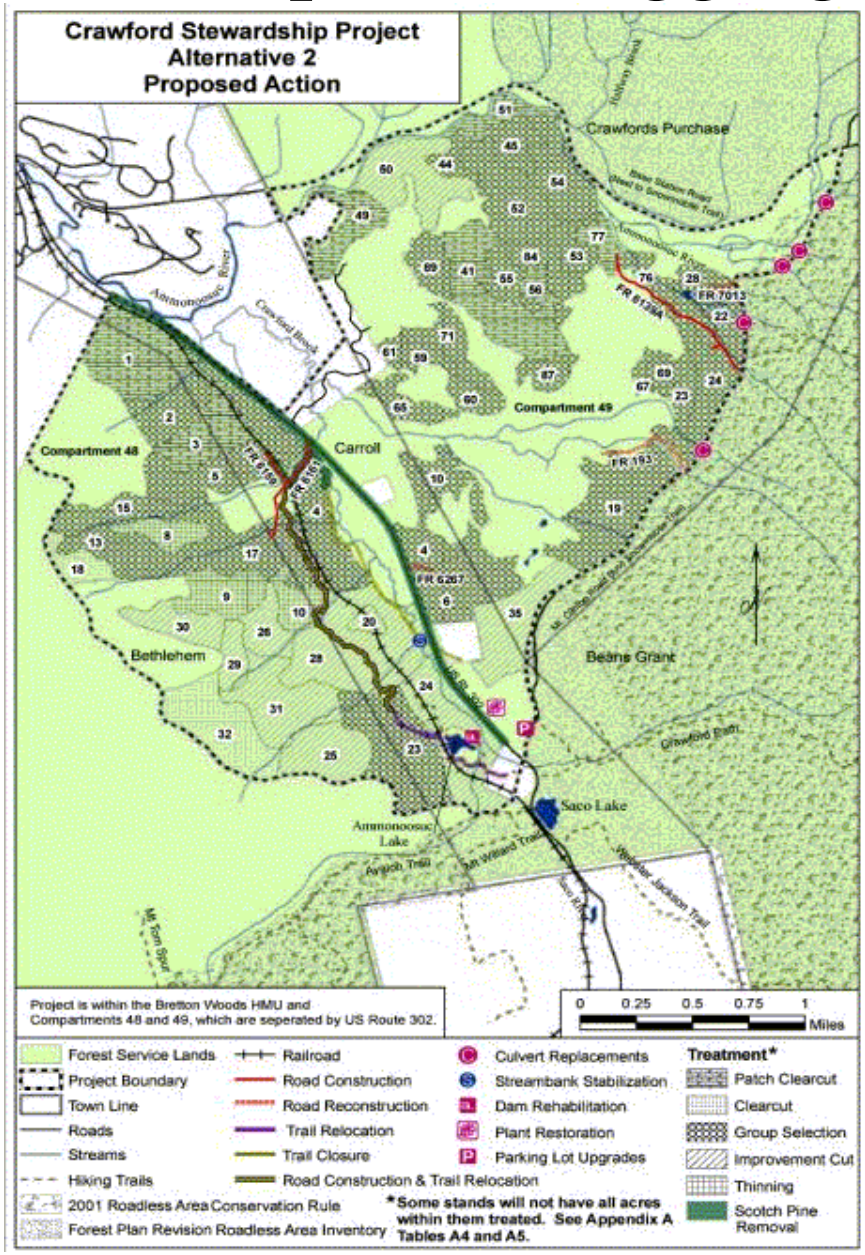


NE Swift River Timber Sale, Along Kancamagus Scenic Highway

Proposed Clearcutting Area WMNF

Crawford Notch Timber Sale Area, Heavy Tourist Zone

Proposed Logging Plan WMNF



Crawford Notch,
WMNF Timber Sale
Heavy Tourist Area, Near
Mt Washington Hotel,
Bretton Woods,
Hiking Trails

“New Look” To Logging On Private Forests Also

The Following Photos Are of a Logging Job by Cowls Lumber in Huntington, MA

After Public Complaints, Cowls Said They Would Not Log in This Manner Again, but State and Private Foresters Defended This Logging

Cowls Lumber, Huntington, MA– Google “Before”- 2006

Cowls Lumber, Huntington, MA– Google “After”- 2010

Cowls Land, Huntington, MA - 2009

Cowls Land, Huntington, MA, 2009

Cowls Land, Huntington, MA - 2009

Cowls Land, Huntington, MA - 2010

Cowls Land, Huntington, MA - 2010

Vermont Private Land Clearcuts – E. Granville

What About Industry Claims That Biomass Energy is “Clean” and “Green” and will “Lower” Carbon Dioxide Emissions Responsible for Global Warming?

A COLOSSAL

“GREENWASH”

See Following Data

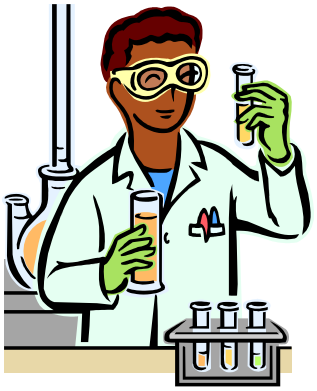
Global Warming and CO2

Science Finally Catches up to Common Sense

Timothy Searchinger, Princeton University

"Fixing a Critical Climate Accounting Error"

October 23, 2009

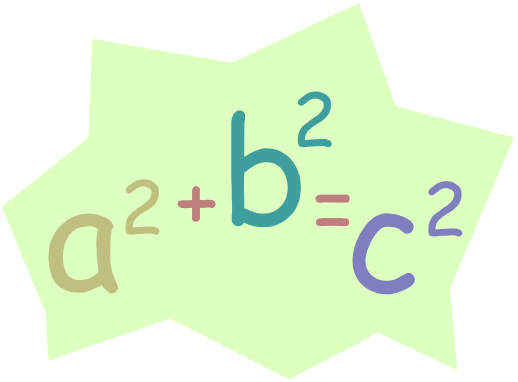


"Harvesting existing forests for electricity adds net carbon to the air. That remains true even if limited harvest rates leave the carbon stocks of re-growing forests unchanged, because those stocks would otherwise increase and contribute to the terrestrial carbon sink"

Global Warming and CO2

Science Finally Catches up to Common Sense

"Manomet Biomass Sustainability and Carbon Policy Study"
June 2010



"Forest Biomass Generally Emits More Greenhouse Gases Than Fossil Fuels Per Unit of Energy Produced"

Global Warming and CO2

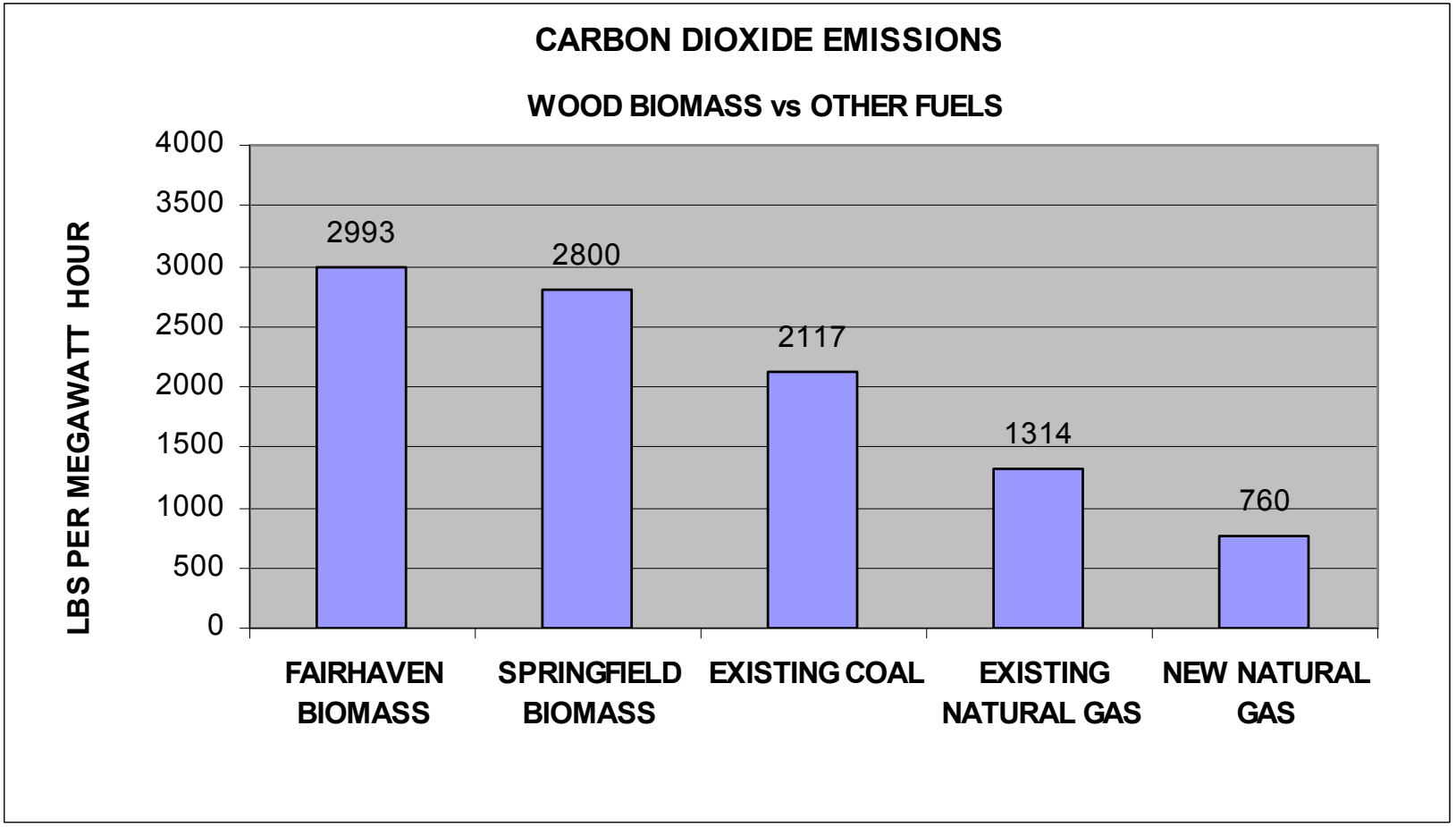
Science Finally Catches up to Common Sense

