

# SCIENCE CHRONICLES

November 2013

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## Learning

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## Editor's Note

By Jonathan Adams

“Learning,” a loaded word these days, with overtones, intentional or otherwise, of a host of additional tasks conservationists must take on in order to better themselves and save the planet. But fear not, I have far more modest goals. My hope, as I take the reins as editor of *Chronicles*, is simply to broaden the communities from whom we can learn. Thus you will find in this issue several articles from authors not of the immediate TNC family, though they may be cousins — Eleanor Sterling and Erin Betley on “push-pull” technology in African, and Nick Salafsky on the unit of learning in conservation. As a cousin myself, I will be expanding the circle of contributors in the months ahead.

There is another perspective on learning here as well. Each of the articles in this issue, I hope, provide suggestions about different ways we can think about what we do, whether it is rethinking the connections between nature and agricultural systems, re-branding green infrastructure to to overcome



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Jonathan Adams

historical or cultural biases, as Sheila Walsh Reddy documents in her article, or arguing for a big-tent approach, as does Mark Burget. Learning from farmers, from history, and from each other.

Elsewhere in this issue, Jonathan Higgins makes the case for measures; Supin Wongbusarakum advocates from a new term to describe the contribution of conservation to human well-being, and Craig Leisher

summarizes the results of the recent reader survey. We also revive a old feature, Drinking from the Firehose, a highly subjective selection of topics from journals, magazines, and so on.

Next month brings the Holiday Book issue, so send me your thoughts on good books and bad. **SC**

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### The Mission(s) of *Science Chronicles*:

1. To bring you the latest and best thinking and debates in conservation and conservation science;
2. To keep you up to date on Conservancy science — announcements, publications, issues, arguments;
3. To have a bit of fun doing #1 and #2.

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## Article

# Working with Farmers and Nature

By [Eleanor Sterling](#) and [Erin Betley](#), Center for Biodiversity and Conservation, American Museum of Natural History



**Above, Figure 1:**  
**Damage caused by**  
**stem borers on**  
**maize.**

Credit: [www.push-pull.net](http://www.push-pull.net)

One year ago, we and our colleagues at the American Museum of Natural History in New York City opened a groundbreaking special exhibition [Our Global Kitchen: Food, Nature, Culture](#), that took a systems view of the past, present, and future of food. In the course of developing the exhibition, we were constantly confronted by some of the most challenging issues of our time — from food insecurity to the environmental impact of agriculture — and we were struck by an underlying question that connected so many of these issues: how can we feed humanity while also addressing biodiversity conservation? Often these discussions focus on yield and how much more can we produce sustainably, but there is so much more to consider: how food is unevenly distributed regionally and around the world, how much food is wasted, the nutritional diversity of the food we produce, and the environmental impact of the food we eat, to name just a few key concerns.

We know that agriculture is dependent on often undervalued ecosystem services, from pollination to nutrient cycling (Power 2010, Wratten et al. 2013) and we know that there is a lively debate in the conservation community about the relative costs and benefits of protecting natural habitats from conversion to agriculture (known as “land-sparing”) or of maintaining biodiversity along with high yielding agriculture through diversified farming practices (known as “land-sharing”) (Phalan et al 2011; Kremen and Miles 2012). Each approach encompasses complex tradeoffs, and economic, social, and political factors are at play in decisions about agriculture at all scales. We noted in our research that many people on either side of the debate expected solutions to come from innovation through high technology.

As we read case after case and considered each approach, we asked ourselves, what if we could improve our food supply by taking lessons from nature rather than continually struggling against it? For millennia, farmers have been keen observers of nature and natural cycles, constantly innovating to improve their crops and overcome challenges, creating a rich traditional ecological knowledge base. Are there examples of the intersection between this type of approach, and advanced modern innovation? We found that a partnership of Kenyan farmers and scientists has implemented an innovative diversified farm system of cereal farming called “push-pull technology” ([www.push-pull.net](http://www.push-pull.net)) that draws on an extensive understanding of the relationship between predators and competitors for cereal.

The predators, stemborers that feed on cereal plants, are “pushed” away from a group of plants, *desmodium* (*Desmodium* spp.), planted among the cereal plants and “pulled” towards Napier grass (*Pennisetum purpureum*) planted at the edge of the field. Both the push and pull of the system are driven by naturally-occurring volatile chemicals that the predators find repellent or attractive, respectively. The sticky Napier plants trap the pests and their eggs away from the crop. The *desmodium* roots also contain a chemical that helps control weeds that otherwise outcompete cereal plants. The leguminous *desmodium* improves soil fertility through nitrogen fixation and erosion control, and both companion plants are high quality fodder for livestock.

This effective system was developed through years of in-depth studies exploring the chemical compositions of various candidate push and pull plants and the behavioral responses of the insects, combined with rigorous field trials and observation (Hassani et al. 2008). More than 30,000 farmers in Africa have adopted push-pull technology and, while the labor inputs are high, the process triples crop yield while decreasing dependence on expensive external inputs (Khan et al. 2011).

The Food and Agriculture Organization of the United Nations estimates that 80% of the food consumed in developing countries is produced by smallholder farmers, so it is critical that innovations are adapted to the needs of these farmers (FAO 2011). Many people have asked us, sure this technique works with small-to mid-sized farms, but we’ll need farms at all scales to feed the growing human population, so can this be scaled up? The principles of push-pull technology represent a growing set of strategies

**What if we could improve our food supply by taking lessons from nature rather than continually struggling against it?**

called agroecological approaches or diversified farming systems that are applied across many scales (Kremen et al 2012; Scherr and McNeely 2008). Essentially, these strategies call for a landscape-scale approach to managing agricultural systems, emphasizing diversity and the outputs from one element of a landscape serving as inputs to another.

For example, the strategy may be about including riparian buffers in the landscape to keep soil from running off the land into waterways, and also protect local and regional water quality. It may be about understanding, through scientific study and also field observations, how integrated systems of mixed crops and livestock can cycle nutrients efficiently across the farm. Planning at the landscape scale also involves incorporating considerations of people and their livelihoods, including healthier diets and farmer autonomy.

We know that a robust food system will be a diverse one, as we face the fact that currently 40% of Earth's ice-free land is already under cultivation (Foley et al 2011), and we confront the challenges of climate change; natural limits to cheap energy and resources; and, increasingly, globalized and integrated markets. There is much promise in partnerships between farmers and scientists that draw from a base of natural observation to inform innovation. These observations are built on an awareness of surroundings and relationships between organisms, and can be a powerful tool to be deployed for our collective future. **SC**

*Eleanor Sterling is the Director of the American Museum of Natural History's Center for Biodiversity and Conservation. Erin Betley is Biodiversity Specialist at the Center.*

