

Web-Enabled Species Identification Guides in Development

Picture it: You encounter an unusual plant or animal in the wild and want a way to identify it by its appearance and state. Your next stop is a Web site where you can match the specimen to pictures, images, and text that lead to a positive identification. This is no blue-sky vision — it can happen in the real world. Plans are underway at the National Biological Information Infrastructure (NBII) <www.nbii.gov> to develop such interactive Web identification guides for each species.

In association with Dr. John Pickering and The Polistes Foundation, the NBII will develop



Blue dasher dragonfly. © John Pickering <www.discoverlife.org>. Used with permission.

“IDnature guides” to allow scientists, school children, nature enthusiasts, and researchers across the United

States to identify more than 1,400 North American species collected or observed in biodiversity studies.

The NBII is a Web-based system that serves as an electronic gateway to biological data and information products maintained by federal, state, and local government agencies; private sector organizations; and other partners in the United States and around the world. As the NBII has evolved, the requirement for state-of-the-art Web-based tools has grown. The Polistes Foundation/NBII partnership proposal allows the NBII to take advantage of leading edge

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Nodes in the News

The creation of regional, thematic, and infrastructure NBII nodes has been a significant program development. These newsmaking nodes are interconnected entry points that, taken together, are forming the NBII. The nodes are being developed in coordination with various partners around the country. Access has devoted several recent issues to reporting on specific nodes. In this issue, we continue profiling the new NBII nodes.

NBII Invasive Species Information Node

Hundreds of species from other countries emigrate to the United States intentionally or unintentionally each year – and the invasion is never-ending. The nation is under siege by many harmful species of plants, animals, and diseases, primarily from other countries. The current environmental, economic, and health-related costs of invasive species (defined as alien, exotic,

non-indigenous, introduced, or non-native species whose introduction causes or is likely to cause economic or environmental harm or harm to human health) could exceed \$138 billion per year – more than all other natural disasters combined. Invasive species are, in short, the chief environmental challenge of the 21st century.

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Creating a Catalog of Life

The Integrated Taxonomic Information System (ITIS) <www.itis.usda.gov> and other organizations around the globe are engaged in a collaborative effort to develop a unified catalog of the 1.75 million known species of living organisms on Earth.

The unified catalog is fundamental to such important tasks as developing worldwide conservation strategies and understanding invasive species. With its planned coverage of plants, animals, fungi, and microorganisms, the program has been dubbed the "Catalog of Life" and, as such, represents one of the more elusive goals of modern biology.

Available through the NBII, ITIS is the first comprehensive, standardized reference for the scientific names – as well as


synonyms and common names – for the flora and fauna of North America. Taxonomic names are among the most commonly used keys for retrieving, sorting, and summarizing biological information. A taxonomic name is the unifying link that makes it possible to cross disciplinary boundaries and link physical and virtual collections of all kinds.

The major organizations involved in this program are ITIS, an important NBII component; Species 2000, a global network based in the United Kingdom and Japan; and the Global Biodiversity Information Facility (GBIF), an international federation of government and international organizations based in Copenhagen. ITIS and the Species 2000 member organizations have already collated basic reference data



on 250,000 species, and plan to reach 500,000 by 2003. The group has extended an invitation to partner organizations in the scientific community and to appropriate funding sources to join the effort to complete the Catalog of Life within ten years.

GBIF, with support from ITIS, Species 2000, and the All Species Foundation, sponsored a Scientific and Technical Advisory Group workshop in Sydney, Australia, last March to prepare a strategy to complete the catalog. Attendees included taxonomic and bioinformatics experts responsible for biodiversity data from all seven continents. A report from the Sydney workshop will be available in June and used to prepare GBIF's 2003 annual work plan.

The biodiversity informatics tools to be developed in this effort include interoperative systems for bringing together data from sources around the world and database "workbench" tools to speed up the creation of the catalog itself. Another priority is developing better ways of dealing with different classifications of the same groups of organisms. All of these tools have to be integrated with processes for keeping the system up-to-date as the taxonomy changes. 



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technologies and methodologies being implemented in the educational sector related to biocomplexity information.

While other identification aids exist on the Web, the 20q software underlying the IDnature guides is the most powerful polychotomous (allowing choices based on more than two characteristics at a time) visual identification key on the Web at this time. The simplicity of the identification keys will allow even school children to identify up to 80% or more species they may encounter during science field trips and, ultimately, will be used by land managers, other federal agencies, and the general public.

