SCIENCECHRONICLES

October 2012

Image: Ants on annual sunflower in the east bison pasture of TNC's Niobrara Valley Preserve, Nebraska, USA., Image credit: Chris Helzer/ TNC.

Why Our Preserves Still Matter...and How to Make Them Matter More

Editor's Note

By Bob Lalasz

In this month's *Chronicles,* Craig Leisher takes on one of the most fraught questions all the talk of the "new work of conservation" provokes at TNC: but what about our 1,200 preserves and our stewards? How do they fit into this new vision? Leisher argues that pitting one against another is a false opposition, and that we should look for ways to marry the two, by intentionally turning our preserves into conservation laboratories. As he puts it: "There are 1,000+ unanswered research questions about how nature benefits people. Let's systematically use our preserves to leverage large-scale change that benefits nature and people. They can be both our retail stores *and* our living laboratories." Think he's right? Off target? Drop both of us a note and let's start a dialogue.

Elsewhere in this issue:

- Peter Karieva outlines why he's cautious about claims that the activities of extractive industries can have "net positive impact" on the environment — and calls for conservation science to address the lack of evidence for those claims;
- Sally Palmer, always a delight both in person and on the page, writes her debut column for *Chronicles* on the three roles conservation NGO scientists play...and why they need to be up front with colleagues about which one they're playing when;
- Tim Tear and Craig Leisher take us around the world to argue that a focus on reducing population growth through education, particularly of young women in developing countries, should be a priority for conservation;
- Jonathan Higgins looks at how the Conservancy is addressing monitoring of water fund activities and emerges (surprise!) optimistic;
- Darci Palmquist gives 15 Seconds of Fame to Edinese Garcia, massive dog lover who directs conservation science for TNC in Amazonia (but has a science background in the Arctic);
- And Matt Miller goes deep to report on the science behind TNC-Tennessee's artificial bat cave.

Make sure that you check out the Announcements for news about a festival of science talks in late November at WO that we hope to simulcast to the field. And (unbelievable) it's time to start thinking about which book you're going to review for the holiday issue...

Next month: Becca Benner, the new director of conservation science for the Conservancy's North Carolina program, asks: What do actually we mean when we talk about "resilience"? And how should we act on it once we agree on a definition?

Apologies to Jon Fisher and Sally Palmer — I misidentified Jon last month as the director of conservation science for The Nature Conservancy in Tennessee, when of course that's Sally. Jon is a spatial scientist with TNC's Central Science team, a fine fellow who holds court daily over vegan lunch at WO's GIS lab. **SC**

Bob Lalasz (rlalasz@tnc.org) is director of science communications for the Conservancy.

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.

Editor & Submissions Bob Lalasz

Batter Up Peter Kareiva

For Back Issues Visit the Conservation Gateway

To Manage Your Subscription Status Contact Nancy Kelley

Letters

Peter Kareiva ("Conservation in a World of Senior Citizens," *Chronicles*, September 2012) is of course correct and on target in his piece about aging and its effects on conservation. However, I would like to at least mention that the really important ration for any society is not the ratio of workers to retirees, but of workers to "dependents."

The elderly are dependents, but they often come with assets attached. Children, on the other hand, come with nothing. As a result, standard sources indicate that, on average, a large cadre of children is a much heavier weight on a society than a cadre of elderly. E.A. Wrigley in his respected books about the English industrial revolution makes the point that economic takeoff was greatly helped by English marriage customs of the 18th century, which delayed marriage and as a result kept the burden of dependent children smaller than it would otherwise have been.

Part of the story of China is that the one-child policy kept the generation born after 1980 relatively small, which for 30 years has greatly reduced the dependency ration in China, freeing resources for development. Now, of course, they are beginning to see the other side of that one-time dividend — they are aging rapidly and by 2030 will be older on average than Americans. This leads to wrong-headed calls to end the one-child policy. But if Chinese birth rates did increase, they would have the worst of both worlds — a period of 15 or 20 years in which the generation of post-1980 must support BOTH a large elderly population and a large population of dependent children, none of them yet old enough to contribute.

The logic is inescapable — if population is to stabilize on Earth (as it must), then each country must eventually go through a transition phase in which the burden of the elderly becomes proportionately greater. The solution is increased individual productivity, not more children.

—**Bill Millan**, senior policy advisor, international government relations, The Nature Conservancy

With regard to Jonah Lehrer (Editor's Note, *Chronicles*, September 2012), he was called out to a degree in a paper I wrote (Young and Karr, *Significance* 2011) written partially in response to his *New Yorker* article. I did send a letter to the editor of the *New Yorker* and it was ignored. I also had a personal friend point out his error to him and it was reported back to me that he seemed to understand. In the *New Yorker* article, Lehrer took the position that when a claim did not replicate, that "science changed," and I pointed out the the initial claim was likely a statistical false positive, so sure, it would not be expected to replicate. Obviously, I did not do enough and it turns out that maybe Lehrer did not care. There is a lot of very bad science out there. Editors and *funding agencies* should require authors to make their data sets available so that some level of oversight is possible.

—**Stan Young**, assistant director for bioinformatics, U.S. National Institute of Statistical Sciences

Peter Kareiva
Net Positive Impact: *The* Science Question for Today's Conservation

By Peter Kareiva, chief scientist, The Nature Conservancy

Image credit: spettacolopuro/Flickr through a Creative Commons license.

Discuss this article on the Conservation Gateway.

Businesses and NGO's (including TNC) with strong commitments to sustainability often announce a goal of "net positive impact" (NPI) for activities such as mining or natural gas and oil pads. At first glance, this goal seems absurd — how could the activities of extractive industries have a net positive impact on the environment?

But once you understand how NPI might work, you also understand how the concept leads to probably the most important suite of scientific questions for today's conservation. When industry mines, drills, dams, erects windmills, or builds roads, the quality of local habitats is almost certainly degraded. But if the places where these activities happen are *already* degraded, and if we work with industry to invest elsewhere in restoring or protecting habitats critical for biodiversity and ecosystem services, then the balance sheet could turn out pretty well. All we need is the science to figure out how to accurately calculate that balance sheet.

The problem is: we almost never have the science. For example, what is the rate of biodiversity or ecosystem decline for each windmill, mine or road added per 1,000

square miles? Are there thresholds of activity or exploitation that, once crossed, lead to a total ecosystem unraveling? And how do we address the possibility of cumulative small impacts that sneak up on us and ultimately end up producing unacceptable degradation? These are just some of the questions to which we lack answers.

Traditional conservation biology focused on the placement, size and management of protected areas. We know that protected area science is not enough, given the scale of human activity today. So today's conservation biology needs to focus on fracking, wind farms, mines, roads, transmission lines and hundreds of other human activities and their footprints. The research will not be about "yes" or "no" — it will be about where and how much, and about what can we do to recover or offset.

We will make mistakes as we take action. We might allow what we think is the correct amount of logging, grazing, or windmills — only to learn in 20 years that ecosystems have been damaged more than we had hoped. The sin will not be in the mistake — the sin will be if we have not been gathering the type of data needed to learn from the mistake. And herein lies the challenge: Suppose you wanted to maintain grasslands as intact — what would you measure to determine whether or not they remained intact after different human intrusions?

"Today's conservation biology needs to focus on fracking, wind farms, mines, roads, transmission lines and hundreds of other human activities and their footprints. The research will not be about 'yes' or 'no' — it will be about where and how much, and about what can we do to recover or offset. "

The good news: Even if we make mistakes, there is much evidence that ecosystem recovery is possible, and sometimes even likely (Jones and Schmitz 2009, Lotke et al 2006). The bad news: outside of agriculture (where there are several studies comparing land sparing to wildlife friendly practices), I know of no large-scale concerted scientific analyses that quantify the dose-response curves for extractive activities or infrastructure deployment versus ecosystem services or biodiversity. The smart development efforts of conservation NGOs (such as TNC's Development by Design and Smart Infrastructure initiatives) offer a tremendous opportunity for basic science studies that can provide the foundation for the new work of conservation.

