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## Science and Technology Resources on the Internet: Biodiversity Web Resources

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# Science and Technology Resources on the Internet

## Biodiversity Web Resources

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## Introduction

*Biodiversity*, a contraction of the phrase "biological diversity," was first used by Walter G. Rosen during a planning meeting for the 1986 National Forum on BioDiversity held in Washington, DC, while the first appearance of the word in the print literature likely occurred with the 1988 publication of the proceedings of this conference ([Hawksworth 1995](#)). The term "biodiversity" first appeared in the

BIOSIS database in 1988 with four references, but by April of 1994 the count of citations had increased to 888 ([Hawksworth 1995](#)).

Over the last decade scientists have noted that biodiversity loss is an irreversible process and a serious threat to our quality of life and that "we are on the verge of a major biodiversity crisis" ([Loreau 2006](#)). Nearly three decades after the founding of the discipline of biodiversity Barnosky et al. ([2012](#)), warns that the earth is quickly reaching a tipping point of climate change, extinctions, and ecological disruptions not seen since the retreat of Pleistocene glaciers 12,000 years ago. They write that "such planetary-scale critical transitions have occurred previously in the biosphere, albeit rarely, and that humans are now forcing another such transition, with the potential to transform Earth rapidly and irreversibly into a state unknown in human experience."

## Scope and Methods

Those engaged in the field of biodiversity must have knowledge of a broad spectrum of life science topics and literature. The number of relevant web-based guides, journals, and data sets is overwhelmingly voluminous. This guide identifies key web resources suitable for a variety of audiences including K-12 instructors, college students, and senior researchers.

In constructing this bibliography, the web-based library guides of campuses offering highly recognized life science programs were reviewed, including but limited to those of Stanford, Harvard, MIT, UC-Berkeley, Johns Hopkins, and Yale. In addition, the author conducted Google and Bing searches and when necessary, sought clarification from OCLC's WorldCat database. The scope is restricted to English language sites freely available on the Web and includes open access journals and periodicals databases; this study focuses on North American sites, but also includes selected international sites. *Zoological Record*, *BIOSIS*, *Oceanic Abstracts*, *CAB Abstracts*, and *Wildlife & Ecology Studies Worldwide* are excellent subscription services that librarians might consider.

## Starting Points

The following web sites provide extensive introductions to the topical life sciences building blocks that students will need to tackle topics in the area of biodiversity. Undergraduates new to this field of study may benefit from the general introductions, while advanced undergraduates and graduate students intent upon complex analysis of research topics will benefit from Starting Points sites targeted more specifically to biodiversity. A significant number of these web sites will benefit science education majors as they prepare lesson plans and conduct research on topics for classroom presentations or papers. Upper-level undergraduates and graduate students may benefit from the coverage of complex topics and the wide taxonomic coverage of species juxtaposed with the general materials. Teaching faculty might browse and enjoy these resources also and, by serendipity, locate materials of interest.

**Tree of Life Project (ToL)**

<http://tolweb.org/tree/>

This non-profit collaborative project funded by the U.S. National Science Foundation and the University of Arizona began as an open access, databases-driven project in 1994 and was released on the web in 1996. The goals are to document all species on earth, to provide information about the characteristics of biological diversity, and to provide pictures, text, and other information for every species and for each group of organisms. Features include an extensive glossary with article links and hundreds of photographs that include the geographical coordinates of a specimen's location when photographed, sex of the specimen, life cycle stage, and more. The Treehouses section provides excellent information and activities for K-12 students, teachers, and college education majors, including games, art projects, stories, and further resources for teachers.

**American Museum of Natural History (AMNH) Hall of Biodiversity**

<http://www.amnh.org/exhibitions/permanent-exhibitions/biodiversity-and-environmental-halls/hall-of-biodiversity>

This series of interactive web displays includes four primary components that might prove invaluable to science education students creating lesson plans or seeking definitive information appropriate for K-12 students: the Spectrum of Life, Dzanga-Sangha Rainforest, Transformation of the Biosphere, and Solutions. The Kids & Families section contains excellent topical information, including interviews with conservation biologists, games, quizzes, art projects, and more.

