



**The National Biological Information Infrastructure
Building Information & Geospatial Technologies for Biological Community**

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Abstract - Looking out an office window or exploring a community park, one can easily see the tremendous challenges that biological information presents the computer science community. Biological information varies in format, content, distribution depending whether or not it is information pertaining to a particular species (i.e. Brown Tree Snake), or a specific ecosystem, which often includes multiple species, land use characteristics, and geospatially referenced information. The complexity and uniqueness of each individual species or ecosystem do not easily lend themselves to today's computer science tools and applications. To address the challenges that the biological enterprise presents the National Biological Information Infrastructure (NBII) (<http://www.nbii.gov>) was established in 1993. The NBII is designed to address these issues on a National scale and Regional scale within the United States, and through international partnerships abroad. This poster would discuss current computer, geospatial, and information science efforts within the National Biological Information Infrastructure Program to aid in the development and implementation of regional and thematic nodes throughout the country.

1. Introduction

The National Biological Information Infrastructure (NBII) is a broad, collaborative program designed to provide increased access to data and information on the Nation's biological resources. The NBII links diverse, high-quality biological databases, information products, and analytical tools maintained by NBII partners and other contributors in government agencies, academic institutions, non-government organizations, and private industry. NBII partners and collaborators also work on new standards, tools, and technologies that make it easier to find, integrate, and apply biological resources information. Resource managers, scientists, educators, and the general public use the NBII to answer a wide range of questions related to the management, use, or conservation of this Nation's biological resources.

The Challenges of Biological Information

Biodiversity data are collected by a variety of organizations within the US for purposes of scientific understanding and natural resource management. Scientific enquiry includes studies that are carried out by educational institutions, museums, and zoos. These institutions are funded through private organizations or the government and provide a wealth of data used to address basic scientific questions related to biodiversity. The information and knowledge derived are made available through the peer review process and provide much of the foundational understanding of biodiversity. Decisions regarding the availability of the resulting data are based upon a variety of criteria, including personal preference; organizational policies; availability of funds; technological capabilities for storage and access; and commercialization potential. The length of time that the data will be made available is also subject to a similar set of criteria, including longevity of both the storage medium and the technology used to store the data sets; the institution's archival policies; funding to support the maintenance of the archive; and the potential long-term financial value of the data. Clearly, the physical and temporal aspects of access are key issues for biological information.

In addition to institutionally owned biodiversity data, similar data are collected under the auspices of various governmental bodies. The scope and scale of the data varies, but is often targeted to local issues such as land use planning, or invasive or endangered species. In addition, there are numerous data collection activities at regional and national levels, with little or no national coordinated integration between these levels or with the more localized data collections (PCAST, 1998). Data therefore exists in disparate formats, at varying scales, on servers that may or may not be accessible, or even known by, other researchers. Costly duplication of efforts, loss of collaborative opportunities, and the unknown existence of key data holdings are only some of the persistent failings associated with remotely held data collections. An additional thought to consider: local and Federal government agencies are likely funding agents for the basic science discussed above.

2. NBII Enterprise Framework

The NBII is addressing these information and computer science issues, and related policies, within the United States as well as internationally, through its various organizational and technological partnerships. These challenges have resulted in the development of several NBII tools and services that have greatly aided users in the creation, discovery, management, and delivery of their information. These tools and services can be described within the context of the NBII Enterprise Framework as depicted in Figure 1 below.



Figure 1: NBII Enterprise Framework

The NBII Enterprise Framework, identifies the various Knowledge Management, Technology Management, and Program Management components of the NBII Program. Specific Knowledge and Technology Management components are briefly described below:

- NBII Web Catalog Resource Tool – The ability for NBII Nodes and partners to identify, catalog, and share resources quickly and seamlessly throughout the NBII network is supported through the implementation of this web-based Dublin Core metadata tool. (<http://inputtool.nbii.gov>)
- Web and Metadata Standards – The importance of a transparent user interface, regardless of where data exists or its format is vital in meeting your organizations data delivery and integration goals. The NBII currently has deployed a number of web standards, tools to implement and validate these standards, and provides technical support to NBII partners implementing these standards. (<http://metadata.nbii.gov>)
- OpenGIS Standards – The NBII fully supports the Open GIS Standards as it relates to the sharing of web mapping applications and data layers. The NBII Open Viewer provides the capabilities for users to easily access distributed data layers from the over 35 web mapping applications currently deployed within the NBII network. (<http://www.nbii.gov>)

- BioBot Search Tool – The NBII BioBot Search tool easily facilitates access to all NBII data holdings, regardless of whether type of format or where they exist. The BioBot Search Tool serves as the overall integrator for NBII data and information within the network. (<http://search.nbii.gov>)
- My NBII Portal – The My NBII Portal is the primary means of collaboration, security, and system integrator within the NBII network. The My NBII portal provides over 50 different communities of practice throughout the United States, currently supports over 1,200 users, and provides a single user interface to support activities related to the NBII Program. (<http://my.nbii.gov>)

3. Conclusion

As the World-Wide-Web continues to attract new users and grow exponentially in data, the importance of finding relevant, authoritative, biological information quickly and accurately becomes imperative. The NBII is the Nation's biological portal to all biological data and information within the United States, and is the US contribution to several international initiatives; thus, it must continue to identify new and more effective means for the discovery, retrieval, and dissemination of these critical resources. Currently, one of the more effective methods for doing this is through the use of meta-information, the BioBot intelligent agent, the My NBII Portal, and various geospatial tools under development. As technology changes, so too will our approaches to solving this ever-growing and ongoing challenge.