But by "basic science studies" I mean actually collecting data in the field, as opposed to assuming that because the maps look right, all is OK. I will be skeptical of NPI until I see field data of species richness increasing or ecosystem services on the rise as compared to control sites. A coalition of different NGOs and their smart development projects could become the test cases of a much needed meta-analysis. Anyone interested in pursuing this with me — email pkareiva@tnc.org. **SC**

References

Jones, H.P., and O.J. Schmitz. 2009. Rapid recovery of damaged ecosystems. *PLoS One* 4(5) http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0005653

Lotke, H.K. et al. 2006. Depletion, degradation and recovery potential of estuaries and coastal seas. *Science* 312:1806-1809.

Sally Palmer
Cheerleader, Buzzkill or Agent of Doom? Science Communication Challenges from "The Field"

By Sally Palmer, director of conservation science, The Nature Conservancy in Tennessee

Image: Bombay Beach, Salton Sea, California. Image credit: Brian Auer/ Flickr through a Creative Commons license.

Discuss this article on the Conservation Gateway.

The title of Jensen Montambault's recent "Science Short" caught my attention right away: "Most Scientists are (Drumroll) Human" (*Science Chronicles*, August 2012). In her article, Jensen reviews one recent publication that analyzes the apparent barriers in communication across non-theoretical and theoretical disciplines, even though the work of the former could be very dependent upon the latter. The researchers found that scientific articles with a higher density of mathematical equations per page are less likely to be cited in non-theoretical papers. The authors suggest this finding indicates a lack of cross-pollination that may slow down scientific progress. Papers that placed their equations in appendices, however, did not suffer a similar lack-of-citation fate.

This phenomenon got me thinking (again) about another science communication challenge — the one we as Conservancy scientists face in applying both our science (when it's available) and our science brains (when they are fully focused) to the

conservation strategies our organization is pursuing. Not surprisingly — and also discussed by previous SC contributors — scientists don't just have trouble talking to each other; we have trouble (drumroll, surprise) talking with everyone else.

TNC has scientists in all sorts of places, doing all kinds of projects, and serving in many types of jobs. I love my job as a TNC scientist in an operating unit. It's exactly the job I set out to achieve years ago when I served as a paid college summer intern for the Conservancy — and here I sit today. Every day is different; no day is dull. If you're like me, you're a scientist serving a specific TNC operating unit or units that are trying to plan for and execute a myriad of conservation strategies, at various spatial and temporal scales, on one or more types of pervasive ecological stress, with a variety of stakeholders, typically for a large swath of conservation targets, and with varying degrees of potential success or failure — all at once. I don't know about you, but all those coincidental challenges make me feel only human on a daily basis.

And they also require an intense level of collaboration and communication. If TNC is indeed "science-based," we simply have to find ways to be effective leaders within our operating units. This is sometimes easier said than done, particularly when we create obstacles for ourselves — mental or otherwise — to actively engaging with our colleagues. One of my favorite coping mechanisms is to begin conversations with non-scientists with this question: "Where are we on the space-time continuum here?" Not that this improves anyone's understanding, mind you, but it does usually get a cheap laugh… which at least makes me feel better.

After the laughter dies down, though, I'm usually being asked to meet one of three specific needs: 1) Identifying key questions (including ones we can't answer); 2) pondering/explaining cause & effect relationships; or 3) defining levels of uncertainty, potential cost/benefits, and potential risks. And the pace of our work demands that we often make these judgments — at least initially — without the benefit of math and with other people who hold a wide variety of assumptions, expectations and understandings of and tolerance for risk.

The Cheerleader, the Buzzkill, or the Agent of Doom: "It is important— for both ourselves and those we work with — to understand that science plays those roles…and to know which role we're playing when."

A scientist has to manage herself carefully through this type of lively – and often time limited -- debate. During these conversations, we often find ourselves falling into one of three primary roles: the Cheerleader, the Buzzkill, or the Agent of Doom. Each role is dicey in its own way, but each has an important purpose depending on the situation at hand. None of them is necessarily easy for someone trained to begin her answer to most questions with the phrase, "It depends…" Let me elaborate on each role further:

The Cheerleader: This role for TNC scientists can actually be quite fun if you (the scientist) feel relatively satisfied that good questions about a particular strategy are on the table, levels of uncertainty have been discussed, and the risk falls within an acceptable comfort level for you. The creative and opportunistic nature of TNC's work requires that scientists cheerlead new strategies and ideas, but we still have to find our

way to the base of the pyramid and strengthen the foundation (I'm imagining a pyramid of cheerleaders here, go with me). Sometimes this balancing act is easier than others. Which leads me to the next role…

The Buzzkill: More often than not, this is the role our identity as scientists requires us to play at TNC — and I'm not always fond of it. Seriously, who wants to be the one who's known for saying, "Hmmm…I'm really not sure about that"? Alas, it often falls to scientists to draw attention to the facts at hand (or call out the lack thereof, or the ones we need to know…). The Buzzkill is absolutely necessary, but sadly unfortunate — my fellow TNC scientists are generally the furthest thing from buzzkillers in real life. Quite the contrary, actually — although I'll refrain here from naming names.

The Agent of Doom: This role must rarely be performed, but there are times and places — for instance, in situations when we're facing high extirpation risk and low probability that our interventions can help. You simply cannot look any TNC person worth her salt in the eye and deliver this type of information without depressing repercussions. Yes, we are science-based, but TNC is also an organization of hope, of doers. People content to sit on the sidelines do not come to work for us, and telling them that the science says hope may be quite limited is emotionally distressful, for them and for me.

In my experience, the scientists who work for TNC are not content to sit idly and ride-the-pine, either. We know that our work is in the service of our fellow doers out there. I believe that the Cheerleader, the Buzzkill and the Agent of Doom all have something to contribute to forward progress. How we as scientists negotiate these roles and execute our leadership responsibilities is critically important to TNC's success as an organization. None of this is ever easy, straightforward, or free of our only-human shortcomings. But it is important — for both ourselves and those we work with — to understand that science plays those roles…and to know which role we're playing when.

Earlier I mentioned my "space-time continuum" coping mechanism; I'll close with another. Recently I've become fond of simply saying, "It's my job." It's my job to serve these roles, and it's my job to engage, contribute and communicate effectively so that science can always serve its proper role in informing sound conservation action. Even if it means I sometimes have to park my "It depends…" in the Appendix. **SC**

Feature Article

Why Our Preserves Still Matter...and How They Could Matter More

By Craig Leisher, senior social scientist, Central Science, The Nature Conservancy

Image: Gerstacker Nature Preserve, Michigan, USA. Image credit: Odalaigh/Flickr through a Creative Commons license.

Discuss this article on the Conservation Gateway.

The Conservancy manages more than 1,200 preserves in the United States. From the 0.03-acre Lick Run Preserve in Virginia that's home to one of the rarest native American plants (*Iliamna remota*) to the 171,813-acre Upper St. John River Preserve that's three times the size of Acadia National Park, the biggest asset on our balance sheet — metaphorically and literally — is the land we own. Yet the median size of our U.S. preserves is 171 acres (0.27 square miles)…or about half the home range of an urban flock of pigeons.

Thanks to early science leaders in the Conservancy like Bob Jenkins, our preserves contain important biodiversity...for North America. There are, however, more native tree species in a hectare of forest in the Amazon than in all of the United States, and the cost of conserving an acre in the United States is an order of magnitude higher than in most of the other countries where we work. This leads to the question: Are our preserves still central to what we do?

Yes. Ultimately all conservation is retail and not wholesale, and Conservancy preserves are our retail stores. It's where we show what we do. It's where we introduce people to our pragmatism and science firsthand. It's where we experiment with new approaches and demonstrate what works. It is what gives us credibility when talking to decision-makers. Visiting a preserve can inspire a long-term love of nature. There are no long-term heartfelt connections with an Adopt-an-Acre site visited only virtually. It has to be real to last a lifetime.