Dr. Pickering believes that the NBII/Polistes Foundation project will empower teachers with simple, new tools and enable them to excite students with the thrill of discovery. "Let's inspire a generation of young naturalists with inquiry-based research and information technology," he says. "Just envision a global network of schools and citizen scientists studying nature, solving its mysteries, and monitoring its health. It's time to leave the regurgitation of facts to Google and teach all students how to think creatively and solve problems logically. The outdoors offers a classroom full of questions, wonders, and challenges. Our project's identification guides will help open the door to this classroom."

The IDnature guides can be observed in action by accessing the <www.discoverlife.org> Web site. Currently, the software presents text, line drawings, and photographs in Web forms to help people identify a sampling of arthropods (insects, spiders, ticks, and their relatives)

and North American plants and trees.

By Fall 2002, the NBII/Polistes Foundation partnership

will have completed the following species identification projects:

1) Add at least 600 North American common species to a wildflower guide. A gateway Web page will be created for each species that will include at least one high-quality photograph of the species and links to the Missouri Botanical Garden's Tropicos database <<http://mobot.mobot.org/W3T/Search/vast.html>>, the Discover Life Web site, and other species sites.

2) Add at least 600 butterfly and moth species from North America and Mexico, with links to information at appropriate Web sites, such as the USGS Northern Prairie Wildlife Research Center's Web site <<http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/bflyusa.htm>> and the Butterflies of North America Web site.



Buckeye butterfly. © John Pickering <www.discoverlife.org>. Used with permission.

"Let's inspire a generation of young naturalists with inquiry-based research and information technology ..."

3) Add 150 species of the most commonly encountered caterpillars to a guide to North American caterpillars.

4) Create a showcase of how to identify invasive

species from native ones, including invasives and their look-alike relatives from the IDnature guides.

5) Develop a system of Easy Names for all the species added to the guides. Easy Names are standard identifiers that are easily remembered, are unique for each morph that they name, are permanent, and can be used over the Web to retrieve the most current scientific name. They also provide permanent pointers by which information about organisms can be linked across Web databases.

The proposed guides and images will be served free-of-charge to users through existing servers into the foreseeable future. 🌿

Electronic or Print Access?

We want to take a moment to remind readers that *Access* is available as both a printed publication and online as an electronic document. The location of the online version of *Access* is noted in the masthead of each issue: <<http://www.nbii.gov/about/pubs/news/>>.

If you would prefer to read only the online version from now on, just send an e-mail stating that to <ron_sepac@usgs.gov>, and we'll remove your name from the *Access* print mailing list. Then we'll add you to our listserv to notify *Access* subscribers when new online issues are ready — with a link to the online version — so you'll be able to stay up-to-date on NBII developments without adding to your incoming snail mail. It's your call! 🌿

The NBII's new Invasive Species Information Node will be a central repository for invasive species information that will be of untold value in helping land managers combat the negative effects of invasive species on the environment. It will provide access through a single Web portal to a vast array of information on potentially harmful invasive species throughout the nation.

Introducing the National Institute of Invasive Species Science

This node is an integral part of the new National Institute of Invasive Species Science, a quickly growing consortium of partnerships between government and non-government organizations that is administratively housed in the U.S. Geological Survey's (USGS) Midcontinent Ecological Science Center in Colorado (which is being renamed the Fort Collins Science Center, effective July 1, 2002).

Together with the NBII, a "data cooperative" is being formed to accelerate the sharing and standardization of data on the distribution and abundance of non-



Purple Loosestrife

native plants, animals, and diseases in the United States.

Node Sources and Uses


Sources for data include other NBII nodes, agencies and non-government organizations, state and local partners, museums and taxonomic experts, and the public. This information will be merged with developing high-resolution habitat mapping programs at the USGS EROS Data Center and high-performance computing capabilities (NASA Goddard Space Flight Center and USGS) to develop new tools for invasive species research and outreach. In addition, we have recently partnered with the Invasive Species Specialist Group, the creator of the Global Invasive Species Database. Together, we will further

develop this database and collaborate on the development of standards and protocols related to the management of invasive species internationally.

