SCIENCECHRONICLES

July 2011

Image credit: hmluker/Flickr

Whole Systems, Re-orgs and the B-Word

Editor's Note

By Bob Lalasz

Try this next time you're bored: If the Nature Conservancy were a hotel, what kind of hotel would it be?

Stop rolling your eyes, because our colleague Janine Wilkin led my Central Science teammates and myself through a similar exercise at our recent team retreat, and it was eye-opening. First, think of your favorite brand, she said. (A lot of us chose Patagonia or REI. I thought of Apple, even though the MacBook Pro I'm typing this on has an increasing tendency to go completely unresponsive without warning. Now *that's* branding.)

Then Janine said: Close your eyes and imagine that your favorite brand has just built a hotel, and you're inside it. What does it look like? What's the décor? What's the staff wearing? What's on the restaurant's menu? What do the guests look like? What do you feel like walking around the lobby?

Of course, it's easy to imagine an Apple hotel, a Patagonia hotel, a BMW hotel, maybe even a McDonald's or an Under Armour hotel. The identity of those brands is three-dimensional; in a sense, we are already walking around inside them.

And, of course, it's not so easy to imagine a Nature Conservancy hotel… which was something of the point of the exercise. (Khaki shower curtains? A fleece-lined whirlpool? Maybe once. But not so much anymore.)

In an important sense — and you might be sick to death of it already — it's this lack of agreement over our shared identity for the organization that we keep coming back to these days at the Conservancy, the chew toy of so many of our conversations, debates, resentments and internal politics. Yes, the Global Challenges/Global Solutions framework promises to resolve the tension as we implement it. But, like patients in therapy, we seem to need to keep talking through what's in and what's out, bridging from what we were to what the world demands we become, figuring out which pieces of our identity to bring with us.

"Like patients in therapy, we seem to need to keep talking through what's in and what's out, bridging from what we were to what the world demands we become, figuring out which pieces of our identity to bring with us."

Bob Lalasz

That's not the work of a mission statement, a vision statement or even a matrix, in my opinion — they're necessary, but not nearly sufficient. Instead, it's the work of specific essays, specific statements, specific turf-staking and dialogue — like the three main pieces of this issue.

I'm thrilled to publish the whole systems conservation paper, which is a critical manifesto — or as Karen Anderson put it in her reaction (which comes after the paper), a compass to guide us forward, at least in our North American work. But the writer in me really loves the pieces by Sally Palmer and Jim Moore, which to my ear encapsulate the torn state of the Conservancy's collective psyche — split between past and future, cognizant of the need to evolve, but not wanting to throw out "the darter with the bathwater," as Sally puts it. Read them all. Then: your serve.

Bob Lalasz is director of science communications for The Nature Conservancy.

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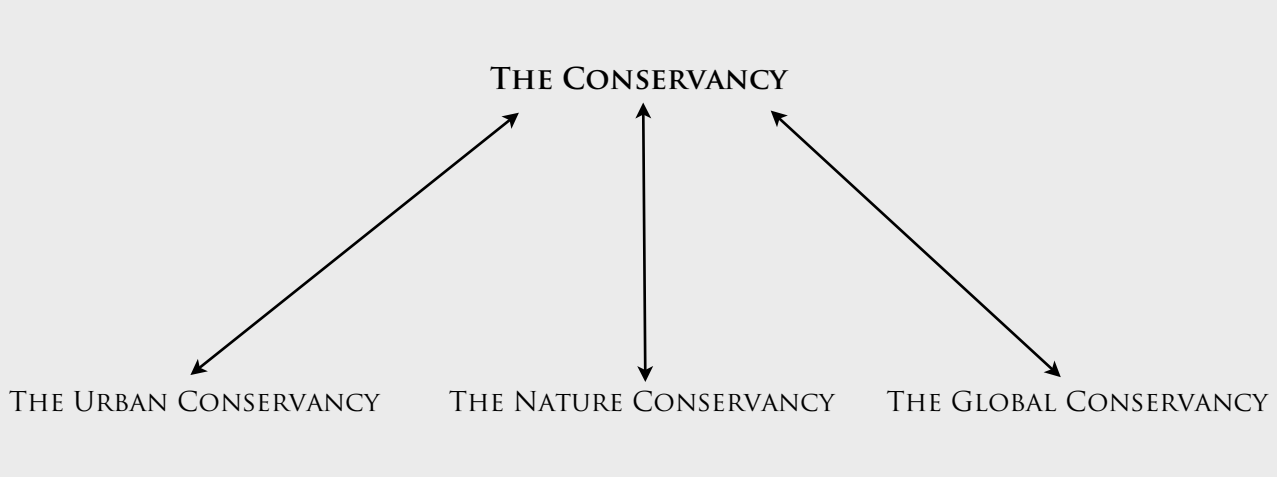
Viewpoint
People and Nature: A Modest Proposal

By Jim Moore, Mojave Desert ecoregional ecologist, The Nature Conservancy



As I listened to a recent Nature Conservancy "townhall meeting" discussing the pros and cons of a "new" approach to our organization's mission, I'm struck by the didactic nature of those who voice their opinions one way or the other on the subject. There is a strong, emotional, visceral tone to their arguments — now 60 years on from the initial musings that started this organization, by wealthy white men wanting to save their favorite fishing stream.

I can also understand the issue just as viscerally from both sides of that argument, and thus I am compelled to outline my synthesis here for others to shoot at or mull over. The way forward for the Conservancy might need more than just a mission renovation; it might require an organizational and structural rethink as well.

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Discuss this article on the Conservation Gateway.

As I am frequently lumped into the science category of our work at TNC — although I greatly prefer the term *naturalist* to describe how I approach my job — I bristle at the thought that we must somehow make humans even more successful in their dominion over the lands and seas of our planet. After seeing how greedy a species we are and how short-term our thinking is, I know that the self-control mechanisms for humans to live in harmony with nature just don't appear to be there on a larger population scale.

I read how locals in the Amazon River basin are catching and chopping up the endemic and endangered pink river dolphin into catfish bait to increase their economic bottom line. I have seen the wholesale clearing of Bornean rainforests to plant monocultures of oil palm trees under the guise of green biofuels production. I am

watching the new gold rush of solar energy facilities being planned across the deserts of the western United States, which will convert intact landscapes into oceans of reflective mirrors and photovoltaic panels to reduce greenhouse gas emissions and garner the support of those environmentally minded citizens who get their information from *USA Today* and Fox News. And I wince when I hear projections that making all societies more affluent will result in lower per capita birth rates. Humans are simply no good at such self-regulation without severe, immediately evident penalties to back it up. *Some* people are….and *some* societies are…but the species that dominates and exacts its will on this planet and its ecosystems is not.

But as a community-based conservation practitioner, I also see the value of making conservation relevant to the common person. For example: After years of struggling to make an endemic amphibian valuable to a mining community in the middle of the Mojave Desert, we struck on the theme of reliable, clean water for a desert town. Who knew *that* would be important? Urban planners knew, but we weren't asking them…we were talking to ourselves about the genetic importance of metapopulations and the need to categorize everything into threats. We held meetings of scientists to list what the factors needed by the species and its habitat were and how we could best protect them from people. We forgot at the beginning that the people, while causing some of the problems, were also the fastest, cheapest, most enduring way to solve the problem — as long as we framed the issue correctly. Forget the toad. Talk about reliable groundwater supplies in an oasis on the edge of Death Valley. The arguments died away. The resistance subsided. People could relate to that message, and thus they could support it. We get what we want: appropriate habitat creation, ecosystem restoration and groundwater protection. Residents get what they want: lush green shady areas that protect properties from damaging flash floods and that recharge groundwater tables from which people draw their drinking water.