Demonstration and study sites, credibility with decision-makers, and creating a personal connection with nature are all clear benefits from our hundred dozen preserves. It's unlikely, however, that we are going to conserve the lands and waters on which all life depends by protecting 171 acres at a time. If we do the math and want to protect, say,

10% of every terrestrial biome on earth (sound familiar?), and we could buy another 171 acres every hour, how long would it take us to hit our goal? About 189 years to reach 10% for the six terrestrial biomes that are short of that mark. And this ignores the 71% of the earth that is ocean.

Buying and managing more land will not get us to conserving the lands and waters on which all life depends. So what if we give our preserves a new role to play? Conservancy preserves are some of the best natural laboratories in the world. If we *identify research questions* that matter to nature and people, *test them rigorously* in our preserves, and *catalyze incentives to replicate the results* elsewhere, even 171 acres can have a whole-system impact. The coolest fact is that we are already doing this — just not enough or systematically.

Preserves as Learning Laboratories

The Niobrara Valley Preserve in Nebraska is one of our few preserves thus far with empirical evidence of benefits to nature and people. An assessment (before-after, control-impact) was completed in June 2012 of five prescribed burns and invasive red cedar (*Juniperus virginiana*) removal sites in Niobrara Valley Preserve using remote sensing imagery along with plant diversity and density transects. The most important ecological finding was that cedar removal via fire or mechanical means resulted in a 22% increase in groundcover of the plant species bison and cattle prefer. While the plant data are for a single point in time, they are suggestive of beneficial changes in plant species communities from cedar removal. This finding is of keen interest to area ranchers because it shows that cedar removal may appreciably improve their slim profit margins.

The assessment also found that the preserve and its staff played a key role in helping change local attitudes towards prescribed burns and building the local institutions, government policies and financial incentives to support wide-spread adoption of prescribed burning as a land management approach.

"If we identify research questions that matter to nature and people, test them rigorously in our preserves, and catalyze incentives to replicate the results elsewhere, even 171 acres can have a whole-system impact."

Mobile Bay oyster reef restoration in Alabama is another example. An economic valuation for restoring local reefs there found that the net present value of the restored reefs over a 50-year timeframe from just the fishery enhancement is $5.6 million, giving the project a social return on investment of 2.3. The valuation results are now being used to leverage state and national incentives for oyster reef restoration.

There are hundreds of research questions about how nature benefits people waiting to be answered. And rigorous, replicable studies are at the heart of science. But it's the third element — leveraging large-scale change — where we get lost in the woods like a kid without a compass. Too many scientists believe that publishing a study is the end rather than the means, yet most policy-makers rarely read academic journals. They do, however, respond to organized constituencies and on-the-ground proof that an idea works. So how does the Conservancy get from 171 acres of proof on the ground to whole-system impacts? Once again, we are already doing it.

Success Factors

To create large-scale change, we have to first create the factors critical for success. The Niobrara assessment identified a highly replicable pathway to large-scale change.

To translate good practices into policies, the Niobrara Preserve and its staff helped start two local institutions, the Sandhills Task Force and the Niobrara Valley Prescribed Fire Association (with the help of the Middle Niobrara/Sandhills Fire Learning Network). These *local intermediary institutions* provided the link between area ranchers and government policy makers and advocated successfully for government incentives to encourage the wider use of prescribed burns and cedar removal. The underlying theory of change is that policy makers respond well to organized groups of constituents championing a better "mousetrap."

In addition to the local intermediary institutions, key success factors (as identified by Niobrara focus group participants) were:

- *Leading by example*. The preserve demonstrated the benefits of cedar removal and prescribed burns, and several preserve staff did the same on their own land.
- *Able leadership*. The preserve benefited from managers anchored in the local community who had the leadership and facilitation skills to engender internal and external changes.
- *People people*. The people skills of the preserve's staff were crucial to success.
- *Patient persistence*. The preserve staff stayed the course, even though it took more than a decade and a large wildfire to change local perceptions about prescribed burns and cedar removal.

"Too many scientists believe that publishing a study is the end rather than the means, yet most policy-makers rarely read academic journals. They do, however, respond to organized constituencies and on-the-ground proof that an idea works."

Another large wildfire engulfed much of the Niobrara Valley Preserve in July 2012. Like the Phoenix, though, fire is part of Niobrara's life cycle. The grasslands are already growing back.

The argument over how conservation can better integrate itself into global conversations too often and too neatly cleaves into a stereotypical divide between "old-style" conservationists who want to do what we have always done but at a much larger scale, and "anthropocene" conservationists who want to sell all the land and just work with corporations and policy types. Those stereotypes are not only false to the facts, but they also prevent us from thinking creatively about how our biggest asset can help us tackle future global challenges.

We have a 1,000+ preserves. There are 1,000+ unanswered research questions about how nature benefits people. Let's systematically use our preserves to leverage large-scale change that benefits nature and people. They can be both our retail stores *and* our living laboratories. **SC**

Tim Tear and Craig Leisher
Education as a Conservation Strategy...Really?

By Tim Tear, director of conservation science, The Nature Conservancy in Africa, and Craig Leisher, senior social scientist, Central Science, The Nature Conservancy

Image: Swema Kabliya walks to get water in the village of Nkonkwa, on Lake Tanganyika in Tanzania. Image credit: Ami Vitale.

Discuss this article on the Conservation Gateway.

It seems like everywhere you turn recently, you hear how the planet's population is headed to 10 billion. And obvious questions follow: How can we balance far more people with the natural resources needed for their survival? How will we get more food? How will we get more energy?

What is missing from these questions is a healthy discussion of a necessary strategy, one that The Nature Conservancy has dodged for years. In this piece, we argue that compelling new data and lessons learned from years of work around the globe suggest that the Conservancy should think hard about adopting another global priority strategy — education, especially education of young women in developing countries — that could catalyze many of the others.

Our assumption is that most readers will be skeptical. We were too. So let's see if we can alter your perspective by taking you first to Tanzania. In true Conservancy place-

based fashion, there is a stunning conservation area that provided the initial attraction — only later to discover it was also full of alarming statistics related to population and human well-being that helped to open our eyes to the importance of education.

On Tanzania's western boundary, the Conservancy's Africa program has a project to conserve a vast forested area with the rugged Mahale Mountain National Park at its core. In addition to containing approximately 90% of the chimpanzees in the country and other Africa icons like elephants, the project area also captures a significant portion of the Lake Tanganyika coastline. Lake Tanganyika is a true freshwater biodiversity gem. It has not only some of the most spectacular fish diversity on the globe, it also holds — in one lake — nearly as much fresh water as all the U.S. Great Lakes combined. But to successfully conserve the fish and chimps, complex conservation issues must be addressed.

In this remote region, people are almost entirely dependent on fishing and farming. When people can't get enough food from the lake, they turn to the forest for hunting and to clear new land for farming. When there are too many people for the natural resource base, both the lake and the forest suffer. To get a better handle on these underlying land- and water-use issues, we conducted a baseline socioeconomic survey of the 50,000 people who live in the area (Hess & Leisher 2010). What we found startled us. The 10 villages on the edge of the lake bordering the national park had some eye-opening numbers that we weren't ready for:

- 49% of the population is under the age of 15, among the highest percentages for that cohort in the world.
- The average household size of 6.7 is 29% higher than the 2010 Tanzania average of 5.2 and among the highest in the world.
- 130 of every 1,000 children born locally between July and December 2006 did not survive to their 5th birthday, giving the villages an under-age 5 mortality among the highest in the world.

"This baseline social science survey made the conservation challenge clear. If we can't address rapid human population growth in the area, we will not succeed in conserving the lands and water on which all local life depends."

This baseline social science survey made the conservation challenge clear. If we can't address rapid human population growth in the area, we will not succeed in conserving the lands and water on which all local life depends.

