

Students as Catalysts for Large Landscape Conservation

Philip J. Nyhus

© 2013 Lincoln Institute of Land Policy

Lincoln Institute of Land Policy Working Paper

The findings and conclusions of this Working Paper reflect the views of the author(s) and have not been subject to a detailed review by the staff of the Lincoln Institute of Land Policy.

Contact the Lincoln Institute with questions or requests for permission to reprint this paper. help@lincolninst.edu

Lincoln Institute Product Code: WP14PN1

Abstract

Colleges, universities, and research institutions are important innovators and partners in many large landscape conservation initiatives. Students are essential but often under-recognized constituents in these endeavors. A conference on *Students as Catalysts for Large landscape Conservation* was held in 2013 at Colby College to explore this topic. Participants came from 12 states, 3 countries, and 19 institutions. This paper summarizes insights from the conference and associated meetings of the Conservation Catalyst Network, including how and why students engage in large landscape conservation, benefits to students and practitioners, and remaining challenges. Land conservation and policy is replete with legacies of innovative and energetic students. The Colby Conference highlighted how students today continue this tradition. Momentum is building around the idea of education and research institutions as important conservation partners and drivers. Extraordinary opportunities remain to harness the creative and passionate power of students to catalyze conservation nationally and globally.

Keywords: Large landscape conservation, students, colleges and universities, conservation catalysts

About the Author

Philip Nyhus, Ph.D., is Associate Professor Environmental Studies at Colby College in Maine. His interdisciplinary research bridges the natural and social sciences to address human interactions with the environment. He is interested in policy and landscape dimensions of environmental conservation, human-wildlife conflict, and endangered species conservation, particularly tiger conservation. He has collaborated on large mammal conservation and research in Indonesia, China, and Africa, and projects using biodiversity risk assessment to inform conservation policy at local, regional, and global scales. Nyhus and his students are active in a variety of conservation initiatives in Maine. Nyhus is author and editor of over 50 articles, chapters, and books; reviewer for 20 journals and publishers; inaugural co-convenor of the North American Regional Network of the IUCN Species Survival Commission Conservation Breeding Specialist Group, member of the IUCN Cat Specialist Group; and Science Advisory Committee member of the Whooping Crane Eastern Partnership. He is co-editor of *Tigers of the World: The Biology, Politics, and Conservation of Panthera tigris*. Interviews and information about Nyhus have appeared in diverse media outlets, including *New York Times*, *Time*, *National Geographic*, Discovery Channel, and Animal Planet. He is an active participant of the Conservation Catalyst Network and related efforts to promote large landscape conservation and the role of colleges, universities, and research institutions as conservation catalysts.

Philip Nyhus, Ph.D.
Associate Professor of Environmental Studies
Environmental Studies Program
Colby College
5358 Mayflower Hill
Waterville, ME 04901 USA
Tel: 207-859-5358
Fax: 207-859-5524
Email: pjnyhus@colby.edu

Acknowledgements

The conference on Students as Catalysts for Large landscape Conservation was made possible through the generous support of the Goldfarb Center for Public Affairs and Civic Engagement at Colby College, the Environmental Studies Program at Colby College, and the Lincoln Institute of Land Policy. The ideas in this working paper benefited from the input of the student and non-student participants at this event. Additional ideas emerged from discussions with colleagues attending meetings associated with the Conservation Catalyst Network. The conference and this working paper would not have happened without the invitation and encouragement of James Levitt, Director, Program on Conservation Innovation at the Harvard Forest, Harvard University and Fellow at the Lincoln Institute. James Levitt is a true visionary in thinking about and encouraging innovative conservation, and a true catalyst for promoting discussion about large landscape conservation among academic institutions and practitioners. A full list of all the students and colleagues who contributed ideas to this working paper is not possible in this short space, but I sincerely appreciate their input. Special thanks are due to Armando Carbonell and Lisa Cloutier at the Lincoln Institute for helping to make the conference and this working paper possible.

Table of Contents

Students and Large Landscape Conservation in History	1
Students and Large Landscape Conservation Today	2
Conference on Students as Catalysts for Large Landscape Conservation	3
Background to the Conference	3
Conference Overview	4
Synthesis of Lessons Learned and Insights	5
How are Students Catalysts for Large Landscape Conservation?	6
Students as Researchers and Scholars	6
Students as Active Participants Outside of the Curriculum	7
Students as Disseminators	8
Students as Activists	8
Why do Students Engage as Catalysts for Large Landscape Conservation?	9
What Unique Attributes do Students Contribute to Conservation?	10
Students Are Creative	10
Students Are Innovative	10
Students Are Early Adopters of Technology	11
Students Are Energetic and Natural Networkers	11
Students Are Not Intimidating	11
Students Are Eager to Learn and Willing to Cross Disciplinary Boundaries	11
Benefits of Engaging Students	12
Benefits to Large Landscape Practitioners	12
Benefits to Students	13
Remaining Challenges and Opportunities Ahead	13
Conclusion	14
Literature Cited	15
Appendix I: Student Travel Award Winners at the Colby Conference	16
Appendix II: Speakers at the Colby Conference	17

Students as Catalysts for Large Landscape Conservation

Students and Large Landscape Conservation in History

In the early autumn of 1878, a nineteen-year-old student, grieving for the recent loss of his father, took a hiatus from his studies at Harvard to visit the North Woods of Maine (Vietze 2010). This young student began hunting, fishing, and learning about the wilderness of New England with woodsman, guide, and lifelong mentor William Sewall and Sewall's nephew, Wilmot Dow (Roosevelt 1918; Vietze 2010). Young "Teedie" would harness and cultivate this passion for wilderness his entire life, eventually using his powers as the 26th president of the United States to create the United States Forest Service and sign into law the 1906 Antiquities Act. As President, Theodore Roosevelt would go on to establish 51 Federal Bird Reservations, 4 National Game Preserves, 150 National Forests, 5 National Parks, 18 National Monuments resulting in the protection of approximately 230 million acres of public land (NPS 2013).

