

Vermont Secondary and Higher Education in the Age of Climate Change

Analysis and Suggestions for the Future

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INTRODUCTION

Modern environmental problems, specifically climate change, present unique problems to society. They defy local, state and even national boundaries, challenging our current methods of addressing these issues. However, in the face of increasing stagnation at the national level, individual states have stepped up to address climate change in their own way, responding to citizen concern and perceived economic benefits. New England has been a leader in this movement, reaching beyond state boundaries and looking for feasible solutions. In this return to local methods of addressing social problems, education plays a central role. In many cases, groups of institutions have led the way in coalition building and advancing new solutions.

Vermont has a proud tradition of excellence and innovation in public and private education. As a sector of society, it is among the most invested in the future of the state through its involvement with children and young adults. Education has a profound ability to transform society and culture, and to guide its direction by imparting facts, values and guidance on youth. From the beginning, the environmental movement has recognized the importance of education and relied on it to cultivate the value of community, sustainability and harmony in students. There are many ways that this kind of education has traditionally occurred. In Vermont, there are numerous organizations devoted solely to environmental education, which provide environmental curricula to schools and teachers throughout the state. In addition, faculty members or administrators' personal initiatives can also spark a school's involvement in climate issues. Third, student concern often can inspire an institution to take action or introduce change. Overall, the potential of educational institutions to be a powerful player in the future community is strong.

In this paper, we attempt to identify the current and future role of Vermont education in the climate change process, something likely to shape public policy over many subsequent decades. We will examine current and planned environmental projects at the secondary and higher levels of the system, both public and private. At the end, we will provide

possible directions and projects for schools, as a sort of resource book on climate change action.

METHODS

We divided Vermont education into four categories: public secondary, private secondary, public higher and private higher education. In each of the groups we conducted interviews based on a list of common questions to determine institutional involvement in environmental issues, in particular climate change. Interview participants were selected in an attempt to gain as wide a geographical distribution as possible for secondary education, and to contact one individual at each institution for higher education. Initial contact information was obtained from the school, the Vermont Board of Education website, or individual school websites. We interviewed those who responded to our initial phone calls or e-mails with the following questions:

Interviewee:

Institution:

Location:

Size of student body:

Size of faculty and staff:

Approximate size of institution landholdings:

Does your institution have a major or academic program that focuses on environmental issues? Is it heavily science based, or does it have other components?

Does the college have any other environmentally related services or curricula? If yes, please describe.

Are any of these services/academic programs/classes focused on issues of global climate change?

Is there environmental concern or significant environmental initiative happening among students? Faculty members? Facilities planners and management staff?

Does your institution have any groups that address environmental issues, or global climate change in particular, through activism or other initiatives? Who has instigated the initiatives?

Does your campus play a role in the wider community in environmental issues?

How would you rate environmental interest in the student body overall?

Have you had any obstacles in trying to implement environmental activities? Those with regard to climate change in particular?

Does your school have any future environmental projects planned? Any that relate to climate change?

What is your sense of the influence of private institutions on environmental issues? Do they face particular challenges or roadblocks?

(Did you guys use any separate or different questions? I know I tweaked the wording of some of mine, but we should include all the questions we asked here)

We conducted the interviews by phone or e-mail in accordance with the participant's preference. Each interviewer worded the questions with slight differences to best represent the area of education they were researching, and/or asked follow-up questions specific to an individual's responses. In addition, web research was done to supplement information from areas or schools not represented in the interviews. We analyzed the results for each area of education independently and as a whole to create a picture of Vermont education today.

PUBLIC SECONDARY EDUCATION

In 1999, about 47,000 Vermont youth were receiving secondary education in 59 secondary school districts. 24 of the 59 schools are supervisory union (SU) schools drawing students from two or more districts. Nearly half of all Vermont secondary schools enroll fewer than 600 students—an attribute that many researchers and educators consider a strength of the system http://www.state.vt.us/educ/new/pdfdoc/pubs/hsom/hsom_03.pdf). We contacted teachers or administrators at various schools in different regions of Vermont, according to the Vermont Principal's Association, to allow for an appropriate geographical distribution in our data. Using the website for the Vermont Principal's Association (<http://www.vpaonline.org/s4.asp>) we chose Champlain Valley Union High, Rutland High School, Franklin Northwest Supervisory Union, Montpelier High School, Austine School, Brattleboro Union High School, Addison Central, Northeast and Northwest Supervisory Union, Burlington High

School, Middlebury Union High School, Lake Region Union High School, Hartford High School, and Mount Anthony Union High School. Unfortunately, the response rate to emails or phone calls was unexpectedly low and we only had two full interviews, both with teachers from Hartford High School. Hartford High provides two important examples of initiatives that promote environmental awareness and taking action: a school recycling program and collaboration between departments.