A common reaction to the data is that, given such overwhelming population pressures, is there any reason for hope?

To find such reason, we have to journey to the other side of the globe — to South Korea. The demographic structure of South Korea in 1960, with roughly half its population under the age of 15 and 6.3 births per woman, was similar to many developing countries in the world today and much like where we work in Tanzania. But in just 30 years, South Korea's demographics changed from a youth-heavy population pyramid to a much more sustainable teardrop shape (Figure 1), with a growth rate at replacement level. Why is this important? Because the projections of Earth reaching 10

billion people span a longer timeframe than it took South Korea to dramatically alter its demographic profile.

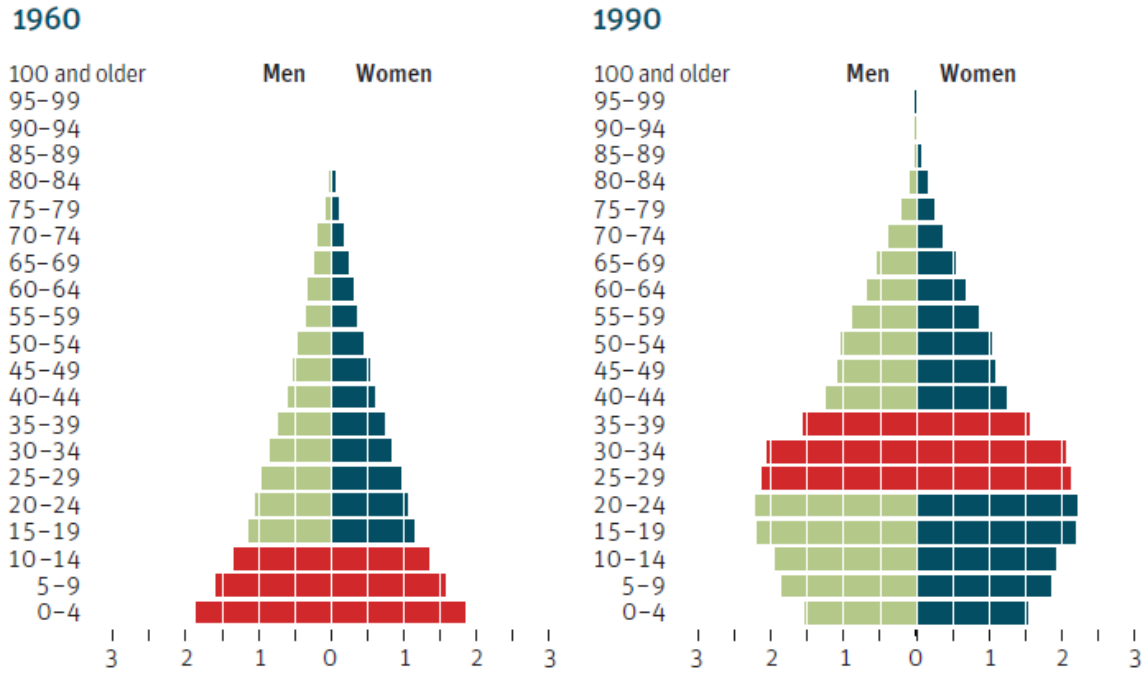


Figure 1. Number of people (in millions) in South Korea by age groups in 1960 and 1990. Data from UN 2009b. Figure from Sippel et al. (2011).

South Korea could be dismissed as an aberration because it has such a large and vibrant economy — think LG and Hyundai — but South Korea is not alone. Columbia, Morocco and Bangladesh had similar demographic shifts in even less time (WDR 2011). Imagine how much worse environmental crises in these countries would have been had they NOT transformed their population pyramids? Rather than continue with the sole focus on more mouths needing more inputs, why not also adopt strategies that result in fewer mouths? Our argument is that population size and growth — and the increased consumption that comes with more people — does matter, and that conservation needs to address this problem. These examples of dramatic demographic change show that it is possible to take the fuse out of the population bomb.

A recent report (Sippel et al., 2011) on the demographic challenges in Africa looked at the factors that contribute to a reduced population growth rate. Education — in particular educating women — was one of the most significant factors for reducing population growth rates. In the figure below, they show how increased education levels result in fewer births per woman. This study also calls out education as the key factor for greater economic development, which is a necessity for sustaining the benefits to an older population.

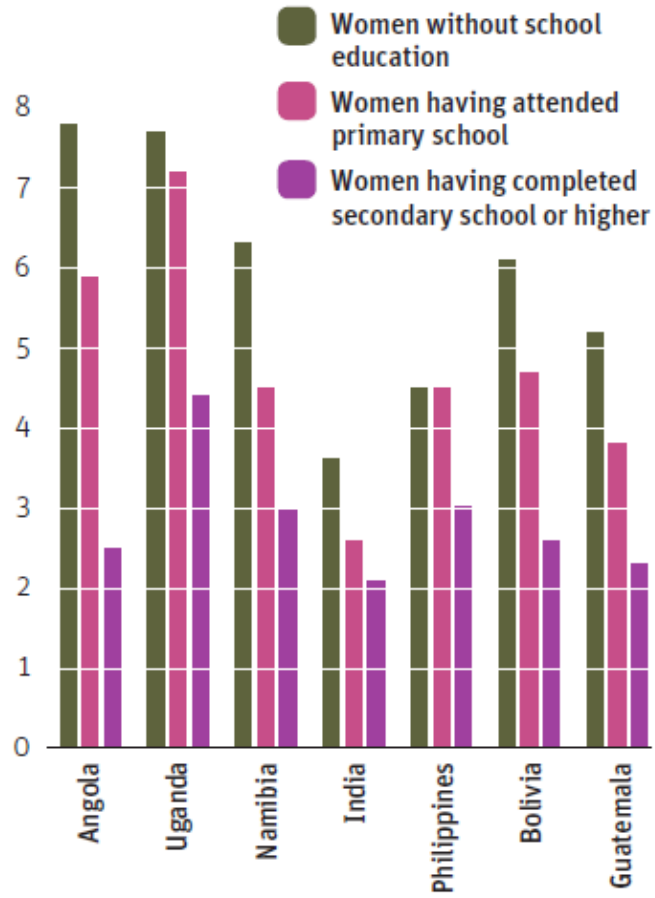


Figure 2. Average number of children per woman in different countries by educational level. The data spans different years (from 2005-2008) and are from Demographic and Health Surveys. Figure from Sippel et al. (2011).

The third stop on our journey takes us to the library to look at what we have learned from a half- century of international development. A meta-analysis of 26 countries dovetails with Sippel et al.'s (2011) findings: educating women reduced the number of children, and even completing primary school was enough to make a significant difference (Castro-Martin 1995). Educating women also had one of the highest return on investment rates among all development initiatives. In Sub-Saharan Africa, for example, the return on investment for completing primary school ranged from 25% to 38% (Psacbaropoulos & Patrinos 2004). This means for every $1 invested in primary education, it returns $1.25 to $1.38 to the community economically.

"Our argument is that population size and growth — and the increased consumption that comes with more people — does matter, and that conservation needs to address this problem."

For comparison, consider this: Primary education's return on investment was even greater than child vaccinations, which itself is the best buy for the money in the health sector (Bloom et al. 2005; Laxminarayan 2008). When poor women in developing countries earned income, they spend most of it on their families, creating a positive feedback loop that helps the next generation to be more educated and healthy (Borges 2007).

Our final stop visits an apparently odd correlation: education and climate change. The UN posited in 2009 that educating women about reproductive health and providing them with family planning options would do more for reducing greenhouse gas (GHG) emissions than stopping all deforestation (UN 2009a). Education reduces the population growth rate, which reduces the growth in consumption, which in turn reduces GHG emissions. REDD+ is cool — but educating women is even cooler for global warming. Literally.

