An Evaluation of
A Forest for Every Classroom:
Learning to make choices for the future of Vermont's forests
2003-2004

Prepared for:
Shelburne Farms
The Marsh-Billings-Rockefeller National Historical Park
The Conservation Study Institute
The Northeast Natural Resource Center of the
National Wildlife Federation
The Green Mountain National Forest
The Northern Forest Center
& the Place-based Education Evaluation Collaborative

Prepared by:
Program Evaluation and Educational Research (PEER) Associates

September 23, 2004

The partners in A Forest for Every Classroom are part of the Place-based Education Evaluation Collaborative (PEEC), a unique partnership of organizations whose aim is to strengthen and deepen the practice and evaluation of place-based education initiatives.
PEEC programs (and organizations) include the CO-SEED Project (Antioch New England Institute); the Community Mapping Program (the Orton Family Foundation, Vermont Institute of Natural Science); the Sustainable Schools Project (Shelburne Farms, and the Vermont Education for Sustainability Project); and A Forest for Every Classroom Project (Shelburne Farms, The Northeast Natural Resource Center of the National Wildlife Federation, The Marsh Billings Rockefeller National Historical Park, The Conservation Study Institute, and Green Mountain National Forest).
In addition, the Upper Valley Community Foundation provides funding and support for several of these programs through its Wellborn Ecology Fund, as well as financial, administrative and staff support for collaborative evaluation and research efforts.

ACKNOWLEDGEMENTS

Special thanks to:

- Dr. Jennifer Jewiss of the University of Vermont Department of Education and the Vermont Research Partnership;
- Dr. Tom Marcinkowski of the Florida Institute of Technology;
- Dr. Michael Murphy of Harvard Medical School;

for their comments and suggestions through review of PEEC work at various stages. In September 2003, these advisors reviewed and commented on evaluation plans. In August 2004, they reviewed and commented on drafts of the final evaluation reports.

Michael Duffin's work on this evaluation report was partially funded through a fellowship from the National Network for Environmental Management Studies (NNEMS) program of the U.S. Environmental Protection Agency. Thank you.

Finally, we wish to extend a particular thanks to the individual teachers, students, community members, and FFEC partners who so graciously participated in this evaluation.

NOTE:

This report was authored by PEER Associates, Inc. A more complete description of the evaluation personnel involved in this project can be found in the Introduction of this report. Evaluation Co-Directors for PEER Associates Amy Powers and Michael Duffin can be contacted at *amy@PEERassociates.net or michael@PEERassociates.net.*

TABLE OF CONTENTS

EXECUTIVE SUMMARY

A Forest for Every Classroom (FFEC) is a professional development program for educators created and implemented by a unique partnership of public land management agencies and nonprofit organizations. The partners work together to provide teachers with a year-long workshop series in which they are immersed in field study of the forested landscape – its ecology, management and stewardship; exposed to diverse viewpoints from public and private landowners; encouraged to transform their teaching into a community-based real-world model, and supported in curriculum development. Critical components of the FFEC model include an emphasis on place-based education, service learning, educational use of community resources (including public land), and civic participation.

Formed in 2000, the partnership consisted of Shelburne Farms, The National Park Service's Marsh-Billings-Rockefeller National Historical Park (MBRNHP) and the Conservation Study Institute (CSI), The Northeast Natural Resource Center of the National Wildlife Federation (NWF), and The Green Mountain National Forest (GMNF). In 2003, the Northern Forest Center joined the partnership, providing a Northern Forest regional perspective.

EVALUATION METHODS

> *"In some senses, I took our natural and cultural richness for granted. I am now much more aware of, sensitive to, and grateful for the Federal, State, and Town conserved lands and the mosaic of natural communities--forest, field, wetland, etc."*
>
> *-FFEC Teacher Participant*

Now in its second year of comprehensive evaluation, the partners and evaluation team decided that the depth of information afforded by a case study methodology would offer valuable insight into how and why FFEC creates change in teachers' practice and within a school. Two case studies were conducted to

highlight exemplary results in two different communities: Woodstock, Vermont and Hanover, New Hampshire. A third case study examined the workings of the FFEC partnership itself, specifically focusing on how the partnership has impacted its constituent organizations, and how each organization contributes to such a partnership. Furthermore, a comprehensive survey was developed and administered to all educators who participated in FFEC in Year 1 and Year 2. This effort built directly upon FFEC's involvement with the Place-based Education Evaluation Collaborative, and helped evaluators and program staff begin to understand how various levels of participation in FFEC impact a teacher's practice.

CASE STUDY HIGHLIGHTS: WOODSTOCK UNION MIDDLE SCHOOL

Teachers from Woodstock Union Middle School (WUMS) used their experience and training through FFEC to develop a Forest Unit, which is now an integrated, multi-disciplinary component of the seventh grade curriculum. From the moment students begin their tenure at WUMS, they are encouraged to develop a deep connection to their home place of Woodstock, Vermont, and its natural and cultural treasures. Beginning with an early fieldtrip to nearby Mt. Tom, teachers approach the traditional content disciplines, such as math, English, global studies, and life skills through the wealth of information provided by their local forests. As a result of FFEC participation, teachers point to the local public lands as a valuable resource, and their students demonstrate increased knowledge and respect for their home place and the array of life contained within.

WUMS Case Study Data Sources

- 5 interviews with WUMS teachers
- 5 interviews with FFEC program staff
- focused group conversation with 7 students, 2 teachers, and 3 program partners
- review of related documents
- 2 site visits to WUMS
- 1 site visit to MBRNHP
- observation of FFEC public forum held at MBRNHP

The data analysis exposed many compelling themes associated with WUMS teachers' participation in FFEC. The main themes include:

- FFEC participation impacts teacher practice
- Forest unit promotes community connections
- FFEC teachers positively influencing other teachers

FFEC-related challenges that emerged in the WUMS case are also discussed.

"I know our students are walking away from their 7th grade experience having a deep appreciation for their own environment and the intrinsic value of public lands for all. They understand our responsibility to be stewards of our land, and not just users of it."

-WUMS 7th grade teacher

The case study concluded that:

- Participation in FFEC influenced teachers' teaching practice, and there was a diffusion of FFEC practices to other WUMS teachers who plan on participating in future FFEC programs. The FFEC program gave WUMS teachers the tools to integrate the local forest into the traditional content areas. The team-teaching framework proved to be a useful support when implementing an interdisciplinary curriculum unit such as the Forest Unit which teachers developed as FFEC participants.

- The FFEC program provided WUMS teachers with exposure to resource specialists useful to their teaching practice. Involving community members with school projects strengthened community-school connections and provided students with different perspectives.

> *"What FFEC did for me specifically is to convince me to begin our 'voyage around the world' with a place-based unit of study, which focuses on our local forests."*
> *-WUMS seventh grade global studies teacher*

- WUMS students gained knowledge about and greater appreciation for public lands and their local forests. Students also demonstrated increased interest in learning traditional content in the context of their home place.

CASE STUDY HIGHLIGHTS: THE RAY SCHOOL

Teachers from the Bernice A. Ray School (Ray School) have recently adopted a cohesive, place-based science curriculum for their Hanover, New Hampshire elementary school. Further, the second grade teaching team has begun to implement a local forest theme for their segment of the new curriculum. The effort to enhance the curriculum was led in part by the participation of one Ray School second grade teacher in FFEC. Additional influence came from the participation of half the school's faculty in a FFEC summer workshop, which was held at the Ray School to encourage their use of the natural surroundings as a teaching resource. Students and teachers of the Ray School have started to discover the learning opportunities of local forests through a curriculum platform inspired by the 32-acre forest adjacent to the school.

Ray School Case Study Data Sources

- 6 interviews with Ray School teachers
- 3 interviews with FFEC program staff
- 1 interview with a Ray School community partner
- review of related documents
- 2 site visits to the Ray School
- observation of 2 class sessions
- observation of FFEC public forum held at MBRNHP

Teachers anticipate that the use of the local forest as a teaching resource will develop over time as Ray School teachers and students gradually adjust to the outdoor classroom.

The main themes revealed by this case study include:

- Development of place-based science curriculum influencing teacher practice
- Public lands used as a teaching and community resource
- Many factors influence school change

FFEC-related challenges that emerged in the Ray School case are also discussed, including finding time to create new lesson plans and adjusting to the use of the outdoors as a classroom.

The case study concluded that:

> *"I truly believe that as a kids goes through K-5 in this school, they will come out with a good basic sense of their place, the skill to understand another place, and a stewardship ethic, which is the ultimate goal."*
> *-Ray School second grade teacher*

- Ray School teachers, including those who did not directly participate in FFEC, indicated their teaching practice was positively influenced. In particular, the FFEC program gave the participating second grade teacher the tools, including confidence and leadership skills, to integrate the local forest into the traditional content areas. Many Ray School teachers have committed to adopting FFEC principles in their teaching. The existing framework of support at the Ray School, including the critical friend groups, allowed for teachers to exchange lesson ideas and provide useful feedback to further develop the use of the natural surroundings as a teaching and learning medium.

- Ray School students showed increased engagement by learning through the context of their local forest. Students also demonstrated increased interest in learning traditional content in the context of their home place.

CASE STUDY HIGHLIGHTS: THE FFEC PARTNERSHIP

The FFEC partnership unites conservation and education organizations representing the public and private sectors. The organizations represent local, regional and national territories, audiences and organizational networks. This combination offers the project a variety of perspectives, modes of operation, sources of funding, and means of dissemination.

Given this unique assemblage, there is much to be learned from how the partnership functions and what effects it has had. In FFEC's first year of comprehensive evaluation, a perfunctory investigation of the strengths and challenges of the partnership itself was conducted. In this, the second year, a case study was designed to build on these findings and investigate the nature of the partnership in more depth.

Partner Case Study Data Sources

- 17 interviews with partners and members of partner organizations
- 21 written surveys from FFEC participants (72% response rate)
- observation of meetings, organizational sites, workshops
- review of related documents

Impact of FFEC on the Partners

All five partner organizations report both depth and breath of influence resulting from their involvement in FFEC. The most salient categories of impact include:

- *Internal Integration of Education and Conservation Activities:* To varying extents, all of the partner organizations reported an increase in the level of integration between their education and conservation activities. Examples include MBRNHP incorporating educational activities into its forest management plan and Shelburne Farms considering broader conservation issues such as the global economy when planning and delivering its educational programs.

- *Building Relationships with Communities and Schools:* Partner organizations reported that FFEC has enhanced their outreach to their communities. For instance, NWF reported that FFEC increases their public appeal by branching out beyond the non-profit sector and into the public sector, and Forest Service respondents noted that public land managers benefit immensely from having a public who is educated about and engaged in the stewardship of their local environment. Their ability to work effectively with schools through FFEC fosters this phenomenon.

> *"[Our participation in FFEC] is indicative of the kinds of education work that many of us would like to invest in in the future."*
> *-NWF Center Director*

- *The Spread of Language and Ideas within the FFEC Organizations:* One indication of a program's effects on its parent organizations is the degree to which its concepts and terminology are adopted into the culture and lexicon of the broader organizations. In each partner organization examples were offered of ways in which the language and ideas of place-based education and / or forest management were being more readily infused into their organizational publications, educational programs, and everyday language.

- *Mutual Understanding Growing Between Public and Private Sector Organizations:* FFEC is setting an example of productive collaboration between public and private sector organizations. Partners reported that organizational relationships had been positive, productive and had offered "gateways to further collaboration" on non-FFEC endeavors. Partners also noted that partnering distributes the burden of funding amongst societal sectors, creates a heightened appreciation within an organization of the "other sector's" role, and presents a positive and balanced message to the public.

> *"We could do things on our own but we would be an island of programs and stewardship ideas…. The partnerships bring a connection to a real world context, what's happening externally to the institution and how what we do internally is affected by and affects the larger world. Our world is bigger, we're better informed. We learn so much from other organizations."*
>
> *-Shelburne Farms Vice President*

- *Other Benefits of the FFEC Partnership:* The case study also revealed four other benefits of the FFEC partnership: credibility and visibility, organizational perspective, confidence and capacity, and resource sharing.

Benefits of Partnering for the FFEC Program

While the partner organizations clearly benefited from the FFEC partnership, so too did the program itself benefit from being the product of collaboration. FFEC appears to be a more balanced program, to have increased legitimacy, and to be more resilient due to its creation and implementation by a network of diverse partners.

Dissemination of FFEC Beyond Vermont

One of the goals of the FFEC partners was to create an educational model that was worthy of replication and dissemination to a broader audience. One of the benefits to working as a partnership between public and private sector organizations is that their vehicles for dissemination are distinct, each with different networks of contacts, thereby magnifying the potential for dissemination of the FFEC model. Numerous examples of FFEC spreading far and wide were in evidence. A few examples include:

- NWF's Northeast Resource Center is one of the few field offices actively involved in combining conservation and place-based education.

- Shelburne Farms and MBRNHP have participated in an idea exchange with a group of Italians who have implemented a program that is essentially the equivalent of "A Farm for Every Classroom."

- MBRNHP is to host a seminar for senior National Park Service managers at their site this fall. One reason for the location is that FFEC is the NPS's "best example…of creating a venue for civic dialogue on the management of resources."

- NPS webpage on Civic Engagement highlights FFEC as an example of successfully implementing civic engagement programs linked to the national parks.

- GMNF partner presented the FFEC model at a national USFS conference.

- CSI director has strong ties with the NPS National Leadership Council which is presently defining the education agenda for the NPS. She also has a pivotal role in developing the educational component of the NPS's Gateway Community program.

Challenges of the FFEC Partnership

The FFEC partnership demonstrates several underlying, though not insurmountable, challenges, including: the difficulty of communication, decision-making, and recognition given the complexity of the partnership arrangement; and issues of equitable funding contributions, time commitments, and institutional support.

> *"As a resource manager, [FFEC] really allows me to do my job better in terms of protecting park resources. It's a way of reaching out to the community and cultivating a greater understanding and sense of care for the resources here…. That is of extreme value."*
>
> *-MBRNHP Resource Manager*

Partner Case Study Conclusions

FFEC partners described many meaningful impacts of their participation in FFEC. Some changes took place inside of organizations, while others occurred in the larger network of communities, schools, and project collaborators. As the partners flourished in FFEC, the program itself reaped the benefits of being fed by many sources. This confluence of inputs from the partners shaped a program that is more flexible, energetic, objective, and transportable than what could have been produced by any one creator.

TEACHER SURVEY HIGHLIGHTS

Two sets of educator surveys administered in June 2004: 21 out of 29 educators who were participants in the FFEC 1 and FFEC 2 trainings (72% representation); and 12

out of 14 educators from FFEC 4, representing 86% of that cohort. An exhaustive exploration of the rich possibilities for interpretation and presentation of this data is beyond the scope of this report, but four scatterplot correlation graphs illustrate the way that the survey data can be used to address important questions about the program's effects and its implementation.

The results of piloting the dose-response measurement strategy have yielded some strong evidence that FFEC is having some notably positive impacts on teacher perceptions of their own teaching practice as well as on their perceptions of outcomes for their students. Although some preliminary inferences can be drawn about the challenging cost-benefit question of "how much FFEC is enough (in order to optimize long term impacts)," deeper investigation into the cost-benefit ramifications of various program delivery models is certainly warranted. This could be very useful for future evaluation efforts.

Figure S2. Teacher Practice (overall module)

From FFEC educator surveys, 2004

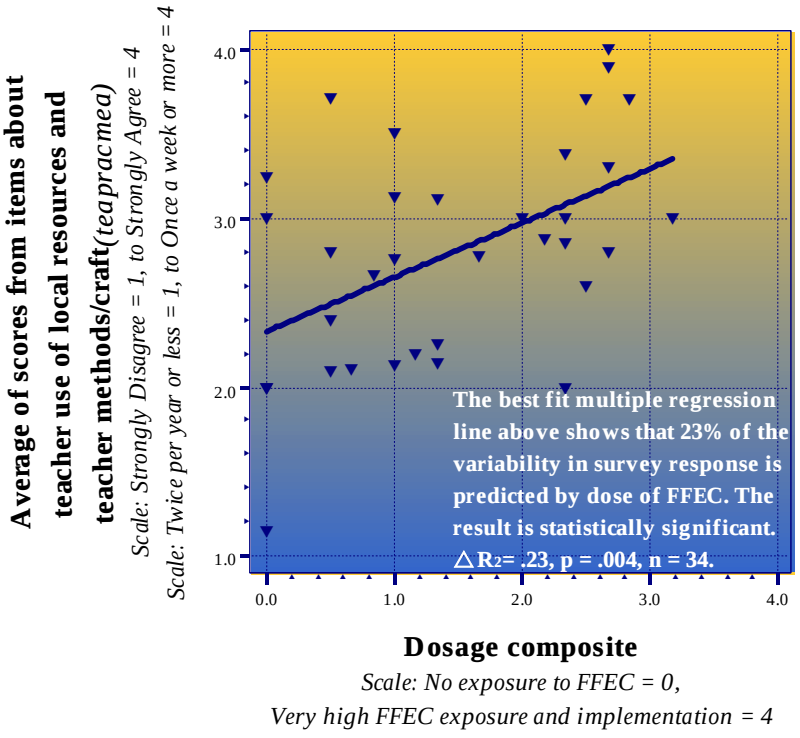


Figure S2 shows that the more a person participates in FFEC, the more likely they are to report changes in teacher practice. This claim is also supported by the case studies presented elsewhere in this report. There is no immediately obvious reason to think that the different FFEC cohorts are systematically different in ways that would bias this finding. Given the scope of FFEC compared to all the other factors that affect teacher practice, an ability for FFEC dose to predict 23% of the variance in teacher practice related questions is impressive.

The dose-response measurement strategy appeared to be quite useful since it made it possible and practical to combine survey results from various FFEC cohorts in a meaningful way to show highly statistically significant results, like the teacher practice changes represented by Figure S2.

Figure S6. Survey Respondent Comments on the high investment delivery model of FFEC

"The older I get the more I agree with the statements; you get what you pay for. You get out of something what you put in."

"Teachers appreciate the continued support. Too much of our professional development is a one-shot deal."

"Do keep FFEC: 1) across the seasons; 2) across the landscapes; 3) nurturing; 4) all those resources, folks, specialists!"

IMPLICATIONS FOR PRACTICE

Interpretation of the four sets of data used in this year's evaluation—three case studies and a survey--points to a number of recommendations for program development, also called implications for practice. Four categories of recommendations are provided: Promoting a Broader Influence, Supporting Participant Implementation, Enhancing Service Learning, and Continuing to Strengthen the Partnership. Further, more specific recommendations can be found within each of the three case studies.

INTRODUCTION

A FOREST FOR EVERY CLASSROOM PROGRAM OVERVIEW

A Forest for Every Classroom (FFEC) is a professional development program for educators developed by a unique partnership of public land management agencies and nonprofit organizations. The partners work together to provide teachers with a year-long workshop series in which they are immersed in field study of the forested landscape – its ecology, management and stewardship; exposed to diverse viewpoints from public and private landowners; encouraged to transform their teaching into a community-based real-world model, and supported in curriculum development. Critical components of the FFEC model include an emphasis on place-based education, service learning, educational use of community resources (including public land), and civic participation.

Figure C1. Features of the FFEC model:

- Offering year long multiple contact workshops
- Encouraging team-teaching and embedded professional development
- Providing tangible resources such as stipends, book money, and mini-grants to support teaching
- Fostering on-going relationships with local agencies
- Introducing teachers to people, places, public lands
- Building a partnership between organizations
- Linking teams of teachers local resources
- Building a network
- Creating civic dialogue
- Learning about service learning

**compiled at December 2003 partnership meeting*

Formed in 2000, the partnership consisted of Shelburne Farms, The National Park Service's Marsh-Billings-Rockefeller National Historical Park (MBRNHP) and the Conservation Study Institute (CSI), The Northeast Natural Resource Center of the National Wildlife Federation (NWF), and The Green Mountain National Forest (GMNF). As with many partnerships, roles and responsibilities of the various partners have evolved over the course of their four years together. In 2003, the Northern Forest Center joined the partnership, providing a Northern Forest regional perspective, with particular resources and knowledge in the areas of culture, heritage, economy, and community development.

While all partners are active participants in developing the project, the National Park Service and the US Forest Service were critical natural resource links for participating teachers providing outdoor classrooms and a context for place-based education.

Shelburne Farms and NWF took the lead in developing the logistics and pedagogy of the professional development series and in training teachers in curriculum development.

The FFEC program has been explicitly participatory from the start. Early in the project's' development, the partners hosted focus groups in which community members around Vermont —including teachers, foresters, loggers, woodworkers, etc.-- were invited to offer input about what tools, knowledge, and experiences students need today to become responsible citizens and active stewards of forested lands. This public input was used as the context for creating a program that is authentic and appropriate for the concerns, needs and values of the targeted community. Based on these premises, and on best current practices in the field of professional development, the FFEC program was developed, and the following vision and goals evolved.

FFEC Common Vision and Project Goals

FFEC Common Vision: If today's students are to become responsible environmental decision makers, they must understand the local ecosystems in which they live and they must have educational opportunities based on real life issues that encourage them to practice citizenship in their own communities.

Accordingly, FFEC's goals are to:

- Cultivate an understanding of place by working with teachers and their students to experience and understand local forests as complex and dynamic systems of natural and cultural resources and increasing interaction between the school and community, building a stronger sense of place and stewardship of public lands;

- Provide resources for educators to meet state and national education standards while effectively integrating stewardship, citizenship and a sense of place into their curricula;

- Foster a strong network of teachers, partners, community members and natural and cultural resource specialists that will ensure an ongoing relationship of sharing of information, materials, and resources.

- Promote a balanced view of forest stewardship that not only teaches about the forest ecosystem, but also includes the spectrum of stewardship challenges faced by land management agencies (federal, state, local) and private forest landowners

- Build a strong partnership that helps to increase institutional capacity and further program needs.

The FFEC Project and the FFEC Program

A distinction is made between the FFEC program and the FFEC project, the former being a piece of the latter. The program refers to the place-based education model that is currently being piloted with teachers in Vermont. Seventeen teachers participated in the first year of FFEC (FFEC 1) and 13 teachers in FFEC's second year program (FFEC 2). During FFEC's third year of operation (FFEC 3), the partners focused their time and resources on offering further support to the existing 30 past participants, moving forward with product development, and fundraising for subsequent year-long programs.

> *"I thought FFEC was entirely fabulous. The breadth of training and [exposure to] resources combined with the depth it encouraged through individual work enriched my knowledge and teaching as well as student learning."*
>
> *-FFEC Teacher Participant*

FFEC 1 and 2 teachers were offered on-going, intensive, one-on-one coaching as well as opportunities to participate in alumni enrichment workshops on topics ranging from forest soils and geology to curriculum development. These functioned as important alumni networking and morale boosting events, as well as expanding on topics merely touched upon in the year-long program. Concurrently, the lessons learned in the year-long program were distilled into a two-day module on Principles and Best Practices of Place-Based Education. This module was piloted with representatives of the National Park Service and US Forest Service, refined through feedback, and then offered to the public in 2003. In

> *"The depth of training I received changed my understanding of forests and advanced my ability to develop curriculum. I was transformed as an educator and my commitment will not lessen with time. The opportunity to do develop my unit under the guidance and encouragement of the community partners was crucial."*
>
> *-FFEC Teacher Participant*

addition, the FFEC partners produced a video which presents the mission, successes and unique qualities of the program. This video will be instrumental in future recruitment within federal agencies and in fundraising for the long-term success of the program. The video was presented to the public in a celebration of FFEC teacher's work.

Unlike the majority of professional development programs offered to teachers, FFEC's structure is such that teachers meet periodically for a year, rather than a day, weekend or week-long course. Teachers have the chance to practice what they are learning in the classroom and then come back to ask questions, receive feedback, and learn new things. This year-long intensive program allows teachers to form a valued network of professionals, and to absorb complex concepts and new approaches to teaching over a realistic timeframe.

The project, on the other hand, is broader than the program and includes the convening and refinement of the partnership, and the evaluation of desired outcomes (such as dissemination goals.) In this evaluation cycle, the process and outcomes of the *program* itself were evaluated in an effort to assist the project partners as they continue refining the program model. As well, pieces of the overall *project*--such as how the partnership itself functions and impacts to participating organizations--have been evaluated and are reported herein.

FFEC AND THE PLACE-BASED EDUCATION EVALUATION COLLABORATIVE

In October 2001, several New England foundations and educational organizations came together to explore how they might collectively strengthen the evaluation of their place-based environmental education programs. They each sensed that their organizations could be doing more and better evaluation of their programs by working together than by working independently. The group decided to form an evaluation collaborative to evaluate their individual programs and also to lay the groundwork for broader research into the effectiveness of place-based education. FFEC's sponsoring organizations are among the founding members of this recently formed group, called the Place-based Education Evaluation Collaborative (PEEC). PEEC has three main purposes. It serves as a learning organization for program developers, fueling internal growth and program development for the individual organizations. PEEC also aims to identify, develop, and disseminate evaluation techniques, tools, and approaches that can be applied to other place-based education providers, thereby promoting better evaluation practice in the field. Finally, as a long-range goal, the collaborative intends to contribute to the research base underlying the field of place-based education and school change.

The goals of the four collaborating projects vary somewhat but common themes are:

- enhanced community / school connections

- increased understanding of and connection to the local place
- increased understanding of ecological concepts
- enhanced stewardship behavior
- improvement of the local environment
- improvement of school yard habitat and use as teaching space
- increased civic participation.

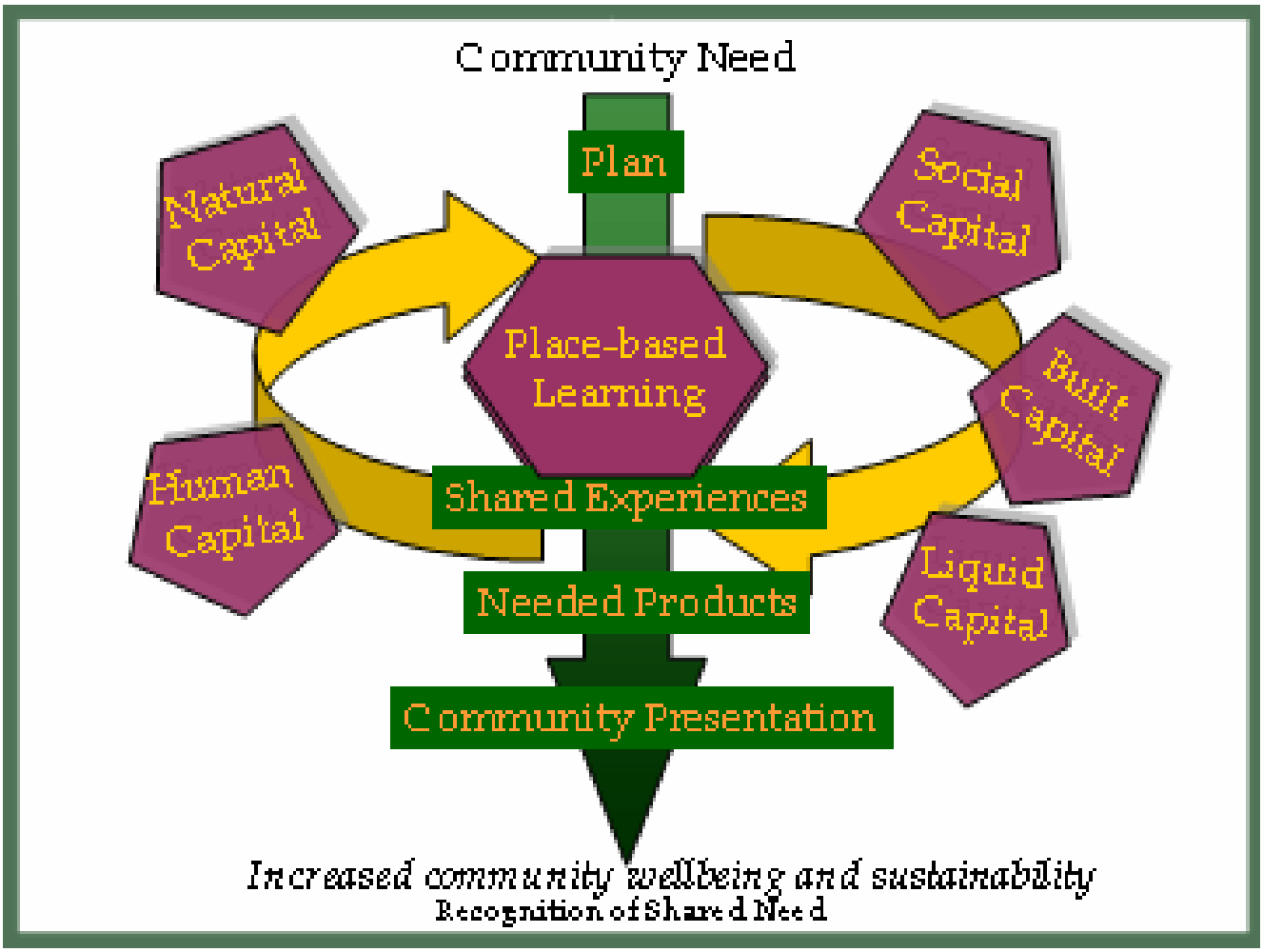
All four programs focus on linking the school curriculum to the local community. Two programs work with whole schools and their local communities (e.g. through in-service days, staff meeting integration, community-school forums, and other ongoing activities), and two work primarily with individual teachers through institutes, curriculum development, follow-up support, etc. All four programs work with teachers and communities over the course of at least 12 months, and in some cases for over three or more years.

Place-Based Education Theory of Change

PEEC members tend to conceive of their programs as unique, locally appropriate, and adaptable instances of an overall philosophy of place-based education. During the Fall of 2003, members of the collaborative worked to create the following generalized theory of change (Figure C2) to visually articulate many the commonalities underlying the logic of the four individual PEEC programs. Program staff then used this working model to portray their programs in the larger context of place-based education to both internal and external stakeholders. This working theory of change also informed both general and specific aspects of individual and cross-program evaluation plans.

It is interesting to note that this model emerged in partial response to the conceptual limitations of the linear, more lock-step process suggested in the proposed theory of change that emerged in the 2002-03 PEEC evaluation reports. While this newer model more accurately captures the iterative, adaptive, interdependent systems nature of place-based education program as they are implemented in local contexts, it may be too general and abstract for some uses. Thus, as of the writing of this report, PEEC members are working on developing a "PEEC Cross-Program logic model" to complement the theory of change depicted below with a representation that might be both more detailed and more simplified. The process of developing these various models and theories embodies a central tension in place-based education: simultaneous commitment to broad overarching concepts and locally unique details.

Figure C2. PEEC Working Theory of Change for place-based education



A more detailed PowerPoint presentation of the components of this theory of change is available on the PEEC web site at http://www.peecworks.org/PEEC/PEEC_Reports/.

Members of the Collaborative

PEEC is comprised of the following "member" organizations and programs, with the Upper Valley Community Foundation (Hanover, NH) operating as the fiscal agent and umbrella organization, contributing directly to PEEC's work from its Wellborn Ecology Fund. The business of PEEC is carried out primarily by the individuals noted in the sidebar, who meet face to face several times per year and carry out extensive phone and email conversations between PEEC meetings.

PEEC programs

- The **CO-SEED** project, sponsored by Antioch New England Institute (Keene, NH),
- The **Sustainable Schools Project**, sponsored by Shelburne Farms and the Vermont Education for Sustainability Project (Shelburne, VT)
- The **Community Mapping Program**, sponsored by the Orton Family Foundation (Rutland, VT) and Vermont Institute of Natural Science (Woodstock, VT)
- A **Forest for Every Classroom** project, sponsored by a partnership between Shelburne Farms (Shelburne, VT), Marsh-Billings-Rockefeller National Historical Park (Woodstock, VT), Green Mountain National Forest (Rutland, VT), the Northeast Office of the National Wildlife Federation (Montpelier, VT), the Conservation Study Institute (Woodstock, VT), and the Northern Forest Center (offices in NH, ME, VT)

Figure C3. PEEC individual members

- Megan Camp, Shelburne Farms
- Delia Clark, Antioch New England Institute
- Bo Hoppin, Antioch New England Institute
- Nora Mitchell, Conservation Study Institute
- Kevin Peterson, New Hampshire Charitable Foundation
- Bill Roper, Orton Family Foundation
- David Sobel, Antioch New England Graduate School
- Liz Soper, Forest for Every Classroom Program
- Ned Swanberg, Vermont Institute of Natural Science
- Erica Zimmerman, Vermont Education for Sustainability Project

External Evaluation Team

All evaluation reports prepared for PEEC were generated by a team of evaluators operating as PEER Associates under the supervision of principal investigators Amy Powers and Michael Duffin. Both Amy and Michael are former employees of collaborating organizations of PEEC who have shifted their careers from program delivery to program evaluation in recent years. Neither of them has ever been employed directly by the particular programs involved in PEEC. Their level of previous familiarity with the evaluated programs and their staff was generally agreed to be an asset to the more participatory approach that PEEC desired. During the course of most of the evaluation efforts contained in this report, Amy operated as a private consultant and Michael was an employee of Antioch New England Institute but working under a different Center than the one that houses the CO-SEED project. In the summer of 2004, PEER Associates was formerly incorporated as a private consulting firm, and Michael ceased being an employee of Antioch New England Institute.

PEER Associates is committed to using a multiple-methods, utilization-focused, participatory evaluation process. It is our intention to help organizations better understand their programs and to help them to improve their programs based on evidence of program functioning and outcomes. We also intend to help organizations build their own capacity to reflect on and internally evaluate programs and to help to improve the evaluablility of programs.

Other evaluators from PEER Associates who contribute to all reports include Dr. George Tremblay, Andrew Powers, and various Graduate Research Assistants. George is core faculty in the Clinical Psychology doctoral program at Antioch New England Graduate School, serves as the Director of Research for that program, and was brought onto PEER Associates specifically for his expertise in quantitative analysis. Andrew Powers serves as both Research Associate and Administrative Director for PEER Associates.