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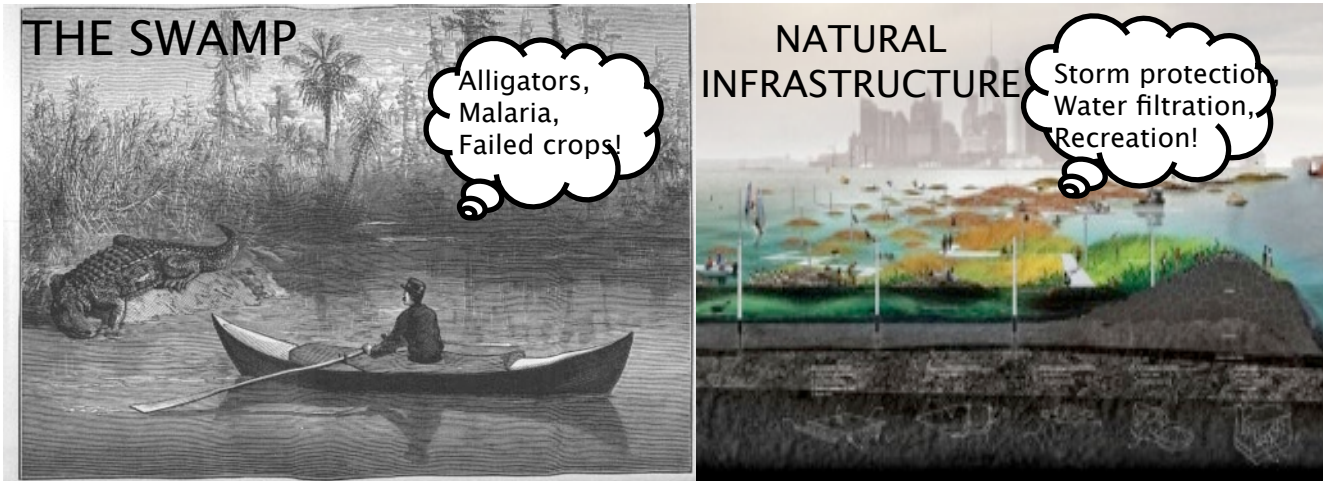
**There is much promise in partnerships between farmers and scientists that draw from a base of natural observation to inform innovation. These observations are built on an awareness of surroundings and relationships between organisms, and can be a powerful tool to be deployed for our collective future.**



# Article

## Re-branding Nature

By [Sheila Walsh Reddy](#), Ecosystem Services Analyst, The Nature Conservancy



A few hundred years ago, swamps were downright un-American. Swamps were “not only the antithesis of the pastoral ideal, but a very real obstacle to commercial prosperity,” writes historian Anthony Wilson in the *Shadow and Shelter: the Swamp in Southern Culture*. Colonial Americans saw putrid waters teeming with alligators and disease. They went to great lengths to drain away these biblical images of sin and impurity to make way for the amber waves of grain. Thomas Jefferson gave encyclopedic advice to gentlemen farmers in *Notes on the State of Virginia*, but he never breathed a word about The Great Dismal Swamp or other vast wetlands. Draining and filling of wetland up and down the east coast made Jefferson’s image of America nearly a reality by the mid-1900s.

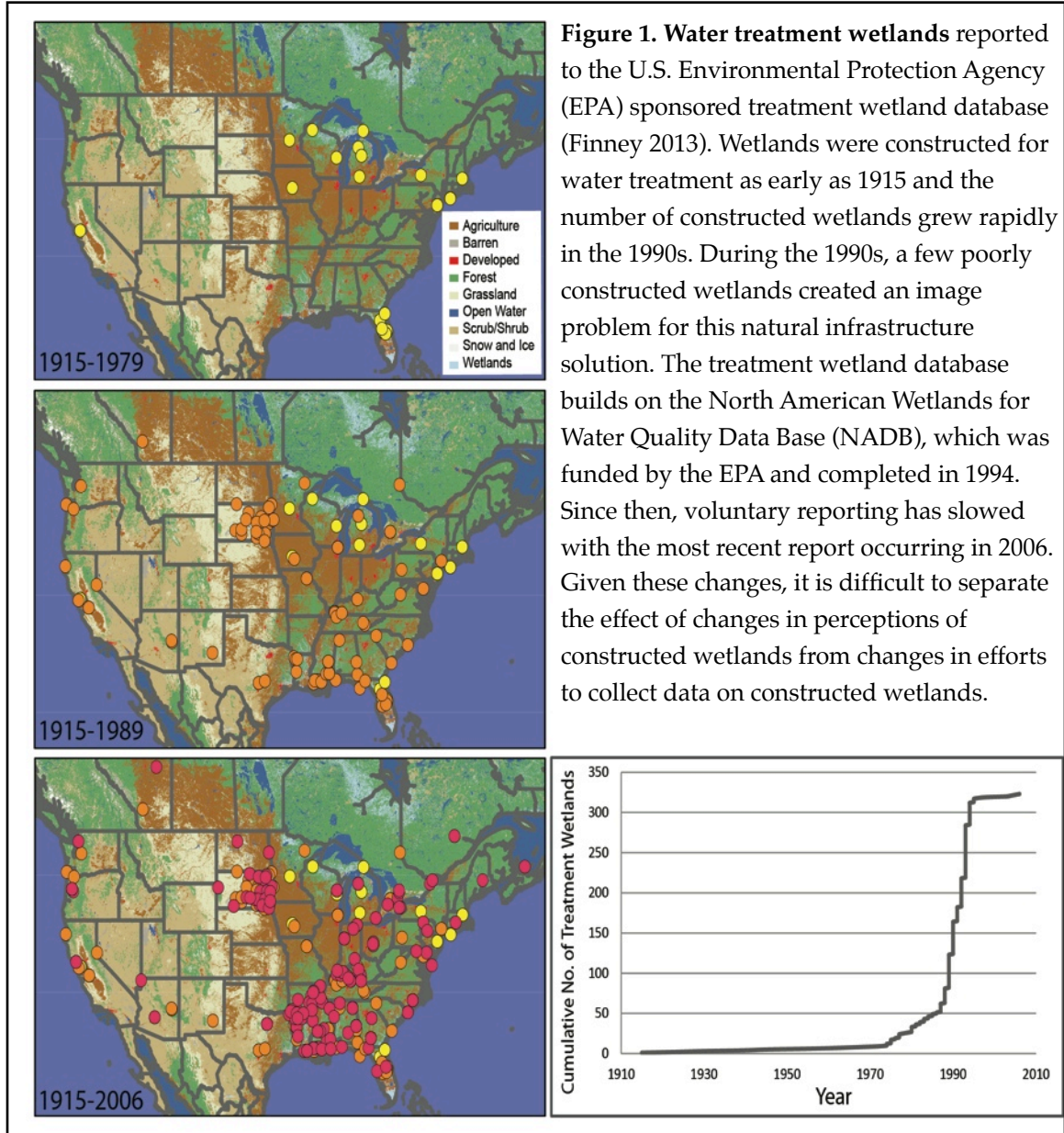
Fast-forward to the 1990s and wetlands have been re-branded. They are a technocrat’s dream, naturally cleaning water and boosting bird populations at the same time. Like a movie on rewind, towns and some small businesses flood dry lands to construct wetlands to replace wastewater treatment facilities. Ribbon-cutting ceremonies feature proud mayors and wise engineers. By the end of the 1990s, there are over 1,000 constructed wetlands in the USA and over 5,000 in Europe (EPA 2004, Cooper 2007).

Success! With such a triumph for people and nature, the updated statistics must show constructed wetlands in the tens of thousands by now, right? In fact, the statistics and the studies tell another story — a story of stagnation (yes, pun intended). But, this story tells us a lot about what we need to do next to launch and sustain investment in natural infrastructure.

Demand for constructed wetlands was outstripping supply in the 1990s. This gap attracted sub-par engineers and contractors. Some constructed wetlands became stinking cesspools. These few bad experiences rapidly transformed the public image of constructed wetlands.