**Encyclopedia of Life (EOL): Explore Biodiversity Resources**

<http://eol.org/info/233>

This section of the EOL provides links to a variety of other web sites that support classrooms and research, along with extensive data on species. Search the site by scientific or common name to retrieve a wide variety of species information: diet, reproductive habits, illustrations, maps, field guides, and in many cases, extensive links to scholarly references.

**Ocean Portal: Smithsonian Institution**

<http://ocean.si.edu/>

This highly visual initiative of the Smithsonian Institution's National Museum of Natural History and more than 20 collaborating organizations provides excellent starting points for general undergraduates seeking topical information on biodiversity and oceanic research as well as a wealth of information for science education majors. The four major sections of the site -- *Ocean Life & Ecosystems*, *The Ocean over Time*, *Ocean Science*, and *The Ocean & You* -- provides materials including high-resolution photographs and videos, along with timelines for mammalian species. *The Ocean Newsroom* on the home pages links to current articles from a variety of sources -- ABC News, the National Science Foundation, LiveScience, Science Daily and more. The *For Educators* section features over 100 lesson plans with suggestions for appropriate K-12 audiences, some of

which offer engaging interactive games and activity books. Users may filter by subject -- biology, earth science, marine biology, etc. -- or by topics -- *Deep Ocean Exploration*, *The Best Hope for Northern Right Whales*, and more.

### **Conservation International**

<http://www.conservation.org/Pages/default.aspx>

While the entirety of this rich web site is worth exploring, two sections stand out--the *Biodiversity* section and the *Biodiversity Hotspots* area. The *Species* sub-section of the *Biodiversity* section highlights the work of scientists and specific Conservation International projects around the globe. The *Profiles* section provides links to clearly presented information on fauna worldwide, including profiles of species, threats to species, and sections on some of the world's most endangered areas. It also includes entertaining and creative presentations such as the *Interactive Primate Tree*. The *Hotspots* section covers five intercontinental areas of the globe, and breaks these down into multiple feature articles including overviews with statistics, species summaries with statistics, summaries of threats, current conservation projects, and very extensive lists of scientific references.

### **BioSciEdNet (BEN) Portal**

<http://www.bioscienet.org/portal/index.php>

This National Science Digital Library Pathway for biological sciences education is managed by the American Association for the Advancement of Science (AAAS). Browsing by the subject "biodiversity" returns over 800 resources that may prove invaluable to science education majors. Sources include targeted audience levels for teachers and classification of resource type, citations to both free and subscription scholarly papers, high-resolution images, and interviews with scientists.

### **Nature Conservancy**

<http://www.nature.org/>

While this resource doesn't contain the degree of complex and in-depth analyses as do many of the other sites covered here, the Nature Conservancy web site is quite user friendly and might be a good starting point for an undergraduate in the initial stages of research. For those seeking initial topical information on biodiversity there are news articles under *Top Stories* and featured reports such as *The Frog with Something Extra* and *How Do Oyster Reefs Work for You?* Many of these features include videos and might be helpful to science education majors looking for topics or preparing K-12 lesson plans. The wide variety of topics covered in the blog might provide ideas to general undergraduate life sciences students and to science education majors.

## **General Biodiversity and Endangered Species Information**

Several other web sites provide good general narrative information about biodiversity and endangered species. Note that, while there may be some overlap in materials with the later section on species databases, the main strength of these sites lies in explaining the basic concepts of importance to biodiversity and the preservation of endangered species.

### **Convention on Biological Diversity**

<http://www.cbd.int/>

This global treaty, an outgrowth of the United Nations Environment Programme's Intergovernmental Negotiating Committee, entered into force in 1993 after signatures by 168 nations. The full text of the treaty may be downloaded here. The current web site gives an excellent overview of worldwide efforts to conserve species. The rich *Information* section provides links to hundreds of press releases, news headlines on biodiversity, national strategy and action plans, photo and video galleries, and much more. Political and cultural aspects of resource conservation are well covered also.

### **International Union for Conservation of Nature**

<http://www.iucn.org/>

The world's first global environmental organization consists of 1,200 member groups, including over 200 government and over 900 non-government organizations, and monitors thousands of projects and activities around the world. The *Conservation Tools* sub-section of the *Resources* area of the web site leads one to five excellent databases in the *Conservation Databases* section. Searches on specific species in the *IUCN Red List of Threatened Species*, for example, provide information on range and distribution of species, taxonomy, habitat and ecology, threats, and conservation actions, and include maps, bibliographies and images.