For this particular report, Amy Powers acted as the Principal Investigator, guiding the bulk of the evaluation activities and serving as overall editor of the report document. Andrew Powers provided much support during the analysis phase, and Michael Duffin directed most of the survey-related evaluation activities for this project. George Tremblay worked closely with Michael to support all aspects of the survey portions of this evaluation. Graduate Research Assistant Matt Lafond contributed extensively to all phases of the Ray School and Woodstock Middle School case studies, including design, implementation and writing. All core employees of PEER Associates provided editorial input during the reporting phase.

The following measures were taken to mitigate the potential for researcher bias:

- Three nationally respected researchers were retained as advisors for the evaluation, all of whom provided interim consultation on research design as well as reviewing final reports.
- All interviews were recorded and transcribed either fully or partially.
- Field notes for interviews and observations were generally typed up within twenty-four hours or less after completing on-site work.
- The faculty of Michael Duffin's Ph.D. program were consulted on specific aspects of research design and analysis.
- The issue of potential researcher bias was publicly and explicitly explored and discussed multiple times to the satisfaction of all members of PEEC.
- The PEER Associates team was intentionally constructed to represent complementary positivist and constructivist epistemological biases.
- Interview guides were developed and followed, and generally accepted methods for coding interview data were employed.
- Every effort was made to maintain high standards for methodological rigor.

FFEC AND THE EDUCATIONAL RESEARCH LITERATURE

The Forest For Every Classroom is one of numerous educational programs emerging throughout the country that use local ecological and cultural resources as a basis for learning, often referring to their approach as "place-based education." In this section of the report, place-based education is situated as one response to the broad call for a cleaner environment, and is explored as one way to connect schools and communities. Place-based education efforts are connected to the extensive existing research on educational reform efforts and successful strategies for improving student academic achievement. Particular emphasis is given to the connection between enthusiasm for learning and academic achievement, and to the notion of classifying the factors that influence student achievement into three categories: student-level factors, teacher-level factors, and school-level factors. This section of the report closes with an overview of "diffusion of innovations" theory and research, as well as highlights from a recent and particularly relevant meta-review called *Measuring Results* (Schneider & Cheslock, 2003) that synthesizes the research on environmental education, museums, health education, and social marketing.

The next several pages present a more in-depth look at the larger educational context in which FFEC operates. While this review of literature is likely to be useful to some program staff and other stakeholders who require a broader, more comprehensive set of data about FFEC and its context, many readers of this report may find it more useful to simply skim or skip the remainder of this section and return to it later if a specific need arises for this type of information.

> *"Place-based education is the process of using the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science and other subjects across the curriculum."*
>
> *-Sobel, 2004*

Under the banner of place-based education, many schools, nature centers, government agencies, and non-profit organizations are working to bring about educational reform by intentionally connecting schools to their communities (Chin, 2001; Smith & Williams, 1999; Stone, 2001). In order to give a flavor for the rich educational context that PEEC programs are working in, this section of the report touches very briefly on research and theoretical literature in the following areas:

- Need for place-based education
- Connecting school and community
- Student achievement
- Educational reform
- Diffusion of innovations
- *Measuring Results*

Place-based education roots learning about abstract systems in the concrete experiences of the schoolyard and community. However, the term place-based education is often used interchangeably with a number of other, similar terms: community-based learning, service-learning, sustainability education, project-based learning. Each of these terms refers to an explicit connection between the school and the community in which the school resides. A broader hope is to "tear down school walls" such that the community becomes integral to all facets of student learning—the school is open and inviting to the community and the community not only welcomes, but inspires and participates in student learning.
A more detailed literature review of the evolution of place-based education and service-learning is available on the PEEC web site (Plumb, 2003).

Need for place-based education

This report is not the place for a litany of statistics about declining ozone and biodiversity, or increasing pollution and material consumption. Yet it warrants note that general awareness of things like the 30% decline from 1970 to 1995 in the "Living Planet Index"[1], (and subsequent 3% annual drop) are clearly a driving force behind current efforts to help young people learn about and care for the environments in which they live (figures from Wilson, 2002). From Rachel Carson's "*Silent Spring*" in 1962, through the first Earth Day in 1970, and continuing on into the present century, the call for environmental education has been growing steadily. A 1996 EPA report assessing the implementation of National Environmental Education Act of 1990 listed as its first recommendation to make environmental education a priority across the country (EPA, 1996). After surveying 1,500 adults every year since 1991, the NEETF/Roper report concluded that "95% of American adults (96% of parents) think environmental education should be taught in the schools and 90% believe that people in the workplace and in other places in adult society should receive environmental education too" (Coyle, 2004, p. 4). This same study goes on to report that "while the weight of the research shows that the simplest forms of environmental knowledge are widespread, real comprehension of more complex environmental subjects is very limited within the public" (*Ibid,* p. 7). Another interesting finding is that "more children (83%) get environmental information from the media than from any other source" (*Ibid,* p. 7). What can schools do to address some of these broad concerns? Place-based education is one response to this question.

Rather than being a totally new approach, place-based education might be more accurately seen as an extension and refinement of environmental education. The key difference is that place-based education focuses on all aspects of the local environment by including local culture, history, social/political issues, and the built environment in its purview, as opposed to focusing more exclusively on the non-human natural world.

[1] Distilled from databases of the World Bank and United Nations Development and Environment Program by the World Wide Fund for Nature.

Connecting school and community

In place-based education, the community becomes the curriculum. One of the key ideas is that when one has developed an attachment to one's place and the skills to act upon that attachment, an individual will become a more active participant in his or her community. This is sometimes referred to as civic engagement. When levels of civic engagement and participation increase in a community, social capital--the invisible web of relationship--is said to broaden and deepen. According to Robert Putnam (2001), author of *Bowling Alone*, social capital refers to features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit. An intensification of social capital then leads, in the long run, to healthier communities, both natural and social. This construct is an essential part of the theory of change embedded in the FFEC logic model and the PEEC working theory of change for place-based education.

If fostering a sense of place and teaching action skills are the first steps toward the desired change, then programmatically it is the job of projects like FFEC to find the most appropriate leverage points in a system (or community) to initiate these first steps. Implicit in the FFEC mission is that educational intervention is an essential way to make change at the community level.

A program evaluation conducted by the Harvard Graduate School of Education for the Rural Trust (1999) provides case studies of schools and communities throughout rural America that have been transformed by grounding students' education in the local community and intentionally moving away from didactic approaches to standardized schooling. The evaluation concludes that as schools and communities work together to design curricular goals and strategies, students' academic achievement improves, their interest in their community increases, teachers are more satisfied with their profession, and community members are more connected to the schools and to students.

Getting parents involved in the school can be a good first step. Several studies show that involving parents in regular day to day activities of the school such as helping with classroom lessons can help parents connect to the values and educational concerns of the school (Comer, 1984, 1998; Epstein, 1991; Epstein & Becker, 1982; Paulsen, 1994a, 1994b; reported in Marzano, 2003). An extensive review of research literature on community organizing for schools conducted by the Harvard Family Research Project concludes that "poor school performance, high dropout rates, lack of qualified teachers, and inadequate facilities demand new forms of parent engagement to hold schools accountable. Community organizing offers one strategy to engage parents to effect system change" (Lopez, 2003, p. 2). The suggested strategies include paying special attention to the roles, relationships, and locus of power of parents. Also developing parent leadership, mobilizing collective power, and building social capital. Such efforts can require significant investment and commitment, but the

payoff can be healthy policy and system changes, stronger home-school connections, improved school climate, and increased student achievement (*Ibid.*). Other studies show direct evidence that parent and community involvement in school can lower absenteeism, truancy, and dropout rates (Bucknam, 1976; reported in Marzano, 2003), and spark parental interest in school governance decisions (Stallworth & Williams, 1982; reported in Marzano, 2003).

Many studies of the effectiveness of service-learning have been sponsored by the Corporation for National Service. These studies demonstrate powerful linkages between grounding the learning experience in the local context, enhanced student participation in community matters, and increased student engagement in their academic studies. In particular, service-learning experiences have been shown to promote a "pro-social, active conception of citizenship" in students (Chi, 2002, p. vi) when implemented consistently and intensively including opportunities for analysis of and reflection on the service experience and regular opportunities for teachers and students to engage in dialogue.

Connecting schools and communities is not an approach that is limited to the United States, either. Roger Hart describes several successful programs from England, Scotland, Columbia, Italy, Brazil, Nicaragua, the Philippines, and elsewhere (Hart, 1997). Denmark has a particularly strong movement toward collaboration between schools and communities around environmental and health concerns (Carlsson, 2004; Jensen et al., 2000). These references describe just a few of the many international examples of projects that share key design and implementation characteristics with the PEEC programs.

All of the programs involved in the Place-based Education Evaluation Collaborative, including the Forest For Every Classroom Project, make extensive use of community members as a core part of their program logic and implementation. Existing research suggests that this is effort well spent.

Student achievement

Many of the goals that place-based education strives to achieve are notably lofty and difficult to convincingly measure. Student academic achievement is an example of this. It is challenging to establish a compelling, direct causal link between a student looking for insects in a local stream or interviewing community elders and that student's scores on standardized tests. There is, however, a noteworthy body of research that suggests that student engagement in learning or motivation can function logically as a measurable proxy for student academic achievement. The first part of this section explores that idea more fully. The second part of this section looks at some of the more general factors that are associated with improved student academic achievement.

Engagement, motivation, and achievement

A very thorough and lucidly written review of the educational research of the last thirty-five years opens chapter 15 with the following statement:

> The link between student motivation and achievement is straightforward. If students are motivated to learn the content in a given subject, their achievement in that subject will most likely be good (Marzano, 2003, p. 144).

In the next five pages, Robert Marzano cites over 40 different studies that collectively lay out the evidence that supports these opening lines. Included in his argument are references to several quantitative studies that show correlations between motivation and achievement ranging from .19 to .63, and effect sizes that range from two-thirds to one and two-thirds standard deviations of improved achievement (Schiefele, Krapp, & Winteler, 1992; Schiefele & Krapp, 1996; Geisler-Brenstein & Schmeck, 1996; Tobias, 1994; Bloom, 1976; Steinkamp & Maehr, 1983; Willingham, Pollack, & Lewis, 2002; reported in Marzano, 2003). These are very impressive findings individually, and taken as a whole they make a fairly compelling case. Please refer directly to Marzano's book, *What works in schools: Translating research into action* (2003), for a fully detailed argument of the research-based connection between motivation and achievement (and for several other useful, well-documented insights into the educational process as well.)

This body of evidence holds an important implication for PEEC programs. If PEEC programs can present a case to support the claim that their programs increase student engagement and motivation in the learning process, then it is logically reasonable to connect that claim to the above mentioned body of evidence about student motivation to suggest that PEEC programs are likely to positively influence student academic achievement.

Figure C4. Excerpt from: The Generally Accepted Principles of Teaching and Learning and their Implications for Local Education Support Systems

- All children do not learn in the same ways or at the same pace. (Good instruction provides students instructional choices and multiple ways to engage with content to help them take ownership of their learning and demonstrate competence.)
- Learning is active. It requires effort and resilience on the part of the student as well as interaction (Good instruction promotes this interaction by maximizing opportunities for students to engage in their learning, rather than passively absorb information with teachers, texts, materials, and/or other learners.)
- Learning depends on a foundation of factual knowledge, the understanding of concepts in context, and the organization of facts and concepts so that they can be retrieved and applied.
- Learning is not limited to school. It can happen anywhere. (Good instruction incorporates children's out-of-school experiences in school with lessons that have value beyond school and is connected as much as possible to settings in the community that enhance learning for children and adults both inside and outside of school.)

**Created by School Communities that Work: A National Task Force on the Future of Urban Districts (June 2002)*

Other factors that support student achievement

Some environmental education research literature advises that a conservation ethic and responsible behavior must begin with early, sustained exposure coupled with action strategies and behavioral practice (Hungerford & Volk, 1990). One of the more prominent and dramatic studies, entitled *Closing the Achievement Gap* (Lieberman & Hoody, 1998) shows broad reaching positive effects of curricula in over 40 schools nationwide that is grounded in the local environment. This 1998 study by the State Environmental Education Roundtable demonstrated that when the environment is used as an integrating context (EIC), student achievement and in-school behaviors improve.

There is a very strong body of general educational research evidence that suggests almost unequivocally that individual teachers make a difference in student achievement (Wright, Horn, & Sanders, 1997; Pedersen, Faucher, & Eaton, 1978; Marzano, 2003, pp. 71-105). This provides support for a key strategy embedded in both the FFEC logic model and the PEEC working theory of change for place-based education (and the program evaluation strategies that follow from them), i.e. that school educators serve as the first level of change. It is primarily from this leverage point that students might be reached. Additional audiences for the PEEC programs include community members, school administrators, and students, but focusing on changing teacher practice is the place to start.

One compelling set of research that supports the notion that individual teachers make a difference comes from an ongoing series of studies working with the Tennessee Value-Added Assessment System (TVAAS). In technical terms "TVAAS has been designed to use statistical mixed-model methodologies to conduct multivariate, longitudinal analyses of student achievement to make estimates of school, class size, teacher, and other effects" (Wright, Horn, & Sanders, 1997, p. 57). In other words, they use high powered math to track the way that student test scores go up or down based upon which teacher they have, and they look at large numbers of students over long periods of time.

A relatively recent study using the TVAAS (Sanders & Rivers, 1996) found that:

- Three straight years of most-effective teachers gives kids a 50-percentile point advantage on students who spend three straight years with least-effective teachers.
- The effects of teachers on student achievement are both additive and cumulative with little evidence of compensatory effects.
- As teacher effectiveness increases, lower achieving students are the first to benefit. The top quintile of teachers tend to reach students of all achievement levels.
- Students of different ethnicities respond equivalently within the same quintile of teacher effectiveness.

A very recent study of 92 elementary and middle school teachers in and around Chattanooga, TN (Public Education Foundation, 2002) is perhaps more directly applicable to place-based education efforts. This report found that the classrooms of the most effective teachers tended to be similar in the following ways:

- Student work could be found everywhere, inside the classroom, out the door and, in some cases, down the hall.
- The teachers did not stand still and lecture; they covered every part of the room and monitored every activity that took place.
- Multiple small group activities were often found in their classrooms, with the traditional arrangement of desks in rows practically non-existent.
- Students in their classes were at ease asking questions and commenting on statements made by teachers and other students.
- Expectations for the students were clearly stated and exemplars of previous years' assignments were shown to students as models of what to produce.
- The organization of the rooms and the lessons was clearly evident. Materials were easily accessible when needed and no class time was wasted from lack of preparation.

So, if PEEC programs can demonstrate an increase in student motivation toward school work as a result of their programs, and they can also demonstrate that their programs lead to individual teachers changing their practice to be more like the characteristics described above, then the claim for a link between PEEC programs and student academic achievement becomes quite strong.

Furthermore, the Rural School and Community Trust recently released a report about their place-based education efforts in Louisiana (Emekauwa, 2004). This report documents improvements in state wide assessment test scores over several years for fourth graders in selected schools and districts with place-based education programs in place as compared to statewide averages. While the results raise some interesting and provocative questions and may well suggest a testable correlation between place-based education training and student academic achievement, the strong claims implied in this report warrant more extensive documentation of context and methodology and deeper exploration of competing explanations for these test score trends in order to improve confidence in the assertions left implicit in the report. This report does, however, add another layer of incremental credibility to the increasingly strong claim that place-based education can positively impact student academic achievement.

As the teaching strategies that are consistent with place-based education methods are increasingly shown through research to generally lead in the direction of increased student academic achievement, a new opportunity for researchers and program staff

emerges. Namely, to systematically explore the ways that *specific* teaching practices lead to *specific* types of student achievement. One example of this type of research is a recent doctoral dissertation that combined an experimental research design with in depth qualitative interviews to investigate the effects of GIS (Geographic Information Systems) instruction on the environmental knowledge of middle school students. The study concluded that GIS can be effectively used for a wide range of classroom instruction contexts. Perhaps even more interestingly, the study also concluded that

> …using GIS may aid students in constructing concepts and promoting understanding of environmental content, problem solving, experimental design and data analysis, and communicating findings to others. Using GIS in classroom instruction may be a way of incorporating spatial learning in schools (Hagevik, 2003, abstract).

This piece of research certainly strengthens the claims of the viability of the particular PEEC program that uses GIS as one of its main tools for implementing place-based education. As more place-based education research and evaluation takes on this kind of targeted focus, the case for the overall effectiveness of place-based approaches will grow stronger.

Educational reform

The body of research and theoretical literature on the topic of educational reform is vast. This section of the report touches very briefly on two concepts that may provide some useful insights for the programs involved in PEEC.

First, there is a categorization scheme that has been used extensively in the educational research literature to simply classify the various factors that affect student achievement (Marzano, 2003). **School-level factors** have to do with school wide administrative, cultural, and/or policy decisions, initiatives, and influences. **Teacher-level factors** are the decisions and behaviors that individual classroom teachers have choice to directly affect. **Student-level factors** have to do with the unique characteristics that individual students bring to school, such as background, intelligence, and motivation.

Which of these three factors has the biggest influence on student achievement? Just nine years after Sputnik, a landmark study involving 640,000 students and entitled *Equality in Educational Opportunity* (but more commonly referred to as the "Coleman report") made the shocking assertion that student-level factors accounted for 90% of the variance in student achievement (Coleman, Campbell, Hobson, McPartland, Mood, Weinfield, & York, 1966). This report led some to believe that schools really did not make that much of a difference, so why bother, because the die is already cast by the background that a student is born into and lives in at home. A more optimistic synthesis of 10 high visibility studies (Marzano, 2000), however, suggests that

schools account for 20% of the variance in student achievement, i.e. more than twice that suggested by the Coleman report. Of the 20% of influence that can be attributed to schools, about 13% comes from teacher-level factors, and 7% come from school-level factors (Bosker, 1992; Luyten, 1994; Madaus et al., 1979; Marzano, 2000; Stringfield & Teddlie, 1989; reported in Marzano, 2003). Perhaps most interestingly, if one reinterprets these statistics in terms of the percentage of students who do or do not "fail", then a defensible case can be made that "schools that are highly effective produce results that almost entirely overcome the effects of student background" (Marzano, 2003, p. 7).

It is not immediately clear where the effects of place-based education programs show up in this 3-level classification system. One could argue that place-based education might be classified as a "community-level" factor. This would suggest that its impact on students would be even less than the 7% level ascribed to schools, since impact on students seems to decrease geometrically as the factors become further and further removed from the individual student unit of analysis. On the other hand, one could also argue that by bridging the worlds of school, home, and community, the effects of place-based education might show up as part of the 80% contribution due to student-level factors. When a student becomes actively involved in community environmental and / or social issues, would this show up in these statistical computations as a glowing, high leverage piece of the student-level factor pie, or as a muted, marginally influential piece of a diffuse community-level factor? The answer does not flow directly from the educational research. This dilemma may also be symptomatic of the general difficulty that place-based education has fitting into simplified classification schemes because of its interdependent, flexible, highly contextualized philosophy.

In any case, the convenient three level categorization scheme of factors affecting students (i.e. school-level, teacher-level, and student-level) provides a potentially useful conceptual framework for place-based education proponents to talk about the program outcomes and impacts they seek to influence. In fact, the programs in PEEC have already adopted language that speaks to this categorization scheme. The Sustainable Schools Project and CO-SEED are "whole school change" (i.e. school-level) models, whereas the Community Mapping Program and a Forest For Every Classroom project are framed more as "professional development" (i.e. teacher-level) models.

The second concept from the educational reform literature that warrants mention is the growing influence of systems thinking terminology and conceptual frameworks. Perhaps the best illustrative example of this is a small 1993 book by Michael Fullan called *Change Forces*. He talks about the complexity of the school change business in terms of paradoxes that only begin to make sense when one looks at the system as a whole and see interrelationships, processes, and feedback loops instead of linear cause and effect chains and snapshots. These ideas are not so different from those

that PEEC members are drawing on when they cast their working theory of change for place-based education in terms of iterative feedback loops and the stocks and flows of various types of capital.

Analyzing school reform from this global perspective leads Michael Fullan to the conclusion that teacher education is the highest leverage way to help schools (and the students within them, and the communities around them) increasingly act as "learning organizations." This echoes much of the educational research that suggests that teacher-level factors are big in the lives of students. This also lends theoretical support to the notion that PEEC programs ought to focus their efforts on teacher practice change.

Diffusion of innovations

The main ideas summarized throughout this section of the report represent only a few of the many interesting ideas contained in three very different books about diffusion of innovations: a 500+ page scholarly review of over 5,200 publications aptly titled *Diffusion of Innovations* (Rogers, 2003); a general synthesis and extension of the key concepts, engagingly written for general audiences and called *The Tipping Point* (Gladwell, 2002); and an extremely practitioner-oriented application of the ideas to a specific context entitled *Crossing the Chasm: Marketing and Selling High-tech Products to Mainstream Customers* (Moore, 1999).

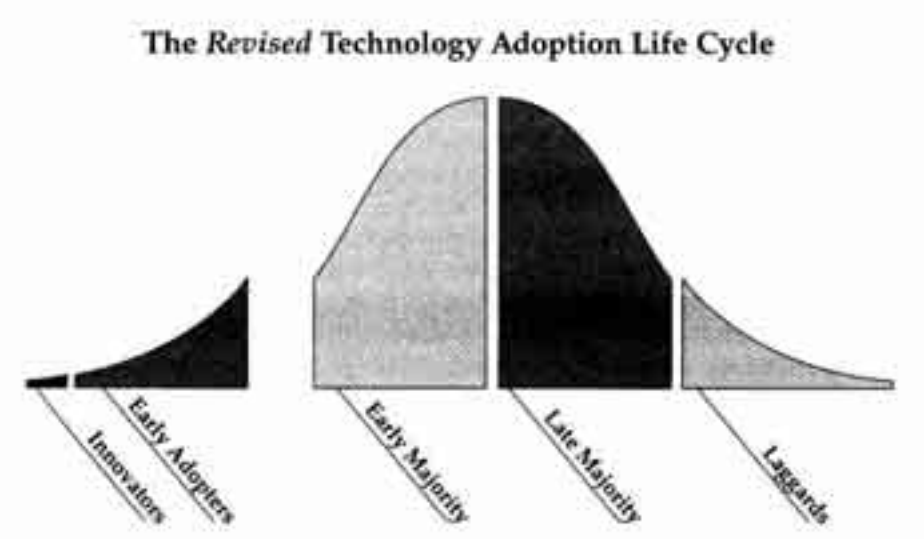
The term "diffusion of innovations" refers to the process by which a new idea or technology becomes increasingly used by a specified group of people. A tiny sampling of the list of fads, trends, policies, and revolutions whose key elements can be described by the diffusion of innovations process includes things like: the popularity of Hush Puppies, or other fashion trends; increasing use of computers, the internet, and cell phones; use of citrus to control scurvy in the British navy; use of hybrid corn in Iowa; or even major political events such as Paul Revere's midnight ride, the dismantling of apartheid in South Africa, or the fall of the Berlin Wall.

Considering the spread of effect of place-based education programs within a given school (or within the field of education in general) as another case of the general diffusion of innovations process has both descriptive and prescriptive power. Analysis of both qualitative and quantitative data from evaluations of PEEC programs in 2002-03 and 2003-04 lend immediate support to the notion that participants in PEEC programs can be fairly accurately (if somewhat loosely) described in terms of "adopter categories." Viewing the design and implementation of PEEC programs through the lens of diffusion of innovations theory and research could potentially help speed up and deepen program impacts as well as inform decisions about how to most efficiently use limited financial and time resources.

The first main idea is that people respond differently to new ideas and technologies based upon individual psychological and / or demographic characteristics. When faced with the uncertainty inherent in considering the adoption of a new technology or way of doing things, people tend to fall into one of the "adopter categories" described in Figure C5 below. The distribution of people in a given population tends to follow a normal, bell-shaped pattern with the early and late majority categories each comprising about a third of the population, and the innovators, early adopters, and laggards collectively making up the remaining third of the population.

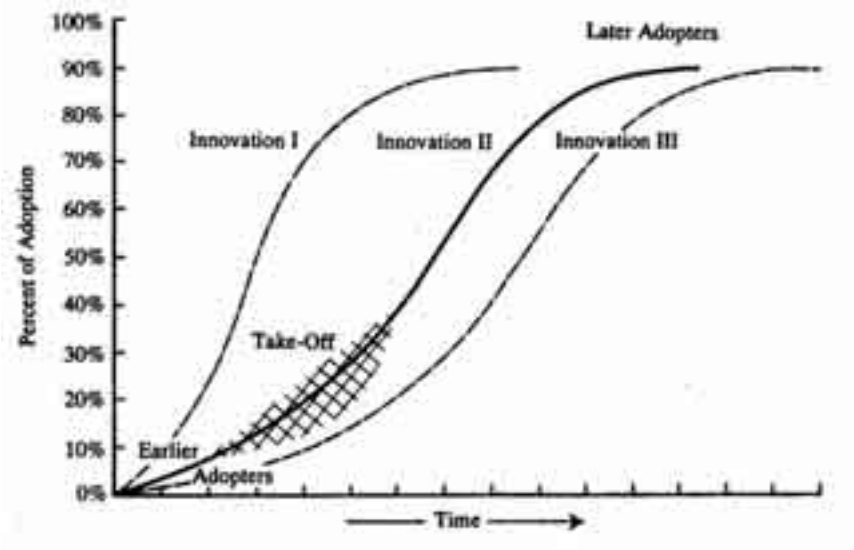
This general idea of adopter categories leads directly to perhaps the most important overall prescription for those planning to create a change. Whether it's a place-based education program or a fashion fad, one should intentionally target their implementation / marketing strategy based upon the core wants and other unique characteristics of each adopter category.

Figure C5. Adopter Categories (Moore, 1999, p. 17)



The second main idea is that for successful innovations the rate of adoption through time in a given population tends to follow a fairly predictable S-shaped curve pattern. Diffusion proceeds very slowly at first, then reaches a "critical mass", "tipping point", or "take-off" period of rapid spread, then levels off at some more "permanent" level of adoption. Conceptual frameworks associated with epidemics and contagiousness are often applied to this S-shaped diffusion pattern. Rogers (2003) describes the tipping point as typically happening when the adoption rate is between 10-20% of the target population. Gladwell (2002) notes the "Rule of 150" (p. 175) which purports that innovations tend to tip after a sub-group of about 150 people in the larger social group have adopted.

Figure C6. General Diffusion Curve (Rogers, 2003, p. 11)



The third main idea is that diffusion is a highly subjective *social* phenomenon, meaning that word of mouth, reputation, and context are critical factors affecting the rate and depth of adoption of new practices. This is where some of the most useful applications of the theory come from, because it is about ***how*** the diffusion actually happens. The sustainability of a place-based education project (in an educational context) or the making of large profits (in an entrepreneurial business context) is all about breaking into the early majority and then successfully transitioning through into the late majority. Here are four things to think about:

- **Change tends to be discontinuous.** Despite the charts above, graphs of real change over time tend to look more like staircases than hockey sticks. This is largely because change happens relatively easily *within* adopter categories in which people tend to share the same interests, concerns, and networks, but moving *between* adopter categories is far more difficult. The biggest gap is the "chasm" between early adopters and early majority because the pragmatic early majority tends not to trust the judgment of the visionary early adopters. Many innovations fail to tip because they fall into this chasm before establishing a hold in the early majority. Moore (1999) suggests that the D-Day invasion of Normandy provides an effective analogy for strategically crossing the chasm. Place-based education supporters may, however, prefer to think in terms of a more nature-oriented analogy such as protecting endangered spotted owls, California gnatcatchers, or coho salmon. By focusing political advocacy and ecological restoration resources on these single keystone species, efforts will hopefully lead to preserving of habitat for the bulk of other species (i.e. the "early" and "late" majority) that depend on the same habitat. The lesson from this category is to focus all of one's resources on a strategic "beach head" or "keystone" in the early majority, i.e. a very tightly defined sub-segment that has many connections within the larger early majority category.

- **Specific *types* of people tend to make an innovation tip.** These are the networkers who know and are known widely (but not necessarily deeply) within many *different* sub-groups. These are the opinion leaders who are esteemed because they embody the implicit cultural and group norms and so become key reference points for others in their identity group. The rare people with extraordinary depth of content knowledge and the enthusiasm to share it can also be key ingredients in the recipe for successful diffusion. Strategically, these people tend to be good targets for a "D-Day" or "keystone species" type invasion into the early majority.

- **Context matters.** How an innovation is perceived has a major impact on how likely it is to be adopted. The two most influential perceived attributes of innovations are "relative advantage" (i.e. the extent to which the new idea is thought to be better than the old way of doing things), and "compatibility" with existing values, cultural norms, and past experiences of the potential adopter. Further, when interpreting human events and behavior we tend to reach for "dispositional" rather than "contextual" explanations, overestimating the contribution of individual character traits and underestimating the influence of situation and context. This is sometimes referred to as Fundamental Attribution Error (Gladwell, 2002, p. 160). The bottom line here is to remember that diffusion is a social process, and is dependent on group social interactions.

- **"Re-invention" tends to be a good thing**. When members of a target population have the ability to change, adapt, and otherwise influence the new idea itself during the process of adopting it as their own, innovations tend to diffuse more rapidly and are more likely to be sustained.

Figure C7 on the following page summarizes many of the key elements of the overview of diffusion of innovations theory presented here.

Figure C7. Adopter Category Summary Chart

Adopter category	Descriptors from Moore, 1999 from Rogers, 2003	Core wants	Strategies for working with them
Innovator	Enthusiast Venturesome	• Straight facts, truth, no tricks • Be first	• Don't expect immediate "profits" • Look for ones who can garner R&D support by virtue of being close to the "big boss"
Early adopter	Visionary Respect	• Breakthrough technologies • Pursue a dream • Project orientation	• Maintain frequent contact • Manage unrealistic expectations • Chunk innovations into discreet products or phases
Early majority	Pragmatist Deliberate	• Incremental, predictable, measurable progress	• D-Day analogy • Keystone species • Focus, focus, focus effort on strategic networkers and opinion leaders
Late majority	Conservative Skeptical	• Smooth, easy change • Discount prices	• Work the bugs out first • Plan for a customer service orientation
Laggard	Skeptic Traditional	• Keep status quo	• Actively listen for "Emperor's New Clothes" phenomena (e.g. the Amish v. modern agribusiness) • Otherwise try to neutralize influence

There are a few additional ideas that warrant mention at this point. Diffusion of innovations research has been critiqued for having a pro-innovation bias that too often assumes the perspective of the change agency rather than the individual adopter. Thus it is wise to remember that almost all innovations have undesirable, indirect, and unanticipated consequences. Additionally, innovators should be encouraged to pay attention to and mitigate for ways that the general nature of innovations can tend to widen gaps between haves and have-nots. Lastly, there could well be rich theoretical and practical grounds for combining elements of diffusion of change models with other psychologically oriented and well-tested models of human behavior such as the stages of change model developed to understand smoking cessation (see Prochaska, 1992).

Measuring Results

In April 2003 the CoEvolution Institute published an important report entitled *Measuring Results* (Schneider & Cheslock, 2003). This review of research literature focuses on the impacts of non-formal programs in environmental education, museums, social marketing, and health programs. These four domains all seek

sustained behavior change in program participants and so have some valuable lessons to share with each other.

One of the main findings of *Measuring Results* is that actually measuring the results of complex human behavior in response to these non-formal programs is a difficult task in and of itself. In the field of environmental education in particular, the authors note a "weak link between theory and practice" (*Ibid.*, p. 26). Interestingly, the theory of change that has perhaps the longest tradition in the field of EE (i.e. that knowledge about the environment leads to positive attitudes about the environment which then leads to pro-environmental behavior, or KAB for short) is not very convincingly supported by the research literature. In summing up the findings of the four behavior change domains as a whole, they note:

> The social science nature of evaluation and the focus on human behavior have made for a lack of systematic analysis, which is attributed at least in part to the necessary reliance on self-reported data. Tracking people's adoption of positive behavior or retention of what they have learned is easier in some case than it is in others. Follow-up is inconsistent and longitudinal analyses are rare…[but] useful and often worth the effort and cost (*Ibid.*, p. 134).

To help strengthen the collective body of evidence for the impact of behavior change programs, the authors recommend "…systematizing evaluation strategies across the field[s]" (*Ibid.*, p. 133) and greater dissemination of measurement strategies and findings. They also recommend rigorous articulation of program goals and mission, and the use of multiple-method research strategies and design. The work of the Place-based Education Evaluation Collaborative could well be a leading example of embodying all of these recommendations.

Beyond the "measurement challenge,[2]" the *Measuring Results* report notes some exciting lessons learned about effective behavior change strategies that emerged from their review of the research literature. For environmental education in particular,

> People need to know *why* and *how* to act in environmentally responsible ways. Effective programs train participants for specific behaviors. In addition…prompts or triggers [e.g. goal setting, commitment strategies, personal reminders, information feedback systems, role modeling] increase the frequency of desirable behaviors and decrease the frequency of undesirable ones (*Ibid.*, p. 46, *emphasis in original*).

The summary of cross-domain lessons learned echoed the importance of targeting specific behaviors in EE and added two other recommendations. First, programs

[2] PEEC evaluators and members have taken to naming "The Measurement Challenge" as a kind of shorthand for all the effort (and opportunity) that is involved in doing this in depth exploration of program outcomes.

should tailor interventions to the "individual characteristics and agendas" of the specific program participant audience. Second, programs should directly address the feelings and emotions of participants in order to "instill positive attitudes toward specific actions," help participants believe that those actions will make a difference, and help them "believe in their own abilities to engage in action" (*Ibid.*, p. 130-131).

