Assessing the Need for a Natural Resources Digital Library

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Abstract

To guide the design, content, and development of a natural resources digital library, the Oregon State University Libraries commissioned a needs assessment. Interviews with citizens, policy makers, and scientists show that potential users want to quickly find, retrieve, integrate, and synthesize well organized and geo-referenced information on Oregon's natural resources, and they welcome the library's intent to develop such an information resource.

Introduction

Rich and abundant natural resources shape the quality of life Oregonians enjoy, but population pressure, growing demand for water, concerns about deteriorating environmental health and declining native species place this quality of life in jeopardy. Citizens, government officials, and scientists are calling for more and more changes in natural resources policy, management, business practices, and research. To inform decision-making and environmental stewardship, planners and policy-makers must have access to high quality, timely information resources.

Oregon's State of the Environment Report (Oregon Progress Board 2000) notes that essential data, maps, and information on natural resources are largely inaccessible, unusable or non-existent. Building on its land-grant mission and commitment to creating information resources that reflect the research strengths of Oregon State University, library administration decided to create a natural resources digital library to remedy the situation. The first step was to commission a needs assessment.

The overall goal of the needs assessment was to determine whether information needs are being met, and if not, what should be done to provide an accessible and understandable

digital library. The assessment focused on two fundamental questions: (1) By providing better access to existing natural resources information through a digital library will users be able to make informed decisions about natural resources policy and practice? And (2) When information is accessed, can it be understood? The intended audience for the digital library includes policy makers, scientists, educators, community groups, and citizens; potential users from academia, business, conservation groups, environmental consulting groups, extension services, government agencies, and watershed councils were targeted for interviews.

Background

Reports on needs assessments conducted prior to creating digital libraries -- at the "needs analysis, wants identification, and ideas-about-what-to-build-stages" (National Research Council 1998) are rare in the literature. Evaluation of designs and content for digital libraries appear more often, but they too are scarce. Although many researchers call for involving stakeholders early and at all stages of development, the common approach is "build it and they will come." Hesitation about asking users in advance of creating a digital library seems to be based on the idea that people have trouble describing what they have never seen or used. This can lead to assessments that focus on needs expressed by articulate providers of information and not the users of information.

In an extensive review (in press) of assessing needs and impact of digital libraries, Marchionini, Plaisant, and Komlodi, note that the "fundamental goal of needs assessment is to identify large numbers of specific needs and map these unique needs into common classes of needs that may be met with standardized procedures. A related goal is to assist/guide people in mapping their personal needs into systems supported tasks." They conducted a multi-faceted needs assessment of current and potential users of Library of Congress' National Digital Library through reading room visits, interviews, and questionnaires.

Projects notable for extensive user needs assessment and evaluation are the Alexandria Digital Library Project (Hill et al. 1997) and the Adaptive Management Portal Project (USDA Forest Service Pacific Northwest Research Station in progress). In 1996, the user needs analysis team for the Alexandria Digital Library focused on what use earth scientists, information specialists, and educators would make of a digital library if it met all their needs. Through target user group meetings, the project developed clear sets of expectations from the different user groups. The Adaptive Management Portal Project staff has interviewed groups of information providers and users in different geographic locales since Spring 2000. Results from phase 1 of their assessment are available online. Technical, organizational, semantic and business aspects of the information management system and process needs and desires are being explored.

In 1998, the Archaeology Data Service at the University of York in the United Kingdom was commissioned to study the creation, archiving, use, and re-use of digital data (Condron et al. 1999). The findings show that archaeologists want access to large

quantities of varied kinds of information to incorporate into all aspects of their work. They also want this information to be free of charge.

In the planning documents for a grant-funded study of users of image collections, researchers at Penn State University Libraries plan to build on the techniques used in new product development in the commercial sector (Pisciotta et al. 2001). They will use a number of user perception measures including surveys and interviews to learn about the needs of teachers, students, and collection managers.

Assessment Design

Oregon State University Libraries' needs assessment began with interviews of key contacts in natural resources fields. It progressed to formal interviews of a variety of potential users, a workshop, and a plan for future projects.

