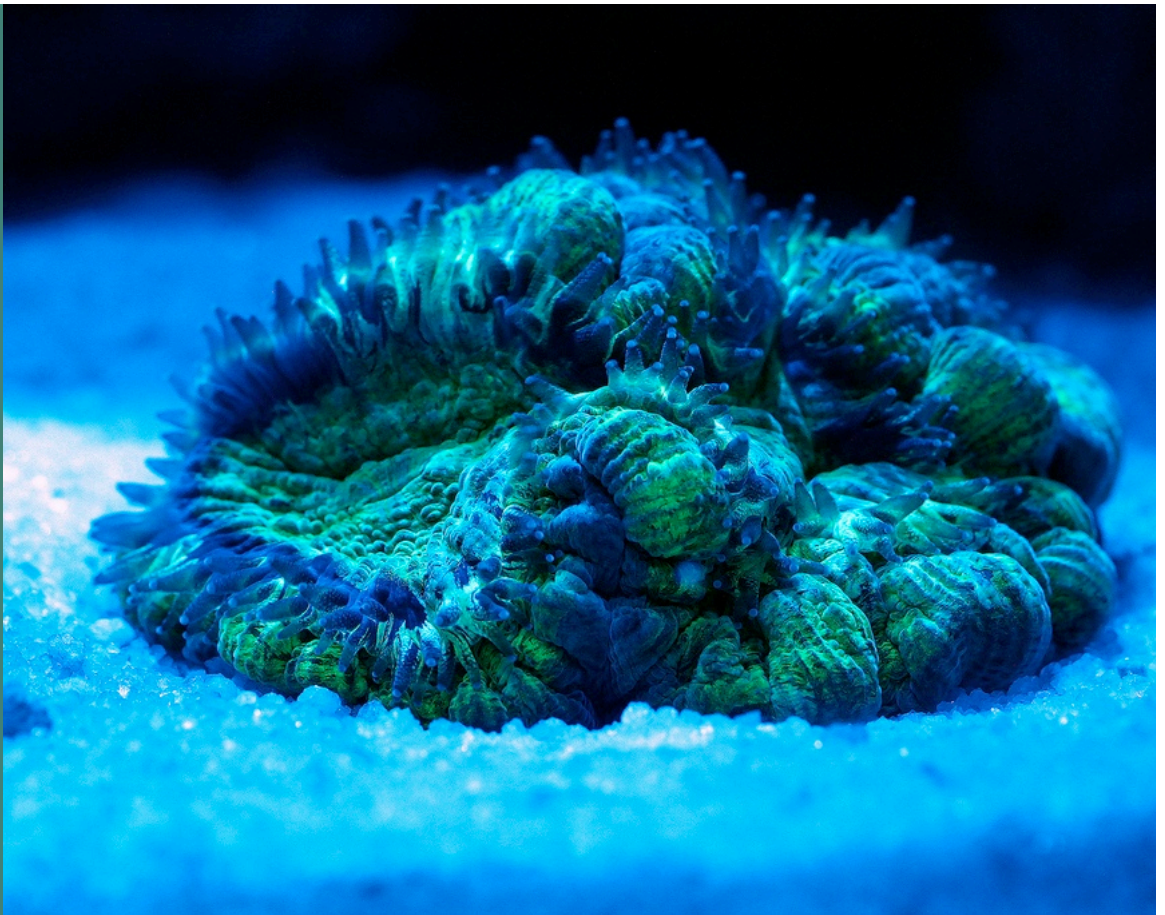


Image: Brain coral under LED moonlight. credit: Flickr user [la.kien](#) via Creative Commons.



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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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# Peter Kareiva

## Measures, Tenure and Rocket Ships: Inspiration from Bill Gates

By [Peter Kareiva](#), chief scientist, The Nature Conservancy



When “measures” comes up as a topic for conservation, understandable responses include: groan, “I wish we could figure out how to do these,” “we need to do these better,” “yeah sure,” “dashboards,” “our donors demand them,” “where are they in your business plan?” and so on.

My first intellectual engagement with TNC was Sanjayan bringing to me a nascent proposal from Seth Neiman (the venture capitalist whose investment in TNC science launched the “measures ship” in conservation). That was 13 years ago.

Well, we have launched but we haven’t achieved escape velocity. So much has been said and written about measures, most folks will not even want to skim this blurb. I get that. But here is the deal — we cannot afford to fail at measures. If we fail at measures, we will fail at conservation.

Is there anything new to be said? Probably not. But I encourage all of you to read [Bill Gates’ annual Gates Foundation letter](#). His point is simple: *Innovation is slow, erratic or nonexistent without measures against which performance can be tracked and hence improved*. After reading Gates’ letter, ask yourself what this means for conservation and for the Conservancy.

**Image: Launch of the shuttle Endeavour.**  
**Image credit: Flickr us [Todd Huffman](#) via a Creative Commons license.**

Here is what I think it means:

- Our measures have to be used to change what we do, not to brag about success.
- Our measures have to be a management tool that might instigate altered personnel, altered strategies and altered investments.
- Our measures have to respond rapidly enough that they can signal the need for change in a sufficiently timely manner that it is not too late.

Our “Global Challenges Global Solutions” aspirations are far-reaching and difficult. Some will fail. Some will, by good fortune and inspired leadership, succeed. And then the bulk of the efforts will succeed or fail depending on whether or not they take measures seriously.

TNC has a wonderful tradition of the compelling entrepreneur making something happen. We have not yet built a tradition of using measures to make key management decisions. When I lived in the university world, you did not get tenure if you did not publish a sufficient number of papers in prestigious journals. It was that straightforward. When do conservation projects and strategies get denied tenure?

We have to push ourselves to use our measures to deny tenure — that is not something that comes easily in an NGO culture. Seth Neiman’s investment has gotten us to a point where we have a good measures framework and some promising measures systems — the next step is to embed measures into management decisions. When we do that, the measures rocket ship will have achieved escape velocity. [SC](#)

# Rob McDonald

## Doing Conservation Like a Startup

By [Rob McDonald](#), senior scientist for sustainable land use, The Nature Conservancy



I have been involved in numerous strategic planning teams, and have even helped lead a few of them — first, our global agriculture strategy, and now the North American urban conservation strategy under Laura Huffman’s wise leadership. So I believe in the value of conservation planning.

But as I review the past 5 years I have spent with TNC, I realize that some of the planning efforts at the global or regional level have been less than successful at changing what TNC does (planning within TNC’s operating units is, in contrast, often more effective). In the last several months, I’ve found it useful to contrast how TNC does planning with how one of my best friends, who made his money in a series of software startups, approaches planning. I think there are some lessons here that TNC can learn.