Hartford High is located in White River Junction, VT. The student body is about 850, and the school owns a few acres of woods behind the school in addition to playing fields. About ten years ago, a small regional resource group implemented a recycling program for the school for plastic bottles, cans and white and mixed paper. It was a "big deal" and many people were involved. The Hartford Landfill Recycling center employed a woman who was responsible for educating the townspeople about recycling at the landfill. She collaborated with art students who did displays at the Recycling Center. Unfortunately, she passed away and no one else has filled her position. According to Bob Harris, a science teacher at Hartford, "There's not a whole lot of help from people in town as far as education goes." Lack of community support is a vital issue for schools' implementation of new programs and initiatives.

The Hartford School District made an effort, unlike in many towns across Vermont, but the recycling system was not very organized or effective. In addition, momentum has been lost as the school administrators or maintenance departments have not been involved. Custodians would come across a wastebasket with recycled goods but did not sort the trash. As is likely the case at many institutions, "Custodial staff feels overworked, wants nothing to do with it" (Harris, May 2, 2005).

Today, the recycling program continues, albeit on a smaller scale than ten years ago, but through a truly collaborative effort. Special education students collect white and mixed paper, cans and bottles from around the school and take it to a shed on campus, where a recycling truck comes and picks it up once a week. Teachers who are involved are hoping to

create recycling stations around the school. There is currently growing interest among teachers to revive awareness about the program.

Another recent collaborative effort was with an art class and the special education program. They combined to construct wooden frames for making recycled paper. A specific teacher took on this initiative. Then, they made a display in the main lobby of the high school including examples of recycled paper, and facts about recycling and natural resources.

The nearby land is more important for educational use than the land directly surrounding the school building. There are a few nature preserves nearby which provide a space for investigation and learning. Bob Harris reported his class took a field trip with the Conservation Land Trust through the VT Nature Conservancy's local land ownings, where they pulled invasive species. A Biology class did a river study, as well. Usually biology classes at Hartford High have 25 kids, but there has been an Environmental Studies course that enrolls about 10 in the past. It is a one-semester course for juniors and seniors that focuses on the textbook, "Living in the Environment" by Miller, which has significant information about climate change.

Like the individual initiative seen at the Recycling Center, a teacher initiated this course a number of years ago. Since the individual moved on from the school, the course has essentially been dormant. Most public high schools in New England do not have Environmental Studies courses. One of the challenges at Hartford is the small class size, which the administration does not favor. But, the good news is, Bob Harris will be teaching the course for first time in quite a few years, and hopes to add more labs.

The portrait of secondary public education's involvement in environmental affairs may or may not represent the rest of Vermont. We think it provides a realistic representation of the difficulty of finding funding, interest, and support from the right groups in a public school setting. The State Board of Education and the Department of Education, however, have a comprehensive Framework for Standards and Learning Opportunities for the state that includes fostering civic, social and environmental responsibility. These standards provide practical

reference points for the development of local curriculum and assessment. They are intended as guidelines and allow for shared expectations for learning for parents, people in the community, and across the state. They are not intended to be limitations.

Analyzing the reference points in the state Standards document provides an appropriate framework, and thus a basis for optimism, about future curricular innovation and environmental initiatives in Vermont secondary educational institutions. We found the standards in unlikely areas (outside of Earth Science) to have the greatest potential for incorporating climate change into the curriculum from different perspectives. For example, the standards for history and social sciences include investigation and critical evaluation of causes and effects in human societies. One of the most important cause and effect stories to understand is that of greenhouse gas emissions and climate change. Design and Technology is a subset of Science, Mathematics and Technology. This includes natural resources, technological systems, outputs and inputs, designing solutions. Students are expected to analyze the roles and responsibilities of scientists, mathematicians, and technologists in social, economic, cultural, and political systems. One of the specific expectations is: "Explain how discoveries or inventions can help or hurt people (e.g., the environmental impact of energy consumption)" (<http://www.state.vt.us/educ/new/html/pubs/framework.html>). Taking this a step further, thinking about ways to cut back on greenhouse gas emissions due to energy consumption from this angle would be a creative and stimulating way to include discussion and critical thinking about climate change and its impact on society.