"How do I react to this new framing of the Conservancy's mission in terms of people and nature, in harmony, hand-in-hand singing Kumbaya while a bevy of new donors open their wallets to support our work? I sense desperation in this rebranding, but I understand it."

So how do I react to this new framing of the Conservancy's mission in terms of people and nature, in harmony, hand-in-hand singing Kumbaya while a bevy of new donors open their wallets to support our work? I sense desperation in this rebranding, but I understand it. The demographics are not encouraging for our current mission and the statistics are not bright when we take stock of our current conservation footprint on this planet compared to the current rate of habitat loss and degradation. Obviously something has got to change…or we go the way of other dinosaur movements and corporations who couldn't bring themselves to adapt in time to the changing economies, demographics and trends.

But I am reminded that pocket watches still sell by the hundreds on EBay every day in the age of smartphones. "Handcrafted" still has panache in the age of digital production. The old ways of doing things need not be tossed aside wholesale in order to diversify our brand or our product. Think globally while we continue to act locally. Use the short-term motivations of people and societies to inculcate the ethic of long-term conservation of our natural resources. Recognize that, while a family in New Hampshire may choose to stop at two children when its basic needs are met, that does not mean a

family in Uganda will follow suit — even if malaria is eradicated in their region or clean water and reliable fuels are made available to them. "One size fits all" will not work in this new, flat, hot, crowded world of ours. But producing small, medium and large may be just what is needed for the Conservancy to survive.

Imagine an urban division of TNC; an ecosystem and landscape conservation core; and a global issues division — all three working in scaled harmony and supporting the whole, now called "The Conservancy" (see box at the beginning of this piece). We would retain our current members (and committed staff) while bringing in new, younger, diverse members and a whole new cadre of bright-eyed employees to think outside the box and create the next Google or Facebook of the environment. Any new revenue brought in would support our historic core mission of saving "the Last Great Places" and the "Last of the Least and Best of the Rest" while enabling innovative approaches to engaging the youth of this rapidly changing world. Our struggling international program could implement conservation approaches that are at scale, appropriate and proper for the cultures where they work without having to worry whether they will pay for themselves.

"The Conservancy" — that's how we are already referred to more often than not, so why not embrace it? After all, as a colleague of mine recently noted, Coke didn't abandon its trademark drink in order to bring in new, younger, or healthier-minded customers. It simply diversified its product line with different divisions to serve the new, growing customer base wanting amped-up extreme beverages or healthy, simple, flavored waters.

Now that's a vision and a mission I can wrap my bifurcated mind around! **SC**

Viewpoint
Honk if You *Still* 'Heart' Biodiversity

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

While working for The Nature Conservancy over the last decade or so, I have grown very accustomed to our ever-changing organizational structures, networks, programs, logos, tag lines, goal-settings and priorities (just to name a few). "Comfort with ambiguity" is not just a desirable attribute in a Conservancy employee; it is an essential survival skill.

Sally Palmer has been in love with the people and nature of Tennessee...for a while now. Email her: spalmer@tnc.org

Image: Interior, American Museum of Natural History, New York City. Image credit: Dano/Flickr.

For the most part — and despite the chronic ambiguity — I believe that the changes TNC has made over these years are gradually positioning our organization to work more effectively with all sorts of partners to attack the most critical conservation challenges at hand today. I do, however, feel compelled to address what I see as a fracture in our current dialogue that could threaten our forward progress.

Ever since the concept of "ecosystem services" began circulating within the Conservancy, staff have been confused about what these services even are, much less how we incorporate them into our traditional conservation plans and strategies. And now we are entering a phase of the dialogue where some in the Conservancy are

questioning why TNC would continue its traditional emphasis on "biodiversity" instead of emphasizing how natural systems support the health, safety and security of human populations.

In the midst of these new conversations, I am hearing colleagues question whether investments in "biodiversity" even matter, or should be a focus of our organization. This train of thought can be not only inaccurate, but also dangerously distracting, because it can undermine some of the best parts of our foundations as a global conservation organization.

In Peter Kareiva's musings on biodiversity & people for the May 2011 issue of *Nature Conservancy* magazine, he criticizes some of our worst habits as conservationists — including focusing on isolated "hot spots" and thinking that we can just build big fences around things and call it a career. He also emphasizes the need to think creatively about how we engage all sorts of new constituencies in our efforts.

But to say that the Conservancy must have other targets for our work besides biodiversity is very different than saying we should no longer target biodiversity at all. Biodiversity loss is a critical conservation challenge, whether or not most people understand the word "biodiversity." Most people don't appreciate the implications of climate change either, but we aren't exactly shying away from tackling that problem head-on.

Yes, We've Had Our Own Problems With 'Biodiversity'

Admittedly, how we define "biodiversity" and what we are trying to do for it have not been simply external communications issues for the Conservancy. We've done at best an inconsistent job within the Conservancy articulating what the term means. Part of the problem has had its origins in our current mission statement and the methods we utilized in developing most of our ecoregional plans.

"Biodiversity loss is a critical conservation challenge, whether or not most people understand the word 'biodiversity.'"

For about 15 years, the Conservancy has done a decent job (at least in the United States) of identifying our "plant, animal, and natural community" targets. We've set goals for their conservation. We know which ecoregions have more species and communities than others. We've made all sorts of maps. But these species and community targets are not and never were fully representative of an ecoregion's "biodiversity," just our best articulation of the most distinctive (and often rarest) parts we can easily see and define. We can't see genes (without help); fungi are ugly (to most of us); and it's hard to wrap our minds around a "natural community" as experienced by a sea turtle.

In addition, many of our plans — often depending on when they were written — considered the targets they addressed in isolation of the multi-scale ecological processes that influence the existence and persistence of those targets in a particular locale. And, in many cases, it is precisely these multi-scale processes that human activities tend to

manipulate for purposes other than biodiversity conservation. We identified these manipulations as "threats" — but we often did little to articulate how they manifest themselves across the landscape…and how attempting to reshape them could help achieve biodiversity conservation goals.

But Biodiversity is Still Critical to Our Future — As a Planet, As an Organization

To be certain, there are definite shortcomings in our past conservation planning methods and strategic approaches. But questioning whether biodiversity even "matters" ignores the massive strategic value we've gained from 60 years of biodiversity conservation. At best, we should use such a question to refine our goals and the implementation of our biodiversity conservation strategies. At worst, skepticism about biodiversity causes us to lose our focus on those biodiversity elements we have successfully defined and executed strategies to conserve — knowledge and strategies that we will need to meet the challenges of the future. Without maintaining that focus, we simply won't ask the tough questions that need asking.