**The story of constructed wetlands tells us a lot about what we need to do next to launch and sustain investment in natural infrastructure.**

In the UK, design engineers, contractors, water utility companies, and researchers responded to this problem by forming the industry association, the Constructed Wetland Association (CWA) (Cooper 2007). The CWA establishes and maintains standards for constructed wetlands through research, training, and accreditation. In the US, the EPA began issuing design manuals, fact sheets, and compiling a database of constructed wetlands. EPA guidance even focused specifically on the dual goals of water quality and wildlife habitat.



The key lessons from these experiences are that we need information that can demonstrate the promise of natural infrastructure as well as standards that help avoid empty promises. New information can re-brand a wetland from something that is perceived as harmful to something that is helpful.

Re-branding wetlands will be a challenge. The constructed wetland that turned into a cesspool had all the ingredients of an image that was made to stick, as laid out by authors Dan and Chip Heath: it was simple, unexpected, credible, concrete, emotional, and it was told as a story. Building a new brand for wetlands will require credible standards that ensure wetlands are consistently helpful.

Despite the image crisis, constructed wetlands have had notable successes with treating municipal wastewater. But, arguably they have not been as successful as they could have been and they certainly have not been widely adopted by some of the biggest producers of wastewater: large businesses.

However, this all may be starting to change. Just this past summer, The Nature Conservancy worked with The Dow Chemical Company, Shell, Swiss Re, and Unilever to issue a joint-industry white paper on natural infrastructure. The white paper was a critical step in demonstrating the potential promise of natural infrastructure solutions, like constructed wetlands, in a business context. Taking a look back at a 110-acre constructed wetland that Dow installed in 1995 in Seadrift, TX, they found that the capital costs for the wetland were \$1.2 to \$1.4 million, compared to \$40 million for an engineered solution. In addition, the wetland has been doing what it was designed to do — clean water — consistently for 15 years. It has also been providing habitat for deer, bobcat, birds, and, yes, alligators.

This information and a set of standards for large businesses could solidify the brand of constructed wetlands as one of a suite of best-available technologies for wastewater treatment, setting off a new wave of investment in natural infrastructure. But there is still the question of whether the story of the successful constructed wetland will be stickier than the story of the gator that crawled out of the wetland and tried to eat the tires off a car last Tuesday. **SC**

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**Building a new brand for wetlands will require credible standards that ensure wetlands are consistently helpful.**



## Article

# What is the Unit of Learning in Conservation?

By [Nick Salafsky](#), Foundations of Success



If the toilet in your house is leaking, or you need to remove the stuck gears on your old clunker bicycle, just go online. In an instant, you will find a dozen YouTube videos or illustrated web-pages made by self-appointed plumbing or bicycle repair mavens that show you exactly how to fix your problem. Learning videos and websites exist for almost any home repair project no matter how obscure, but a search for materials showing conservation practitioners how to practice the basics of our craft turns up relatively empty.

For a decade or more, conservation practitioners have been urged to “harvest and share lessons learned” from our work. You may be tired of hearing it. And yet despite the best of intentions, learning has proved to be really hard to do in practice. Why are people willing to share their knowledge about fixing leaky toilets, but not saving our planet?

One simple explanation is that we conservationists are too busy with our day-to-day work to take the time to document what we have done for the benefit of others. Following this logic, to enhance learning, we would just need to provide incentives to get these busy folks to take the time to document and share their lessons learned. Other factors that may also explain the challenges in learning include the lack of data collection, lack of information technology systems to manage data, and a perception among practitioners that every project is both unique and complex.

**Image credit:** Flickr user [Garycycles8](#) via Creative Commons.

But a more fundamental explanation lies in a lack of agreement on the “unit of learning” being transmitted. Anyone can easily create or search for and quickly find a video to “replace a leaking valve on a Kohler toilet” or “remove a Shimano freewheel.” In a similar fashion, it is possible to produce and find self-help videos and guidance materials for certain kinds of specific conservation actions, like using drip torches to create prescribed burns in grasslands. Or on [ConservationEvidence.com](http://ConservationEvidence.com), you can find detailed meta-analyses of treatments for establishing nest boxes to protect breeding birds from predation or spraying herbicides to control invasive weeds. But it is difficult to find a video or best-practices website on how to establish a debt-for-nature swap or to change national policies to stop illegal trafficking in elephant tusks.

A few years back, the Conservation Measures Partnership and IUCN created a standard classification of conservation actions ([Salafsky et al 2008](#)) which is now being revised. One key change involves dividing the overall classification into two major categories of conservation actions:

**Direct conservation actions** involve either restoring a conservation target (for example, captive breeding and release of an endangered mussel species or controlled burns of a grassland ecosystem) or addressing a direct threat (removing a dam from a stream or spraying herbicide to control an invasive plant).

**Enabling condition actions** (if you have suggestions for a better term, please email me) address underlying conditions required to set the stage to make other conservation efforts possible. Examples here include providing training to park guards, establishing certification systems for sustainable commodity production, or influencing agency policies regarding the management of invasive species. These indirect actions generally don’t lead to any conservation by themselves, but rather seek to create leveraged capacity to more effectively undertake direct actions such as conducting patrols, implementing better soy or beef production practices, or applying herbicide to invasive plants.

At first glance, direct conservation actions seem to be more amenable to learning than enabling condition actions. Careful analysis of the learning involved in direct conservation actions, however, provides some clues as to how to extend the model to enabling condition actions. The actual question being asked in the herbicide application case is not “Does applying herbicide work?” Instead, the underlying question actually employs the scientific method to ask whether a specific treatment (injection of 5 ml of glyphosate) produces well-defined outcomes for a specific problem (killing invasive Japanese Knotweed rhizomes) under a certain set of conditions (in autumn when the plant is drawing nutrients back into the rhizomes).

This combination of problem statement, treatment, conditions, and desired measurable outcomes — what often is called the Theory of Change for a given action —

“Despite the best of intentions, learning has proved to be really hard to do in practice. Why are people willing to share their knowledge about fixing leaky toilets, but not saving our planet?”

is the basic unit of learning. Using this unit, we can establish general and yet non-trivial principles about the conditions under which a given action can be used to achieve desired outcomes. And it also gives us a simple set of search criteria by which practitioners can search for the information they need. Our collective challenge is to create a common framework in which units of learning can be developed not only for simple direct actions, but also for more complex enabling condition actions. **SC**

*Nick Salafsky is Co-Founder and Co-Director of [Foundations of Success](#)*

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# Viewpoint A Big Tent

By [Mark Burget](#), Senior Vice President and North America Managing Director, The Nature Conservancy



People keep asking me what I think of the “new” Nature Conservancy. It’s a question that worries me.

To be clear, some things have changed a lot over the years. These days, we fully support a truly global conservation vision. We are working more now to better engage urban communities. We are doing more work with global corporate leaders. And we are beginning to collaborate much better across organizational boundaries. All of this is good movement, I believe.

But there is much that hasn’t changed, especially one important thing: The Nature Conservancy is the organization where you get to work with others — people not like you — to save a place for nature in this world. Here at TNC, we don’t pledge allegiance to any one creed; we are not confined by ideology. At TNC, you should be ready to respect the views of others. Here you can focus on understanding one another, finding common ground, and getting good stuff done for the natural world.

In short, we have room for just about anyone who cares about the future of nature, natural systems and natural places. There is room in the TNC tent for corporate CEOs; for hard-core environmentalists; for Democrats, Republicans, and independents; for hawks and doves; for religious fundamentalists and for non-believers too. We have plenty of room for vegetarians and omnivores, vegans and carnivores!