We would like to highlight the potential for utilizing the Civic/Social Responsibility standards' category called Continuity and Change. This category calls for understanding cultural, environmental, societal changes that are both rapid and revolutionary, as well as slowly evolving changes. Global warming, climate fluctuation- however you choose to look at the issue- it is an issue of change. Change will happen for natural communities, developed human communities and the myriad communities in between. It is important to understand to develop

a basic understanding of the scope of this change at the secondary education level to instill a sense of its importance (<http://www.state.vt.us/educ/new/html/pubs/framework.html> Section 4.5). The next category of civic and social responsibility corresponds to understanding Place. Students are encouraged to demonstrate understanding of the relationship between their local environment and community heritage and how each shapes their lives. We highly recommend the inclusion of climate change in this section, and think all of the standards are worth sharing:

“Apply knowledge of local environment through active participation in local environmental projects (e.g., work with local planning board to analyze existing agricultural land use from a variety of perspectives); Explore the interrelationship between the local environment and the local community culture (e.g., settlement patterns, tourism, hunting, agriculture); Explore and participate in sustaining or building on unique and valued elements of past and present community heritage (e.g., survey community to improve access to town meeting). Demonstrate knowledge and history of local environment (e.g., soils, forests, watershed) and how their community relies on its environment to meet its needs (e.g., nutritional, recreational, economic, emotional well-being); Describe the role of agriculture, forestry, and industry on the development of their local community over time; Demonstrate knowledge of past and present community heritage (e.g., traditions, livelihoods, customs, stories, changing demographics, land use) and recognize ways in which this heritage influences their lives. Evaluate and predict how current trends (e.g., environmental, economic, social, political, technological) will affect the future of their local community and environment” (<http://www.state.vt.us/educ/new/html/pubs/framework.html> Section 4.6)

Challenges for secondary public schools in Vermont extend far beyond creating innovative curricula, however, and we do not mean to gloss over the realities of an increasingly socio-economically, racially, and culturally diverse population, though this is more relevant in certain areas more than others. After two years of study, a Task Force put together by the Department of Education reported that a major challenge in Vermont today is that students have complex emotional and social learning needs. These needs are increasing, but resources are not necessarily increasing at the same pace. Overall student performance, based on statewide assessments (the NSREs), is not satisfactory in Vermont. In other words, not enough high school students are meeting or exceeding the assessment’s standards. Therefore, it is not surprising that we did not receive enthusiastic feedback after contacting public secondary

schools. Integrating environmental curricula is not likely to be a priority when the focus needs to be on increasing the number of students who satisfactorily meet the state's standards.

PRIVATE SECONDARY EDUCATION

We interviewed six teachers and administrators from the following secondary private schools in Vermont regarding environmental programs at each school: Long Trail School, Burr and Burton Academy, The Gailer School, Green Mountain Valley School, Burke Mountain Academy and Vermont Commons School (please see table 1 for location and student body size). We will discuss the environmental curricula, community involvement in environmental issues, sustainable facilities planning and climate change initiatives happening at these independent schools in the state.

Private schools have a greater flexibility in their overall mission and curriculum than public schools do and the advantage of a lower student to teacher ratio. Often, these independent schools operate on small budgets and campuses of limited area, but the administrators and teachers' passion and vision lead to innovative curriculums that engage students in the larger community.

The curricula of all of the schools interviewed include extensive, and growing, environmental science programs. For example, at Burr and Burton Academy, environmental science students participate in Riverwatch, a program in which they monitor the chemical and physical health of the local river. At The Gailer School, environmental science students monitor bird and monarch butterfly populations. The Research and Service course at Vermont Commons School challenges students to identify a problem, usually environmental, research a solution, and implement that solution. This assignment led students to work with neighborhoods in Shelburne to eliminate pollution in the runoff from their homes into the river. The students repaired the riverbank and were supported by the Department of Natural Resources and a

grant to create a wetland. Overall, the environmental science courses at these schools were the strongest and most established aspect of their environmental activities.

A smaller number of schools mentioned the importance of the environment in their social science and humanities programs. A course called "Nature, Technology and People" at The Gailer School addresses interactions between humans and the environment. At Vermont Commons School, language arts classes in seventh grade are place-based at a local level, and then the classes gradually expand to a larger sense of place as the students advance in their studies. The concept of relationships between human and natural communities is integral to students' studies at Vermont Commons School, as well as the study of ecological systems and environmental modeling. Although some schools had strong environmental themes in non-science classes, it is an area that can be expanded and improved.