The node will enable users to:

- Access extensive fact sheet or species profile information on the range, description, and management of invasives.
- Evaluate the invasion of multiple biological groups (and several invasive species) simultaneously.
- Zoom in on particular states, parks, refuges, and natural areas by merging data sets from many sources in single, dynamic representations of the highest priority problem species and problem areas.
- Access invasive species information and models on local, state, regional, and national scales.

The developers of the NBII Invasive Species Information Node welcome your involvement. Join the partnership by volunteering data, time, expertise, equipment, or funding to advance the program.

For more information, contact: Dr. Thomas J. Stohlgren, 970/491-1980, <tom_stohlgren@usgs.gov>; or Annie Simpson, 703/648-4281, <asimpson@usgs.gov>. 

NBII Fisheries and Aquatic Resources Node

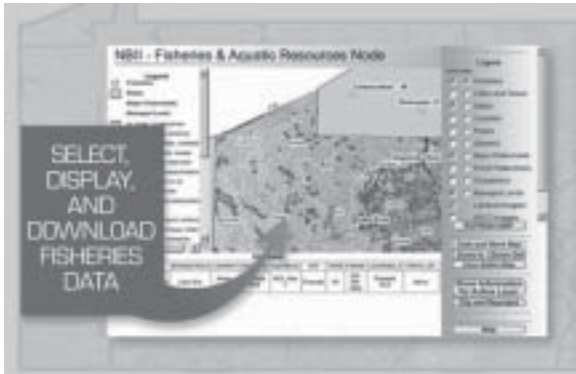
Fishing for information on aquatic species and their habitats? You may find your perfect catch at the NBII Fisheries and Aquatic Resources (FAR) Node <<http://far.nbii.gov>>. The FAR Node provides access to a vast array of fisheries and aquatic resources information and serves as an integrated, comprehensive Web-based resource for scientists, managers, environmentalists, and the general public.

Early featured information on the FAR Node includes:

- The National Fish Strain Registry containing information on nearly all fish strains under management in the contiguous United States. Commercial fisheries and public fisheries managers can access information via a map, and research strains of stock according to disease resistance,

stress tolerances, and other performance traits, and find fish that are most likely to promote success. This Registry is the product of a collaborative effort among the Northern Appalachian Research Laboratory (NARL), the U.S. Fish and Wildlife Service, universities, private aquaculture companies, and 42 states.

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- Recreational fishing resources (by state) for quick access to fishing recommendations, fishing season and regulation information, regional stocking and catch statistics, as well as access areas.
- Fishing condition information (by state), consisting of water conditions, climate forecasts, and travel information. This information will let folks assess conditions prior to leaving the house.
- The PA Watershed Explorer that provides an interactive, Web-based GIS system to access, display, and view data sets in the region.

FAR continues its development of a comprehensive synthesis of fisheries and aquatic research, educational materials, and data sets concerning: fishing (sport and commercial), aquatic species, invasive species, water quality, climate, aquatic habitats and ecosystems, and anthropogenic activities affecting fisheries and aquatic resources.

The upcoming incorporation of search engines, online metadata tools, and thesaurus and cataloguing tools will enhance user accessibility to the array of FAR information. Stakeholder workshops to enhance the design, content, and accessibility of information on the site are planned for the upcoming year.

The FAR Node is being developed under the direction of the USGS

Biological Resources Discipline Northern Appalachian Research Lab (NARL) located in Wellsboro, PA. The NARL maintains a diversified research program in ecology, conservation technology, genetics, and physiology to develop scientifically sound approaches to the management of aquatic ecosystems. The NARL will make available fisheries data and information from across the nation, including its own valuable data holdings.

The NARL is partnering with Pennsylvania Spatial Data Access (PASDA) – Pennsylvania’s official geospatial data clearinghouse – to provide access to thousands of data sets, metadata, and information resources already developed as a service to the citizens, governments, and businesses of Pennsylvania. PASDA will develop site infrastructure, Web GIS, interactive mapping capabilities, and online metadata documentation tools, as well as ensure the integration of fisheries data with existing framework data available on the PASDA site.

Other node partners include the Center for International Earth Science Information Network of New York’s Columbia University and the International Association of Fish and Wildlife Agencies.

For more information, contact James Meade or Cara Campbell at the NARL, 570/724-3322, <jim_meade@usgs.gov>.