The European Environment Agency, September 2011

"It is widely assumed that biomass combustion would be inherently "carbon neutral". This assumption is not correct. The potential consequences of this bio-energy accounting error are immense"

Global Warming and CO2

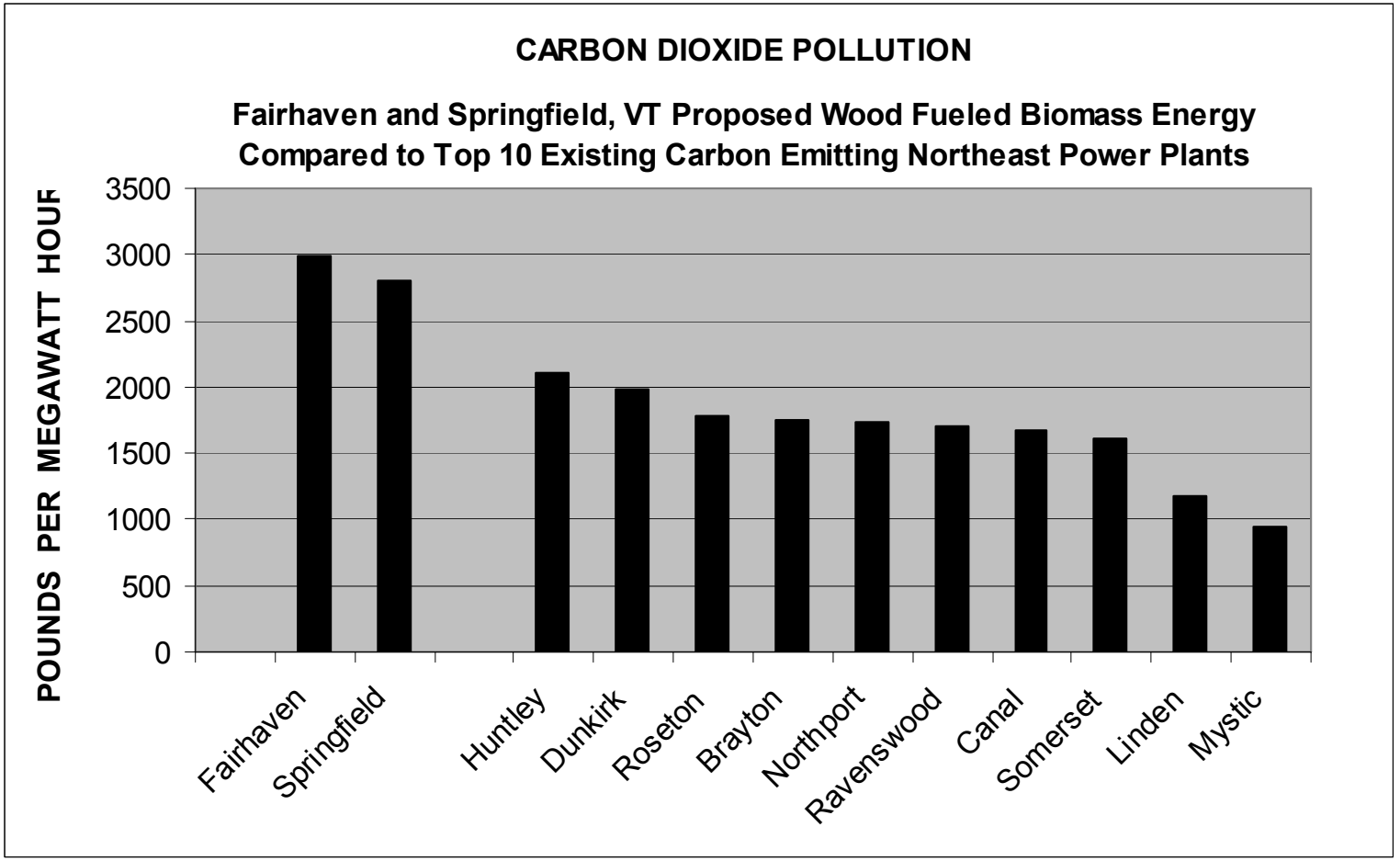
Biomass Electric Power Plants vs Fossil Fuels



Burning Trees Emits 50% *More* CO2 per MW Than Existing Coal Plants, 150% *More* CO2 Than Existing Gas Plants, and 330% *More* than New Gas Plants

Global Warming and CO2

New Biomass vs Top 10 Worst CO2 Polluting Power Plants in the Northeast



Global Warming and CO2

Science Finally Catches up to Common Sense

Massachusetts State Commissioned "Manomet" Biomass Sustainability and Carbon Policy Study" June 2010

<u>Long Term Carbon Dioxide Impacts:</u>

Tree-Fueled Biomass Electric Power Plants:

Worse than Coal For 45 to 75 years

Tree-Fueled Biomass Thermal Plants:

Worse Than Oil For 15 to 30 Years

Worse Than Natural Gas for 60-90 Years

Global Warming and CO2

Review of "Manomet Biomass Sustainability and Carbon Policy Study" June 2010

Unrealistic Biomass Friendly Modeling Assumptions Used That Minimized True Carbon Impacts:

- No Carbon Release From Soil Due To Logging
- Only Harvest Biomass Fuel From Sawtimber Sales
- Cut Large Trees For Biomass
- Instant And Complete Carbon Release From Tops and Branches
- No Re-Cutting of Forest For Long Periods, Up To 90 Years

Global Warming and CO2

Review of the "Manomet" Study By Dr. Mary Booth, For The Clean Air Task Force

"*The Manomet study has underestimated the net carbon emissions of biomass power, and policy-makers should be extremely cautious about accepting the study's optimistic conclusions…"*

"The results in the Manomet study should thus be viewed by policy-makers as an extreme best-case scenario unlikely to be achievable in reality."

BIOMASS: "Clean" ?

The Environmental Protection Agency has proposed air pollution rules that are more lenient in many respects for biomass plants than for coal plants, yet the biomass industry is resisting the proposed pollution standards.

"We are very concerned that the rules EPA has proposed will hamper [biomass industry] *growth and place in jeopardy the existing capacity of the industry to provide clean, renewable energy."*

Bob Cleaves,

President of the Biomass Power Association

Existing McNeil Biomass in Vermont

#1 Air Pollution Source in Vermont, ~ 70 Pollutants

Carbon Monoxide
Particulate Matter PM2.5
Ammonia Formaldehyde
Styrene
Acetaldehyde
Chloride
Phenol
Tetrachloroethylene
Propylene Dichloride
Trichloroethylene
Phosphorus
Arsenic
Methyl Bromide
Cobalt
Cadmium
Fluorene
Benzo[a]Pyrene
Hexachlorodibenzo-p-Dioxin
Octachlorodibenzo-p-Dioxin
Benzo[b]Fluoranthene
Benz[a]Anthracene
Chrysene
Dibenzo[ah]Anthracene

Nitrogen Oxides
Hydrochloric Acid
Sulfur Dioxide
Manganese
Chlorine
Naphthalene
Lead
Chlorobenzene
Methyl Chloroform
Ethylene Dichloride
Xylene
Chromium
Antimony
Methyl Ethyl Ketone
Pyrene
Anthracene
Beryllium
4-Dinitrophenol
Fluoranthene
Benzo[ghi]Perylene
Pentachlorophenol
Benzo[k]Fluoranthene
Acetophenone

Particulate Matter PM10
Volatile Organic Compounds
Benzene
Toluene
Methylene
Propionaldehyde
Carbon Tetrachloride
Nickel
Ethyl Benzene
Chloroform
Methyl Chloride
Vinyl Chloride
Phenanthrene
Acenaphthylene
Chromium
Selenium
Acenaphthene
Methylnaphthalene
Nitropheno
Indeno[123-cd]Pyrene
Bis(2-Ethylhexyl)Phthalate
6-Trichlorophenol
Benzo[e]Pyrene

Biomass Burning Health Impacts

American Lung Association:

"*Burning biomass could lead to significant increases in emissions of nitrogen oxides, particulate matter and sulfur dioxide and have severe impacts on the health of children, older adults, and people with lung diseases.*"

"The American Lung Association does not support biomass combustion for electricity production, a category that includes wood, wood products, agricultural residues or forest wastes, and potentially highly toxic feed-stocks, such as construction and demolition waste".

"The American Lung Association recognizes that pollution from the combustion of wood and other biomass sources poses a significant threat to human health, and supports measures to transition away from using these products for heat production."

Biomass and Particulate Pollution

United States Environmental Protection Agency:

"*Particle pollution especially fine particles—contains microscopic solids or liquid droplets that are so small that they can get deep into the lungs and cause serious health problems.*"

Wood Burning Biomass Plants, Even When Using the "Latest" Pollution Control Technology, Emit Higher Rates of Particulate Pollution Than Even Fossil Fuels.