A wilderness curriculum is also an integral part of studies at many of these private schools. At The Gailer School, the 2005-2006 academic year will be the first with an outdoor leadership and service course, which includes trail work with the Green Mountain Club. Vermont Commons School has created an Encounter Week program, during which students in groups of 10 learn outdoor skills on trips to the Adirondacks or the Green Mountains among other locations. Some students become Wilderness First Responders during the program, while others learn how to winter hike and camp. These schools are founded in a sense of place in the environment and they work to build this connection for students.

Partnerships in the community are central to the study projects of many of these schools. Cooperation with local land trusts, the Nature Conservancy, the Federal Fish and Game program "A trout in every classroom," Green Mountain Club, Audubon Society and the Shelburne Museum enrich the education and environmental awareness of students. Many of the environmental science classes complete environmental impact studies or models or collect data to present to town planners or local organizations. The students are doing work that serves the well being of the local human and environmental communities. They can gain a valuable

sense of how civil society works through these experiences, taking part in what Robert Putnam calls “bridging” social capital by linking a variety of groups and organizations into a meaningful larger entity.

Even though the landholdings of some of these schools are modest, for the most part a few acres, these connections to the community allow them to explore their surroundings in meaningful ways. The value of public lands is clear to students after time spent in a state park or a local land conservancy. Using a variety of lands for research and recreation expands students’ sense of place and teaches stewardship for the larger community. Vermont Commons School exemplifies this use of its neighboring resources and lands as it uses Lake Champlain for study; for example, middle school science students go to a quarry on the lake for research. Science classes at Burr and Burton Academy are taking responsibility for the greatly damaged Battenkill River: students have cleaned it up and made recommendations to the town of Manchester for its improved protection. This connection between environmental learning and service is well developed at almost all of the school interviewed and creates an important link with the larger ecological community.

All schools expressed an interest on the part of facilities planning and management for environmental sustainability. Green Mountain Valley School, a ski academy near Sugarbush, has a larger campus than many of the other respondents, 17 acres, which allows them greater flexibility with facilities planning than the smaller campuses or those in leased buildings. The administration there is planning a new, environmentally sound library modeled after the newly completed Middlebury College library and the installation of solar panels on the main administration building. Students are also getting involved in the technical aspects of facilities planning where it is appropriate: at Burr and Burton Academy, for example, the environmental science class was invited to participate in the Act 250 process when the academy applied for a new building permit.

The schools with smaller campuses, including Vermont Commons School and The Gailer School, expressed some feeling of limitation with the greening of their buildings. Vermont Commons School leases its space, and although the building's owners are very cooperative, there is clearly a limit to the changes that can be made. An environmental science teacher at The Gailer School cited lack of funds and personnel as a major holdback to development. It seems to be a bigger challenge for smaller schools to institute change on campus buildings. Although the desire for greener buildings is there, it is the practical limitations that prevent improvement in these cases. The philosophies of these schools support environmental sustainability, but the question is availability of funding. Each school, regardless of size, mentioned cost as a barrier to some larger-scale projects, particularly construction or building modification.

Overall, the private schools were weakest in the area of climate change. In terms of curricula, environmental science teachers universally touched on climate change, but it tended to be in a tangential way and not as a main focus. At Burr and Burton Academy, students monitoring a river system will be able to look for climatic changes over time as they build up data. At The Gailer School, classes participated in Burlington's 10% Challenge, a voluntary program that encouraged homes and businesses to reduce their carbon emissions by 10%. However, no long-term institutional changes were made based on this program. Burke Mountain Academy recently hosted an energy awareness seminar that included lectures and discussions led by experts on alternative energy. The school also invited Bill McKibben to speak about climate change last winter as part of the effort the administration is making to raise awareness about climate change and other environmental issues.

Perhaps the most exciting innovation came from Vermont Commons School: to address climate change, students researched energy usage in the building and researched how to mitigate the carbon emissions that the school produces. The students have decided to plan

15,000 trees in Charlotte, Vermont, to mitigate carbon emissions for one year. The project will continue in the future; the students will likely work with forestation projects abroad.

Exciting environmental programs and innovations are happening in Vermont's private secondary schools. While environmental science programs are very strong, the climate change component of curriculum and facilities planning should be strengthened generally. Teachers and administrators are consistently passionate about the philosophy and sense of place of their schools, and they help students collaborate with the larger community to complete meaningful projects and research. Perhaps most importantly, these schools are working to give students a sense of place and personal responsibility in the Vermont landscape.