Back in Mahale, Tanzania, we can see how its remoteness has been a blessing and a curse. Remoteness has helped to protect these special habitats from destructive human development. However, the people have been virtually forgotten by government health and education programs, in large part due to being so far from population centers. Yet even in apparently dire situations like this, education as a strategy is critical to finding hope: hope supported by data.

If you're mentally jet-lagged after our strange trip from Tanzania to South Korea and back, the idea is simple: a wealth of data suggest that education, in particular educating women, could be one of conservation's most important and successful strategies.

So what might some of these "education strategies" look like? Here is one possible pathway to the education frontier tailored to TNC talents:

- ***Develop education strategies for the 10 countries where TNC works with an expansive (youth-heavy) population pyramid***. In these countries, 35% or more of the population are under the age of 15, and these population demographics threaten to nullify the potential conservation gains planned for the next 50 years.
- ***In each of these countries, team up with respected family planning and reproductive health partners.*** Together, advance priority projects where population, health and environment (PHE) actions are developed — collaboratively — from the beginning. The Conservancy does not have to be the expert here; but can and should leverage expertise already available. In Mahale, we have a partnership with Pathfinder International, the leading human and reproductive health organization in Tanzania.
- ***In projects where a PHE approach is adopted, insure that education focuses on strategies that directly target young women***. Again, this is why partnerships are important — they should bring knowledge of which strategies have worked best for the socioeconomic situation of each project.
- ***Support government funding for primary and secondary education for women.*** Government relations' efforts in countries where PHE projects are being advanced should support education in its broadest sense. Increased access to education should amplify local conservation benefits.

Still skeptical? **SC**

References

Bloom, D. E., D. Canning, and M. Weston. 2005. The value of vaccination. *World Economics* 6:15–39.

Borges, P. 2007. *Women empowered: Inspiring change in the emerging world*. Rizzoli, New York. p 13.

Hess, S., and C. Leisher. 2011. *Baseline study for the Greater Mahale Livelihoods Conservation Project*. The Nature Conservancy. 87 pp.

Laxminarayan, R., and L. Ashford. 2008. Using evidence about 'best buys' to advance global health. Policy Brief: Disease Control Priorities Project.

Psacharopoulos, G., and H. A. Patrinos. 2004. Returns to investment in education: A further update. *Education Economics* 12:111–34.

Sippel, L., T. Kiziak, F. Woellert, and R. Klingholz. 2011. *Africa's demographic challenges: How a young population can make development possible*. Berlin Institute for Population and Development, Berlin.

UN (United Nations). 2009a. *State of World Population 2009: Facing a Changing World: Women, Population and Climate*. United Nations Population Fund, New York and Washington DC.

UN (United Nations) 2009b. *World Population Prospects: the 2008 Revision*. CD Rom Edition. Population Division, Department of Economic and Social Affairs.

WDR (World Development Report) 2011. *Gender Equality and Development, World Development Report 2012*. World Bank, Washington, D.C.

Jonathan Higgins/Straight, No Chaser
On Monitoring Water Funds

By Jonathan Higgins, senior aquatic ecologist, The Nature Conservancy

Above: Cattle in the Ayampe River valley, Ecuador, where TNC is working with local partners to develop a water fund to help protect the remaining native forests in the watershed. Image credit: Erika Nortemann/TNC.

Many at the Conservancy assume that water funds are automatically good, that the activities they support are always beneficial, and that they are doing enough of the right things to make the differences we are claiming will result. Many Conservancy scientists agree with most of these assumptions — we think water funds are good things, and that most of the activities are beneficial. However, we also know that conservation needs to document the extent to which individual water funds are working for a variety of reasons:

- To ensure that we are not overpromising the benefits of water funds and under-delivering;
- To understand what is working, what is not, and to identify activities to expand in specific watersheds in order to achieve goals and objectives for each water fund — if necessary.
- To illustrate to water fund investors that they are indeed getting their return on investments;
- To expand water funds to other places based on factual results; and
- To make our work better over time.

These things require data, and data requires monitoring and measures. Narratives alone will not defend our work or inspire additional multi-million dollar investments in it. We need hard proof that what we are doing with water funds has benefits.

The Benefits and Limits of RIOS

In the August issue of *Chronicles*, Heather Tallis and Adrian Vogl presented the modeling tool RIOS and how it is being used to support decisions for the design and implementation of protection and restoration activities in water funds. RIOS presents optimization results and estimates of impacts from suites of activities, among other things. So where does RIOS fit into our expanding knowledge about the impacts of water fund activities?

I was recently at a TNC workshop in Lima, Peru where RIOS was presented and evaluated for upgrades, and monitoring needs and approaches for water funds were discussed. RIOS is an excellent decision-support model. I like it a lot; great thinking and hard work has gone into it. It makes some basic assumptions, as all models do, and it is not intended to simulate reality, although some people at that meeting thought it would give them "the" answer for everything, and if it currently did not, it should. Let's get one thing clear — models are abstractions of reality, and modelers and those that use them should understand that. RIOS also provides a template for informing monitoring design, and it should be used to help water fund teams understand where sampling sites might best be placed in order to answer questions about the results of water fund activities.

RIOS has built-in flexibility to provide values for assumptions about the results of activities such as reforestation — for instance, that a restored forest will provide the same degree of sediment and water run-off control that natural forests do. These assumptions go into the model's return on investment projections. Most people who study forest hydrology will question whether restored=natural, but as an initial value input into a model, it is a place to start. If better information is known, it can be used to generate more realistic attributes for the model. But decision makers at the Conservancy need to understand that RIOS makes several other assumptions that are also just "places to start" and not gospel.

"Narratives alone will not defend our work or inspire additional multi-million dollar investments in it. We need hard proof that what we are doing with water funds has benefits."

For instance, RIOS bases many of its returns on investments for water users on simple linear models of responses to activities. The modelers know these are not accurate, but I fear that some at the Conservancy are using the results and talking to investors about them as if they are accurate. Additionally, there is no component of the models in RIOS that address the time lags between activities and results — a major gap in our communications about water funds. All of these aspects need to be evaluated and steps taken to refine inputs into the models (if pragmatic). More importantly, TNC staff need to be clear on what the strengths and assumptions of the models are, so that the outputs are understood and expectations are communicated in ways that are closer to reality.

Don't Forget About Monitoring and Measures

Evaluating the results and impacts of different water fund activities still requires site-based monitoring, before and after activities. We know from existing literature that many of these activities provide benefits. However, we often do not have examples from the same environments, situations or (most importantly) places that local partners are investing in:

- Evaluating changes in land cover requires control, impact and reference conditions before and after activities.
- Evaluating the water-quality impacts and local in-stream biotic responses of a water fund activity requires monitoring above and below a site before and after an activity is put into place.
- To learn if water fund activities are having an impact on things like water quality and base flows at a watershed scale, we should monitor these at the bottom of an impact watershed where activities are widespread, and at a control watershed that is similar but where activities are not being put into place.

We also need to look at counterfactuals — such as climate and other activities that are taking place in the watershed — in order to determine the degree to which water funds have contributed to changes in indicator values over time. In addition, monitoring and measuring the impacts of a water fund as a whole should keep in mind the needs of the investors – for instance, a municipal water supply. Monitoring changes in water quality and flow at the water intake point of an investor — for instance, a municipal water supply — is necessary, since these are the reasons for investments.

Factoring in the Rest of the World

"Monitoring provides us with a window into changes, but things such as climate, landslides, deforestation in lands not participating in water funds, and other beneficial activities being supported by programs other than water funds need to be estimated as well."

However, change over time is only…change over time. And comparing that change to what happens in a control watershed will not allow a precise measure of the degree to which the *water fund activities* resulted in those changes (if changes happen at all). Such inferences will need to be calculated using models and site-based measures that verify results from actions. Models refined with data from monitoring provide the estimated results in a water fund from all activities. Monitoring provides us with a window into changes, but things such as climate, landslides, deforestation in lands not participating in water funds, and other beneficial activities being supported by programs other than water funds need to be estimated as well.