Summary of literature review

Place-based education is still an emerging field. It is not separate from the general awareness of ecological issues that is increasingly a part of public discourse. Programs like those in PEEC are still connected to the longer and stronger tradition of environmental education, even as they work to identify place-based education as a distinct approach. And of course, all PEEC programs operate (or at least strive to operate) in the very heart of the thing called educational reform. It seems that the burden of proof for the efficacy of a place-based education approach lies with the programs themselves. PEEC is putting forth substantial effort to continually and rigorously evaluate their programs and actively seek theoretical and research-based bridges to other fields of study, including areas like psychology, behavior change, and diffusion of innovations. This effort to bridge gaps between far ranging but fundamentally connected arenas is characteristic of place-based education's philosophical commitment to bridging the global and the local.

EVALUATION METHODS

This year, the evaluation team sought to evaluate the effectiveness of A Forest For Every Classroom in terms of process (program implementation) and outcomes (results). The evaluation is intended to provide useful information for FFEC project partners and funders to assist with program development, justification and refinement. The evaluation utilized multiple methods.

Now in its second year of comprehensive evaluation, the partners and evaluation team decided that the depth of information afforded by a case study methodology would offer valuable insight into how and why FFEC creates change in teachers' practice and within a school. Two case studies were conducted to highlight exemplary results in two different communities: Woodstock, Vermont and Hanover, New Hampshire. A third case study examined the workings of the FFEC partnership itself, specifically focusing on how the partnership has impacted its constituent organizations, and how each organization contributes to such a partnership. Furthermore, for more breadth of information, and to begin to understand how various levels of participation in FFEC impact a teacher's practice, a comprehensive survey was developed and administered to all educators who participated in FFEC in Year 1 and Year 2.

Throughout the evaluation process FFEC partners were invited to be active participants in structuring and contributing to the evaluation process in order to increase the likelihood that evaluation processes and products will be both appropriate and useful for all stakeholders. The process of developing evaluation questions and instruments, and of collecting and analyzing data are described below.

EVALUATION QUESTIONS

Evaluation questions were designed by looking at the goals and expected outcomes outlined by FFEC partners in their logic model (see Appendix A) and by meeting with the partners. Specifically, evaluation questions addressed in this study are cited in Figure M1 on the following page.

Figure M1. Evaluation Questions for FFEC Program Evaluation 2003-04

Themes	**Evaluation questions**
Process/Model Effectiveness	• *What is the impact of FFEC sustained professional development on teacher practice and community involvement? Do teachers who choose to participate in FFEC beyond one year of training demonstrate stronger or more lasting impacts to their teaching?* • *In what ways has the existence of this unique partnership contributed to teachers' involvement and/or implementation of their units?*
Teacher outcomes	• *How has teacher practice changed, and been sustained?(draw from stages of change literature)* • *Did teachers implement units resembling what they proposed in their initial application?* • *Are teachers using more community partners, and in what ways?* • *Are there notable personal changes in teachers such as engagement in community?*
Teacher-reported student outcomes	• *How does FFEC type teaching affect student learning?*
Teacher-reported community outcomes	• *Is there a shift in teachers' perception and use of public lands?* • *Are teachers, parents and students more involved in public land use and decision making as a result of FFEC?*
Partner Outcomes	• *How are FFEC partners—individuals and organizations--changing the ways in which they operate as a result of involvement in FFEC? (roles, budget allocations, program decisions, etc.)*
Partner-reported Community Outcomes	• *In what ways are partners facilitating relationships between schools and communities?* • *In what ways has this partnership contributed to changing relationships between public lands and communities (via the training of teachers to help students attach to place)?*

FFEC program staff reviewed the questions and evaluation structure and, upon approval, appropriate evaluation instruments were designed. At various points in the evaluation process.

The remainder of the methods section of this report describes many of the details of the research process that evaluators used. The information is almost certain to be useful to some program staff and other stakeholders who want or require an

academically rigorous description of research and evaluation methods. Many readers of this report, however, may find it more useful or appropriate to simply skim or skip this section and return to it later if a specific need arises for this type of information.

CASE STUDY PROCESS

Yin defines a case study as a social science research strategy which "…investigates a contemporary phenomenon within its real-life context…and relies on multiple sources of evidence, with data needing to converge in a triangulating fashion…." (Yin, 2003, pp. 13-14). Further, Davey describes a case study as "a method of learning about a complex instance through extensive description and contextual analysis." (1991, p. 3). All three case studies for the FFEC evaluation were complex instances that were thought to elucidate important understandings about how the FFEC program and project function. All three were investigated within their real-life context and multiple sources of data were collected in order to properly triangulate the study.

Initial contact was made with case study participants in December 2003, and data collection was completed in April 2004. All three case studies utilized semi-structured interviews and focus groups with teachers, community members, parents, students and/or FFEC partners to gather in-depth information about each case. Classroom, school, meeting and organizational observations were undertaken, and student work, teacher curricula and a review of other documents was used to triangulate the interview data.

Open interviews are particularly useful in program evaluation because they are engaging interactions that help us understand both the process and the outcomes of a program, including what participants know and like about the program, how they have been affected by the program, and what they think should be different (Monroe, 2002). An interview guide was developed that was specific enough to adequately encompass the evaluation questions but flexible enough to meet the stakeholders' level of participation in FFEC activities. See Appendix for interview guides. Most interviews were audio recorded and transcribed and a few were transcribed on site.

Figure M2 on the following page summarizes the data collection methods and instruments used in the case studies:

Figure M2. Case study data collection methods

Case Study	*Individual and Focus group interviews*	*Site Visits (Class, Field, and Meeting Observations)*	*Documents Reviewed*
Hanover, NH	• 6 Ray School teachers • 3 FFEC program staff • 1 Ray School community partner	• 2 site visits to the Ray School • observation of 2 class sessions • observation at MBRNHP	Lesson plans, student work, newspaper articles, FFEC program materials, organizational websites
Woodstock, VT	• 5 Woodstock Union Middle School (WUMS) teachers • 5 FFEC program staff • 7 students	• 2 site visits to WUMS • 1 site visit to MBRNHP	Lesson plans, student work, newspaper articles, FFEC program materials, organizational websites
FFEC Partnership	• 17 (see list of participants below)	• 5 (meetings, site visits, institute observations)	Grant reports, staff meeting minutes, partner meeting minutes, organizational brochures and newsletters, internal correspondence, video and DVD productions, organizations' websites, program brochures, institute plans, newspaper articles

Specific Procedure: FFEC Partnership Case Study

Partners met with the evaluator in February 2004 to discuss case study parameters, including identifying the most pertinent interviewees and identifying one person within each partner organization to be the key contact for document collection. The evaluator then met with 17 staff members from the five partner organizations, interviewing them singly or in pairs.

Interviewees represented a spectrum of involvement with the FFEC partnership and program; members of the five organizations who are directly involved in the FFEC partnership, and those who are more tangential in their view of the partnership. These people were solicited in order to balance "internal" views of the program and partnership and "external" views of the same. In several instances, where interviewees are stationed in other states, phone interviews were conducted.

Interviewees were informed that, although confidentiality is normally paramount to the evaluation process, because of the focused nature of a case study, names would not

necessarily be withheld from the report, data were not confidential, and that the evaluator would be recording their interview on tape and as a typed file.

The evaluator also met with one representative of each organization to receive any written documentation that was compiled as evidence of the partnership's impact on that organization, or the organization's influence within the partnership or program. Data collection was complete in April 2004.

Interviewees for FFEC Partner Case Study

- *United States Forest Service:*
  - Kathleen Diehl, Public Affairs Officer, Green Mountain and Finger Lakes National Forests
  - Martha Twarkins, District Ranger, Hector District, Finger Lakes National
  - Forest
  - Don Howlett, Region 9 Conservation Education Coordinator
  - Susan Cox, NA Station Conservation Education Coordinator

- *Northeast Natural Resource Center of the National Wildlife Federation:*
  - Liz Soper - Forestry and Wildlife Specialist / Educator
  - Eric Palola, Center Director
  - Jennifer Baer - Education Coordinator

- *Shelburne Farms:*
  - Megan Camp, Vice President and Program Director
  - Alec Webb, President
  - Tre Burke, School Programs Coordinator
  - Sue Dixon, Development Coordinator
  - Pat Straughan, Program Coordinator

- *Marsh Billings Rockefeller National Historical Park:*
  - Rolf Diamant, Superintendent
  - Tim Maguire, Chief of Visitor Services
  - Christina Marts, Resource Manager

- *Conservation Study Institute*:
  - Nora Mitchell, Director
  - Barb Slaiby, Education Coordinator

Analysis of Case Study Interview Data and Documents

After fieldwork was complete, descriptive observation data, additional documents and transcribed interviews were coded to illuminate key emergent issues and answer the evaluation questions (Miles & Huberman, 1994). The most prevalent themes emerging from the data were analyzed and are synthesized into the case studies.

Specifically, the evaluators used the following protocol for analyzing the data:

1) wait until the vast majority of data has been collected
2) read through all data (making minimal notes) for the purpose of clarifying the context and getting a holistic impression of the data set
3) create an initial list of 5-20 themes that seem to reflect the data
4) code all data according to the theme list, while remaining very open to the emergence of new themes, sub-themes, and meta-themes, including three categories: Irrelevant, Probably Irrelevant, Need to Confer
5) as the remaining data is collected, code it according to the theme list
6) look within the data from each theme, sub-theme and meta-theme and recode as necessary to establish clarity and coherence within each level
7) generate an outline of the findings and discussions section of the report based upon the final theme list
8) write up the narrative based upon the outline, pulling in data from documents and transcripts to support as appropriate
9) each person involved in the above steps agree that the final analysis is consistent with their experience
   Note: If Research Assistants are involved in the process, then the primary author checks their work at each step.

In the case of the FFEC case studies, all of these steps, including the final note, were employed.

SURVEY PROCESS

As part of the PEEC cross-program evaluation initiative, and also to meet FFEC's current evaluation needs, an educator survey (see Appendix I) was developed and administered to all FFEC 1 and FFEC 2 educator participants, and also the new FFEC 4 participants at their first summer institute in June 2004. PEER Associates encourages program staff to be involved in the administration of evaluation instruments to the greatest reasonable extent. Written guidelines for survey administration are provided to staff. Evaluators oversee program staff as they download, copy, distribute, confidentially collect, and remit all survey instruments.

For FFEC 1 and FFEC 2, twenty-nine surveys were sent to participants by email in April 2004. Participants were given three options: complete the survey on-line, complete the survey by computer and send as an email attachment, or print, complete and return the survey by post. Two weeks later, teachers were sent a reminder email. One week following this reminder, non-respondents were sent a paper copy of the survey, a reminder letter and a return envelope in the mail. One week later, non-respondents were sent another reminder email. Program staff administered the surveys and reminder messages both on email and by post, but did not have access to any completed surveys, which were returned directly to the evaluators. Twenty-one surveys from this census were returned.

Analysis of Survey Data

Pilot measurement strategy

Following the 2002-03 evaluation cycle, the members of the Place-Based Education Evaluation Collaborative wished to strengthen the quantitative elements of their evaluation strategy. Emerging from the September 2003 PEEC meeting, the top priority for the 2003-04 PEEC cross-program research agenda was to develop a way to measure the extent to which outcomes of interest varied consistently with degree of program exposure. By demonstrating the effectiveness of this pilot measurement strategy in 2003-04, PEEC has created a very solid methodological foundation for on-going evaluation in years to come. The allocation of intensive effort this year to measurement challenges was made possible through the pooled resources of PEEC programs, aided by the support provided indirectly by the EPA through an evaluation team member's doctoral fellowship.

The evaluation team settled on a "dose-response" approach, adapted from concepts in the field of behavioral psychology (Strosahl et al.,1998). From this frame, the question becomes: Do participants exposed to a higher "dose" of a program systematically report higher levels of behaviors and attitudes that the program is trying to impact? "To the extent that relevant outcomes vary with dose, assertion of program impact becomes increasingly credible." A primary benefit of this dose-response measurement strategy for PEEC is that evidence of program impact can be assessed using survey data collected at *any point* before, during, or after program completion, provided there is enough variation of dose among program participants. This sidesteps numerous conceptual and logistical obstacles to pursuing strict pre- and post-program measurement efforts, and also allows a relatively standardized set of surveys to be more easily used across the diverse program designs in PEEC.

The main thrust of all the survey-related sections of this report is to present the findings of the effort to pilot a dose-response measurement strategy. Thus, this report takes an educative approach to presenting statistical findings. We omit some of the more descriptive statistical representations (e.g. simple bar graphs) in favor of putting more focused effort into helping the reader understand the meaning and

power of the inferential statistics that undergird this dose-response measurement strategy. It will substantially increase the long term value of this pilot measurement strategy effort if key program staff have a solid understanding of the significance of the statistical foundation upon which it is based. There are, however, additional questions that could be explored with the existing data, beyond the scope of the current report. It is possible that PEEC programs might individually or collectively find it useful to more exhaustively analyze some of the survey data already collected, in order to produce a supplementary "quantitative only" evaluation report or pamphlet targeting specific decision-making needs of priority stakeholders.

Another consequence of this focus on piloting a measurement strategy is that some of the most important evaluation "findings" are actually presented here in the "methods" section of the report for the sake of coherence of the narrative. Testing the method *was* the finding.

Instrument design strategy

Indices and Modules

Much of 2003-04 was spent developing and refining a set of survey modules that were standardized for use across all PEEC programs. Design elements were drawn from previously implemented surveys from several PEEC programs, as well as from individual program logic models and the PEEC cross program theory of change. This standardization process allows for much larger samples and more varied comparison groups over longer time periods. Further, it is hoped that the place-based education philosophy that is shared by all PEEC programs and designed into the fabric of these surveys will make the instruments transferable / modifiable for use in other place-based education programs. All survey instruments are available for free distribution (citation requested) on the PEEC web site.

The design process began by grouping items from existing surveys into broad conceptual categories, and adding additional categories to the list where needed. This resulted in a list of eight core ideas for potential inclusion across all PEEC surveys. We call these "modules." Each module was then broken down into two to five constituent "indices," each intended to capture a distinct element of the idea represented by the module. Similarly, two or more "items" (i.e. individual survey questions) were developed for each index, taking care to use items from existing surveys whenever possible in order to maximize the possibility of comparing current and future results to previously collected data. Finally, because changes in teacher practice are at the heart of many PEEC interventions, we grouped several modules together to form, at the highest level in this scheme, a "overall module" construct representing all survey elements that reflect teacher practices targeted by the PEEC program.

Several design guidelines were used in the construction of survey items. Most modules have one negatively worded item as a way to help keep respondents focused on the meaning of the response options. Extreme wording was avoided while constructing the phrasing for items. Response scales for all Likert items were standardized with four interval points (either agreement or frequency) in order to oblige respondents to choose either the top half or the bottom half of the scale (or else the systematically included option for "n/a, don't know").

From what might be regarded as a "test bank" of survey components, program-specific surveys were then compiled by choosing the highest priority modules and indices for each program and audience (i.e. community member/partner, educator, or student). Drafts were compiled by evaluators and shared with program staff, with each instrument going through multiple rounds of editing and/or field testing (sometimes more than dozen!). Many of the surveys were converted into on-line versions through the commercial software package, Survey Monkey. By 2004-05 the evaluation team intends to have on-line administration options for all survey versions.

There are three important reasons for using this indices and modules design approach. The first is that survey design begins with relatively broad questions or concepts. Although it proceeds to more intricate items, the "answers" we're interested in are usually not focused on the item level, and we want our analytic strategy to be consistent with our primary interests. The second reason is that each time one conducts a statistical test, there is a small probability of reaching an erroneous conclusion on the basis of that test (think of the "margin of error" reported with polling results). That probability of error compounds with multiple tests, and for this reason it is common practice to minimize the number of tests by reducing the number of "scores" one has to work with--a process referred to as data reduction. Conducting our analyses at the level of indices instead of individual survey items reduces the risk that we will be attempting to extract meaningful interpretations from what are, in fact, chance arrangements of the data. Finally, the third reason for this approach is to stabilize the construct being analyzed. Individual survey items can be modified slightly without having to change the index.

This was crucial during 2003-04 because different versions of surveys needed to be administered (even within the same PEEC program) as a consequence of the iterative design process. This also allows for the refinement and evolution of the wording of survey items. Finally, it is hoped that this indices and modules design approach increases the transferability of surveys to other place-based education programs.

The resulting indices and modules are summarized in Figure M3 below. See Appendices D and E for samples of surveys used for FFEC this year. A complete list of all survey items used for PEEC surveys is available on the PEEC web site.

It was conceded at the beginning of the design phase that any measurement of the "dose" of a program would be necessarily imprecise. PEEC programs are not simple training seminars that are over and done with in two hours. Rather, they are multi-faceted, highly adapted to local conditions, take place over extended periods of time, and intentionally rely on informal diffusion throughout the school and community in which they take place. These factors make it difficult to definitively determine even who is an official "program participant." Still, any measure of dose would likely be more accurate than no measure of dose, and so the number of hours of direct, personal contact with formal program elements was taken as the starting target for measurement. Comprehensive lists of the core activities for each PEEC program were developed, and survey respondents were asked to estimate the number of times that they had participated in each activity over the years of their involvement with the program (see item D1 on the survey in Appendix D).

Separately, program staff generated estimates of the average duration of a typical example of each activity in the list. From this information it was possible to calculate a rough estimate of the total number of hours of participation. Additional multiple choice items were created which asked participants for overall estimates of: the number of hours of participation (item D2); the frequency with which they were implementing the program in their classrooms (item D3); the extent to which the program is embedded in their curriculum (item D4); and the amount of effort they expended on this program relative to other aspects of their teaching (item D5). During the Spring of 2003 we realized that it was also critical to find out the amount of training participants had received in place-based education prior to involvement with PEEC programs, and so an additional question to that effect (item D12) was added for later versions of the surveys. It is not at all perfectly clear to survey respondents what exactly qualifies as "non-FFEC place-based education training," but, again, some measure of this important factor is likely to be more accurate than no measure at all.

Figure M3. Summary of PEEC Survey Modules and Indices

MODULE			INDEX		CMP			CO-SEED			SSP			FFEC		
	Description	Type		Description	Com	Edu	Stu	Com	Edu	Stu	Com	Edu	Stu	Com	Edu	Stu
L	adult reported use of local resources	freq	*llp*	use of local place		☒	☒	☒	☒	☒		☒	☒		☒	
			llpeop	use of local people		☒	☒	☒	☒	☒		☒	☒		☒	
			lsl	service-learning		☒		☒	☒			☒			☒	
P	adult reports of pedagogical craft	agree	*pcg*	meet curriculum goals		☒			☒			☒			☒	
			ptc	collaboration		☒			☒			☒				
			pteg	engagement/growth		☒			☒			☒			☒	
C	student reports of engagement, civic- and learning	agree	*ccc*	connect. to comm.			☒			☒			☒			
			cse	self-efficacy			☒			☒			☒			
			csr	social responsibility			☒			☒			☒			
			cel	engagement in learn.			☒			☒			☒			
			csb	stewardship behavior			☒			☒			☒			
N	student reports of attachment to place	freq	*nlr*	learn through local			☒			☒			☒			
			nto	time outdoors			☒			☒			☒			
			nup	understanding of place			☒			☒			☒			
			noa	overall affect			☒			☒			☒			
X	adult reports of student performance	agree	*xsel*	engagement in learn.	☒	☒		☒	☒			☒			☒	
			xsaa	academic achievement	☒	☒		☒	☒	☐		☒	☐		☐	
			xsce	civic engagement	☒	☒		☒	☒			☒			☒	
			xssb	stewardship behavior	☒	☒		☒	☒			☒				
			xts	test scores		☒	☐	☒	☒	☐		☒	☐		☒	
W	adult, student reports of whole school improvement	agree	*wpeop*	school culture, people				☒	☒	☐		☒	☐			
			wenv	environmental quality				☒	☒	☐		☒	☐			
Y	adult, student reports of improve-ments in the community	agree	*yce*	civic engagement	☒	☒		☒	☒			☒			☒	
			yeq	environmental quality	☒	☒		☒	☒	☐		☒	☐		☒	
			ypdm	planning/decision making	☒	☒		☒	☒			☒			☒	
			y10	self-efficacy				☒	☒			☒			☒	
			ygen	general, overall	☒	☒		☒	☒			☒			☒	
			ypav	program adds value	☒	☒		☒	☒			☒			☒	
D	dose, misc. demog.	mult	*n/a*	hours, freq., %, non-PBE	☐	☒		☐	☒	☐		☒	☐		☒	
S	Sustainable Schools Project (SSP) specific	agree	*stp*	sustain. teach practice								☒	☒			
			n/a	misc. items								☒	☒			
E	CO-SEED specific	open	*n/a*	misc. items				☒	☒	☒						
M	Community Mapping Program (CMP) specific	agree	*mpi*	project implementation	☒	☒										
			mgis	use of GIS	☒	☒										
			mvc	value to community	☒											
			mstan	meet nat'l standards		☒										
			mps	project sustainability	☒	☒										
		varies	*mngs1*	world in spatial terms			☒									
			mngs16	geog. for future planning			☒									
			mnrc	science as inquiry			☒									
			mistep6	technol. problem-solving			☒									
			msel	engagement w/maps			☒									
			miu	interdisciplinary utility			☒									
			mmas	mapping mastery			☒									
		open	*n/a*	misc. items	☐	☐	☐									
F	Forest For Every Classroom (FFEC) specific	agree	*fcb*	cost-benefit											☒	
			fvpl	value of public lands											☒	
			n/a	misc. items											☒	

Analysis strategy for Likert scale data

Assumptions

First, it is important to reiterate that the entire dose-response measurement strategy is built upon the assumption that program dose is, in fact, a latent construct that can sensibly and accurately describe the experience of an individual participant in one of these PEEC programs. If one does not accept this assumption, then one should disregard all reported survey results involving inferential statistics.

Second, there is debate in the academic community about the validity of applying parametric statistical tests to data from Likert scale type sources (see Newton & Rudestam, 1999, pp. 179-187). We are convinced by the side that argues that such tests are appropriate due to the assumption that the latent constructs being measured are continuous in nature, despite being manifested in the data as ordered categories.

Third, because the primary goal was to pilot a measurement strategy, a broadly exploratory approach was taken during the first stages of data analysis. In order to protect against over-interpretation of correlations between dose and program outcomes at multiple levels of analysis (i.e. item level, index level, module level, and overall module level), or the critique of going on a "fishing expedition" for affirming results, stricter criteria for statistical significance were assumed prior to analysis. The Bonferoni correction stipulates that for aggregate categories of analysis, the p value statistical significance threshold should be divided by the number of component constructs. In our case, this means that the p value threshold for modules and overall modules is closer to .01 than the typical .05.

The final and most general assumption is that deep methodological rigor in statistical analysis was extremely important for PEEC. In the highly politicized arena of education, quantitative evaluation and research findings are at a premium, even though many consumers of the findings may not be substantially trained in critically examining the math and philosophy underlying statistical presentations of data. Thus, the evaluation team took the position that PEEC members (i.e. our clients) need to be entirely confident that any statistical evaluation findings they present to stakeholders are thoroughly defensible on methodological grounds.

Tools

Since the number of surveys collected for PEEC during the 2003-2004 evaluation cycle was fairly large (i.e. over 1600 total, including 33 for FFEC), most of the survey data entry was outsourced to professional data entry sub-contractors or completed by graduate research assistants for PEER. In all cases, data entry specialists were provided with a detailed data entry protocol and database (SPSS) template files that were already configured for the specific surveys. Responses to open-ended questions were typed into MS Word documents and analyzed separately.

Additionally, a journal was kept that documents the key junctures in the exploratory process of coming to a viable analysis strategy.

Survey analysis process findings

In short, the dose-response measurement strategy tested this year has generated defensible inferences about program effects. Refinements are certainly warranted, but overall the pilot test can be considered to have been "successful." The paragraphs that follow describe process findings for the measurement of dose at the teacher, student, and school levels.

The measurement of dose at the teacher level was the first and most intensely investigated element of the strategy to be pursued. In the first step, a data set was constructed that included educator data from three of the four PEEC programs[3]. Bivariate correlations between each of the potential dosage items (D1-D5), and program outcome indices were analyzed[4]. As new data sets became available from all PEEC programs, interpretative hypotheses were continually generated and tested on the aggregate data sets and also on individual program data sets.

Eventually, items D2 (participant estimate of overall hours of exposure to formal program elements) and D5 (amount of effort put into the program relative to other teaching activities) were excluded from subsequent analyses, due to low and / or highly variable correlations with other data. A composite dose score was then calculated by scaling the raw score for item D1[5] and averaging that result with the average of the scores for item D3 (frequency of program activities in the classroom curriculum) and item D4 (extent to which the program is embedded in the year-long curriculum). The resulting dose composite score was a number between 0 and 4.0. This dose scale score was then successfully cross-validated with various combinations of the original data set and with all new data sets as they became available.

Measurement of dose at the student level was more problematic. Many of the student survey instruments contained student versions of items D3-D5 with the intent of corroborating educator reports of program implementation. Averaging the scores on these items into a student dose variable did, indeed, reveal statistically significant correlations between dose and selected program outcomes (which were typically higher than those obtained by simply assigning students the same dose composite score as their teachers), but this approach was considered problematic on

---

[3] Administration of the educator survey from the fourth PEEC program and subsequent data entry were not yet complete. These data became available within two weeks and were immediately incorporated into the analysis.

[4] …by calculating Pearson correlation coefficients and also by systematically viewing vicariate scatter plots and frequency distributions for outliers or other confounding anomalies.

[5] Item D1 generated an estimate of the total number of hours of exposure to formal program elements. The raw scores ranged from 0 to over 500. Assigning a cumulative value of .5 for each 1/3 of a standard deviation in the raw score range generated a scale of 0-4 that is compatible with the scale of items D3 and D4.

conceptual grounds. We realized that this measure of student dose is not likely to be independent of student engagement. Students who were engaged in the program are likely to systematically remember more and / or overestimate the amount that the program was a part of the experienced curriculum. We thus settled for assigning students with the composite dose score of their teacher whenever that data was available. This raised three important implications:

1. Does it even make sense to conceptualize dose as varying among students in a given classroom? This question needs to be explored further with program staff to determine whether or not to continue efforts to find a suitable student-level dose measure other than that of the student's teacher.

2. Since student dose is determined to be rationally derived from the dose of their teacher, it becomes *essential that student and educator surveys be administered at the same time*. There were several cases in 2003-04 where this did not happen. For example, the dose-response statistical analysis could not be run for the situations in which the student surveys were administered in the spring while the educator surveys were administered in the fall.

3. It is critical that educators put their names on the surveys. Otherwise there is no way to assign a dose to students.

Perhaps the most far-reaching results of PEEC's pilot of a dose-response measurement strategy comes from looking at dose at the school level.[6] It appears that, at least for whole school change model programs within PEEC, teacher level dose begins to be superceded by a school level dose after a program has been involved with that school for a year or more. It seems that as programs become an accepted part of the school culture and norms, duration of the program at the school becomes a more accurate predictor of program outcomes for an individual participant than the individual's own teacher-level dose. This argument is discussed more fully in the PEEC 2003-04 Cross-Program Evaluation Report (PEER, 2004) and provides striking support for the educational impact model proposed by Marzano (2000, 2003) that was discussed in a previous section of this report.

The "response" side of the pilot dose-response measurement strategy findings was considerably more straightforward than the "dose" side. Only one potential challenge with using the above described indices and modules system for measuring program outcomes was found. Educator responses to many of the questions tended to be skewed toward the "agreement" side of the scale. This "ceiling effect" imposes limits on both the power of statistical analyses with this data, and relatedly, on the sensitivity of these measures to

[6] This general approach was loosely tested in the 2002-03 evaluation of CO-SEED, a program in PEEC, with inconclusive results (Powers & Duffin, 2003, p. 61).

program effects. Some suggestions for identifying and interpreting this ceiling effect are provided in the next section. One implication of skewed distributions for the dose-measurement strategy is that simple averages (means) may not accurately describe the central tendency of responses, so we have reported medians in addition to means. Another implication is that it may be advisable to explore ways of rewording many of the survey items to push the average response lower on the agreement scale.

The distribution of student responses, however, was almost perfectly normal (i.e. a bell-shaped curve) for all indices and modules across all programs. This supports a claim for a relatively high degree of instrument and/or construct validity for the student survey items.

Survey administration process findings
On-line and paper administration of surveys each have their advantages and disadvantages. Paper administration tended to work better in situations where surveys were administered at a school-wide staff meeting or in-service day. As availability and comfort with internet access increase, this advantage may slowly erode over time. Additionally, data entry for on-line survey administration becomes incrementally less expensive in terms of both time and money as each sample becomes larger than a dozen or so.

More importantly, the sample of educator and student surveys collected across PEEC was large enough in 2003-04 that continued increase in sample size will not necessarily lead to increases in statistical power or significance. This is especially true for the larger programs in PEEC (i.e. CO-SEED and CMP), and less true for the smaller programs (i.e. SSP and FFEC). With each succeeding year of evaluation efforts, a cost-benefit analysis of survey administration is likely to favor on-line administration to a randomly or purposefully sampled set of participants instead of paper administration to all participants. This does not, however, take into account the less tangible benefit of having participants fill out surveys as a way to engage them with the intended outcomes of the program.

As mentioned above, one of the primary advantages of this dose-response measurement strategy is that the measurement event can take place at any time in the program cycle for individual projects, providing all participants in each respective project are evaluated at the same time. This provides an excellent opportunity to avoid administering surveys during the end of the school year rush in April and May. We recommend that programs work to create a culture and expectation of a regular time of year (e.g. mid- or late winter) as the "survey season."

Notes for interpreting tables and graphs

The "ceiling effect" mentioned above is an example of a phenomenon that can be interpreted from the data tables presented. If responses are skewed toward the

"strongly agree" or "once a month or more" ends of the scale, the mean will be higher than the median. The mean (indicated by the letter X) is the same thing as the arithmetic average. This is the measure of central tendency that is often easier to understand since it is more common in public discourse. The median (indicated by the letter M) is the number that divides the top half of responses from the bottom half of responses.

Inferential statistics deduce mathematical patterns in a given data set and then use that pattern to predict dependent variables (marked on the vertical axis of a graph) from given independent variables (marked on the horizontal axis). In the context of this report, that translates as: 'given the responses that people actually made on these FFEC surveys, if a teacher had a given score of such and such for dose, then they would most likely to have a score of such and such for this particular index or module.' The multiple regression line on the scatterplot graphs in this report represents that statistical prediction. If the regression line slopes from lower left to upper right, it is essentially saying that the higher the dose of the program a participant has, the higher they are likely to rate themselves on the intended program outcomes. Similarly, a lower dose (e.g. dose = 0, which is equivalent to the typical "pre-test" situation), predicts that a participant will report lower scores on desirable program outcomes. Sloping lines on graphs in this report can be broadly interpreted as evidence that the program is likely to be contributing to the desired program outcomes. For clarity's sake, graphs are only shown if they meet additional tests for "statistical significance," which is a fancy way of saying that it is highly unlikely that observed results are due to chance only.

The slope of the regression line represents the strength of the effect of the program. Steeper slopes suggest stronger effects of the program. This is represented in the data tables in this report by the variable $\triangle R^2$ which is directly interpretable as "percent of variance." For example, if $\triangle R^2 = .2$ for the overall teacher practice module, that means that 20% of the variance in teacher practice can be predicted by the extent to which participants have been exposed to the PEEC program, i.e. their dose.

But what percent variance constitutes a large effect for PEEC programs? The literature review section of this report provides a couple of benchmarks for comparison. The Coleman report claimed that schooling accounted for only 10% of the variance in student achievement (Coleman et al., 1966). Marzano claims that that number is actually closer to 20%, with 13% deriving from teacher-level factors, and 7% attributable to school-level factors (Marzano, 2003). Studies asserting that motivation predicts student academic achievement show correlations (which are directly comparable to percent variance or $\triangle R^2$) values ranging from .19 to a whopping .63 (or 19% to 63%). As a final benchmark for this somewhat arcane (to the lay reader) statistic of percent variance or $\triangle R^2$, consider "Abelson's paradox"

which applies this statistical method to the everyday world of professional baseball. “The percentage of variance in any single batting performance explained by batting skill is about one third of 1%” (Abelson, 1985, p. 131). Further, and perhaps more revealing for PEEC,

> ". . . the attitude toward explained variance ought to be conditional on the degree to which the effects of the explanatory factor cumulate in practice. Some examples of potentially cumulative processes are *educational interventions*, the persuasive effects of advertising, and repeated decisions by ideologically similar policy makers. In such cases, it is quite possible that small variance contributions of independent variables in single-shot studies grossly understate the variance contribution in the long run" (*Ibid.*, p. 133, *emphasis added*).

Essentially, Abelson is arguing that small statistical effects can indicate very important outcomes in educational contexts.

Here is another illustration that may provide some context for understanding this "percent of variance accounted for" (i.e. $\triangle R^2$) statistic. We are all aware that the health care profession has been widely publicizing the dangers of our culture's expanding waistlines. Being overweight is one of the most often cited risk factors that could lead to heart attacks or other cardiovascular diseases. But being overweight is just one of many factors that contribute to any one individual's risk of cardiovascular disease. Other factors include genetic predisposition, environmental insults (e.g., pollution), access to regular healthcare, etc. The percent variance statistic provides a way to begin to understand how much influence being overweight has compared to all the other factors that can lead to heart problems. It turns out that weight status accounts for some 17-19 percent of the costs of cardiovascular disease in our country (Wang et al., 2002).

Percent variance can be helpful when you have a situation in which multiple factors contribute to a common outcome, like heart disease or education. If a person’s weight status predicts nearly a fifth of their chance of heart disease, then focusing health promotion efforts on weight status starts to seem like a high leverage activity. In terms of PEEC’s dose-response measurement strategy, if a person’s dose of a PEEC program predicts nearly a fifth of their likelihood of reporting favorable responses on survey questions that are important (like, say, use of local resources), then that PEEC program starts to seem like a high leverage activity.