For instance, while "maintaining the current species richness" of a certain location may be a wholly inadequate conservation goal in the face of climate change, so is "improving floodplain function" when it is disconnected from the questions of "for what?" (species, natural community) or "for whom?" (people). And when we discuss achieving better organizational returns on investment, which "returns" do we expect, and how should we measure them? These are all tough questions — for science and for our values. But dismissing the value of biodiversity puts us in a much poorer position — an intellectually impoverished position — to answer such questions well.

Ecologists know that oversimplifying complex natural systems can lead to dysfunctional outcomes, although we often struggle to define those outcomes concisely. We also know that extinctions are happening right now, will continue to happen — and that there's not much any intervention can do to reverse them. These realities suggest that the Conservancy faces a slew of critical questions that require a continued focus on biodiversity, such as:

"We have some serious choices to make about where, how and with whom we invest as an organization. But those serious choices all involve serious considerations of biodiversity."

- How should we define "resiliency" for ecological systems, and "resilient" for what purposes?
- What do current patterns of species richness and diversity have to teach us about potential future resiliency?
- Which species may go extinct and which ecological systems lose their integrity, given predicted climate impacts and human population shifts?
- Where do we have hope for successful engagement, where might our attempts ultimately fail, and how will we measure these things?

There is a vast difference between (a) making conservation investment choices once these types of questions have been addressed, and (b) determining a priori which investments ought to be made based on old assumptions and habits. We have some

serious choices to make about where, how and with whom we invest as an organization. But those serious choices all involve serious considerations of biodiversity.

Tinkering with Methods, But Keeping the Parts

I've been very fortunate in the last six months to attend several gatherings of my Conservancy colleagues. Many of us are struggling to improve and advance our work at multiple spatial scales, with a variety of new approaches and partnerships. During this time, I've yet to hear a single one of my colleagues articulate that biodiversity targets were not an important focus of their strategic investments.

Rather, I believe the leaders among us are being creative at utilizing the old Conservation Action Planning concept of "nested targets." Under this approach, elements of biodiversity are priority targets, but they are becoming conceptually nested within the larger landscapes in which they have always occurred, landscapes that in the past we've been less explicit in defining. Employing the concept of biodiversity elements as nested targets within functional (and dysfunctional) ecological landscapes is empowering a wide range of conservation partnerships and strategic experiments. We are also just beginning to grasp the complexities of incorporating metrics of human well-being into how we evaluate our conservation successes and failures.

One of my favorite take-away messages from the recent Global Freshwater Conference was from our new colleague, TNC Senior Social Scientist Supin Wongbusarakum. She reminded us that not all situations will be win-win. Some will be win-lose. This is the case both for biodiversity and for human communities. I struggle to accept the reality of win-lose, but I hope we can live in that reality together by doing the best we can with the choices we have to make — and at least reverse the trend of lose-lose that we witness in many circumstances today. And, as Supin also reminded us, learn from our mistakes.

Discuss this article on the Conservation Gateway.

I guess I fall into the camp of the hopelessly biodiversity-besotted, but maybe I'm less myopic these days. I can say that one of my biggest professional mistakes so far has been trying to keep score by how many species I still have in my own backyard. (Alabama has more freshwater species, but y'all have also had more extinctions, so there!). I do consider it a positive sign of intellectual development that I don't believe there is such a thing as "Nature" anymore, but I still want to work for The Nature Conservancy. I believe that our conservation approaches have got to evolve in a way that helps transform humanity's relationship with the natural world. But I have to tell you that, as the Conservancy seeks to be a leader in this evolution, we really should take special care not to throw out the darters while saving the bathwater. **SC**

Article

Stepping Up to the Challenge: A Concept Paper on Whole System Conservation

By Joni Ward*, Vera Agostini, Mark Anderson, Catherine Burns, Patrick Doran, Joe Fargione, Craig Groves, Lise Hanners, Jon Hoekstra, Rob Marshall, Scott Morrison, Sally Palmer, Doug Shaw and Jo Smith, The Nature Conservancy**

In a nutshell:

- **What is our purpose?** We intend to foster a broader dialogue in the Conservancy about the benefits and tradeoffs of the whole system approach.
- **Why focus on whole systems?** The scope and magnitude of today's conservation challenges mean that we can no longer afford to limit our conservation practice to collection of sites.
- **What is a "whole system"?** It has a recognizable unifying ecological feature and includes people. It must be large enough to maintain resilience, sustain key ecological processes and services, and allow for movement of organisms within and through it. It includes conservation areas with high ecological integrity surrounded by a matrix of lands and waters that vary in quality but are important for conservation.
- **What is "whole system conservation"?** This approach considers the needs of people and an increased emphasis on managing the matrix of lands and waters surrounding portfolio sites. It also requires working at multiple scales, managing for connectivity and a permeable landscape, and tying policy solutions to place.
- **What's different?** Our conservation strategies need to evolve beyond protecting a network of preserves to include strategies based on maintaining ecosystem function and services.
- **What is success?** Success will require the design and execution of strategies to ensure that a whole system can self-maintain its key ecological functions and continue to provide ecological services over space and time. It will be measured by our ability both to build support and capacity with people and institutions to carry out this vision, and to demonstrate that the public sees the relationship between the economy, environment, and our overall welfare.

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In its 60-year history, The Nature Conservancy (TNC) has continually worked to improve its methods and strategies to achieve its mission. We have expanded our conservation footprint from acres to bioreserves to functional landscapes, and we should be proud of our conservation achievements. However, as the first decade of the 21st century comes to a close, the impacts of global climate change and the growing human footprint are upon us. We are challenged to respond to the large-scale disturbances associated with these impacts while recognizing the increasing importance of trying to maintain the ecological function of landscapes, seascapes and watersheds. The Conservancy now has the organizational capacity (a $270 million annual operating

budget and 2,700 staff in the United States alone) to address complex problems — such as altered river flow or fire regimes across large areas — that have long represented barriers to mission success. Taken together, these factors compel us to step up to the conservation challenges we face today. In a growing number of places across North America, we are finding that these challenges are best confronted using a "whole system" approach.

In the remainder of this concept paper, we outline the rationale for whole system conservation, define some of its characteristics, discuss the implications for the Conservancy's work, and suggest what success may look like. Our aim is to foster dialogue about (a) the benefits and tradeoffs of the whole system approach, (b) the uncertainties around the science and strategies, and (c) how we may align our work to meet the challenge. It should be noted that this document largely reflects experiences drawn from TNC staff based in the United States and is not meant to represent our international programs.

Why Focus on Whole Systems?

Why are some TNC programs developing goals and organizing their work at larger scales? The short answer is that we can no longer afford to practice conservation within state lines or among a collection of sites. Whether it's the long-distance dispersal of marine larvae, the massive restoration effort needed in response to the Gulf oil disaster, proposed energy development projects across large regions, or the need to redress the problem of ecological flows across entire river basins, the lessons are the same. The solutions to complex conservation problems are increasingly at scales that require the Conservancy to work collaboratively across our own programmatic borders and with key partner institutions.

****The authors acknowledge that much of what we describe here is not new to conservation, and indeed has been in practice for years by our many partners, our international Conservancy colleagues, and (in some cases) domestically as well. Our intent is to build upon that foundation of work to promote further discussion about the whole system approach.**

In many respects, we understood this over a decade ago when we transformed the way that we looked at the world — portfolios of conservation areas in ecoregions — and emerged as a leader in large-scale conservation planning. As the human footprint has grown in scope and magnitude, we now realize that achieving conservation in portfolios of priority areas is necessary but not sufficient. Our strategies must transcend portfolios. We need a greater emphasis on the surrounding matrix of lands and waters that vary in quality from mostly natural to working lands, and the large-scale process and functions that sustain biodiversity across these regions.