This story is not singular. The history of modern conservation in the United States is replete with the archetypal narrative of youth meets wilderness begets Big Conservation Ideas. Between 1846 and 1857, just decades before Teddy Roosevelt travelled to visit Bill Sewall in Island Falls, a young Henry David Thoreau would make three trips to the backwoods of Maine, resulting in the publication of now-famous essays from these visits (Thoreau 1972). Unlike Roosevelt, Thoreau was no longer a student when he traveled to Maine (Thoreau graduated from Harvard in 1837). But Thoreau's travels, immortalized in *The Maine Woods*, along with his more famous experiences at Walden Pond, would lay the foundation for his, and some of the country's, most influential writings about nature, wilderness, and conservation.

Many others have made their impact on landscape conservation in Maine and nationally while still enrolled as students. Charles Eliot, a Harvard student and the son of the former president of Harvard University, Charles W. Eliot, for example, had his own Maine epiphany. The young Eliot declared following a trip in the 1880s to Mount Desert Island under the banner of the "Champlain Society," "It is time decisive action was taken, and if the state of Maine should...encourage the formation of associations for the purpose of preserving chosen parts of her coast scenery, she would not only do herself honor, but would secure for the future an important element in her material prosperity" (NPS 2001). The younger Eliot passed away in 1897, after having helped to create the Trustees of Public Reservations in Massachusetts, the first private nonprofit conservation organization of its kind in the country (The Trustees of Reservations 2013). The elder Eliot found these writings and kept alive his son's ideas, using them to spur conservation on Mount Desert Island, leading to the incorporation of the Hancock County Trustees of Public Reservations in 1901 (NPS 2001). Eventually, the efforts of Eliot and others, like George Dorr, led to the establishment of Siuer de Monts National Monument in 1916. The National Monument became Lafayette National Park in 1919, later renamed Acadia National Park in 1929—the first National Park established east of the Mississippi River (NPS 2001). It remains to this day Maine's first and only National Park.

These stories of students and youngsters who visited Maine and then left their marks on the practice and notions of conservation are just seedlings in a forest of similar stories that have occurred over time across different landscapes around the country and the world.

For some, early experiences as students would directly shape future professional careers: a young Gifford Pinchot would graduate from Yale University in 1889, pursue postgraduate study as the first American to study at the French National School of Forestry, and later serve as the nation's first director of the Roosevelt's new National Forest Service, spending a lifetime influencing forest policy in this country (Egan 2009).

Margaret (Mardy) Murie, the first woman to graduate from the University of Alaska at Fairbanks, would go on to become known as the "Grandmother of the Conservation Movement." Murie devoted her life to large landscape conservation. Along with her husband, Olaus Murie, she championed creation of the Arctic National Wildlife Refuge. In 1964 she attended the signing of the Wilderness Act by President Lyndon Johnson, and in 1998 she was awarded the Presidential Medal of Freedom by President William Clinton (<http://wilderness.org>).

For others, activities as enrolled students would shape national and international policy, science, or even influence how people view the world. A young second-year law student at the University of Tennessee, Hiram Hill, finding the small snail darter in the Little Tennessee River, would contribute to the eponymous 1978 Supreme Court decision, Tennessee Valley Authority vs Hill. That decision upheld the importance and weight of the then-new Endangered Species Act, one of the most important environmental law in the country, and the first law of its kind in the world (Doremus 2005). The Endangered Species Act would become the fulcrum behind efforts to protect and recover endangered and threatened species like gray wolves and efforts to protect the large landscapes on which these species depend.

As a young graduate student, Jane Goodall traveled to what is today Tanzania to study the biology and behavior of chimpanzees. Her early determination, innovation, and exploration would lead to a lifetime of extraordinary scientific and conservation accomplishments (Goodall 2009). As one of the world's foremost conservation scientists and champions of wildlife conservation and education, she has also influenced the lives of thousands of young people through her writing, lectures, and activities through the Jane Goodall Institute. The Institute's Roots and Shoots program, a global environmental and humanitarian youth program for young people, engages students from preschool through university with nearly 150,000 members in more than 120 countries (www.janegoodall.org).

Students and Large Landscape Conservation Today

Students and young people continue to innovate, catalyze, and achieve bold conservation outcomes. In an effort to explore the contemporary role of students and their role in protecting large landscapes, a conference was convened March 1, 2013, on the campus of Colby College in central Maine. The conference was titled: "Students as Catalysts for Large Landscape Conservation." The conference included participation by students, scholars, and practitioners from Colby College and colleges and universities from around the United States and abroad.

This working paper describes highlights of the conference and provides a synthesis of lessons learned and insights offered by participating students, faculty, and practitioners in their individual and collective efforts to advance the practice of large landscape conservation.