Some of these lessons are similar to things that others within TNC have been saying for a while, including what Craig Groves and his Planning Evolution Team have said, or work by Andrew Soles and Jeff Hardesty, and all credit to them for their hard work. Obviously, not all of these lessons will apply to TNC, which is a very large corporation, and quite far in culture from a software startup. But it is an interesting thought experiment — what if we tried to develop new conservation strategies like they were little startups within TNC? **What would that look like?**

**Image: The \$100 startup tour. Image credit: Flickr user [Chris Guillebeau](#) via a [Creative Commons license](#).**

Paul Graham, in his famous speech on [“how to be a startup,”](#) listed one thing you don’t need and three things you do need to have a successful startup:

*You don’t need a big idea.* Graham argues you don’t necessarily need a brilliant idea, let alone a fully developed business plan. Rather, you need a really *simple*, easily understandable product or goal. Google’s original goal wasn’t to be the first search engine (there were already lots of them), just the best search engine. For all their rhetoric, Apple didn’t come up with the iPhone with some theory of how people’s relationship with technology will change over the next several decades — their simple idea was to have the most seamless internet connection of any phone on the market.

And a team’s conception of your goal will necessarily change over time. As Graham puts it, the value of a big idea is “mainly as starting points, as questions for the people who will continue thinking about them.” Contrast this attitude with TNC’s global planning, which has moved toward strategy documents that try to be comprehensive, mentioning all big global issues in a broad domain like “freshwater” and all of TNC’s relevant actions. We are often looking for a vision of how we could change the world over the next 10 or 30 or 50 years. This kind of exercise is useful for lots of reasons, and sometimes we need it for trying to make a big pitch to a foundation or donor. But often it means we are making plans that are so complex and high-level that it is hard to get traction on implementing the strategy. Our plans are often the opposite of *simple*.

*Start with good people.* By “good,” Graham means smart people who can get things done, who are fun to work with, and who will be able to work 100% on the startup. Ideally, just 2-4 foundational team members are needed; any more people and the startup gets bogged down in meetings. Consider Twitter — there were (depending on how you count) 4 founders. They had an idea and they ran with it.

Contrast this with TNC planning efforts, which might have 10-20 people involved, only 1-2 of which might have more than a token allocation of their time to the global or regional plan. Heck, when I supposedly helped lead the global agriculture strategy development, even I had less than half my time allocated to it.

*Make something customers want.* This seems obvious, but Graham’s main point is to talk often to the product’s putative users, and to get a “version 1” of the product out there as quickly as possible for users to critique. Again, consider Twitter — from the first conception of the project to a working prototype was (depending on how you count) less than a year.

Above all, expect to constantly change the product. Graham makes fun of what he calls the Hail Mary strategy of planning that many big companies use: “You make elaborate plans for a product, hire a team of engineers to develop it... and then find that after a year you’ve spent 2 million dollars to develop something no one wants.”

I would sadly submit that TNC does the occasional Hail Mary planning effort.

*Spend as little money as possible.* As Graham puts it, “in nearly every case the proximate cause [of a startup failing] is running out of money.” Obviously, this is true

“Imagine for a second that instead of working to develop a comprehensive strategy, TNC just announced that there was a small pot of seed money for work in a focal topic.”

for TNC too — the most common reason global strategies get reorganized is lack of money. So, the solution from Graham's point of view is to keep the number of team members small, and spend your money building a small, easy-to-use tool that you can get out to the public quickly. This is the opposite of TNC teams, which often focus first on raising funds and then hiring people to increase capacity.

**Lessons for TNC.** Does any of this really apply to TNC? I don't know for certain, and I don't want to belabor the analogy. But I think in certain situations we could probably be more efficient by running global priorities like they were startups.

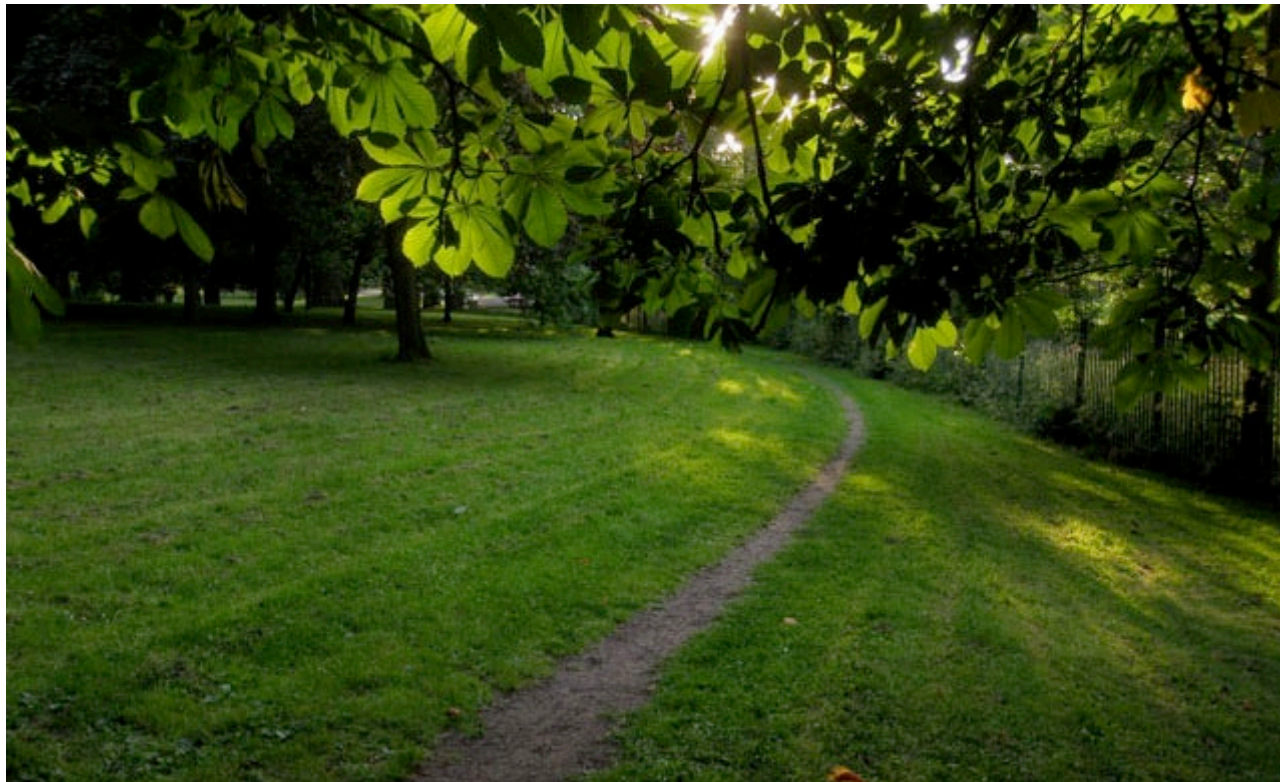
Imagine for a second that instead of working to develop a comprehensive strategy, TNC just announced that there was a small pot of seed money for work in a focal topic. Any TNC employee (perhaps in collaboration with outside experts) could write a short pitch for their idea for how to most increase conservation within that focal topic, with the condition that it contained a clear, simple product it would deliver in the short term. They would have to have a plan for a working prototype within 2 years, and a plan for how they could obtain more funding once TNC's modest seed funding ran out. Further, a condition of funding would be they would have to work full-time for at least a year on their idea.