Pre-assessment

Prior to the formal assessment, a pre-assessment involved meetings with 37 key contacts. Key contacts are providers of information, developers of information systems, and/or people who supervise or provide outreach to individuals who are users of information (e.g., academic deans). Conversations with these key contacts assisted with project design and selection of users, served to informally build a constituency for the digital library, and created a network of people who are interested in the outcome of the needs assessment and can advise on the current and future direction of the digital library.

User profile

Thirty-five individuals representing academia, business, conservation groups, environmental consulting groups, extension services, government agencies, and watershed councils were selected for interview. All the interviewees represented users of natural resources information. The top three primary uses for information were: research (26%), education (23%), and policy (20%). Other use categories were planning, coordination, outreach, and assessment.

Identification of questions

Eleven questions were carefully chosen to fit into an hour interview (Appendix). The University's Survey Research Center provided helpful assistance with the design of survey to ensure an objective and meaningful outcome. Interviewees were asked where they currently get their natural resources information, how they use the information, if information can be used off the shelf without any modification, and what information and information services they would like that are not currently available. The interviewer also sought to capture respondents' vision of a digital library without influencing their thoughts from a provider's perspective.

Face-to-face interviews (individual assessment of needs)

Face-to-face interviews were conducted over a four-month period (March-June 2001). Interviews averaged one hour. In two cases, two people were interviewed at the same time and these interviews lasted 1.5 hours. Interviews were not tape recorded, but extensive notes were taken and compiled in a spreadsheet for later evaluation. Interviewees had an opportunity to review their response for accuracy.

Workshop with users (collective assessment of user needs)

All of the individual interviews supported the need for a comprehensive natural resources digital library. Because of the diversity of needs expressed by users in the interviews, we decided to organize a group discussion specifically on how to move forward. A workshop was held to seek recommendations on the creation of a prototype, or proof of concept, for a natural resource digital library from the collective perspective of users and key contacts. The workshop was extremely helpful and provided the library with a blueprint for moving forward in a way that corresponds with user-defined needs.

Findings

The needs assessment process was intentionally designed with open-ended questions to facilitate the most creative and non-constrained responses from potential users. Although the interview responses were largely qualitative, certain patterns and themes emerged that enabled a quantitative reporting of the collective response.

Current sources for natural resources information

Users largely depend on personal in-house collections (29%), web sites (26%), direct people contacts (20%), and agencies (20%) for their natural resources information. A very small percentage (5%) utilizes university library collections as their primary source of information.

Kinds of natural resources information users need

The term "natural resources" is defined broadly to include physical, biological, social, and economic elements. Most natural resource information is needed at a variety of spatial scales and geographic extents, with 1:24,000 the most commonly used scale. Geographic extents mentioned most frequently were watersheds, state, Pacific Northwest region, ecoregion, and county. Users want to identify a place and find the available information for that particular place.

More than 85% of potential users want more natural resource information available to them to support their work. In particular, they expressed a desire for basic geospatial information at 1:24,000 scale on the physical, biological and management features in the state. Specific information requested includes transportation, land use, habitat, vegetation,

fish and animal species, and water quality. Remote sensing data, historical information, and projections of future land use and land cover conditions are important. Synthesized materials in the form of maps, annotated bibliographies, webliographies, abstracts, research results, and successful restoration projects are also desired.

Ability to use information off the shelf

More than 90% of users are not able to take natural resources information off the shelf and use it. Interviewees noted that the kinds of transformations they often perform are data integration and synthesis (e.g., combining water quantity and fish distribution data); filling in data gaps (e.g., interpolating water temperature data where stream gauges are not in place), and remedying temporal and spatial inconsistencies (e.g., evaluating historical and future forest conditions when the information is collected in different ways across the state). In order to perform these transformations, high quality metadata is crucial.

