

# Needed: a global bioinformatics system

August 7 2012

---



One of the main priorities in an increased reliance on citizen scientists, individuals who already are making regular observations of biological life. If you are a biker, hiker, an avid bird watcher or even just take periodic walks in your neighborhood, you could be among those to help the cause.

A global information infrastructure is critical to making intelligent decisions about the grand challenge of rapid shifts occurring in the environment and life on Earth.

At the University of Arizona, P. Bryan Heidorn is working with a team of researchers around the world to help plan and develop this information system and, this fall, will be disseminating ideas to United Nations organizations.

The right information can lead [urban planners](#) to work to preserve rivers, lakes and streams to maintain a clean water supply because "economically, it's a lot cheaper to keep a forest than it is to build

another water-treatment facility," said Heidorn, who directs the UA's School of Information Resources and Library Science, or SIRLS.

Information also can help African subsistence farmers who are directly affected by the persistent changes in rainfall and temperature that then contribute to shifts in success of crops and [farm animals](#), wild prey animal availability and subsequent [human migration](#).

"Subsistence farmers and hunter-gatherers are more directly dependent on the environment. They do not have synthetic agriculture systems to buffer them," Heidorn said.

What connects those examples and others around the world is the present challenge in improving [biodiversity informatics](#), a field that employs current and developing technologies for gaining and sharing information about humans, animal and plant life as well as environmental factors.

"The issues related to biodiversity are worldwide. Some of that is attributed to land-use changes, or invasive species and environmental changes. Those are the main factors contributing to biodiversity decline," said Heidorn, who served as the program officer for the National Science Foundation's Division of Biological Infrastructure before his UA appointment.

"Unfortunately, there is a great information gap currently. We have to know what is in peril before we know where to focus our efforts," Heidorn said. "We need globally accessible databases and information standards so that when the U.S. creates this information, it can be combined with information from countries in Europe, Africa, Asia or anywhere. We need to build a global model."

Heidorn is part of a 12-member team working to do just that.

Initiatives exist, namely the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets, which offer guidelines around the preservation of species and protected lands, for example.

But as of yet, no coordinated set of global initiatives exists to inform countries on how to organize and disseminate information around biological life.

The team is developing a Global Biodiversity Informatics Outlook document, or GBIO, which will be delivered to diplomats who convene in October for the Conference of the Parties during the Convention on Biological Diversity in India. The document also will be provided to other United Nations organizations and branches, along with other intergovernmental and governmental organizations.

The team culled 14 major objectives from an invitation-only workshop held in July in Copenhagen, involving about 100 experts from the U.S., Spain, China, Mexico, Italy, the United Kingdom, Australia, Germany, Brazil, Iran and elsewhere. All told, the objectives will stand as suggestions for worldwide priorities for collecting, organizing and disseminating biodiversity information 10 years out, Heidorn said.

"We hope these will turn into action items," Heidorn said, adding that the group hopes also to inform research organizations and policy decisions.

Braulio Ferreira de Souza Dias, executive secretary of the Convention on Biological Diversity, said in a statement: "The world community is grappling with the question of how to ensure the social and economic well-being of a growing population while at the same time sustaining the natural environment on which we depend."

He noted that, during difficult economic times, decisions tend to focus

on the short-term. But what is needed is better information and increased collaboration to help improve conservation and restoration efforts.

"We need to explain the logic of using scarce resources for the conservation and sustainable use of biodiversity at a time where this is lower on the list of priorities of many governments and individuals than it may have been some years ago," de Souza Dias also noted. "And to do that we need arguments. We need facts. We need information."

"Nature provides ecosystem services that provide food and clean water. When services fail we have economic and health pressures causing social turmoil," said Heidorn, who presented the biodiversity challenge during a Institute for Computing in Science [conference](#) held this week in Utah. His aim: to convince individuals developing and working with supercomputers to make some of their tools more readily accessible.

For the Heidorn and the team of collaborators, which meets online weekly, one of the 14 priorities centers around improving computing power. Another is related to ways to easily share information between countries. Also, the group will spotlight a huge untapped resource: general community members who have the ability to quickly generate data to help support researchers around the world.

"There aren't enough scientists or sensors around the world to gather all of the information we need," Heidorn said.

"For example, we don't have satellites that can detect grasses. If we want to know about grasses on mountains we need humans to go up there and look. There are people right now walking on various mountains, but they happen not to be scientists. We need to get average people involved in providing reliable information that we could then integrate into a global system."

No Band-Aid; no quick fix. It will require a major worldwide, systematic and long-term effort. But the sense of urgency is here now.

"There are basic questions about biodiversity and sustainability we can't answer, so we can't make intelligent decisions," Heidorn said, noting that, for example, new plant, animal and insect species continue to be uncovered.

"The main point is how we get the information we already have in a form so that can make intelligent decisions that will help identify information we are missing, and also to direct our efforts."

Provided by University of Arizona

Citation: Needed: a global bioinformatics system (2012, August 7) retrieved 20 June 2024 from <https://phys.org/news/2012-08-global-bioinformatics.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.