It seems really different from how we create teams now, and it certainly doesn't replace the occasional comprehensive strategic plan, but this kind of program isn't that different from how major companies like Google nurture creative, entrepreneurial ideas by their employees. [SC](#)

# Dan Majka & Tara Schnaible

## Improving the Reach of Our Science: People Can't Use What They Can't Find

By [Dan Majka](#), senior cartographer/analyst, & [Tara Schnaible](#), usability analyst, The Nature Conservancy



How can we get more attention for the Conservancy's science?

Would you believe that the answer could be found in a dirt path? Or in a men's restroom?

### Putting Information Where People Will Find It

How many times have you seen a dirt path cutting through a patch of grass? Known as *desire paths* to landscape architects, these grooves are created when people repeatedly take the shortest path between two points, while ignoring the sidewalk thoughtfully designed by the landscape architect.

Not surprisingly, **humans take the easiest and most efficient route that meets our needs.** This tendency has huge, often overlooked, implications for how we distribute and communicate our science. Simply put, we cannot control the path someone will take to find information. But we *can* understand his or her path, and put information along their way.

**Image: Desire path.**  
**Image credit: Flickr user [Moff](#) via a Creative Commons license.**



Suppose you work for a partner agency, and your boss gives you an assignment to collect some background information on a conservation project. Where do you start? Do you go to nature.org or the Conservation Gateway? Probably not. If you're like most folks, the easiest, most efficient path is to go to Google and click on a couple links that come up on the first page. How can we distribute our data to take advantage of this?

One way is to **improve the search engine optimization (SEO) of our conservation data, documents and communications so people can find them easier**. Most websites receive up to 50% of their traffic from search engines, and nearly all clicked links come from the first page of results. Yet if we search for topics and systems important to the Conservancy, our content is often nowhere to be found.

I tried searching for one of my favorite Conservancy tools, [ClimateWizard](#), without using its name. Searching for the terms, *climate maps* and *climate change scenario maps*, I found ClimateWizard as the 48<sup>th</sup> result, while it did not place at all for the term *climate change data*. Fortunately, ClimateWizard *was* ranked fifth for the term "climate change maps." The reason ClimateWizard ranks poorly for related keywords has nothing to do with the quality of the tool. Instead, the main reason is simply because it does not have much keyword-laden text describing its utility.

How about a search for sustainable fisheries, one of our global priorities? WWF has the sixth-ranked search result, Conservation International has the thirteenth. To find a Conservancy article, you have to click through to the 53<sup>rd</sup> search result.

While advanced SEO can be a technical endeavor, there are a number of easy, best practices we can follow to make our work more findable by the public. These practices can be summarized as: write high-quality content using your audience's language, and format it using correct HTML.

### **Making the Most of a Captive Audience**

If we can't control the path people take to find information, **why don't we put our data in their way?**

I spotted these waterless urinals (see photo on next page) at an Arizona staff retreat. Meticulously mounted above each was a placard describing their importance for water conservation. Look a little closer — does anything about the signs look off to you?

The signs weren't mounted more than four feet above the ground!

But...uh...what does this have to do with science communication?

It **illustrates the opportunity missed when we fail to make the most of a captive audience**. The sign touting the water conservation benefits of the urinals could have had virtually 100% readership had the installer placed the signs at an appropriate level for

**“By nurturing a sense of empathy towards our audience, and bringing our data and ideas to them — instead of expecting them to come to us — we can improve the reach and effectiveness of our science.”**



**Image: Waterless urinals with water conservation signs. Image credit: Dan Majka/TNC.**

their audience. How often do we put compelling content where our audience is looking? When we *do* have an audience's attention, how often do we give them something to remember?

Wikipedia has the sixth highest traffic of any website, and is one of the first results to show up in a web search. Why don't we improve Wikipedia pages for topics most important for the Conservancy, and link back to a Conservancy webpage when relevant? Testing shows websites are used 30% more when visitors are referred from Wikipedia.

Contrary to what you might be thinking, this isn't something that our digital/web folks should be responsible for. Anyone can edit Wikipedia pages, and it only takes a couple of minutes to [learn how](#). Whether it's a specific ecological system or geography we work in, a conservation planning or analysis technique, or an environmental policy, thousands of topics have pages on Wikipedia related to our work. Check a couple out — are they telling the whole story?

I recognize that we don't have a way to reward the spread of our ideas on third-party websites, and certainly wouldn't recommend pumping major resources into such an effort. But if we truly care about winning hearts and minds, and there are existing websites that already receive a lot of viewership, shouldn't we consider putting our data where people are already looking?

Effective conservation in the 21<sup>st</sup> century requires us not only to produce great science, but also to deliver it efficiently to those who need it most. By nurturing a sense of empathy towards our audience, and bringing our data and ideas to them — instead of expecting them to come to us — we can improve the reach and effectiveness of our science.

For some simple steps to improve reach, we've compiled the following list:

**“Simply put, we cannot control the path someone will take to find information. But we can understand his or her path, and put information along their way.”**

## 6 ways to improve search results for blog authors, content creators, and site managers

1. **Use the language of your audience** in titles and descriptions of reports, data and blog posts. Translate TNC and technical jargon.
2. **Use phrases of 2-5 words** that include keywords relevant to your topic throughout your content.
3. **Use variations of keywords and phrases** throughout a web page or blog post.
4. **Insert keywords into proper headings** to break up your text. In HTML, headings look like this: <h1>, <h2>, <h3>. Google weights keywords within headings higher, but it has to understand where headings are on your page. <h1> is usually reserved for a page's title, while <h2> and lower break up a page into sections, like report headings.
5. **Include a page summary** using the <meta name="description"> tag in the page's header. Google will usually display the 156 characters as the summary for each webpage when listing search results.
6. **Use alternative text for images** (e.g. <img alt="map of Arizona grasslands">. This serves two functions: 1) it makes an image's content understandable to those with visual disabilities, and 2) improves the image's chance of appearing in Google's image search. [SC](#)

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## Article

# Engaging the Fire-Climate Reality...Before We Get Burned

By [Mary Huffman](#), associate director of the Fire Learning Network, and [Blane Heumann](#), director of fire management, The Nature Conservancy



*“We will respond to the threat of climate change, knowing that the failure to do so would betray our children and future generations. Some may still deny the overwhelming judgment of science, but none can avoid the devastating impact of raging fires, and crippling drought, and more powerful storms.”*

—Barack Obama, 2<sup>nd</sup> Inaugural Address, January 21, 2013

Within days of each other, on opposite sides of the Earth, the U.S. President avowed the connection between “raging fires” and climate change, while Australia’s Prime Minister headed to the field in support of thousands of Australians battling a hundred wildfires in the midst of another record breaking heat wave. Although fires burning in vegetation is a 420 million-year-old-process (Scott and Glasspool 2006), a new and more complex fire reality is upon us, commanding the attention of people in every biome.