### **Endangered Species Program: U.S. Fish & Wildlife Service**

<http://www.fws.gov/endangered/>

This site will be of value to those searching for species-specific information related to biodiversity in the U.S. The program web site contains thousands of reports, maps, documents related to critical habitat, recovery programs and more. The *Species Search Map of the U.S.* allows the user to click on individual states and receive a listing of all animal and plant listings for that state, including links to a wealth of information on the species--listings of counties where species occur, maps of species occurrence, links to relevant Federal Register documents such as critical habitat descriptions, and recovery and conservation plans.

### **Endangered Species International**

<http://www.endangeredspeciesinternational.org>

With offices on four continents, this group focuses on "reversing the trend of human-induced species extinction, saving endangered animals, and preserving wild places." Primary value may be found within the *Endangered Species* drop down menu where a number of species are

covered and issues related to species decline are well documented, including classes and sub-classes of fishes, birds, mammals, amphibians and reptiles. The section on birds, for example, covers background, reproduction, migration, ecological roles, and threatened, endangered and recently extinct species. The *Galleries* sub-section contains a wealth of stunning photographs organized by themes such as camouflage, coral reef protection, rain forests, amphibian decline, and more. The site may benefit science education majors preparing projects and lesson plans.

## Collections, General Publications, and Reports

The following web sites focus on compilations related to biodiversity. Some of the collections include digitized works, while others include numerous links to other useful sites.

### **Biodiversity Heritage Library (BHL)**

<http://www.biodiversitylibrary.org/>

This consortium of natural history and botanical libraries, a digitized component of the *Encyclopedia of Life*, holds millions of pages of taxonomic literature, representing tens of thousands of titles and nearly 100,000 volumes that users can read online or download. The texts included provide information on over 1,060,000 scientifically identified species. Coverage has expanded over time to include server nodes and access to collections in Europe, China, Brazil, Australia and the Bibliotheca Alexandrina. The BHL provides a wealth of texts to the developing world from many resources formerly unavailable to most researchers and students.

### **World Resources Institute (WRI)**

<http://www.wri.org/>

This center for policy research and analysis addressing global resources offers information that might spawn undergraduate research projects and prove of value to graduate students and professionals also. Begun in 1982, the WRI now covers vast topical areas such as climate protection and man's relation to ecosystems, and includes full text of studies from around the globe. Over 500 reports and documents including their annual reports are freely available as downloads. Students and researchers delving deep into biodiversity-related topics should also investigate the *Biodiversity Topics* pages at <http://www.wri.org/topics/biodiversity>.

### **Center for Biological Diversity**

<http://www.biologicaldiversity.org/>

Founded in New Mexico, this center works extensively in both the areas of U.S. endangered species and climate change issues and in international conservation. The *Species* section covers a wide range of amphibians, fish, birds, invertebrates, mammals, reptiles, and plants. The *Key Documents*

links on the right side of each species page cover a variety of topics, from the federal plan for protection of the woodland caribou to correspondence, news stories, finding, and lawsuits related to protection of the Mexican gray wolf.

### **AMNH Center for Biodiversity and Conservation**

<http://cbc.amnh.org/>

The site contains an excellent array of online exhibitions on topics as diverse as vertebrate and invertebrate aquatic species and the Arctic National Wildlife Refuge, as well as archives of photographic exhibits. There are links to extensive information on geographic regions such as mainland Southeast Asia, the Solomon Islands, and the American Southwest, as well as geospatial and remote sensing resources and data and species modeling data. Many of the research sections contain citations to related scientific publications.

### **U.S. Department of the Interior**

<http://www.doi.gov/index.cfm>

The web site contains voluminous data from the nine agencies comprising the Department of the Interior. Users may especially appreciate the huge numbers of records and data, the full text of reports, and a variety of multimedia files such as videos, newsfeeds, and podcasts and more that are housed within the National Park Service and the U.S. Fish and Wildlife servers. Use the search engine to locate thousands of relevant documents across the web servers of various U.S. agencies. Offerings include descriptive information on aspects of biodiversity and human impacts on species across U.S. national parks, national monuments, wilderness areas, and more.

