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ENVIRONMENTAL JOURNALISM REVISITED

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The traditional journalistic model has been to follow interesting stories, expose scandals, and explore controversies. This approach has been very relevant to the political process, but it is not as applicable to the now-critical relation between humanity and the Earth. Today's communities must understand the interconnections between energy use, climate, and food to make the transition to an efficient, resilient, and sustainable society. This process involves people from all sectors—businesses, citizens groups, farmers and foresters, students and teachers, officials in state government, politicians, and voters. It requires an informed public with access to a wide range of articles of trustworthy information relating to local and global environmental issues.

This vision is the basis for the Sunday environment section featured in two Vermont statewide newspapers since January 2008: the *Rutland Herald* and the *Barre-Montpelier Times Argus*. Elizabeth Gibson is the section editor, and Alan Betts, a climate scientist, is the science adviser and one of six columnists (<http://alanbetts.com/writings>). Articles are selected based on their relevance to major environmental issues in Vermont and are then reviewed and edited for technical accuracy and clarity of expression. This chapter outlines the philosophy and scope of this project, including some of the major environmental themes that have emerged to date and the significance of an informed public for facilitating environmental leadership.

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The Challenge of Reporting on the Environment

As environmental concerns grow, the need for a well-informed public becomes more critical. A major challenge is how to convey complex concepts and impart a sense of the urgency of these challenges in a way that engages the reader. Climate change, for instance, is a fascinating and important story—but one that has not been well told by traditional media. The founders of the online journalistic collaboration Climate Desk (<http://theclimatedesk.org/about>) suggest several reasons:

- Climate change is slow moving, vast, and overwhelming for news organizations to grapple with.
- Coverage tends to be fractured and compartmentalized; science, technology, politics, and business aspects are covered by different teams.
- The focus too often is on imperiled wildlife, political gamesmanship, or the debate over the existence of climate change, all at the expense of advancing the bigger story—how we're going to address, mitigate, or adapt to it.

Other important websites have sprung up to explain the evolving science to the public, such as Climate Central (www.climatecentral.org), which blends journalism and science, and RealClimate (www.realclimate.org), whose tagline is “climate science by climate scientists.” Others, such as Skeptical

Science (www.skepticalscience.com), were set up to specifically address the controversies and rebut “global warming misinformation.” Many other websites funded by political think tanks and the fossil fuel industry are designed to confuse the public on climate issues to protect vested interests, as discussed in Hoggan and Littlemore (2009). And there are many important blogs related to both policy and scientific issues, including those by Andrew Revkin (<http://dotearth.blogs.nytimes.com/author/andrew-c-revkin>) and Roger Pielke Jr. (<http://rogerpielkejr.blogspot.com>).

Generally, the public is confused about what is happening given the irreducible uncertainties about the future and the different messages coming from many strident interest groups as well as from scientists concerned with the integrity of the science. Global change seems remote from the average person’s daily experience, and people often cannot see how they might deal with such issues in their everyday lives. But climate change and other environmental concerns are increasingly relevant to everyone, and an informed public is a critical ingredient in the necessary practical steps and policy changes needed to alleviate the developing crisis.

Overview of the *Rutland Herald/Barre-Montpelier Times Argus* Environment Section

Purpose

This weekly environment section has been published in the Sunday issue of two Vermont newspapers—the *Rutland Herald* and the *Barre-Montpelier Times Argus*—since January 2008. The section was conceived in response to this question: What would help residents of a small state like Vermont understand and deal with both the local and global aspects of environmental change?

In certain respects, Vermont is well prepared to deal with environmental challenges. According to the Vermont Council on Rural Development’s 2009 report on the future of the state, Vermonters rank “the working landscape and its heritage” as a common value more highly than any other. Given this deep appreciation for the natural beauty of the state, conservation of Vermont’s natural resources and beauty has long been state policy, regardless of political party. Many people enjoy outdoor recreational activities in forests and by lakes; other people work on the land in farming and forestry. But even though Vermont enjoys a widespread land ethic, a large gulf exists between local and global environmental issues—and there is much confusion about pressing concerns, such as energy alternatives, land use and development, and the impact of climate change on Vermont.