The scientific framework for whole system conservation is compelling, but there are equally important economic, social and political dimensions to our work. The global economic collapse of 2008 and subsequent recession and belt-tightening in our own organization as well as within key state and federal agencies means that partner capacity has been reduced, traditional funding sources have been trimmed or eliminated altogether, and the basic infrastructure that kept conservation moving forward is being rethought. All sectors of society are being forced to consider how they can conduct their business in a sustainable fashion in this rapidly changing world. We know that the near

future will be very different from our recent past. More than ever, our work must be seamlessly melded with the workings of human institutions. Whether it's the Central Appalachians, the Colorado River, or the Great Lakes, the theaters in which the Conservancy and others are now operating are being determined not only by ecological boundaries and problems, but also by the identity and culture of their human residents.

Working in whole systems is not about abandoning past efforts and successes or moving away from species or ecological community conservation; it is about working towards a more resilient and long-term strategy for their conservation. We envision a future where the ecological stage takes precedence over the actors; and by better connecting people and nature, conservation becomes part and parcel of the larger societal transformation underway.

What is a Whole System?

Whole systems encompass the geographical and ecological complexities inherent in the natural world. While there is no simple formula for defining a whole system, e.g., a whole system in one part of the world may look very different from one elsewhere, there are attributes that can be used to identify whole systems in any region.

A whole system will include the following attributes:

- *Terrestrial, freshwater and/or marine habitats* as well as their inherent interactions.

- *People* as an integrated part of the whole system.

- A recognizable, *unifying ecological or physical feature* such as the Great Lakes, the Colorado River Basin, the California Current, Gulf of Mexico, or the Appalachian Mountains.

"Why are some TNC programs developing goals and organizing their work at larger scales? The short answer is that we can no longer afford to practice conservation within state lines or among a collection of sites."

- Sufficient size to *sustain ecosystem services* that human communities rely on as well as key ecological processes, including disturbance regimes, water filtration and purification, nutrient cycling, complex food webs, hydrological flow regimes and upwelling patterns in marine systems.

- Allows for *movement and migration* of organisms through the system. This should include movement within as well as between terrestrial and aquatic components of the system.

- Sufficient size to be resilient to significant disturbances. *Resilience*, or capacity to change while still maintaining the fundamental identity of the system, will ensure that conservation efforts are successful despite the inevitable changes that the coming decades will bring to these systems. It also means that some attributes of the whole system, such as species composition, will not remain static, but will change through time.

• Conservation areas of high ecological integrity surrounded by a *matrix* of lands and waters that vary in quality but are critical for providing habitat, increasing effectiveness of protected areas, and contributing to connectivity.

Several attributes of whole systems are worth highlighting:

• The first is *the inclusion of people*. All of nature is influenced by humans. Acknowledging and incorporating the needs of people is fundamental for identifying strategies that will improve the long-term health of whole systems.

• Second, *the size of a whole system is defined by its dominant ecological features and functions*; therefore, a whole system could cover an extensive geographic area such as the Central Appalachians, or it could be more localized such as the Delaware Bay. However, correctly defining the outer boundary of a whole system is ultimately a distraction. It is more important to understand the system's unifying features and functions, because those are the attributes we want to maintain through time.

• Finally, *we emphasize ecological processes in our definition of whole systems*, in part because most of TNC's work has historically focused on maintaining only one attribute of whole systems — species composition — when structure and function, or process, are also important. These three attributes are interrelated; however, species composition is heavily influenced by ecological processes, whereas ecological processes can often be maintained in the face of at least some altered composition. Accordingly, we propose that ecological processes be considered first among equals as attributes of whole systems that can result in a renewed focus on process or function in our conservation approach.

"We envision a future where the ecological stage takes precedence over the actors; and by better connecting people and nature, conservation becomes part and parcel of the larger societal transformation underway."

How Do We Implement Whole System Conservation?

Understanding the attributes of a whole system is most helpful when it pushes us to reconsider our conservation strategies. Below, we list a suite of considerations for designing whole system conservation projects.

• *Manage the matrix of lands and waters between conservation areas*. The portfolio will continue to be important, but more attention should be given to management of the matrix of lands and waters surrounding areas of high ecological integrity so that the ecological processes that maintain biodiversity and provide ecosystem services are sustained.

• *Manage for landscape connectivity and permeability*. Maintaining connectivity will require identifying key linkages where animal movement may be concentrated as well as the barriers that may prevent that movement. Permeability is a generalized measure of the degree of barriers within a whole system rather than the movement of a particular species within it. Accordingly, this measure indicates how conducive a landscape is overall to range shifts, plant dispersal and the ability to sustain ecological

processes. Strategies that target migratory corridors as well as the matrix of lands with varying degrees of human development will help maintain both connectivity and landscape permeability.

• *Include the role and needs of people*. We cannot achieve the Conservancy's long-term conservation goals by continuing to focus solely on the most pristine locations and localized biodiversity hotspots. We must expand our approach to include human activities in working landscapes. This includes sustainable harvest strategies, sustainable forestry certification, improved agricultural practices, and so on. We should also focus on those whole systems that resonate with people, capture their imaginations, and inspire action. Increasingly, effective conservation requires that people within and around the system become engaged in strategies to sustain its long term health.

• *Work at multiple scales*. A whole system is comprised of ecological processes and species that occur and interact at multiple scales. Accordingly, conservation strategies designed without consideration of local to whole system scales will be insufficient to maintain the whole system through time.

• *Tie policy solutions to places*. Recognizable systems provide a visible opportunity for demonstrating the importance of good public policy and legislation to accomplish conservation goals. By linking our national policy work to places of national importance, we are better able to show the importance of conservation for people and nature.

What is Success?

*"In the end, our conservation success will be judged on the persistence of populations and ecosystem processes, rather than the short-term symbolic collection of species in a few small areas."****

The Conservancy has invested millions of dollars to complete eco-regional assessments for much of TNC's North America Region, generating "the portfolio," a vision of the places where conservation action is needed to achieve our biodiversity goals. We are in no way suggesting that a whole system approach to our work replaces or makes that work irrelevant. In fact, ecoregions can be thought of as the Conservancy's first step towards whole system conservation.

Rather, we are suggesting that the current portfolio needs to evolve and expand from an emphasis on place alone to include ecosystem function and dynamics while continuing to preserve the knowledge of important rare species and communities. A rapidly changing climate is causing shifts in individual species distributions, changes in community composition, and alterations in wide-scale processes. The challenge is to build on our ecoregional portfolio foundation and develop a conservation plan that anticipates and allows for dynamics, sustains important functions and processes, and

***Salomon, A.K., J. L. Ruesink, R. E. DeWreede. 2006. Population viability, ecological processes and biodiversity: valuing sites for reserve selection. Biological Conservation 128:79-92.

maintains biodiversity in current and future forms. By incorporating whole system conservation features into the existing portfolio, we will have an updated and more durable vision of success (Figure 1).