For example: It may be possible for sediment concentrations and pollution to actually *increase* over time in a watershed being served by a water fund. Those findings would not necessarily suggest that water funds were not beneficial there. If there were severe rainfall events — as we have seen recently in some water fund projects — sediment loadings may increase dramatically and swamp any measurable influence of water fund activities. It is critical to illustrate what would have happened without water funds in place, and show that sediment loads would have been even larger, and the

benefits to investors are that difference. Illustrating this difference requires monitoring at the site level to validate and improve models, and monitoring at micro-watershed scales to validate impacts of overall water fund efforts.

We're Making Great Progress

Staff from TNC's Global Freshwater Team, Central Science team, and the Latin America Region are working with water fund projects and the Natural Capital Project researchers to structure monitoring and measures questions and approaches, develop guidance documents, and assist in implementation. There has been great progress in these efforts, and it is exciting. I am glad to be part of it. The issue has not been a lack of existing science, it has been the lack of clarity on what to monitor and measure, and a lack of capacity, infrastructure, and management to focus on appropriate monitoring and measures. But this gap is changing, and that is a welcome development. We are positioning ourselves to be able to make defensible statements about the results of water funds and to at last document their benefits to people and nature. **SC**

15 Seconds of Fame
Edenise Garcia

Edenise Garcia is science coordinator for the Conservancy's work in the Amazon—a job that puts her at the nexus of global deforestation, sustainable land use and indigenous rights. A multicultural, dog-loving polymath, she says this job is "the perfect world" for her. Meet Edenise.

GROWING UP: I'm Brazilian-Canadian and I speak French, Spanish, Portuguese and English. As a child we lived in Sao Paulo but my father had a small farm in the Atlantic Forest that we would go to on weekends and vacations. It's a really, really nice place — lots of snakes, colorful insects and other animals, and the exuberant bromeliads on every tree around you.

DOGS: I have 5 dogs. The mother came from the high Arctic, where I was doing my post-doc research — my Inuit field guide gave her to me. She's an Alaskan malamute so she was OK in Canada, but here in Brazil it's much hotter. That's why I used to go jogging with the dogs only very early in the morning or at night.

I used to collect abandoned dogs in the city and bring them to my father's farm in the country — the most my parents allowed were 15 at a time. I literally couldn't see an abandoned dog on the street and not take care of it. I'd cry and my mother would let me bring it home, we'd bathe it and give it medicine and then bring it to the farm.

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

Image: Sila, Manu and Edenise.

Discuss this article on the Conservation Gateway.

FUTURE OF THE AMAZON: The Amazon is not only about trees, it's about people too. With our work here we are trying to conserve the forest, respecting peoples' right to have a good life.

For many years the Amazon had high deforestation rates, then these rates began do decrease steadily. TNC is helping to achieve this, working with landscape planning and responsible production, among other initiatives. But we need to keep an eye on overall trends. I was looking at last August's deforestation data and there's been a 220% increase compared to the same period the year before. It's not a trend yet, but there are other signs that it could become so. We need to make sure farmers comply with the environmental legislation, and have access to incentives and sustainable alternatives of production, or else deforestation will increase again.

ARCTIC EXPLORER: I did my post-doc research on the effects of climate change on methylmercury bioaccumulation in the Arctic, mostly on Ellesmere and Cornwallis islands. I spent 2 years there, although I didn't stay through winters because my research required sunlight. I was looking at how light and temperature influence mercury biochemistry.

PAST CAREERS: I've had lots of change in my life, but I kept the best for last! I started with medical school for 3 years but decided I didn't want to do that for the rest of my life. So I switched to journalism and literature and worked as a book translator and journalist.

Then I decided that I wanted to do something that would last longer than an article, so I went back for an undergraduate degree in biology and ecology, and a master's and Ph.D on contaminants in the environment. I then worked for one year as a consultant on mercury issues for the World Health Organisation in Geneva. Before my current job, I was the Conservancy's REDD coordinator in Mato Grosso State.

LOVE MY JOB: I have a background in research and teaching, but here I get to see the application of science. So this for me is the perfect world. I have an opportunity to work with policy and government and it's a chance to apply science to the real world. We have a great team at the Amazon Conservation Program. **SC**

From the Field
Building the 'Cave of Dreams'

By Matt Miller, senior science writer, The Nature Conservancy

Above: Construction at the artificial bat cave near Clarksville, Tennessee. Credit: Paul Kingsbury/TNC.

Editor's note: This article first appeared on Cool Green Science. If you want TNC's Science Communication shop to report on your science fieldwork, email Bob Lalasz, Matt Miller or Darci Palmquist.

Note: This is the third part in a blog series on The Nature Conservancy's new artificial bat cave, an experiment to help stop the spread of white-nose syndrome, a fungal disease killing millions of bats. Read all Matt's blogs on the cave.

Cory Holliday frequently evokes Field of Dreams when talking about the artificial bat cave: "Build it and they will come."

It's true that bats readily use human-made habitats, from bat houses to mine shafts to attics.

Still, when the goal is to protect large numbers of bats from a deadly disease – perhaps, even save them from extinction – you have to rely on more than chance. You have to consider what will make the artificial bat cave a healthy, attractive place to spend the winter. You have to make it better than the real thing.

Just digging a hole in the ground won't cut it.

Holliday, the cave and karst program director for The Nature Conservancy in Tennessee, considered every detail available on bat natural history and hibernation habits to ensure that the bats will indeed come to the artificial cave being constructed near Clarksville, Tennessee — the first of its kind.

So what are the components of a "cave of dreams?"

Keep it Close

This one is pretty simple: Build it close to a natural cave that is home to the endangered gray bat. Bellamy Cave has 260,000 gray bats, it's a Conservancy project and there was a logical place to place the cave 100 yards away.

But even when this ideal location was chosen, construction couldn't begin immediately. That's because Bellamy Cave is also a maternity colony, meaning gray bats have babies there. Young bats — called pups — often fly haphazardly when they leave the nest.

There was a real risk of them darting out of the cave and crashing into construction equipment, defeating the purpose of the artificial cave.

So, construction began as soon as they left the cave, in late summer. But that meant there was a rush to complete the project before bats begin arriving to hibernate, which can be as early as mid-October.

"In a few weeks, bat calls will be broadcast from the cave entrance in the hopes of drawing them to the opening. At one point, Holliday even considered using bat guano to replicate the smells of a real bat cave, but experts suggested this wouldn't make a difference, and would risk introducing the fungus."

While the cave could hold as many as 200,000 bats, a more realistic goal is 10,000 to 15,000.

Keep It Cool and Moist

The most critical factor in designing the cave was temperature. Gray bats hibernate in caves that are in the 50 degree range. Any warmer, and the bats will avoid it.

The bat cave is designed to be a cold air trap. It is situated at the bottom of the hill, so cold air naturally sinks. Still, the cave had to have ventilation to ensure a constant temperature. The Conservancy turned to refrigeration engineers.

Basically, the cave has tubes that function as chimneys. They capture and trap the cold air, which flows evenly through the cave.

But there's one added wrinkle: One part of the cave is actually designed to stay warmer, to attract species of bats that need or prefer a less chilly hibernating spot.

The bat cave is constructed of concrete. When earth was cleared away and the structure installed this summer, it was exposed to the sun. This heated the cave up, and it is taking a while to cool down.

"Our biggest battle right now is lowering this temperature," says Holliday. "It has to drop a bit before it's ready for bats."

To accomplish this, Holliday has portable air conditioning units cranking in the cave.

The artificial bat cave also must remain at a relatively constant 85% humidity. A tube supplies water into a small, shallow pool that will keep the humidity level high throughout the winter.

Bats do arouse from their torpor throughout the winter. When they do, they often seek a drink of water, so the pool doubles for this purpose.

Keep it Clean

The other key component of the cave is ensuring that it can be easily cleaned — thus killing white-nose fungus — each spring.