The premise underlying this project is that local communities must understand the connections between energy use, climate, food, and the natural world to plan collectively for the transition to an efficient, resilient, and sustainable society. This process engages all sectors of

society—businesses, citizens groups, farmers and foresters, students and teachers, officials in state government, politicians, and voters. Consequently, the stories in the environment section attempt to reflect what is happening in Vermont from as many perspectives as possible to provide the kind of inspiration and deeper understanding needed to meet today’s environmental challenges.

From this perspective, many controversial issues such as imperiled wildlife, the climate change debate, and ideological conflicts are not primary. The root problem is the sheer magnitude of human impact on the Earth’s system—large enough to imperil the survival of millions of species of which humanity is only one. This relatively recent development, which has emerged from the Industrial Revolution, the rise of science and technology, modern medicine and agriculture, requires a wide range of collective, informed action at all levels of society.

History

The *Rutland Herald*, founded in 1759, is the oldest family-owned newspaper in continuous operation, published under the same name in the same city, in the United States. The *Herald* is the largest daily newspaper in Vermont after the *Burlington Free Press* and is the sister paper of the *Barre-Montpelier Times Argus*. These publications combined have a daily print circulation of about 25,000, with a growing online readership. The environment section is published in the Sunday edition of both newspapers.

The impetus for the section came from a community activist in Rutland, Carol Tashie, who had become frustrated with her town energy committee in the fall of 2007. Tashie discussed her concerns with the editor of the *Rutland Herald*, Randal Smathers, and climate scientist Alan Betts. The environment section was conceived during these conversations as a way to present technical, timely information to the general public every week in the Sunday papers. It was first published in January 2008, and it has appeared continuously since then. The section is also published in the online edition of both newspapers (www.rutlandherald.com and www.timesargus.com).

Approach

The environment section presents a wide range of articles that aim to be straightforward and instructive. Each section consists of at least one feature article and a commentary piece from one of six *Weekly Planet* columnists. The more factual feature articles are typically local environmental stories that refer to global implications and trends where relevant. The columns are usually interesting personal stories reflecting a particular columnist’s orientation—whether energy efficiency, home building and improvements, farming, environmental activism, climate research, or water quality.

Articles are reviewed for technical accuracy and clarity of expression. Sidebars are often added to define concepts and highlight relevant upcoming events. Many feature writers are experts in their respective fields, and others often have rich experience that informs their articles. Freelance writers are occasionally used. The author's identity and professional background are included as a byline with every article.

Articles are mostly written as a collaborative process between the editor and the community members directly involved rather than by a newspaper reporter. This approach offers the benefit of firsthand accounts that are more direct and immediate. The collaborative process also develops relationships and connections that in turn cultivate more readers of the section and lead to future stories. The disadvantage is the extra editorial work required, although the resulting archive of information is well worth that effort.

The columns and feature articles ideally convey a story about the Vermont environment in a way that engages and instructs the reader. Secondary goals are to offer resources for additional information and facilitate understanding of how local environmental issues relate to global concerns. Often, the articles are linked to an upcoming event: workshop, conference, planning forum, rally, and the like. In this way, the articles offer diverse opportunities for community involvement—to empower readers to learn and do something about the many environmental challenges of the 21st century.

Team

The environment section team consists of an editor, science adviser, and six rotating *Weekly Planet* columnists. Feature articles are written mostly by community members—educators, researchers, policymakers, and others. The section editor, Elizabeth Gibson, is assisted by Alan Betts as science adviser. Betts is also one of the regular columnists. Gibson solicits and edits articles, submits text, and often sends photographs to the newspaper editor, Randal Smathers, who oversees page makeup.