In his book *Nature’s Fortune*, Mark Tercek, our president and CEO, recognizes and rightly honors the many reasons that people support the cause of nature conservation. Mark makes a great case for the economic value of nature, but he also honors the many other ways in which people value the diversity of life.

**Image credit:** Flickr user [Zach Dischner](#) via Creative Commons.

Some conservation supporters favor a utilitarian view of nature. We should protect nature first and foremost, they say, because it provides essential elements — food, water, and shelter — that are necessary for human survival and prosperity. They observe that improving human well being is more important to most people, and especially most poor people, than protecting nature for spiritual, emotional, aesthetic or ethical reasons.

Perhaps unintentionally, this argument has upset many TNC colleagues and friends. Some have been offended by what they perceive to be an attack on the spiritual or intrinsic value of nature.

I think we can make the “basic needs” case for nature without diminishing the spiritual and other values that so many of our friends and supporters hold dear. We can support human development while believing that all people, rich and poor, have the right to access aesthetic, spiritual, and ethical ideals through their relationship with nature.

You don’t have to look very hard around the world to find among poor people and struggling communities deep ethical and spiritual attachment to other species, natural systems, and special natural places. I have known plenty of people in poorer communities who hold dearly their spiritual connection to the rest of life.

I find the whole argument about the “right” way to value nature unsettling. Why should there be only one acceptable reason to preserve the natural world around us? And who really believes that humankind needs only the bare necessities? After all, going beyond those necessities is what makes us human to begin with! Much of what we care about most deeply — our children, our communities, laughter, fun, art, music, purpose — takes us far beyond food, water and shelter. Who would deprive any community, rich or poor, of music, love, and opportunities for reflection? Why deprive anyone of the many layers of value and meaning to be found in nature? What are we living for anyway?

In short, let’s embrace an “all of the above” case for protecting nature.

Yes, we now know that natural systems help enhance food production, water supply, air quality, coastal protection and carbon storage. And we also suspect that nature is good for our physical and cognitive health. That’s all great; let’s make this utilitarian case for nature, especially when we know that this case will move corporate and government decision-makers and those less drawn to wild places.

But beyond the utilitarian view of nature lies real meaning, real value. We lose something vitally important when we lose nature, something beyond food, water and shelter. We will not be whole human beings, or whole communities, without natural lands and waters and the rest of life with which we have shared the planet for millions of years.

So let’s keep the TNC tent open, big and welcoming. As we make the case of the value of nature, let’s leave room for Leopold, Thoreau and Rachel Carson. Let’s save space for Edward Abbey! Let’s welcome Jesus, Mohammed, the Buddha and the whole range of spiritual leaders in whose footsteps we walk today, including those who don’t believe in any one deity. Let’s hold some space for the full range of people, governments, corporations and organizations — including those hard-core environmentalists — that have always made The Nature Conservancy such a vibrant, inspiring and effective force for our mission. **SC**

**We can support human development while believing that all people, rich and poor, have the right to access aesthetic, spiritual, and ethical ideals through their relationship with nature.**

# Straight, No Chaser Listen to the Silence

By [Jonathan Higgins](#), Senior Freshwater Ecologist, The Nature Conservancy



Image credit: Flickr user [Bixentro](#) via Creative Commons.

'Straight, No Chaser' is an irregular (if not downright odd) column exclusive to *Chronicles* by Jonathan Higgins.

Miles Davis said great jazz has plenty of well-placed silence; it unclutters the musical message and makes the notes that are played clearer. Most of all, a musician should not play notes unless they have something to say. Listen to the album *Kind of Blue* and you will understand what he meant.

The Nature Conservancy should take the same approach. I am not suggesting we slow down marketing efforts, but rather back off on the promises and fill more space with what we have actually accomplished and the changes we have made.

However, in order to carry this out, we need evidence of our impacts. That is an ongoing challenge, even though we have a Strategy and Measures Team, programs provide summary measures of status and progress to leadership and funders, and we have developed numerous tools and processes.



There are several reasons why measuring impact remains a work in progress:

We think we understand what our managers, donors, and partners want to know and the terms we should use to categorize our measures, but we are often wrong. The first thing to do is to ask those to whom we are delivering information what they need to know, in what format, and how that information will be used. The Executive Team defined five categories of Global Impact Measures they want reported from global strategy teams: Governance, Sustainable Funding, Management, Environment, and People. This approach worked because each global strategy teams did not decide what they thought was important to report and how. However, some practitioners still mix up the definitions, and mis-categorize their results. That will be rectified through review, training, and practice.

We often fail to organize information appropriately, or re-classify existing measures to allow simpler presentation. It is easy to aggregate a suite of measures by using a common currency — which often needs to be created, such as those proposed for Global Impact Measures. We are doing that in the Global Freshwater Team. It is not difficult, but it has not yet become common practice. I think it will soon be.

People think that a given suite of measures serves all purposes, and that all the detailed information needs to be provided for all measures and communications, and “rolled up” to provide the answer. Leadership and other audiences need simple summary measures, such as the Global Impact Measures. The summary measures are not intended to inform site-based, strategy, or project management. Measures for those purposes are more complex, and depend on details, and are used by other audiences, for other purposes. However, many people still think that the distinctions and wealth of information are lost, and information is “dumbed down.” In fact the information still exists, and it is “smarted up” for communications to the given audience for the given purpose.

Monitoring and measures do not need to be expensive or unaffordable, but we have made them so. We tend to prefer the most accurate, precise, and high-resolution equipment and data we can find (when we actually get to monitoring decisions), often when it is not necessary.

We represent monitoring at the end of the processes we use. For instance, monitoring and measures are at the end of the steps of CAP right before adaptive management, and is the last step in the process that has been described for building a Water Fund. Monitoring and measures need to start before actions take place so we can measure the change that has happened.

**Monitoring and measures do not need to be expensive or unaffordable, but we have made them so.**

**Some people have said we do not need to monitor because we already know we are doing the right things. That is like going on a diet and never getting on the scale.**

Monitoring and measures are often overlooked when defining funding for strategies and implementation, and those responsible for monitoring and measures have their hat in hand asking for spare change to cobble together a meager attempt to track things. We need to get the monitoring needs, data sharing, and funding aspects included early in the process.

Many people think we need to measure everything, and when all is said and done, more is said than done. Believing that everything needs to be measured often results in nothing being measured, because the drive for comprehensive knowledge overwhelms every step, interaction, and process. The list gets too long, there is not a distinction between what is minimally necessary and what is ideal, nobody defines who is responsible for collecting, analyzing and reporting the information, and we end up reporting what interventions we have implemented (sometimes) and how much money we have raised, but not the difference we have made to people and nature. Successful monitoring and measures are carried out when there is a focus on the most important and affordable measures, efficient and effective ways to collect and manage data, simple ways to summarize the information, and clear communication purposes and audiences.

Measures are often viewed as an accountability mechanism. I am not searching for that here. We need to embrace the opportunities to illustrate the great changes we make.