Conference on Students as Catalysts for Large Landscape Conservation

Background to the Conference

There is growing recognition that a major challenge in modern conservation is how to protect large landscapes. Regions of conservation concern frequently cross multiple political boundaries and encompass a range of local, state, national, and international jurisdictions and public and private land owners (McKinney et al. 2010). As a result, collaborations are growing around the country and the world to conserve diverse ecosystems, watersheds, and wildlife corridors. For example, in New England, the Wildlands to Woodlands initiative includes a 50-year conservation commitment to retain at least 70% of New England in forestland, permanently free from development (Foster et al. 2010). In the Western United States, the Crown of the Continent initiative seeks to promote biodiversity conservation across 16,000 square miles by linking regions like Glacier National Park, the Bob Marshall Wilderness Complex in Montana, and Waterton Lakes National Park in Alberta (McKinney et al. 2010). Large landscape conservation initiatives have been supported by federal and state authorities and public-private partnerships. In 2011, for example, the Obama administration announced its America's Great Outdoors effort to promote and support community-level efforts to conserve outdoor spaces (Department of Interior 2013).

The Conservation Catalysts Network (CCN) was established to explore the unique role of colleges, universities, and research institutions as catalyst for biodiversity conservation across large and complex landscapes (<http://conservationcatalysts.org>). The CCN, at first known as the Program on Academic and Research Organizations as Conservation Catalysts (PARCC) was conceived in 2011 by researchers at Harvard University, the Lincoln Institute of Land Policy, and the Center for Natural Resource and Environmental Policy at the University of Montana. This initiative grew out of the awareness that many universities are engaged in distinctive “on-the-ground,” projects that have helped to catalyze major land conservation efforts of regional and national significance. Colleges and universities are enduring institutions, and thus are well suited to the challenges of engaging with long-term problems, like conservation.

The inaugural meeting of the network was held in September 2011 at Harvard Forest, Harvard University, with the goal of building collaborative links among like-minded faculty and staff at colleges involved with large landscape conservation. A follow-up meeting occurred in Boulder, Colorado in 2012 with representatives from a wide range of institutions, including international universities.

Among the disparate topics discussed by participants at these meetings, one working group discussed the role of students in conservation efforts undertaken at these institutions. It was out of this context that the idea for the Colby conference emerged.

Conference Overview

The Conference on Students as Conservation Catalysts, held on March 1, 2013, was attended by students, scholars, and practitioners from twelve US states, three other countries, and 19 unique institutions. The conference web site (<http://web.colby.edu/landscapeconservation>) at the time of the event was visited by individuals from 46 different states and 40 countries, and queries about the event came from around the country and the world. Over 150 participants (including those from Colby and from off campus) participated.

One of the signature elements of the conference was a *Student Conservation Innovation Contest*. Undergraduate and graduate students were invited to submit essays or creative contributions, such as videos, on one of the following topics:

1. Describe a creative approach to large landscape conservation in which you have participated;
2. Describe a new approach to large landscape conservation that you could imagine pioneering in the next several years;
3. Describe how the conservation community can demonstrate—analytically or in narrative—that a large landscape approach is more effective than other conservation approaches in meeting social, ecological, and economic objectives.

Some twenty-eight essays and two creative (arts and media) submissions were reviewed by a panel of judges. Of those, six submissions were selected to be presented at the conference (see Appendix I to this paper for the information on the three graduate students and three undergraduates from the United States, Germany and Trinidad and Tobago whose submissions were selected for presentation at the conference). The authors of the selected submissions were given travel reimbursements to attend the conference and present their work.

In addition to these invited presentations, we also received 11 posters that were presented at the conference. These included contributions from both graduate students and undergraduate students.

Another important part of the conference was a morning of invited plenary talks by seven leading conservation scholars and practitioners (see Appendix II). The event began with introductions from representatives of Colby College. The morning plenary session included a presentation by a group of Colby students on the “State of Large Landscape Conservation in Maine.”

The afternoon included breakout sessions on the following topics attended by all interested participants:

- *Students as Catalysts: What Role in Large Landscape Conservation?*
- *Why Large Landscape Conservation: How do You Show it is Effective?*

- *The Future of Large Landscape Conservation*
 - *How do different approaches complement each other across the landscape? How do we identify areas for protection? What kinds of tools should we use? Who are the players?*

The conference concluded with a dinner for all participants, award winners, and registered conference participants.

In addition to the Lincoln Institute, funding for the conference came from the Goldfarb Center for Public Affairs and Civic Engagement at Colby College and the Environmental Studies Program at Colby College. A total of 18 universities, colleges, research institutions, organizations, and agencies provided input and support in framing and organizing the event.¹

Synthesis of Lessons Learned and Insights

The different ways in which colleges and universities act to catalyze large landscape conservation are quite diverse. Likewise, the role of students within these enterprises are widely diverse. From discussions before, during and after the conference, a preliminary series of categories emerged for ways in which students serve as conservation catalysts. Some of these ideas are intuitive and obvious, falling squarely within the educational and research missions of these institutions. Some of the ideas that emerged were less obvious, but no less noteworthy. For the purposes of this paper, I have synthesized many of the ideas that emerged from the Conference in the following section of this paper, along the lines of three questions: (1) How are students catalysts for large landscape conservation?; (2) Why do students engage as catalysts for large landscape conservation?; (3) What unique attributes do students contribute to conservation?; (4) What are benefits of engaging students?; and (5) What are remaining challenges and opportunities ahead to engaging students as catalysts for large landscape conservation?