Five of the six *Weekly Planet* columnists have been writing since 2008. The columns of Carol Tashie, a community activist and local farmer, reflect local community and food issues. Robin Chesnut-Tangerman, a green builder, writes about the technical aspects of building efficient homes powered by renewable technologies. Paul Scheckel is an energy efficiency consultant and author, whose columns address the many choices to consider in building an efficient society with clean energy technologies. Alan Betts, climate scientist, discusses weather and climate through the seasons, including both local and global environmental issues from an earth system perspective. Elizabeth Courtney, the executive director of the Vermont Natural Resources Council (VNRC), writes about many environmental issues that affect the state and the many legislative efforts in Montpelier, the state capital, that deal with environment, conservation, and the development of a sustainable energy future.

Mark Skakel, a local forester and teacher, joined the group in 2009 to write about forest and conservation issues from his uniquely practical, hands-on perspective. He died in 2010, and Susan Allen, the executive director of Renewable Energy Vermont, then signed on as a columnist focusing on policy aspects of renewable energy development at the state and national levels. When she joined the Vermont state government in 2011, Louis Porter, the Lake Champlain Lakekeeper for the Conservation Law Foundation, took her place. His columns address the web of interactions between storms, watersheds and lakes, development projects, and the runoff of human pollution from urban and agricultural sources. Occasionally, articles from guest columnists are published, including Bill McKibben, Schumann Distinguished Scholar at Middlebury College and founder of 350.org, and Helen Mango, professor of geology and chemistry at Castleton State College.

The environment section team is unique in several important ways: Collectively, it represents a broad range of expertise in environmental issues; it functions relatively independently from the rest of the newspaper staff; and it has experienced hardly any turnover since inception more than 3.5 years ago. The content of the section is scientifically accurate, consistent, and wide-ranging as a result.

Scope of Information

Since January 2008, about 195 feature articles and as many columns have been published. The columns generally reflect the columnists' orientation, as explained above. The feature articles can be grouped into eight categories to convey the scope of information they offer:

1. Technical solutions: renewable energy, efficiency, infrastructure changes (26%)
2. Vermonters' relationships to their natural environment, including such diverse aspects as birds, butterflies, marshes, meadows, forests, stream monitoring, the land ethic, and environmental literacy (23%)
3. Community initiatives, projects and conferences, social transformation (13%)
4. Educational and school projects, climate and energy literacy issues (10%)
5. Forestry, agriculture, and food issues, including biofuels, farmers markets, composting, and the Vermont farm-to-plate movement (10%)
6. Impact of climate change on Vermont's seasonal climate and growing season (7%)
7. Significance of personal lifestyle and energy use choices (7%)
8. Legislative issues (4%)

The preponderance of articles addressing technical issues and broad environmental issues is immediately apparent. The technology side, supported by incentives from the state, provides many photogenic opportunities for articles as Vermont builds a renewable energy infrastructure (with megawatt-scale photovoltaic arrays as well as small installations on homes and businesses), retrofits homes for greater winter efficiency, and explores new wind and hydro generation.

Vermonters have roots in the outdoors; many articles cover how the Vermont environment is changing and speak to their roles and responsibilities in caring for the natural world. The large number of articles on community initiatives reflects the fact that Vermont communities are not waiting for their state government to take action, let alone the federal government.

The importance of educational and school projects is also reflected by the number of articles in this category, as Vermont looks for ways to address climate and energy literacy issues and retrofit schools to use less electricity and especially less fossil fuel for winter heating.

Vermont is an agricultural state. Many articles cover the changes under way in this category, as the local food movement, farmers markets, community-supported agriculture, and local food processing systems are all rapidly growing. Vermont also has extensive forest resources and an expanding wood energy industry producing wood pellets and chips for winter heating.

Relatively few articles address core issues of personal lifestyle and energy use, even though this is a major challenge for a society that has grown accustomed to abundant supplies of cheap fossil fuel. In fact, the columnists—not the feature writers—have written most on this difficult topic.

The legislative category is the smallest, even though the Vermont state legislature is a leader in the nation in addressing environmental issues. This perhaps reflects the slow but steady pace of legislative change as well as an editorial emphasis on the many community-level activities.