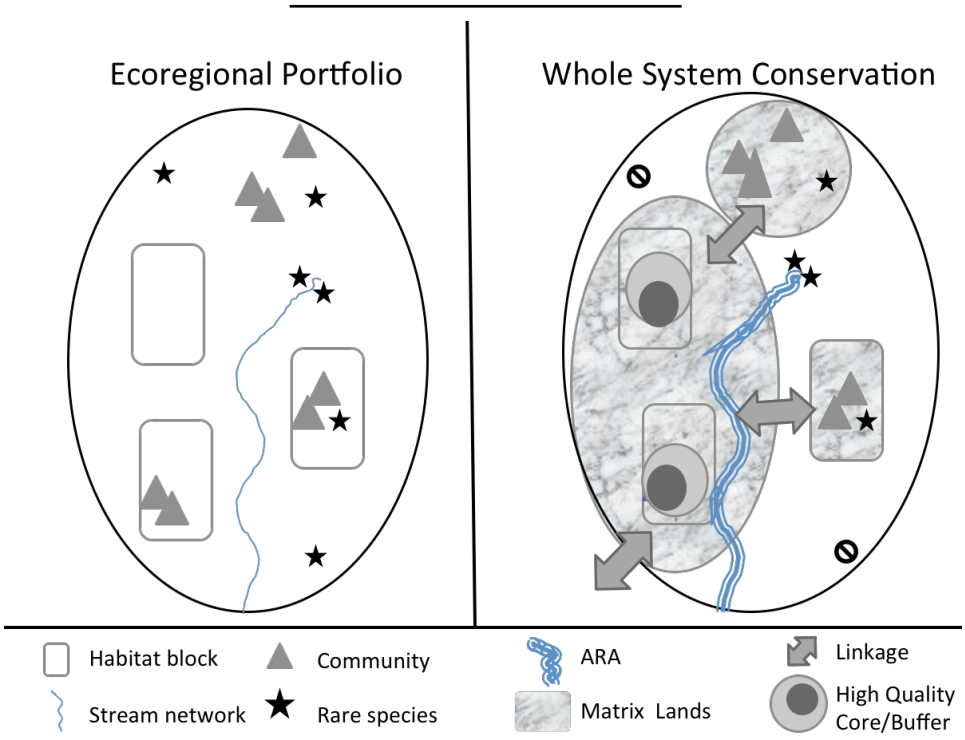

Figure 1. Illustration of how the application of whole system principles changes the traditional ecoregional portfolio. The whole system conservation vision incorporates active river areas (ARA), key linkages, conservation areas with high ecological integrity placed in blocks of habitat and surrounded by matrix lands and waters of varying quality. Small areas that are not resilient are removed (shown by ⊘).

Determining Whole System Project Success

The whole system approach to conservation leads to goals that focus on maintaining system dynamics, sustaining ecological function, and delivering benefits to people; the ultimate measures we design should reflect those goals. Many of TNC's whole system projects are less than five years old; consequently, development and implementation of robust measures remain a work in progress. For now, the near-term effectiveness of Conservancy actions and strategies within our whole system projects are being tracked using intermediate results and strategy effectiveness measures following established Conservancy guidance and standards.

With the permission of TNC's Colorado River Program, here we offer our proposal for how long-term measures might be constructed to mark achievement of conservation goals for this whole system.

Colorado River

The river, stream and riparian habitats of the Colorado River provide essential habitat for iconic and threatened species such as the southwest willow flycatcher and humpback chub. The river also provides vital water supplies for millions of people in the southwestern United States. Over-allocation of water and alteration of natural flow regimes threaten to degrade both the quantity and quality of habitat available for species; they also undermine the Colorado River's ability to support the human populations who depend on it. The Conservancy's Colorado River Program is developing an integrated suite of strategies that will operate at multiple scales to protect essential fish and wildlife habitat, restore more natural stream flows, and help reduce water demand. Each strategy can and should have appropriate strategy effective measures to ensure that Conservancy actions have desired intermediate outcomes.

Long-term whole system measures for the Colorado River system may include:

- *Water availability (supply) relative to water use (demand)* — having supply consistently exceeding demand is a necessary condition for success.
- *Percent of river restored to natural flow regimes* — increasing this percentage, especially in tributaries and stretches of ecological importance, marks progress toward a more functional and dynamic system.
- *Viability of fish and flycatcher populations* — these are the species that distinguish the Colorado River system from other river systems and so are essential "parts" of the whole system.

Read and discuss the concept paper and its full appendix (with more examples like the Colorado River system) on the Conservation Gateway.

Note that the hypothetical measures we put forward for the Colorado River are really indicators of whole system function, dynamics and human benefits. Rather than attempt to define a comprehensive set of measures that describes all aspects of the state of the whole system, we sought a small number of indicators that represent processes, functions or services considered to be necessary for success. If the indicators point in the right direction, we can be confident that we are at least on the right track to success; conversely, if the indicators point in the wrong direction, then we will know that the sufficiency of our strategies should be reexamined. **SC**

Reactions to 'Stepping Up to the Challenge"

"Conservation is like the Roman Empire: Size does matter, but too big is also a recipe for disaster."

By Karen Anderson, state director, The Nature Conservancy in Washington

First, I want to congratulate Joni Ward and her team for doing a fabulous job on this paper. I really appreciate the clarity, the organization, and the thoughtfulness of how they treated the topic and presented the conclusions.

Here is what I think the paper is telling us: Conservation is like the Roman Empire. At first, the recipe for success was relatively easy: 1. Build big armies of big men carrying big swords. 2. Seize lands and toss out the people. 3. Build fortresses. 4. Damn the unwashed masses. 5. Hail Caesar, the rich white guy.

The recipe began to fail when the empire chose not to adapt to new forces such as Jesus, horseshoes and women. 1. Jesus encouraged embracing and washing the masses. 2. Shoes on horses enabled more invaders to attack faster and from farther away. 3. The "barbarians" brought women along on their campaigns and allowed them to fight, resulting in bigger armies during the day and happy warriors at night.

The Whole Systems paper is telling the Conservancy, the Roman Empire of the conservation world, to heed the similarities in our histories: Threats to our mission are bigger and coming faster than ever before, the masses need to be part of the solution, and women....well, it always comes down to us in the end, doesn't it?

My most favorite sentence in the paper is: "Correctly defining the outer boundary of a whole system is ultimately a distraction." How well the authors understand TNC's culture and the ways we can use minutiae to hold ourselves back! I would caution us not to let any of the multitude of facts that we don't presently have answers to stop us.

Have thoughts on these responses? Post them on the Conservation Gateway.

The paper did raise one question in my mind that the Conservancy still needs to resolve: As the Romans realized, size does matter. But too big is also a recipe for disaster. How should TNC manage a portfolio of work at multiple scales to stay connected to the masses while at the same time fight the invading forces at the right pace and scale?

Lastly, I only have one issue with the paper: It referred to itself (no less than four times) as a "concept" and "means to foster dialog." I'm not sure anyone else has noticed, but we are beyond talking and conceptualizing. We are in the middle of change. So let's recognize this paper for what it really is — a compass to guide us forward — and stop apologizing for being clear, forward-thinking and helpful in a changing world.

"Whole Systems is the only viable political option for conservation in the 21st century."