But where is fire in the Conservancy’s current framework of strategies and actions? A quick word search for “fire” in the [Global Challenges Global Solutions](#) Framework

**Image: Smoke from the Boundary Fire.**  
**Credit: Mary Huffman/TNC.**

document yields, “No matches were found.” We need to correct such gaps in strategy if we want our mission to succeed.

Consider these facts:

- Around the world, some 300 million hectares burn each year in vegetation fires (Giglio et al. 2006), most in fire-adapted ecosystems.
- Seventy percent of the planet’s fires and more than half the area burned occurs in Africa (Miller et al. 2010).
- Ninety percent of vegetation fires are started by people (Davidson-Hunt and Michael O’Flaherty 2007), and most often by people in poorer sectors of society who rely on their skillful use of fire for getting food.
- Under the influence of climate change, 62 percent of the Earth’s surface will experience increases in fire activity (Moritz et al. 2012), and already 25-33% of global greenhouse gas emissions come from biomass burning (Crutzen and Goldammer 1993, Levine 1996).
- Climate change aside, a first estimate suggests that 300,000 people die annually from exposure to particulates in smoke (Johnston et al. 2012).

For half a century, [the Conservancy has honed its skills in shaping protected areas, landscapes and institutions where nature depends upon fire for good health](#). This investment has made TNC the only sizable non-governmental organization in the world with expertise in two things: authentic know-how in the craft of handling vegetation fires, and enabling governments and civil society to work together without blame to solve complex fire problems. The [Fire Learning Network](#) has proven that we can weave 100 multi-stakeholder collaborations together with new policy and funding to achieve tangible results at national scales.

Now **climate-related challenges call us to reframe our fire investments**, and new tools provide insight into where and how to focus our effort. For example, [satellite-detection](#) of fires coupled with sophisticated modeling in atmospheric science tells us that solutions lie not only in what vegetation gets burned, but also in when and how it is burned (Bond et al. 2013). These nuances influence the amount, travel distance and disposition of fire’s primary by-product: the smoke that includes greenhouse gases and black carbon particles. If fire practices can be adjusted to better meet the needs of both people and nature, then the Conservancy’s talent in fire problem-solving will be needed in many parts of the world.

Our commitment to the GCGS framework implies a duty to ensure it succeeds. To that end, here are four areas in which the Conservancy must integrate fire-related strategies into GCGS goals.

#### 1. **Where people and nature depend upon fire for survival.**

On every continent except Antarctica, people still use fire on the land for food production necessary for survival and well-being. In Punjab, India, farmers set

**“It is essential that we grapple with fire in peatlands. Covering only 3 percent of the Earth’s land area, peatlands store as much carbon as all terrestrial biomass, twice that of the world’s forests, and about the same amount as the atmosphere (Parish et al. 2008).”**

thousands of fires to produce one-fifth of the nation's wheat crop, burning crop stubble to control pests and to fertilize the soil (NASA 2012). As their ancestors have done for thousands of years, as many as 500,000 farmers in Chiapas, Mexico (INEGI 2007) rely on fire to prepare small plots for planting corn and beans, and to maintain pine-oak forests for grazing, domestic lumber and medicinal herbs. Yak herders in Yunnan, China depend upon fire to keep alpine meadows flush with herbs and free of brush, thereby maximizing yields of valuable yak butter (Moseley 2006, Moseley personal communication).

To the extent that indigenous people have rights to continue traditional practices, they have a right to burn and the Conservancy respects that. In Northern California, for example, the Karuk Tribe is working together with the Fire Learning Network to rejuvenate its traditional fire practices, on behalf of healthy rivers and salmon that are central to Karuk livelihoods. Local projects can also link to broader strategies. TNC's James Fitzsimons reports that in the [West Arnhemland Fire Abatement Project](#), actively supporting indigenous peoples' rights to burn is helping to maintain tropical savannas and avoid 100,000 tons of greenhouse gas emissions from wildfires, while providing \$1 million in income to Aboriginal Australians each year.

## 2. Where governments unwisely insist on trying to control fire too tightly.

At the global scale, even in [Africa](#), *too much fire and the wrong kinds of fire* are the overwhelming problems. Does this argue for more fire suppression? More government prohibition of burning? No. If we care about both people and nature, excluding fire in the long term doesn't work and it never will (Vélez 2005).

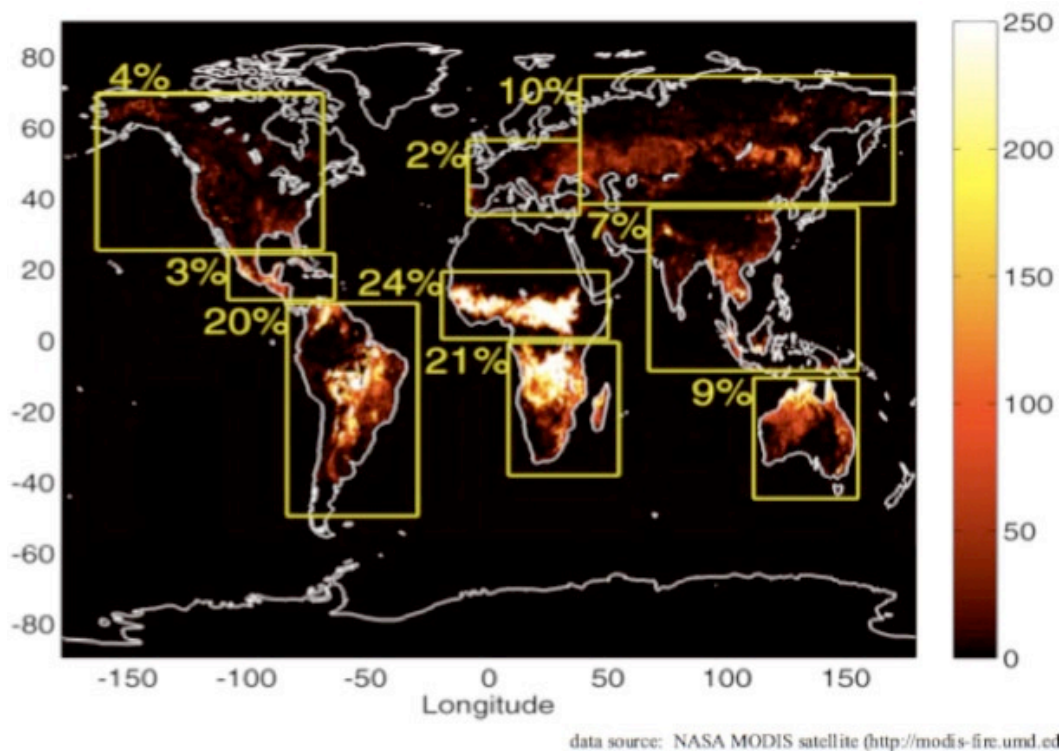
Just ask Madagascar, where more than a century of government sanctions against local burning has resulted in a social system of clandestine ignition, centered on setting fires at night and leaving them unattended, not to mention using fire to protest the regulations (Kull 2002). Why not try what Spain is doing instead? Recognizing a deteriorating national fire situation, the very agencies that ushered in top-down fire control are now piloting projects to work with farmers to get proactive burning done (Duce-Aragües, personal communication). The Conservancy's expertise in government relations combined with community-based projects can expand such efforts into several countries where governments are recognizing the limits of "command and control" (Holling and Meffe 1996) and are ready for more nuanced approaches.