Significant Environmental Themes

Over the life of this project, many important themes reflective of the growing environmental movement in Vermont have emerged. The section titled *Scope of Information* (above) discussed eight basic categories of feature articles; this section expands on the three themes of energy efficiency, climate change indices, and opportunities for public participation. The overarching theme, the development of environmental literacy, should once again be stressed as the central goal of this entire project.

Energy Efficiency

Energy efficiency is regularly featured because it represents such a critical opportunity for energy savings. A feature article on home energy audits was published in the

second month of this project (February 2008). The thread has been picked up many times since, both as a regular topic by columnist Paul Scheckel, an energy efficiency specialist, and in several other feature articles over the years as the energy efficiency movement has developed in Vermont.

These articles have been written from many different perspectives: public school initiatives, opportunities for homeowners, town energy groups, local businesses, and projects by various government and nonprofit groups. The first article explained how the typical home energy audit process happens and encouraged homeowners to undertake the simple kinds of measures that could yield substantial savings. Many organizations also were urging Vermonters in this direction given the state's infrastructure of older buildings and high heating costs in the winter. Subsequent articles publicized the annual "Button-Up Workshops" available statewide each fall for homeowners and sponsored by Efficiency Vermont, the state's nonprofit energy conservation utility. Other articles told stories of similar initiatives in public buildings—schools and town halls—and also from the perspective of businesses that were offering to partner with consumers to assume some of the up-front costs of capital improvements that would be more than offset by the heating costs saved over a relatively short period of time.

Most recently, an unprecedented countywide energy challenge in Rutland County has been featured several times to explain to homeowners how they can make very significant energy-efficient home improvements with federal funds made available through the Department of Energy's Energy Efficiency and Conservation Block Program via the nonprofit NeighborWorks of western Vermont. Financial incentives are being offered to all 27 towns in the county, which are competing with each other to make home improvements; the total goal is to upgrade 1,000 homes in Rutland County by 2012. The section editor is working together with NeighborWorks, the Rutland Regional Planning Commission, and town energy groups to publish a series of articles during the energy challenge that track the progress of the project and encourage public participation.

Climate Change Indicators

The general public hears a lot about climate change on the global scale: melting polar ice, receding glaciers, and rising sea levels. To bring the picture closer to home, Vermont state climatologist Lesley-Ann Dupigny-Giroux has written several articles discussing the state's climate during each of the four seasons. She reviews the kind of weather that different areas of the state expect for that season, considers historical trends, and gives the perspective needed to understand the relation of weather to climate and the issue of climate change in general. Many feature articles, some written by climate scientist Alan Betts, have examined local indicators of climate change, including

changes in plant and animal species and in climate trends such as freeze dates, the length of the growing season, the frozen duration of small lakes, and the onset of spring. All these climate indicators show a consistent pattern of a warming climate in Vermont during the past few decades. For example, in the past 40 years, the growing season for frost-sensitive plants in Vermont has increased by almost 2 weeks; for frost-hardy plants the growing season may have increased by as much as 3 to 4 weeks. The winter cold season has been getting shorter and less severe. Resources for additional information are usually included if readers want to explore further.

The impacts of a warming climate on Vermont's plant and animal life are critical to the state's economy, which is so dependent on the natural landscape. What do warmer winters mean for the ski industry, ice fishing, and other winter recreation activities? How will the sugar maple trees be affected and the maple sugar industry in turn? What should be done about invasive species? Why are people noticing species of birds that have not been widely reported before? How should the public deal with the northward migration of the deer tick population and increasing incidents of Lyme disease? These are just some of the questions that have been considered in the environment section.

More recently, the devastating flooding associated with Hurricane Irene and the record spring flood of Lake Champlain have provided unfortunate occasions to revisit the likelihood of increased rainfall associated with a warming climate in Vermont. There is an urgent need to understand such issues as floodplain development, wetland restoration, and general land management. Most articles, beyond providing the facts, talk about ways people can act, with examples of grassroots efforts such as the Vermont climate witness group, the Vermont climate registry, town planning groups, and Internet-based resources.