¹ Partner Institutions for the Conference on Students as Catalysts for Large Landscape conservation: Lincoln Institute of Land Policy, Harvard Forest, Center for Research on Sustainable forests at the University of Maine, Center for Natural Resources and Environmental Policy at the University of Montana, Center for Large Landscape Conservation, School of Natural Resources and the Environment at the University of Arizona, the School of Earth and Environmental Sciences at the University of Arizona, Round River Conservation Studies, The Conservation Fund, Philander Chase Corporation, Kenyon College, the State of the Rockies Project at Colorado College, Yale School of Forestry and Environmental Studies, The Institute for Sustainable Solutions at Portland State University, Beijing Normal University, the Nature Conservancy, the United States Fish and Wildlife Service, Natural Resources Council of Maine

How are Students Catalysts for Large Landscape Conservation?

Students as Researchers and Scholars

The morning session included a talk by three students from Colby College on the “State of Large Landscape Conservation in Maine.” Synthesizing a range of published and unpublished data, the students described the growth in conservation land in Maine over the past 25 years, changes in state and federal laws influencing conservation, and patterns in the distribution and size of conservation parcels, including comparing Maine’s experiences to other New England States (Beck et al. 2012).

This talk exemplifies what is one of the most common roles of students in conservation: the role of student as scholars. These particular students presented the results of an undergraduate senior capstone project that was undertaken as part of a regularly-offered course focused on the “State of Maine’s Environment.”

In similar courses and programs, undergraduate and graduate students around the United States are involved in organized research projects that explore their regional environment and conservation resources. Alex Suber, a Colorado College sophomore, showcased at the March 1 conference a film highlighting a multi-year effort focusing on the Colorado River undertaken by involved in Colorado College’s State of the Rockies Project. In part inspired by the Colorado Rockies effort, The State of the Rockies Project will, during the 2013–14 academic year, take on the topic of large landscape conservation (see: www.coloradocollege.edu/stateoftherockies).

Likewise, a group of students from Ithaca College in New York presented posters at the Colby Conference related to projects they worked on related to land management on college-owned properties. In yet another example, students associated with the Susquehanna River Heartland Coalition for Environmental Studies (SRHCES) at six colleges in central Pennsylvania are active in better understanding and helping to protect stream health across their region (see: www.srhces.org).

Not all student projects are as ambitious—requiring a semester or a year or even a dedicated course. Numerous students contributed essays to the Colby conference that were written as individual course assignments. More than a dozen students from the University of New England, for example, contributed papers as part of a single course at their institution.

At a great many colleges and universities, undergraduate students contribute to conservation efforts through independent studies, honors theses, and other individual or focused research projects. Karena Mahung, from the University of the West Indies, contributed to the Colby conference through just such a project by reporting on the results of her thesis on “Applying Conservation Easements as Private Lands Conservation Strategy in Trinidad & Tobago.”

The scope and length of the scholarship ramps up substantially, of course, for graduate students. Joe Figel’s Ph.D. thesis work at the University of Central Florida exemplifies this level of authoritative scholarship. At the Colby conference, he reported on his research showing the

importance of oil palm plantations and other landscape features in efforts to protect a hemispheric jaguar migration corridor that stretches from the US-Mexico border to Argentina. This type of research requires long-term field work and advanced technical skills (e.g., using Geographic Information Systems and camera trapping of jaguars using infra-red cameras), and has the potential to have a long-term impact on sustainable forestry and agro-industrial practices across Central and South America.

Students as Active Participants Outside of the Curriculum

Like Thoreau, Eliot, Roosevelt, and numerous other historic counterparts, students today continue to engage their newfound understanding of the world and their passions through activities outside of the classroom or formal research activities. Participation may range from the scale of days or weeks (e.g., attending meetings) to long-term participation spanning the time students are enrolled in degree programs.

Institutions of higher education offer a wide range of structured activities to support these endeavors. One form of active student participation gaining widespread acceptance is the use of internships, often for academic credit. At the Archbold Biological Station in Florida, for example, CCN Partner and Executive Director of the Station Dr. Hilary Swain helped to support many years of internships from students interested in the work of her institution. In 2010, Professor Robert Lillieholm from the University of Maine and James Levitt from the Lincoln Institute of Land Policy along with a wide range of partner institutions, including the Quebec Labrador Foundation and the Schoodic Institute, created the Acadian Program in Regional Conservation and Stewardship with a special focus on large landscape conservation in Downeast Maine. This program offers students from places as diverse as Belize, Chile, Ethiopia, Hungary, Ireland, Lebanon, Palestine, the United States and Zimbabwe a mix of in-class lectures and field-based experiential learning based out of the beautiful new Schoodic Education and Research Center (SERC) at Acadia National Park..