By Bob Bendick, director, U.S. government relations, The Nature Conservancy

Sadly, there are no longer natural areas in the United States or elsewhere in the world that are unaffected by human industrial activity. With a still-growing global population and the impacts of climate change, those impacts will become more severe. The Whole System approach is the only way to sustain natural processes while meeting inevitable human demands for more services from nature and natural resources. The Whole Systems idea is not only the likely path for from a conservation science perspective, it is the only viable political option for conservation in the 21st century.

In fact, the listening sessions around the United States for President Obama's America's Great Outdoors initiative and studies by the Lincoln Institute of Land Policy and the University of Montana have revealed that there is a growing from-the-bottom-up movement across America for governments, non-profits and landowners to work together to plan for and manage large landscapes and watersheds. The challenge will be for government agencies and large non-profit organizations like the Conservancy to overcome their fragmented and excessively bureaucratic approaches to doing business so that they can support conservation at new scales and to achieve the objective set out in the Whole Systems paper — that those systems becoming "self-maintaining." Accomplishing self-maintaining conservation will take many years for any one large landscape. To be successful, the Conservancy must be prepared for this sort of commitment.

"But is it enough about people?"

By Eddie Game, conservation planning specialist, The Nature Conservancy

At what unit is it most effective to plan and organize conservation? This paper makes the case for a new unit — whole systems. It's a good one, because "unifying ecological or physical features" is certainly a more compelling and intuitive approach than "ecoregions." Probably few Conservancy staff could name many ecoregions beyond those they work in, and yet even as someone who lives on the other side of the world, I could place most of the whole system examples given in the paper. Recognition is strength. Whole systems lie somewhere between the ascetic ecology of ecoregions and the unpredictable patchwork into which humans have decided to divide up the planet. They represent geo-cultural distinctions as much as ecological ones.

But is it enough about people? Something we've learned time and time again in conservation (it just occurred to me how illogical this expression is) is that it's hard to plan on scales that don't also represent geopolitical units. Not impossible, just hard. Ecology rarely provides enough motivation for political cooperation, even in convincing cases like freshwater supply. Take Australia's Murray-Darling river system — it took the federal government to take over the individual state's right's to manage that resource

(effectively creating a political unit at this ecological scale) before anything like progress could be claimed. The same could be said for the Great Barrier Reef. If the Conservancy wants to be effective at the whole-system scale, we need to both organize ourselves along these lines — and more challengingly, demonstrate that there are clear ecological or economic reasons why different political divisions need to work together at these scales.

"It's either whole system conservation or no conservation."

By Peter Kareiva, chief scientist, The Nature Conservancy

Imagine being an ecologist visiting what is now Yellowstone National Park in the year 1700, when the area had a full complement of grizzly bears, wolves, elk, bison and so on. Grizzly bears were at the top of the food web — a keystone species that drove the dynamics of the entire system. Would you as an ecologist decide to ignore grizzly bears and do your studies as though they did not exist? I bet not. Yet that is exactly what conservation has done for the last 30 years — ignoring *Homo sapiens* as a keystone species that is 1,000 times more impactful than the grizzly bears ever were. Conservationists from the West do this because they like to think of nature as something special, even sacred, and hence something to be protected, managed, zoned and admired without acknowledging that protecting any ecosystem means addressing human needs and appetites.

For crying out loud — of course we have to do whole-system conservation. But when we do so, let's think clearly about what it means in terms of the Conservancy's business:

- First, instead of our science staff being 90% natural scientists, we need a staff that is 50% economists and social scientists.
- Second, instead of our objectives being strictly ecological, they also must include social and economic outcomes — to do otherwise is like managing the Yellowstone ecosystem in 1700 and pretending grizzlies do not exist.
- And obviously our ecological or conservation goals will be as much about processes and functions as lists of species.
- And then there is the sacred "conservation portfolio." These portfolios have value in that they help us to prioritize our work. But they can also make it too easy to ignore everything that goes on outside of the portfolio.

So where will whole system conservation take us? By 2020, the Conservancy should be influencing how public and private sectors shape the future of the Great Lakes, the Mississippi Basin, the Yangtze River and the Amazon — and that future has to include plans for economic activities, cities, agriculture and transportation as much as it will include plans for a crazy quilt of special conservation places. The only way for conservation plans to become anything but the desires of a special interest is to make

conservation plans that embrace the broader objectives of society in our large ecosystems.

These changes might seem radical — but they are not. "Marine spatial planning," "ecosystem-based management" and "multi-objective planning" are all steps towards "whole-system conservation." Ideally, whole system conservation takes us even closer to what we need, because the whole is made up of species, ecosystem processes, and human economies and livelihoods — all of which need to be conserved.

Two years ago, Fox News had a heyday chastising conservationists for favoring the California delta smelt over farmers. The response of conservation leaders was to correct the many and expected scientific inaccuracies in the Fox News reporting. What they should have said in response was "We care about farmers' jobs, too" — and show why what's good for the smelt is also good for the farmer. That would be whole system conservation. **SC**

Science Shorts

Paying for Results

Gibbons, J., E. Nicholson, E. Milner-Gulland, & J. Jones. 2011. Should payments for biodiversity conservation be based on action or results? *Journal of Applied Ecology* DOI: 10.1111/j.1365-2664.2011.02022.x

What if The Nature Conservancy only paid landowners for conservation easements incrementally — as they demonstrated that their easements were really doing something for conservation?

This suggestion is exactly what Gibbons and colleagues challenge conservation practitioners to do by showing how private and agency interests interact when we shell out cold, hard cash for nature's benefits.

Paying for results works best in highly degraded systems, according to the authors' model, because monitoring and attribution is relatively cheap and reliable. It also attracts participants who think they are more likely to have success, either because they believe have the best location or better management skills. In contrast, anyone will sign on to get paid for an action that doesn't have to have an effect.

Paying for results is common in the private sector; less so in conservation. We should consider it. We need to start making sure we are really getting what we pay for.

Read this article yourself: http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2664.2011.02022.x/pdf. More commentary on this article: http://www.conservationmagazine.org/2011/06/lets-make-a-deal/

Already paying for conservation results? We'd love to hear your story. Please contact me at jmontambault@tnc.org. SC

— **Jensen Montambault**, conservation measures specialist, The Nature Conservancy

Paying for Results 2

Klemick, H. 2011. Shifting cultivation, forest fallow, and externalities in ecosystem services: Evidence from the Eastern Amazon. *Journal of Environmental Economics and Management* 61: 95-106.

Klemick finds that forest fallow in the Eastern Amazon increased agricultural productivity on farm and downstream on neighboring farms by 0.5-0.7% and 0.1-0.3% per hectare, respectively. Surprisingly, farmers allocated land to fallow at levels high enough to benefit themselves and their neighbors, foregoing R$574 in revenues from not expanding to the individually optimal level. Over-fallowing may be due to limited access to credit or transportation. If these market barriers erode, farmers might expand farms and substitute chemical fertilizers for fallow-based soil nutrients. Policies, such as payments for global climate regulating services, could counteract this trend, but may be difficult to implement in low-capacity settings. However, policies that manage forest fallow for local freshwater regulating services may be supported by local institutions that have some advantages in terms of monitoring and enforcement. This research highlights how understanding the scale of ecosystem services may help identify the appropriate scale for management.