A collaborative effort here is with the Rutland Natural Resources Conservation District, which is providing a series of articles to help people understand their role in such issues as algae bloom in Lake Champlain, urban runoff, and water quality and land management generally.

Opportunities for Public Participation in Major Planning Efforts

Public forums, which represent a crucial step in developing environmental policy, are also featured regularly in the environment section to encourage public participation. A series of articles reported on an effort by Vermont's Statewide Environmental Education Programs (SWEEP) alliance and the Four Winds Nature Institute to develop a plan for statewide environmental literacy in Vermont. This group held a series of public dialogues in all 14 counties of Vermont during the winter of 2010 to facilitate a statewide conversation on environmental literacy in Vermont. Feature articles in the environment section gave progress

reports on the project, reminded readers of upcoming dialogues, and generally encouraged Vermonters to participate in crafting a road map to environmental literacy for Vermont.

More recently, the state has been updating its comprehensive energy plan. The Department of Public Service (DPS) held a series of four public hearings and encouraged the public to attend and speak to the kinds of policy, programs, and practical solutions that should be considered. DPS also was coordinating closely with many state agencies and key stakeholder groups. The four public forums in June were hosted in Montpelier, Springfield, Rutland, and Colchester by the DPS, VNRC, the Vermont Energy and Climate Action Network (<http://vecan.net>), and local regional planning commissions.

In this case, the editor of the environment section worked with the VNRC and the DPS to publicize the hearings and underscore that public participation in developing a comprehensive energy plan is crucial to its long-term acceptance and success. At each forum, groups of Vermonters turned out to hear an overview from DPS Commissioner Elizabeth Miller on Vermont's energy landscape. In focused and facilitated small-group sessions, attendees also offered their input and ideas on the state's energy direction. The public forums underscored the urgent need to turn the state's energy challenges into opportunities and develop a clean energy economy. The forums also showed that many Vermonters are ready to help the state undertake this significant task.

As the 2011 public review draft of the energy plan is developed and released, additional articles will encourage Vermonters to stay involved by summarizing key points and explaining how comments can be submitted via additional meetings and online at the Vermont Comprehensive Energy Plan (CEP) website.

The Framing of Climate Change and Other Environmental Issues

Earth Systems Perspective

The basic challenge that has inspired this section from its inception is how to present vitally important but complex information to a public that has only passing familiarity with the scientific method and is easily overwhelmed by the staggering implications of climate change and related environmental issues.

Building a sustainable society requires resonant metaphors connecting people to the natural world and to each other (Larson, 2011). The mix of *Weekly Planet* columnists—writers who represent many different environmental “voices,” including scientist, builder, community activist, farmer, energy efficiency specialist, lake ecologist, and environmentalist—is broad enough to engage many readers. The themes offered from these many perspectives likewise present a wide range of

opportunity for readers to connect with both the local community and the natural world.

All voices must be heard, since everyone is deeply embedded in the status quo. But a sustainable future requires a systems approach to the Earth, well beyond the limited frame of human social controversies. The challenge is far deeper than environmental science; it involves the coupling between society and the natural world it depends on for food, fresh water, and other resources. In less than a century, human industrial society has become the major driving force affecting the future of the Earth: its fauna, forests, oceans, and very climate. This is new, and for the Earth's ecosystem, the change is very rapid. Humanity did not start down this path consciously but now has a sense of where it may lead. A collective understanding of humanity's responsibility is essential, and this requires a much deeper level of environmental literacy in the general public.

Starting with this perspective, the columns written by climate researcher Alan Betts use a holistic framework to explain the underlying science of the current weather, seasonal climate, climate change, and energy issues. They address how the future of humanity is deeply interwoven with the future of the Earth and its ecosystems. They use examples from Vermont so that readers can relate their personal experience in the state to what is happening globally, and they suggest hopeful strategies that individuals and communities can pursue for a sustainable society. The columns are written so that a scientist will perceive them as accurate though simplified, while the public will understand some critical earth system processes as related to personal experience of local weather and climate.