Bonnie C. Carroll, NBII Coalition Co-Chair, enjoys the opportunity to express thanks to Congressman Zach Wamp of Tennessee for his outstanding support of the NBII and SAIN.

SAIN Emerging as a Leader in the Region

The NBII Southern Appalachian Information Node (SAIN) is emerging as a leader in the region as it addresses issues of ecosystems informatics and biodiversity information analysis and evaluation. Through partnerships across the region with universities, government offices, and non-profits, SAIN has developed a directory of over 1,000 information resources relevant to regional issues.

SAIN has also developed a Web user-based GIS infrastructure that will allow state-of-the-art mapping and analysis of environmental and biodiversity variables that can aid decision making. In applications and pilot projects, SAIN has developed a 3-D visualization of the Tennessee River Gorge (a private land trust) that includes environmental variables that are being used to help determine land acquisition and use.

Outreach to the education community resulted in SAIN being designated a GLOBE (Global Learning and Observations to Benefit the Environment) partner to help develop biodiversity curricula and training programs for elementary schools.



International Connections

IABIN Gets \$650K GEF Grant

The Global Environment Fund (GEF) has given IABIN a grant of \$650,000 in response to the NBII's proposal, "Building the Inter-American Biodiversity Information Network (IABIN)." The proposal, which had been technically cleared by the GEF in early January, was funded for the full amount requested. The grant will be made by the World Bank. The Organization of American States (OAS), working under the direction and review of the IABIN Executive Committee, will oversee the activities funded by the grant.

IABIN is an initiative of the countries of the Americas to promote compatible means of collection, communication, and exchange of biodiversity information relevant to decision-making and education using the Internet. It builds on existing national and regional information networking initiatives through incremental enhancement of those efforts to ensure hemisphere-wide interconnection and interoperability.

The grant will fund a year-long consultative process through which participants, in collaboration with the Clearing-House Mechanism of the Convention on Biological Diversity, will define the approaches and technologies needed to build the network that is the IABIN vision. A detailed plan for IABIN resulting from

these consultations will then become part of a proposal to GEF for a full-size project grant, on the order of \$4-5 million, for a 5-year effort to build IABIN.

Hemisphere Divided into Seven Subregions

The GEF grant will fund seven subregional consultants, who will determine the biodiversity resources available in his or her subregion; define the standards, formats, and protocols currently being used; determine the training and capacity-building requirements; and initiate partnerships with biodiversity information providers and users in the regions. Funds are also available to hold a workshop in each subregion to increase interaction among participants.

The seven subregional reports will then be integrated by an IABIN Regional Coordinator who will define the requirements and architecture for IABIN as a whole. The final report will be presented to the IABIN Council at its Third Meeting, tentatively scheduled for early 2003.

The Terms of Reference for the subregional consultants and the Regional Coordinator are available on the U.S. IABIN Web site, <www.iabin-us.org>. Selection of the consultants is expected in June 2002, with their work beginning shortly thereafter. 🌍

NBII Metadata Clearinghouse Interface Redesigned

The NBII's Metadata Clearinghouse interface has undergone a significant redesign. Now, accessing Clearinghouse metadata (data about data) is simpler and easier than ever before.

The new interface was formally introduced at the Third NBII All-Node Workshop, which was held recently in Davis, CA. Oak Ridge National Laboratory in Oak Ridge, TN, handled the interface redesign project, which took about three months to complete.

To reach the new tabbed interface, go to <<http://www.nbio.gov/datainfo/metadata/clearinghouse/>> (the interface is an online search window that gives you access to the Clearinghouse — and

not the Clearinghouse itself). The new interface is referred to as "tabbed" since, at the top of the screen, you have a variety of "tabs" to choose from — keywords, spatial, temporal, formats, and sources.

First you click on one of the tabs, then you enter relevant information to search against that category.

"One reason the new Clearinghouse interface is easier to use is because everything is on one page," says Sharon Shin, NBII Metadata Project Manager. "You just enter search information through the tabs at the top, then click on the



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*NBII Metadata Clearinghouse
Interface Redesigned
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search button at the bottom of the frame. You don't have to scroll through lots of text before you start your search."

The NBII Metadata Clearinghouse has always been an important element of the NBII.