— **Sheila Walsh**, ecosystem services scientist, The Nature Conservancy

Orgspeak

A New Approach to Finding and Sharing Conservation Data (AKA, If You Love Your Data, Set it Free!)

By Jon Fisher, data management specialist, The Nature Conservancy

Most scientists at The Nature Conservancy agree in principle with the idea that we should share our data/analysis/publications whenever possible. But TNC staff are sometimes very particular with how we choose to share it, and as a result it's much harder than it has to be for people to find our information and act on it.

We now have a new approach that can help us overcome this problem.

The approach is based on how the digital world has updated the very appealing idea of a "one-stop shop" that makes it as easy as possible to find what you're looking for. With digital, we don't have to have all of our data stored in one place just to be able to *find* it via one site. For example, Amazon has been successful in part because you can find just about anything there. But they achieve that not with country-sized warehouses filled to the brim with every product imaginable, but by serving as a hub for a huge network of specialty stores to supplement their own products. The shopper doesn't care *which* store is fulfilling their order; they just want a site that handles the details for them.

"Efforts to get multiple organizations to put all of their projects in one system have for the most part failed because we all prefer choices and flexibility. The problem isn't our diversity of publishing venues — it's a lack of good search tools."

The Conservancy and conservation in general needs to follow suit with conservation data, and accept that we're not going to get everyone to contribute all of their information to the same site in the same way. Instead of bickering over who has the best system and proselytizing why we should all use it, why don't we allow for diversity and focus on making it easy to find data wherever it lives? Over time, the systems that are the best for different use cases (e.g., a detailed Conservation Action Plan vs. a paragraph outline of a conservation project vs. a spatial analysis of our priorities, or a beautiful

poster-sized map vs. a quickly sketched "napkin map") should rise to the top if we stay out of the way and let people use the systems that most appeal to them.

One relatively easy place to start is the fact that there are several "competing" (or complimentary) systems for managing conservation projects, each run by a different organization. Efforts to get multiple organizations to put all of their projects in one system (whether ConPro, the Conservation Registry, or others) have for the most part failed because we all prefer choices and flexibility. Imagine if we told our scientists to only publish in a single journal! The problem isn't our diversity of publishing venues — it's a lack of good search tools.

In an effort to make progress towards meeting this challenge, the conservation community now has a new search tool that crawls multiple similar sites (Conservation Gateway, Conservation Registry, Action Atlas, Eco-Index and ConPro) available via ConPro. As a bonus, anyone can easily add the same search tool into their own websites (for free, by copying/pasting 9 lines of HTML), so that no matter where you start you end up with the same broad set of results. We can add new systems (or remove existing ones) in a matter of minutes. Best of all, there's no more begging each other to ship data back and forth. Let the data live in the system that best suits it. Although the tool was created by TNC, there's no TNC branding or bias, and it's available to anyone.

To try it out, you can go to http://conpro.tnc.org/fulltext_search_cse (users get there from the main ConPro search page, which lists "Search Public ConPro Projects and Partner Sites" as an option). Once you perform a search, you can limit results to only one of the sites being searched by clicking on the tabs that appear. You can use "Colorado river" as an example that will return results from multiple sites on the first page of results. Unlike a plain Google search (which has more information on history and recreation than conservation), all the results have relevant conservation information.

Along similar lines, rather than shipping CDs to partners every time our spatial data changes, the Conservancy's Conservation Data & Information Systems unit in conjunction with TIS has made it possible for anyone to view "map services" that always point to the latest information (see http://maps.tnc.org/). Our partners can offer a map seamlessly combining their data and our data, despite the fact that the data is stored in two different places. We don't have to worry about partners republishing out-of-date information — and they don't need to worry about keeping track whenever we make updates. The same data is also available in multiple formats (Google Earth, ESRI's ArcMap, different kinds of web maps, etc.) without the need to manually convert it back and forth between formats.

Email the author:
jon_fisher@tnc.org

Discuss this article on the Conservation Gateway.

These aren't perfect solutions, but they are steps in the right direction. There is currently still value to the conservation community in having data in one system because it enables more powerful analysis. Over time, if we see enough value in analyzing our combined data sets, we can move towards common standards that let us do more. But being able to at least *find* the data wherever it lives is a start. **SC**

Orgspeak

Science Peer Review Help Desk & Quantitative Support (Plus a Ringing Endorsement from a User)

By Jon Fisher, data management specialist, The Nature Conservancy

Most of us working in science can sometimes use input from our peers, but find it a pain to chase people down to get their review. The good news is that there's a service to do it for you, the TNC Science Peer Review Help Desk! So far we've provided review for 24 submissions from across the Conservancy. Plus, we have a new volunteer (a physics Ph.D student) willing to provide direct support for people who want assistance with the quantitative aspect of papers they're working on.

- Have a paper you are working on that you want reviewed with no writing workshop in sight?
- Need help with the statistics or analysis of your data?
- Need feedback on a monitoring plan or protocol?
- Have a cool new science method or tool you want to use, but for which you need a sounding board?
- Been asked to write up the science for your program's business plan and want feedback?

If you answered "yes" to any of the above questions or find yourself in a similar situation to those described, then send your work to the Science Peer Review Help Desk. The help desk is designed for any and all science at TNC. Your submission can be "half-baked" — i.e. just beginning — or nearly done. No matter the stage, you will receive thoughtful feedback from a set of peer reviewers.

Some examples of potential submissions:

- Monitoring plans
- Science that will inform a business plan
- New science methodologies
- Social science methods or approaches
- Draft funding proposals
- Draft papers to be submitted for peer-review
- Potentially high impact science analyses with policy implications

How does it work?

1. Send your submission to the help desk manager (Jon Fisher) at tncsciencehelpdesk@gmail.com and specify what kind of review you're looking for (and/or what kind of quantitative support you need).

2. Jon will send your submission to 2-3 expert reviewers within TNC (and/or put you in touch with the new volunteer).

3. Reviewers will have up to 3 weeks to provide a review.

4. Jon will then send all reviews back to you.

5. Reviewers have the option to remain anonymous.

6. For large file size submissions please use Accellion or another file transfer service. **SC**

Why should you *use the Peer Review Help Desk? Just read these thoughts from a satisfied customer...*

"Hey, I've got an idea…" My colleagues roll their eyes when I make such statements. For instance: I suggested using the Peer Review Help Desk to get some new perspectives on a paper we are writing on agricultural conservation practices. My co-authors were skeptical — "that will take too long," "we don't need any more reviews." But I will admit it: they were wrong! I went ahead and contacted the Help Desk anyway. Jon Fisher responded in record time, got the request out, got married, went on a honeymoon, returned and sent me three reviews in three weeks! We are now in the final stages of incorporating the reviews, all of which were helpful and very similar to the formal journal review process in detail and depth. And just last week...I sent another paper in to the Review Desk.

— **Patrick Doran**, director of conservation science, The Nature Conservancy in Michigan

Announcements

SAVE THE DATE: July 15-18, 2012 for the North America Congress for Conservation Biology (NACCB)

Don't miss this opportunity to attend the most important meeting for conservation science professionals and students working in North America, organized by the Society for Conservation Biology for the San Francisco Bay Area next summer: http://www.scbnacongress.org

This inaugural NACCB — "Bridging the Gap: Connecting Nature, People and Climate" — will provide a forum for presenting new research and developments in conservation science and practice and for discussing today's conservation challenges. The Congress will feature numerous symposia, workshops, short courses and field trips.