This analogy even applies to how the percent variance figure is arrived at. In health care, the strategy is to first measure the actual risk of cardiovascular disease for large samples of people, then determine how widely that risk varies across individuals, and then measure how much of that total variability in risk is attributable to each of

many potential predictors, i.e. things like income, education, genetic factors, environment, and weight status. For this place-based education evaluation endeavor, the strategy is to measure (through surveys) the reported levels of desired outcomes for large samples of educators, then determine how widely those outcomes vary across individuals, and then measure how much of that total variability in response is attributable to the predictor of program dose.

In sum, if 10% (or $\triangle R^2$=.10) of a teacher's attitude or behavior as reported on a PEEC survey can be attributed to that PEEC program (especially given that there are so many other factors at play) this could defensibly be interpreted that the program is almost certainly having some noteworthy effect. Correlations of .30 (or 30%) likely represent large effects.

Closing comments on survey methods

This section closes with two important caveats. First, the number values of the dependent variables (i.e. program outcomes, on the vertical axis) shown in any graphs in this report should not be interpreted as corresponding to any direct physical reality. In actuality, they are averages of averages for groups of self-reported responses. Statistics do enable us to identify systematic patterns in the data which can be broadly connected to observed phenomena, and which can be very helpful in making important programmatic decisions. But it is not defensible to assert that a "3.5" on, say, the student academic achievement index, corresponds directly to a certain test score or any other isolatable empirical event.

Second, we encourage the reader to heed the old admonition that "correlation does not equal causation." The statistical data presented here (and in almost any other piece of social science research with statistics) are correlational. They say that one thing is more likely to be observed when another thing is also present. That is it. The notion of what constitutes "causation" has been, and continues to be, hotly debated in academic and political circles. In a recent paper, Michael Scriven, a very well-respected educational researcher / evaluator notes that, "This concept [causation] has had a stormy history, from which it has not yet emerged" (Scriven, 2004, p. 1). Generally speaking, and for program evaluation in particular, this evaluation team proposes that "validity" is in the eye of the stakeholder.

CASE STUDY: WOODSTOCK'S FORESTED CLASSROOMS

Teachers from Woodstock Union Middle School (WUMS) used their experience and training through A Forest for Every Classroom (FFEC) to develop a Forest Unit, which is now an integrated, multi-disciplinary component of the seventh grade curriculum. From the moment students begin their tenure at WUMS, they are encouraged to develop a deep connection to their home place of Woodstock, Vermont, and its natural and cultural treasures. Beginning with an early field trip to nearby Mt. Tom, which is situated within Marsh-Billings-Rockefeller National Historical Park, teachers approach the traditional content disciplines, such as math, English, global studies, and life skills through the wealth of information provided by their local public forests. As a result of FFEC participation, teachers incorporate local public lands as a valuable resource in their teaching and in their community, and their students demonstrate increased knowledge and respect for their home place and the array of life contained within.

WUMS CASE STUDY CONTEXT

As members of the Place-based Education Evaluation Collaborative (PEEC), the FFEC partners are committed to the evaluation of program outcomes and processes, and to disseminating results to the larger educational community. The case study is one way to explore and highlight outcomes of the FFEC model.

The Program: A Forest for Every Classroom

FFEC is a professional development program created by a unique partnership of organizations including The Northeast Natural Resource Center of the National Wildlife Federation (NWF), Shelburne Farms, The Green Mountain National Forest (GMNF), The Marsh-Billings-Rockefeller National Historical Park (MBRNHP), and The Conservation Study Institute (CSI). According to FFEC program literature, the goal of the program is "to foster students' understanding of place and to develop their

citizenship skills in order to inspire and enable their long-term stewardship of forests within their communities."

> *"At the heart of the FFEC program is the belief that students who are immersed in the interdisciplinary study of 'place' are more eager to learn and be involved in the stewardship of their communities and public lands.*
>
> *-CSI website*

In order to reach this goal, FFEC strives to provide teachers from a variety of backgrounds the skills and knowledge to integrate a place-based education model into their classrooms and schools. Teachers attend a series of workshops throughout the year in addition to a week-long intensive session during the summer. During this series, participants are given support in developing a place-based forestry curriculum that links them and their students to the local community. They are also treated to presentations by local and regional forestry professionals, ecologists, educators, and resource managers. This aspect of the program is well-regarded by participants. As reported in the August 1, 2002 edition of The Vermont Standard, a participating teacher remarked "they're really getting people who are experts in their fields so they're giving us content on a really high level." Please refer to Appendix for newspaper articles.

The partners in FFEC also have individual institutional goals within the larger intent of the program. For instance, the Chief of Visitor Services at MBRNHP expressed the goals of the park's participation in FFEC as two-fold. "One was to really get in touch with our local teachers, and also to encourage utilization of the local forests, not just the park but also the other resources that Vermont has to offer. It was an avenue to get the teachers into the forest." Although FFEC focuses directly on teachers, this National Park Service employee explained that

> …the ultimate goal is to reach students. This particular strategy is to reach the students through the teachers, rather than developing a program in the park ourselves and trying to run students through the park.

The School: Woodstock Union Middle School

WUMS is a regional middle school in Woodstock, Vermont that brings together seventh and eighth grade students hailing from six area elementary schools. The school is comprised of 240 students and 20 teachers in a building connected to Woodstock Union High School. The school is surrounded by open space and is in close proximity to the Ottauquechee River, MBRNHP, and the GMNF.

Due to its proximity to the National Forest and the

National Park, WUMS was a prime candidate for its teachers to participate in this professional development program. Four seventh grade teachers from WUMS participated in the FFEC year-long professional development series. Staff at MBRNHP provided resources for the teachers as well as a destination for several class-wide field trips. Following their participation in FFEC workshops, middle school teachers called upon the Windsor County Forester, as well as employees from NPS and CSI for support.

> *"Our community is blessed to have a national park and we wanted our kids to feel a strong tie to that. In terms of the purposefulness, we knew we wanted a strong relationship with Marsh-Billings."*
> *-WUMS 7th grade teacher*

WUMS CASE STUDY METHODOLOGY

Representing one segment of the FFEC evaluation for 2003-04, this case study was completed to highlight an effort of FFEC that has been considered exemplary by the program staff. It should be noted that when designing the case study, the largest emphasis was placed on understanding how teacher practice was impacted in association with the FFEC partnership. To provide a fuller picture, the case study also illustrates scenarios of how FFEC impacted the school curriculum, student learning, and community-school connections.

Details of how FFEC influenced teachers, students, their school and greater community were gathered through interviews, observations, and teacher self-reflection.

Figure W1. WUMS Case Study Data Sources

- 5 interviews with WUMS teachers
- 5 interviews with FFEC program staff
- focused group conversation with 7 students, 2 teachers, and 3 program partners
- review of related documents (lesson plans, student work, newspaper articles, etc.)
- 2 site visits to WUMS
- 1 site visit to MBRNHP
- observation of FFEC public forum held at MBRNHP

Data collection for the case study included two site visits to the Woodstock Union Middle School and another visit to the Marsh-Billings-Rockefeller National Historic Park, both in Woodstock, Vermont. Data sources for the case study included interviews and comments from five teachers, and five program partners; observation of one class session; a focus group with seven students, two teachers, and three community partners; review of related documents, including newspaper articles, FFEC fliers, associated student work, and teacher lesson plans; and, observation of a SpeakChorus performance by the 6th graders of Pomfret Elementary School.

All of the data were analyzed using qualitative methods described in the Methods section of the FFEC Evaluation Report 2003-04.

WUMS CASE STUDY FINDINGS

The data analysis exposed many significant themes associated with WUMS teachers' participation in FFEC. The main themes include:

- FFEC participation impacts teacher practice
- Forest unit promotes community connections
- FFEC teachers positively influencing other teachers
- FFEC-related challenges at WUMS

FFEC Participation Impacts Teacher Practice

A direct result of teacher participation in FFEC was the development of the Forest Unit as part of the seventh grade's fall curriculum. In planning and teaching this unit, teachers demonstrated notable changes in their practices, including bringing community members into the classroom, increased interdisciplinarity, and more frequent and effective use of local natural areas. As a result of these teacher practice changes, students demonstrated a greater appreciation and understanding of local forests, showed increased desire to learn, and made new connections in their community.

One way in which the seventh grade teachers and students had already been using the forest was by starting the school year with a field trip. The entire seventh grade celebrated the coming together of six elementary schools by taking a trip to nearby Mt. Tom, known to the students and teachers as the "Forest Frolic." The teachers expressed their desire to have the students feel like one group, given that they are together for the subsequent six years.

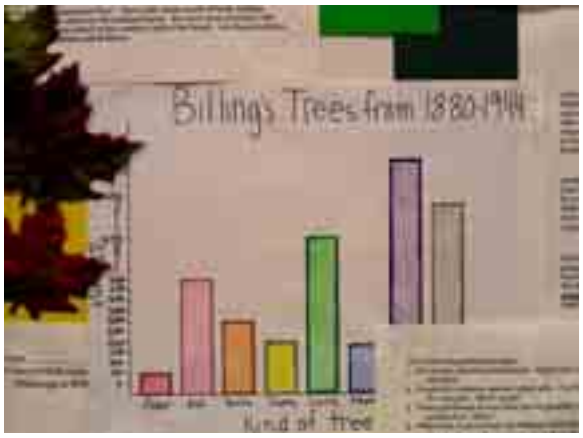
> *"What FFEC did for me specifically is to convince me to begin our 'voyage around the world' with a place-based unit of study, which focuses on our local forests."*
>
> *-WUMS seventh grade global studies teacher*

With the implementation of FFEC-inspired curriculum, students reflected back on their trip to Mt. Tom over the next four to six weeks as they became immersed in the Forest Unit. FFEC workshops and partners helped participating teachers plan and craft their individual segments of the unit. Then the entire seventh grade team, which typically includes five or six teachers, used the local forest as a springboard for teaching their lessons. (See http://www.nps.gov/csi/trends/forest.htm for curriculum overviews and sample lesson plans.) The following examples show how teachers implemented their parts of the unit, and highlight some of the notable outcomes.

Global Studies and Math Teachers Use Local Forests as Teaching Resource

One WUMS global studies teacher used FFEC to reshape her interdisciplinary unit by making it more relevant to her students. Her unit encourages students to develop a deeper understanding and appreciation of their immediate environment "through trips into the field, discussing the natural and cultural elements of their environment, nature journaling, and reading the landscape." In addition to the Appendix of this report, a segment of the unit, as well as the other teachers' units, can be found at the website for the Conservation Study Institute. http://www.nps.gov/mabi/csi/

Another teacher's participation in FFEC gave her the opportunity to transform her mathematics curriculum into a real-world analysis of forest growth and management including the mathematical complexities. According to the math teacher, many other WUMS teachers already had an element of the forest in their units, but there was none in math. The requirements of FFEC challenged her to create a forest-specific curriculum that was going to be relevant to her students and still cover the required math concepts. As she combined forest lessons with her daily math lessons, she had to spend time giving background about the forest in addition to her daily math concepts. In the short run, she had to spend three or four days to cover a lesson that would usually take only one day. In the long run, however, she noticed that the students had a deeper understanding of the math. Combining forestry with math in the context of the *local* forest as well as actually *in* the forest brought it to life for the students giving them a new perspective on the local public lands and a deeper connection with forests.



One of the math lessons involved the local deer populations and the ecology of their interaction with the local forests. "It hooked all the kids that don't like math. We talked about deer hunting, deer populations, carrying capacity and sustainable deer herds," explained the math teacher. The students in her intermediate math class used the information she downloaded from the state of Vermont's website and created line graphs showing deer populations over a period of time. "They had to make historic connections with the material. It was a nice way to draw in the kids who struggled with the math content, but liked the connections we were making." Some of the questions the math students sought to answer included:

> *"This was one of the best professional development opportunities I have had. It was tough, they expected a lot from us."*
> *-WUMS seventh grade math teacher*

- *How do you take raw data and interpret it?*
- *What does this graph tell you?*
- *What happened to the deer population over time?*

The students showed a renewed interest in math as well. The math teacher reported, "They said they liked working with real data. There is no math book that teaches about our local forest, we created our own book. There was a lot of ownership there." One idea the math teacher hopes her students will walk away with is that they "…can't understand the forest without being a mathematician." Although her students had never made connections like these in other math classes, they saw the relevance. One student remarked, "We practiced finding the height of trees using the Biltmore Stick. I was surprised at first to be doing it, but math is measuring."

> *"There is no math book that teaches about our local forest, we created our own book. There was a lot of ownership there."*
>
> *-WUMS seventh grade math teacher*

During another lesson, math students collected data from within the forests at Marsh-Billings-Rockefeller National Historic Park. Using the data, the students created frequency tables, bar graphs, line graphs and histograms. Many students then used their "exploratory" period to design and market "Carriage Trail Mix." The diversity of the contents of the snack mix was based on the tree species' composition and basal areas of the forest at the park. According to the label for the trail mix designed by the middle school students, "money raised from the trail mix will be donated to a local non-profit organization working on forest-related issues." Creating the trail mix allowed the students another chance to interact with the community as they visited the Woodstock Cookie Company to look at how to run a small business, and to host a visit from a local businessman who shared insights on packaging.

Other Team Teachers Connect to the Community

Other teachers also expanded their current curriculum units to form a cohesive thread with the math and global studies teachers. The seventh and eighth grade life skills teacher involved the forest by expanding on an existing unit involving quilt-making. The activities in her class, as part of the Forest Unit, have students collecting items from their natural surroundings to make dyes and provide inspiration for the quilt designs. The FFEC program gave the teacher a way to tie it all together. She reported that FFEC inspired her to invite

> *"My own learning about the program has encouraged me to participate in the program in the future when I can. The perspective they brought in terms of what Mt. Tom and the historical park mean to this community made it more important to me to teach the kids how much to appreciate what they have right here in their backyards."*
>
> *-Non-FFEC-participating WUMS seventh grade Teacher describing the impact FFEC teachers have had on her*

community members to interact with and provide guidance to students during the project.

Furthermore, the team's physical education teacher who also participated in FFEC expanded upon an existing orienteering program, including taking students out to the MBRNHP. With his FFEC unit students explore the forested landscape while exercising, learning map and compass skills, and meeting community resource people.

The seventh grade team now has a coherent forest unit in their fall curriculum. Every subject has projects and lessons that correspond with the overall forest theme. The 7th grade teachers' participation in FFEC has given the new Forest Unit momentum and a sense of ownership. Please refer to the Appendix for FFEC-related curriculum pieces.

Forest Unit Promotes Community Connections

The methods chosen by the seventh grade teachers to bring the local forests into the classroom allowed the students to meet and interact with members of the community they might not have the opportunity to meet otherwise. Many of the contacts the teachers used in their respective segments of the Forest Unit were first initiated during the FFEC workshops. Others were initiated solely by the teachers themselves.

During the Forest Unit, students from one global studies class visited a local maple sugaring operation as well as a local furniture maker. According to the teacher, these kinds of experiences have "helped our students see their connection to the larger community." The global studies teacher tries to get her students to learn about the world through a local lens. She added, "In this way, they will see how people world wide, in their very diverse environments, care for their places as well."

> *"We are really supportive of programs like this because the most effective way to get to the kids is to train the teachers to use us a resource. Knowing that these teachers were going through this program made me more excited about showing the kids something about measuring trees because I knew they were going to use it again."*
>
> *-Windsor County Forester*

A central theme to the math segment of the Forest Unit is to

learn "how and why foresters count trees." To help the students understand the importance of this procedure, the Windsor County Forester, along with National Park managers, "conducted workshops and guided students through their culminating activity, a circle sweep plot at Marsh-Billings-Rockefeller National Historical Park." One math student reflected on this activity by stating that counting trees is important "in case there is disease, you want to know which ones are affected more than others."

> *"In order for our students to appreciate, understand, and care about the larger world, they must build their knowledge and develop a connectedness for their own place-their home."*
> *-WUMS seventh grade global studies teacher*

This aspect of place-based education helps form a valuable bond not only between the school and the greater community, but also with the local natural communities. As one student commented, "We hiked through the forest and looked at the trees and say 'Wow, they're big' but I never really analyzed it and thought about what type of tree it is and how important it is to the health of the forest. Now I know a lot more."

The emphasis placed on building community connections by the WUMS seventh grade teachers encouraged their students to consider new perspectives and appreciate the connection between the greater Woodstock community and the local forests.

FFEC Teachers Positively Influencing Other Teachers

The seventh grade teachers who participated in FFEC brought many new ideas to their teaching team and encouraged the use of their natural surroundings as a teaching resource. The growth of fellow team teachers through the program and the potential for middle school students to learn about their home place has impressed other WUMS teachers. The Forest Unit experience can only become more significant as more seventh grade teachers participate in future FFEC teacher programs.

According to the program coordinator at Shelburne Farms, the program is about to enter its fourth year in operation and connect to its third cohort of teachers. Because FFEC makes such a heavy investment in each participating teacher, the partners realized that careful screening of FFEC participants prior to the series is critical to attaining program goals. In this case, one indication that these teachers were a good fit for the program was that their influence spread to other teachers who did not participate directly in FFEC.

> *"We looked at the forest and how important it is to our world and our survival. It is pretty important to me because living in Vermont we have forest all over the state so it is important to learn more about them."*
> *-WUMS 7th grade student*

One seventh grade teacher who did not participate in the FFEC series tried to bring elements of local forests to her students as well. She described the significant impact of the Forest Unit in creating a thread between the elementary and middle schools:

> I think it reinforces what the kids are already doing in many of our district schools. The elementary schools are already developing a sense of place for these kids, and I think it reinforces that. So when they come [to WUMS], they know it is still true here.

A new member of the seventh grade team this year has already signed up to participate in FFEC's next cohort. Both of these non-FFEC teachers were committed to the foundations of the seventh grade Forest Unit, but admitted that the unit will be even stronger once the whole teaching team has participated in FFEC.

Figure W2. A Conversation about Public Forested Lands

The following conversation depicts an interaction between students, teachers and NPS staff, illustrating a compelling educational dynamic inspired by FFEC. On an April afternoon, several students, teachers and NPS employees gathered and offered their reflections on the Forest Unit and the use of public lands. The superintendent at the MBRNHP presented the students with a scenario to prompt their thoughts on student involvement in a forest management plan. He stated:

> *All these trees, we see them today. We think it is like seeing a building. It's there and will always be there. But they are like people. They grow and they also die. If we went into the future 200 years from now, 2204, what would we see? The same place? Or a different place? Our challenge is to ask what are we doing today that will create what we see in 200 years?*

Many of the students had thoughts about the scenario. One student suggested that we should encourage a greater variety of trees, "I would like to see the same number of trees, but maybe more diversity."

The superintendent of MBRNHP returned, "What about the big trees?"

Another student offered, "They should chop down some of the big trees to let sunlight in to the small trees, but keep some of the big trees to create a roof."

The teachers and park employees smiled at each other as the students realized that they had just described a forest management plan. The superintendent added, "If we were to say that your class has responsibility for an acre of Mt. Tom, and it would be your decision for what it would look like two hundred years from now, how would you go about managing it?"

The students lit up momentarily at the proposal. One student responded, "I would decide what has to be done. We could look at the other acres and see what should be there."

Another student offered, "We could count the trees and look at their ages." Yet another suggested that it would best to "…conduct a wildlife inventory and look at the soils."

The students' quick responses were evidence of the impact the Forest Unit had on their ability to think clearly about complex issue such as forest management.

FFEC-Related Challenges at WUMS

The FFEC teachers reported that the most challenging aspects of integrating FFEC ideas into the curriculum were:

- Logistics of bringing students to the nearby park
- Incorporating service learning components
- Utilizing FFEC ideas with advanced classes

Logistics of bringing students to the nearby park

The WUMS teachers reported that their most challenging moments using their FFEC lessons came while trying to bring their students to the National Park. One seventh grade teacher pointed out, "The biggest problem was moving the 100+ kids around. Even though the bus ride is only 15 minutes, it was a lot of work, lots of back up plans, and lots of chaperones." Other teachers, including non-FFEC teachers, also pointed to the field trips to the park as the most a challenging aspect of implementing the Forest Unit. "I would definitely take them up to the park much more if it were easier to get over there," one teacher reported.

Integrating Service Learning Components

Given that FFEC is rooted in place-based education and civic engagement, FFEC partners strive to emphasize the service learning component of FFEC. Another less obvious challenge associated with the large number of students moving through the seventh grade curriculum is trying to create a service learning component that can engage every student.

Several of the seventh grade teachers explained that they struggled with integrating the service learning component of the Forest Unit. "The service learning component was very difficult to get done, especially if we wanted every kid to have a similar experience," one teacher reported.

> *"Place-based education builds so strongly on the idea that the learning can be community-based and reciprocal with the community. We are trying to promote that."*
>
> *-Program Coordinator at Shelburne Farms*

According to the WUMS math teacher, valuable class time, which was already stretched to incorporate the forest perspectives, is not available to continue working with service learning projects, such as the "Carriage Trail

Mix." So far, the school's "exploratory period," which allows students to chose an activity to pursue for one period every Wednesday, has been the best available time to offer this service learning activity. Similarly, in the life skills class, students can choose a different "exploratory" to determine to whom the student-made quilt will be donated and to experiment with other quilt-making methods used by local quilters. Thus, not every student will choose the exploratory linked to FFEC service learning work, so only a self-selected group participates in the service learning element.

The service learning component of the FFEC model is an aspect that the teachers and program staff hope to expand in the coming years. Program staff indicated that the service learning component is a focus for the next group of teachers. The program coordinator at Shelburne Farms commented, "We will be trying to demystify service learning in FFEC4 and keep it on the front of teachers' minds."

> *"An area we have yet to fully expand and meaningfully incorporate in our Forest Unit is a community service component. I do think this will be a focus for the next group of teachers from our 7th grade team to enroll in the FFEC program."*
>
> *-WUMS 7th grade teacher*

Honors Level Classes

On a more individual level, the seventh grade math teacher was able to use the forest-based math model in her intermediate level classes only. The time needed to address the background forest material would not allow the advanced classes to cover all the math concepts required. Since she decided when and how to combine math with local forest perspectives, a seventh grade teacher reflected, "It's hard, you can't do it all the time."

In spite of the challenges of bringing a large number of students to the park, incorporating a service learning component for every student, and using FFEC in honors level classes, implementation of the WUMS Forest Unit was a notable success.

WUMS CASE STUDY CONCLUSIONS

In light of the intended outcomes of the FFEC program, as indicated in the FFEC Logic Model, this case study shows that:

- WUMS teachers pointed to the program as a challenging and worthwhile professional development endeavor.
- Participating teachers indicated their teaching practice was influenced.
- There was a spread of effect as other WUMS teachers plan on participating in future FFEC programs.

- The teacher-team framework at WUMS allows for interdisciplinary curriculum units, such as the Forest Unit, to be most effective, especially when multiple teachers from one team are involved in FFEC.

- The FFEC program gave WUMS teachers the tools to integrate the local forest into the traditional content areas.

- WUMS teachers are challenged by time to incorporate local forest perspectives in addition to the traditional content.

- WUMS teachers are challenged to involve every student in a service learning project.

- The FFEC program provided WUMS teachers with community contacts useful to their teaching practice.

> *"I know our students are walking away from their 7th grade experience having a deep appreciation for their own environment and the intrinsic value of public lands for all. They understand our responsibility to be stewards of our land, and not just users of it."*
>
> *-WUMS 7th grade teacher*

- Involving community members with school projects strengthens community-school connections and provides students with different perspectives.

- WUMS students gained knowledge about and greater appreciation for public lands and their local forests.

- Students demonstrated increased interest in learning traditional content in the context of their home place.

WUMS CASE STUDY IMPLICATIONS FOR PRACTICE

The data collected in the case study reveals several themes which are detailed above. The implications and details of these themes have an impact on the future of FFEC programs. Items of significance include:

- The success of the FFEC participants from WUMS can be attributed to many factors, including FFEC's solid foundation as a program, the proximity to MBRNHP and GMNF, as well as the creativity, experience and energy of the WUMS teachers. Yet another factor contributing to their success seemed to be the added resilience that resulted from their participation in FFEC as a group. Given that those who participated in FFEC are among the more experienced teachers within their team, their influence in spreading the concepts and practice of place-based education seemed to be strong. Not only were other teachers willing and

able to blend their work into the Forest Unit, but one or more team members who had not already participated in the program planned to do so in the future. **To encourage the type of success found in the WUMS case, FFEC should continue to encourage teaching teams to participate in future FFEC programs. If it is not logistically feasible for whole teams to participate in a given cycle, FFEC could encourage team members to participate in successive years. Furthermore, FFEC staff should continue to make alumni events open to FFEC participants and their peers, thus broadening the base of learning and support within teaching teams.**

- By utilizing local resources, including visits from guest speakers and visits to special places, teachers allow students to understand that learning can also take place outside of the classroom. By showing how local resource managers, scientists, and businesses consider and care for the natural resources of the area, students see that their present and future decisions will impact how forests look and function. **FFEC programs should continue to encourage teachers to use community members in various ways as teaching resources.**

- The service learning component of the FFEC model proved to be the most challenging aspect for the teachers to implement. The "exploratory" periods offered at WUMS are a great opportunity for students to continue working on a chosen project. **FFEC partners should work with teachers and teaching teams to examine alternative approaches for getting students involved in service-learning activities beyond the individual classroom.**

- In accordance with recommendations from earlier studies, **FFEC partners should continue to provide enhanced instruction in, and support for, service learning practices within the program. The partners should also continue to express recognition of barriers faced by many teachers attempting community-based projects and provide realistic suggestions for pursuing practical service learning opportunities.**

CASE STUDY: THE RAY SCHOOL'S OUTDOOR CURRICULUM

Teachers from the Bernice A. Ray School (Ray School) have recently adopted a cohesive, place-based science curriculum for their Hanover, New Hampshire elementary school. Further, the second grade teaching team has begun to implement a local forest theme for their segment of the new curriculum. The effort to enhance the curriculum was supported in part by the participation of one Ray School second grade teacher in A Forest for Every Classroom (FFEC), a year-long professional development program. Additional influence came from the participation of half the school's faculty in a FFEC summer workshop which was held at the Ray School to encourage their use of the natural surroundings as a teaching resource base in the science curriculum. Students and teachers of the Ray School have started to discover the learning opportunities of local forests through a curriculum platform inspired by the 32-acre forest adjacent to the school. Teachers anticipate that the use of the local forest as a teaching resource will develop over time as Ray School teachers and students gradually embrace the outdoor classroom.

RAY SCHOOL CASE STUDY CONTEXT

As members of the Place-based Education Evaluation Collaborative (PEEC), the FFEC partners are committed to the evaluation of program outcomes and processes, and to disseminating results to the larger educational community. The case study is one way to explore and highlight outcomes of the FFEC model.

The Program: A Forest for Every Classroom

FFEC is a professional development program orchestrated by a unique partnership of organizations including the Northeast Natural Resource Center of the National Wildlife Federation (NWF), Shelburne Farms, the Green Mountain National Forest (GMNF), the Marsh-Billings-Rockefeller National Historical Park (MBRNHP), and the Conservation Study Institute (CSI). According to FFEC program literature, the goal of the program is

"to foster students' understanding of place and to develop their citizenship skills in order to inspire and enable their long-term stewardship of forests within their communities."

In order to reach this goal, FFEC strives to provide teachers from a variety of backgrounds the skills and knowledge to integrate a place-based education model into their classrooms and schools. Teachers attend a series of workshops throughout the year in addition to a week long intensive session during the summer. During this series, participants are given support in developing a place-based forest unit that links them and their students to the local community. They also experience extensive field studies with local and regional forestry professionals, ecologists, educators, and resource managers. This aspect of the program is well-regarded by participants. As reported in the August 1, 2002 edition of The Vermont Standard (see Appendix), a participating teacher remarked "they're really getting people who are experts in their fields so they're giving us content on a really high level."

> *"If we implement comprehensive educator professional development on place-based and citizenship education, people (including youth) will contribute to the stewardship of public lands and communities."*
>
> *-FFEC Logic Model*

The CSI website aptly captures the spirit of place-based education in general and the FFEC endeavor in particular: "At the heart of the FFEC program is the belief that students who are immersed in the interdisciplinary study of 'place' are more eager to learn and be involved in the stewardship of their communities and public lands."

The School: Bernice A. Ray School

The Ray School is an elementary school (grades K through 5) in Hanover, New Hampshire. The school is comprised of approximately 500 students and 30 teachers within a 32-acre complex that is approximately 75% forested. One Ray School second grade teacher participated in the year-long FFEC professional development program. Following the year-long program, the FFEC program staff, by way of a special grant, held a four-day workshop during the summer at the Ray School with half the school's faculty, including their science curriculum committee. The summer workshop sought to emphasize the fundamentals of place-based education and focus the teachers on the ideals of connecting to their schoolyard habitats using the vast forest adjacent to the school as a teaching and learning medium.

> *"The Ray School is blessed to have a forest on their school site, and also a supportive administration."*
>
> *-FFEC program staff*

Due to its proximity to accessible forests, the Ray School was a prime candidate for participation in this professional development program. Although only one Ray School teacher participated in the FFEC year-long professional development series, her leadership and enthusiasm for the using the local forest as a teaching and learning resource was enough to influence a

change in the science curriculum for not only the second grade, but the whole school. Please refer to the Appendix for a map of the school grounds.

RAY SCHOOL CASE STUDY METHODOLOGY

Representing one segment of the FFEC evaluation for 2003-04, this case study was completed to highlight an effort of FFEC that has been considered exemplary by the program staff. It should be noted that when designing the case study, the largest emphasis was placed on understanding how teacher practice was impacted in association with the FFEC partnership. To provide a fuller picture, the case study will also illustrate scenarios of how FFEC impacted the following:

- the school's science curriculum
- student learning
- community-school connections

Details of how FFEC influenced teachers, students, their school and greater community were gathered through interviews, observations, and teacher self-reflection.
Data collection for the case study included two site visits to the Bernice A. Ray School in Hanover, New Hampshire. Data sources for the case study included interviews and comments from six teachers, three program partners, and one community partner; observation of two class sessions; and a review of related documents, including FFEC program materials, associated student work, and curriculum plans.

Figure R1. Ray School Case Study Data Sources

- 6 interviews with Ray School teachers
- 3 interviews with FFEC program staff
- 1 interview with a Ray School community partner
- review of related documents (lesson plans, student work, FFEC program materials)
- 2 site visits to the Ray School
- observation of 2 class sessions
- observation of FFEC public forum held at MBRNHP

All of the data were analyzed using qualitative methods described in the Methods section of the FFEC Evaluation Report 2003-04.

RAY SCHOOL CASE STUDY FINDINGS

The data analysis exposed many significant themes associated with the second grade teacher's participation in the year-long FFEC program and elements of the faculty's participation in the FFEC summer workshop. The main themes include:

- Development of place-based science curriculum influencing teacher practice

- Public lands used as a teaching and community resource
- Many factors influence school change
- FFEC-related challenges

Development of Place-Based Science Curriculum Influencing Teacher Practice

The direct result of one second grade teacher's participation in FFEC was the development of a place-based science curriculum for the Ray School which embodies an approach to using local natural and human resources, a fundamental aspect of the FFEC program. The new science curriculum strives to utilize the forest adjacent to the school as a teaching and learning resource by assigning each grade a theme to which teachers can connect their lessons and units. The second grade, for example, will incorporate a "Forest" theme in their curriculum. Refer to the table below and the Appendix for the Ray School science curriculum matrix.

Figure R2. Summary of the New Ray School Science Curriculum

Grade Level	K-1st	2nd	3rd	4th	5th
Habitat Theme	Meadow	Forest	Vernal Pool	Stream	River / Wetland

In addition to the influence of the year-long FFEC program, a summer FFEC workshop held at the Ray School offered support to the school's faculty to help facilitate the change in curriculum. This multi-day event was initiated by the FFEC participant who teaches second grade at the school.

Subsequent to planning and implementing this enhanced curriculum, teachers described changes in their teaching practices, including an inspiration to teach outside the classroom, increased interdisciplinarity, and more frequent and effective use of local natural areas. One Ray School teacher reported, "Using the outdoors as a teaching and learning resource was previously only done by teacher choice. Now it is a school plan."

Teachers also reported that as a result of these teacher practice changes and curriculum changes, students demonstrated a greater appreciation and understanding of local forests and showed increased desire to learn about the local forests.

Second Grade Forest Curriculum

Within the new place-based theme of the school's science curriculum, the second grade teachers are focusing on the Forest as a springboard to connect the students to the local outdoors. Prior to the Forest theme, the second grade teachers did not have a common thread with which to connect their curriculum units. One second grade teacher reported, "Within our common forest theme, we have developed the outside classroom and it has developed to be something that is effective." The teacher added,

> In years past, we would actually try to go outside, but we found that the kids weren't really focused on what we wanted them to focus on. They didn't really have an investment, but now that they know we have established a connection with our forest as a place to learn from, they have taken on some ownership of the experience. It's no longer playground time, it is time to explore and learn.

By connecting each grade with an aspect of their natural surroundings, such as the forest in the second grade, the new place-based science curriculum allows students and teachers to build on the previous year. Additionally, teachers can connect their lessons and units to the appropriate theme of the grade. Please refer to the Appendix for examples of student work associated with the second grade Forest theme.

FFEC Summer Workshop at the Ray School

A FFEC-sponsored summer workshop at the Ray School further encouraged the development of the new science curriculum and gave the teachers tools to make the changes happen. Following the year-long FFEC program, the participating Ray School teacher encouraged the FFEC program staff to make a special visit to the school. She wanted her fellow teachers to experience the breadth and depth of place-based education presented by the FEEC staff. A FFEC program staff member commented on the Ray School teacher's influence in bringing the summer workshop to Hanover:

> The summer workshop was a direct result of her participation in FFEC. She sensed there was strong support there from the partners and that it could meet the needs of her school's teachers. Her goal was to pull in the people she had met through FFEC and to continue a little deeper what we were driving at within the FFEC program. She knew us. She knew the quality of the content and the message we were striving for. It fit exactly with where her school was at. It was just a natural link.