## 3. Where climate-driven changes and fire will cause ecosystem collapse.

Believe it or not, scientists now predict that shifts in fire regimes driven by climate change will cause ecosystems in some regions to collapse. In the U.S. West, where fire-adapted ponderosa pine forests once blanketed 11 million hectares (Van Hooser and Keegan 1988), researchers now predict that drought stress and severe fires will convert broad zones into shrublands or novel vegetation assemblages (Williams et al. 2012).

**“Just as healthy coastal ecosystems buffer against hurricanes and tsunamis, healthy forests can buffer the negative impacts of inevitable wildfires for communities. At least for the United States, this approach is akin to Disaster Risk Reduction for terrestrial systems.”**

Losses to water security, outdoor recreation, timber, biodiversity and people's sense of place are settling in. Our best bet is to move swiftly with partners to expand models of [fire-adapted communities](#) where people can live well with fire, and support purposely and repeatedly putting preemptive fires into nearby forests when burning conditions are moderate. Just as healthy coastal ecosystems buffer against hurricanes and tsunamis, healthy forests can buffer the negative impacts of inevitable wildfires for communities. At least for the United States, this approach is akin to Disaster Risk Reduction for terrestrial systems.



**Figure 1: Percent of the world's fires by region, as detected by MODIS satellites from 2001-2006 (NASA). Graphic courtesy of Brian Magi, National Oceanic and Atmospheric Administration (NOAA).**

*Figure 1: Percent of the world's fires by region, as detected by MODIS satellites from 2001-2006 (NASA).*

#### 4. Where burning peatlands release methane.

It is essential that we grapple with fire in peatlands. Covering only 3 percent of the Earth's land area, peatlands store as much carbon as all terrestrial biomass, twice that of the world's forests, and about the same amount as the atmosphere (Parish et al. 2008). In their natural condition, peatlands are either saturated with water or frozen. When warm, dry periods coincide with exposed soils, fires emit voluminous quantities of CO<sub>2</sub> and methane.

The 2007 Anaktuvuk River fire, which burned 104,000 hectares along Alaska's Arctic slope, released roughly as much carbon as the entire arctic biome sequesters in an average year (Mack et al. 2011). In 1997-1998, a strong El Niño event collided with widespread agricultural burning practices in Indonesia, igniting extensive peatlands. The resulting haze not only caused economic losses in nearly every sector, but an

estimated 20 million people suffered respiratory illnesses (WHO 1998), with between 20,000-48,000 premature deaths (Heil 2007).

How can The Nature Conservancy help? Land acquisition and management strategies that retain water in peatlands and avoid artificial drainage are within our grasp. The [Great Bear Rainforest](#) and the [Canadian Boreal Forest Agreement](#) are remarkable examples of conservation land projects that will, among other things, leave water on peatlands by minimizing artificial drainage.

Although addressing this new fire reality will require incorporating fire-climate interactions routinely in our strategic thinking, the practices we already use so well will still apply. We must, however, stop banking on investment returns from our existing strategies while we ignore the fire equation. Let's start by being explicit about fire in our global, regional and OU business planning...before we get burned. [SC](#)

*Author's note: If your conservation strategy will be affected by the fire-climate reality, and you would like some help thinking about it, contact the authors.*

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# Survey Report

## Is the LEAF Program Changing TNC Staff Attitudes Toward Conservation?

By [Darci Palmquist](#), senior science writer, The Nature Conservancy



For 18 years the Conservancy's [LEAF](#) program — Leaders in Environmental Action for the Future — has provided urban high school students with summer internships at Conservancy preserves. The program exposes young urbanites to nature and experience in green jobs, with the end goal of creating the environmental leaders of tomorrow.

By all accounts it is working: Recent surveys have found that LEAF participants are 5 times more likely to major in life sciences in college. Working so well, in fact, that the Toyota USA Foundation recently approved a \$4 million grant to LEAF for another two years, allowing the program to continue to expand into new locations and serve more students.

But how does involvement in LEAF impact TNC staff? Is LEAF changing how *we* think about conservation? The program recently commissioned sociological surveys by an independent firm to explore how staff participants with LEAF had expanded their thinking about different cultural perspectives on conservation.

**Image: LEAF interns and TNC staff at the Conservancy's Broxton Rocks Preserve in southeast Georgia. Image credit: Karine Aigner.**

In response to the survey question “LEAF has exposed me to cultures other than my own,” the staff had an overwhelmingly positive response (mean of 4.29 on a scale of 1 to 5, with 1=strongly disagree and 5=strongly agree). The surveys also examined staff and student perceptions of race and ethnicity, finding a “noted lack of evidence of any racial tension in these data.”

From the findings:

“About half the responding staff members remarked that several teens seemed to think about conservation through an anthropocentric lens that covered **social justice, resource use and management**. It seemed to these respondents that interns consider conservation in relation to social justice concerns, engaging in pro-environmental behaviors such as recycling and composting, or participating in active restoration.”

“When asked how LEAF helped staff expand their thinking about conservation, many said they felt their experience working with and learning about urban teen life had expanded their thinking about how conservation can be approached. These experiences encouraged many to **think about conservation from an urbanite’s point of view.**”

“Staff acknowledged that urban youth culture is different from cultures they are more commonly exposed to in their conservation work, and that their contact with the interns expanded their thinking as conservationists, helping them to perceive, evaluate, and approach their work, and its **relevance to American culture**, in new ways.”

“All in all, the surveys indicate that LEAF staff and students both expanded the way they view conservation,” says [Brigitte Griswold](#), the Conservancy’s director of LEAF. “While students developed more eco-centric viewpoints, staff developed more anthropocentric viewpoints, learning to consider the urban environments these kids are coming from.”

This expanded view of conservation will be vital as the Conservancy moves towards global priorities that include urban conservation, diversity and the long-term sustainability of the conservation movement.

In just a few short years, LEAF students will be of voting age. Their generation — the Millennials — will total 90 million eligible voters, comprise 40 percent of the electorate and represent the largest and most racially diverse generation in history (44 percent are people of color).