Most importantly, these bi-annual conferences will help connect our regional community of conservation professionals and serve as the major networking outlet for anyone interested in North America conservation in years when there is not a SCB international meeting scheduled.

Stay updated on notices about this important conference by joining our mailing list. See you at the conference! **SC**

All-Science TNC Gathering: Call for Posters, Short Talks and Training/Workshops

By Lynne Eder

TNC's "Conservation Science for People and Nature" gathering is quickly approaching and we need more content from you! This is the call for poster submissions, short talk submissions and any additional training sessions or workshops you would like to host for your colleagues. The meeting is being held October 18-20 in Olive Branch, Mississippi, with optional workshops being held before and after the meeting. Session submissions are in the process of being approved and it is looking like it will be wide variety of sessions offered by TNC staff from every aspect of our work. Don't miss the chance to have your work viewed too. The forms needed to submit your work can be accessed at http://www.conservationgateway.org/sites/default/files/Science_mtg_workshop_proposal.doc (for workshop proposals) and http://www.conservationgateway.org/sites/default/files/Science_mtg_posterORtalk_proposal.doc (for short talk or poster proposals). Please note the deadlines on the forms (July 15 for workshops, July 29 for posters or talks) and be sure to submit them to science@tnc.org. It is sure to be great, so we hope to see you there! **SC**

Introducing EAST: The Ecoregional Assessment Status Tool

By Dave Smetana

Ecoregional assessments represent the science foundation of The Nature Conservancy's work and reputation, and the Conservancy is committed to preserving and sharing one of our most important bodies of science-based work.

To that end, we'd like to introduce EAST — the Ecoregional Assessment Status Tool — TNC's online repository for ecoregional assessment information. EAST has become the internal go-to source for our ecoregional assessments and as a result of Major Systems Initiative (MSI) funding, EAST is now available online to conservation practitioners everywhere!!

In addition to TNC ecoregional assessments, EAST's features include:

- **Google (GSA) Enabled Search Engine**, which crawls all assessment information, as well as the entire content of any document uploaded to EAST, and the

EAST Conservation Tools

contents of any web pages hyperlinked in EAST entries. This feature means that the EAST search tool is reaching far and wide to find the content you're looking for.

- **EAST now holds the ecoregional assessment reports and documents!** EAST

now holds all of the reports previously uploaded to ConserveOnline. Contributors and users can now use EAST for complete assessment information management and report storage and distribution.

- **EAST is integrated with the Conservation Gateway!** As information in EAST is updated by practitioners, Conservation Gateway content will also be automatically updated, including links to the reports. The Gateway will be configured soon to consume EAST information so that efforts to share ecoregional assessment information is not duplicated.
- **EAST is spatially-enabled!** EAST users can now click the Map button from any assessment report to open a web map that will show the boundary of the assessment in an online, interactive map.
- Lastly — **EAST is now public!** We've made EAST available on the public Internet so that we can easily share our ecoregional assessment work with the world.

We invite you to check out the new EAST at http://east.tnc.org. As you are key stakeholders in defining, conducting and consuming ecoregional assessment information, we want you to be aware of this comprehensive collection of TNC's most well-known science. Check out your favorite assessments and those of your colleagues, upload missing reports and hyperlinks for your own assessments or updated report iterations, and update contact and other information. **From this point on you can use EAST to store, share, map and promote your ecoregional assessment information with the world!**

When you visit EAST, we invite you to:

- Use the search options on the home page to find your assessments.
- Sign in with your TNC email username and password to edit your assessment information such as its status and team members.
- Check that we have a copy of your assessment report, or upload the latest iteration.
- Try out the **Map** button to see your assessment in a web map, or provide us with a GIS boundary file that we can use to enable the map function for your assessment.
- If you can't find your assessment in EAST, create a new assessment record. EAST holds terrestrial, freshwater and marine assessments.

If you have any questions or comments, please contact **Dave Smetana**, conservation data node manager, TNC-WO and ecoregional and portfolio dataset lead for the Conservation Data and Information Systems (CDIS) Unit, at dsmetana@tnc.org. **SC**

New Modeling Workshop

A "Modeling Patterns and Dynamics of Species Occurrence Workshop" taught by Darryl MacKenzie is being planned for this fall in California. This notice is to gauge attendee interest to help refine dates and location. At present, the 4.5 day workshop will be held the last week of August in Sacramento, California. Course is limited to 20 people. Please see http://www.proteus.co.nz/workshops.html for a complete description of the course and to express your interest (which must be received by August 1, 2011). Course confirmation is contingent upon sufficient interest. For additional questions please contact Darryl MacKenzie at darryl@proteus.co.nz. **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 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.

Escobedo, F. J., **T. Kroeger**, and J. E. Wagner. 2011. Urban forests and pollution mitigation: Analyzing ecosystem services and disservices. Environmental Pollution 159:2078-2087. http://www.sciencedirect.com/science/article/pii/S0269749111000327

Halpern, B.S., J. Diamond, S. Gaines. S. Gelcich, **M. Gleason**, S. Jennings, S. Lester, A. Mace, L. McCook, K. McLeod, N. Napoli, K. Rawson, J. Rice, A. Rosenberg, M. Ruckelshaus, B. Saier, P. Sandifer, A. Sholtz, and A. Zivian. 2011. Near-term priorities for the science, policy and practice of coastal and marine spatial planning (CMSP). Marine Policy. doi:10.1016/j.envpol.2011.01.010

Konrad, C.P., **A. Warner,** and **J. V. Higgins**. 2011. Evaluating dam re-operation for freshwater conservation in the Sustainable Rivers Project. River Research and Applications. DOI: 10.1002/rra.1524

Obura D.O., G. Stone, **S. Mangubhai**, S. Bailey, A. Yoshinaga, C. Holloway, and R. Barrel. 2011. Baseline marine biological surveys of the Phoenix Islands, July 2000. Atoll Research Bulletin 589: 1–62. Read the PDF

Obura D., **S. Mangubhai,** and A. Yoshinaga. 2011. Sea turtles of the Phoenix Islands, 2000-2002. Atoll Research Bulletin 589:119–124. Read the PDF

Ruttenberg B.I., S.L. Hamilton, **S.M. Walsh**, M.K. Donovan, A. Friedlander, et al. 2011 Predator-induced demographic shifts in coral reef fish assemblages. PLoS ONE 6(6): e21062. doi:10.1371/journal.pone.0021062 http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0021062 Read the PDF

Saha, S., K. Bradley, M.S. Ross, P. Hughes, T. Wilmers, P. L. Ruiz, and **C. Bergh**. 2011. Hurricane effects on subtropical pine rocklands of the Florida Keys. Climatic Change 107:169-84. DOI 10.1007/s10584-011-0081-1 Read the PDF

Zhang, K., J. Dittmar, M. Ross, and **C. Bergh**. 2011. Assessment of sea level rise impacts on human population and real property in the Florida Keys. Climatic Change 107:129-146. DOI 10.1007/s10584-011-0080-2 Read the PDF