The FFEC summer workshop contributed to the idea of using the adjacent forest as a teaching and learning resource and it helped many of the teachers invest in the opportunity to enhance the curriculum as a team. One Ray School teacher said, "It was important for us as a team to start collaborating and start to informally look at each other's strengths and feed off of that." Another teacher commented, "We were ready as a school to embrace the habitats in our backyards."

> *"I am working to help my students probe deeper into their questions about the forest."*
> *-Ray School second grade teacher*

One Ray School teacher commented on the summer workshop, "In general, it was really helpful to have it as a resource for those of us who needed some coaxing to get into the forest. It helped us develop lessons and resources that make our units more meaningful."

The FFEC summer workshop proved to be a valuable experience for many of the participating teachers as they prepared to make the shift to a place-based science curriculum.

FFEC Teacher Positively Influencing Other Teachers

The spread of FFEC-inspired ideas and lessons by the participating second grade teacher has had the greatest impact on other second grade teachers within the Ray School. As the confidence to teach outdoors builds in years to come, impacts will certainly be felt in other grades as well.

> *"We are looking for teachers who are motivated, inspired, and equipped to teach outside of the classroom. Whatever their discipline is, they would teach through their own forested landscape and their community. That is the expectation."*
> *- Shelburne Farms Program Coordinator*

The second grade teacher who participated in FFEC brought many innovative ideas to her second grade teaching team. Her natural science background had always encouraged her to involve the outdoors in her teaching, but the FFEC model helped her to bring it back to her second grade teaching colleagues and her school. She said, "There are so many different ways of going about the implementation part. That's where FFEC has helped me to bring such a broad concept to this setting." She also described the value of the FFEC network:

> FFEC gave me the peers on a professional level outside my school to recharge and to update my knowledge and content and gave me some connections with other teachers. It was that link in that course that gave me the push to get the science committee to commit to the outdoor-focused curriculum.

The process of altering the curriculum to involve more outdoor lessons required assistance from the FFEC participating teacher. Other teachers, especially other second

grade teachers, looked to her for physical and philosophical leadership. She encouraged the use of outdoor lessons by means of the local forest with lesson plans as a general strategy for making the transition. One second grade teacher reported, "From day one, it was planned. We focused on what we were going to do to start to build a sense of place and build the foundation for an outside classroom."

Another second grade teacher commented on the influence on her teaching practice and that of others:

> Our teacher practices have changed. All of the second grade teachers are getting outside, and our students are benefiting. I think the goal this year was simply to get outside and get more comfortable being outside with our classes. Many of us feel we could do better with content when we're outside, but we realize that this is a building year. Next year, we'll feel more equipped to get out there and do more substantive activities.

According to the program coordinator at Shelburne Farms, the program is about to enter its fourth year in operation and connect to its third cohort of teachers. Because FFEC makes such a heavy investment in each participating teacher, the partners realized that careful screening of FFEC participants prior to the series is critical to attaining program goals. In this case, one indication that the participating teacher was a good fit for the program was that her enthusiasm for using the local forest as a resource spread to other teachers who did not participate directly in the year-long FFEC program.

Public Lands Used as a Teaching and Community Resource

The forest that surrounds the Ray School is public land that represents a substantial learning and teaching resource to the school as well as the greater Hanover, New Hampshire community. The Ray School teachers have begun to further utilize the forest as an outdoor classroom, while the partnership between the Hanover Conservation Council (HCC) and the Ray School encourages members of the Hanover community to recognize the forest as well.

Using the Forest as an Outdoor Classroom

The main change to teacher practice as a result of the FFEC influence on the Ray School was the development of the outdoor classroom. Many teachers reported the need to further develop their skills to teach effectively outdoors, but the process has begun nonetheless. As a result of her colleague's participation in FFEC, a second grade teacher reported, "We have been energized to do more in the area of backyard science because we realize that we CAN!"

> *"My attitude about going outside has certainly changed. I just feel so much more comfortable with the classroom management scene. It is difficult to be productive out there."*
> *-Ray School second grade teacher*

In addition to the teacher practice changes, teachers reported differences in student motivation as well. One Ray School teacher pointed to the increased investment in and ownership of the learning experience her students have shown with the forest-based curriculum. She shared one example:

> I noticed after spending a class making nature sculptures in a section of the forest, I heard students talking about coming back on the weekends with their parents to continue to create their sculptures. It was a great way for parents to see what's in our backyard because they don't really know.

This example also points to the potential connections the outdoor-based curriculum can encourage between parents and their child's education. One teacher commented, "It is still too early to tell the effects and have a good look at what this can be. We are still developing. By next year, we plan to have more parent volunteers helping us too."

> *"My class has had a blast this year, and we have made some amazing unplanned discoveries: bear scat, fox tracks, evidence of deer browsing, and some amazing stuff in a rotting log."*
> *-Ray School second grade teacher*

The implementation of the place-based science curriculum at the Ray School has encouraged many of the school's teachers to use the outdoor classroom and develop a complementary teaching style for that setting.

Partnership Strengthens School-Community Connections

From a partnership forged by the FFEC second grade teacher, the Hanover Conservation Commission and the Ray School are working together to raise public awareness of the ecological treasures located in the Ray School forest. Additionally, the HCC is providing additional support to the Ray School teachers as they enhance the school's science curriculum.

The HCC is connected directly to the school as several of the commission members are also parents of Ray School students. One member of the HCC reported, "We have tried to

provide support to the teachers as they have tried to change their curriculum to be more outdoor-based. We spearheaded an inventory of their natural area behind the school."

Additionally, the HCC can provide additional expert resources for the Ray School teachers. A member of the HCC pointed to the connections the organization offers. She said,

> …we have strong links with Dartmouth College, especially their Biology and Environmental Studies Departments. I can say to my organization, 'The Ray School really needs some help right now with vernal pools in the third grade.' So we can get a professor or a graduate student to go talk to them about that. It is these informal ties that I think are so valuable.

The connection with the Ray School is consistent with the goals of the HCC. One HCC member reported,

> We are trying to grow the next generation of conservation-minded people, so we have real self-interest. We are hoping these families look at the personal choices they make based on what they may have learned at school and how that translates to their backyard.

The partnership between the HCC and the Ray School offers resources to the Ray School teachers as well as an avenue to involve community members in the education of the community's children.

Many Factors Influence School Change

A variety of positive factors encouraged the successful implementation of FFEC-related ideas and the drive to incorporate the local forest in the science curriculum at Ray School. Some of the positive influences at the Ray School include:

- A supportive school administration
- Critical Friend Groups (teacher team support)
- FFEC teacher's natural science background
- FFEC teacher's relevant sabbatical
- 32 acre public forest adjacent to school
- Partnership with Hanover Conservation Council
- FFEC Summer Workshop at the school

The teachers at the Ray School all pointed to these factors as positive influences in the curriculum change. One of the more unique features of Ray School is the support teaching teams provide to each other through critical friend groups (CFGs). Brought to the school by the principal, CFGs offer teachers a place to offer support and feedback to

each other. According to one Ray School teacher, "CFGs are a place to review lessons, revise those lessons, and talk about what worked and what didn't work."

Another Ray School teacher reported, "In one way it brought much more work because we have to take ownership for change." One CFG in the second grade focused on enhancing the science curriculum by using the adjacent forest as a teaching resource. The members of the CFG focused on making the change happen. The place-based curriculum idea was originally brought to the table four years ago, but according to the second grade FFEC teacher, "There wasn't enough team support to make it happen." The increased support provided by the CFGs contributed significantly to the implementation of the new curriculum.

In addition to CFGs, the place-based science curriculum has benefited from a variety of influences that have encouraged teachers to use the adjacent forest as a teaching and learning resource.

FFEC Model Can Present Challenges

The main challenges cited by the Ray School teachers while developing and implementing FFEC-influenced changes in the curriculum include:

- finding time to create new lesson plans
- devoting time to the science curriculum
- adjusting to the use of the outdoors as a classroom.

By implementing a science curriculum enhanced by the local forest, the teachers have had to create new lesson plans that directly engage their students with the forest while simultaneously making adjustments in the other content disciplines as well. According to one second grade teacher, there have been many other initiatives besides the change in the science curriculum. The teacher commented, "We have a ton of initiatives right now. We have a spelling initiative, a reading initiative, and a math initiative. In the second grade, everything we are teaching is new in the last year or two."

An additional challenge reported by the second grade teacher was the attention the other content disciplines receive. She said, "Science at the elementary levels is hard because most teachers have backgrounds in language arts and mathematics. Science usually doesn't get the attention."

"Science at the elementary levels is hard because most teachers have backgrounds in language arts and mathematics. Science usually doesn't get the attention."
-Ray School second grade teacher

Another challenge cited by the Ray School teachers was changing their teaching styles to involve the outdoor classroom. Although the teachers admit to having plenty of room to improve, they are making strides in advancing their outdoor teaching skills. One teacher

reported, "We have done a lot of helping ourselves become comfortable with the outdoor classroom. We have done sensory awareness, adopting trees, and studying the animals that live there."

The biggest challenge in developing the outdoor classroom is building an outdoor ethic in students. One teacher commented, "You have to generate and build those rules early, including the expectation that the outdoors is not playground time. It is our classroom time." Another teacher reported, "Building the foundation in second grade is as simple as knowing not to run and use loud voices so that you don't disturb what else is there in the forest."

Creating new lesson plans, devoting time to science, and adjusting to an outdoor classroom style have been challenges, but Ray School teachers report that they have also proved to be rewarding to their students and themselves.

RAY SCHOOL CASE STUDY CONCLUSIONS

In light of the intended outcomes of the FFEC program, as indicated in the FFEC Logic Model, this case study shows that:

- Feedback from the FFEC-participating teacher pointed to the program as a challenging and worthwhile professional development endeavor.

- Ray School teachers, including those who did not directly participate in FFEC, indicated their teaching practice was positively influenced.

- The teacher-team support framework at Ray School, including the critical friend groups, allowed for teachers to exchange lesson ideas and provide useful feedback to further develop the use of the natural surroundings as a teaching and learning medium.

- The FFEC program gave the participating second grade teacher the tools, including confidence and leadership skills, to integrate the local forest into the traditional content areas.

> *"I truly believe that as a kids goes through K-5 in this school, they will come out with a good basic sense of their place, the skill to understand another place, and a stewardship ethic, which is the ultimate goal."*
>
> *-Ray School second grade teacher*

- Ray School teachers are challenged by time to design new lessons that include forest study in addition to traditional content.

- The FFEC summer workshop provided Ray School teachers with lesson ideas and techniques for developing the outdoor classroom ethic.

- Ray School students showed increased engagement by learning through the context of their local forest.

- Students demonstrated increased interest in learning traditional content in the context of their home place.

RAY SCHOOL CASE STUDY: IMPLICATIONS FOR PRACTICE

The data collected in the case study reveals several themes, which are detailed in the "Findings" Section of this case study. The implications and details of these themes may have an impact on future FFEC programs. Items of significance include:

- FFEC-related successes at the Ray School were heightened by the existence of other positive influences within the school. Even though only one Ray School teacher participated in the year-long FFEC program, other components, including a positive administrative infrastructure, the FFEC summer workshop, and an adjacent forest, all supported the enhancement of the school's science curriculum. **Future FFEC programs could encourage participants to explicitly identify and cultivate other supporting factors within their schools that would encourage the implementation of FFEC-related lessons and curricula.**

- A school with an adjacent forest, such as the Ray School, may be more inclined to use the forest as a teaching and learning resource. The proximity to the forest makes it easier for the teachers to bring their students outdoors and allows for a gradual transition to the use of the outdoors as a classroom. Additionally, a permanent forest connected to the school grounds encourages the involvement of parents, since they can visit the forest when they visit the school. **FFEC could encourage participants from the start of their involvement with FFEC to plan to utilize a specific nearby public forest while implementing FFEC-related ideas. This may include screening participants from the start of the program, recognizing that those without this physical resource may not be able to fulfill FFEC goals.**

CASE STUDY: THE FOREST FOR EVERY CLASSROOM PARTNERSHIP

PARTNERSHIP CASE STUDY CONTEXT

The FFEC partnership, consisting of the Marsh Billings Rockefeller National Historical Park (MBRNHP), The Conservation Study Institute (CSI), the Green Mountain National Forest (GMNF), Shelburne Farms and the Northeast Natural Resource Center of the National Wildlife Federation (NWF), is a unique gathering of partners delivering a professional development program. The partnership unites governmental and non-governmental organizations, representing the public and private sectors. The organizations represent local, regional and national territories, audiences and organizational networks. This combination offers the project a variety of perspectives, modes of operation, sources of funding and means of dissemination.

> *"When you're talking about resource management issues that are associated with a project like this they can become polarized. If it's one organization offering information on a certain issue there can be associations with that agency, but a collaboration between such diverse organizations allows for a greater degree of public openness and comfort in how issues are presented."*
>
> *-MBRNHP Resource Manager*

Given this unique assemblage, there is much to be learned from how the partnership functions and what effects it has had. One of the goals of the FFEC partnership is to disseminate its program to broader audiences. As such, the partners and evaluation team chose to conduct a case study to gain a more in depth understanding of how the partnership functions, how partner organizations benefit from participation and how a program can be improved by having multiple organizations involved in its creation, implementation and evolution.

In FFEC's first year of comprehensive evaluation, a perfunctory investigation of the strengths and challenges of the partnership itself was conducted. In this, the second year, a case study was designed to build on these findings and investigate the nature of the partnership in more depth.

PARTNERSHIP CASE STUDY METHODOLOGY

Several questions were identified as areas of focus for the case study:

Primary Questions:

1. How are FFEC partners—individuals and organizations--changing the ways in which they operate as a result of involvement in FFEC?

This question focuses on several sub-questions:

- Have the organizations' capacities been enhanced by participation in the partnership?
- What do agencies learn from each other?
- Did participation in the partnership contribute to organizational change?
- What do large organizations learn from working with smaller ones and vice versa?
- What is gained from the collaboration between public and private sector organizations?

2. How has the program benefited from having multiple partners rather than a single organization as its creator and implementer?
    - Have students and teachers benefited from the partnership?
    - Is program legitimacy enhanced by having more than one organization involved?

Secondary Questions:

3. Partner-reported community outcomes: In what ways has this partnership contributed to changing relationships between public lands and communities (via the training of teachers to help students attach to place)?

4. What hypotheses about the program emerge from the case study that inform program development and/or future evaluation endeavors?

Data Sources

Data sources for the case study included interviews with 17 individuals from five partner organizations. The majority of the interviews were conducted in person, with several conducted over the phone due to the respondent living in another state. Interviews were conducted singly or in pairs. A representative from each partner organization was appointed to gather documentation for the case study. Documents reviewed for the case study included:

- grant report narratives describing FFEC activities and impacts
- grant proposals for non-FFEC funding
- letters of support from teacher and curriculum coordinator
- local newspaper articles
- video productions of FFEC program and FFEC event
- organizational brochures and newsletters
- organizations' internal correspondence
- organizations' websites
- organizations' internal staff meeting minutes
- FFEC partner meeting minutes

- FFEC program fliers
- FFEC institute and module outlines and plans
- organization's interpretive plan
- organization's web-based case study
- organizations' seminar, workshop and conference descriptions, presentation outlines, handouts
- organizations' annual reports
- organization's report to its national leadership
- program logic model

In addition, several pertinent open response questions and several Likert scale items administered on a survey to FFEC 1 and FFEC 2 educators were considered in the case study analysis. Finally, the evaluator's site observations of the organizations, FFEC workshops, and partner meetings were also used as data in compiling the case study.

PARTNERSHIP CASE STUDY FINDINGS

The dynamic collaboration that evolved in the FFEC partnership is a vivid example of how the whole can be greater than the sum of the parts. In general, each partner reported that their organization could not accomplish a program of this scope without their partners. The partners complemented each other in what they brought to the effort, including conceptual elements such as language and ideas, basic necessities like funding and space to work in, specialized logistical and educational skills, and the natural canopy overarching the project--the complex system of natural and cultural relationships that is the forest.

The Impact of FFEC on Partner Organizations: Organizational Learning and Change

"Because of FFEC and the learning that the Park has done, there's been much more attention in drawing together the resource divisions—Interpretation working with Resource Management. Now they're working more closely together, integrating more."

-MBRNHP Resource Manager

When a new program is spawned it is clearly influenced by the organizations that create it. Often less clear is the impact the program has on the organizations themselves. In the case of the FFEC partnership, all five partner organizations report both depth and breath of influence resulting from their involvement in FFEC. The most salient categories of impact are enumerated below:

Evaluation Question:
How are FFEC partners—individuals and organizations--changing the ways in which they operate as a result of involvement in FFEC?

- Internal Integration of Education and Conservation Activities
- Building Relationships with Communities and Schools

- The Spread of Language and Ideas within FFEC Organizations
- Mutual Understanding Growing Between Public and Private Sector Organizations
- Other Benefits of the FFEC Partnership: Credibility and Visibility; Organizational Perspective; Confidence and Capacity; Resource Sharing

Internal Integration of Education and Conservation Activities

NPS Integrates Interpretation and Conservation

The organization that has most clearly been influenced by participation in the FFEC partnership seemed to be the National Park Service. MBRNHP's forest management plan, for instance, now contains an education component. Minutes from an educational strategy meeting minutes (January 2003) held by CSI and MBRNHP staff reflect place-based education and service learning as chief components of the organizations' educational mission. The document centers on defining place-based, community-based and service learning approaches to education as central to the program goals for MBRNHP. The language in this document is consistent with that of FFEC: stewardship behavior, community connections, ownership of place, life-long learning, and citizenship skills.

> *"As a resource manager, [FFEC] really allows me to do my job better in terms of protecting park resources. It's a way of reaching out to the community and cultivating a greater understanding and sense of care for the resources here…. That is of extreme value."*
>
> *-MBRNHP Resource Manager*

Interviewees from the NPS organizations consistently reported a significant shift toward integrating interpretation and education programs. In particular, the park's superintendent noted that the resource manager's job description had changed to incorporate more education into MBRNHP's natural resource management planning agenda. The park's resource manager notes that this blending of management and education "fosters my ability to manage resources by connecting with the community."

One embodiment of this connection came when MBRNHP staff asked teachers to contribute to the creation of their forest management plan. The park's resource manager

explained, "The work we did with teachers with the forest management program shows how our planning can reach out and pull in the teachers to integrate into our management and the use of this place as a learning laboratory." She continued,

> Most management plans are natural or cultural resource specific, but we're looking at the interplay of the two throughout the whole document. We want every activity we do to have some educational value, whether to students or teachers.

She explained that if she had not worked with teachers through the FFEC program, it would have been unlikely for her to have incorporated teachers into the creation of the forest management plan.

> *"FFEC has pushed us to cross between resource management and interpretation."*
> *-Conservation Study Institute Director*

The resource manager at MBRNHP also discussed another indicator of the its changing commitment to integrating education and management. They are currently seeking a variety of ways to involve the students of FFEC teachers into the resource monitoring program.

> We'd like to work with students to implement long term monitoring…allowing them to do authentic research to influence park management. We'd also like to involve students in on the ground management--removing invasive species, thinning, apple orchard release. …using those things we've charted for actual park management as opportunities to work with children.

Interviewees noted that these types of changes have been possible for CSI and MBRNHP because of three factors: 1) the park making an institutional priority of integrating management and education; 2) hearing directly from teachers that they were interested in working in partnership with the park; and 3) an increase in confidence that these organizations have the skills and knowledge of place-based education, and the knowledge that there is a cushion of partners to assist as needed. All three of these factors were directly linked to participation in the FFEC partnership.

Even from an NPS outsider's perspective, the park was most open to influence by its participation in FFEC. The program coordinator at Shelburne Farms stated, "They're in this enviable position to be able to prove change because they started out as new to this."

Green Mountain National Forest

Of the five FFEC partners, the Forest Service has the least prominent educational focus. Its conservation education program was started only fourteen years ago, relatively recently given the long history of the agency. Each Forest Service interviewee reported that prohibitively few funds are dedicated to educational concerns. Nonetheless, the

Forest Service respondents uniformly saw potential for this program to impact the Forest Service, perhaps generating support for a greater education emphasis.

The GMNF public affairs officer described how the role of conservation education in the Forest Service historically seemed to fall into the realm of "just getting a call to entertain schoolchildren." For the GMNF, FFEC moved their conservation education role into the more proactive arena of educating teachers to use the forest, and giving them and their students "real life projects they can work on." One local teacher developed a lesson plan using data from the timber harvest. Hearing about this, other GMNF employees were impressed, and, as the public affairs officer explained, began to see that conservation education is as much about adults (i.e. teachers) as it is about school children.

The public affairs officer's assertion that "you impact adults with good education more than you do children" seems to represent a new awareness for GMNF, and is generating new support for education. Through the FFEC partnership, she had exposure to the Park Service's use of demonstration forests for educational purposes. When the GMNF Ranger District learned of the Park Service's success with this innovative strategy, "they immediately put it in their plan as well."

Shelburne Farms

As an organization with a deeply-rooted educational mission, the question was whether FFEC has influenced Shelburne Farms toward organizational change with respect to conservation issues. Indeed, it was clear that Shelburne Farms is looking more globally at conservation issues since their involvement in the FFEC partnership. Citing the influence of work with NWF in particular, the Shelburne Farms vice president stated,

> We've benefited from looking at the ways in which [NWF] strategizes at a national level. And we've gained from them that they integrate program and policy work.

> *"I have a better understanding of our role in forest stewardship...we're not just Shelburne Farms trying to manage our forest which we were doing before, we're doing it in the context of larger issues."*
>
> *-Shelburne Farms Vice President*

> We're not a policy organization, so they have brought some of the forest stewardship issues at a national and regional level. Now we are more likely to look at our role in forest stewardship, global economy, certification, supply and demand for forest products. FFEC has deepened our knowledge of where we are in the big world of forest stewardship.

She elaborated that she better understands the significance to the larger world of what Shelburne Farms does on site, and this influences program decisions such as the message that tour guides impart to the visiting public or the way the "forest to furniture" story is presented to teachers and school children.

The Northeast Natural Resource Center of the National Wildlife Federation

NWF, whose focus on conservation issues is at its crux, reported that its Montpelier-based field office has been able to commit to more sustained, intensive, long term work with communities and teachers as a result of working with FFEC. In contrast, the forestry and wildlife specialist described how the mode of operation in other field offices—and indeed in the northeast office at one time—is to separate conservation issues and education programs. "For example, the education program would focus on habitat but the conservation program is working on prairie dog issues. For the most part the research and policy and advocacy agendas are separate from education," she said.

Meanwhile, NWF in the northeast has made a commitment to place-based education, which means that they blend their work on professional development with the organization's priority conservation issues. The wildlife specialist, a FFEC partner, explained:

> We're trying to get teachers to look at issues important to NWF like pollinators or the forest and we're working together with them to develop curriculum and engage their communities in the process. So we start with the teachers and expand to include other community-based education work.

The Center Director explained how FFEC provided the "opportunity to synergize educational work with conservation program work." Doing so, he said, would bring two distinct benefits:

- The ability to learn from and expand the conservation program through education;
- The ability to form collaborative partnerships that enhance the contribution of the program as a whole.

Through participation in FFEC and creating and implementing this place-based professional development program, the northeast field office of NWF has become a model of how conservation programs can be integrated with education. "This program

has…and will continue to provide us with proof that sustained place-based education works and that a national organization can be place-based in the work that it is doing" explained the NWF FFEC partner.

Building Relationships with Communities and Schools

"I never gave it much thought before, but now I see public lands as extremely valuable. Students get hands-on learning experiences, become motivated and learn about their environment when utilizing nearby lands--so important in our computer age!"

-FFEC Teacher Participant

The importance of building relationships can not be underestimated. Close contact between an organization and its local constituency enhances the organization's ability to define and move the agenda on conservation. As FFEC has shown, an organization's education program can help foment these relationships by getting staff in touch with real people in the community—students, teachers, and parents.

Evaluation Question:
In what ways has this partnership contributed to changing relationships between public lands and communities (via the training of teachers to help students attach to place)?

Enhancing relationships with communities

An important goal for both the public agencies involved in FFEC is the development of new tools to engage the communities they are located in. The reasons for this include increasing public use of their lands, educating the community about management decisions and policies, increasing participation in public processes, and mitigating misperceptions of the agencies.

A regional conservation education coordinator for the Forest Service felt that the agency was at one time more closely linked to the community, but had drifted away over time:

> Historically we've always had a real strong link to the local communities. When we formed it was the local district ranger going down and having coffee with the local leaders. Now we're all so doggone busy that maybe we're not connecting with the community as we had in the past. This is a shame because I felt that was a strength of ours and built our credibility with the public.

"Participating in FFEC was the beginning of my relationship with community organizations. Since then, the stewardship component of my program and the connection to the community has become a major and integral part of my program."

-FFEC Teacher Participant

He expressed interest in getting involved in partnerships, citing FFEC's community involvement component as a real advantage. "It's the way we ought to be doing business."

Another Forest Service conservation education director explained that a

public land management agency benefits from having a populace educated about the stewardship of the environment in which they are living. The better the public understands the forest and its management options, "the more beneficial public meetings are around the management plan…because you have a more knowledgeable public." In an agency where public comment is part of the process, better education of the public could foster a higher quality and perhaps higher level of participation.

> *"I do feel that there are many opportunities for educators to use public lands and public lands staff for teaching."*
>
> *-FFEC Teacher Participant*

The NWF center director appreciated that FFEC provided "an avenue to engage in dialogue with people," and eschewed the tone that is often associated with environmental conservation non-profits: "a paternal 'we know what's best for you.'" In bringing organizations with diverse views together to create a dialogue with a community, FFEC enables them to avoid pre-judgments that might be held about the individual organizations.

Working with Schools

Because of their FFEC partnership, MBRNHP is becoming more widely known in the regional school district, and the impacts of this are broader than teacher training. When the school district administrators needed to have a meeting, they asked MBRNHP if they could use the space. The park's resource manager saw this as an opportunity to further educate the administrators about FFEC and she showed the FFEC video documentary. She reported that the administrators' body language, commentary and applause demonstrated the pride they felt seeing their teachers captured in the film. According to the resource manager and park superintendent, the administrators reported that the FFEC teachers are serving as spokespeople for place-based education within the school, creating change with their non-FFEC colleagues in the school. This type of promotion also serves as an opportunity to recruit participants for subsequent FFEC cohorts.

> *"This program has been a real eye opener for me as far as what teachers and the whole education community are up against."*
>
> *-GMNF Public Affairs Officer*

Similarly, many audience members turned out for the presentation of a "SpeakChorus" by one FFEC participant's fifth grade class, as part of a community forum focused on connecting conservation, community, and the classroom. The forum, held at the park, was attended by school board members, local forest land owners, local park commissioner, parents of presenting students, FFEC teachers and a few representatives of local non profit organizations. This kind of event brings new people to the park and builds social capital. The superintendent at MBRNHP explained:

> Unlike some of our partners we didn't exist more than five years ago so there

were no relationships [with the community]. We're an entirely new creation…. We could do lots of things to build community connections but we saw FFEC as the most effective and the most productive in terms of long term value…. People now ask to use our meeting space, they feel comfortable using these facilities.

In effect, by partnering with effective educational organizations through FFEC, MBRNHP and CSI built their capacity to serve the needs of the educational community and thereby laid a foundation for a strong relationship with the local population. Similarly, the GMNF reported that 11 of 29 participating teachers are now connected to the national forest either through service learning or just "getting out" onto public lands.

The program coordinator at Shelburne Farms reported that both of the larger FFEC partners (MBRNHP and GMNF) have

…made great strides toward making connections happen between teachers and public lands…. The park is becoming known as a resource since it has been spending more time working with the schools.

A benefit accrued to Shelburne Farms was the depth of relationship formed with participating teachers. The program coordinator explained that as a result of the investment they had made in their relationship to teachers, they felt comfortable using those teachers as a resource for program development. Because of the strong relationship, they are able to engage in valuable dialogue rather than "trying to second guess what teachers want."

> *"FFEC has enhanced our confidence to engage with the community. In terms of working with schools, FFEC has moved us along."*
>
> *-CSI Director*

Significantly, the partners are learning first hand that in order to generate genuine service learning endeavors in the community—a major goal of FFEC--there needs to first be time and effort dedicated to relationship building. The CSI director described it this way:

We've realized that [service learning] is most successful when you have a set of relationships operating, with the teachers in particular. Then you really generate ideas. I think to get sustained, real projects it takes a web of relationships on an ongoing basis. If we want those relationships we have to keep investing in them. Some of this is a lesson from FFEC. FFEC has reinforced persistence and long term cultivation [of relationships].

The NWF center director described how working with FFEC kept NWF "…fresh in terms of distilling the conservation message to constituents like teachers," and also gave them

useful feedback that would help them understand better how to talk to other populations.

The Spread of Language and Ideas within the FFEC Organizations

One indication of a program's effects on its parent organizations is the degree to which its concepts and terminology are adopted into the culture and lexicon of the broader organizations. Three NPS documents reflect this infusion. A June 2003 NPS publication *Renewing our Education Mission: Report to the National Leadership Council the National Park Service* lays out a course to achieve its educational goals. Because of CSI's involvement in both FFEC and the drafting of this publication on education, the first "Guiding Principal" outlined for the NPS states that "National Park Service programs are place-based." The CSI director reported,

> *"[Our participation in FFEC] is indicative of the kinds of education work that many of us would like to invest in in the future."*
> *-NWF Center Director*

> During FFEC's early days we did a seminar series for the NPS leadership on place-based education and we are pleased to see that this national literature uses that term. We've also created an NPS education council to carry this work forward....so people in parks across the country are benefiting from the work we've done here.

Similarly, an NPS publication titled *The Natural Resource Challenge: The National Park Service's Action Plan for Natural Resources,* resource management and education are woven together as the third strategy cited in the action plan. The strategy reads: "The actions funded and undertaken to date share certain objectives…. Engaging the public as partners in resource preservation through education…," reflecting a similar spirit to the FFEC-influenced infusion of education and conservation.

And, a 2001 NPS publication titled *The National Park Service and Civic Engagement* highlights FFEC as a case study for professional development in the civic engagement arena. The MBRNHP resource manager sees this publicity in a national publication as an indication that the larger organization "…recognizes FFEC as something of value to the agency."

According to the resource manager, another staff member who coordinates inventory and monitoring with MBRNHP and eleven other parks has expressed genuine interest in aligning his work with educational endeavors. He and the director of CSI have shared ideas about how other national parks might learn from the FFEC experience. Since the goal of CSI is, as the CSI director explained, to "…help the National Park Service learn and to help the park's partners learn," CSI's participation in the partnership means that FFEC is a resource to the entire park system.

The NPS was not the only organization influenced more broadly by FFEC. The GMNF public affairs officer attended a meeting of a volunteer "Friends of the Forest" working group that wanted to get involved in education, and received an enthusiastic reception. She recounted,

> At the first meeting I said that if we got involved it would have to be place-based and we'd have to be using the standards. One person couldn't believe it and was leaping around the room and it changed the dynamic of the whole meeting. I gave the presentation on what we are doing here, and there are now two teachers getting ready to drive all the way here to do the next FFEC workshop. It was unbelievable. And the district ranger was there and she couldn't believe her eyes. She's sold on it already.

The NWF center director explained that when meeting with NWF's organizational leaders, he uses FFEC as an example in discussions about the direction of the national education program. During the past 15 years NWF has disseminated many classroom development materials, but not necessarily a place-based model. FFEC has provided an example of a collaborative model where curriculum is developed through "the interaction of different voices." "This is the flagship place-based education project within NWF….its done a lot to legitimize place-based education within NWF. It's already served to change people's thinking," the director summarized.

FFEC has given Shelburne Farms the ability to present forestry issues with more confidence and depth. The program coordinator reported that during a non-FFEC professional development workshop, she was able to complement her co-worker's presentation with a broader picture of the issues. She said this was "…a case where [because of our involvement in FFEC] we could offer access to forestry-based resources and the sense that it was a worthy topic. It added credibility."

Shelburne Farms' vice president noted that FFEC has influenced the training of tour guides, a group of docents who speak to thousands of farm visitors every year. The

"forest to furniture" story is a hallmark of Shelburne Farms' conservation education program, and now has a greater emphasis on the connections to the global forestry picture.

As an agency that does not typically work directly with youth, CSI found another way in which participation in FFEC broadened their perspective. The CSI director noted that she has a new lens through which she looks at other aspects of her work: "I find myself in other forums making sure that the youth piece is in there. I didn't do that in the past. I had not seen that fundamental link and the power of youth to learn." More broadly, CSI, in partnership with MBRNHP and Shelburne Farms, was able to successfully compete nationally to beome one of 32 Research learning Centers across the country. Explained the CSI director, "Our focus for this center will be place-based education and evaluation."

Mutual Understanding Growing Between Public and Private Sector Organizations

Public organizations such as state and federal agencies do not frequently collaborate with private sector organizations such as non-profits. FFEC, however, is setting an example of such collaboration. Though not an explicit line of inquiry for this case study, the growth of mutual understanding between public and private sector organizations was a thread that appeared throughout the data. This phenomenon is worth underscoring.

> *"From dialogue about conservation through the Conservation Study Institute, we developed a belief that successful partnerships had to be [comprised of] both private and public sectors."*
>
> *-Shelburne Farms Vice President*

The NWF Northeast Natural Resource Center director reported that participating in the FFEC partnership had "cemented" relationships with the other FFEC organizations and expressed that those relationships are "very positive and productive." He also noted that partnering with MBRNHP on FFEC was a gateway to further collaboration with them on certifying the Park's 500 acres of forest land.

