

# HEALTHY WATERSHEDS ~ HOME WOODSHEDS: Conserving Water Quality While Harvesting More Forest Biomass In the Headwaters of the Five-Town Forest

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## Introduction

We are fortunate to live in a place that still wants to be forested. However, the need for ecologically sustainable forestry has never been greater. Changing global climate and peaking oil supplies pose major challenges for the ecological health of forests in the Champlain Basin and beyond. Climate change is increasing the frequency of severe storm and drought events, tree stress, and forest pathogens. Peaking oil supplies are accelerating the substitution of forest fuels for fossil fuels and may be inadvertently increasing negative ecological impacts resulting from the harvest of forest biomass. As Bill McKibben suggested in *Eaarth* (2010), this is all part of the process and challenge of “making a life on a tough new planet.”

Most of our productive forests -- or *timberlands* as they are called in forestry circles -- are either managed for timber, tapped for maple sap, used for recreation, and/or asked to provide some other tangible products. Our forests are even taxed on their ‘use value’. *Use* trumps *wild* in Vermont and, whether the use is ecologically sustainable or not, the actively-managed and harvested timberlands are considered ‘working forests’. And, there is now an increased demand for the leaves, twigs, small branches, and other products from working forests that not long ago were considered unmerchantable and that were therefore left behind to rot and to nurture those forests.

Aldo Leopold told us that “health is the capacity of the land for self-renewal.” We know that land health can be assessed by: the stability and productivity of its soil; the biological diversity of the flora and fauna it grows; the capacity of the forest to sequester and store carbon; and the ability of the forest to resist invasion by exotic pests. And just as the blood in our veins can provide excellent insights into our health, the quality of water flowing from forests can give excellent insights into the health of that forestland and the ecological sustainability of the forestry practiced there.

All other things being equal, wild forests produce the cleanest, clearest, coldest, and most-highly oxygenated water of any land cover. However, we are much more inclined to use our forests than to allow them to be wild and self-willed. Suspended sediment is the primary water pollutant originating from working forests. This pollution is of the *non-point source* variety. The vast majority of it can often be attributed to just one storm event per watershed over a 20 year period. This non-point, storm-related sediment from actively-managed forest watersheds is therefore exceptionally difficult to detect, to quantify, and to regulate. In 1972, the Federal Clean Water Act required that states develop *best management practices* (BMPs) in order to reduce non-point pollution originating from managed forest lands. Vermont adopted twenty-four BMPs and called them *Acceptable Management Practices for Maintaining Water Quality on Logging Jobs* (AMPs). Based upon long-term scientific research, the AMPs have been shown to be very effective in maintaining forest water quality on actively managed timberlands when fully

implemented. Timber harvesting impact assessments have found that the full application of *best* or *acceptable* management practices is often lacking.

Global climate change and peaking oil supplies are creating a pressing need for local, ecologically-sustainable, energy alternatives. In a state that is almost 80% forested, utilizing significantly more local wood for fuel would appear to be a very logical option if harvested in ways that are ecologically sustainable. The Forest Guild and others have stated that this increased forest biomass harvesting must comply fully with the state best management practices for maintaining water quality. Increasing their application will likely require an integrated approach that: employs innovative operational systems; encourages local, collaborative, community-based approaches to monitoring; and identifies effective market, tax, or cost-share incentives -- and perhaps enforcement mechanisms -- to encourage a higher level of AMP compliance.

In summary, global climate change and peaking oil supplies demand that we cultivate and commit to real *craftsmanship* in the conservation of working woodlands. The level at which forestry complies with *best* or *acceptable* management practices for conserving water quality may be a cost-effective-though-indirect way of assessing water quality and ecological sustainability in managed watersheds over time.

### Project Description

There are forty Vermont schools and institutions that are using forest biomass as their primary heating source. Middlebury College's biomass plant went on line in February of 2009 as part of the college's commitment to reduce its carbon footprint. Using about 20,000 green tons of hardwood chips annually, the college established a goal of sourcing their wood from local and sustainable forestry operations. The Fall 2009 ES-401 Class evaluated the need for procurement standards and the Winter 2010 ES-401 Class examined the emerging issue of carbon neutrality. Your applied research this semester will build on their work.

The theme or subtitle of the Fall 2010 ES-401 Class will be *Conserving Water Quality While Harvesting More Forest Biomass in the Headwaters of the Five-Town Forest*. The Five-Town Forest is a primarily forested area located in the northeast corner of Addison County in the towns of Bristol, Lincoln, Monkton, New Haven, and Starksboro. It includes the headwaters of the Lewis and Little Otter Creeks and the New Haven, Middlebury, Mad, and Huntington Rivers. The working title for our project will be *HEALTHY WATERSHEDS~HOME WOODSHEDS (HW~HW)*.

The primary goal of the *HEALTHY WATERSHEDS~HOME WOODSHEDS PROJECT* is to develop a strategy for conserving water quality in the managed timberlands of the Five-Town Forest that is: ecological, economical, and ethical; effective even with increased harvesting of forest biomass; and of real value to woodland stewards and town conservation commissions. Specific objectives for the project are to:

1. To characterize the science, art, and craft of water quality conservation as practiced in a variety of working woodlands located in the headwaters of the Five-Town Forest;

2. To identify existing challenges and opportunities for achieving full compliance with the AMPs on working woodlands in the Five-Town Forest; and
3. To develop strategies that will enhance the conservation of water quality while harvesting more forest biomass in the headwaters of the Five-Town Forest.

You will be asked to address the project's goal and objectives by focusing on six primary questions:

- What are the ecological and socio-economic functions and values of the streams and rivers in the Five-Town Forest?
- Who owns the working woodlands, what are *their* stories, and what are *their* specific ownership objectives and challenges?
- What are the primary impacts of timber and biomass extraction on water quality in these headwater woodlands?
- How effective are Vermont's *Acceptable Management Practices* in conserving water quality as currently implemented?
- What are the associated challenges and opportunities for landowners and logging operators in achieving full compliance?
- Assuming increased harvesting of forest biomass as well as increased forest stress due to climate change, what should be done to assure that water quality is conserved in the headwaters of the Five-Town Forest?

We will work individually and in groups to gather existing quantitative information from a wide variety of sources. We will also employ a positive, collaborative, five-step community-based process for gathering, processing, and sharing information. These steps will include:

- Exploring the craft of water quality conservation in managed headwater woodlands
- Listening to the stories of the woodland stewards
- Identifying the opportunities and challenges in achieving full AMP compliance
- Mapping the transition to a higher level of AMP craftsmanship
- Celebrating conservation and resilience in the Five-Town Forest community

Community partners for this project will be Vermont Family Forests and representatives from each of the five town conservation commissions. We will also seek to involve many other community associates.

### Presentation of Project Results

A final report detailing your methods, key findings, and recommendations; supporting GIS maps and metadata as appropriate; participation in a public workshop for the Five-Town Forest Community and survey of participants; and a *field guide* -- especially for woodland stewards and conservation commissions -- reflecting the science, art, and craftsmanship of water quality conservation in the once and future Five-Town Forest.