### **U.S. Department of Agriculture**

<http://www.usda.gov/wps/portal/usda/usdahome>

The USDA is comprised of over 30 agencies and offices, many of which provide reliable biodiversity-related documents. Entries in the *PLANTS* database, for example, include names, checklists, distributional data, species abstracts, characteristics, images, crop information, software tools, web links, and references. Users may find the *Threatened & Endangered* search features especially helpful, as one may limit searches to common and species names, duration, growth habits, wetlands status, or by state. Also consider visiting the U.S. Forest Service site for program data related to conservation practices within the national forests and grasslands, and for forest species inventories and analysis.

### **United Nations Environment Programme: Biodiversity**

<http://www.unep.org/themes/biodiversity/>

This site provides extensive links to programs and activities related to both terrestrial and marine global treaties, conventions, research projects and conservation efforts, many times by specific regions of the planet. Hundreds of UN news releases are also available.

### **UNESCO: Ecological Sciences for Sustainable Development**

<http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/>

This natural sciences sub-section of the UNESCO web site documents the organization's work in areas related to minimizing biodiversity loss and mitigating the consequences of climate change to the earth's species. This section links to numerous science programs: the *Man and the Biosphere Programme*; *Biosphere Reserves*; *Biodiversity and Climate Change*; and the *Capacity Building and Partnerships* program. There are numerous links to news items, program highlights, and photo galleries, and the *Related Information* section links to the full text of policy briefs, bureau reports, and research findings.

## **Searchable Databases and Datasets**

A dizzying amount of biodiversity data regarding individual species is available on the web. These searchable databases and datasets are critical in many phases of biodiversity research. These databases are arranged by the variety of life forms included in the database. For instance, a website listed under narrow scope might include only trees, fishes, or reptiles, whereas items of broad scope will include a more comprehensive array of life forms.

### **Databases and Datasets: Broad Scope**

#### **Global Biodiversity Information Facility (GBIF)**

<http://www.gbif.org/>

The most abundant reservoir of biodiversity data available worldwide, GBIF is an astoundingly rich resource, but can be overwhelming at first glance. The GBIF was established in 2001 to provide free and open Internet access to global biodiversity data, and is comprised of over 80 participant countries and organizations. The facility contains over 300,000,000 indexed records from over 8,000 datasets and 379 publishers. The *Access data portal* takes the user into the heart of the facility where the user can search by species, country or dataset. One can also browse and explore by the same characteristics.

#### **UN Environment Programme: World Conservation Monitoring Centre (UNEP-WCMC)**

<http://www.unep-wcmc.org/>

This web site, a collaborative effort between the United Nations Environment Programme and WCMC contains a wealth of datasets, maps, and the full text of reports and monographs. The *Data and Information* link leads to dozens of datasets: global wetlands, marine turtle nesting sites, global wilderness areas, the *World Database on Protected Areas (WDPA)*, the *Global and Regional Assessments of the Marine Environment Database (GRAMED)*, and much more. This site includes numerous links to the free full text of monographs such as the *World Atlas of Biodiversity*, *The Conservation Atlas of Tropical Forests: Africa*, and *The Conservation Atlas*

of *Tropical Forests: Asia*, to name just a few.

### **NatureServ**

<http://www.natureserve.org/>

This international network of biological inventories consists of natural heritage programs or conservation data centers that operate in all 50 U.S. states, Canada, Latin America, and the Caribbean. The site details a wide array of interesting projects students might investigate such as *Conserving Biodiversity on Military Lands* and *Risks to Imperiled Species Along Pipeline Routes*. The site provides links to excellent data sources such as the *Global Amphibian Assessment* of over 6,000 species, and the *NatureServe Explorer*, a source for information on more than 70,000 plants, animals, and ecosystems of the United States and Canada.

### **Index of Organism Names: ION**

<http://www.organismnames.com/query.htm>

Derived from Thomson Reuters's databases *Zoological Record* and *BIOSIS Previews*, this database contains millions of animal names, both fossil and recent, at all taxonomic ranks, reported from the scientific literature. Entries include basic nomenclatural and hierarchical information, links to articles in the *Encyclopedia of Life* and, in some cases, links to other web resources.