Students are no longer limited to regions near their schools. At Colby College, for example, approximately 70 percent of the student body participates in a study abroad program for credit for a term (January term or semester) or, in some cases, an entire year. Some of these programs are deeply rooted in the theory and practice of large landscape conservation. Doug Milek, Director of Student Programs for Round River Conservation Studies, presented a talk at the conference on “Students Working in Big, Wild Landscapes.” Round River, an organization unique in its scope but nevertheless representative of a growing number of organizations with interest in this field, offers student off-campus study opportunities to work with professionals and local indigenous communities around ambitious conservation projects such as those in British Columbia, Canada with the Taku River Tlingit First Nation; the Kunene Region of Namibia, southern Africa; the Okavango Delta in Botswana; and the Greater Yellowstone Ecosystem in Wyoming. Students not only gain experience in unique locations, they participate in long-term conservation activities with local communities and reap the rewards of an immersive experience in large landscape conservation. Representatives of the organization Northwest Connection also attended the conference and shared information with students about opportunities for learning about community-based conservation and other large landscape activities in the Western United States.

Other students participate in large landscape activities through civic engagement or as volunteers. At Colby College, for example, students have a long history of contributing to conservation efforts in the nearby Belgrade Lakes region of central Maine through courses, research, internships but also through civic engagement with community partners. At Colby these activities are supported by programs funded by the Goldfarb Center for Public Affairs and Civic Engagement and the National Science Foundation, among other sources, and range from education programs with schools in the region to hosting events that enable students to meet with individuals and organizations active in watershed conservation. Many colleges and universities support outreach activities or otherwise facilitate opportunities for students to volunteer their time with activists and organizations working on regional conservation initiatives.

Students as Disseminators

In 2011 a new resource center was built in the small town of Belgrade Maine with the goal of becoming a state-wide focal point, activity center, and source of information related to lake conservation. As hoped, this Maine Lakes Resource Center, located in the heart of the Belgrade Lakes watershed in central Maine, has become an important resource center about lake and watershed conservation in the region and the state. A key to the success of this resource is the role of student volunteers and summer research assistants who serve as educators and disseminators of information. Indeed, whether sharing the results of course projects or theses, like the students attending the Colby conference, or as educators or volunteers like the Colby students who spend the summer at Maine Lakes Resource Center, students can use their knowledge, communication skills, energy, and enthusiasm to share and spread information with a wide audience.

In a talk the evening before the March 2013 conference at Colby, Dr. Margaret Lowman, Executive Director of North Carolina's Nature Research Center presented a talk on "Undergraduates Under the Trees." She described a wide range of examples of students contributing to—and disseminating information about—large landscape conservation in locations as diverse as India and Africa. Working with Dr. Travis Reynolds at Colby College students have written reports on the status of church forests in Ethiopia, islands of biologically diverse forests dotting that nation's landscape. Students in the course travelled from the United States to Ethiopia to disseminate the results of their findings—including abstracts of research papers translated into the local language—to their in-country collaborators.

Students as Activists

Large landscape conservation initiatives can often be contentious, pitting conservation and development interests, or even competing conservation interests, against each other. Students long have been at the forefront of these debates, contributing time and energy to support the hard work of community organizing, lobbying, or providing information to support these efforts. Students involved in current ongoing efforts to block the construction of the Keystone XL pipeline that would carry Canadian oil sands bitumen across the Great Plains of the United States are but one contemporary example of such student activists (Wiener, 2013)

Why do Students Engage as Catalysts for Large Landscape Conservation?

The energy at the Colby conference was palpable. For some students and faculty, the notion of large landscape conservation was well understood and it was engagement with this idea that brought them together. For many others, however, including some students attending because the topic simply sounded interesting, they knew much less about what this phrase really means. What was clear from multiple discussions was that there are many reasons students want to be engaged in large landscape conservation. A few of the more notable ideas that emerged during our discussions including the following:

Passion: Students are energized about many subjects. When the energy turns to passion about a given topic, students are motivated to contribute their time and energy to the cause. Some students get their passion ignited by the chance to bring together diverse interests to improve the quality of life in the region in which they live or study. Some students come to discussions of large landscape conservation already passionate about the conservation of certain animals, plant communities, or habitats. For them, the idea of large landscape conservation fits as a new tool in a diverse conservation toolbox. Other students come excited by a love of a particular country or region, and large landscape conservation is for them a way to protect such a beloved place.

Eagerness to Learn: Students are excited to learn about innovative topics and to engage with diverse topics or stakeholders. For many students, an important motivator is the chance to learn about a new idea or a new location.

Optimism and Bold Ideas: Many students are optimists who are motivated by courageous ideas. Conserving entire parts of continents or thinking about crossing country boundaries while supporting indigenous communities, or even engaging with private lands and landowners associated with individual colleges or universities, can be invigorating and motivating.

New Experiences: The stories the students told included many descriptions of activities and opportunities made possible by their activities as students. For some, it was new ideas generated in the classroom. For others, it was new connections made far beyond their institution's walls. For one student, for example, an internship at a Jaguar Rehabilitation center in Belize was a driver behind her passionate interest in the topic. For another, it was standing on a mountain-top in Patagonia that sparked a commitment to do more in the field of conservation. The Acadian Internship Program, for example, brings students from the United States and from abroad together to not only gain knowledge about conservation tools and the region, but to share stories and to network among themselves. Award winner Karena Mahung, for example, described at a follow-up meeting how she didn't know what a conservation easement was until she attended the Acadian Program; once she became interested in the topic and the new paths it opens for collaborative conservation across boundaries, it strongly influenced her career path choices.

Because Conservation Is "Cool": As one speaker pointed out, many students participate in conservation research or activism because it is exciting and because "you might run into a mamma grizzly bear." For many students, the larger the landscape, the larger the draw.

What Unique Attributes do Students Contribute to Conservation?