School	Location	Student Body	Website
Long Trail School	Dorset	132	www.longtrailschool.org
Burr and Burton Academy	Manchester	650	www.burrburton.org
The Gailer School	Shelburne	53	www.gailer.org
Green Mountain Valley School	Waitsfield	95	www.gmvs.org
Vermont Commons School	Shelburne	75	www.vtcommonsschool.org
Burke Mountain Academy	East Burke	65	www.burkemtnacademy.org

Table 1. A sampling of Vermont private secondary schools: school location and student body size.

PUBLIC HIGHER EDUCATION

The Vermont public higher education sphere is comprised of five state colleges:

Castleton State College – www.castleton.edu, Community College of Vermont – www.ccv.edu,

Johnson State College – www.jsc.vsc.edu, Lyndon State College – www.lyndonstate.edu,

Vermont Technical College – www.vtc.edu, and the University of Vermont- www.uvm.edu.

We received no interview responses from these schools. However, there are abundant resources online to research the connections these institutions have made or can potentially make with climate change. These connections, both in history and possibility, are outlined here.

Castleton State College has 1,600 full time students, 85 faculty, and 160 acres of land.

They offer a degree in environmental science, providing an interdisciplinary approach to

prepare students for work in government, industry, non-profit, graduate study, or teaching. One interesting thing about Castleton is its outdoor classroom club, connecting students to the world outside of their academic buildings. Another initiative going on their campus is the American Democracy Project. There has been abundant literature recently on the declining civic and political engagement of young people. This program works with state schools to help them revitalize moral development, civic engagement, and political action on their campuses. Castleton has adopted this program as part of its mission.

The Community College of Vermont has locations in Bennington, Brattleboro, Burlington, Middlebury, Montpelier, Morrisville, Newport, Rutland, St. Albans, St. Johnsbury, Springfield, Upper Valley, and Waterbury. In addition they offer classes online that student can take no matter where they are. They have 8,500 students per year, with 520 part time faculty and 133 staff. They have no environmentally related degrees. CCV does have open admissions, a rare thing among higher education institutions, and very important in terms of broadening knowledge to all people in Vermont. Indeed, one of their main goals is to challenge and break down economic and social barriers within the higher education system.

Johnson State College has 1800 students on a 350-acre campus, with 54 full time and 53 part time faculty. They offer 2 degrees in environmental science. The first is integrated to prepare students for graduate studies in environmental affairs, and the second is a natural resource concentration focusing more on public policy and natural resource management. They also have an environmental education major. Johnson states a deep interest in service learning pedagogy for their students. They also have a very strong environmental action group, the Green Community Planning Committee. This group has initiatives in recycling, greenhouse restoration, campus-wide fossil fuel reduction, energy conservation, composting, and stream restoration. Acting in subcommittees for different initiatives, this group gets a lot done, and was just noted for development in its composting program, where they are attempting to have all

food waste from the dining commons composted. The contact for this program is greencampus@jsc.vsc.edu.

Lyndon State College has 1280 students, 56 faculty, and 175 acres to their institution. They have an environmental science major with concentrations in environmental pollution and physical environmental monitoring or conservation, biodiversity, and environmental assessment. Another interesting degree offered without any connection to environmental affairs is global studies. Lyndon also seems to be interested in applied learning, as Professor Kelly Rossiter demonstrated when she had students lead Earth Day activities as part of Leadership Theory and Practice course.

Vermont Technical College holds an important place within the Vermont state college system. They have two campuses, one at Randolph and one at Williston, holding 1250 students. The Randolph campus is on 544 acres of land. Their degrees range from agribusiness, architecture, and bioscience, to diesel power technology and environmental engineering. This last group, environmental engineering, recently embarked on a project raising a 100-foot wind turbine. The turbine has allowed on site learning about wind technologies and even prompted Governor Douglas to tromp out to the site to praise the students, faculty, and the institution for its research into possibilities for Vermont wind power. One of Vermont Tech's main goals is to prepare students to adapt to changing technology.

The University of Vermont stands apart from the other Vermont state higher education institutions, both in form and size. UVM has 8 schools, 993 full time and 192 part time faculty, 8000 undergraduates, 1300 graduates, and 400 medicine students. The campus sits on 450 acres in Burlington. Environmental awareness is infused in much of what the college does, and receives mention in the President's Welcome, the mission statement, and the vision statement. Their facilities include the Gund Institute for Ecological Economics and the Rubenstein School of Environment and Natural Resources. UVM is also hosting a Sustainable Business Summer Initiative. There is interesting research into environmental problems, such as Adel Sadek's project

looking into traffic congestion that he hopes will help highway development planners. UVM is also committed to service learning.