The walls have to be designed for easy disinfecting, but they also have to be places bats would actually roost. Bats hang "upside down" on the ceiling of caves. But they can't just cling to a flat surface. A variety of surfaces are used in the artificial cave – remember, it's the first of its kind so experimentation is vital – to see what bats most prefer. In some areas, the surface merely has texture; in others, netting provides an extra foothold for bats.

The bats naturally move out of the cave in the spring, moving to maternity caves or smaller caves around the forest. When they do, staff will enter the cave and kill the fungus.

A variety of cleaning methods will be tried, from high-pressure water treatments to household disinfectants.

Keep on Trying

As with any experiment, it's hard to know how exactly it will turn out. That's why Conservancy staff members are considering every possible way to make this a welcoming place for bats.

In a few weeks, bat calls will be broadcast from the cave entrance in the hopes of drawing them to the opening. At one point, Holliday even considered using bat guano to replicate the smells of a real bat cave, but experts suggested this wouldn't make a difference, and would risk introducing the fungus.

"We're trying everything we can think of to make the habitat suitable and draw the bats," says Holliday. "Not everything is a viable option, but there is a lot going on here. It may look like a concrete bunker, but it represents the best thinking out there on how to mitigate the white-nose syndrome disaster."

Thermal cameras will be installed so that the bats can be monitored, without disturbance, throughout the winter. (I'll be following the latest news on the artificial cave's results, so check back for the latest information on how the bats are faring).

The final component is to ensure this project is replicable. The hope is the cave becomes a key tool in fighting white-nose syndrome.

"Hopefully, this is a pilot project," says Holliday. "If it works, you could build more of them. You could build them larger. You could probably do it for less cost, because you'd know what exactly works and what doesn't.

"We're also buying time," he continues. "The more we can slow down the spread of the disease, the more time we have for research that can make a difference." **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 rlalasz@tnc.org.

1) Why Do Conservation Scientists Get Out of Bed? (ConservationBytes): Cory Bradshaw laments that "not one, single, broad biodiversity metric around the globe shows improvement." So why doesn't he just dive back under the covers? (Read the whole post to see if he undoes his own argument.)

2) Who Knew Americans Were More Interested in Science Than Celebs? (SciGuy/ Houston Chronicle): This new Reuters Institute report says more people want news about science than about Kate or Katy. I'm waiting for the report about how authors of reports like these could forget that people are embarrassed to report their interest in Kate or Katy to total strangers... Still, rejoice, scientists, because you are on fire...

3) Data Scientists: The Sexiest Job of the 21st Century (Harvard Business Review): Forget soft lights and Ray J. on the stereo — good lovin' these days needs Big Data, according to HBR. Even better news: Jensen Montambault writes that the HBR description of these data hotties fits the work profile of many Nature Conservancy scientists. Smokin'!

4) Misrepresentation of Randomized Controlled Trials in Press Releases and News Coverage: A Cohort Study (PLoS Medicine): Everyone knows that the media distort science — but whose fault is that? This new study of 70 press releases for two-arm, parallel-group randomized controlled trials concludes that, while half the press releases and subsequent news articles contained "spin" of the studies' results (mostly emphasizing the benefits of the trials), that spin could be traced back to spin in the *original scientific articles' abstracts.* Andy Revkin has further discussion.

5) Apocalypse Not: Here's Why You Shouldn't Worry About End Times (*Wired*): Chemicals, disease, people, resources — the Four Horseman of environmental doom. Really? asks Matt Ridley, author of *The Rational Optimist*. Don't worry; get busy.

6) A Modest Proposal to For Wealthy Countries to Reforest Their Land for the Common Good (Biotropica): Erik Meijaard, my predecessor as this publication's editor and a former TNC scientist renowned for his puckish blogging, writes here about the Coalition of Financially Challenged Countries with Lots of Trees (Cofcclot), which proposes that the G8 countries should plant up to 75% of their land with trees to stabilize global climate — *a modest proposal indeed* that exposes some of the biases and hypocrisies of Western conservationists. *The Guardian*'s John Vidal approves.

7) **Watch Helplessly From A Mussel's Shell As It Is Slowly & Inexorably Consumed (Deep Sea News):** Do not watch this sea star predation video (complete with translucent stomach) before going to bed. Do not. DO NOT. All right, go ahead. **SC**

Science Shorts
Hand Me The Tricorder, Scottie

Goldberg, C.S., D.S. Pilliod, R.S. Arkle, and L.P. Waits. 2012. Molecular detection of vertebrates in stream water: A demonstration using Rocky Mountain Tailed Frogs and Idaho Giant Salamanders. *PLoS ONE* 6(7): e22746. doi:10.1371/journal.pone.0022746

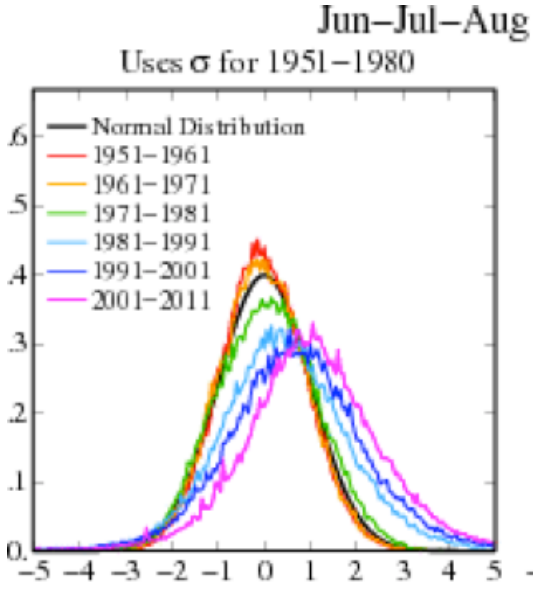
Thomsen, P.F., J. Kielgast et al. 2012. Detection of a diverse marine fish fauna using environmental DNA from seawater samples. *PLOS ONE* 7(8): e41732. doi:10.1371/journal.pone.0041732

For all our work on protecting whole systems, major habitat types, and such, the bottom line for biodiversity comes down to the presence and status of individual organisms: the frog in the water, the bug in the tree. But rare things are, almost by definition, hard to find, making research and monitoring expensive and time-consuming. Equally challenging is tracking microscopic disease organisms that can eliminate the things we're trying to conserve. Recent advances in the study of environmental DNA promise to make such efforts faster, easier, and cheaper by allowing us to identify species presence through the bits of genetic material they shed. These two recent papers on eDNA show its application to amphibians in streams and fish in the ocean. **SC**

— Dale Turner, conservation planner, The Nature Conservancy in Arizona

Climate Dice: Now Loaded

Hansen, J., M. Sato, and R. Ruedy. Perception of climate change. *PNAS* doi: 10.1073/pnas.1205276109.



Renowned NASA climate scientist James Hansen published an elegant study in *PNAS* in August showing that extremely hot summer temperatures are more than 10x more likely to occur now than 50 years ago. The authors define extremely hot temperatures as three standard deviation (s.d.) temperature events based on the year-to-year summer temperatures from 1951-1980 — events that virtually never occurred during that time period (about 0.13% of the time). They show that these three s.d. summer temperatures now occur over about 10% of the Earth at any given time. And even higher four s.d. events now occur occasionally too, something almost unthinkable in the

past. They conclude that the recent heat waves in Texas (2011), Moscow (2010) and France (2003) — all three s.d. events — would have virtually zero probability of occurring in the absence of climate change. This paper is not about human-driven causes of climate change, but rather simply looks at what we have observed in the temperature record. What is elegant about the study is it shows we can more easily perceive climate change occurring around us by looking at the tails of the bell curve. Here's the new metaphor: the climate dice are now statistically weighted toward many more extremely hot summers. **SC**

(**Figure 1**: Frequency distribution of summer temperature differences from the 1951-1980 baseline average. Note the distribution shifts toward higher temperatures and greater variance over time (Hansen et al 2012))

— **Evan Girvetz**, senior scientist, Global Climate Change team, The Nature Conservancy

Announcements

ScienceFest: November 26-27, 2012

By Bob Lalasz

I'm pleased to announce ScienceFest, two days of talks and debate by TNC and external scientists that Central Science is hosting at WO on Monday and Tuesday, November 26-27.