Many participants to the Colby conference attended initially because of the impressive speakers and their stories. By the end of the day, however, many the most impressive stories were told by the participating students themselves. This was indeed one of the more surprising outcomes of the event—even if in hindsight it should not have been a surprise in the least. Some of the ways the students impressed follow below:

Students Are Creative

One of the most captivating presentations was not about science or research but about personal experiences. Blair Braverman, a graduate student at the University of Iowa Nonfiction Writing Program, one of the premier writing programs in the country, shared an essay she wrote, “The Drowning Fish: Large Landscapes and the Burden of Significance.” In the essay, she shared her experience spending time with a group of hunters (she is a vegan) and the discussions, simultaneously hilarious and profound, that she had with the people she met. The audience was captivated, and we all left thinking more deeply about our individual biases and motivations. As an undergraduate at Colby, Blair had written a wide range of award-winning and published essays in outlets as diverse as *Orion Magazine* and *The Atlantic*. As a sophomore, she wrote an essay on the role of the Iditarod Sled Dog race as a vehicle for encouraging conservation that resulted in her invitation to participate in a conference in Peru on conservation finance (Levitt 2010). We were all inspired by Blair’s stories. It is this creative element among so many students that is simply waiting to be tapped.

Other students have been active with mass media. Whether writing traditional opinion articles, like one of the student volunteers at the conference who recently wrote an article for *Huffington Post*, or more creative outlets, like viral videos, students often are at the cutting edge of contemporary trends and ideas.

Students Are Innovative

One of the talks that engendered the most discussion was presented by Jacob Marx from Colby College and Meredith Bates from College of the Holy Cross. Their talk, “What do a Retired Bus Monitor and Large Landscape Conservation have in Common?” described a novel idea for how to use technology, social networking, and competition to encourage students to solve problems. While applicable to a wide range of social justice and environmental challenges, their talk precipitated a robust discussion about how student across the country and the world could leverage the power of technology and their creative impulses to collaborate and to solve challenging problems. Among the “over 40” crowd it was evident many of these ideas were new. Among the students, there was rapid understanding and widespread agreement that innovative networking, leveraging new technologies, and tapping into the competitive impulses of young people could—and already has—led to real social and political change. The conference was held in the shadow of global events—like the previous year’s Arab Spring—and the ongoing revolution in the role of social media like Twitter, Facebook and Instagram that are shaking up much of the global economy and society broadly.

The creative use of technology to share a story was brought home by a video presented by Alex Suber from Colorado College on “Colorado College’s Large Landscape Conservation Strategy.” The video tracks two Colorado College students as they traverse the entire length of the Colorado River—until it turns dry—and use this experience to talk with leading policy makers, like Secretary of the Interior Ken Salazar, about conservation imperatives along the river. Part of the State of the Rockies Project, the video uses dramatic images, humor, music, and cuts of the notable speakers to drive home their conservation message. It was a powerful example of how creative students can use technology to bring immediacy to their work and to disseminate findings—the images of the cracked sand along the dried-up river bed, for example, were particularly striking.

Students Are Early Adopters of Technology

In addition to understanding social media, students often are adept at using a wide range of new technologies. The talks at the Colby conference were replete with references to maps produced in Geographic Information Systems (GIS) and other emerging technologies. With the rapid pace of changes in telecommunications, smart phones, portable computers, and other technologies, students are both creating these new technologies and adopting them for use in creative ways.

Students Are Energetic and Natural Networkers

As a rule of thumb, many students are passionate and energetic about topics that concern them. Whether the issue is social justice or the environment or politics, students have tremendous drive and can mobilize and engage with each other and the world. Throughout history, students have been at the forefront of revolutions, both intellectual and political. Listening to the students discuss issues related to conservation at the Colby conference, it was clear that harnessing this energy has already—and could continue—to promote change. And it is not just intellectual energy that students have: Students are eager to climb mountains in Patagonia or to paddle the entire length of the Colorado River. As one of the speakers pointed out, a network of students arguing for federal action and funding for large landscape conservation could have a dramatic impact on policies and funding.

Students Are Not Intimidating

Much of the work of conservation is working with local communities. As one speaker pointed out, students are not intimidating—they can walk into a community, or a meeting, and they are unlikely to be perceived as threatening. Students are by definition learners and listeners—an important attribute when working with stakeholders. As one student observed, she was able to work with local communities in Belize and encourage local people to get involved because of her status as a young person.

Students Are Eager to Learn and Willing to Cross Disciplinary Boundaries

The Colby conference coincided with the bicentennial year of the college. For two hundred years at Colby—and far longer at institutions like Harvard and Yale—students have arrived to learn from faculty, to receive guidance, mentorship, to gain confidence and be encouraged, and to train

to become future leaders. Indeed it is this eagerness that drives many of the ways that students can contribute meaningfully to conservation. Whether learning in the classroom or on their own through affiliated experiences, students are veritable sponges for new ideas.

One of the student award winners pointed out the importance of the humanities for understanding the challenges of conservation. While science might provide the foundation for understanding the biological dimensions of the problem, the social sciences and film, philosophy, English, and other humanities disciplines are needed when working with people. Indeed, at liberal arts colleges and many universities students are required to take courses that span diverse disciplines. These liberally trained students are already practiced in crossing traditional disciplinary boundaries and may approach topics from different perspectives with more plasticity and less disciplinary rigidity than their faculty mentors.