Particulate Matter Health Impacts

American Heart Association:

"*Short-term exposure to particulate matter air pollution contributes to acute cardiovascular morbidity and mortality and exposure to elevated particulate levels over the long term can reduce life expectancy by a few years.*"

Particulate Matter Health Impacts

Children's Hospital Boston:

"A national epidemiologic study found a strong, consistent correlation between ***adult diabetes and particulate air pollution*** *that persists after adjustment for other risk factors like obesity and ethnicity.* ***The relationship was seen even at exposure levels below the current Environmental Protection Agency (EPA) safety limit."***

November 2010

Biomass Burning Health Impacts

Massachusetts Medical Society:

"*Biomass power plants pose an unacceptable risk to the public's health by increasing air pollution.*"

50 Year Old Coal vs Proposed Biomass Pollution

HEAD TO HEAD AIR POLLUTION COMPARISON

50 Year Old Mt Tom Coal Plant vs New Fairhaven, VT Biomass

(Pounds of pollution per megawatt hour of energy produced)

Pollutant	Old Coal Plant	Proposed Biomass	Biomass Difference
Carbon Dioxide (CO2)	**1,963**	**2,993**	**+ 52%**
Carbon Monoxide (CO)	**1.07**	**1.06**	**~ Equivalent**
Volatile Organics (VOC)	**0.03**	**0.07**	**+ 158%**
Particulate Matter (PM)	**0.05**	**0.27**	**+ 457%**
Nitrogen Oxides (NOx)	**1.08**	**0.43**	**-61%**
Sulfur Dioxide (SO2)	**2.07**	**0.28**	**-86%**
Ammonia (NH3)	**0.002**	**0.083**	**+ 3,479%**

Notes:
1. This Comparison to Coal is Used to Demonstrate How Dirty Biomass Energy is. It is Not an Endorsement of Coal Energy.
2. High Biomass Emissions Occur Despite Using the Best Available Pollution Control Technology. Other Biomass Facilities Have Similar Emission Profiles.

Natural Gas vs Proposed Biomass Pollution

HEAD TO HEAD AIR POLLUTION COMPARISON

New Westfield, MA Natural Gas vs New Fairhaven, VT Biomass

(Pounds of pollution per megawatt hour of energy produced)

Pollutant	Proposed Nat Gas	Proposed Biomass	Biomass Difference
Carbon Dioxide(CO2)	**816**	**2993**	**+ 267 %**
Carbon Monoxide (CO)	**0.31**	**1.06**	**+ 242 %**
Volatile Organics (VOC)	**0.01**	**0.07**	**+ 404 %**
Particulate Matter (PM)	**0.03**	**0.27**	**+ 835 %**
Nitrogen Oxides (NOx)	**0.06**	**0.43**	**+ 579 %**
Sulfur Dioxide (SO2)	**0.01**	**0.28**	**+ 2,686 %**
Ammonia (NH3)	**0.02**	**0.08**	**+ 412 %**
Hazardous Air Pollutants	**0.003**	**0.076**	**+ 2.423 %**

Notes:
1. This Comparison is Used to Demonstrate How Dirty Biomass Energy is. It is Not an Endorsement of "Fracking".
2. High Biomass Emissions Levels Occur Despite Using the Best Available Pollution Control Technology. Other Biomass Facilities Have Similar Emission Profiles.

“Small” Biomass Pollution

Even “Small” Wood Fueled Biomass Boilers Emit The Highest Rates Of Pollution, And Many Are Being Installed At Schools And Hospitals

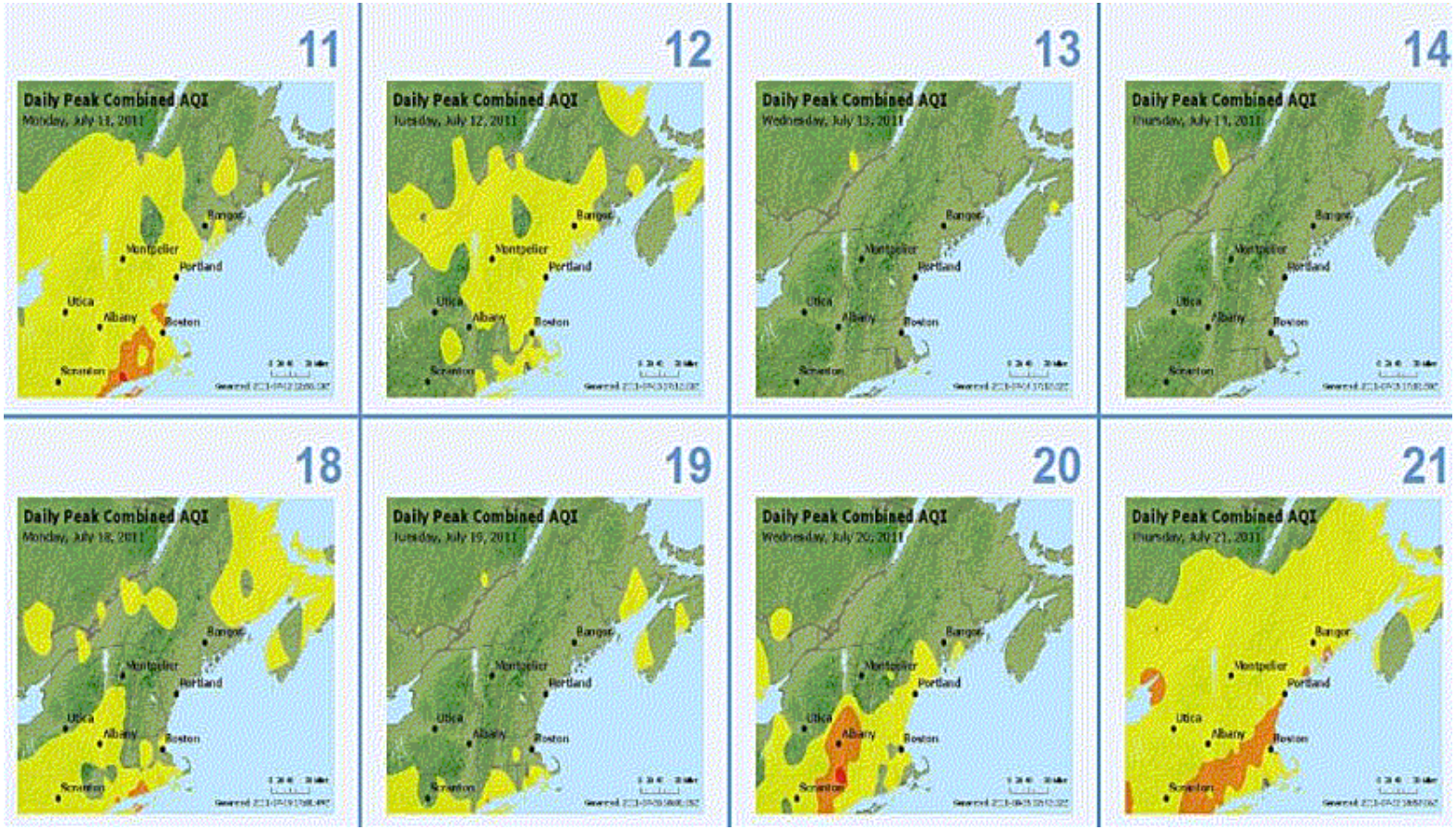
	Wood Chips	Oil	Natural Gas	Propane
Carbon Dioxide	287	232	146	-
Particulates, PM 10	.100	.014	.007	.004
Carbon Monoxide	.730	.350	.080	.021
Nitrogen Oxides	.165	.143	.090	.154
Sulphur Dioxide	.008	.500	.001	.016

(lbs/MMBtu)

Note: The particulate emission rate listed above for wood chips are 700% worse than oil, 1,300% worse than natural gas and 2,400% worse than propane.

New England Already Polluted

Air Quality Snapshot – US EPA - July 2011



Green Area Indicates "Good" Air Quality for Ozone and Particulates.
Yellow, Orange, & Red Indicate Progressively Degraded Air Quality.

New England Asthma Worst in Country

"Not only does New England have the nation's highest rate of asthma, but the disease remains poorly controlled in most patients — routinely causing trips to the hospital and lost days at school and work, according to a study being released today."

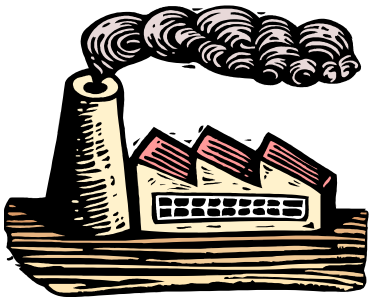
Boston Globe, April 26, 2010

Vermont Asthma

According to the Center For Disease Control Data, 1 of Every 9 Adults in Vermont Has Asthma, **the Highest Statewide Adult Asthma Rate in Country**. **Really.**

In Rutland, VT, 1 of Every 7 Adults Have Asthma, **the Highest Rate of any Metropolitan Area in the United States,** Worse than Los Angeles New York. **Really.**

Rutland is Only 15 Miles Downwind From The Proposed Fairhaven Biomass Facility That Would Burn ~400,000 Tons of Wood Each Year

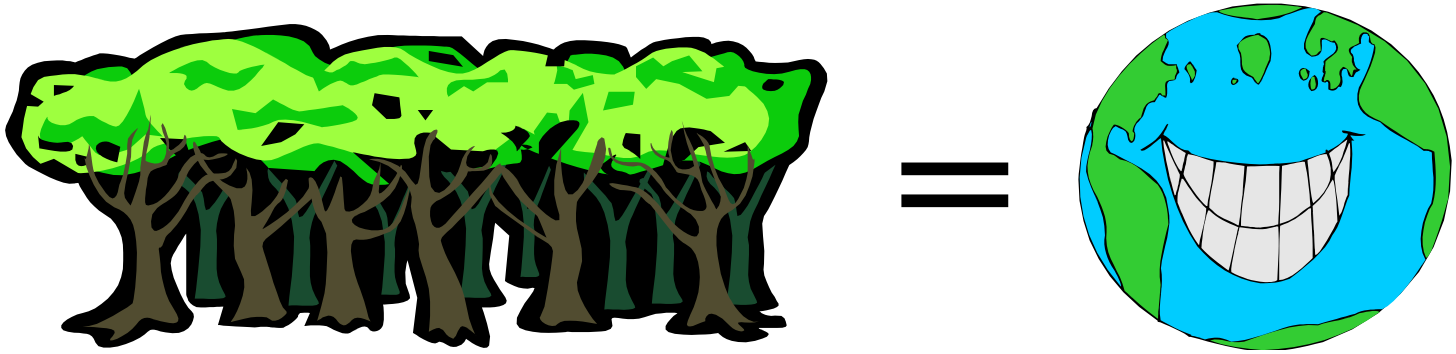


Trees Clean Pollution More Than Thought

A study released October 2010 by the **National Center for Atmospheric Research** found that Plants Play Larger Role Than Thought in Cleaning Up Air Pollution

"Plants clean our air to a greater extent than we had realized….they actively consume certain types of air pollution"

"Deciduous plants appear to be taking up the compounds at an unexpectedly fast rate--as much as four times more rapidly than previously thought. The uptake was especially rapid in dense forests and most evident near the tops of forest canopies"



More Biomass Problems

- Communities Become Divided,
  Developers Prey on Struggling Communities
- Facilities May Switch to Burning Even More Toxic Construction and Demolition Debris (CDD). In Maine, Many Plants That Started Burning Only Forests, Now Burn CDD.
- Developer Often Sells After Getting Permits or When Plant Built. Pre-Construction Promises Are Not Carried Forward.
- Ash from the plants often contains lead and arsenic and other toxins and is spread on farms as fertilizer.