The FFEC partner from GMNF explained that with her involvement in FFEC came a new understanding about what NWF and Shelburne Farms do. This first hand experience helps her to distribute information from them to the appropriate people within her own agency, thereby facilitating the building of a network.

> *"In some senses, I took our natural and cultural richness for granted. I am now much more aware of, sensitive to, and grateful for the Federal, State, and Town conserved lands and the mosaic of natural communities--forest, field, wetland, etc."*
>
> *-FFEC Teacher Participant*

A district ranger for the Forest Service in upstate New York described how partnering with different types of organizations can help distribute the burden of funding different types of projects. "I

have a strong commitment toward introducing natural resources and environment to our kids. However, the USFS doesn't have money for this kind of thing. I see FFEC as a very successful way to do that." This is just the type of obstacle that partnerships are designed to overcome.

Officials from Shelburne Farms also noted the benefits of a multi-sector partnership. The president said, "[FFEC] has helped us to develop a richer relationship with the National Park Service and that higher level of trust has benefited the organization through other activities such as our National Historical Landmark status." Consequent to having developed a deeper relationship with the NPS, Shelburne Farms was better able to understand and appreciate the honor and importance of the National Historical Landmark designation it was awarded.

Shelburne Farms' vice president, a FFEC partner, pointed out that within the public-private assemblage, it is important to represent the diversity within those sectors both at the planning table and in presenting to the public. She stated,

> If it were just NPS and Shelburne Farms it wouldn't be the same. The two federal agencies (NPS and USFS) have different management strategies…. Within the public sectors and private sectors there are very different things going on. You can't just dichotomize them by having one private organization to represent the private sector and one public organization to represent the public sector.

Moreover, in addition to the growth of mutual understanding between the organizations, many of the findings detailed above can be explicitly linked to the fact that FFEC is a public-private venture. Because of the strengths, orientations and reaches of the different players, public and private, FFEC has lead to enhanced relationships with communities and schools, greater integration of conservation and education activities within organizations, and a spread of the language and ideas of place-based education. And, to be discussed below, the fact that the program itself is balanced, resilient and holds legitimacy with its participants and their administrators can be partially attributed to the diversity offered by a public-private partnership.

Other Benefits of the FFEC Partnership

It was clear that numerous other benefits accrued to the partner organizations. The most salient of these are discussed below:

- Credibility and visibility
- Organizational perspective
- Confidence and capacity
- Resource sharing

Credibility and Visibility

> *"The fact that the National Park Service and United States Forest Service were working together on this was groundbreaking. That added excitement and impetus because it was something new and had the potential to become visible to a whole new audience, the federal agencies."*
>
> *-Shelburne Farms Program Coordinator*

Symbiosis between larger and smaller organisms can be found throughout the natural world. Likewise, there exists a mutually beneficial symbiosis between larger and smaller organizations involved in the collaboration.

It was apparent that Shelburne Farms provides regional credibility to the larger, national organizations by bringing a deeply rooted understanding of the local context, and more importantly, experience with and strategies for educational program implementation. In turn, Shelburne Farms' visibility is boosted regionally and nationally through its affiliation with the larger and better known organizations, and it also gains credibility locally.

The staff member who leads Shelburne Farms' special tour groups noted that she now routinely mentions this national collaboration as evidence of Shelburne Farms' clout in the broader arena. Not only does this enhance the credibility of Shelburne Farms to visiting tourists, but perhaps more importantly to local visitors and supporters as well.

The Shelburne Farms development coordinator recounted how involvement in the partnership helped to secure an important funding commitment. She described one funder who is

> …very interested in the Park Service and wilderness areas. When they came to the farm we were able to highlight the [FFEC] collaborative and it resonated with them. It wasn't solely that, but without the collaboration it would have been less appealing.

> *"When we first did FFEC it was the biggest and most informed series I'd been involved in, the biggest commitment, the longest relationship, the most intense connections to classroom teachers, the biggest package we had to offer. It was fun that we had some proof that these tactics would be effective because it came directly out of [our past professional development experiences], an amalgamation of everything we'd learned in terms of how to change teacher practice. We felt confident that we knew what we were doing."*
>
> *-Shelburne Farms program coordinator*

Furthermore, Shelburne Farms increased its visibility throughout the state by building relationships with more teachers in different regions of the state. In turn, MBRNHP benefited from increased visibility within its own local community, where it is a relative newcomer and is not yet widely known.

Another way in which credibility was enhanced for partner organizations was in their relationships with presenters. One partner speculated that her organization is likely to have easier access to a wide range of high quality conservation-related experts to call upon for other, future programs because those who participated in FFEC were impressed by the array of partners involved and "enjoyed" their role in this high quality endeavor. Along these lines, partners agreed that their organizations have become more "visible" in various arenas to which they had limited entrée in the past. Where one organization might traditionally have had links with academia and another organization had ties with state agencies, now, since individuals from these realms had joined as FFEC presenters, new connections were fostered across partner organizations.

It should be noted that as a national non-profit organization NWF also contributes significantly to the credibility of the partnership, especially with constituencies that may have reservations about large government organizations. Because they have developed a substantial cache of curriculum resources, NWF provides a strong draw for teachers, aiding in program recruitment efforts. Another contribution NWF made to the program was its unique positioning straddling both worlds, given its experience in the regional educational arena and its ties to a national network.

Organizational Perspective

As well as wider visibility, Shelburne Farms appeared to be benefiting from wider vision. The vice president called partnerships "a gift" saying:

> We could do things on our own but we would be an island of programs and stewardship ideas…. The partnerships bring a connection to a real world context, what's happening externally to the institution and how what we do internally is affected by and affects the larger world. Our world is bigger, we're better informed. We learn so much from other organizations.

The president of Shelburne Farms mentioned that one of the key benefits he sees in partnerships is that the organization receives feedback from its peers rather than being limited by a cycle of internal monitoring. As Shelburne Farms is able to project itself into the larger world, and project the larger world into itself, a creative, reflective, organizational learning cycle is created.

Confidence and Capacity

> *"A lot of place based education is getting people within a region to look closely at issues and get involved and do something and you can't do that when you just go in and run canned programs. We have an opportunity as a large organization to reach a big area with a bunch of different issues."*
>
> *-NWF Forestry and Wildlife Specialist/Educator*

Because of the expertise and experience available through these new connections, organizations gained confidence to consider programs that were previously not within their scope. The Shelburne Farms program coordinator affirmed,

> Our capacity for offering programs has increased because this has been a highly successful and highly enjoyable program, so the people who have worked with us probably have a greater willingness to work with us.

The NWF center director noted that FFEC lent his organization greater visibility with funding organizations. He said,

> It gave us access to some funders…Wellborn got to know us and we were able to approach them for peregrine falcon restoration. Those kinds of institutional relationships are built from a project like this.

The blossoming of new relationships takes time, as does the gelling of a partnership. In that vein, he added, "You may not recognize the institutional value until several years into it."

In the case of GMNF, they were able to participate in such an endeavor because the other organizations have stronger educational missions. GMNF did not have the educational capacity to do this alone. Highlighting the contribution of Shelburne Farms, the GMNF public affairs officer said, "There's nobody that can do education better…. There's no way we could do it for teachers, we don't have anything that has to do with education. They know education and they know how to train teachers."

NWF also brought their professional development experience to the partnership, with a full complement of curriculum resources, a long history of doing environmental education in the regional forests, and professional contacts in the area.

Resource sharing

> *"We always pull out our empty pockets when we get asked to be part of a partnership, but we forget that what we do have is time, resources, forests, networking, and other things to offer than money."*
>
> *-Forest Service Regional Conservation Education Coordinator*

Critical to the mission of FFEC is the existence of forests. While Shelburne Farms has forests, they are only within range of a certain number of schools. On the other hand, GNMF has 400,000 acres in Vermont, and holds the possibility of being the forest for many classrooms statewide.

A regional conservation education coordinator for the USFS who is not a FFEC partner explained how the multi-organizational structure helped him to see the potential of FFEC. "We don't have a budget for conservation education so those programs that tap into what we **do** have are more likely to succeed." He noted that the fact that FFEC is a partnership makes it "more palatable for the Forest Service" since within their agency there is minimal funding dedicated to educational purposes.

Likewise, the development coordinator at Shelburne Farms explained how partnering also facilitated the program financially: "We wouldn't have the capacity to raise funds for all of this – that's the whole model of working in collaboration to expand fundraising capacities." She added that "having a model that shows a successful partnership and particularly with national partners is helpful in fundraising. The trend in fundraising is to more effectively utilize resources so funders are expecting to see that." She suggested that it might also be possible to reduce program costs through such collaboration.

Benefits of Partnering for the FFEC Program

As indicated above, the benefits of partnering for the partners are plentiful. We also sought to understand how the FFEC program itself benefits from the fact that it is the creation of this diverse group of partners. Three main benefits to the program are discussed below:

> *<u>Evaluation Question:</u>*
> *How has the program benefited from having multiple partners rather than a single organization as its creator and implementer?*

- A more balanced program
- Increased legitimacy of the program
- A More resilient program

Finally, a table summarizes the terms used to describe the contributions each organization and partner adds to the program.

A More Balanced Program

Environmental education can be controversial given that there are groups who view it as biased, anti-business, or advocacy-based. The FFEC partnership confronts this perception by bringing together a diverse set of views to help present an objective analysis of issues.

> *"This kind of program has many positive messages, rather than the negative messages we tend to give out. These are the kinds of relationships that can make other things possible."*
>
> *-CSI Director*

The NWF center director shared his thoughts on the FFEC discussion forums:

> [They've] put people in a room together who would not normally be in that same room…and teachers can see the competing ideologies play out. Teachers feel like they can make up their own minds given the full spectrum of views on these things, and it models them being able to think for themselves.

Others echoed the idea that each player in the partnership makes an important contribution. "You need all the partners. If any were gone we would be communicating something very different to the teachers," said the vice president of Shelburne Farms reiterating the importance of diverse viewpoints. She took her analysis a step further in explaining the importance of having more than one agency from each the public and private sectors, stressing the value of showing that within each sector there are "very different things going on."

Program participants noted the impact that FFEC's diverse viewpoints had on them. Three teacher comments capture this idea:

- *"I understand the complexity of the issues more fully."*
- *"I am more aware of the multiple, sometimes conflicting demands and interests for public lands."*
- *"I was already partnering with community members and groups, but FFEC participation encouraged me to stretch and become more inclusive and include the breadth and variety of the community."*

Increased Legitimacy of the Program

As discussed in the section above on credibility, the individual partner organizations gained enhanced credibility in various arenas. Similarly, the program itself assumes a broad mantle of legitimacy by association with the participating organizations' reputations. This legitimacy helps the program to win support amongst funders, school administrators, parents, and community members.

Having a variety of reputable and far reaching partners makes the program more appealing to funders because it is more likely to disseminate and replicate. The presence of national government agencies and national non-profits offer a broad network for this dissemination.

> *"I've had other teachers who participated in FFEC in my workshop and I felt self-conscious because they've seen FFEC. I've seen FFEC teachers doing more extraordinary things than other teachers I've worked with."*
>
> *-NWF Education Director*

Because many of the partner organizations are well known and respected, administrators allow teachers to attend, thereby bolstering recruitment efforts for the program. Respondents also suggested that parents and community members are more likely to support a teachers' implementation of FFEC curricula since they have heard of participating organizations. "When you say you have the National Park Service and the US Forest Service at the table it brings its own sort of credibility or interest. It added weight to the project that I'm sure helped with recruitment," remarked one partner.

A More Resilient Program

Just as a single post is more likely to topple than a tripod, the FFEC program itself is more resilient and resistant to demise because of the multiple prongs holding it up. The education director at NWF observed that there are many features of the partnership that add to its resiliency:

> All of the heads coming together with different expertise and backgrounds, working within different types of organizations with different types of freedom, access to funding, eligibility for funding, and the resources that each organization brings to the table…these all benefit the program. And a really important benefit is the reach of each organization. For instance, NWF is a national organization while Shelburne Farms is locally strong. Each has a niche.

In particular, the program's resilience is evident in terms of person-power and sustained funding. In terms of financial stability, when one source of funding brought to the table by one partner became unavailable, another partner stepped in with a different funding source. And the sustained energy afforded by different people has been one of FFEC's strengths. One respondent noted that the USFS partner had been able to maintain her commitment to the program even when her organization was less supportive due to the energy being infused into the program by other FFEC partners. She noted, "When several different entities are contributing, the energy is continuous."

Both of these features—funding sources and energy sources—indicate improved odds for the longevity of the program. One reason longevity is important in a professional development program is that the longer a program is sustained, the more participants

learn of it naturally by word of mouth, building a reputation and a community of participants.

"What has each organization contributed to the FFEC partnership?"
Figure P1 summarizes the types of descriptors interviewees used when asked what each individual organization contributes to the FFEC partnership and program.

Organi-zation	**Figure P1. Descriptors associated with each partner/partner organization**
NWF	Policy / conservation agenda, connections to resource people, curriculum development skills, training, planning, competence with learning standards, national and regional forest and stewardship issues, professional development experience, northern forest expertise, name recognition, grant money, tangible resources and materials (books, posters, etc.), national mechanism for dissemination, program management, experience cultivating teacher relationships, strong education focus, prior collaboration with Shelburne Farms
Shelburne Farms	Strategic thinking, leadership, vision, logistics, details, "mother hen", planners, low-key activities, experience with partnerships, existing relationships with other partners, local and regional grounding, professional development experience, connections with educational community, organizational resources such as large staff, grants, publicity, local grounding, "think tank", experts on the theory and practice of place-based education, networks for public and recruitment, having previously partnered with NWF on forestry-based professional development
MBRNHP/ CSI	Facility, land, civic engagement issues, federal arm, logistical support, big financial contributo national connections, dissemination mechanism, documentation, name recognition, recruitme credibility, diverse audience, excitement, weight Specific to CSI: dissemination venue, ties to conservation leaders, perspectives of conservation experts from outside the education realm
GMNF	Documentation, initial spark for the project, federal arm, land base, ranger station facility, national dissemination possibilities, name recognition, recruitment, credibility, balanced perspective

Note: this list represents an amalgamation of responses from all interviewees. It is not necessarily exhaustive of all the roles each organization played in the partnership. Descriptors are not listed in order of importance. Though CSI and MBRNHP are two organizations, nearly all respondents spoke of them as one entity housed under the National Park Service.

The Spread of Effect Beyond FFEC: Diffusion and Dissemination of the Model

One of the goals of the FFEC partners was to create an educational model that was worthy of replication and dissemination to a broader audience. In this section, we report evidence of FFEC's present diffusion into the broader arena as well as ideas respondents shared for enhancing dissemination of FFEC in the coming years.

> *"What I envision is every NWF field office doing place-based education in association with conservation programs. There would be a seamless integration, not such a distinct division. Education staff would be within the conservation program rather than currently how it is as a separate department which isolates the education staff from the other stuff. FFEC can serve as a model for that. That would be a huge step for NWF."*
> *- NWF Forestry and Wildlife Specialist/Educator*

One of the benefits to working as a partnership between public and private sector organizations is that their vehicles for dissemination are distinct. They each have different networks of contacts, thereby magnifying the potential for dissemination of the FFEC model.

For instance, the very involvement of CSI in the partnership bespeaks the intention and possibility of dissemination within the National Park Service. A branch of the NPS focused on enhancing leadership in the field of conservation, CSI offers the FFEC partnership ties to conservation leaders and the perspective that conservation experts from outside the educational realm can bring to a program like FFEC.

The Center Director at NWF reported that he has brought the FFEC model to national NWF leaders at higher level discussions about the direction of the national level educational program.

> We've used the partnership time and again to say not only does this work for us in the northeast, but this is a model for how to think about education in a conservation

Figure P3. A USFS regional conservation education coordinator who is aware of FFEC's work and interested in its dissemination, talking about the importance of such a program for guiding the forest service toward more education-focused strategies.

"The reason I think this program has a way of succeeding is the link to the community.… Ideally the community would come back and tell the forest supervisor of their success and that it's worthwhile to include students and the community in forest management…[FFEC] can offer that feedback loop to leadership….All it takes is one county commissioner or mayor calling up the forest supervisor and saying 'this program made a difference'-- that's what it takes. I can do that for hours and days, but if a mayor or other community member takes one minute to make a phone call it could really have an impact on [the forest service's] commitment to educational programs."

organization in the future. It's appealing because it is highly collaborative…and driven by the interaction of different voices.

He noted that the NWF leadership was becoming increasingly receptive to the idea because, he said, "we'd found a strategic partnership coupled with an educational model that connects with a conservation program. They were receptive after a while." He added that, for conservation within the national organization, "the ship is slowly turning."

Similarly, there is evidence within the Forest Service that the word about FFEC is spreading. Consider the following text from the USFS website: "Imagine this: the federal government is on the cutting edge of an education revolution in the United States… Impossible?... It would never happen… But it is happening in Vermont." One Forest Service interviewee was the regional conservation education coordinator for twenty states. His knowledge of and enthusiasm for FFEC is an indicator that the word is spreading. He attended a two day seminar about FFEC and was "…impressed by the concept, the applicability, the excitement the teachers had in the program, and the unique multi-organization cooperation."

> *"[FFEC] is an exciting model. It's the way we ought to be doing business."*
> *-USFS Regional Conservation Education Coordinator and Partnership Coordinator*

MBRNHP and CSI are also actively engaged in spreading the FFEC model through multiple means. The MBRNHP superintendent noted the "duality" of their work.

> On first glance our work is very local and community oriented. But it has this broader dimension, we're using it as a model for how to do civic engagement in other parts of the country. A cultivation of local teachers here in Woodstock is also used as a model for how to do place-based education service-wide. … We feel an obligation to find ways to move the state of the art in the larger organization, so we always think in terms of how we can take lessons learned and apply them to different tiers of interaction—international, national or otherwise.

To further pinpoint the spread of FFEC, Figure P2 offers examples of the many ways in which FFEC is currently being disseminated beyond Vermont and its current partners.

> *"This office is very motivated to push FFEC into the national scene. The people I've talked to within NWF are excited about FFEC. Place-based education is something I want to push."*
> *-NWF Education Director*

Figure P2. Existing Evidence that FFEC is being Disseminated

- NWF's Northeast Resource Center is one of the few field offices actively involved in combining conservation and place-based education.
- Shelburne Farms, MBRNHP, and CSI have participated in an idea exchange with a group of Italians who have implemented a program that is essentially the equivalent of "A Farm for Every Classroom".
- MBRNHP and CSI are to host a seminar for senior NPS managers at their site this fall. One reason for the location is that FFEC is the NPS's "best example…of creating a venue for civic dialogue on the management of resources."
- The NPS webpage on Civic Engagement highlights FFEC as an example of successfully implementing civic engagement programs linked to national parks.
- GMNF partner created a manual for the USFS on how to create and execute a FFEC program and presented the FFEC model to Finger Lakes National Forest working group which intends to replicate FFEC in New York State.
- USFS Conservation Education Coordinator has highlighted the FFEC model in her work with the New York City watershed forestry council, which seeks to educate the citizens of New York City about their water sources. The group is also comprised of non-profit organizations and city and state agencies.
- Numerous indirect partners were invited to participate in the "trial run" of FFEC's NPS staff training module, including those from the NPS, USFS, and regional organizations.
- USFS website provides a brief overview of the FFEC program
- FFEC partners created a high quality video documenting the program. The video has been showed to numerous audiences.
- GMNF partner presented the FFEC model at a national USFS conference.
- MBRNHP Superintendent presented the FFEC model at a national NPS conference in Louisiana.
- NWF Education Director provides regular updates about FFEC to a national network of NWF educators. She reported a lot of interest, especially in how the partnership functions. For example, she was approached by teachers from Texas who wanted information on how to develop a FFEC program in Texas.
- MBRNHP was approached by teachers from Texas who are interested in implementing FFEC-type curriculum.
- CSI Director has strong ties with the NPS National Leadership Council which is presently defining the education agenda for the NPS.
- CSI Director and Shelburne Farms vice president presented FFEC model at a conference in California.
- CSI Director presented FFEC at a conference in California which all federal (and some international) land management agencies attend.
- CSI Director has pivotal role in developing the educational component of the NPS's Gateway Community program.

Barriers to and opportunities for dissemination

As reported by several conservation education specialists in the USFS, one hindrance to the dissemination of FFEC by the USFS is that the Service is more poised for adoption of such programs at the "field level" rather than at the upper echelons. Since the educational mission is not a top priority of the USFS, and a program like FFEC is not tailored to provide "immediate gratification" in terms of numbers served, a challenge will be moving this model from the ground up to the decision makers within the USFS. One respondent noted that decision makers respond to evidence of success. It is incumbent upon program developers to investigate and "prove impacts on students and community members' attitudes and behavior."

Another respondent suggested that, particularly within a public sector organization that has political ties, it is important to get local officials to notice a program's impact. When a public official mentions his or her impression of a program like FFEC to a Forest Service district ranger, for instance, there is more likely to be a response than if a lower level USFS employee emphasizes the same thing.

Several interviewees suggested utilizing the USFS conservation education national reporting system as a means of disseminating FFEC. Noted one regional conservation education coordinator, "Within big organizations we need to be more efficient and effective at reporting what we do." If individual field offices or organizations tackle their own projects but do not broadcast their experiences and impacts to the upper echelons, a spread of ideas is less likely to ensue.

The Challenges of the FFEC Partnership

> *"Implicit in any partner relationship are difficulties; there are no relationships that one doesn't have to work things out. We learn about ourselves, the process, and how to improve the process…. If we can't learn from that we're not capturing the full value."*
>
> *-MBRNHP Superintendent*

The benefits of partnering, both for the FFEC partner organizations and for the program, are clearly numerous and deep. There are challenges inherently associated with program development of any kind, and others uniquely associated with partnership programs.

Time

- Because of the weightiness of this partnership, the potentially broad-reaching impacts and the complexity, all partners have devoted considerable time to the endeavor. In some cases, this includes the leaders of the organizations as a whole in addition to program staff.

- While equal participation is seen as an important feature of such a partnership, partners from each organization are not always able to make the same level of

commitment to attending meetings or other events due to varying levels of organizational support and conflicting job expectations.

- The complexity of the partnership can have an impact on support staff in the organizations. For instance, respondents reported that coordinating such tasks as FFEC publications, workshop logistics or fundraising efforts tends to be more time consuming than usual due to having to coordinate details between so many organizations.

Communication

- As the number of members in a group increase, the amount of effort spent in communication and schedule coordination increases accordingly. In one case it took six months to find a time when all partners could be together in one place.

- For clarity and efficiency of communication, shared language is needed, and may require time up front to establish and disseminate. One partner, for instance, explained that due to her lack of experience with some of the terms and concepts, she spent the first meetings trying to understand the basic context.

Figure P4. Participant Ideas for Lowering Program Costs

- *Extended series is critical, but could offer more rustic, less costly accommodations.*
- *Bringing in speakers is critical, but fewer would be sufficient. Apprise participants of other experts and groups without necessarily inviting them all to make presentations.*
- *Streamline partners' time commitment by aligning partners with particular participant interests based on location and expertise.*
- *Focus on classroom teachers, and just offer a "weekend version" of the program for teachers in supporting roles so they understand the program without the high cost.*
- *Seek donations from big corporations and the State Department of Education.*

(from participant survey, Spring 2004)

- Partners reported that it was not eminently clear at the start of the partnership whether they were entering into a long-term working relationship or a short-term capacity-building one. The Shelburne Farms program coordinator stated, "We thought we'd hand over the running of this to the park after the first year but we later realized that they were looking for partners to collaborate with on an on-going basis rather than to educate them and leave. It took a while to become clear on this."

- Several interviewees commented on the difficulty of communicating across the different conceptual levels of the program. For instance, where some organizations brought big picture thinking to the table, others were more focused on the

programmatic. During meetings, switching frequently back and forth between the two realms was noted as a challenge.

Institutional Support

- Without institutional buy-in, continuity of the program within that entity is linked to an individual's commitment to the project and / or organization. In the case of the GMNF, it did not appear that there was a high level of support for the project by the organization's leaders. If the designated partner from GMNF does not choose to stay involved with FFEC, or leaves the agency, the USFS may no longer be a partner.

- Persuading other employees in an organization that the program was worth the resource diversion appeared to be an issue. The MBNHP superintendent reported that their seasonal interpreters often do not understand why the park invests in FFEC. "They ask, 'Why are we giving money in a cooperative agreement with [other organizations]?' So there's this constant part of trying to overcome resistance."

Location

- If a program is to be presented in various locations, portability becomes a function of the mobility of the involved groups. MBRNP is in a fixed location, accustomed to operating from that location, and more committed to their particular community. On the other hand, NWF and Shelburne Farms are more experienced in bringing their show on the road. For instance, if Vermont's northeast kingdom is the next place for a FFEC series, the logistical issue of its location being distant from the two more fixed, land-based partners will need to be addressed.

- A broader concern about location was raised by a non-FFEC Forest Service district ranger who wondered how this program might translate to more urban populations. Many different issues would need to be addressed, ranging from understanding the different attitudes about the environment for urban versus rural students to the logistics of getting urban kids to natural areas to deciding which partners are most appropriate as program sponsors.

Recognition

- There is some sacrifice of recognition inherent in partnering with other organizations. Each organization must share the "credit" for the program. Still, as Shelburne Farms' vice president said, "on some level we gain more recognition because we are networking more widely."

Planning and Decision-making

- The partnership's current structure consisting of an A Team (logistics) and a B Team (big picture) is helpful but not perfect. There is some tension between the agendas of the two teams and since not every organization was interested in or able to have an upper level administrator present at partnership meetings, some decisions were

slowed down. Several partners mentioned that it would be helpful to have an equal balance from each organization on each team, e.g. one person from each organization on each of the two teams. The silver lining is that some degree of tension can build creativity and excellence.

> *"To be a serious player you have to have tremendous investment."*
> *-NWF Center Director*

- There is some nuance to making decisions as group when the members bring varying levels of investment to the project, and issues of equity may arise. As the MBRNHP superintendent diplomatically summarized, "different resource contributions from different partners creates a complicated dynamic."

Funding

- One partner explained, "Not having a five year plan or five year funding…there was a real sense of break in momentum, a lack of security." Implementation-level staff in particular found that their job roles were more difficult to define due to uncertainties in funding sources. In particular, a break in the funding chain in year three was difficult for morale since partnership meetings were not as consistent, and the future of FFEC was less clear.

- Since the USFS does not historically have an educational focus, fewer monetary resources tend to be dedicated to educational programs. This can create a sense of imbalance in the provision of funding by partners in an arrangement such as FFEC. However, USFS respondents reported that partners in a program like FFEC could be called upon to make in-kind contributions such as staffing, land, ideas, and workshop space.

PARTNERSHIP CASE STUDY CONCLUSIONS

FFEC partners described many meaningful impacts of their participation in FFEC. Some changes took place inside of organizations, while others occurred in the larger network of communities, schools, and project collaborators. As the partners flourished in FFEC, the program itself reaped the benefits of being fed by many sources. This confluence of inputs from the partners shaped a program that is more flexible, energetic, objective, and transportable than what could have been produced by any one creator. And, with FFEC's success on the ground, partners are rapidly disseminating the model around the country (and in some cases internationally) through word of mouth, organized presentations, and formal and informal networks.

Whether in program implementation or in the way the partnership itself functions, there was consensus on the importance of authenticity and "real" experience. One partner explained,

> FFEC was a way of actually collaborating beyond the philosophical to implementing in a concrete way…You can talk about partnerships at one level but doing something real is different. We'll continue to [partner] because FFEC has been a positive experience.

With the credibility of larger organizations and groundedness of smaller ones, many hurdles can be overcome. In spite of lingering challenges, including equity of financial contributions, decision-making, and role clarity, in its first few years of development and implementation, FFEC has created a model for place-based education professional development and a model for partnering between public and private sector organizations, large and small.

PARTNERSHIP CASE STUDY IMPLICATIONS FOR PRACTICE

An organization's glowing successes and lingering challenges have this in common: they present an opportunity for learning and growth both for involved parties and those who may wish to embark on a similar course. The following recommendations are offered as this partnership ventures into its fourth year together, and as it spreads its message beyond its initial nucleus to others who may wish to emulate the FFEC partnership and program.

Evaluation Question:
What hypotheses about the program emerge from the case study that inform program development and/or future evaluation endeavors?

Clarify roles, decision-making, and mission

1. Build in time up front for partners to get to know one another's strengths, areas of interest and expertise, goals and personalities. A retreat for partners early in the process would honor the fact that working with a diverse group is necessarily more complex than working within one organization. Such a retreat would also help partners to define and agree on key terms pertinent to the project and share a common language. A shared common language would not only benefit the internal process of program development and implementation, but would facilitate a smoother translation of concepts to participants from the start. A retreat would also serve as a forum for each organization to make very clear what its expectations and goals are as an organization. Continue to retreat every year to reestablish goals and chart the program's course, reexamine structures, etc.

2. Designating an A Team (logistics, program implementation) and B Team (visioning, big picture agenda) was universally well-regarded in bringing more efficiency to the group but a handful of partners reported that it did not go far enough. Delineate roles more clearly, including what aspects of planning and implementation each partner needs to be present for. Carefully consider a variety

of meeting configurations that encourages a balance of specialization and collaboration amongst partners.

3. Develop guidelines for decision making within the partnership, accounting for the varying presence and absence of higher level decision makers amongst the participating partners. For instance, it might be advisable to expect upper-level decision makers from all organizations to meet at least once a year to assure the same level of institutional buy-in from all partners.

> *"One of the things that makes FFEC successful is that the people work so well together."*
> *-NWF Education Director*

Plan for optimal organizational learning

4. To capitalize on the potential benefits accrued from the transfer of learning from the individual FFEC partners to the rest of their organizations, have other staff from each organization (development, education, research, management, etc.) meet partners face to face and experience the program itself on some level. Present at staff meetings, board meetings, have leaders and staffers meet. One successful example of this is that the development coordinator at Shelburne Farms went to one of the FFEC seminars and consequently felt better able to represent FFEC when writing publications and seeking funding.

5. To promote breadth and staying power of FFEC within the organizations, strategically plan for systematic and explicit integration of education and conservation activities, such as the "seamless integration" for which NWF is striving and the increasingly linked Resource Management and Interpretation programs at MBRNHP.

Choose partners carefully

6. Develop working relationships with other organizations that are doing similar work. One partner that is not part of the FFEC partnership but could be a key player in some contexts is a state agency such as the State Park System, or the Agency of Natural Resources. One current FFEC partner explained that the state has been involved in FFEC in many ways, presenting at workshops or offering state properties but has not been sought as an official partner.

7. Most partners were satisfied and enthusiastic about the number and configuration of partners comprising FFEC and agreed that FFEC would be less successful with fewer partners. "When you boil it down, FFEC is about partnership between federal agencies and a regional non-profit. But it adds more appeal and power and potential when you have more partners," explained one partner.

> *"I don't think any one organization could have developed this program on its own.*
> *-CSI Program Coordinator*

8. To account for the importance of the partnership itself in delivering the FFEC program, when developing the FFEC dissemination module, include a segment on how to set up and operate as a partnership as well as how to actually create the educational component of FFEC.

Invite Potential Disseminators to Experience FFEC

9. For most effective dissemination, begin inviting key people from around the country to sit in on FFEC workshops so that they actually experience the flavor of the program and the zest of the participants while it is in session.

TEACHER SURVEY RESULTS

Table S1 on the following page summarizes the descriptive and inferential findings for two sets of educator surveys administered June 2004: 21 out of the 29 educators who were participants in the FFEC 1 and FFEC 2 trainings (72% representation); and 12 out of 14 educators from FFEC 4, representing 86% of that cohort.

In general, Table S1 shows that about half of the modules and indices tested are significantly and positively correlated with an educator's overall dose of FFEC. Large effect sizes are associated with the following outcomes:

- Overall teacher practice (contributed to in particular by the module for teacher use of local resources)
- Perceptions of overall student performance (contributed to in particular by indices for student engagement in learning and student civic engagement)
- Civic engagement existing in the community
- General quality of the community
- FFEC adds value to the community


FFEC Educator Survey

How much do you disagree or agree?

All of the graphs and tables presented in this section benefit form the ability to statistically control for the amount of reported training each participant has had in other, non-FFEC, place-based education programs.[7] All versions of FFEC educator surveys included an item asking for an estimate of the number of hours of other place-based education training they had received (item D12). When running the statistical analysis, any percent variance accounted for by the D12 variable was factored out before calculating the results presented in the table above and the graphs below. This means that the effects shown are that much more likely to represent impacts from FFEC as opposed to attitudes and skills that the participant had before working with FFEC

[7] As an interesting side note, this ability to control for prior place-based education training is a direct consequence of feedback from a FFEC program staff member during the editing and review stage of developing the FFEC educator survey. This innovation has greatly increased the strength of the pilot dose-response measurement strategy not just for FFEC, but for all of PEEC.