Some people have said we do not need to monitor because we already know we are doing the right things. That is like going on a diet and never getting on the scale. I believe in most cases we are doing the right things. The question is — have we done enough of the right things in the right places to make the changes we are seeking? I think I eat correctly enough of the time to make a difference. My scale does not indicate that. **SC**

# Article

## Social Wellness: A New Umbrella for Conservation

By [Supin Wongbusarakum](#), Senior Social Scientist, The Nature Conservancy



Conservation can effect many dimensions of human wellbeing, from the tangible (economic and material wealth, physical and psychological health) to the intangible (social cohesion, culture, equity and good governance). These different domains of human wellbeing are often interdependent and mutually reinforcing. The presence of tangible benefits such as secure jobs and good individual physical health can influence household and community wellbeing, while good governance can result in security and access to livelihood resources that in turn enhance economic wellbeing.

I have been struggling to find an umbrella term for how well larger groups of people — like communities or societies — are doing as a result of access to good natural resources and effective nature conservation. “Social cohesion” is commonly used in the conservation literature as an umbrella term and as an indicator for how well a society is doing. However, I feel we need a richer and more encompassing term. By itself, cohesion simply connotes holding together and says nothing of the vitality, creativity, or

**Image credit:** Flickr user [Chadica](#) via Creative Commons.



resilience of the relationships that make up a community or society. Solidarity is important. But so are the ways in which different actors, perspectives, values and practices are brought into productive coordination. “Social wellness” seems to be a good candidate term for capturing the more dynamic dimensions of human benefits from nature conservation.

Social wellness has not been a common term in discussions about how nature benefits people. Nevertheless, it is a term that seems to be applicable at the intersection of good natural resource management and sustainable nature conservation.

As a way of stimulating consideration of “wellness” as a critical human wellbeing domain and its strong relationship with nature conservation, let me unpack the term “wellness.” Social wellness has three key components:

**Stability** (problems under control!). By “stability,” I mean a sustainable state characterized by the fact that social problems or conflicts related to natural resource use and management are being effectively managed or solved. As we see all too frequently, for societies in places where natural resources are degraded or depleted, where resources are limited or scarce, and where equity of access and resource distribution are lacking, environmental problems often trigger social problems that in turn further aggravate ecological problems. In places where nature is more intact and natural resources are well managed and provide the society’s needs, inter- and intra-societal conflict is less and social cohesion is more prevalent. Our strategies addressing sustainable fisheries and agriculture, securing water, and protecting lands all actively protect the fundamental resources that, if scarce or degraded, would inevitably stir up and aggravate social problems and conflicts. These strategies help mitigate social problems related to using and accessing scarce resource and help in realizing stability within and among societies.

**Vitality.** By “vitality,” I mean a state in which a community is able not only to pursue its functions, but also to grow and thrive through the provision of good natural resources and the conservation of healthy ecosystems. This state goes beyond just getting problems under control. Growing and thriving need not involve population or territorial expansion. Rather, they are indices of ongoing physical, psychological, and cultural development. Healthy environments are a crucial factor in achieving and sustaining healthy communities. Strategies focusing on ecosystem services, improving natural resource management, and creative policy and corporate practices involving good resource governance not only protect the resources themselves, they also help make sure that whole communities and societies thrive.

**Resilience.** Where the community is less sensitive to environmental stresses and natural hazards because it is based on healthy resources and environment, where green infrastructure reduces exposure to hazards, and where the variety and abundance of

“Social wellness” seems to be a good candidate term for capturing the more dynamic dimensions of human benefits from nature conservation.

natural resources allows for expanding adaptive capacity, society is able to withstand and recover from shocks stresses. Coastal resilience, smart and green infrastructure, forest carbon, and other strategies addressing climate change and adaptation all fall into this category.

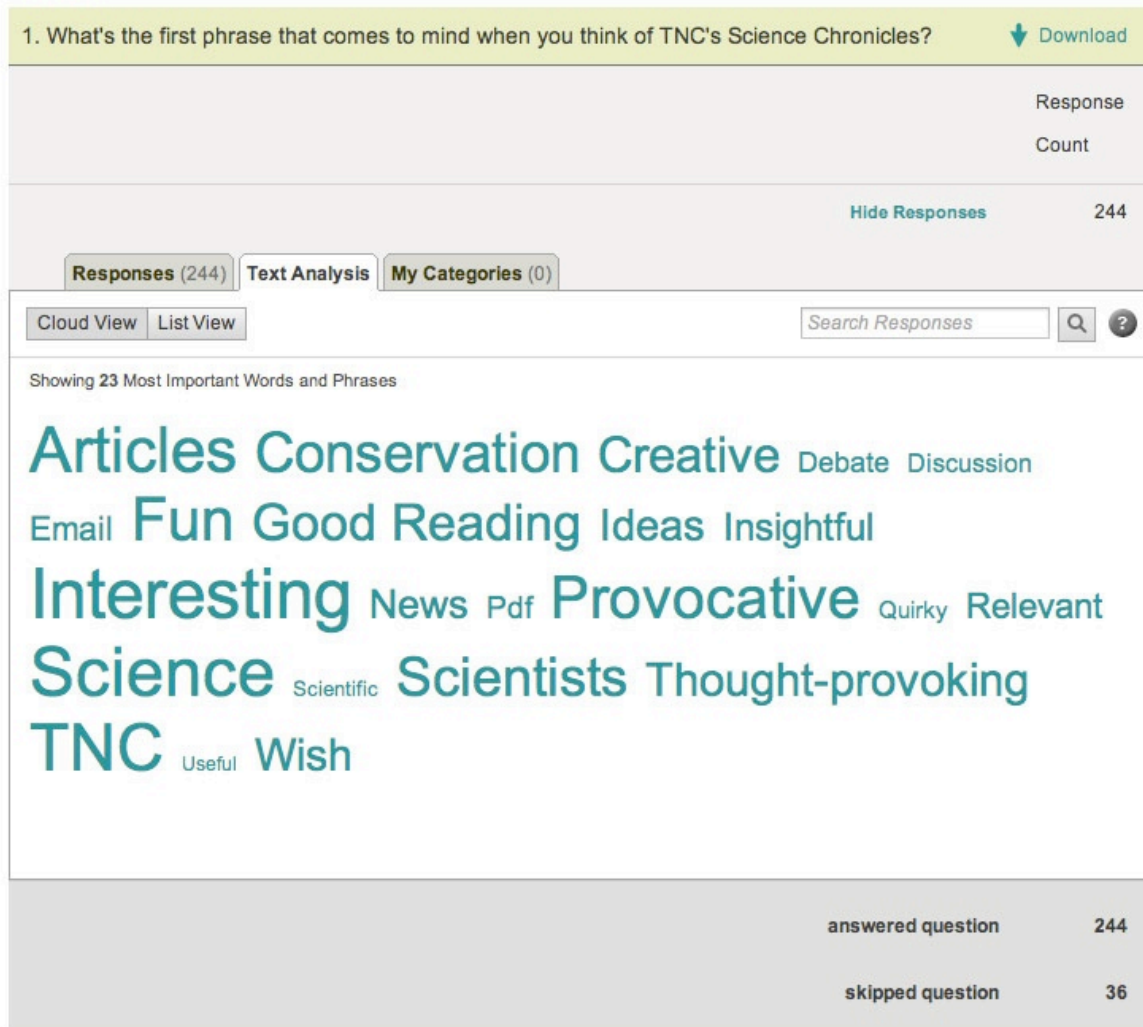
In combination, stability, vitality and resilience point toward a dynamic and yet coherent conception of social wellness as an index of successfully blending concerns for benefitting society and nature conservation. While umbrella terms that reduce human wellbeing at a group level to single dimensions (like cohesion or governance) are tempting, human wellbeing is far more complex. Adopting a more holistic concept like social wellness has potentially greater merits in identifying human wellbeing objectives and indicators. **SC**

**In combination, stability, vitality and resilience point toward a dynamic and yet coherent conception of social wellness as an index of successfully blending concerns for benefitting society and nature conservation.**

# Article Science Chronicles Readership Survey Results

By [Craig Leisher](#), The Nature Conservancy

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From 8 August to 13 September 2013 (5 weeks), we polled *Science Chronicles*' 1,247 subscribers using Survey Monkey. We sent an email link to the survey with the August issue of *Science Chronicles*, a email reminder two weeks later, and a follow-up email after the Labor Day holiday.