“We need these young leaders to carry the conservation torch for their generation — and we need the continued commitment of our dedicated staff to serve as role models to inspire the leaders of tomorrow,” says Griswold. [SC](#)

“It seemed to these respondents that interns consider conservation in relation to social justice concerns, engaging in pro-environmental behaviors such as recycling and composting, or participating in active restoration.”

# Introduction

## Heather Tallis: New Lead Scientist

By [Darci Palmquist](#), senior science writer, The Nature Conservancy

Heather Tallis, one of the world's foremost analysts of the connections between nature and human well-being, has agreed to join The Nature Conservancy as lead scientist.

Tallis, 36, will become the first woman to serve as lead scientist in the Conservancy's history. She joins [M. Sanjayan](#) as one of two lead scientists for the organization.

"Heather brings incredible expertise in understanding and measuring how conservation impacts people," says Peter Kareiva, chief scientist for The Nature Conservancy. "She will be leading new efforts that conservation desperately needs — a scientific focus on how our work can both improve human well-being while also protecting biodiversity."



Tallis comes to the Conservancy from her position as lead scientist for the [Natural Capital Project](#), a path-breaking scientific collaboration based at Stanford University that seeks to understand and measure the economic values of nature. Measuring these [ecosystem services](#) — the benefits that nature provide people in the form of clean water, fertile soil, clean air and much more — has become increasingly important as human activity stresses natural resources and [extreme weather events](#) push communities to consider how healthy nature can buffer and protect us.

"My new position will focus on bringing science about people into the work of the Conservancy," says Tallis. "There are many areas where the Conservancy is already doing this, but there are many more opportunities to bring economic and social science approaches to conservation."

One such area in which Tallis has been a leading analyst is [water funds](#). In a water fund, urban water users pay for rural watershed conservation in the pursuit of securing stable supplies of drinking water for millions of people — conservation that also protects forests and the livelihoods of the farmers and ranchers living in those forests.

**"With servicesheds, we can actually map the connections between nature and people."**

“Water fund design now really takes into account three areas of scientific knowledge — ecological, social and economic. It’s a marriage of practicality, efficiency and biological effectiveness that’s working remarkably well,” says Tallis. She is leading efforts to develop a free software tool that will help guide the development of water funds in 40 new locations across Latin America.

She is also credited with developing the concept of “[servicesheds](#)” to analyze the link between conservation efforts and the people who benefit from them. “With servicesheds, we can actually map the connections between nature and people,” explains Tallis. “It’s powerful to have a visualization of how and where conservation might benefit people, especially for policy makers and planners who are deciding where and how to invest in development.”

For instance, Tallis and a team of analysts tracked the proposed development of new coal mines in Colombia and a new road in the Peruvian Amazon, mapping the impacts of these activities to communities, including indigenous groups. The team modeled changes to water quality, access to wild harvested food and carbon sequestration. These analyses provided a picture of whom would be impacted by the changes and whether social equity could be maintained through mitigation.

“Ultimately, servicesheds are a basic concept that could underpin many types of projects and policies, and be applied in many social and ecological contexts,” says Tallis.

Among Tallis’ many scientific achievements:

- She has helped identify metrics that reflect the contribution of nature to people’s nutrition, income and social equity;
- She currently co-chairs efforts to create a global monitoring system ([GEO BON](#)) for these kinds of social metrics; and
- She is an expert member of the World Bank’s global effort to promote and standardize the inclusion of natural capital in national accounts, contributing scientific expertise as a member of the Policy and Technical Expert Committee.

In her new role with the Conservancy, Tallis will continue to [collaborate with the Natural Capital Project](#).

Tallis holds an M.S. in chemical oceanography from the University of California, Santa Cruz, an M.S. in marine ecology from the University of Otago in New Zealand and a Ph.D. in zoology from the University of Washington. She is co-editor of the book, *Natural Capital: The Theory and Practice of Mapping Ecosystem Services* (Oxford, 2011) and has been widely published in scientific journals. Tallis joins the Conservancy March 18.

SC

# 15 Seconds of Fame

## Annick Cros

Annick Cros is a marine scientist for the Asia-Pacific program. She's the brain (and brawn) behind the [Coral Triangle Atlas](#), an online GIS database for decision-makers in the world's epicenter of marine biodiversity. Meet Annick (pronounced "Anneek").



**SPEAKING:** I speak French and Spanish. I'm a French citizen, U.S. resident. I was born in the Caribbean (Guadeloupe) and grew up mostly in French Polynesia and New Caledonia. When I was in high school, we lived in Argentina for 2 years. My parents moved us around a lot; travel was a lifestyle.

**BENEATH THE SEA:** When I'm not diving in Asia Pacific for work, I occasionally help out friends in Hawai'i, but I get a little sad when I put my head underwater here. There are some beautiful spots, but in Oahu most of the reefs are degraded and overfished. On the positive side, right now is humpback whale season. It's amazing! Sometimes when you're surfing, you can see them breaching.

**ISLAND LIVING:** I lived in Tahiti until I was 7. We had a house on the lagoon, with a garden. I could jump right into the water. I haven't been back though. I'm a little scared to — you have your memories, and they don't always correspond with reality.

Before I moved to Hawai'i 5 years ago for my job with TNC, I was living in Belize on Glovers Reef. The island I lived on was very small — I had to jog around it 4 times to do a 30-minute run, and halfway through I would get attacked by crabs! It was challenging

**Image: Annick taking a lunch break on one of Palau's Rock Islands.**

to live there. We were a couple of hours away from the Belizean mainland by boat. It was isolated, and there were some eccentric people living there! Belizeans who'd been there for generations. It was a bit like living in a book sometimes.

**TRUE STORY:** Once we had refugees from Cuba land on the island. It was the middle of the night and there were 3 big guys and one woman. Their raft looked homemade, just tires tied together and planks of wood with a small outboard motor. At the time we were hosting some marine authorities, so we knew the refugees would be deported if found. So we gave them some food, water, fuel and a compass and pointed them toward Honduras. They left before morning.

**ON BEING A SCIENTIST:** I work part-time for TNC right now. I'm also pursuing my Ph.D. in population genetics at University of Hawai'i. My topic is connectivity of coral reefs in Palau to improve MPA design. It's fun. I really missed doing science. I'd been working in conservation and management and I was missing doing hard science. I'm getting back to the lab, back to the water, collecting samples. It's challenging — I don't have a social life! — but fun.

I love management and policy, but those are about building relationships and connecting with people. Science is more about being curious, discovering some extra little bit of information that can be used. Being investigative. It uses a different side of the brain. It's good for me to go back to school and challenge myself, to see if I can come up with new concepts and ways of applying them. I enjoy that.

**BEST & WORST:** One of my best experiences since coming to work for TNC has been becoming a [CAP](#) coach. I absolutely love this role. The team is full of interesting people who have great ideas all the time about new ways of doing things. It's really influenced my life, even to help me go back to school. The [CAP coach network](#) is great.