Figure S1. Summary of Dose-Response Data for FFEC Educator Surveys, 2004
Controlling for exposure to non-FFEC place-based education training

Variable *(items included)*	N	$\bar{X}$	M	SD	$\triangle R^2$	p	F	df
Dose composite *(calculated from d1,d3,d4)*	34	1.5	1.3	1.0	-	-	-	-
Other place-based ed. Training *(item = d12)*	34	2.2	2	1.2	-	-	-	-
Overall teacher practice *(overall module=p1,p3,p4,p6,l1,l2,l3,l4,l5,l6)*	34	2.8	2.8	.65	.23	.004**	9.8	31
Use of local resources *(L module = l1,l2,l3,l4,l5,l6)*	34	2.5	2.5	.80	.19	.011*	7.3	31
Use of local places *(llp index = l1,l4)*	34	2.9	3.0	.89	.19	.010**	7.5	31
Use of local people *(llpeop index = l2,l5)*	33	2.4	2.5	1.0	.19	.013*	7.0	30
Service learning *(lsl index = l3,l6)*	31	2.1	2.0	1.1	.11	.08	3.4	28
Improving teacher craft *(P module = p1,p3,p4,p6)*	32	3.4	3.4	.49	.08	.11	2.8	29
Meeting curricular goals *(pcg index = p1,p4)*	26	3.2	3.0	.51	.09	.16	2.2	23
Teacher engagement / growth *(pteg index = p3,p6)*	32	3.5	4.0	.57	.09	.08	3.2	29
Reports of student performance *(X module = x1,x2,x3,x5,x7,x9,x10,x11,x12)*	34	3.1	3.1	.53	.29	.002**	12.1	30
Student engagement in learning *(xsel index=x1,x5,x12)*	34	2.8	3.0	1.0	.23	.006**	8.9	30
Student academic achievement *(xsaa index=x2,x10,x11)*	22	3.3	3.3	.56	.00	.86	.03	19
Student civic engagement *(xsce index = x3,x7)*	31	3.0	3.0	.90	.33	.001**	13.9	28
Student test scores *(xts index = sqr. Root of x9*x10)*	9	2.4	2.5	.41	.10	.42	.74	6
Helps students w / learning challenges *(item = x11)*	21	3.5	4	.51	.04	.41	.71	18
Perceptions of community improvement *(Y module = y3,y4,y5,y6,y7,y8,y9,y10)*	34	3.2	3.2	.44	.09	.07	3.6	31
Community civic engagement *(yce index = y3,y6)*	32	3.3	3.3	.59	.33	.001**	15.0	29
Community environmental quality *(yeq index=y4,y7)*	32	3.0	3.0	.62	.11	.04*	4.8	29
Community planning process *(ypdm index = y5,y8)*	25	3.0	3.0	.76	.07	.21	1.7	22
General community quality *(ygen index = y3,y4,y5)*	33	3.1	3.0	.60	.21	.004**	9.6	30
Program adds value to comm. *(ypav index=y6,y7,y8,y9)*	20	3.1	3.0	.55	.21	.04*	4.9	17
Personal efficacy / involvement in com. *(item = y10)*	31	3.6	4	.51	.00	.95	.00	28
FFEC-cost-benefit of in depth support *(fcb index=f4,f5,f6)*	34	3.3	3.3	.51	.01	.50	.48	31
FFEC- valuing public lands *(fvpl index = f7,f8)*	30	3.3	3.5	.70	.00	.79	.07	27

N = *sample size;* **X =** *mean;* **M =** *median;* **SD =** *standard deviation;* $\triangle$**R²** *= % of outcome variability accounted for by dose composite;* **p =** *statistical significance test, threshold < .05/(# of component indices);*
** = significant at p < .05; ** = significant at p < .01;* **F =** *regression test;* **df =** *degrees of freedom*

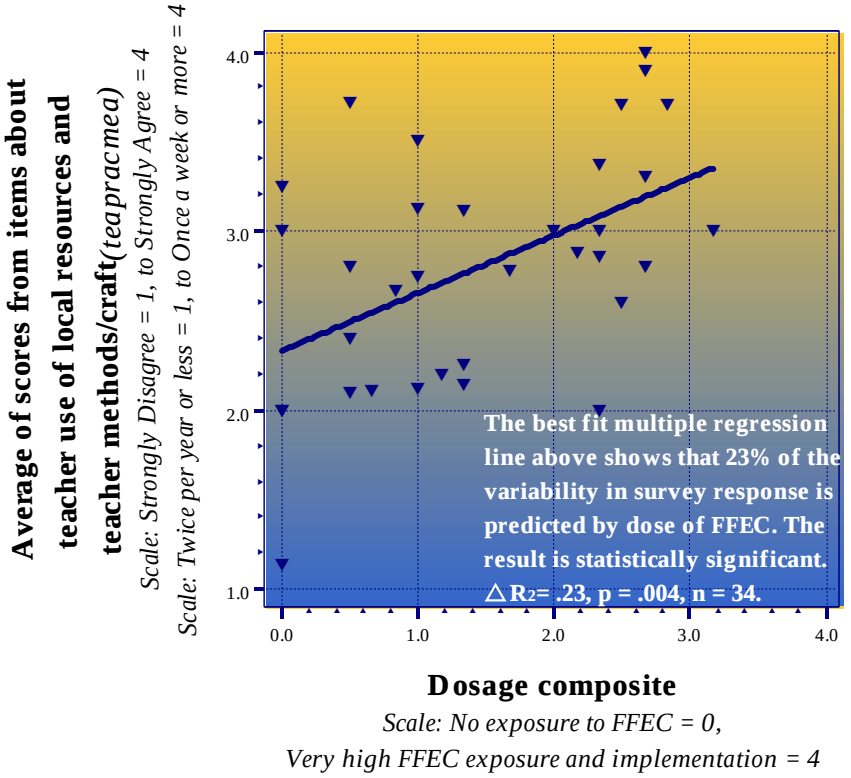
Figure S2 below shows that the more a person participates in FFEC, the more likely they are to report high scores on items about desirable teacher practice. This claim is also supported by the case studies presented elsewhere in this report. There is no immediately obvious reason to think that the different FFEC cohorts are

systematically different in ways that would bias this finding. Given the scope of FFEC compared to all the other factors that affect teacher practice, an ability for FFEC dose to predict 23% of the variance in teacher practice related questions is quite noteworthy.

Figure S2. Teacher Practice (overall module)

Controlling for exposure to non-FFEC training in place-based education

From FFEC educator surveys, 2004



The dose-response measurement strategy made it possible and practical to combine survey results from various FFEC cohorts in a meaningful way to show highly statistically significant results, such as the teacher practice changes represented by Figure S2. Since FFEC cohorts are necessarily small in order to ensure that individuals receive high levels of attention and support, the sample sizes of individual cohorts are too small to regularly generate statistical significance. But in combination, the results are highly statistically significant, meaning that it is extremely unlikely (a fraction of a percent likliehood) that the same results could have happened just by chance alone. Had the measurement strategy been limited to a strict pre-post, matching sets approach, we would have been hard pressed to document statistically significant findings from just this one measurement event.

Figure S3. Survey Respondent Comments on the high investment delivery model of FFEC

"The older I get the more I agree with the statements; you get what you pay for. You get out of something what you put in."

"Teachers appreciate the continued support. Too much of our professional development is a one-shot deal."

"Do keep FFEC: 1) across the seasons; 2) across the landscapes; 3) nurturing; 4) all those resources, folks, specialists!"

. Figure S4. Student Engagement in Learning (index)

Controlling for expsoure to place-based education training other than FFEC

From FFEC educator surveys, 2004

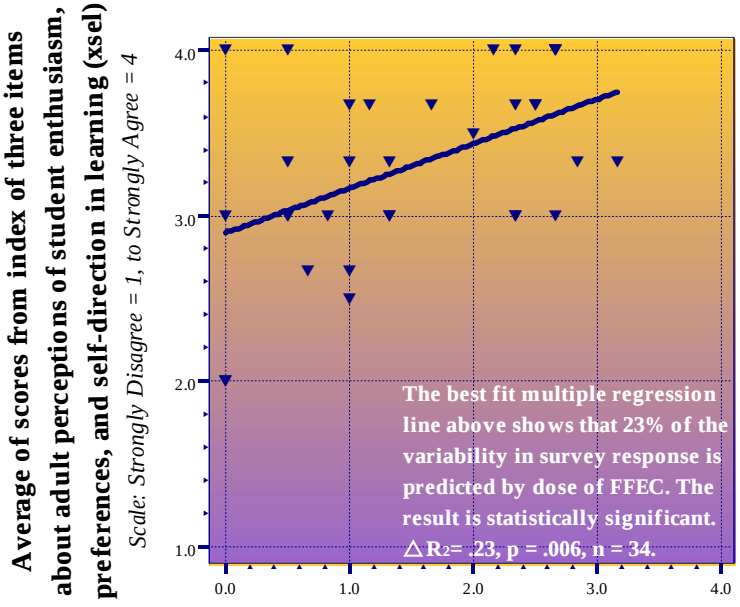


Figure S5. Student Academic Achievement (index)

Controlling for exposure to place-based education training other than FFEC

From FFEC educator surveys, 2004

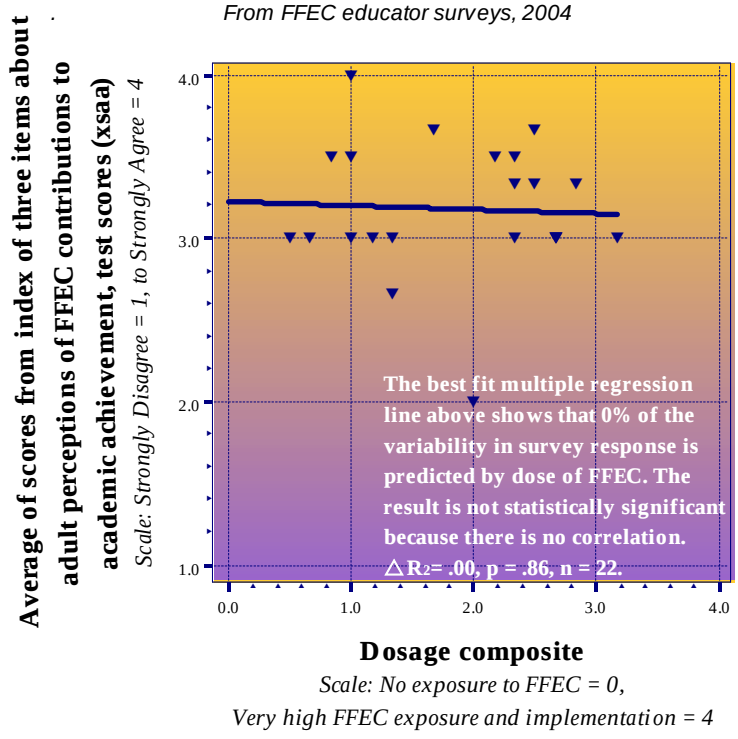


Figure S4 shows a strong correlation (23% variance) between FFEC dose and the extent to which participants report that FFEC increases their students' motivation to learn. Hearkening back to literature cited earlier in this report that supports the claim that students who are more motivated will end up performing better academically, it would be tempting to claim that the results show that FFEC indeed causes increased student academic achievement. But Figure S5 casts some doubt on this assertion, at least for now. Figure S5 suggests that higher doses of FFEC are not associated with teacher reports that FFEC helps their students achieve academically. The regression line here is flat (0% variance), indicating essentially no correlation between dose (i.e. extent of involvement in FFEC) and response (i.e. reported increases in student academic achievement).

The difference between Figures S4 and S5 reveals some useful information for interpreting scatterplot correlation graphs of this sort. Looking beyond the inferential statistics and instead focusing on the actual values of the index, it seems as if there is a kind of ceiling effect going on. FFEC participants report high levels of agreement that the

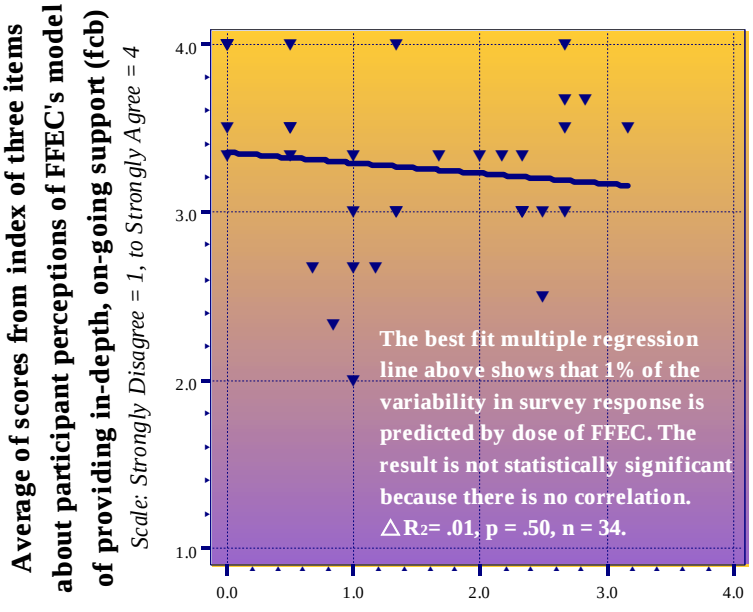
program helps their students achieve, *regardless* of how long they have been working with FFEC. This suggests that, for the student academic achievement piece at least, it does not matter so much *how much* FFEC a participant gets, as whether or not they receive *any* dose of FFEC. Alternatively, it might suggest that any teacher would think that FFEC would increase student academic achievement, whether or not they were involved in FFEC at all.

In our view then, the survey data clearly support the notion that students with larger exposures to FFEC show higher levels of motivation to learn in general. The data are also consistent with the notion that student participation in the FFEC program is associated with teacher ratings of higher overall academic achievement, although higher doses of FFEC are not necessarily more potent than lower doses in this regard.

It is important to remember when considering the impact of FFEC on students that Figures S4 and S5 represent teacher perceptions of student performance as opposed to direct measures of actual students. Thus, inferences drawn from this survey data should be tested for confirmation or disconfirmation by other sources of data.

One could draw some statistically sound (but necessarily preliminary) inferences from these graphs about how to structure FFEC. If demonstrating improved student academic achievement as a result of FFEC is a relatively high priority for key program stakeholders, then it might make sense to spend fewer resources per participant in order to be able to offer the program to a larger number of participants.

Figure S6. Cost-Benefit of FFEC Support Model (index)
Controlling for exposure to place-based education training other than FFEC
From FFEC educator surveys, 2004



The implication becomes more complex, though, when looking at Figure S6. This graph suggests that, like student academic achievement, participants with less FFEC dose are equally as likely to support the high investment per participant delivery model as participants who have been working with FFEC

for multiple years. Also, as in Figure S5, the overall level of agreement from participants is quite high (though it is common sense that they would tend to agree that the special care and feeding approach of FFEC is a good idea since they are immediate beneficiaries).

If, on the other hand, engaging students in the learning process through hands on projects in their community is deemed to be a higher priority outcome for FFEC, then this survey data clearly suggests that continued investment over time is the more effective strategy. This conclusion is warranted because of the very strong effect shown in Figure S4.

The preceding inferences about implications for program design would be strengthened greatly by including a comparison to scores from teachers who are not participating in FFEC at all. The overall PEEC survey system does not include a provision for such a measure at this point, and so that is a potential direction for PEEC to consider in future survey efforts.

Educator survey conclusions

In any case, piloting the dose-response measurement strategy has yielded solid evidence that FFEC is having positive impacts on teacher perceptions of their own teaching practice as well as on their perceptions of outcomes for their students. Some preliminary inferences can even be drawn about the challenging cost-benefit question of "how much FFEC is enough (in order to optimize long term impacts)," and a deeper investigation into the cost-benefit ramifications of various program delivery models would certainly be warranted in future evaluation efforts.

IMPLICATIONS FOR PRACTICE

Interpretation of the four sets of data used in this year's evaluation—three case studies and a survey--point to a number of recommendations for program development, also called implications for practice. Four categories of recommendations follow:

- Promoting a Broader Influence
- Supporting Participant Implementation
- Enhancing Service Learning
- Continuing to Strengthen the Partnership

In addition, more detailed, case specific implications for practice can be found at the end of each of the three case studies.

Promoting a Broader Influence

Through each participating teacher or team of teachers, FFEC has indirect access to a host of other teachers. By specifically aiming to support participating teachers to influence their partner teachers FFEC is more likely to magnify its effects.

- Some FFEC participants create outdoor classrooms and, while they are prepared and equipped to use teach in the outdoors themselves, they may not be skilled at inviting their colleagues to do so. Perhaps FFEC could offer participants specific tools to offer *other* teachers in their school--such as team teaching groups or short FFEC-led workshops--the process of creating the outdoor classroom may be not as intimidating.

- FFEC staff could provide further ideas for the school as a whole, such as first-day activities, to help participants create the gradual transformation to implement an outdoor curriculum.

- FFEC could continue to offer whole-school FFEC training workshops to complement a particular teacher or teaching team's lengthier participation in FFEC.

- Consider bring the cost-benefit mindset to higher prominence when deciding evaluation priorities. This includes deeper investigations into: the program delivery model, the rate and depth of diffusion of FFEC practices in participant schools, and more direct measures of impact on students.

Supporting Participant Implementation

- Perhaps the most fundamental aspect of supporting participants in their implementation of FFEC-related curricula is selecting appropriate participants

from the start. For year two, for instance, recruitment was not as focused as it was in Year 1, and as a result some teachers were noted to be "outliers" to the core curriculum. Their curricular requirements in the school made it more difficult for them to implement the aims of FFEC in their classrooms. By more explicitly recruiting teachers who will have the institutional support to implement FFEC, the percentage of FFEC participants who implant their curriculum may increase.

- To make the experience more valuable for everyone involved, FFEC staff could try to encourage entire teaching teams to participate in future FFEC programs.

- Future FFEC programs could encourage participants to explicitly identify and cultivate other supporting factors within their schools that would encourage the implementation of FFEC-related lessons and curricula. For instance, FFEC could encourage participants from the start of their involvement with FFEC to plan to utilize a specific nearby public forest while implementing FFEC-related ideas. This may include screening participants from the start of the program, recognizing that those without this physical resource may not be able to fulfill FFEC goals.

Enhancing Service Learning

Both participant-focused case studies indicated that the service learning component of the FFEC model proved to be the most challenging aspect for the teachers to implement. FFEC partners could enhance their service learning component by providing access, skills and encouragement to teachers for engaging their students directly in a forest management activity. One example is engaging students in the management of a selected piece of property.

- FFEC programs could encourage teachers to incorporate a service learning component for every student, but not necessarily the same experience for every student by incorporating the service learning element into the kinds of "exploratory" periods offered at WUMS. While students would have different service experiences, this would ensure that all students completed a service learning component and that they had the opportunity to choose the one they enjoy the most.

- While emphasizing the service learning component with subsequent FFEC cohorts should increase the comfort and skill with which participants implement this aspect, it will also be incumbent upon the FFEC partners to better understand and attempt to remedy the various barriers teachers face—such as a packed school day, or administrative and logistical hurdles—when trying to implement service learning.

Continuing to Strengthen the Partnership

Please see partnership case study (above) for recommendations including:

- Clarify roles, decision-making, and mission
- Achieve maximal organizational learning
- Choose partners carefully
- Invite potential disseminators to experience FFEC

LITERATURE CITED

Abelson, R.P. (1985). A variance explanation paradox: When a little is a lot. *Psychological Bulletin, 97,* 129-133.

Bloom, B. S. (1976). *Human characteristics and school learning.* McGraw-Hill, New York.

Bosker, R. J. (1992). *The stability and consistency of school effects in primary education.* Enschede, University of Twente, The Netherlands.

Bucknam, R. B. (1976). The impact of EBCE: An evaluator's viewpoint. *Illinois Career Education Journal, 33*(3), 32-36.

Carlson, M., Sanders, D. (2004). *Perspectives on collaborative projects between schools and external actors.* Conference presentation. Retrieved May 19, 2004 from http://www.nfer.ac.uk/research/papers/perspectives.doc

Chi, B. (2000). *Service-learning as "Citizenship" Education: The Promise and the Puzzles.* Corporation for National Service, Washington, D.C. Retrieved August 1, 2004 from http://www.nationalservice.org/research/fellows_reports/2000/chi.pdf

Chin, J. (2001). *All of a Place: Connecting Schools, Youth and Community through Place-based Education.* Paper presented at the Funders Forum on Environment and Education, San Francisco, CA.

Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfield, F. D., & York, R. L. (1966). *Equality of educational opportunity.* U.S. Government Printing Office, Washington, DC.

Comer, J.P. (1984). Home-school relationships as they affect the academic success of children. *Education and Urban Society, 16*(3), 323-337.

Comer, J.P. (1988). *Educating poor minority children*. Scientific American, 259(5), 42-48.

Coyle, K. (2004). *Understanding environmental literacy in America: And making it a reality: What Ten Years of NEETF/Roper research and related studies tell us about how to achieve environmental literacy in America.* National Environmental Education & Training Foundation, Washington, D.C. Retrieved August 1, 2004 from http://neetf.org/roper/ELR.pdf

Davey, L. 1991. The application of case study evaluations. Practical Assessment, Research & Evaluation, 2(9). Retrieved September 19, 2003 from http://edresearch.org/pare/getvn.asp?v=2&n=9

Emekauwa, E. (2004). *They remember what they touch: The impact of place-based learning in East Feliciana parish*. Rural School and Community Trust. Retrieved August 1, 2004 from http://www.ruraledu.org/docs/Louisiana-East_Feliciana.pdf

Epstein, J. (1991). Effects on student achievement of teachers' practices of parent involvement. In S. B. Silvern (Ed.), *Advances in reading/language research: Vol. 5. Literacy through family, community and school interaction* (pp. 261-276). JAI Press, Greenwich, CT.

Epstein, J., & Becker, H. (1982). Teacher practices of parent involvement. *Elementary School Journal, 83*, 103-113.

Fullan, M. (1993). *Change forces: Probing the depths of educational reform.* Falmer, London.

Geisler-Brenstein, E., & Schmeck, R. R. (1996). The revised inventory of learning processes: A multifaceted perspective on individual differences in learning. In M. Birenbaum Y F. J. R. C. Chochy (Eds.), *Alternatives in assessment of achievements, learning process, and prior knowledge* (pp. 284-317). Kluwer, Boston, MA.

Generally accepted principles of teaching and learning: And their implications for local education support systems. (2002). Annenberg Institute for School Reform, Brown University. Retrieved August 1, 2004 from http://www.schoolcommunities.org/images/GAPTL.pdf

Gladwell, M. (2002). *The tipping point: How little things can make a big difference.* Little, Brown & Co., Boston, New York, London.

Hagevik, R. A. (2003). *The effects of online instruction using geographic information systems to foster inquiry learning of middle school teachers and science students.* Ph.D. dissertation, North Caroline State University. Retrieved August 1, 2004, from http://www.lib.ncsu.edu/theses/available/etd-11032003-235227/unrestricted/etd.pdf

Hart, R. (1997). *Children's participation: The theory and practice of involving young citizens in community development and environmental care.* Earthscan, London.

Hungerford, H. R., & Volk, T. (1990). Changing learner behavior through Environmental education. *The Journal of Environmental Education*, 21(3), p. 8-12.

Jensen, B. B., Schnack, K., & Simovska, V. (Eds). (2000). *Critical environmental and health education research issues and challenges.* Danish University of Education.

Liebermann, J., & Hoody, L. (1998). *Closing the achievement gap: Using the environment as an integrating context for learning*. State Education and Environment Roundtable, San Diego, CA.

Living and learning in rural schools and communities: a report to the Annenburg Rural Challenge. (1999a). Cambridge, MA: Harvard Graduate School of Education.

Living and learning in rural schools and communities: lessons from the field. (1999b). Cambridge, MA: Harvard Graduate School of Education.

Lopez, M. (2003). *Transforming Schools Through Community Organizing: A Research Review.* Harvard Family Research Project, Harvard, MA. Retrieved August 1, 2004 from http://www.gse.harvard.edu/hfrp/projects/fine/resources/research/lopez.html

Luyten, H. (1994). *School effects: Stability and malleability*. Enschede, University of Twente, The Netherlands.

Madaus, G. F., Kelleghan, T., Rakow, E. A., & King, D. (1979). The sensitivity of measures of school effectiveness. *Harvard Educational Review, 49*(2), 207-230.

Marzano, R. J. (2000). *A new era of school reform: Going where the research takes us.* Mid-continent Research for Education and Learning, Aurora, CO.

_____ (2003). *What works in schools: Translating research into action.* Association for Supervision and Curriculum Development, Alexandria, VA.

Miles, M. B. and A. M. Huberman. (1994). *An expanded sourcebook: Qualitative data analysis* (2nd ed.). California: Sage.

Monroe, M. C. (2002). Evaluation's friendly voice: the structured open-ended interview. *Applied Environmental Education and Communication, 1*, 101-106.

Moore, G. A. (1999). *Crossing the chasm: Marketing and selling high-tech products to mainstream customers.* Harper Collins, New York.

National Environmental Education Advisory Council. (1996). *Report assessing environmental education in the United States and the implementation of the National Environmental Education Act of 1990.* US EPA. Retrieved August 1, 2004 from http://www.epa.gov/enviroed/pdf/report.pdf

Newton, R. A. & Rudestam, K. E. (1999). *Your statistical consultant: Answers to your data analysis questions*. Sage, Thousand Oaks, CA.

Patton, M. Q. (1997). *Utilization-focused evaluation: The new century text* (3rd edition). Sage, Thousand Oaks.

Paulsen, S. E. (1994a). Parenting style and parental involvement: Relations with adolescent achievement. *Mid-Western Educational Researcher, 7*, 6-11.

Paulsen, S. E. (1994b). Relations of parenting style and parental involvement with ninth-grade students' achievement. *Journal of Early Adolescence, 14,* 250-267.

Pedersen, E., Faucher, T. A., & Eaton, W. W. (1978). A new perspective on the effect of first grade teachers on children's subsequent adult status. *Harvard Education Review, Vol. 48,* No. 1. President and Fellows of Harvard College, Harvard, MA.

PEER Associates. (2004). Place-based Education Evaluation Collaborative: Cross-program evaluation report, 2003-2004. Retrieved October 1, 2004 from http://www.peecworks.org/PEEC/PEEC_Reports/

Place-based Education Evaluation Collaborative (PEEC) website: http://www.peecworks.org

Plumb, S. (2003). *The potential power of place in education: Literature review*. Master's Thesis, University of Vermont. Retrieved August 1, 2004 from http://www.peecworks.org/PEEC/PEEC_Research/0009D4DB-007EA7AB.0/Plumb%20CMP%20Thesis%20Lit%20Review.pdf

Powers, A. L. & Duffin, M. T. (2003). An evaluation of the Community-School Environmental Education Program: 2002-2003. Retrieved August 1, 2004 from http://www.peecworks.org/PEEC/PEEC_Reports/S0004B2DD-0004B2DE.1/02-03%20CO-SEED%20Eval%20web.pdf

Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist, 47*(9), 1102-1114.

Public Education Foundation. (2002). *Highly Effective Teacher Study*. Chattanooga, TN. Retrieved August 1, 2004 from http://www.pefchattanooga.org/www/docs/5.261

Putnam, R. (2001). *Bowling Alone: The Collapse and Revival of American Community*. Touchstone, New York.

Rogers, E. M. (2003). *Diffusion of innovations (5th ed.).* Free Press, New York.

Sanders, W., & Rivers, J. (1996). *Cumulative and residual effects of teachers on future student achievement.* University of Tennessee Value-Added Research and Assessment Center, Knoxville, TN. Retrieved August 1, 2004 from http://www.heartland.org/pdf/21803a.pdf

Schiefele, U., Krapp, A., & Winteler, A. (1992). Interest as a predictor of academic achievement: A meta-analysis of research. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development*, pp. 183-212. Erlbaum, Hillsdale, NJ.

Schiefele, U., & Krapp, A. (1996). Topics of interest and free recall of expository text. *Learning and Individual Differences, 8*(2), 141-160.

Schneider, B. & Cheslock, N. (2003). *Measuring results: Gaining insight on behavior change strategies and evaluation methods from environmental education, museum, health, and social marketing programs.* CoEvolution Institute, San Francisco, CA.

Scriven, M. (2004). *Causation*. Retrieve August 1, 2004 from http://www.arts.auckland.ac.nz/FileGet.cfm?ID=7745A664%2D64CE%2D48D2%2DA07B%2D39D663B23FF3

Smith, G. A., & Williams, D. R. (1999). *Ecological Education in Action: on Weaving Education, Culture and the Environment*. State University of New York Press, Albany, NY.

Sobel, D. (2004). *Place-based education: Connecting Classrooms & Communities.* Orion Society, Great Barrington, MA.

_____(1998). Mapmaking with children: Sense of place education for the elementary years. Heineman, Portsmouth, NH.

Stallworth, N. T., & Williams, D. L. Jr. (1982). *Executive summary of the final report: A survey of parents regarding parent involvement in the schools.* Southwest Educational Development Laboratory, Austin, TX.

Steinkamp, M. W., & Maehr, M. L. (1983). Affect, ability, and science achievement: A quantitative synthesis of correlational research. *Review of Educational Research, 53*(3), 369-396.

Stone, M. K. (2001). Solving for pattern. *Whole Earth,* 77-83.

Stringfield, S., & Teddlie, C. (1989). The first three phases of the Louisiana school effectiveness study. In B. P. M. Creemers, T. Peters, & D. Reynolds (Eds.), *School effectiveness and school improvement: Proceedings of the second international congress, Rotterdam* (pp. 281-294). Swets & Zeitlinger, Lisse.

Strosahl, K. D. (1998). Assessing the field effectiveness of acceptance and commitment therapy: An example of the manipulated training research model. *Behavior Therapy, 29,* 35-64.

Tobias, S. (1994). Interest, prior knowledge and learning. *Review of Educational Research, 64*(1), 37-43.

Willingham, W. W., Pollack, J. M., & Lewis, C. (2002). Grades and test scores: Accounting for observed differences. *Journal of Educational Measurement, 39*(1), 1-37.

Wilson, E.O. (2002). *The future of life.* Vintage, New York.

Wright, S. P., Horn, S., & Sanders, W. (1997). Teacher and classroom context effects on student achievement: Implications for teacher evaluation. *Journal of Personnel Evaluation in Education, 11*, 57-67. Kluwer Academic Publishers, Boston, MA.

Yin, R. K. (2003). *Case study research: Design and methods. Third edition*. Sage, Thousand Oaks, CA.

APPENDIX

APPENDIX A: FFEC LOGIC MODEL

Draft: 5/02

HYPOTHESES: If we implement comprehensive educator professional development on place-based and citizenship education, people (including youth) will contribute to the stewardship of public lands and communities

RESOURCES / INPUTS	ACTIVITIES / STRATEGIES	SHORT TERM OUTCOMES	INTERMEDIATE OUTCOMES	LONG TERM OUTCOMES
Technical Assistance from experts/contractors Partners • National Park Service • Conservation Study Institute • National Wildlife Foundation • National Forest Service • Shelburne Farms Teachers/Educators Community Forest Stewardship Network Funding National Parks Service JL Foundation Ittleson Foundation Wellborn Fund Promising Practices/Research Evaluation Graduate Credit Resource Materials	Collaborative Partnerships Community Forum and other community events Sustained and embedded professional development Ongoing support for educators Standards based curriculum development (instruction and assessment) Peer coaching Network building (sustained over time) Service Learning Access to resource specialist and community resources Mini grants	Develop and pilot a professional development model in place-based education and citizenship education. Evaluation of program including: • Assessment in student learning and stewardship activities • Teacher practices in place-based education pedagogy and service learning • Community involvement / investment • Partners' capacity Resource development for replication in other communities	Students who have the knowledge, skills and motivation (social potency) to be active stewards/citizens. Teachers/schools are committed to and have the capacity to create and implement place-based learning that fosters student participation in the community. Social Capital increases in the community demonstrated by increased interaction between school and community and stronger sense of place Government and non-government organizational effectiveness and capacity is increased by working together in partnership. Learning Organizations	Strengthening civil society Stewardship of communities and special places.

APPENDIX B: FFEC EVALUATION OVERVIEW 2003-04

A Forest for Every Classroom
Evaluation Methods 2003-2004
September 5, 2003
Amy Powers, Michael Duffin, George Tremblay

FFEC Common Vision and Project Goals

FFEC Common Vision:

- If today's students are to become responsible environmental decision makers, they must understand the local ecosystems in which they live and they must have educational opportunities based on real life issues that encourage them to practice citizenship in their own communities.

FFEC's goals are to:

- Cultivate an understanding of place by working with teachers and their students to experience and understand local forests as complex and dynamic systems of natural and cultural resources and increasing interaction between the school and community, building a stronger sense of place and stewardship of public lands;
- Provide resources for educators to meet state and national education standards while effectively integrating stewardship, citizenship and a sense of place into their curricula;
- Foster a strong network of teachers, partners, community members and natural and cultural resource specialists that will ensure an ongoing relationship of sharing of information, materials, and resources.
- Promote a balanced view of forest stewardship that not only teaches about the forest ecosystem, but also includes the spectrum of stewardship challenges faced by land management agencies (federal, state, local) and private forest landowners
- Build a strong partnership that helps to increase institutional capacity and further program needs.