The talks will be open to WO-based staff and invited guests in the DC area, and we hope to webcast the event to all TNC staff. In addition, donors interested in science will also be invited.

Why are doing this?

- To allow some of TNC's and our partners' best and most productive scientists to present new science, ideas, papers and inspirational talks for critique — and to give them feedback on improving their presentation skills.
- To expose senior management at WO, donors and the rest of the Conservancy to those ideas.
- And to continue building a culture of science at TNC.

The event will span two days: 12p-5:30p on the 26th,and 10a-2p on the 27th. We hope to do this at least annually if it's successful.

What we are looking for:

- 20-minute presentations on the coolest science TNCers are part of or are applying to a big conservation challenge;
- 20-minute presentations of in-process or recently published TNC-authored papers that could shift the way conservation does business;
- Suggestions for panel discussions or debates on issues in conservation science or practice.

Look for a lineup in November's *Chronicles* and on CONNECT. If you have suggestions for talks or debates, please let me know at your earliest convenience at rlalasz@tnc.org. **SC**

Which Journals Does TNC Subscribe To...and How Can I Access Them?

By Jon Fisher

Finding out which journals TNC has access to has traditionally been a slow and arduous process, since you have to click through each of the journal stores and search within them one by one. I'm pleased to announce that we now have a new page that lists all of the journals we have access to, in one alphabetical list:

https://connect.tnc.org/Departments/CentralScience/Lists/TNC_Science_Journals/Allitemsg.aspx

To browse any of the journals, just click on the journal name. Hopefully this will be a time saver for those of you who regularly go hunting for journal articles. Questions about which journals we subscribe to should be addressed to Lynne Eder. **SC**

Year-End Book Review Issue: Holy Chimney Slide, It's Almost Here!

By Bob Lalasz

Help the TNC world make its year-end book-gifting decisions by writing a book review (or more than one) for the December all-books issue of *Chronicles*. Please send your 250-word reviews of any book — fiction, non-fiction, textbook, cookbook, instructional manual — to rlalasz@tnc.org, and I'll edit and include them. (Please also give me a heads-up of what you'd like to review before that, so I can make sure there aren't any duplicates.) **SC**

New Journal: *Ecosystem Services*

By Bob Lalasz

Elsevier has announced a new journal, *Ecosystem Services: Science, Policy & Practice*. Elsevier says the aims of the journal are:

(1) to improve our understanding of the dynamics, benefits and social and economic values of ecosystem services,

(2) to provide insight in the consequences of policies and management for ecosystem services with special attention to sustainability issues,

(3) to create a scientific interface to policymakers in the field of ecosystem services assessment and practice, and

(4) to integrate the fragmented knowledge about ecosystem services, synergies and trade-offs, currently found in a wide field of specialist disciplines and journals.

Jen Molnar, the director of TNC Central Science's Sustainability Science Team, is on the editorial board and happy to answer questions about submissions. **SC**

New Conservancy Publications

Conservancy-affiliated authors highlighted in bold.

Please send new citations and the PDF (when possible) to: pkareiva@tnc.org and 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.

Agostini, V. N., H.S. Grantham, **J. Wilson, S. Mangubhai,** C. Rotinsulu, N. Hidayat, A. Muljadi, Muhajir, M. Mongdong, A. Darmawan, L. Rumetna, M.V. Erdmann, and H.P. Possingham**.** 2012. *Achieving fisheries and conservation objectives within marine protected areas: Zoning the Raja Ampat network*. The Nature Conservancy, Indo-Pacific Division, Denpasar. Report No 2/12. 71 pp.

Fisher, J. and B. Dills. In press. Do private conservation activities match science-based conservation priorities? *PLoS ONE*.

Hastings, J., S. Thomas, V. Burgener, K. Gjerde, D. Laffoley, **R. Salm** et al. 2012. Safeguarding the blue planet: Six strategies for accelerating ocean protection. *Parks* 18(1).

Kendy, E., C. Apse, and **K. Blann**. 2012. A practical guide to environmental flows for policy and planning, with nine case studies from the United States. The Nature Conservancy. http://conserveonline.org/workspaces/eloha/documents/practical-guide-to-environmental-flows-for-policy/view.html.

Kendy, E., M.P. Smith, J. Higgins, G. Benjamin, T. Hawes, K. Lutz, D. McGrath, and **M. Reuter**. 2012. TNC's whole-system freshwater conservation projects. Email ekendy@tnc.org.

Keppel, G., C. Morrison, H. Hardcastle, I.A. Rounds, I.K. Wilmott, **F. Hurahura**, and P.K. Shed. 2012. Conservation in tropical Pacific Island countries: Case studies of successful programmes. *Parks* 18(1).

Konisky, R.A. 2012. Role of simulation models in understanding the salt marsh restoration process. In C.T. Roman & D. M. Burdick, eds., *Tidal Marsh Restoration: A Synthesis of Science and Management*. Washington, DC: Island Press.

Maypa, A.P., **A.T. White,** E. Canares, R. Martinez, R.L. Eisma-Osorio, P. Allno, and D. Apistar. 2012. Marine protected area management effectiveness: Progress and lessons in the Philippines. *Coastal Management* 40(5):510-524.

Minckley, T.A., **D.S. Turner**, and **S.R. Weinstein**. In press. The relevance of wetland conservation in arid regions: A re-examination of vanishing communities in the American Southwest. *Journal of Arid Environments*.

Rau, G.H., **E.L. Mcleod**, and O. Hoegh-Guldberg. 2012. The need for new ocean conservation strategies in a high-carbon dioxide world. *Nature Climate Change* 2(9).

Redford, K.H., **C. Groves**, R.A. Medellin, and J.G. Robinson. 2012. Conservation stories, conservation science, and the role of the intergovernmental platform on biodiversity and ecosystem services. *Conservation Biology* 26(5):757-9.

Schilling, K.E., C.S. Jones, A. Seeman, E. Bader, and **J. Filipiak**. 2012. Nitrate-nitrogen patterns in engineered catchments in the upper Mississippi River basin. *Ecological Engineering* 42:1-9.

Shinneman, D.J., B.J. Palik, and **M.W. Cornett.** 2012. Can landscape-level ecological restoration influence fire risk? A spatially-explicit assessment of a northern temperate-southern boreal forest landscape. *Forest Ecology and Management* 274:126-135.

van Lavieren, H., **M. Spalding**, D. Alongi, M. Kainuma, M. Clüsener-Godt, and Z. Adeel, 2012. *Securing the Future of Mangroves. A Policy Brief.* Hamilton, Canada: UNU-INWEH, UNESCO MAB with ISME, ITTO, FAO, UNEP WCMC and TNC.

van Woesik, R., P. Houk, A.L. Isechal, J.W. Idechong, **S. Victor**, and Y. Golbuu. 2012. Climate-change refugia in the sheltered bays of Palau: analogs of future reefs. *Ecology and Evolution* doi: 10.1002/ece3.363.

White, M.A. 2012. Long-term effects of deer browsing: Composition, structure and productivity in a northeastern Minnesota old-growth forest. *Forest Ecology and Management* 269:222-228.

Withey, J.C., J. J. Lawler, S. Polasky, A.J. Plantinga, E.J. Nelson, **P. Kareiva** et al. 2012. Maximising return on conservation investment in the coterminous USA. *Ecology Letters* doi: 10.1111/j.1461-0248.2012.01847.x.

Wong-Perez, K.J. and C.L. Thaler. 2012. Measuring the success of the Management Capacity Building Program for marine protected areas in the Gulf of California. *Knowledge Management for Development Journal* 8(1):93-104.