The goal is to communicate environmental science and facilitate a social understanding of earth systems thinking. The following sections discuss some of the issues involved in this process.

Role of the Earth Scientist

Global climate change presents a basic challenge to the long-held view that science will lose its integrity and scientists will lose their impartial reputation if they stray into the domain of public policy. Human civilization depends on both natural and managed ecosystems, which in turn depend directly on the Earth's climate. Now greenhouse gases from global industrial society are increasing global mean temperatures (Intergovernmental Panel on Climate Change, 2008) with dramatic long-term ecosystem impacts.

Managing the earth system requires limiting greenhouse gas emissions. This is a challenge to many human-centered political and economic ideologies and their implicit authority. Earth scientists have a responsibility to communicate more clearly and more directly with the public (Betts, 2011a). Without a much deeper understanding of climate change and the earth system, citizens cannot see

the need for change and will not support governments when they have to make difficult decisions to move away from "business as usual."

Traditionally, the primary task of scientists has been to write scholarly papers—but these are largely unintelligible to the public (Betts, 2011b). One approach taken by Betts in this regard is to focus research on local issues. An example is the topic of seasonal climate transitions (Betts, 2011c) at northern latitudes, linked with the winter, spring, summer, and fall seasons. These transitions are familiar to the public, but the underlying climate processes (water vapor feedback in all seasons, snow-ice albedo feedback in winter, and evaporation-precipitation feedback in summer) are not generally understood. The seasonal climate transitions can be used to explain climate feedback processes and the distinct roles of the three phases of water (ice, liquid, and vapor) in the surface energy balance, as well as the links between the water cycle and vegetation. A second example in Betts's research is his effort to develop climate change indicators (Betts, 2011d) for Vermont that are familiar to local communities. The regional climate is warming twice as fast in winter as in summer, as snow and ice cover shrink, so the frozen period for small lakes is decreasing by about 7 days per decade. The growing season between frosts is getting longer, and spring, as indicated by the leaf-out and bloom of lilacs, is coming earlier.

Betts's *Weekly Planet* columns pick up these seasonal topics in descriptive language that enables readers to directly relate their experiences of the seasons to key climate processes that operate locally as well as globally. This translation from global abstract concepts to local experience is very important. If professionals and citizens can understand more clearly what is happening in the local climate system around them, they can adapt to the changing climate and perhaps see more clearly their collective responsibilities. A parallel example in the localization of the food system is that citizens can make more responsible choices—once they know the real source of their food and who grows it.

The Challenge of Managing Technology

A broad perspective is critical. Toward the end of the last century, the realization that human impacts on the natural world needed to be managed led to the rise of the environmental movement. But society has been slow to appreciate that technology itself, which has afforded the marvels of human civilization, must be managed along with all the waste and pollution. Technological developments have been market driven, without proper costing of the adverse impacts. More generally, society has not grasped the fundamental distinction between the predictable manmade world of technology and the unpredictable, complex natural world, which is poorly understood (Schumacher, 1977). Today's global environmental problems are both severe and unpredictable because technology, combined with a rapidly

expanding human population, is now having a global impact on the natural world. The earth system itself cannot be managed; only human impacts can be managed and severely limited. This basic understanding, however, conflicts with traditional thinking in industrial societies.

Earth Systems Perspective Versus Growth Model

The traditional economic concept of continual growth contrasts starkly with natural ecosystems, which are characterized by cycles of growth and decay. Forests, for example, grow slowly and respond to the supply of nutrients, water, and sunlight. All parts of the system—soil, roots, trees, leaves, and air—are exchanging and communicating with each other. The forest system is continually seeking balance with a complex network of regulatory controls providing stability. In contrast, the free market economic and financial system is based on the premise of maximizing growth and limiting regulation, even though the information flows and feedbacks may be insufficient to keep the system stable.

In reality, global stocks of nonrenewable resources are finite. Humanity depends on the natural world for food, fresh water, and renewable energy supplies. Thus, it is critical to understand what governs the regulation of the natural world. And society as a whole has failed to appreciate how humankind has coupled the real world, which has real limits, to the fantasy of limitless growth and then coupled this to a virtual growth world of limitless leveraged debt. Computers do an excellent job of constructing virtual fantasy worlds and idealized models. But the real material world is subject to finite resources and real physical laws.