Additional Costs of Biomass Energy

- ~ Reduced Property Values
- ~ Threatens Lucrative Tourist Industry
- ~ Large Water Withdrawals from Stressed Rivers and Aquifers
- ~ Hundreds of Local Logging Truck Trips Per Day, or Hundreds of Thousands of Local Logging Truck Trips Per Year on Narrow Rural Roads for A Single Large Facility
- ~ Increased Road Maintenance Costs Due to Heavy Truck Traffic
- ~ Large Amounts of Diesel Fuel Required to Cut, Chip and Ship the Wood
- ~ Increased Health Care Costs From Increased Air Pollution
- ~ Hundreds of Millions Of Dollars In “Clean” Energy Subsidies Go To New Dirty Smokestacks Rather Than Truly “Green” Energy Sources. Fosters Public Cynicism About “Clean” and “Green” Energy

Huge Financial Costs To The Public

Enormous "Clean and Renewable" Public Subsidies are Being Given to Dirty Biomass Energy.

For a Typical 50 MW Biomass Electric Facility:

1. Stimulus Cash Grant Worth 30% of the Cost
   ~ $75 Million - One Time

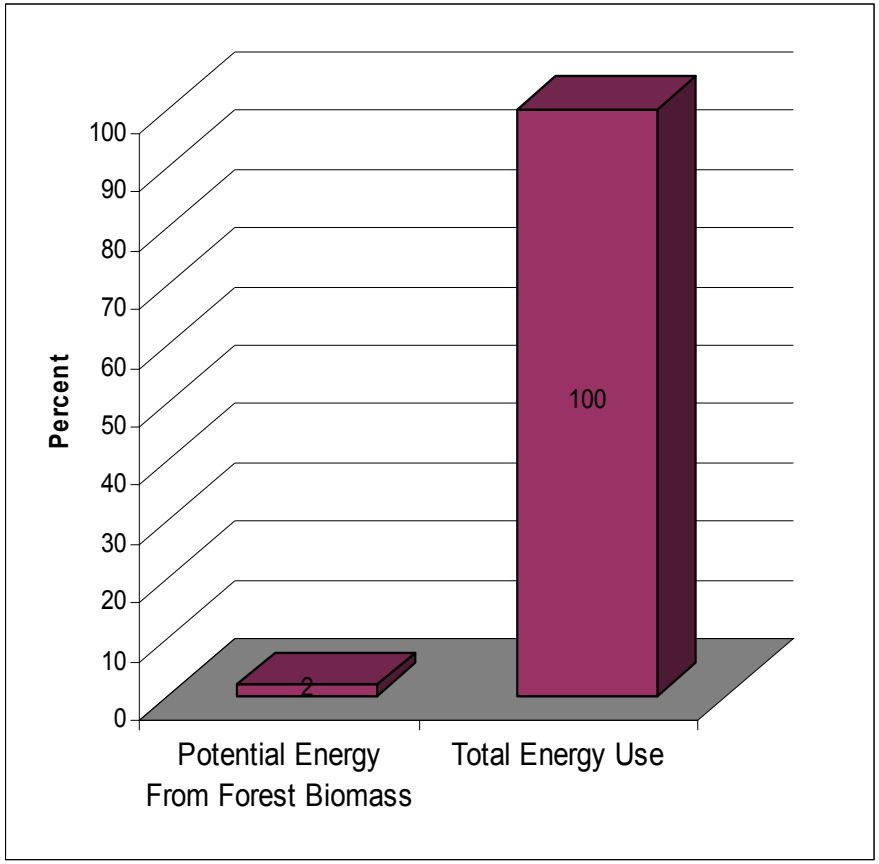
2. Renewable Energy Credits, About $28 per MWh
   ~ $11 Million – Per Year

3. Biomass Crop Assistance Program, Up to $45 per dry ton
   Up to $15 Million – Per Year

Note: The actual amount of public subsidies is a moving target. These amounts provide a "snapshot" of typical subsidy amounts.

Is Biomass Energy Worth the Increased Deforestation, Carbon Emissions and Air Pollution?

According to the Cary Institute for Ecosystem, the amount of energy that could be replaced with forest biomass is ***less than 2%.***



No New Power is Needed

The New England Electric Grid
Already Has Excess Capacity

Peak Electric Demand in New England Averages Between 15,000 MW and 24,000 MW. The Highest Historical Demand Ever Was ~28,000 MW the Summer of 2006.

The New England Power Grid Has ~38,000 MW Available, 35% More Than the Highest Power Demand Ever.

Genuinely “Green” Solutions

- Achievable and economic conservation and efficiency measures could reduce energy use **at least 30%.**
- Phantom Loads alone account for 5% of electrical use
- Conservation cost 3.2 cents per kWh versus 8.9 cents per kWh for new production.

The Future of New England Forests

Commercial Logging and Energy Interests Are Working Hard Lobbying Legislators to Pass Laws that Will Require Citizens To Subsidize a Dramatic Increase in Cutting and Burning of New England's "Golden Goose" Forests.

The Result Would Be Increased Clearcutting and Degraded Forests, Negative Impacts to Wildlife, Increased Air Pollution, Higher Carbon Emissions, to Provide at Best About 2% of Our Energy Use.

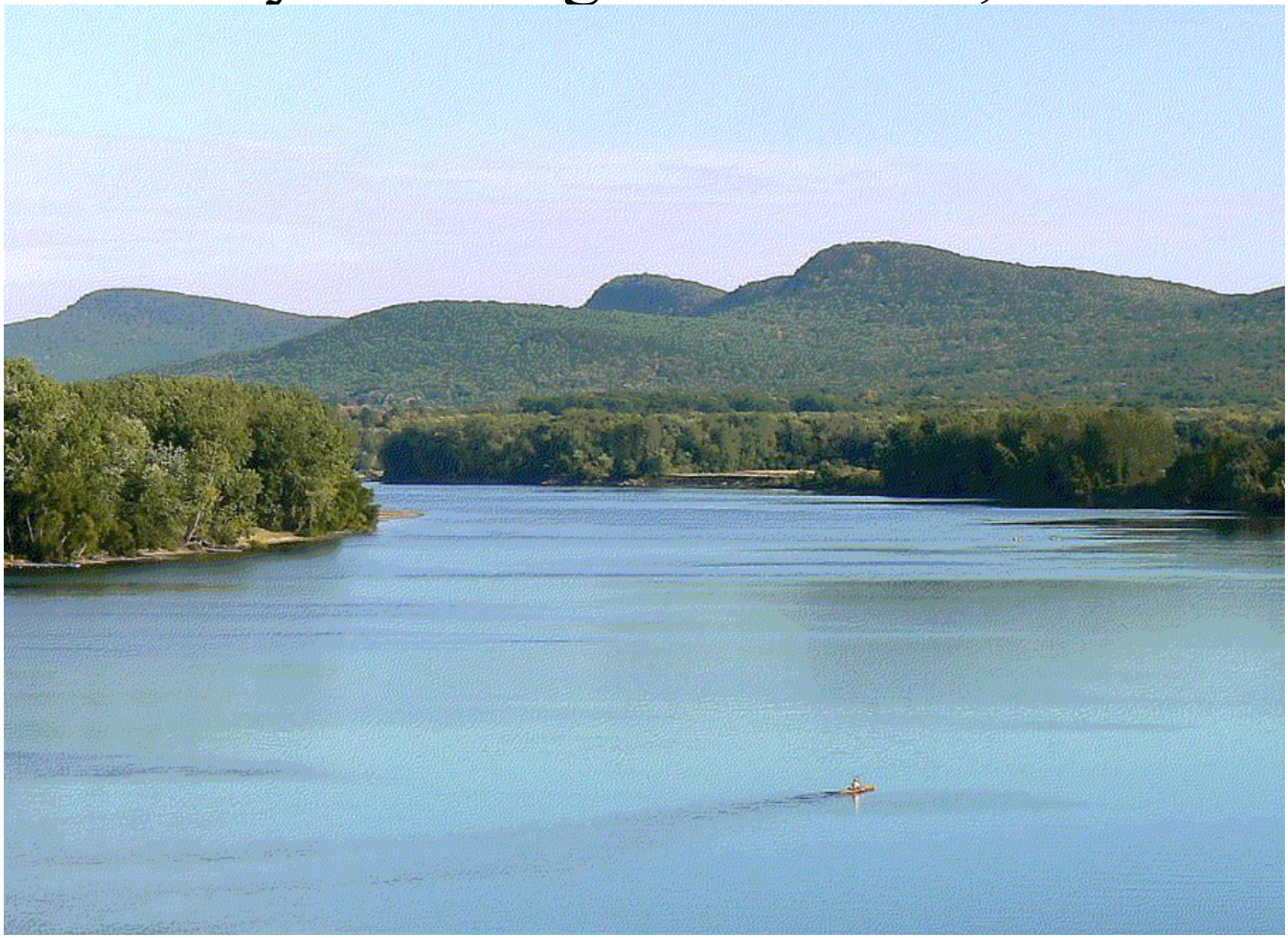
The Most Important Thing Citizens Can Do To Halt the "Biomess" is to Prevent Clean Energy Public Subsidies From Going To Dirty Biomass Energy.