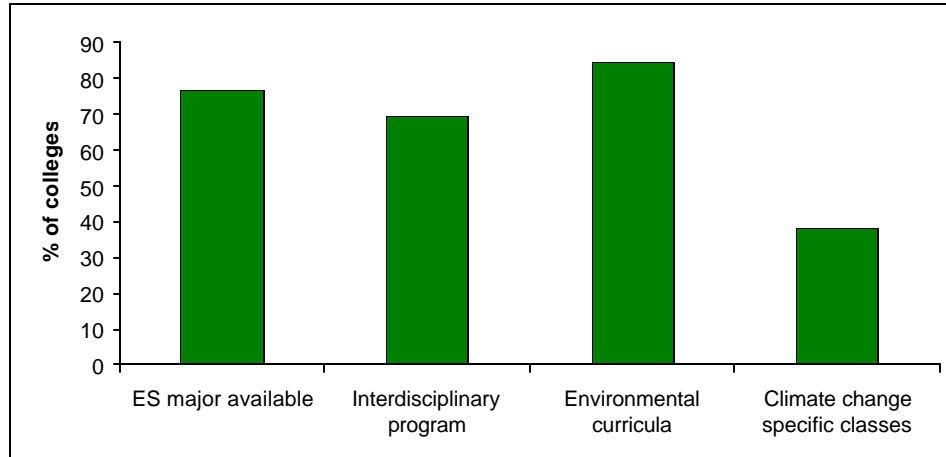
Where do we go with all this information? Service and applied learning is a growing trend in higher education. All of these schools speak of their belief in the potential for this kind of education. The potential to connect service or applied learning with climate change is huge. Look to Lyndon State and Kelly Rossiter for an example of possibilities. She shows that classes do not have to be focused on climate change or environmental affairs to establish that link. All Vermont state higher education institutions are interested in reaching out with their students to benefit both their greater community and their students' learning. This interest has and may continue to prove fruitful for climate change understanding and awareness. There are many existing frameworks that exist within these schools that need only be tapped to connect them to climate change study. The American Democracy Project is a forum encompassing service learning that is committed to engaging students in social issues. Integration of this program into state higher education institutions can provide opportunity for demonstrating that climate change is a major issue that requires civic participation and involvement. Degrees like Lyndon State's Global Studies program are also perfect ground for integrating climate change into the existing curriculum.

UVM is the strongest institution to look towards for an example of an integrated approach throughout curricula. They have successfully incorporated environmental interest into many of their degrees, providing a space for students to look at the environment from a scientific, economic, or an engineering perspective. Despite its larger size and resources, this approach could work well for state colleges as well, and in fact has been implemented to some degree (like Vermont Tech's environmental engineering program). To link learning with climate change however, the focus need not be environmental. Climate change holds possibility for study within economics, social sciences, natural sciences, technological studies, architecture...

the list goes on. Imagine Vermont Tech incorporating biodiesel technologies into their diesel power technology program, maybe with a service learning component talking to farmers about their opinions on the subject, or possibly setting up a supply from local farms to the school to help run school vehicles. Students are exposed to the changing technology that their school wants to prepare them for, the school develops connections to the local community, and the farmers expand the new market for biofuel to their economic benefit. This is just an idea, but it's one of hundreds, both in place today as shown above, and on the drawing board for the future of climate change study in Vermont.

PRIVATE HIGHER EDUCATION

Historically, Vermont private higher education has been an innovator in environmental education, and it remains very much in touch with these issues today. Middlebury College, for example, was the home of the first environmental studies program in the nation, and today the Environmental Studies major is one of the five most popular on the campus. Of the thirteen private colleges and universities in the state, all but three have majors in environmental studies or engineering, including individually designed programs. One of these three, however, still offers environmentally focused curricula. The other two colleges are specifically oriented toward pre-professional training such as paralegal work or counseling, so there is very little applicability of environmental classes. In general the majority of the colleges have broad, interdisciplinary offerings within their environmental studies major. The degree to which each of these focuses specifically on natural sciences varies, but 70% are mostly interdisciplinary. Overall, based on interviews and web research, although environmental interest was high on over 80% of the campuses, classes and curricula focused specifically on climate changes were present on less than 40%.