In the biosphere, growth and decay pathways are well balanced. The earth system manages itself and biological processes play a major role. In contrast, the human societal focus is on maximizing growth with little attention to the waste products and the decay side of the balance. This makes today's industrial society unsustainable for two reasons. Fossil fuel supplies and raw materials are limited, and many human-generated waste products have become major disturbances to the very biosphere that humanity depends on for its survival. A balance must be established in which industry and society are fully responsible for everything that humans make, including a life cycle analysis—with a clear recycling or remanufacturing pathway. This may require a fast decay of waste into products that are not toxic in the biosphere. It means no accumulation of long-lived effluents, such as the greenhouse gases, that perturb critical planetary balances in the atmosphere, oceans, ice sheets, or biosphere.

Three broad guidelines for reducing and managing the human impact are

1. minimize a lifetime of human waste products in the earth system and eliminate waste with critical biosphere interactions;

2. minimize the use of nonrenewable raw materials and maximize recycling and remanufacturing; and
3. maximize the efficiency with which our society uses energy and fresh water and maximize the use of renewable resources.

These provide a useful guiding framework for the transition to an efficient society powered largely by renewable energy—a society in which humanity accepts its place as an integral part of the earth system.

Social Aspects

The transformation to a resilient and sustainable society in balance with the natural environment is not just a technological issue but also one that involves a profound change of mind-set regarding humankind's relation to the earth system (Meadows, 1999). Conceptually, the shift from managing local forests or the health of the deer herd to managing humanity's overall impact on the earth system is huge. In addition, understanding the Earth requires a fundamental shift from an annual to a generational perspective because the timescales and lags in the earth system are long. For Western capitalist society, this means looking beyond quarterly profits to the "real costing" of goods and services for humanity and the earth system for the next 30 years. Even this perspective is not really long enough, but it is a tangible first step for many with children and grandchildren.

In reality, the longer seven-generation time frame of some native peoples is a better timescale for the Earth's ecosystem. The Earth changes slowly, but it is far more powerful and resilient than humanity. The choice is clear: Humanity must either accept responsibility and adapt to this real world or face consequences far beyond its control.

Responsibility for the next generation comes easily because parents love their children and understand their needs. The lives of successive generations are interwoven, and the survival and future of children matter deeply to their parents. Responsibility for the Earth is just as important and likewise requires humanity to understand and love the natural world—and appreciate how the health of the earth system is interwoven with human lives, food, and its very survival. This deep connection to the natural world has largely been lost in urban society, which is why environmental literacy is so important.

Political Considerations

Communicating environmental science to the public is now tightly interwoven with politics. Today's global climate problem, for example, is one consequence of a hands-off attitude toward science and technology coupled with mainstream growth and free market philosophies. Climate scientists, by modeling the complexities of the earth system as accurately as possible, have revealed the

urgent climate risks facing the biosphere. These scientists sometimes naively hope that politicians will use this valuable information to redirect the economy away from fossil fuels, away from the precipice of irreversible climate change. But it is very difficult for the public and elected leaders to face this transformation. So paradoxically, although climate research is marketed as necessary to provide governments with better guidance for the future, it is less and less useful for this purpose (Sarewitz, 2010). The earth system has such an unpredictable richness and complexity that computer models cannot predict the future in enough regional detail to give cover for difficult political choices. At the national level in the United States, political paralysis has deepened, and progress toward global governance on climate issues seems slower than the advance of global change.

Vermont is a relatively environmentally aware state, with many well-informed citizens who understand that humanity must respect earth system limits or face the consequences. More than a hundred community groups are working on climate and energy issues, hoping to build new resilient paths for their communities. In this context, the broad question is what would it take to transform communities so that their citizens and entrepreneurs were active and well informed, with the prerequisite skills to generate real wealth, and the authority to be self-governing? Humankind still has some precious time and in its spirit and collective wisdom a rich, unlimited, and sustainable resource.