Hopefully, the Following Photos Will Help Inspire New England Citizens to Speak Up for Their Forests and for a Genuinely "Clean" and Green" Energy Future**.**

(If You Are in "Slide Show" Mode, Turn Up Your Speakers, Go to the Next Slide, and Let The Presentation Run Automatically)

Holyoke Range State Park, MA

Holyoke Range State Park, MA



Holyoke Range State Park, MA

Chesterfield Gorge State Park, MA

Pitcher Brook Falls, MA

Nickerson State Park, MA

Quabbin Park, MA

Quabbin Reservation, Massachusetts

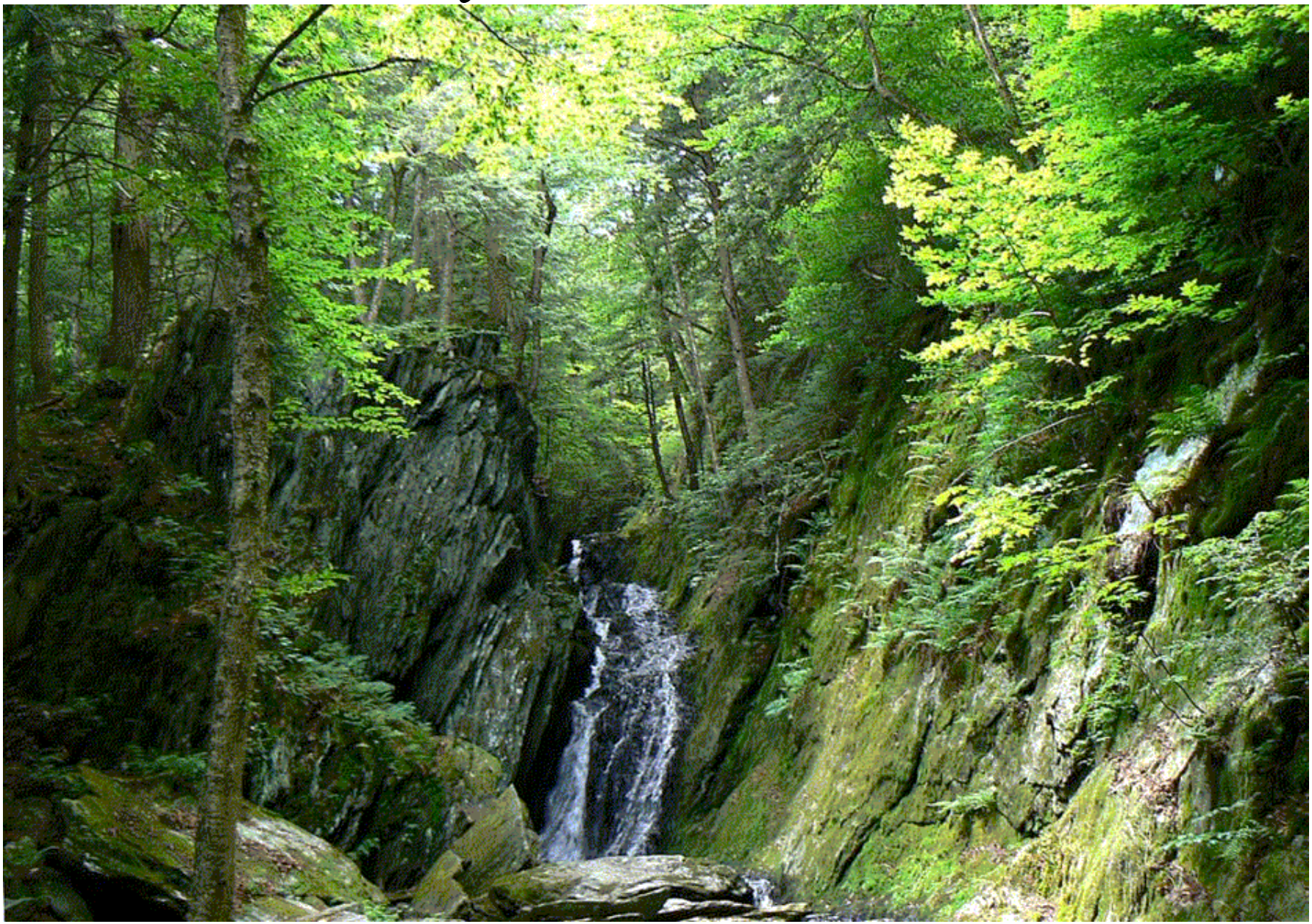
Quabbin Park, MA

Quabbin Reservation, MA

Bash Bish Falls State Park, MA

Savoy State Forest, MA

Savoy State Forest, MA



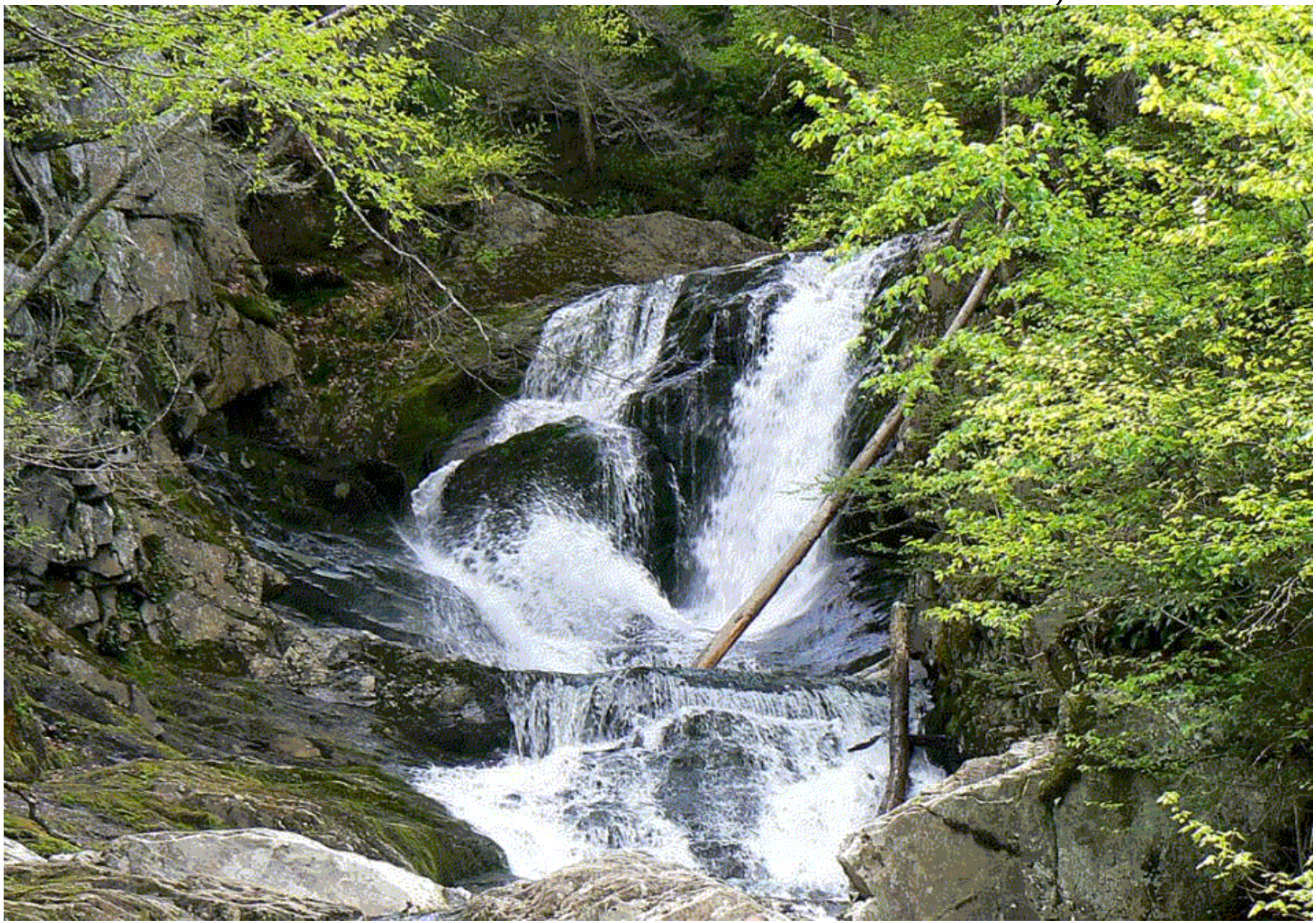
Mohawk Trail State Forest, MA

Westfield National Wild & Scenic River, MA

Mohawk Trail State Forest, MA

Mohawk Trail State Forest

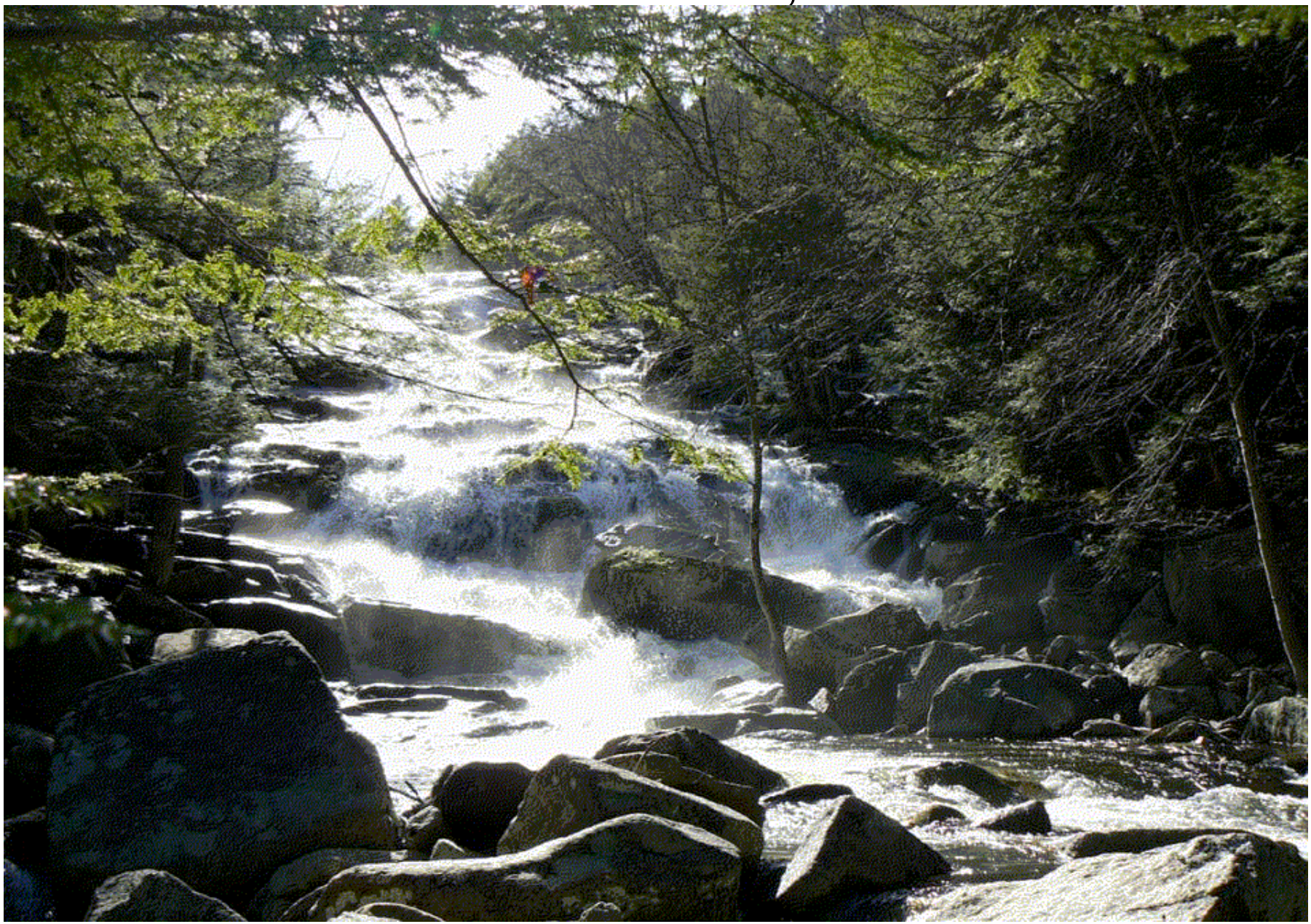
Chester Blandford State Forest, MA



Jamaica State Park, VT

Deerfield River, MA

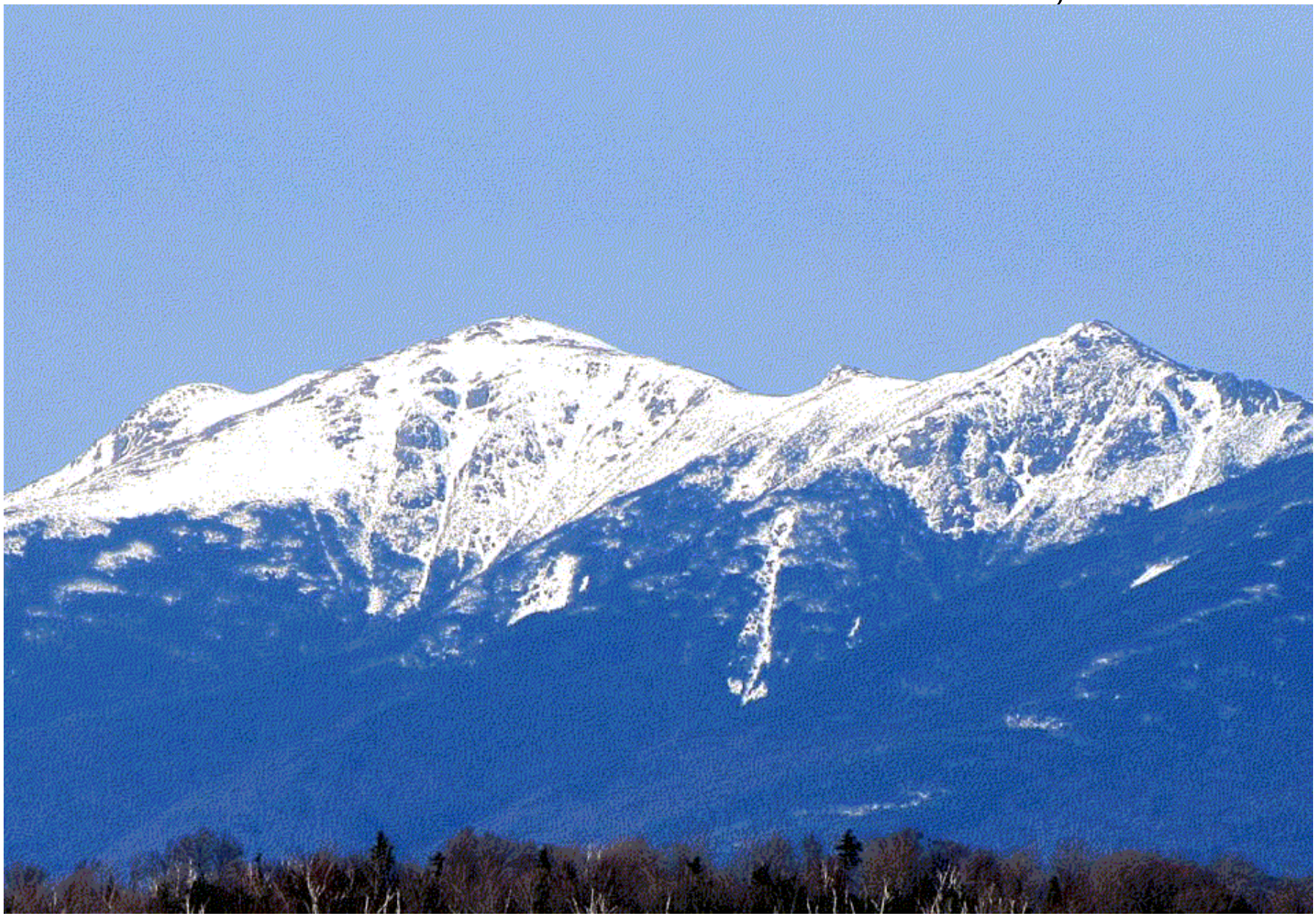
Glendale Falls, MA



White Mountain National Forest, NH

Photo, Blake Gardner

White Mountain National Forest, NH



White Mountain National Forest, NH

White Mountain National Forest

White Mountain National Forest, NH

White Mountain National Forest, NH

White Mountain National Forest, NH

White Mountain National Forest, NH

Baxter State Park, Maine

Green Mountain National Forest, VT

Green Mountain National Forest, VT

Green Mountain National Forest, VT

Putnam State Forest, VT

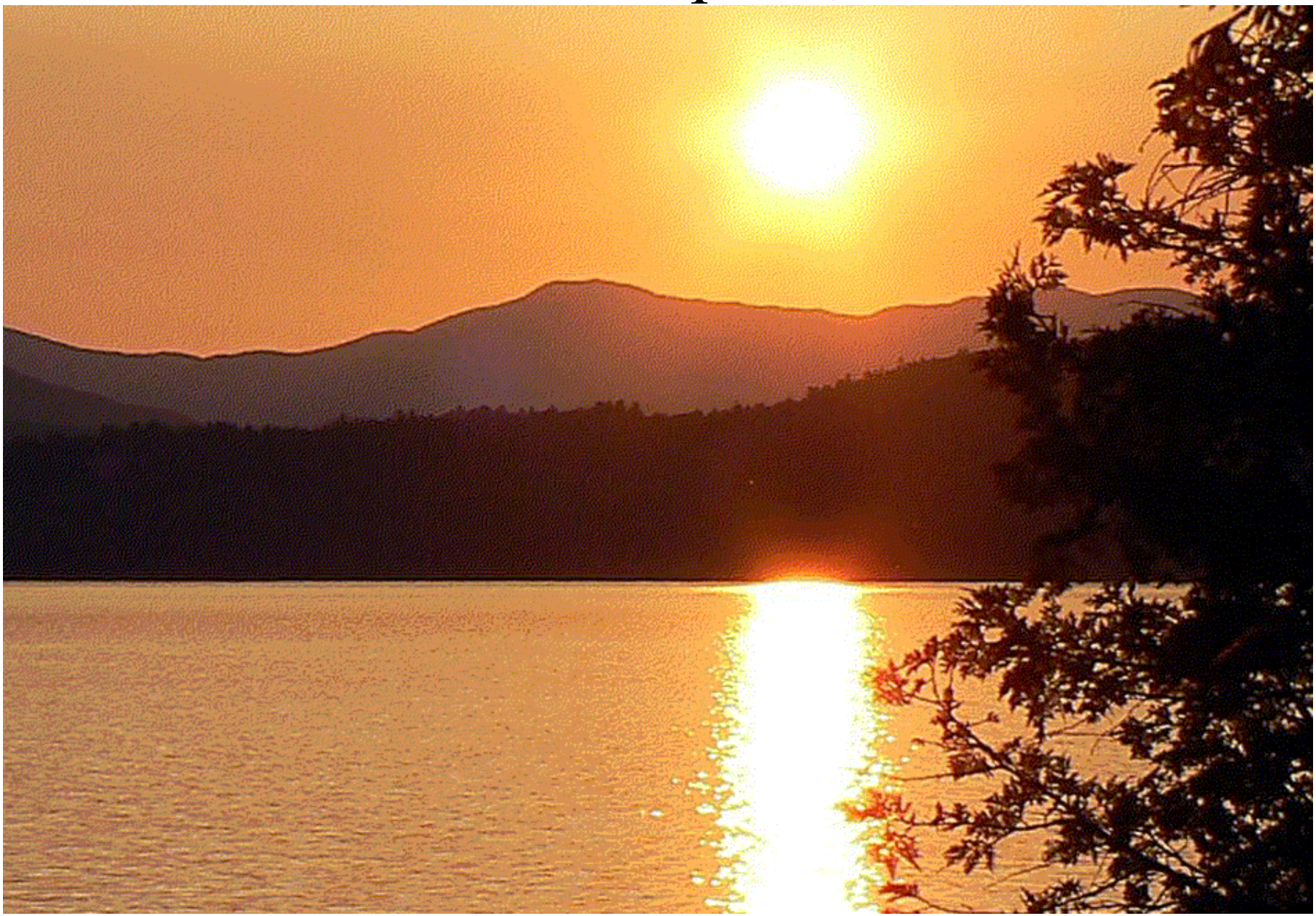
Green Mountain National Forest, VT

Green Mountain National Forest, VT

Camels Hump, Vermont

Jamaica State Park, VT

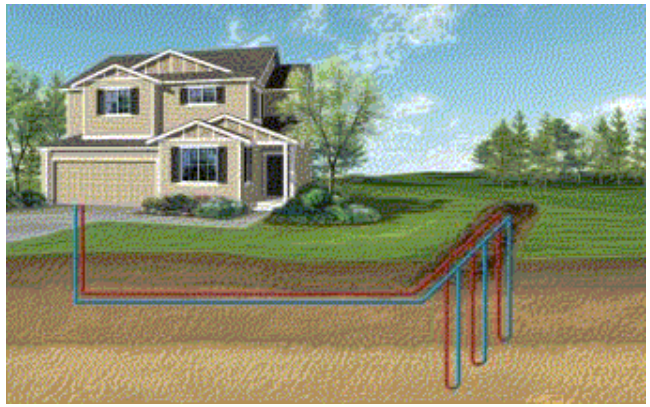
Lake Champlain, VT

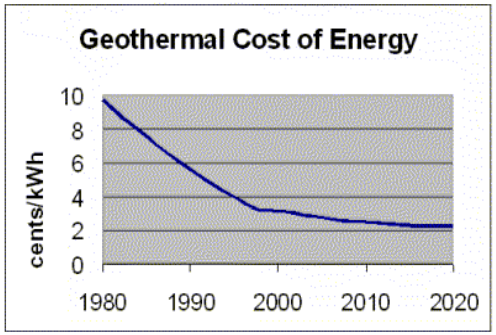


Our Choice: More Pollution….