We had 282 respondents for a response rate of 22%. While the number of responses is sufficient to provide a statistically reliable sample (5.1% margin of error with a 95% confidence interval), it is not a representative sample of readers. Thus:

- Any differences of less than 5% are meaningless; and
- The results are biased towards those who read *Science Chronicles* and email.

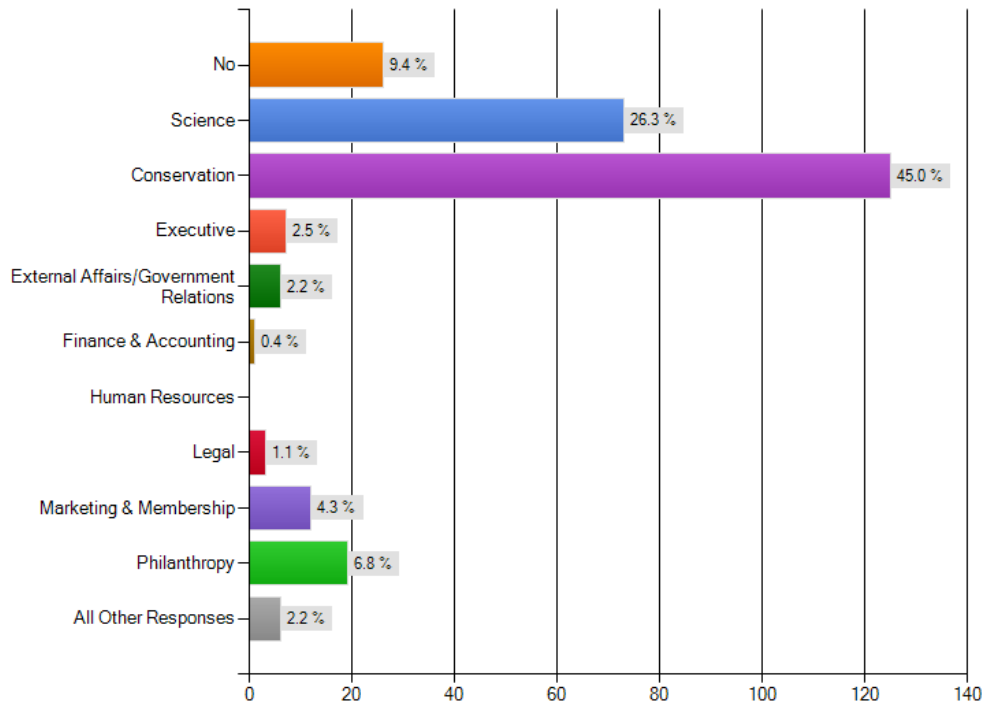


Some sample responses about how an article in *Chronicles* has changed the way people think:

“**[Article on] working with partners who are in the non-environmental protection camp. Explained why we get in bed with some of the "bad guys" in a clear way so that I could tell others.**”

“**Over the last year, SC articles have colored my thinking on conservation's shift toward including people in conservation, the need to build personal relationships, and the innate values of 'wilderness' and biodiversity.**”

Do you work for TNC? If yes, please select a job family.



*The average respondent has the following characteristics:*

- Works in conservation or science at TNC (71%)
- Almost always reads *Science Chronicles* (54%)
- Reads the same amount of *SC* as when they first started reading it (57%)
- Reads more than half the articles in an issue (45%)
- Finds the content interesting (81%) rather than boring (1%) or neutral (11%)
- Has been a TNC employee for 10 years

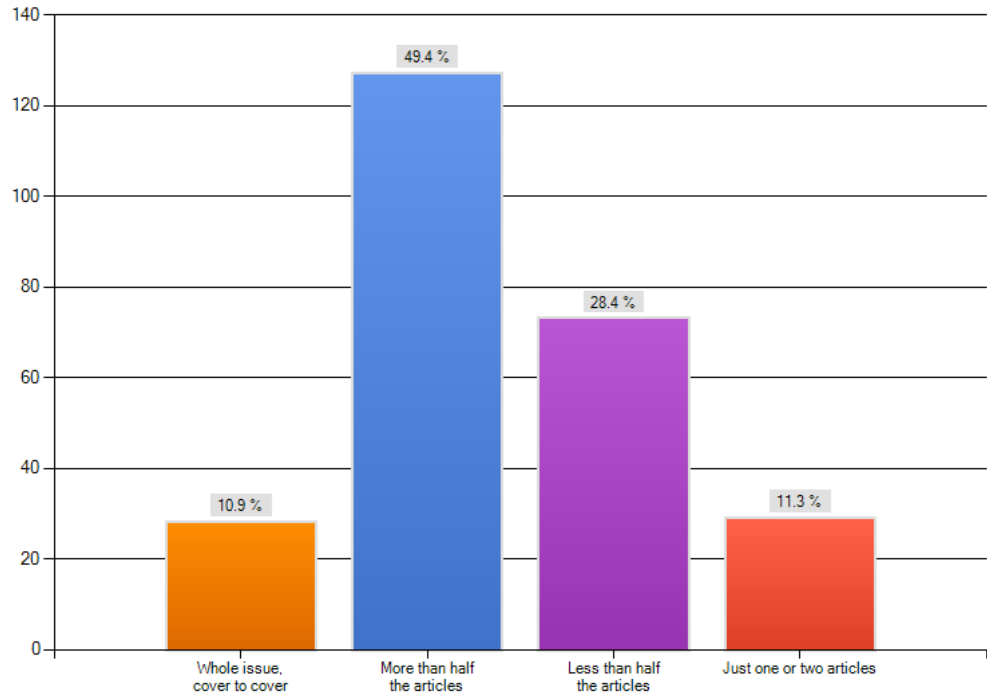
*Reader typology*

To give a more nuanced view of the survey results, we divided the responses into typologies of readers along a continuum: *SC* advocates, loyal readers, occasional readers, and never read it.

*SC advocates.* 10% of respondents report that they read almost every issue cover to cover (n = 28). Of these people, 11% read more now than previously (3), and 43% have published articles in *SC* (12).

*Loyal readers.* 54% of respondents read almost every issue (n = 151). Of these people, 55% read more than half the articles in an issue (83), and 23% read less than half the articles (35). 67% read the same amount as previously (101), and 77% find the content interesting (116). 76% of these people work in science (48) or conservation (68).

Do you read the whole issue, most of the issue, or only the best bits?



“I really like the fresh look at our corporate engagement with Dow - and how others outside and inside TNC see the pros and cons on that.”

“Working at multiple scales to achieve conservation; several articles on the role of science in conservation and the need for multidisciplinary approaches etc.”