The Clearinghouse offers an assortment of standardized descriptions – metadata — of different biological databases or information products developed and maintained by USGS scientists, as well as data and information from other NBII participants, including federal, state, and local government agencies; private organizations; universities; and other partners around the nation and the world. The metadata concisely convey such things as subject matter; how, when, where, and by whom the data were collected; how to access the database or information products; and person(s) to contact for more information.

"Plus, while the old interface offered spatial searching, this interface makes such searching much easier," says Shin. "You use your mouse to select an area. Then you either enter the coordinates or hit the map button. If you choose the latter, a map pops up for you to glide your cursor over, drawing a box around the area you want. That's all there is to it."

The new interface also automatically searches metadata of all the NBII node partners, rather than requiring users to choose which partners they want to search.

If you need help operating the new interface, just click on Help and it is available via a pop-up window.



Upcoming Events of NBII Interest

45 th Annual Conference of the International Association for Great Lakes Research, Winnipeg, Manitoba, Canada.	June 2-6
The International Association of Technological University Libraries 23 rd Annual Conference: "Partnerships, Consortia and 21 st Century Library Service," Kansas City, MO.	June 2-6
Science, Society, and Natural History Museums: The Natural Science Collections Alliance 2002 Annual Meeting, Washington, DC.	June 6-9
Healthy Ecosystems, Healthy People: Linkages Between Biodiversity, Ecosystem Health, and Human Health, Washington, DC.	June 6-11
Special Libraries Association (SLA) 93 rd Annual Conference, Los Angeles, CA.	June 8-13
GeoSpatial World 2002, Atlanta, GA.	June 10-12
American Society for Limnography and Oceanography 2002 Summer Meeting, Victoria, British Columbia, Canada.	June 10-14
American Library Association Annual Meeting, Atlanta, GA.	June 13-19
National Educational Computing Conference, San Antonio, TX.	June 17-19
Technology in Education 2002, Copper Mountain, CO.	June 25-28
American Society of Ichthyologists and Herpetologists 2002 Annual Meeting, Kansas City, MO.	July 3-8
The 6 th World Multiconference on Systemics, Cybernetics and Informatics SCI 2002, Orlando, FL.	July 14-18
Society for Conservation Biology 2002 Annual Meeting, University of Kent, Canterbury, England.	July 14-19
Association for Tropical Biology 2002 Meeting, Panama City, Panama.	July 29-August 2
American Society for Plant Biologists 2002 Annual Meeting, Denver, CO.	August 3-7
Botany 2002, Madison, WI.	August 4-7
87 th Annual Meeting of the Ecological Society of America, Tucson, AZ.	August 4-9
American Fisheries Society 2002 Annual Conference, Baltimore, MD.	August 19-22

NBII Metadata Training

The “Preserving Data Value” metadata workshop took place on May 15-16. USGS scientist Sharon Shin and Theresa Ely from the National Park Service presented a computer-based training workshop on the Federal Geographic Data Committee’s Biological Data Profile and metadata creation. Metadata, critical characteristics and information regarding a data set, is key to preserving the outlay, expertise, and time spent developing data sets. Attendees at the workshop represented many agencies including the USGS, National Park Service, and U.S. Fish and Wildlife Service.

For the latest information regarding location and dates of metadata training classes, just check <http://www.nbii.gov/datainfo/metadata/training/calendar.html> or contact Sharon Shin at sharon_shin@usgs.gov, 303/202-2430.

NBII to Sponsor National Fish and Wildlife Data Summit

The NBII is the lead sponsor of the first National Fish and Wildlife Data Summit to be held in Baltimore, MD, in November 2002. The International Association of Fish and Wildlife Agencies and the Organization of Fish and Wildlife Information Managers are working together to host the Summit.

The Summit is designed to bring resource managers and data experts together to define the issues and conservation needs that will be served by improving data management infrastructure in the natural resources management community. It is modeled after the Freshwater Fisheries Data Summit held in 1998 <http://www.iafwa.org/documents/Freshwater%20Database.PDF>, but goes further by including a broader group of participants. Biologists and data managers from state fish and wildlife agencies and federal natural resources agencies will all be invited.

The Summit fills a need within the NBII to identify the key issues and data needs required by the conservation community. Following the summit, the proceedings will be distributed so that the participants and the NBII will have a road map they can use to improve their information resources and prioritize partnering opportunities.



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