Three of the five colleges we contacted responded to requests for an interview: Goddard College, Sterling College, and Green Mountain College (Table 1). At Sterling and Green Mountain we received the perspective of faculty members, and at Goddard a member of the administration in facilities management. Overall, each institution indicated that environmental awareness at the institution was high, especially among students. However, focus on climate change was variable, and only one of the three had any current short-term or long-term environmental initiatives planned, including those unrelated to climate change. All the schools faced challenges in the implementation of climate-related projects, including lack of tangible benefits and motivating a large group to act collectively.

Green Mountain College bills itself as “Vermont’s Environmental Liberal Arts College,” therefore all students must take a series of core courses emphasizing environmental issues, despite its many different majors and programs. This 37-credit “Environmental Liberal Arts General Education Program” focuses on developing the students’ senses of being responsible citizens in a globalized world, as well as human relationships with the natural world. The college’s mission is: “GMC prepares students for productive, caring and fulfilling lives by taking the environment as the unifying theme underlying its academic and co-curricular programs... Through a wide range of liberal arts and career-focused majors, the college fosters the ideals of environmental responsibility, public service, global understanding and lifelong intellectual, physical, and spiritual development” (www.greenmtn.edu). There are majors in Environmental Studies and

Environmental Management, as well as a minor in Environmental Education. Moreover, Green Mountain's commitment to these issues extends beyond the classroom; the service-learning program headed by five faculty members and coordinated by Vista has strong environmental components in both its activities and outreach. A number of courses at GMC focus directly on climate change and others that discuss it without being exclusively dedicated to that one problem. One such class is Corporate Environmental Management, which discusses climate and energy policy from the business point of view.

Student interest in environmental issues at Green Mountain College naturally runs deep, given the type of students GMC tends to attract. Interested students have organized numerous initiatives, such as the Deep Scholar program, an Environmental Club and Students for Sustainability. Many of these connect students and faculty members, but there has been little outreach to include facilities planners or members of the management staff. To date there are no future environmental projects planned, either related to climate change or otherwise. According to the interviewed faculty member, environmental activities are easier to implement when there is a "clear action-outcome duality." Results of projects such as planting seedlings in a forest offer immediate results, whereas climate change offers a different sort of problem. Success of activities is difficult to measure or even comprehend with a "problem that appears so diffused and oftentimes overwhelmingly complex."

Goddard College uses a progressive education model, and offers both Bachelor of Arts and Master of Arts programs focused mainly in Education, Health, Psychology and Creative Writing. The BA in Health Arts and Sciences focuses on Nature, Culture and Healing with some emphasis on the role of nature in community. In addition, the Individualized Studies Masters program has an available concentration in environmental studies. The "interdisciplinary and transdisciplinary" program focuses on "human interactions with the environment." Students are encouraged to "critically examine social and cultural issues within an environmental and ecological context, recognize the sources of beauty, inspiration, health, sustainability and

renewal in the world, and identify and understand the threats to these values, and develop and articulate a personal environmental practice" (www.goddard.edu). This program to date has not produced studies related to climate change, yet there are no obstacles in place to implementing or beginning them. Environmental interest among Goddard students is rated as "high," and the overall philosophy is one of sustainability. The campus supports a solar-powered greenhouse built by students, also indicating a commitment to renewable energy. No current projects are being planned or organized, however, and like many organizations, Goddard faces the lack of resources necessary to actualize ideas or proposals.

Sterling College is yet another environmentally focused college in the state, operating under the motto: Working Hands, Working Minds. Students are encouraged to balance classroom and hands on learning in the four Bachelor of Arts degrees: Sustainable Agriculture, Wildlands Ecology and Management, Northern Studies, and Outdoor Education and Leadership. The first three of these are heavily science based, and many classes have direct focus on climate change issues. The interviewed professor also highlighted the Environmental Science class required of all second year students at the college, which addresses climate change as a theme running throughout the entire course. In addition, this particular course discusses fossil fuel reserves, dissolved oxygen loss in lakes and rivers, waste management, toxic waste, alternative fuels, and renewable energy. Despite significant concern among students, faculty and facilities management staff regarding environmental issues and climate change, "progress sometimes feels like trying to roll a beached whale back into the ocean," as the staff of 50 is "hard to steer quickly." Recent environmental initiatives include great improvements in local buying in the kitchen, yet only after 10 years of steady effort and pushing. Sterling College was the only interviewed institution with any future project related to climate change. Their long-range plan includes re-insulation and window replacement in all their buildings to increase energy efficiency and thereby lower greenhouse gases emissions. Most of the faculty research has been dedicated to the problem of reducing the college's greenhouse gas contributions, the largest of

which is heating oil combustion. However, this entails significant costs, which creates donor hesitation. Like many other private colleges, Sterling has the opportunity and potential to be great role model for other institutions across Vermont.