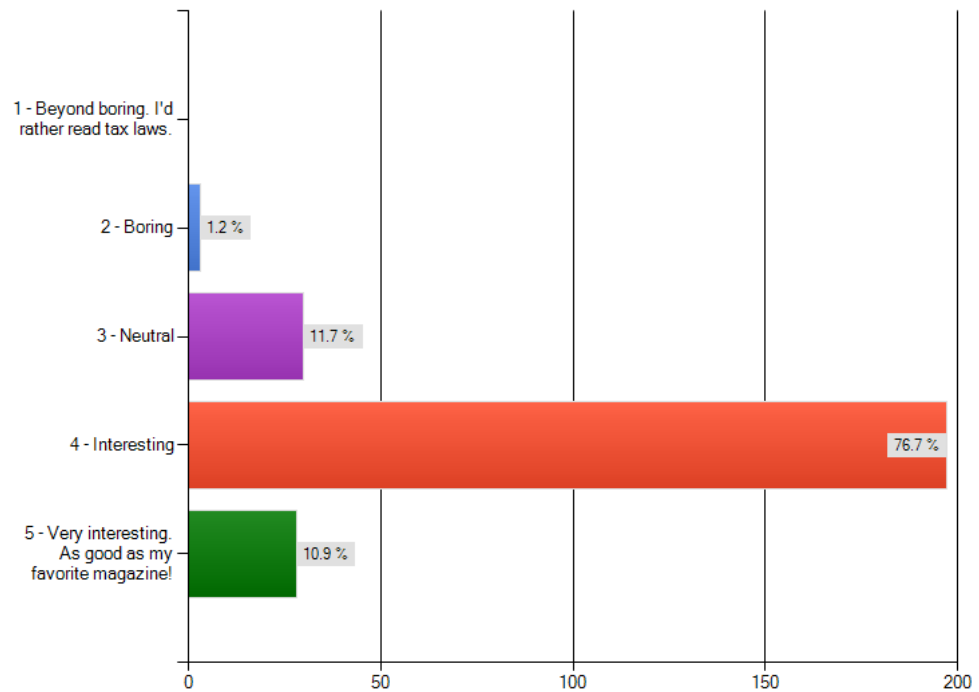
“People & Nature, People & Nature... as an old-timer, I'm still wrapping my head around that one, but I'm coming around.”

*Occasional readers.* 42% of respondents read SC only occasionally (n = 118). Of these people, 38% read more than half the articles (45), 32% read less than half the articles (38), and 23% read one or two articles (27). 70% of occasional readers find SC interesting (83), 16% find it neutral (19), and 0.8% find it boring (1).

*Never read it, but...* 5% of respondents read SC never or almost never (n = 13). Of these people, 9 were in conservation at TNC, 2 were external, and one was in science at TNC. These respondent's suggestions for improvement are (verbatim):

- “Would be nice to have brief teasers of each story in the email that's sent with the PDF -- similar to what's done with the staff newsletter. This would allow me to quickly figure out what I might want to read right away, as well as get a sense of what's going on with TNC science without having to read each article.”
- “Shorter articles.”
- “Don't send as attachment -- send as list of topics with one sentence description of content in each article, with links to go directly to each article or full issue online.”
- “I think it is pretty good. I don't seem to have much time to read. Maybe make it as easy as possible to either click the link or read directly from an email.”
- “I used to read Science Chronicles pretty regularly, but I just haven't had the time for a couple years. It would be nice to have a shortened version, whether it be highlights or summaries.”

**How interesting do you find the average issue of Science Chronicles?**



Some sample responses about how to improve *Chronicles*:

“Broaden the scope. The audience and contributors now seem to be mainly those for whom science (usually broad scale and large topic science) is their primary role.”

“I'd like to hear more about science at the state or country level. I think it is important to understand the big picture questions on conservation science broadly, but they are often presented with such generality or in such esoteric ways that I find it difficult to see how it is useful on the ground.”

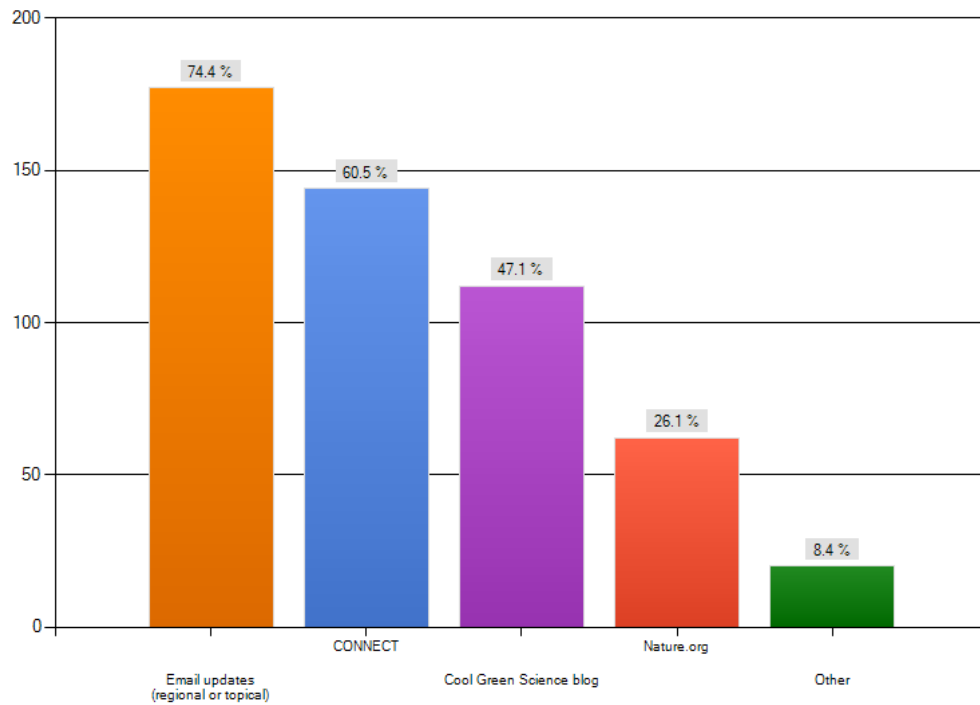
- “I'm usually intimidated by their length and thus "save them for later," but later never comes.”
- “Since you include a link to the pdf online, don't attach the 2MB pdf to the email. My Outlook is always on the verge of hitting its limit so I have to delete large messages.”
- “Make it relevant to conservation implementation. I really don't care about book reviews, hunting trips, or measures that will never be implemented. I do care about info that helps me better and more efficiently achieve conservation.”

***Readers of special interest***

*Executive team readers.* 54% of TNC’s Executive Team members read the SC (7 out of 13). Four read it occasionally and three read it almost always. One reads the issue cover to cover, and four read more than half the articles, but of those who read more than half the article, three are occasional readers. Five read it about the same amount as previously, one reads it less and one reads it more. The one who reads it more, however, reads just one or two articles and only occasionally reads an issue. All find it interesting (6) or very interesting (1). Five said something they read in SC had changed their mind and two said nothing they have read in SC changed their mind. There were no suggestions for improvements. Conclusion: SC has a modest influence on the Executive Team.



What other digital vehicles do you use to find out about science at TNC?



“I miss the pieces that were more opinions. I think if people are spending enough time to have a really well structured argument, citations, etc. that the authors should be submitting to journals.”

“More science in the science chronicles - don't shy away from methods and approaches. This is the one place where scientists can learn from each other. Seems like it has become more of a marketing chronicles.”