Empowering Readers

The choice of hope over despair is crucial. Having given many talks on climate change, Betts has noticed how a few listeners get angry when they realize that humans are endangering the well-being of the Earth and their children and grandchildren. Some audience members react with despair because the challenge seems so great and political systems so paralyzed that they feel overwhelmed. Others resonate with the fact that Betts speaks from a position of hope. They recognize that understanding the truth of what is happening is in itself a cause for hope because it frees one to take responsible actions. Then someone will look up from their despair and ask with burning clarity, “Why are you so hopeful?”

This is a much deeper question than understanding and responding to climate change. For human beings, hope opens doors to possibilities that expand their vision; hope connects them to one another and deepens their sense of communion. Imagine the hope and joy of a summer sunrise immersed in the dawn chorus. Hope opens doors and frees humans to be creative and joyfully work with each other and with the Earth. In contrast, despair closes people off from the real world of possibilities into a dark and isolated world.

Accelerating environmental change presents humanity with many difficult choices. The first step is to recognize

the truth and choose hope over despair. This opens the door to working together to make choices that will lead toward a more sustainable and resilient society.

Facilitating Environmental Leadership

Four years of researching and writing about the environment for the general public have confirmed our perception that an informed public facilitates environmental leadership within the community. The initial premise of this project was that an informed public with access to a wide range of articles of trustworthy information relating to local and global environmental issues would be empowered to face change. The task was thus to facilitate the flow of stories and accurate scientific information about the environment that would deepen readers’ understandings and connections to each other and to the Earth.

During the lifetime of this project, Vermont has experienced a growing grassroots environmental movement, an expanded digital communications network, and some severe natural disasters. Public policy efforts have focused on energy choices, climate change, and resource allocations. This background has served as a rich medium for a variety of articles from diverse sources. The environment section has developed as a place where many of these voices can be heard and revisited over time, a place where experts and members of the public can connect directly with one another.

The process of maintaining and developing the environment section has also yielded many unexpected fruits. Collaborative efforts with University of Vermont faculty, policy planners, energy experts, and other organizations and individuals have been some of the offshoots. Over the course of this project, related articles and editorials have appeared more frequently in other sections and issues of the paper and in an expanded online presence. Revisiting the model for environmental journalism has taken this effort beyond its original goal of attempting to educate the general public to make informed choices about environmental issues. The process has itself adapted the journalist model to a more community-based approach that reflects the web of relations that comprises the natural world.

A sense of connection is empowering for individuals and community groups. But it is much more for society generally and its relation to the Earth. The stability and resilience of complex natural systems depend on a network of connections and flows of information. Creating a similar system with honest flows of information for our complex human society is essential but difficult. Power structures have traditionally controlled and manipulated information flows, fostering confusion and mistrust. But now that humanity is driving rapid environmental change that adversely affects the global ecosystem, systems of deception are not just unsustainable—they are self-destructive.

Consequently, our role as environmental leaders is subtle: to help create an honest web of information imbued with a deep sense of our interconnections that inspires and empowers communities to reconnect to the Earth and face the critical challenges at hand.

On August 28, 2011, Hurricane Irene dumped 6 inches of rain on the already saturated Vermont landscape, producing devastating floods that washed away roads and bridges and isolated 13 towns. In the face of this crisis, Vermonters responded immediately with a unified community spirit. Social media mapped out critical needs; volunteers linked up communities and supplies and improvised transport networks using emergency roads, coordinating with state and

national resources. Human beings instinctively respond when confronted with a crisis—indeed, humanity's survival as a species has depended on this capacity for immediate response to danger.

Today's environmental challenges seem less immediate. They are global as well as local in scale and are developing with the slower timescales of the Earth. Facing them requires deeper understanding and a longer vision but the same kind of community spirit. Informed community action guided by visionary environmental leadership is a crucial planetary resource that will determine the kind of Earth that this generation passes on to its descendants.

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