### **Catalogue of Life**

<http://www.catalogueoflife.org/col/search/all>

The *Species 2000* project and *Integrated Taxonomic Information System* (ITIS) have partnered to produce this guide to taxonomy and classification compiled from 115 taxonomic databases from around the world. The site currently contains over 1,300,000 species. Users can search by common and scientific name or by geographic distribution, or browse by taxonomic tree or classification.

### **Animal Diversity Web**

<http://animaldiversity.ummz.umich.edu/site/index.html>

This database from the University of Michigan contains thousands of species accounts, including natural history, taxonomy, and distribution data. The site contains extensive information on habitat, geographic range, behavior, reproduction, food habits, predation, and more. Includes many excellent illustrations and photographs.

### **The Plant List**

<http://www.theplantlist.org/>

This collaboration between the Royal Botanic Gardens, Kew and Missouri Botanical Garden provides a working list of all known plant species. Version 1 contains 1,244,871 scientific plant names of which 298,900 are accepted species names. It includes no vernacular or common plant names. Entries include links to other databases for further information, such as *GBIF*, the *Catalogue of Life*, and *Biodiversity Heritage Library*, among

others.

### **IUCN Red List of Threatened Species**

<http://www.iucnredlist.org/>

This exhaustive, comprehensive and widely recognized objective database listing from the International Union for Conservation of Nature has assessed and updated the status of threatened species for more than four decades on a global scale "in order to highlight taxa threatened with extinction, and therefore promote their conservation." Users may search or browse by a range of categories, from *Least Concern* to *Extinct in the Wild*, and *Extinct* and also limit by a broad range of criteria including taxonomy, location, habitats, and more. Individual records contain extensive taxonomy, assessment, and threats information, as well as descriptions of geographic range, range maps, and habitat and ecology data. Numerous summary statistical tables are available, including those of category changes, endemic species by country, summaries by country, and more.

### **Integrated Taxonomic Information System (ITIS)**

<http://www.itis.gov/>

Collaborative effort of five U.S. agencies -- the Departments of Commerce, Agriculture, Interior, EPA, and the Smithsonian - to improve access to reliable information on species names and their hierarchical classification. Users can search on a variety of criteria and once initial searches are complete one can run an "off site search" that includes the *GBIF*, *BioOne* journals, the UN World Conservation Monitoring Centre, U.S. Fish and Wildlife Service, the *NatureServe Explorer*, and other sources. Includes taxonomic information on over 500,000 plants, animals, fungi, and microbe of both terrestrial and aquatic habitats.

### **Conservation Biology Institute (CBI)**

<http://www.consbio.org/>

Founded in Corvallis, Oregon in 1997, the CBI works mainly with U.S. federal agencies to provide scientific expertise in support of the conservation and recovery of biological diversity through research and education. Exploring the site turns up links to a variety of CBI databases, ecological modeling tools, GIS and decision-support tools, and datasets that may be of value to upper level undergraduates and graduate students.

### **BiologyBrowser**

<http://www.biologybrowser.org/>

This free searchable database from Thomson Reuters includes links to data sets held in a number of national and institutional repositories, descriptions of behavior, distribution status, maps, illustrations, videos, and news stories.

## **Databases and Datasets: Narrow Scope**

### **BugGuide.Net**

<http://bugguide.net/node/view/15740>

This site from the Department of Entomology at Iowa State University serves as a comprehensive clearinghouse for identifying insects in the United States and Canada. Information includes but is not limited to species and related names, species counts, size, identification tips, range, habitat, life cycles, print and Internet references, and links to work cited to build each entry. The *Clickable Guide* feature on the home page allows users to begin a search visually rather than by species name and will prove invaluable to some users. Large numbers of excellent high-resolution photographs accompany most entries. The *Links* navigation tab accompanying each entry provides dozens and sometimes hundreds of additional web sites to review for further information.

### **FishBase**

<http://www.fishbase.org/home.htm>

This comprehensive and invaluable database of species worldwide contains over 32,000 species, 295,000 common names, and 50,000 photographs. Individual species records hold a wealth of data: worldwide habitat maps; excellent photographic images; classification and name information; environment; species range and climate; distribution; description; authoritative references; and brief biological discussion. Science education majors and faculty may find use for the following site sub-sections: *Fish Quiz*, *Ichthyology Course*, and *Quick Identification*.