*External affairs readers.* Six out of the 258 people in External Affairs replied (2%). Five of the 6 read it occasionally and one reads it almost always. When they do read it, 4 out of 6 read more than half the articles. Two read it less than previously and 4 read it about the same. Four out of 6 don't recall any articles in SC that changed their minds.

Conclusion: SC has minimal influence on External Affairs staff but a push to get more External Affairs readers might change that.

**Impact questions**

When asked, “have there been any *Science Chronicles* articles that have changed your thinking on a topic?” 45% of respondents said “don't recall” (126), 35% of respondents said yes (100), and 10% said no (28).

Conclusion: *Science Chronicles* does have an impact on people's thinking. SC

# Drinking from the Fire Hose

A quick monthly roundup of interesting articles, websites and other experiences collected by your editor. Send your suggestions for future roundups to [pangolin19@gmail.com](mailto:pangolin19@gmail.com).

1) [Paul Krugman reviews \*The Climate Casino: Risk, Uncertainty and Economics for a Warming World\*](#). (New York Review of Books). Yale economist William Nordhaus has sometimes rankled environmentalists, who have accused him of being too dismissive of aggressive steps to combat climate change. Krugman, the New York Times columnist and Nobel laureate in economics, studied with Nordhaus and offers a cogent summary of Nordhaus's arguments, and adds his own rather more pessimistic gloss. Nordhaus's tone is typically calm, Krugman's typically urgent if not downright angry, which gives this article a satisfying tension.

2) [The Maine Lobster Industry \(Conservation and Society\)](#): An interesting study that straddles anthropology and conservation. It focuses on the politics of lobster management in Maine, and highlight just how tricky managing a common resource can be. Eleanor Ostrom and others have argued that vested interests can negotiate solutions to the problem of the commons, and the Maine lobster industry both confirms that approach while also illustrating its fragility.

3) [Lost in the Denialosphere: Climate Denial and Obamacare](#) (The New Yorker): As if the stories about healthcare.gov and the recent IPCC report were not gloomy enough on their own, Elizabeth Kolbert helpfully combines them. Bottom line: "It's been so long since reality has made much of a difference on Capitol Hill that it sometimes seems it genuinely has been repealed. But the thing you can always count on with reality is that it has staying power."

4) [Trouble at the Lab](#) (The Economist): Are scientists as rational as we think, and hope? Psychologist Daniel Kahneman is worried, pointing to the phenomenon of "priming," in which decisions can be influenced by seemingly irrelevant actions or events that occur just before a choice is made. *The Economist* starts with Kahneman and goes deeper, arguing that the self-correcting nature of science and peer-review may not be as robust as we thought. According to Bruce Alberts, editor of *Science*, scientists "need to develop a value system where simply moving on from one's mistakes without publicly acknowledging them severely damages, rather than protects, a scientific reputation."

5) ["To Those Influencing Environmental Policy But Opposed to Nuclear Power"](#) (New York Times Dot Earth Blog): On the lists of things guaranteed to start a row among environmentalists, first comes endorsing genetically modified organisms, and second comes taking a strong stand in favor of nuclear power. But read this open letter from four climate scientists. If you are still in the contrarian mood, read [this piece on alternative energy](#) always insightful and seemingly omnivorous Vaclav Smil. **SC**

## Announcements

### Science, Stewardship, and Conservation Conference

Registration is now open for the 2014 CUSD Science, Stewardship and Conservation Conference

Marriott (Convention Center) Hotel, New Orleans, January 21-24, 2014.

Download Registration Materials at: [https://connect.tnc.org/sites/cusdcons/ConferencePlanning/Forms/2014\\_Registration.aspx](https://connect.tnc.org/sites/cusdcons/ConferencePlanning/Forms/2014_Registration.aspx)

Save \$50 on the conference fee by submitting your registration on or before November 30, 2013; late registration will be accepted until December 31, 2013.

Poster abstracts are due by January 10, 2014.

#### Conference Description

Learn and share at the intersection of science, stewardship and conservation. The meeting is specifically designed to highlight cutting edge conservation strategies from across the region, emphasizing the best of emerging implementation practices. Although the conference is targeted to Central U.S. Division (CUSD) staff, and will focus on projects and innovation within the Central Division, we have invited presenters from across the US and encourage TNC staff from all divisions to consider attending. Plenary sessions will

highlight regional and global priorities and over 20 concurrent sessions will focus on the cutting edge topics that influence our work, ranging from invasive species control to agricultural policy - from monetizing ecosystem services to large-scale habitat restoration. A poster session will enable project staff to present and discuss a plethora of new and exciting ideas emerging from our ever innovative programs (and there will be glorious prizes for the best of the best posters in many categories). Ample breaks and a "dinner-on-your-own" will provide opportunities for ad hoc gatherings to encourage further discussions and networking.

The main meeting will begin Wednesday morning, January 22nd and end at noon on Friday the 24th. For those able to carve out the time, there will be field trips and pre-conference learning network meetings on Tuesday, January 21st.

#### Conference Location

The conference will be held within short walking distance of popular destinations like the French Quarter, Aquarium of the Americas, National WWII Museum, Ogden Museum of Southern Art and Harrah's Casino. The Marriott is located on the edge of the Central Business District, which supports a vibrant residential community and arts district along with numerous restaurants and nightclubs.

### Chronicles Holiday Book Issue Needs You

Take one book, any topic; read. Write 250-300 words, distilling your opinions about said book. Send to [pangolin19@gmail.com](mailto:pangolin19@gmail.com) by December 6 for inclusion in the ever popular Holiday Book Issue of *Science Chronicles*. (Send me the titles you want to review first, so I can avoid duplicates.) Prepare to be read and discussed by beautiful people on beaches from Maui to Lake Michigan. Prepare to be recognized.

—Jonathan Adams **SC**



# New Conservancy Publications

Conservancy-affiliated authors highlighted in bold.

Please send new citations and the PDF (when possible) to: [pkareiva@tnc.org](mailto:pkareiva@tnc.org) and [rlalasz@tnc.org](mailto:rlalasz@tnc.org). Please include "Chronicles Citation" in your subject line so we don't miss it.

Some references also contain a link to the paper's abstract and a downloadable PDF of the paper. When open source or permitted by journal publisher, these PDFs are being stored on the Conservation Gateway, which also is keeping a running list of Conservancy authored science publications since 2009.

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Golet, Gregory H.; Brown, David L.; Carlson, Melinda; Gardali, Thomas; Henderson, Adam; Holl, Karen D.; et al.(2013). Successes, Failures and Suggested Future Directions for Ecosystem Restoration of the Middle Sacramento River, California. *San Francisco Estuary and Watershed Science* 11(3):1-29. jmie\_sfews\_13170. Retrieved from: <http://www.escholarship.org/uc/item/0db0t6j1>

Pocewicz, A. W.A. Estes Zumpf, M.D. Andersen, H.E. Copeland, D.A. Keinath, H.R. Griscom (2013) Modeling the distribution of migratory bird stopovers to inform landscape-scale siting of wind development. PLoS ONE 8 (10): e75363 <http://dx.plos.org/10.1371/journal.pone.0075363> [Here is a related report that covers the same study, but with fewer words and more photos: Mapping Migration: Important Places for Wyoming's Migratory Birds <http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/wyoming/mapping-wyoming-bird-migrations.pdf>.]