Program evaluation will:

- Evaluate effectiveness of the FFEC model in terms of process (program implementation)
- Evaluate effectiveness of the FFEC model in terms of outcomes (results)
- Provide useful information for FFEC project partners and funders to assist with program development, justification and refinement

See below for evaluation strategies

Evaluation Strategies for FFEC Evaluation 2003-2004

Areas of focus	Evaluation Questions
1. Comprehensive Teacher Survey • Telephone, in-person or paper TBD based on availability of graduate students, time allocation, etc. • all FFEC 1 and 2 teachers • *see notes on page 3* *Timing: Early Spring 2004*	• Process / model effectiveness *a) What is the impact of FFEC sustained professional development on teacher practice and community involvement? Do teachers who choose to participate in FFEC beyond one year of training demonstrate stronger or more lasting impacts to their teaching?* *b) In what ways has the existence of this unique partnership contributed to teachers' involvement and/or implementation of their units?* • Teacher outcomes *c) How has teacher practice changed, and been sustained?(draw from stages of change literature)* *d) Did teachers implement units resembling what they proposed in their initial application?* *e) Are teachers using more community partners, and in what ways?* *f) Are there notable personal changes in teachers such as engagement in community?* • Teacher-reported student outcomes *g) How does FFEC type teaching affect student learning?* • Teacher-reported community outcomes *h) Is there a shift in teachers' perception and use of public lands?* *i) Are teachers, parents and students more involved in public land use and decision making as a result of FFEC?*
2. **Case study of 2-3 excellent examples of FFEC in action:** Visit selected ideal sites to record implementation, make observations, take photos, interview students, parents, administrators, teachers about teacher and school practice change, community impacts, perceptions of public lands, student achievement. Enlist key teachers in collecting evidence throughout the year. *Timing for 2 and 3: Fall and Spring: Site visits , observations, doc review, in-person interviews and/or phone interviews, (may involve grad student help)*	
3. **Case study of FFEC Partnership**: Interviews with and observations of all four partner organizations (NPS, USFS, NWF, SF), including interviews with individuals directly involved and not involved with FFEC. Gathering pertinent documentation and materials pertinent to partner relationships. Enlist partners in collecting evidence throughout the year.	• Partner outcomes *j) How are FFEC partners—individuals and organizations--changing the ways in which they operate as a result of involvement in FFEC? (roles, budget allocations, program decisions, etc.)* • Partner-reported community outcomes *k) In what ways are partners facilitating relationships between schools and communities?* l) *In what ways has this partnership contributed to changing relationships between public lands and communities (via the training of teachers to help students attach to place)?*

Evaluators' Roles

- Meet with project staff to develop evaluation plan, and make modifications as needed
- Develop and refine evaluation tools and protocols
- Data collection including site visits, interviews, photo documentation
- Data analysis
- Report writing (to be completed by August 31, 2004)
- Provide planning and / or recommendations for Year Three evaluation (as appropriate)
- Amy is the evaluation team's contact person for FFEC evaluation; Pat is the partners' contact person.
- Estimated number of days to complete FFEC evaluation products: **30**

FFEC Partner Roles in evaluation process

- Develop Year Two evaluation plan with evaluators
- Provide input throughout the year via meetings, phone and / or email on evaluation direction and appropriateness of instruments
- Liaison between evaluators and school (e.g. setting up interview schedule)
- Provide incentives for participant participation in evaluation process
- As available organizationally, assist with administrative work such as survey administration (copying, mailing, collating); data entry; and provision of incentives for evaluation
- Provide data such as test scores as designated
- Meet with evaluators to consider evaluation needs for Year Three, as appropriate
  - effect"…does some teachers' practice change follow a delay?

APPENDIX C: WOODSTOCK AND RAY SCHOOL CASE STUDY INTERVIEW GUIDE

December 2003

Teachers

1. How has participation in the FFEC series (yours or another teacher's) impacted your teaching style?
2. Describe how your students engage in the FFEC related activities.
3. As you brought the FFEC influence into your classroom, did you notice your students becoming more engaged in learning? In the community?
4. What was the most challenging aspect of implementing the FFEC program?
5. How did you overcome it?

Students

1. What has your class done this year related to local forests and your local community?
2. Do you like about learning about the local forests and community? Are there parts that you do not like?
3. Does learning about the forests in your town (or state) help you understand other parts of your schoolwork such as math, science, reading and writing?

School Administrators

1. How has the FFEC program influenced the school's relationship to its community?
2. In what ways have you seen FFEC influence students' involvement in the community?
3. Describe a change you have noticed in a teaching style that you would attribute to the FFEC teacher workshops.

Parents

1. Have you noticed a change in the amount of engagement your child's class has had in the community and public lands? In what ways?
2. Do you see your child's engagement in his / her schoolwork changing because of the class getting outside and / or studying the local area more?

Community Partners

1. In what ways has the FFEC program impacted your organization?
2. In your eyes, how has the FFEC program helped define the value of the school in the community?
3. Have you been aware of changes in the way that teachers teach as a result of FFEC participation?

APPENDIX D: FFEC PARTNERSHIP CASE STUDY INTERVIEW GUIDE

Interview Guide

Interviewee(s):
Date:
Place:
Taped/Transcribed

---

1. What has your organization contributed to the partnership?

2. What has your organization learned from participation in the partnership?

3. Has there been a spread of effect beyond FFEC within your organization?
    a. Programs or trajectories that have changed b/c of your participation?
    b. A change in the "way you do business"?
    c. A shift in mentality, philosophies?
    d. Organizational structure?
    e. The way resources are allocated?

4. What have you personally/professionally learned from participation in the partnership?

5. In what concrete ways do you believe the FFEC program is enhanced by the fact that it is a product of a partnership rather than an individual organization?

6. Have there been sacrifices for you or your organization associated with the partnership?

7. What advice would you give a new partnership forming?

8. What challenges have you faced as a partnership?

9. Can you offer me concrete examples of the ways you have seen the FFEC partnership help to facilitate relationships between schools and communities?

10. Can you offer me any examples of ways in which you have seen the partnership contribute to changing relationships between public lands and communities?

11. What documentation or evidence of the partnership's effects on your organization or community can you offer?

12. Other comments…

APPENDIX E: CASE STUDY PROGRESS CHART

To be used by: *Researcher*
Directions for use: *Use this form to guide the development of the case study, marking progress along the way.*

Case Study Task	*Target completion date*	*Actual completion date*
1. Select themes of case study with program staff		
2. Select case study site with program staff		
3. Screen site for case study criteria.		
4. Discuss possibility of incentive / stipend for Gateway Contact Person, as appropriate.		
5. Confirm target completion dates with program staff.		
6. Create an Overview and provide to stakeholders.		
7. Develop system for document collection by researcher and by Gateway Contact Person.		
8. Collaborate with program staff to establish an introduction to site contacts. Meet with Gateway Contact Person. (use *Gateway Contact Person Guidelines*)		
9. Identify and set up appropriate interviewees with help from Gateway Contact Person.		
10. Gather data: interviews, observations, written documents, photos. (see *Interview Guide*)		
11. Compile and analyze data.		
12. Write draft of case study (see Written Case Study Outline) and provide to program staff for review.		
13. Complete case study report and, as appropriate, coordinate inclusion in overall FFEC evaluation report.		

APPENDIX F: CASE STUDY GATEWAY CONTACT PERSON GUIDELINES

To be used by: Researcher
Directions for use: Identify a FFEC teacher who agrees to provide access to case study data throughout the process. Use this sheet during initial meetings, emails and / or phone calls with Gateway Contact Person to clarify expectations for their role in the case study.

- ❑ Provide Gateway Contact Person (GCP) with an overview of the project
- ❑ Introduce GCP to the purposes and process of the case study, including the theme, methods and larger evaluation context, if applicable.
- ❑ Review roles / expectations of the GCP (see *Sample Email* below) and discuss incentive or stipend for participation (provided by program, as appropriate).
- ❑ Show GCP the data gathering system (such as an accordion file) and / or create a workable system *with* the GCP. The accordion file can contain labels noting the types of materials that would be useful for the GCP to gather. Potential items for collection include:
  - ✓ Photographs (print or digital)
  - ✓ Newspaper articles (or reference to other media coverage)
  - ✓ Student work
  - ✓ Teacher work / curricula
  - ✓ Correspondence (with partners, parents, students, local officials)
  - ✓ Journal entries, reflective writing (students, teachers partners)
  - ✓ Fliers, brochures
  - ✓ Other supporting documents

- ❑ Ask GCP for recommendations, introductions and / or contact information for the following:
  - ✓ Other teachers in the school who participated in FFEC
  - ✓ Other teachers in school who were impacted by FFEC (not necessarily participants)
  - ✓ Relevant school administrators
  - ✓ Other teachers in neighboring schools who may have been impacted by FFEC work (if applicable)
  - ✓ Other community partners
  - ✓ Parents or other community members

- ✓ Students (inquire about what permissions are needed for interviewing and / or photographing students)
- ✓ Note: Also arrange to interview FFEC program staff (may not be necessary to discuss with GCP)

❑ Set up interview date(s) with GCP

❑ Set up dates for gathering data from accordion file, including its final retrieval

❑ Set up dates for observing the following FFEC related activities:

- ✓ students in the field
- ✓ students in the classroom
- ✓ students working with community partners
- ✓ teacher team meetings in which FFEC is discussed
- ✓ student, teacher or partner presentations
- ✓ other culminating events

Sample Email to Gateway Contact Person

Dear Janet,

It was good to talk to you the other day. I was encouraged by your willingness to be part of the case study we're conducting in conjunction with an evaluation of FFEC.

I will provide you with more specific details about the case study when we meet, but I want to remind you what we're hoping from you as the Gateway Contact Person. As the "gateway" to the project, we hope you will link us with appropriate community partners, students, teachers, parents and administrators whom we might interview about the project. We would like you to provide us with dates when we might observe the students working in class, the field, presentations, etc., and we will also ask you to show us your project documentation (curricula, student work, etc.) that we can include in the case study. FFEC has offered to provide you with a $100. stipend in appreciation of your participation.

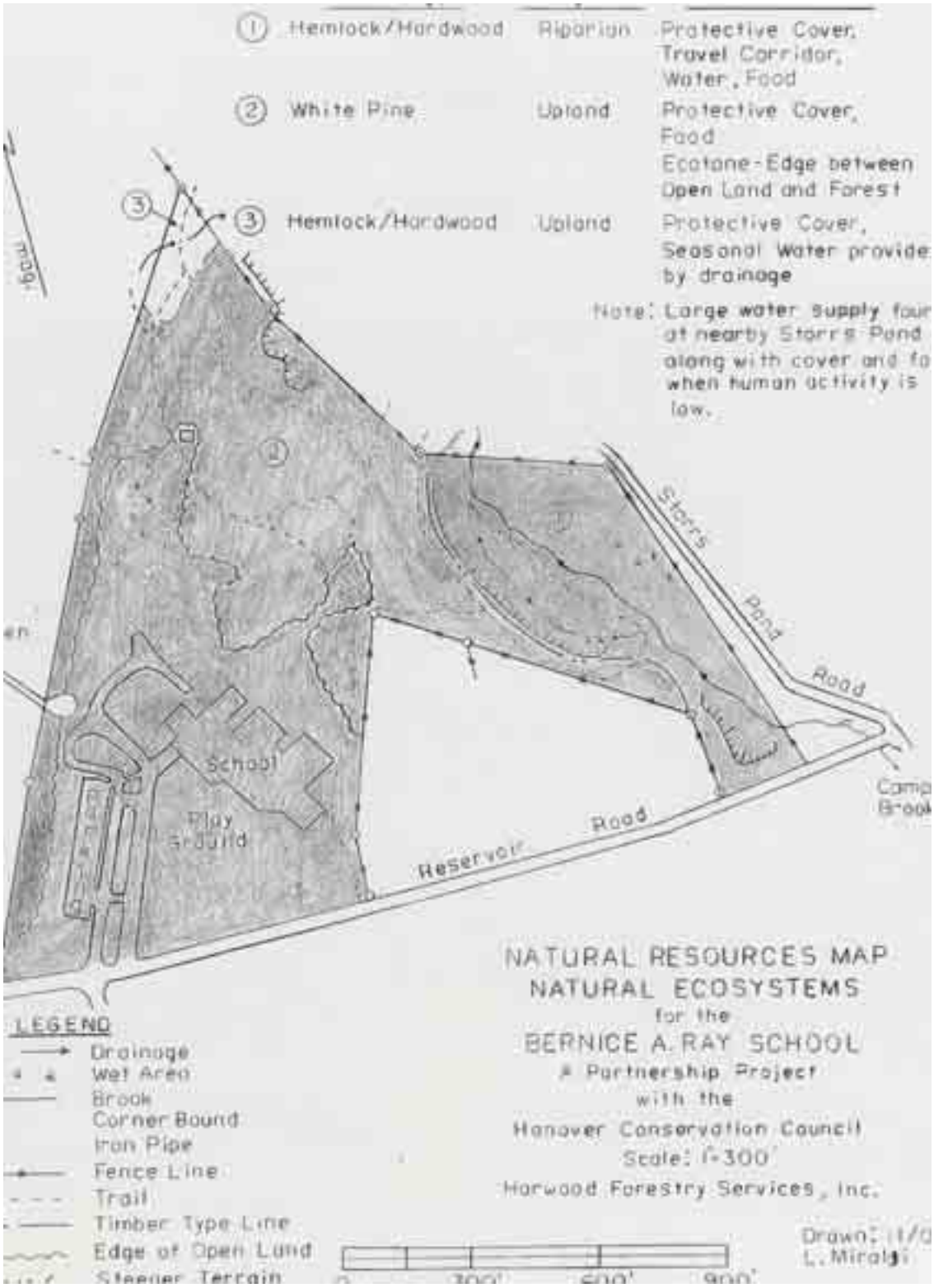
Also as a reminder, our focusing theme for the study is *how FFEC has influenced a change in teacher practice*. Our investigation will center around that theme.

Please let me know if this role is still agreeable to you, and we will proceed from there.

Thanks again for your participation.

APPENDIX G: RAY SCHOOL CASE STUDY MATERIALS

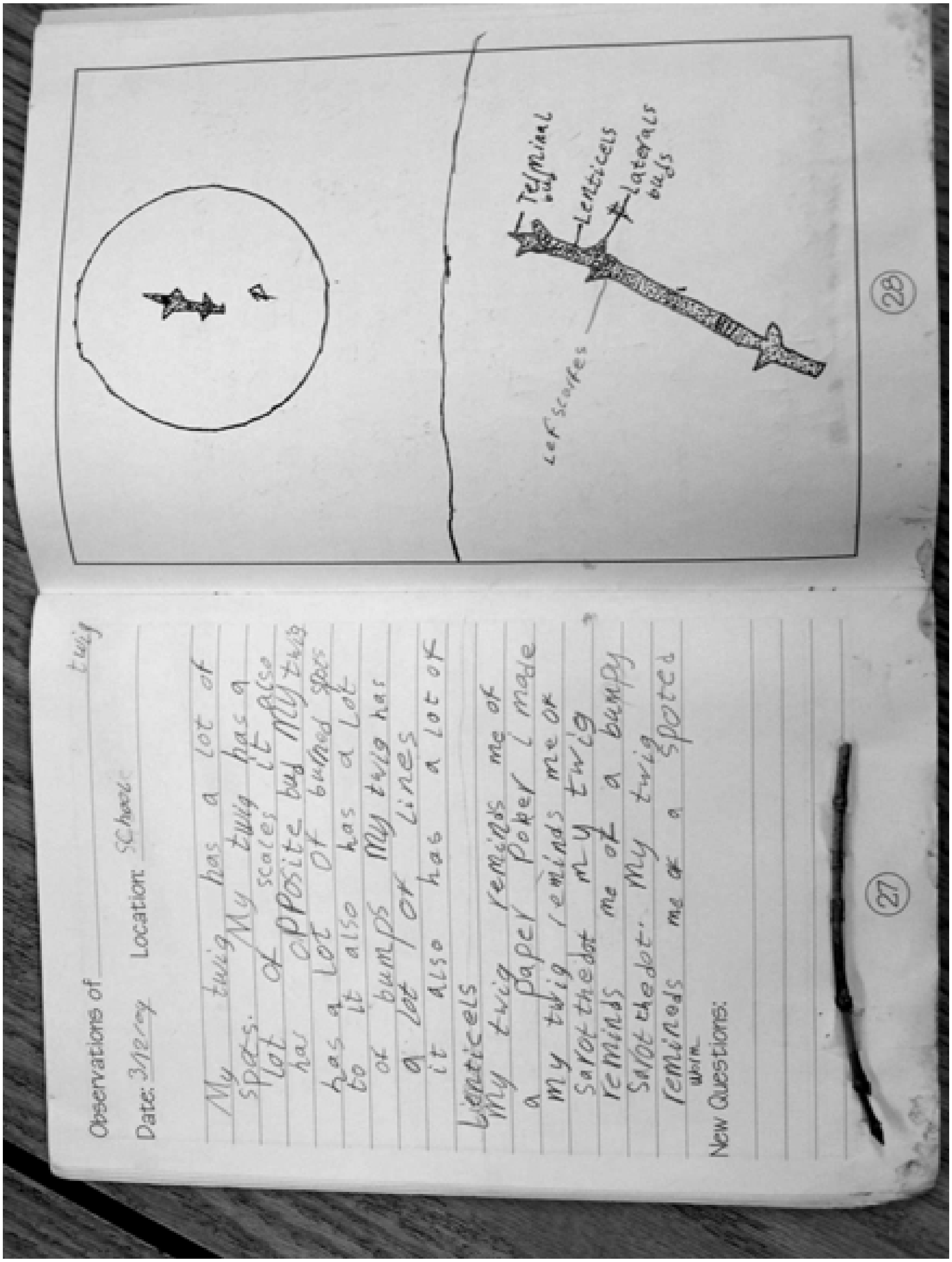
Ray School Appendix 1. Map of Ray School forest

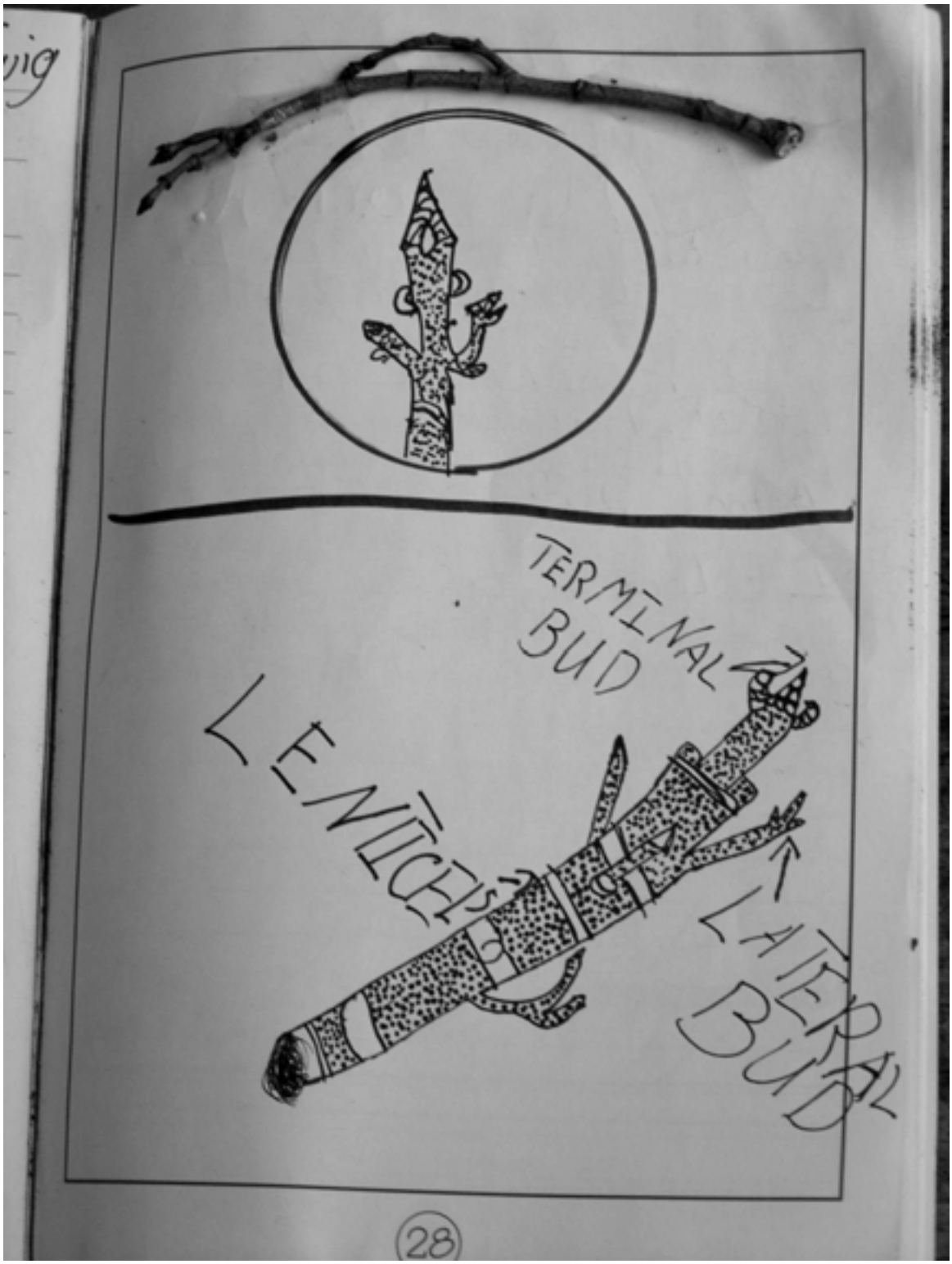


Ray School Appendix 2. Science Curriculum Matrix

K-5 Ray School Science Curriculum Topic Matrix - 1/14/04

	Habitat	Life Science Human Factors and Systems	Physical Science	Earth Science	Health
K-1	**Meadow** • Grasses, flowers, seeds, insects, birds, and mammals	• Diversity of animals, plants, and living things • Change in plants and animals	• Observing through senses	• Place/Earth	• Nutrition
2	**Forest** • Trees and mammals	• Diversity of trees • Interactions of plants and animals • Change in the forest	• Physical properties of matter • Sound	• Seasons • Rocks/soil	• Nutrition/food Pyramid/healthy choice
3	**Vernal Pool** • Emerging aquatic plants. • Grasses, sedges, insects, amphibians, and reptiles	• Interactions of plants and animals • Changes within the vernal pool	• States of matter	• Weather	• Muscular-skeletal system • Cells
4	**Stream** • Macroinvertebrates	• Adaptation of organisms	• Force and motion • Light	• Solar system • US geology	• Digestive system
5	**River/Wetland** • Fish, macro-invertebrates, fresh water mollusks, crustaceans, and aquatic plants	• Energy transfer	• Magnetism • Electricity	• Forces/ changing landscapes	• Respiratory system • Disease • Human growth and development


Observations of twig
Date: 3/12/04
Location: School
New Questions:
27
28


TERMINAL
BUD
LEAFLET
LATERAL
BUD
28

APPENDIX H: WOODSTOCK CASE STUDY MATERIALS

Woodstock Case Study Appendix 1. Sample of three newspaper articles about Woodstock teachers' and students' FFEC-related experiences

WOODSTOCK VERMONT THURSDAY DECEMBER 19 2002

Students And Sustainable Forests

Local educators took a course entitled "A Forest For Every Classroom" offered by the National Park Service, Shelburn[e] Farms and the National Wildlife Federation. The know[ledge] was passed onto Woodstock Union Middle School [...] These essays were selected from among 100 written [...] seventh graders dealing with the topic of Sustainable [...] Use. Our thanks to teacher Wanda Stetson for coordinat[ing] this project.

By KELLY GILLER

Although we may not know it, forests play a part in our lives everyday. If we don't work to keep them safe and use them wisely, then we may not have forests in the future. Two local businesses in Vermont that support and practice to protect forests are Maplecrest Farm and Charles Shackleton Furniture.

Forests have many values in [...]

Vermont Standard December 4, 2003

Classroom In the Woods

Forest-Based Teaching Program Celebrates Success

By SEBASTIAN FRANK
News Correspondent

Monday evening Billing's Farm and Museum hosted a celebration for the professional development program for educators, *A Forest for Every Classroom* (FFEC). The evening's events included a film premiere, a Speakchorus presentation, and a panel discussion. As an appetizer for this creative fete, Woodstock Union Middle School's Mount Tom in-depth projects were exhibited outside the auditorium.

Representing the joint work of six organizations—Shelburne Farms, the Conservation Study Institute, Marsh-Billings-Rockefeller National Historical Park, Green Mountain National Forest, the Northeast Office of the National Wildlife Federation, and the Northern Forest Center— over two years' time and created by local talents Charlie Rattigan and Paul Lenett, the film "Learning to Make Choices for the Future" offers a vibrant and melodic exploration of the FFEC program. Primarily shot within Vermont's fall forest setting with gurgling streams and blue skies, the film's narrator and interviewees address many of the important factors fueling this program.

Forest Course Opens Their Eyes

By MICHELLE FIELDS
News Correspondent

"The course has been incredibly eye-opening [...]

See FOREST - Page 8A

A Forest for Every Classroom through Physical Education: Learning Basic Orienteering

a physical education and interdisciplinary unit for 7th grade by Tim Whitney
Woodstock Union Middle School, Woodstock, Vermont

Orienteering is becoming increasingly more common across the United States as a recreational activity, which gives people the opportunity to enjoy the out of doors, particularly forest lands. At Woodstock Union Middle School, orienteering activities are an excellent way to incorporate interdisciplinary curriculum and community resources. The Marsh-Billings-Rockefeller National Historical Park is the primary community resource and backdrop for the large-scale orienteering activities.

Teaching the Principles of Design Using Forest and Nature as Examples

a life skills unit for grades 7 and 8 by Marie Olson-Badeau
Woodstock Union Middle School, Woodstock, Vermont

This unit was created to tie into a design and textile unit. It was also important that the unit could be used in different seasons and with a variety of students. This unit can also be taught as an independent unit for either an art class or a Family and Consumer Science class.

The focus of this unit was on forest and nature designs. Students first participated in visit to the Mt. Tom forest at Marsh-Billings-Rockefeller National Historical Park as part of an interdisciplinary team-based "FOREST FROLICS" fieldtrip. The unit activities completed after the fieldtrip included nature sculpturing, journal drawings and writings, making dyes from natural materials, coloring quilt squares and drawing nature and forest designs onto the dyed squares. The culminating activity will be turning the individual quilt squares into one complete quilt or wall hanging.

APPENDIX I: FFEC EDUCATOR SURVEY

FFEC Educator Survey

We sincerely thank you for taking the time (approx. 30 minutes) to complete this survey. Your frank feedback is very valuable for helping us to improve the Forest for Every Classroom program. Your individual responses will be seen only by the evaluation team and program staff, and your name will NOT be used in any report, publication or discussion without your prior permission. We appreciate your best guess on any items that may seem a little broad or not directly connected to FFEC. We also recognize that FFEC is not the only factor affecting your students. You will notice that the question numbers and letters are not always in sequence. That is because this survey is a key part of a larger effort to measure the impact of place-based education programs. Please do not leave blanks. THANK YOU!

How much do you disagree or agree? **For each of the following items, please circle only *one* number that best matches your opinion.**	*Strongly Disagree*	*Tend to Disagree*	*Tend to Agree*	*Strongly Agree*	*Not sure or N/A*
F2 I plan on implementing my FFEC curriculum next year.	1	2	3	4	0
F3 Since participating in FFEC I call on parents or other community members to assist in my teaching more often.	1	2	3	4	0
F4 Sustained, intensive professional development like FFEC offers is probably worth the very high program costs.	1	2	3	4	0
F5 Ongoing support from FFEC partners after the series (whether formally, as in workshops, or informally as in emails or phone calls) is/was necessary for successful implementation of my FFEC curriculum.	1	2	3	4	0
F6 FFEC would be just as successful without so many partner organizations involved in its creation and delivery.	1	2	3	4	0
F7 Since participating in FFEC, I see public lands as more valuable.	1	2	3	4	0
F8 My *students* see public lands as valuable community resources.	1	2	3	4	0

For questions F9-F11, please write your answers in the boxes (use a separate sheet if necessary)

F9 In what ways (if any) has participating in FFEC changed the way or amount you call upon community partners (whether FFEC partners or otherwise)?

F10 What advice would you give to FFEC partners as they try to balance the benefits of providing sustained, intensive professional development with the high program costs?

(Please complete all 4 pages of this survey) FFEC Edu v3.5 Page 1 of 4

F2 In what ways (if any) has your perception of the value of public lands changed since your participation in FFEC?

How much do you disagree or agree? Like the previous page, please circle only <u>one</u> number. ***NOTE: Items X1-X12 refer to the group of students that you know best or work most closely with in your school or project.***	*Strongly Disagree*	*Tend to Disagree*	*Tend to Agree*	*Strongly Agree*	*Not sure or N/A*
X1 Students are enthusiastic about learning.	1	2	3	4	0
X2 My FFEC curriculum may be nice, but it doesn't really improve student academic achievement.	1	2	3	4	0
X3 Through my FFEC curriculum, students gain a sense of responsibility for improving the local community and environment.	1	2	3	4	0
X4 Students prefer FFEC activities to more traditional-style school activities.	1	2	3	4	0
X5 Students have a strong connection to the community where our school is located.	1	2	3	4	0
X6 Standardized test scores are an accurate indicator of student academic achievement.	1	2	3	4	0
X7 My FFEC curriculum helps students increase their scores on standardized tests.	1	2	3	4	0
X8 My FFEC curriculum is particularly beneficial for students with learning challenges.	1	2	3	4	0
X9 Students are self-directed in their FFEC-related work.	1	2	3	4	0
F1 My FFEC curriculum helps me meet local, district and/or state learning standards.	1	2	3	4	0
F3 I feel energized and confident while teaching about the local environment and/or community.	1	2	3	4	0
F4 It is difficult to cover traditional subjects through my FFEC curriculum.	1	2	3	4	0
F5 My FFEC curriculum helped me become a better teacher.	1	2	3	4	0
X1 In general, people in our community are actively involved in trying to make the community a better place to live.	1	2	3	4	0
X2 Our community is environmentally healthy.	1	2	3	4	0
X3 The key decision makers in our community have a good plan for addressing the important needs in our community.	1	2	3	4	0
X4 My FFEC curriculum gets people (young and old) more involved in solving real life problems in our community.	1	2	3	4	0
X5 The quality of the environment in our community is improving as a result of my FFEC curriculum.	1	2	3	4	0
X6 Through my FFEC curriculum, students are collaborating with important decision makers in our community.	1	2	3	4	0
X7 My FFEC curriculum may be nice, but it doesn't address real needs in our community.	1	2	3	4	0
X8 I am (or plan to become) actively involved in projects to improve the social or environmental quality of our community.	1	2	3	4	0

D1 For the following item, please write a NUMBER in the box to the right of each activity description to indicate how many times you have participated in that FFEC related activity over the years. Write 0 in the box if you have not taken part in that activity or if it does not apply to you. If the number of times is large or hard to quantify, just put your best guess. The idea here is to try and get an overall estimate of your le of involvement with FFEC and which types of support from FFEC partners are most used. It might help to read through the whole list of activities first to jog your memory.

	Number
a. attended *[X number of]* days of FFEC institutes or workshops (main program). X =	
b. attended *[X number of]* additional FFEC presentations (i.e. Ethnobotany, Alumni on Forest Soils, Service Learning institute (w/ Joe Brooks), etc.)	
c. used FFEC partners for curriculum planning assistance	
d. used FFEC partners for logistical and/or technical problem solving	
e. used FFEC partners as source of data or data-related assistance connected to your curriculum unit	
f. used FFEC partners to access additional printed resources and/or materials	
g. borrowed equipment from FFEC staff	

	Num
h. facilitated activities/events when FFEC staff worked directly with your students	
i. facilitated activities/events when resource experts you met during FFEC worked with your students	
j. received additional funding from FFEC after year long program	
k. planned public community event to celebrate/share FFEC-related student work	
l. worked with another FFEC teacher (not in your team) as a result of networking during the FFEC program	
m. other FFEC activity (please specify)	
n. other FFEC activity (please specify)	

For the remaining "D" items, please circle the one answer that most closely applies. Items D2 and D12 may refer to more than one year. The other "D" items refer to the current year or

D2 I would guess that, over the years, the total number of hours I've spent in direct contact with FFEC staff and formal program elements is about:

a. less than 5 hours
b. between 5 and 40 hours
c. between 40 and 100 hours
d. between 100 and 500 hours
e. more than 500 hours
f. I'm not sure/couldn't guess

D3 For the current school year, I have had (or will have) my students working on FFEC-related activities:

a. twice per year or less
b. three to six times per year
c. about once a month
d. once a week or more
e. I'm not sure/ doesn't apply to me

D4 In terms of my overall curriculum plan for the current school year, FFEC projects are:

a. a very small part of it, if at all
b. a significant but contained unit
c. a major part of it
d. the core organizing structure
e. I'm not sure/ doesn't apply to me

D12 I would guess that, over the years, the total num of hours I've spent in other (non-FFEC) place-b or environmental education training programs is a

a. less than 5 hours
b. between 5 and 40 hours
c. between 40 and 100 hours
d. between 100 and 500 hours
e. more than 500 hours
f. I'm not sure/couldn't guess

D5 The amount of effort I put into planning and implementing FFEC-related activities for the current school year is:

a. minimal or non-existent
b. comparable to other topics/units I teach
c. more than other aspects of my teaching
d. far above and beyond the call of duty
e. I'm not sure/ doesn't apply to me

D6 For how many school years have you been working in this school? (count the current school year as one)

a. first year here
b. 2-3 years
c. 4-5 years
d. 6 or more years

(Please complete all 4 pages of this survey)

FFEC Edu v3.5 Page 3 of 4

B4 What subject do you teach:

a. not a teacher/ doesn't apply to me
b. elementary classroom, integrated
c. math
d. science
e. social studies/ history
f. English
g. foreign language
h. physical education or health
i. art or music technology
j. other: _____
k. After school or other non-formal education project leader

B10 How many students would you confidently say were involved in your FFEC curriculum this year?

# of students =

How often do these things happen? **Items L1-L6 refer to the classrooms that you know best or work most closely with.**	*Twice per year or less*	*Three to six times per year*	*About once a month*	*Once a week or more*	*Not sure or N/A*
L1 The school building and grounds (places outside of the classrooms) are used as places for learning.	1	2	3	4	0
L2 Parents and/or other community members work directly with students on school-related projects.	1	2	3	4	0
L3 As part of school, students work on real-world problems in their community, school buildings and/or school yard.	1	2	3	4	0
L4 The content of classroom assignments and homework is directly connected to the local natural and/or urban environment.	1	2	3	4	0
L5 Students learn about and/or interact with local cultural heritage, history and people through their schoolwork.	1	2	3	4	0
L6 Students do community volunteering and/or service-learning work to satisfy their educational requirements.	1	2	3	4	0

For the final question, please write your answer in the space provided.

F10 Please use this space to clarify any of your responses, or to comment on any aspect of your experience with FFEC.

Your School _____ Your Name _____ Today's Date _____

Please return this survey by postal mail or email to:
FFEC Evaluation, 836 Snipe Ireland Rd., Richmond, VT 05477; apowers@sover.net.

The End. Thank you again for taking the time to fill out this survey!

(Please complete all 4 pages of this survey) FFEC Edu v3.5 Page 4 of 4