### **AmphibiaWeb**

<http://www.amphibiaweb.org/>

Dedicated to amphibian biology and conservation, the international partners maintaining the web site aspire to create a home page for every existing species worldwide. Highlights of the site include the ability to search photos, and to browse more than 6,900 species lists and more than 23,000 photos. The *Call and Video Files* section provides links to hundreds of sound files and videos featuring individual species. Many of these pages include links to the *IUCN Red List*, provide high-resolution photographs, and feature lengthy descriptions including distribution and habitat, country distribution, and links to distribution maps.

### **ReefBase**

<http://www.reefbase.org/>

ReefBase is the official database of the Global Coral Reef Monitoring Network (GCRMN), as well as the International Coral Reef Action Network (ICRAN), with funding from the United Nations Foundation. Especially helpful is the *Key Topics* section, containing information on topics and reports detailing the interrelationship of poverty and reefs, reports and data on reef fisheries, and studies on the impact of population and consumption on reefs. *The Online Geographic Information System* (ReefGIS) allows the user to locate coral reef related data and information on interactive maps. The *Global Database* includes country-level data organized by status, management, resources and threats.

### **PrimateLit**

<http://primatelit.library.wisc.edu/>

This is a bibliographic index to the journal literature on primates; there is simply no other site on the open web so rich in information on all aspects of primatology, including the impacts of biodiversity loss on primates worldwide, from Borneo to a variety of continental African populations. The database comprehensively indexes scientific literature from 1940 to the present and includes all publication categories, from articles to books, dissertations, technical reports, book chapters, and more, and includes a wealth of biodiversity citations along with those of many other subject areas.

## **News Sources**

### **ScienceDaily: Biodiversity News**

[http://www.sciencedaily.com/news/earth\\_climate/biodiversity/](http://www.sciencedaily.com/news/earth_climate/biodiversity/)

Since its introduction in 1995, ScienceDaily has grown into an online science news service that contains over 65,000 research articles, 15,000 images, 2,500 encyclopedia entries, 1,500 book reviews, and hundreds of educational videos. The *Biodiversity News* section contains nearly 1,500 articles, over 275 of which have appeared in the last year. This is a reasonable place to look for quick news updates or to explore possible topics.

### **Discovery: Biodiversity News**

<http://news.discovery.com/biodiversity/>

This site combines brief news articles written by Discovery staff with news from agents such as ABC Science Online, Agence France-Presse, Science News and other sources. Many of the articles link to the originating research source and a number of them include high-resolution photographs and video including *Bizarre Deep-Sea Hot Spots Shimmer*, *Viking Mice Live On*, *New Flowering Plant Found in Fiji*, and many others.

### **Biodiversity and Earth and Environment News from Scientific American**

<http://www.scientificamerican.com/topic.cfm?id=biodiversity>

This topical section highlights biodiversity articles from recent issues of *Scientific American*. Searching the keyword "biodiversity" retrieves nearly 500 entries from the magazine. Features include multimedia content—videos, slide shows, and podcasts. The *Science Images Gallery* includes articles and links to more content.

### **Environmental News Network (ENN)**

<http://www.enn.com>

Stating that its mission is to "inform, educate, enable and create a platform for global environmental action," for over 15 years the ENN has been providing news from a growing number of sources that now totals more than 40 sites, all with a global focus and perspective. With a staff of six, ENN recently has begun writing its own news stories in addition to

aggregating content. The *Ecosystems and Wildlife* sections of the site might prove of interest to users checking for news updates or looking for topics for papers.

### **Endangered Species Online Bulletin**

<http://www.fws.gov/angered/news/bulletin.html>

This quarterly bulletin, with archives back to 2001, disseminates information on species-related rulemakings, conservation partnerships, recovery plans and activities, research developments, and a variety of other endangered and threatened species issues.

### **Convention on Biological Diversity: News Headlines on Biodiversity**

<http://www.cbd.int/information/news.shtml>

This sub-section of the CBD site highlights recent news from across the globe. The user may browse and search from a dropdown menu of over 60 subjects as diverse as biodiversity for development, ex-situ conservation, global biodiversity outlook, mountain biodiversity, sustainable use of biodiversity, and tourism and biodiversity.