I think TNC is good at providing opportunities to develop new skills on the job; gaining these sideways skills has been beneficial to me. But, you develop all these great skills and then there's nowhere to go. For a lot of people at a certain point in their career, they have to leave in order to grow. There could be more effort devoted to talent management here.

**READING:** I don't have time to read much outside of scientific papers. The last book I read was *Kafka on the Shore* by Haruki Murakami. It was a good non-scientific read about a world completely different than mine.

**LISTENING & WATCHING:** I don't have a TV. But over the Christmas holidays my parents were watching the "Big Bang Theory" and I got hooked on that, so now I'm watching it online. I think if I had a TV I'd watch too much.

I'm into Spanish music. Bebe is an artist I like, she's sort of alternative pop. I listen to Pandora a lot because I can't be bothered to spend time looking for new music. One station I like is "Nouvelle Vague" — it's mellow French music, good for working to. [SC](#)

Interview by Darci Palmquist. Know someone we should feature in this column? Please [email her](#) with comments or suggestions.

## Book Review

# How and Why Did Humans Take Over the World?

*The Social Conquest of Earth.* By Edward O. Wilson. Liveright Publishing, 2012. 352 pages.

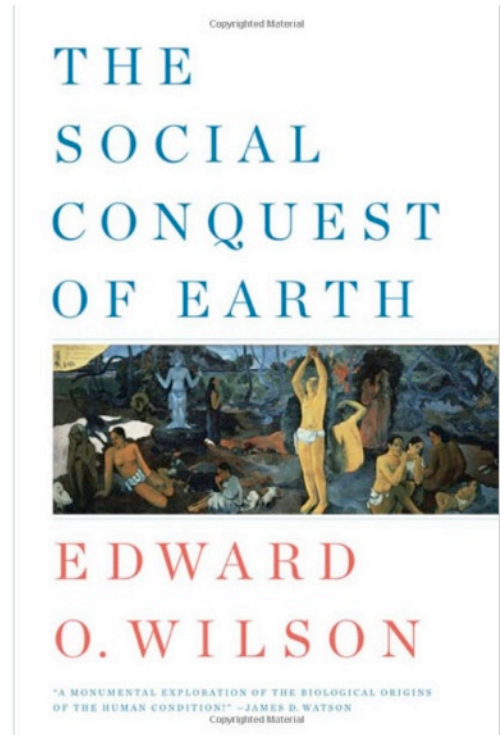
Reviewed by [Matt Herbert](#), aquatic ecologist with The Nature Conservancy in Michigan

What is it about humanity that allowed us to take over the world? E.O. Wilson tackles this by 1) detailing the story of human evolution — to the extent that science has reconstructed it to date, 2) describing how complex social structures developed and evolved across the animal world, and 3) identifying those elements that were unique about humanity as our social structure evolved. With those key elements in place, he describes how our social structures and individual intelligence both became increasingly advanced (each pushing the other along) through group selection — or competition among groups (and cooperation within groups), which eventually brought us to where we are today.

Wilson describes how, as a result of group selection, we naturally have inherent tendencies toward conflict and war, but also toward altruism. Everything I've ever read previously was either very skeptical (at best) of the potential for natural selection to lead to altruism (except in the case of close relatives) or wasn't particularly convincing. But I thought Wilson provided a compelling case here. Whether you agree with him or not (many evolutionary biologists do not), it is an interesting argument.

Wilson details some of the disagreements in socio-biology in recent years (group selection vs. inclusive-fitness theory via kin selection). This will get a bit technical for some audiences, but it is important that he explains some of the specific scientific disagreements behind his story (some important background and a small glimpse of how science works). In fact, many of these disagreements are very active, so it is important to note that Wilson has been highly criticized by some for his conclusions and for presenting ongoing disagreements as being resolved.

So arguably, Wilson could have spent *more* time detailing these disagreements. Some of these disagreements are as interesting as the book. For example, in his review of the book, Richard Dawkins says: "To borrow from Dorothy Parker, this is not a book to be





tossed lightly aside. It should be thrown with great force.” For additional perspectives on this, see: <http://www.umass.edu/preferen/gintis/BioScienceReviewPub.pdf>.

In some ways, this book made me think of Jared Diamond’s *Guns, Germs, and Steele*. Like Diamond, Wilson took on a broad, fundamental question relevant to all of humanity. The details in Wilson’s effort is somewhat more technical than Diamond’s — and not as well organized in my opinion, so it may not reach as broad of an audience — and doesn’t seem to be having the same impact well into its first year of publication (though admittedly, I don’t really know how sales of the book have done). But that is unfortunate, because everyone would benefit from a fuller understanding of who we are and what it was about us that led us to where humanity is today. A better understanding of how we became who we are would help us to better address the difficulties that we must address moving forward. **SC**

## Science Short

# The Culturomics of Conservation

Phillis, C.C., S.M. O'Regan, S.J. Green et al. 2012. [Multiple pathways to conservation success](#). *Conservation Letters* (early online).

Here's a wonderful dream: Scientists define and research a conservation problem; the public becomes aware of the problem after we clearly communicate the findings; and then the public puts pressure on policymakers to solve it...which they do.

Smell that coffee? Cuz it's *strong*, ladies and gentlemen.

Turns out science is as much the caboose on the 4:15 to Change as it is the engine, according to this analysis from Phillis et al. They use *culturomics*, a technique that IDs cultural trends by quantitatively analyzing word use over time in digitized texts, to look at three conservation successes — the reduction of emissions that produce acid rain, the decline in global DDT use, and the CITES 1989 international ban on ivory exports — and what was being said about those topics in news periodicals and peer-reviewed journal articles. (OK, so now we can say that CITES ban wasn't so successful.)

Findings? All over the place, in terms of the order and mixture of science, public, and policy-sector responses and interactions. For DDT, public interest led scientific interest, which drove more public concern — a powerful feedback loop that eventually drove policy change. But for the ivory ban, research seemed unconnected to policy or public sentiment. However, there are some crucial general conclusions: High scientific uncertainty around findings reduces the chances for policy change and public interest in an issue — so the authors recommend that scientists focus on the results with the greatest certainty. Also, science about problems directly relating to human well-being have a greater chance than purely ecological ones of gaining public traction. And — no surprise — even consensus science that supports costly or divisive actions loses public support.

Above all, the researchers note, scientists have to accept that they are just one part of the pathway to success — and that “if scientific suggestions do not resonate with the public, policy makers are unlikely to enact policies that ameliorate environmental stressors.” So get out there...and don't knock 'em dead. [SC](#)

— **Bob Lalasz**, director of science communications, The Nature Conservancy

## Announcements

### December 9-13, 2013: TNC All-Science Meeting

The Hayes mansion in sunny San Jose, CA, will host this powerhouse gathering of Conservancy scientists, staff and external experts from all over the world. Agenda details will follow in the coming months — expect diverse sessions on research, strategies, tools, techniques and much more. If you have questions, please contact [Lynne Eder](#), director of operations for Central Science. **SC**

### March 21 at 2PM ET: North America Region Science Spotlight Webinar

The North America region is hosting a webinar series to highlight some of the most exciting new TNC science happening in the U.S., Canada and Caribbean.