Benefits of Engaging Students

Benefits to Large Landscape Practitioners

Regardless of whether students are new undergraduates or advanced graduate students, most collaborate with faculty, whether as professors in courses or as advisors or committee members, or with professional collaborators from off campus. In addition to the benefits accrued by students, there are abundant benefits available for these faculty and practitioners in engaging students in the practice of conservation.

- Students are abundant, often “free” (or low cost) sources of scholarship, advocacy, and passion. They are, as participants in conservation initiatives, flexible to contribute to landscape initiatives small or large. There are many more problems than resources to study and solve. Students present a potential major untapped resource. As one participant pointed out, students (particularly graduate students) often have time and flexibility that may not be available to their supervisors with more rigid professional schedules and personal obligations.
- Universities are themselves incubators and catalysts of innovation—and students play an important role in keeping these institutions vibrant. Hundreds of educational and research institutions are already using the conservation expertise of their faculty, staff, and students to engage in significant large landscape conservation.
- Students are educators. In Chile, for example, students are helping a major landscape conservation project by helping to educate local communities about the significance and impact of ongoing conservation activities.
- Nongovernmental organizations and government agencies can benefit from the academic training of students to apply to problems when resources (financial, personnel, time) are limited. Students can simultaneously act as professionals (particularly with adult or continuing education students) as happened with students at Deakin University in Australia helping to protect coastal lands in Victoria.

- Students become future conservation leaders. They also become business leaders, government administrators, politicians and academics who go on to work with the next generation of students. At Kenyon College, a former student helped to catalyze a senior gift and donations from other alumni and major donors to contribute to one of the first College-run land trusts in the country (Givens 2013).

Benefits to Students

In addition to the benefits, numerous additional benefits accrue to students. Just a few of these include:

- Students gain valuable skills that can contribute to future graduate school or career paths, including those that transcend traditional disciplinary or scale boundaries.
- Engaging in large landscape conservation provides a unique inter- and cross-disciplinary experience for students that cross traditional academic, temporal, and spatial boundaries. The experiences gained in these initiatives can draw on student interest and experiences in the social sciences, the natural sciences, the humanities, and include a wide variety of methods and tools.
- Students have an outlet to use their creativity and energy to work on projects that matter to communities small and large.
- Students can become linked into and a part of regional, national, trans-boundary, and international conservation networks.
- Students are motivated by, and learn from, other students. We saw at the conference “mini-networks” of students that were catalyzed from mutual interest and experiences. One of our Colby students, for example, became “best friends” with one of the student award winners because they were both from Belize and shared similar interests.

Remaining Challenges and Opportunities Ahead

The Conference on Students as Catalysts for Large Landscape Conservation identified numerous ways that students contribute to, benefit from, and otherwise engage in the larger process of large landscape conservation. Numerous challenges remain, however, if student involvement is to grow. Some of the challenges that were discussed at the event include:

- **Funding:** Whether at undergraduate or graduate institutions, funding for student support is often limited. Some well-known funding sources currently exist, such as: the Student Conservation Association, a stepping stone for many students seeking field experiences, and the Wilderness Fellows Program operated by the US Fish and Wildlife Program. Some students leverage specialized fellowships, such as the Watson Fellowship, which provides funding for students to spend a year traveling around the world, to pursue their interests. Most, however, rely on funding for internships from sponsoring agencies or

their own programs or schools, assistantships to support research, and other institutional funding sources.

- **Appropriate degree programs:** There are a growing number of institutions with an interest in large landscape conservation, but few that have “large landscape conservation” as a particular focus or degree (for a partial list of these institutions interested in large landscape conservation see <http://conservationcatalysts.org/>). To further develop training and expertise and a cadre of student experts able and willing to work on these complex issues, a more tangible curricular link at more institutions would be helpful.
- **Networks:** At present a dedicated network does not yet exist for students interested in focusing their activities and energy in large landscape conservation. There are many scientific societies that include students in large landscape initiatives, notably the Society for Conservation Biology, the Ecological Society of America, and the Association of Environmental Studies and Science, and numerous university- or NGO-specific projects or regional projects exist, but a single and obvious “go to” network (like the CCN network) specifically targeting students and large landscape conservation at present is lacking.
- **Incentives:** Students were excited by the conservation innovation contest. Finding additional incentives to encourage students to participate—whether through competitions, funding, non-remunerative incentives (e.g., publication in a journal or book for those pursuing an academic track or an outlet for music, photography, or art for those passionate about the arts)—could continue to motivate students locally, regionally, or even globally.
- **Global Scope:** Opportunities for students to engage in projects at regional and national levels typically are more abundant than international and transboundary engagement with large landscape conservation. The Colby conference suggests there is fertile opportunity to support an internationalization of student engagement with this theme, notably at the World Parks Congress in Australia in 2014.

Conclusion

The history of conservation is well-represented with stories of students and young people who left their mark on the trajectory of environmental protection and sustainability. There is growing recognition that colleges, universities, and research institutes have played and will continue to play a catalytic role in studying, protecting, and managing large landscapes. The Conservation Catalyst Network generally, and the Colby conference in particular, highlight the unique and exciting ways in which students can benefit from and themselves promote and contribute to these emerging initiatives.