### **World Resources Institute: Biodiversity News**

[http://www.wri.org/search?s=biodiversity&restrict=wri\\_news](http://www.wri.org/search?s=biodiversity&restrict=wri_news)

This complex web site can be somewhat structurally obtuse and non-intuitive to use, yet anyone conducting thorough research in biodiversity may want to attempt to locate news here. From the site's home page the user may click on *News* and navigate directly to a search screen that includes the choice to limit to news, as in the URL above. Execution of a search in *News* on the keyword "biodiversity" then returns over 2,000 items of interest, many of which contain authoritative essays, interactive maps, and links to both full text documents and other valuable and related resources.

## **Journals**

### **Journal Directories**

#### **PLoS Biodiversity Hub**

<http://hubs.plos.org/web/biodiversity/>

The PLoS Biodiversity Hub provides three main functions to connect researchers with content: open-access articles on biodiversity are selected and imported into the Hub; over time, the articles will be enhanced with metadata; and the Hub provides a community forum for discussion of content. Initially, all of the open-access content will come directly from *PubMed Central*. *PLoS Hubs: Biodiversity* includes articles from the *PLoS Journals and Collections*, plus articles from other publishers. Another way to think of or to view the Hub is as an aggregator of existing content from open access journals, with the purpose of allowing registered users to mashup content over time by adding additional publicly available information such as a taxonomy hierarchy, species images and descriptions,

and maps with specimen overlays. As of the date of review the *Biodiversity Hub* contains over 1,300 articles.

### **Directory of Open Access & Hybrid Journals - Biodiversity**

<http://www.doaj.org/doaj?func=findJournals&hybrid=1&query=biodiversity>

This free, full text, quality controlled scientific and scholarly journal collection covers a wide range of subjects and offers searches by keyword in journal title or article. Searching the keyword "biodiversity" in the *Journals* field returns 37 titles of interest. The brief list of titles in the following section includes details on a small selection from the 37 available titles, along with selected titles from other sources.

## **Open Access Journals**

### **Biodiversity Journal**

<http://www.biodiversityjournal.com/>

Papers dealing with all aspects of biodiversity are considered. Article formats include guest editorials, featured papers, notes and correspondence, along with standard research papers.

### **BMC Biology**

<http://www.biomedcentral.com/bmcbiol/>

Peer-reviewed research articles of special importance and broad interest in any area of biology, as well as reviews, opinion pieces, comment and Q&As on topics of special or topical interest. *BioMed Central* levies an article-processing charge to cover the cost of the publication process.

### **BMC Ecology**

<http://www.biomedcentral.com/bmcecol/>

Considers articles on environmental, behavioral and population ecology as well as biodiversity of plants, animals and microbes.

### **PLoS Biology**

<http://www.plosbiology.org/home.action>

PLoS features original works of significance and relevance in all areas of biological science. Intended audiences include the international scientific community, policy makers, educators, and general interest readers. In addition to scientific articles one may find synopses of research articles, primers that serve as concise introductions to topics of relevance, news features, and perspectives articles and postings to engender discussion.

### **The International Journal of Biodiversity and Conservation (IJBC)**

<http://www.academicjournals.org/ijbc/index.htm>

Provides monthly publication of articles across a range of areas including information technology applications for environmental management and planning, green technology and environmental conservation, health, sustainable development and more. The journal typically publishes research articles on original findings, brief communications on new

investigations, methods and techniques, and book reviews.

### **Biodiversity Informatics**

<https://journals.ku.edu/index.php/jbi>

Focuses on the emerging field of biodiversity informatics--the "creation, integration, analysis, and understanding of information regarding biological diversity." Papers include two main types: full scientific manuscripts; and "application notes," shorter papers not to exceed ten pages in length that describe new applications.

### **Biodiversity Science**

<http://www.biodiversity-science.net/EN/volumn/home.shtml>

First nationwide academic journal in China specifically addressing the issues of biodiversity and the only one comprehensively reporting achievements in biodiversity research, with the aim of enhancing information exchange between Chinese and international scholars. The journal accepts papers dealing with all taxa and all types of ecosystems. All ecological levels are covered, from molecular, through single-species studies, to ecosystem-, biome- and global-level perspectives.

### **The Open Conservation Biology Journal**

<http://www.benthamscience.com/open/toconsbj/>

Publishes research articles, letters, reviews, and single topic issues in all areas of conservation biology and biodiversity.

## **References**

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