In the wake of Hurricane Sandy, the March 21 webinar will focus on science in support of building Coastal Resilience. Get the [call-in info here](#).

#### **About Coastal Resilience:**

Coastal Resilience is an approach that supports decisions to reduce the ecological and socio-economic risks of coastal hazards under current and future climate scenarios. The approach includes 4 elements: 1) Raise Awareness by developing integrated databases on social, economic and ecological resources critical to communities and providing mapping and visualization tools; 2) Assess Risk and Vulnerability to coastal hazards including sea level rise and current and future storms with community input; 3) Identify choices for reducing vulnerability focusing on joint solutions across social, economic and ecological systems; and 4) Take Action to help communities develop and implement

solutions. Please join this webinar to learn about the science of Coastal Resilience in 3 North American geographies: **New York and Connecticut, the Gulf of Mexico, and the Grenadine Bank in the Caribbean.**

The [Coastal Resilience Network](#) supports a community of practitioners around the world who are applying planning innovations to coastal hazard and adaptation issues. The network provides access to peer practitioners, tools, information and training focused on nature-based solutions in a consistent and cost effective manner, and includes a communications team, a community of practice, and a platform for decision support tools.

**About the webinar series:** The Science Spotlight is a new quarterly webinar series to showcase some of the great science happening in North America, whether it's conducted at the chapter, regional, or global level of the organization. The North America science team serves as host of the forum and interested staff will provide the content.

Have a topic you'd like to propose? Know of specific projects going on in our region that your colleagues should hear about? Please send your suggestions to [Brad McRae](#) and learn more about [upcoming webinars](#). **SC**

### July 16-18, 2013: Grassland Restoration Network Workshop

Join colleagues in Columbia, MO, for presentations and discussion of trials, challenges and lessons learned in restoring grassland systems. Field trips will include a tour through several stages of grassland reconstruction at [Prairie Fork Conservation Area](#). Details and registration information coming in

April. Questions? Contact [John Shuey](#), director of conservation science for The Nature Conservancy in Indiana. **SC**

### January 21-24, 2014: CUSD Science, Stewardship and Conservation Conference

Join your fellow conservation practitioners in balmy New Orleans for the 2014 bi-annual CUSD (Central U.S. Division) Science, Stewardship and Conservation Conference. We hope to build upon the successful 2012 Nebraska conference and provide you with more of what you want and need from these important opportunities to share our knowledge.

**Conference description:** The meeting will begin Wednesday morning, January 22<sup>nd</sup> and end at noon on Friday the 24<sup>th</sup>. There will be sessions covering all scales of our work as well as a poster session/social the second night. Although the conference will be focused on CUSD staff and projects, we will have presenters from outside of the division and encourage staff from other divisions to attend.

There will be group field trips on Tuesday the 21<sup>st</sup>, including all-day trips for those who arrive on Monday and afternoon trips for those who arrive Tuesday morning. Trips will include visits to coastal wetlands, cypress swamps, floodplain forests and longleaf pine savannas and will focus on areas where TNC has been actively engaged.

For more information, contact [John Shuey](#), director of conservation science for The Nature Conservancy in Indiana. **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/or 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.

Allan, J.D., P.B. McIntyre, S.D.P. Smith, B.S. Halpern, G.L. Boyer, A. Buchsbaum, G.A. Burton Jr., L.M. Campbell, **W.L. Chadderton**, J.J.H. Ciborowski, **P.J. Doran**, T. Eder, D.M. Infante, L.B. Johnson, C.A. Joseph, A.L. Marino, A. Prusevich, J. Read, J.B. Rose, E.S. Rutherford, **S.P. Sowa**, and A.D. Steinman. 2013. Joint analysis of stressors and ecosystems services to enhance restoration effectiveness. *Proceedings of the National Academy of Sciences* 110:372-377.

Bakker, J.D., L.J. Colasurdo, and **J.R. Evans**. 2012. Planting practices to maximize Garry oak seedling performance in a semiarid environment. *Northwest Science* 86: 300-309.

Castello, L., D.G. McGrath, L.L. Hess, M.T. Coe, P.A. Lefebvre, **P. Petry**, M.N. Macedo, V.F. Renó and C.C. Arantes. 2012. [The vulnerability of Amazon freshwater ecosystems](#). *Conservation Letters* doi: 10.1111/conl.12008

Davies, G.M., J.D. Bakker, E. Dettweiler-Robinson, P.W. Dunwiddie, **S.A. Hall**, J. Downs, and **J. Evans**. 2012. Trajectories of change in sagebrush steppe vegetation communities in relation to multiple wildfires. *Ecological Applications* 22: 1562–1577.

Dygico, M., A. Songco, **A.T. White**, S.J. Green. 2013. Achieving MPA effectiveness through application of responsive governance incentives in the Tubbataha reefs. *Marine Policy*, <http://dx.doi.org/10.1016/j.marpol.2012.12.031>.

Emery, S. M., **P.J. Doran**, **J.T. Legge**, **M. Kleitch**, and **S. Howard**. 2012. Aboveground and belowground impacts following removal of the invasive species baby's breath (*Gypsophila paniculata*) on Lake Michigan sand dunes. *Restoration Ecology* doi: 10.1111/j.1526-100X.2012.00915.x.

**Fitzsimons, J.A.** and J.L. Thomas. 2012. [Ground-foraging techniques of welcome swallows \(\*Hirundo neoxena\*\), including an instance of kleptoparasitism](#). *Australian Field Ornithology* 29, 160–165.

**Fitzsimons, J.A.**, E. Meijaard, I. Hunow, D. Prawiradilaga, J.L. Thomas and J.S. Tasirin. 2012. [Diet of the speckled boobook \(\*Ninox punctulata\*\) in north Sulawesi, Indonesia](#). *Forktail* 28, 169-171.

**Legge, J.**, **P.J. Doran**, **M. Herbert**, J. Asher, G. O'Neil, **S. Mysorekar**, **S. Sowa** and **K. Hall**. 2013. Prioritizing locations for implementing agricultural best management practices in a Midwestern watershed. *Journal of Soil and Water Conservation*, 68:22-33 doi: 10.2489/jswc.68.1.22.

**Leisher, C.**, **Sanjayan, M.**, **Blockhus, J.**, Larsen, N. and Kontoleon, A. 2013. Does conserving biodiversity work to reduce poverty? A state of knowledge review. In *Biodiversity Conservation and Poverty Alleviation: Exploring the Evidence for a Link*. Eds D. Roe, J. Elliott, C. Sandbrook and M. Walpole. John Wiley & Sons, Ltd, Chichester, UK. doi: 10.1002/9781118428351.ch9