Literature Cited

- Beck, G., G. Keesler, and L. Maxwell. 2012. State of Large Landscape Conservation in Maine 2012. Pages 11–62 in C. Aronsohn, G. Beck, K. Bernard, J. Broadbent, L. Garrard, S. Hegde, G. Keesler, L. Maxwell, and N. Teachy, editors. State of Maine’s Environment 2012. Environmental Studies Program, Colby College, Waterville, Maine.
- Department of Interior 2013. America's Great Outdoors: Promise to Future Generations. US Department of Interior: <http://www.doi.gov/americasgreatoutdoors/index.cfm>.
- Doremus, H. 2005. The story of TVA v Hill: A narrow escape for a broad law in R. Lazarus, and O. Houck, editors. Environmental Law Stories. Foundation Press, New York.
- Egan, T. 2009. The Big Burn: Teddy Roosevelt and the Fire that Saved America. Mariner Books, Houghton Mifflin Harcourt, Boston.
- Givens, D. 2013. Town-Gown Conservation at Kenyon College. Land Lines:8–13.
- Goodall, J. 2009. Hope for Animals and Their World: How Endangered Species are Being Rescued from the Brink. Grand Central Publishing, New York.
- Levitt, J. N., editor. 2010. Conservation Capital in the Americas. Lincoln Institute of Land Policy, Cambridge, MA.
- McKinney, M., L. Scarlett, and D. Kemmis 2010. Large landscape conservation: A strategic framework for policy and action. Lincoln Institute of Land Policy, Cambridge, MA.
- NPS 2001. Hancock County Trustees. National Park Service, U.S. Department of the Interior: <http://www.nps.gov/acad/historyculture/upload/HancockCountyTrustees.pdf>, Acadia National Park, Maine.
- NPS 2013. Theodore Roosevelt and Conservation. National Park Service: <http://www.nps.gov/thro/historyculture/theodore-roosevelt-and-conservation.htm>.
- Roosevelt, T. 1918. My Debt To Maine. Division of Parks and Public Lands, State of Maine: <http://www.maine.gov/doc/parks/history/biblepoint/letter.htm>.
- The Trustees of Reservations 2013. Trustees History. The Trustees of Reservations, downloaded June 2013: <http://www.thetrustees.org/about-us/history/>.
- Thoreau, H. D. 1972. The Maine Woods. Princeton University Press, Princeton, NJ.
- Vietze, A. 2010. Becoming Teddy Roosevelt: How a Maine Guide Inspired America's President. Down East, Camden, Maine.
- Wieners, B. 2013. “Secrets, Lies, and Missing Data: New Twists in the Keystone XL Pipeline”, in Bloomberg Businessweek, July 11, 2013. Bloomberg Businessweek, New York.

Appendix I: Student Travel Award Winners at the Colby Conference

- Tilmann Disselhoff, Technical University of Berlin, ***“The National Nature Heritage Network in Germany”***
- Karena Mahung, University of the West Indies, ***“Applying Conservation Easements as Private Lands Conservation Strategy in Trinidad & Tobago”***
- Joe Figel, University of Central Florida, ***“The Jaguar Corridor as a Model for Large Landscape Conservation”***
- Jacob Marx, Colby College, and Meredith Bates, College of the Holy Cross, ***“What do a Retired Bus Monitor and Large Landscape Conservation have in Common?”***
- Blair Braverman, University of Iowa Nonfiction Writing Program, ***“The Drowning Fish: Large Landscapes and the Burden of Significance”***
- Alex Suber, Colorado College ([video](#)), ***“Colorado College’s Large Landscape Conservation Strategy”***

Tilmann Disselhoff joined us via Skype.

Appendix II: Speakers at the Colby Conference

- Philip Nyhus, Associate Professor of Environmental Studies, Colby College
- Lori Kletzer, Vice President for Academic Affairs and Dean of Faculty, Colby College
- Daniel M. Shea, Director, Goldfarb Center for Public Affairs and Civic Engagement and Professor of Government
- Jillian Blouin ('13) and Lydia Ball ('13), Student Welcome
- James Levitt, Lincoln Institute of Land Policy and Harvard Forest: ***“Catalyzing Conservation in the 21st Century”***
- Gary Tabor, Executive Director of the Center for Large Landscape Conservation and Senior Fellow at the University of Montana’s Center for Natural Resources and Environmental Policy: ***“Bold Ideas for Big Places — The Ecology of Scale in a Warmer World”***
- Robert Lilieholm, E.L. Giddings Associate Professor of Forest Policy at the University of Maine: ***“Alternative Futures Modeling: Understanding the Past, Envisioning the Future”***
- Catherine Johnson, Senior Staff Attorney and North Woods Project Director, Natural Resources Council of Maine, ***“Protecting Maine’s North Woods: Using all the Tools in the toolbox”***
- Mike Tetreault, Executive Director of The Nature Conservancy in Maine, ***“Forests, Fish, and Freshmen — the new Frontiers in Conservation” [cancelled due to weather]***
- Doug Milek, Director of Student Programs, Round River Conservation Studies, ***“Students Working in Big, Wild Landscapes”***
- Brian Czech, Biologist, National Wildlife Refuge System, Branch of Planning, Headquarters Office US Fish and Wildlife Service, ***“Students Solving Problems for the National Wildlife Refuge System: Precedents and Possibilities”***
- Garrison Beck, Ginny Keesler, and Laramie Maxwell, Colby College, ***“The State of Large Landscape Conservation in Maine”***