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Introduction to Online Ecological and Environmental Data

Virginia A. Baldwin
University of Nebraska-Lincoln, vbaldwin2@unl.edu

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Introduction

The advent of the Internet and proliferation of materials on it has brought significant and rapid change in scholarly communication. Perhaps more gradually has come the posting of research data for sharing with other researchers in the field. This volume describes several projects that have made environmental and ecological researchers' data freely available online. Librarians from the National Aeronautics and Space Administration (NASA), the United States Geological Survey (USGS), from one regional agency based in Oregon, one university, and one research corporation describe aspects of the online data projects developed by their respective institutions. A sixth paper, from a librarian at State University of New York University at Buffalo, follows the development of online research data in a specific field, acid rain research, from a variety of types of research programs. A common theme in these papers is the interdisciplinary involvement of researchers who produce and use data in the fields of environmental and ecological studies.

In their paper, "Cooperative Design, Development, and Management of Interdisciplinary Data to Support the Global Environmental Change Research Community," Downs and Chen taut the value of online data for interdisciplinary research while calling our attention to the principally unrecognized difficulties due to differences in the terminology and protocols of various disciplines and the ability to interpret the meaning of data gathered for the research in another discipline. Described in this paper are a multitude of factors that required definition, structure, and procedures to develop the Center for International Earth Science Information Network (CIESIN) at Columbia University. Here an organizational system and administrative infrastructure of knowledge workers and information systems was developed to foster and support interdisciplinary research that is focused on global environmental change (GEC). This is an appropriate opening for this volume as it lays the foundation for the various aspects for consideration in such projects. For example, the authors describe in detail processes involving

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intellectual property rights management, identification of qualifying data to be included and acquired, internal cataloging, the establishment of metadata (essentially data about data) criteria, web designers and other professionals to facilitate access to the varied user community, archiving considerations, and facilitation of identification and assistance with retrieval of needed resources by the user community. Qualifying data for inclusion involves a peer review process similar to that used for journal publication. Quantitative metrics are collected to assess viability of the data center, data delivery, and user satisfaction. In the article, sample online data products are described as well as future project directions and ongoing partnerships.

A government agency interdisciplinary online data project is described in "Beyond Bibliography: A Dynamic Approach to the Cataloging of Multidisciplinary Environmental Data for Global Change Research." Gene R. Major describes the multidisciplinary field of global environmental change research as being comprised of oceanographers, climatologists, ecologists, geologists, hydrologists, agriculture researchers, geophysicists, and health researchers, among others. In this paper, Major describes in detail the challenges of developing and applying new technologies of adapting research data for online interdisciplinary research use and for sharing metadata. Keys to aid researchers and librarians in locating the data in the NASA database, Global Change Master Directory (GCMD), are the hierarchical structure of the controlled vocabularies that describe the earth science data sets in the Directory and the use of semantic metadata in a particular format (Directory Interchange Format (DIF)). In many disciplines the researcher's data often vanishes once the analysis is done and the paper published. As with many other fields, preservation of global change research data is important to advance the understanding of this area of vital importance.

While the first two papers in this volume provide detailed insight into some of the management principles and concepts involved in universal access into online data, in his paper, "A National Environmental Data Network Revealed Through the Study of Acid Rain," Fred Stoss tracks the availability of research data for one particular global environmental problem, that of acid rain. Of especial interest in this paper is the historical perspective that contributed to the building of acid rain information from decades of research, and the subsequent development of online access to environmental and ecological data from these studies. Stoss also describes representative samples from a variety of government agencies, universities, and organizations that provide data related to acid rain research and related studies, and outlines future prospects for the development, recognition, and use of these online sources of data.

The fourth paper, "Information Science and Technology Developments Within the National Biological Information Infrastructure" describes a portal

project for specific biological collections available on the Web. Created by a federal government agency, the USGS, the National Biological Information Infrastructure (NBII) is the nation's biological portal to all biological data and information within the United States, and is the United States's contribution to several international initiatives. In this paper, four co-authors from two different USGS agencies describe the challenges of the biological information world and the program, NBII, which was developed to address the challenges on a national scale. The portal, BioBot, is an intelligent agent that targets the NBII collection, major search engines and indexes, and specific biological collections on the Web. The accompanying profiling capability for current awareness, thesaurus structure, an individual user portal (NBII Knowledge portal), and the use of metatags are important features of this program. Also described is a public/private partnership with CSA, a publisher of indexes and abstracts for scientific literature for over thirty years, to provide a freely available single dissemination point for biocomplexity information from proprietary and nonproprietary (Web) resources.

In "Syracuse Research Corporation's Chemical Information Databases: Extraction and Compilation of Data Related to Environmental Fate and Exposure" seven co-authors from the Syracuse Research Corporation describe another government/private sector partnership. In a project sponsored by the Environmental Protection Agency, data related to the health and environmental impacts of chemicals are extracted from research publications, bibliographically referenced, and made available through several databases produced and maintained by Syracuse Research Corporation. Other databases that provide environmentally relevant physical and test properties and actual data files are completely accessible to the public. Licensed commercial PC versions provide enhancements to the interface.

The final article, "Convergence and Dissemination: A Brief History and Description of the StreamNet Project" is significant in that it portrays the development of a portal through which various researchers in the region deposit and disseminate information on fish and fisheries for the entire Columbia Basin Fish and Wildlife Program. StreamNet Regional Librarian, Lenora A. Oftedahl, describes the StreamNet Project and the StreamNet Library that archives and makes accessible the regional data and the referenced documents.

Further studies to identify fields of study in which actual research data is being shared online would be valuable to researchers, librarians, and their clients. Certainly the projects described in this volume serve as models for other disciplines, especially for the various aspects of handling data made available online, and for the structures of controlled vocabulary and metadata that make this data more accessible and usable on the Internet.

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Virginia Baldwin
Editor