…and More Deforestation?

Or A Genuinely Clean Energy Future…





…..and Healthy Forests

What Can Be Done?

1. End All Public Subsidies For Tree-Fueled Biomass Energy and Other Counterproductive Bio-Fuels

2. Fully Protect Our Important and Scarce Public Forests From Commercial Logging

3. Use Genuinely Clean Energy Solutions Such As Solar, Geothermal, Appropriately Scaled and Located Wind and Hydro, and Conservation and Efficiency

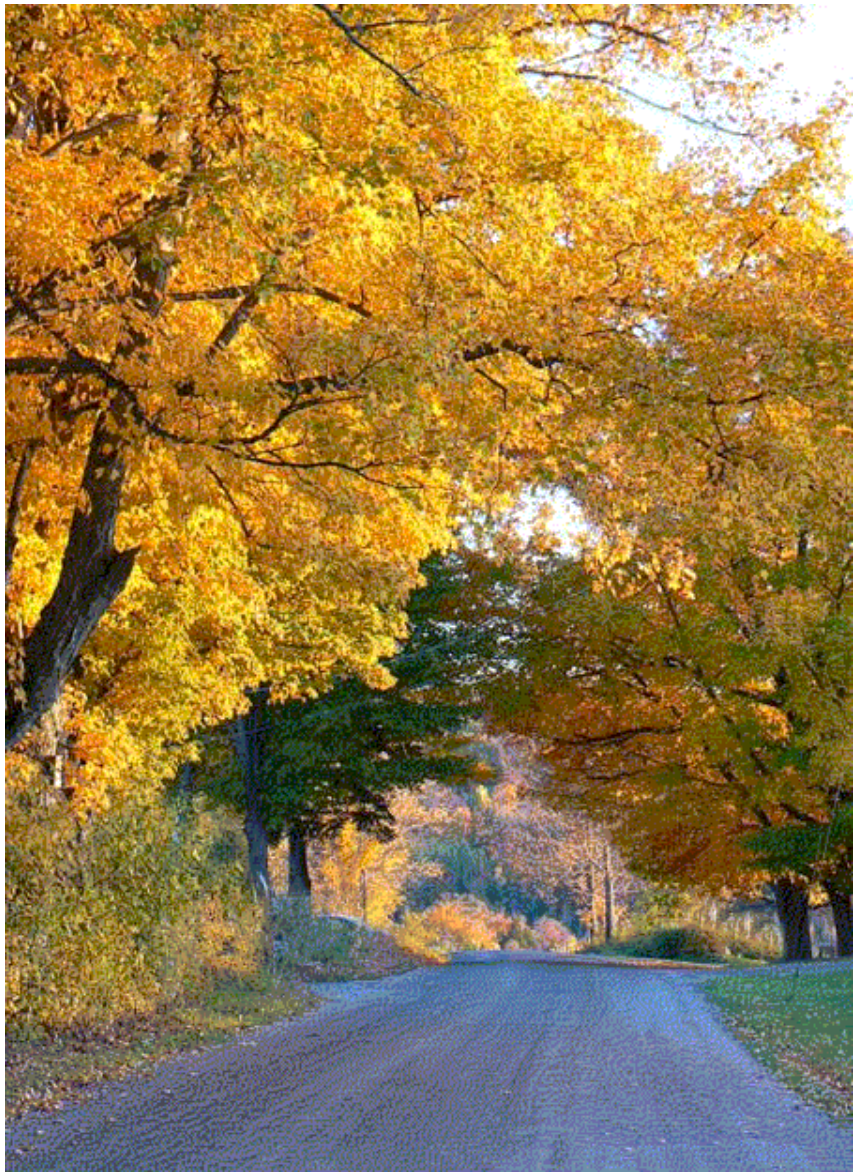
What Can You Do?

Forward this Presentation to Others.

Contact the Media and Your Representatives and Make the Points That "Clean and Green" Subsidies Should Not Go To Tree-Fueled Biomass Energy (or Bio-Fuels) and Public Forests Should Get Full Protection From Commercial Logging

MASSACHUSETTS FOREST WATCH

NEW ENGLAND FORESTS AT THE CROSSROADS



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Presentation And Info Available At:

www.maforests.org

See Sources & Calculations in Following Slides

Sources and Calculations:

Slide 12: http://www.sciencedaily.com/releases/2010/04/100407094447.htm

Slide 13: http://www.wildlandsandwoodlands.org/sites/default/files/Figure1_large.jpg

Slides 14, 15, 16: http://wilderness.org/files/Wood-Biomass-Energy-Facilities-in-Northeast-map.pdf

Slide 18: Existing NH, VT, MA, CT Commercial Cut

NH 3.20 million green tons, p. 44: www.manomet.org/sites/manomet.org/files/Manomet_Biomass_Report_Full_LoRez.pdf

VT 1.50 million green tons, p. 44: www.manomet.org/sites/manomet.org/files/Manomet_Biomass_Report_Full_LoRez.pdf

MA 0.37 million green tons, p. 37: www.manomet.org/sites/manomet.org/files/Manomet_Biomass_Report_Full_LoRez.pdf
(Includes 50,000 tons from public lands)

CT 0.24 million green tons p. 5: http://www.ct.gov/dep/lib/dep/forestry/forest_practitioner_certification/primaryprocessors.pdf