Interviewed Colleges	Location	Student Body	Faculty/ Staff	Website
Sterling College	Craftsbury Common	97	50	www.sterlingcollege.edu
Green Mountain	Poultney	650	142	www.greenmtn.edu
Goddard College	Plainfield	550	150	www.goddard.edu

Table 1: Information about the interviewed colleges: location, size of student body and faculty, along with websites.

In addition to these interviews, we inspected the websites of the remaining colleges (Table 2), focusing on available academic programs and course catalogs. None of the schools had links to any student organizations, so student interest was impossible to quantify. There is great potential among Vermont's private colleges and universities to lead the state in climate change related activity, as evidenced by the unique academic methods and curricular innovation at the various schools. Southern Vermont College's mission statement, for example, is "SVC aspires to be a model of an enlightened educational community that is diverse, supportive, environmentally respectful, and socially responsible" (www.svc.edu). Many of the colleges have reference to environmental issues in their overall mission statement.

Bennington College also has a unique approach to education, allowing students to completely design their own course of study. Professors used to write syllabi on the first day of class, in accord to the interests of the students, and this practice still exists in the form of tutorials or the development of new courses (www.bennington.edu). There is no particular major for environmental studies at Bennington (just as there are no majors for any discipline), but classes offered contain explicit references to climate change in their descriptions. These include Environment and Human History, Global Change: Science, Policy and Security in an Uncertain World, Environmental Chemistry and Global Capitalism.

Marlboro College also operates in a unique fashion, based entirely on the New England Town Meeting model and emphasizing student participation in the planning of the institution. All students, faculty and staff may participate in monthly Town Meetings with equal votes, and this body governs community life and many aspects of the college (www.marlboro.edu). Town meeting is responsible for administering funding to student initiatives, and has a Committee on Environmental Quality. This committee is responsible for overseeing campus resource consumption and improving campus environmental quality. Previously, they have developed and are now in charge of recycling and composting. In addition the Environmental Studies major curriculum is strong on classes related to climate change including courses such as: Global Atmospheric Change; Atmosphere, Weather and Climate; Global Environmental Issues; Resolving the Tragedy of the Commons, and Culture and Ecology of the Western U.S. (www.marlboro.edu) Marlboro is one of the few schools to offer such a wide selection of classes related to not only environmental issues but also climate change.

Other Institutions	Location	Website
Bennington College	Bennington	www.bennington.edu
Burlington College	Burlington	www.burlingtoncollege.edu
Champlain College	Burlington	www.champlain.edu
College of St. Joseph	Rutland	www.csj.edu
Marlboro College	Marlboro	www.marlboro.edu
Middlebury College	Middlebury	www.middlebury.edu
Norwich University	Northfield	www.norwich.edu
Southern Vermont College	Bennington	www.svc.edu
St. Michael's College	Burlington	www.smcvt.edu
Woodbury College	Montpelier	www.woodbury-college.edu

Table 2: Basic information about the ten other private colleges and universities, including the school websites. These websites were the sources for much of our information.

Overall, awareness of climate change is very high in Vermont's private colleges and universities. The freedom of these schools to form their own rules, charters and mission statements allows them much more flexibility in addressing environmental issues, and many colleges have a specific environmental focus, such as Sterling and Green Mountain. Small size also helps these schools create new initiatives and remain in close touch with student concerns. Environmental

majors, whether interdisciplinary or purely natural science related, are strong parts of the program at a majority. However, all of these schools face problems of lacking funding and resources for environmental programs. Most initiatives are likely to remain small, especially at the very small schools. They each have potential, as in other states, to develop new and exiting methods of dealing with complex issues, to make commitments to these programs and to serve as role models to the rest of their communities.

CONCLUSION

Vermont education is directly tapped into the future values and concerns of the state through its education of young people. These sets of research and suggestions are presented to help those involved within this sphere in any way find examples of good work around the state, possible areas to establish further connections to climate change, and resources and networks to continue discussing these ideas. We, as students, are finishing our class, but understand that we are now more deeply committed citizens, climate change reduction activists, and (most importantly for you) more dedicated students. Thank you.

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