Natural resource collection(s) of greatest value today

The interviewees identified three high priority natural resource thematic areas: watersheds, land and water use, and forestry. Examples of the type of questions users currently ask about these themes are:

- What are the fish species and their distribution in a particular watershed?
- What is the history behind Klamath River Basin water allocation conflicts?
- What will the future species mix and forest structure be in Oregon's Coast Range?

The consensus is that these three kinds of content themes are not mutually exclusive, and information can be made available on aspects of these three themes at a variety of spatial scales.

Accessing natural resource information

Users agree that access to existing information is paramount. Less emphasis is placed on the development of new information. Interviewees said that they consider it acceptable to allow the depth of information to vary for the various spatial scales based on extent of available information. Although it is useful to target areas that have a wealth of information, interviewees advocated for building a prototype that includes places for which information is sparse.

Important services and web functions to provide in a natural resource digital library

Potential users' familiarity with the concept of a digital library ranged from "not at all" (34%) to "little" (<10%) to "somewhat" (31%), to "familiar" (26%). Although most interviewees were less than somewhat familiar with digital libraries, all had a good understanding of what a digital library could feature.

A variety of features were mentioned as useful components of a digital library. In order of importance these features were: powerful search capability; access to spatial data; access to full-text documents and reports; immediate accessibility; and access to synthesized information. It is clear that information needs are quite broad and go beyond traditional library holdings and services. Specifically, users want to be able to quickly find, retrieve, integrate, and synthesize geo-referenced and well organized documents, maps, spatial data, computer models, databases, spreadsheets, analytical results, video clips, audio clips, photographs, satellite imagery, presentation materials, and people contacts at various spatial and temporal contexts across terrestrial, aquatic, and marine environments.

Future Projects -- Moving Forward with a Natural Resources Digital Library

Based on the results of our needs assessment, Oregon State University Libraries plans to continue the development of the natural resources digital library and work with key contacts and interviewees on the design and implementation. Next steps are to:

1. Design a prototype that will demonstrate electronic access to natural resource information at multiple spatial scales: state (Oregon), basin (Willamette Basin), ecoregion (Willamette Valley), watershed (5th or 6th order watershed), county, and perhaps research forest (H.J. Andrews Long Term Ecological Reserve), and temporal scales (present day, future projections, historical conditions);
2. Address aquatic, terrestrial, and marine environments;
3. Demonstrate multi-format data and information discovery;
4. Enable data and information integration and synthesis; provide evaluations of information quality and data gaps;
5. Facilitate people networking (e.g., searchable database of contact information, research in progress, research findings, "ask an expert" feature);
6. Provide assistance to users of natural resource information accessed through a digital library (e.g., new kind of extension agent); and
7. Secure long-term funding.

We believe the needs assessment has been a worthwhile investment, and the continued involvement of "real users" will result in a natural resources digital library at Oregon State University that will be used and valued.

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Appendix

Interview Questions

1. Do you use natural resources information for your work?
2. Where do you go to access natural resources information for your decision-making? Which site(s) is most important to you?
3. Can you describe how you used natural resources information to address a recent resource management decision or issue? What geographic and temporal scales are most useful for the work you do?
4. Did you have to do anything to the information to make it useful (e.g., change the scale, change the attributes, update, fill in data gaps, synthesize with other information)?
5. In recent decision-making tasks, what kinds of natural resources information did you need that you were not able to access? Is there other information you wish you could have access to for your work?
6. How much do you know about the concept of a Digital Library? Tell me what the term Digital Library means to you and how you would use one.
7. Have you used the OSU Libraries in the last 3 months to access information? If so, what kinds of sources did you use? Did they meet your needs?

8. Assuming the OSU Libraries form a digital library, what prototype or collection(s) would be of the greatest benefit to you professionally? Do you think the OSU Libraries should move forward with a Natural Resources Digital Library? Is a Natural Resources Digital Library the appropriate name? Are you familiar with other efforts with a similar goal?
9. In your opinion, what are important measures of effectiveness for a natural resources digital library?
10. Thinking of other ways to access information, what is your favorite web site? What is the best feature of this web site? (note: this does not have to be a source for natural resource information)?