(40 mmbf x 5 g tons per mmbf = 200,000 g tons + 41,000 g tons = 241,000 g tons)

Total ~ 5.3 million green tons

Proposed additional NH, VT, MA, CT Commercial Cut for Biomass

13,000 tons per MW per year: p. 11: www.mass.gov/eea/docs/doer/renewables/biomass/bio-08-02-28-wmass-assess.pdf

560 MW (slide 14) x 13,000 = 7,280,000 green tons

890,000 tons of pellets (slide 14) x 2.2 g tons / ton of pellets = 1,958,000 g tons

7,280,000 + 1,958,000 = 9,238,000

Total ~ 9.2 million green tons

Total Cut with New Biomass & Pellets = 5.3 + 9.2 = ~14.5 million green tons

Sources and Calculations Continued:

Slide 19: p. 20: http://www.ecostudies.org/report_biomass_2011.pdf

	Net Growth	Removals	%
CT	1985171	1972099	99%
ME	16585125	17381728	105%
MA	3548842	1028608	29%
NH	5744156	2490233	43%
RI	475929	80258	17%
VT	5107525	3412785	67%
Total	**33446748**	**26365711**	**79%**

Slide 20: www.risiinfo.com/technologyarchives/risi-wood-biomass-market-report-woodfiber-supply.html

Slide 30: 13,000 tons per MW per year:
p. 11: www.mass.gov/eea/docs/doer/renewables/biomass/bio-08-02-28-wmass-assess.pdf
70 MW x 13,000 = 910,000 green tons per year

Average New England Standing Biomass = 78 green tons per acre
See: http://www.maforests.org/STANDING%20BIOMASS%20CALC.xls

Sources and Calculations Continued:

Slide 30 Continued:

910,000 green tons per year / 78 green tons per acre = **11,667 acres clearcut per year**
11,667 acres /1.32 acres per football field= **8,838 football fields clearcut per year**
8,838 football fields clearcut per year / 365 days = **24.2 football fields clearcut per day**

Average trees (< 11" dbh) too small to use for saw-timber weigh on average 434 lbs.
p. 2 of 6: www.fs.fed.us/ne/newtown_square/publications/research_papers/pdfs/scanned/OCR/ne_rp366.pdf

910,000 g tons per year x 2000 lbs per ton / 434 lbs per tree = **4,193,548 trees cut per year**.
4,193,548 trees cut per year / 365 days = **11,489 trees per day**
11,489 trees per day / 24 hours / 60 minutes **= 8 trees per minute**

Slides 31 & 32:

13,000 tons per MW per year: p. 11: www.mass.gov/eea/docs/doer/renewables/biomass/bio-08-02-28-wmass-assess.pdf
Total Waste Available = 629,000 million green tons all western MA including Worcester County
Page 31 - www.mass.gov/eea/docs/doer/renewables/biomass/bio-08-02-28-wmass-assess.pdf
Subtract C&D portion = 186,000 dry tons x 1.9 = 353,400 x 50% (C&D portion) = 177,000 g tons
Page 25 - www.mass.gov/eea/docs/doer/renewables/biomass/bio-08-02-28-wmass-assess.pdf
629,000 – 177,000 = ~0.4 million green tons (likely to be much less, smaller, existing Pinetree biomass already using whole trees)

185 MW (See Slide 14) → x 13,000 = 2,405,000 g tons per year ~2.4 million green tons

Massachusetts new biomass wood demand from forest cutting ~2.4 – 0.4 = ~2.0 million green tons

Sources and Calculations Continued:

Slides 31 & 32 Continued:

~2,000,000 green tons of wood per year / 78 tons per acre (see slide 30 calcs) **= 25,641 acres clearcut per year**

25,641 acres /1.32 acres per football field= **19,425 football fields clearcut per year**
19,425 football fields clearcut per year / 365 days = **53.2 football fields clearcut per day**

Average trees (< 11" dbh) not large enough for saw-timber, weigh on average 434 lbs.
p. 2 of 6: www.fs.fed.us/ne/newtown_square/publications/research_papers/pdfs/scanned/OCR/ne_rp366.pdf

2,000,000 g tons per year x 2000 lbs per ton / 434 lbs per tree = **9,216,590 trees cut per year**.
9,216,590 trees cut per year / 365 days = **25,250 trees cut per day**
25,250 trees per day / 24 hours / 60 minutes **= 17.5 trees per minute**

Slide 33:

280,000 dry tons targeted from public lands p 25 http://www.mass.gov/eea/docs/doer/renewables/biomass/bio-silviculture.pdf
280,000 x 1.9 = 532,000 green tons
Historical MA public land logging = ~ 50,000 green tons See footnote 3: www.maforests.org/Biomass.pdf
532,000 / 50,000 = 10.6 times historical rate

Slide 34: MA Current Capacity = 13,697 MW http://www.eia.gov/electricity/state/

185 / 13,697 x 100 = 1.3%

Sources and Calculations Continued:

Slide 35: ~9,200,000 green tons of wood per year (see slide 18 calcs)
/ 78 tons per acre (see slide 31 calcs) **= 117,948 acres clearcut per year**

117,948 acres /1.32 acres per football field= **89,355 football fields clearcut per year**
89,355 football fields clearcut per year / 365 days = **244 football fields clearcut per day**

Average trees (< 11" dbh) not large enough for saw-timber, weigh on average 434 lbs.
p. 2 of 6: www.fs.fed.us/ne/newtown_square/publications/research_papers/pdfs/scanned/OCR/ne_rp366.pdf

9,200,000 g tons per year x 2000 lbs per ton / 434 lbs per tree = **42,396,313 trees cut per year**.
42,396,313 trees cut per year / 365 days = **116,154 trees cut per day**
116,154 trees per day / 24 hours / 60 minutes **= 80.7 trees per minute**

Slide 36: http://www.vtenergyplan.vermont.gov/ (vol 2, page 99, page 233)

Slide 37: http://www.masslive.com/business-news/index.ssf/2011/02/massachusetts_moneymaker_crane_co_looks.html

Slide 38: www.pressherald.com/news/new-plant-would-ship-wood-pellets-to-europe_2011-10-25.html

Slide 39: http://www.openmass.org/dcr/recreate/campwhatsnew.htm

Slide 40: New England Forestry Foundation, www.maforests.org/FF%20Notes%20May%202010%20-%20NEFF.doc
General: http://www.maforests.org/Timberspeak-Timber_Industry_Propaganda.pdf

Slide 41: P. 150-151: http://www.mass.gov/eea/docs/eea/lf/forestgreencertreport.pdf

Slide 42: Quoted with permission

Slide 43: http://harvardforest.fas.harvard.edu/publications/pdfs/Foster_ConservationBio_2006.pdf

Slide 44: Frelich and Hutchinson quoted with permission
FSC, page 7 of 11: www.mass.gov/eea/docs/eea/lf/green-certification-report-peer-review-2009.pdf

Slide 45: http://water.epa.gov/polwaste/nps/czara/ch3-1.cfm

Slide 46: http://www.saveamericasforests.org/resources/Scientists.htm

Sources and Calculations Continued:

Slide 47: Pages 38, 39 www.maforests.org/Report.pdf

Slide 48: See: http://www.maforests.org/Timberspeak-Timber_Industry_Propaganda.pdf

Slide 110: www.concordmonitor.com/article/judge-rules-against-challenge-to-logging
http://www.thenation.com/article/wrong-kind-green
http://www.washingtonpost.com/wp-dyn/content/article/2007/06/26/AR2007062600803.html

Slide 111: http://www.maforests.org/Clearcutting%20Adirondack%20Park.pdf

Slide 112: hwww.northcountrypublicradio.org/news/story/17348/20110322/nature-conservancy-loggers-accused-of-damaging-adirondack-trout-stream
http://www.adirondackdailyenterprise.com/page/content.detail/id/523680.html

Slide 113: TNC President: http://nicholasinstitute.duke.edu/people/Tercek
TNC Salaries: http://www.nature.org/media/annualreport/irs_form990_2011.pdf
Roger Milliken, now chairman of the board at TNC: http://www.forestecologynetwork.org/paul.htm
Clearcutting Illegal at DFW, Last line: www.malegislature.gov/Laws/GeneralLaws/PartI/TitleXIX/Chapter131/Section4
MA Audubon State Payments: www.maforests.org/MA_Audubon_State_Payments.xls
MA Sierra Chair Public Lands / Forestry, Elisa Campbell: www.maforests.org/ElisaC.doc & www.maforests.org/eccj.pdf

Slide 128: www.maforests.org/SCIENCE.pdf

Slide 129: Page 6 of 182 www.manomet.org/sites/manomet.org/files/Manomet_Biomass_Report_Full_LoRez.pdf

Slide 130: Page 1 www.eea.europa.eu/about-us/governance/scientific-committee/sc-opinions/opinions-on-scientific-issues/sc-opinion-on-greenhouse-gas

Slides 131, 132: Page 5 of 9 and footnotes 11-13, http://www.maforests.org/VermontBiomassBiomess.pdf

Slide 133: Page 13 of 16, www.ct.gov/dep/lib/dep/air/siprac/2010/mass_biomass_sustainable_study.pdf

Slides 134, 135: www.catf.us/resources/whitepapers/files/201007-Review_of_the_Manomet_Biomass_Sustainability_and_Carbon_Policy_Study.pdf

Slide 136: http://biomassmagazine.com/articles/4043/bpa-outlines-mact-negatives-in-submitted-comment

Slide 137: www.planethazard.com/phmapenv.aspx?mode=topten&area=state&state=VT

Slide 138: http://www.pfpi.net/wp-content/uploads/2011/06/ala-energy-policy-position.pdf &
www.sourcewatch.org/index.php?title=Biomass_power_generation

Slide 139: www.epa.gov/particles/health.html

Slide 140: http://circ.ahajournals.org/cgi/content/full/121/21/2331

Sources and Calculations Continued:

Slide 141: http://healthfreedoms.org/2010/11/07/national-study-finds-strong-link-between-diabetes-and-air-pollution/

Slide 142: www.maforests.org/MassMed.pdf

Slide 143: www.maforests.org/Fairhaven%20VT%20vs%20Coal.xls

Slide 144: www.maforests.org/Fairhaven%20VT%20vs%20Nat%20Gas.xls

Slide 145: Page 14 http://www.maforests.org/doer_pellet_guidebook.pdf
For CO2, page 4 of 12 www.manomet.org/sites/manomet.org/files/Manomet_Biomass_Report_Chapter2.pdf

Slide 146: http://airnow.gov/index.cfm?action=airnow.mapsarchivecalendar

Slide 147: www.boston.com/news/health/articles/2010/04/26/scourge_of_asthma_is_acute_in_ne/

Slide 148: Rutland http://apps.nccd.cdc.gov/brfss-smart/ListMMSAQuest.asp?yr2=2010&MMSA=All&cat=AS&qkey=4416&grp=0
Vermont: http://apps.nccd.cdc.gov/brfss/list.asp?cat=AS&yr=2010&qkey=4416&state=US &
http://healthvermont.gov/tracking/health_asthma.aspx

Slide 149: http://www.sciencedaily.com/releases/2010/10/101021152401.htm

Slide 152: www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US53F &
Page 13: www.manomet.org/sites/manomet.org/files/Manomet_Biomass_Report_Chapter1.pdf &
www.fsa.usda.gov/FSA/newsReleases?area=newsroom&subject=landing&topic=pfs&newstype=prfactsheet&type=detail&item=pf_20110503_energ_en_bcap1.html

Slide 153: http://wamcradio.org/EarthWise/?p=415

Slide 154: http://www.iso-ne.com/nwsiss/pr/2012/final_fca6_initial_release_04062012.pdf
http://www.iso-ne.com/nwsiss/grid_mkts/pwr_sys/index.html

Slide 155: http://sustainable.cchrc-research.org/2008/07/dont-let-phantom-power-haunt-your-home/
Page 2 of 14 http://www.mass.gov/eea/docs/doer/electric-deregulation/ee03-05.pdf
http://www.nae.edu/Publications/Bridge/EnergyEfficiency14874/ThePotentialofEnergyEfficiencyAnOverview.aspx

Slide 156: http://www.maforests.org/Report.pdf