

Harvesting Information to Sustain our Forests^{*+}

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1 Introduction

We are building a web-based system to provide easy access to documents for use by natural resource managers, scientists and other interested parties in the Pacific Northwest. We are focusing, initially, on the Adaptive Management Area Program (www.fs.fed.us/r6/plan/adapt.htm). The USDA Forest Service (FS), the lead government partner, collaborates with natural resource management specialists from the USDI Bureau of Land Management (BLM), USDI Fish and Wildlife Service (FWS), as well as other agencies and groups.

2 Articulating the problem: ongoing interaction with federal agencies

We are interviewing and studying the work processes of prospective users of the system including policymakers, land managers, researchers, and citizens, as an ongoing part of this project. We discovered that they need credible, relevant information (e.g., observations, surveys, model results) to create new documents (e.g., Environmental Assessments, Decision Notices) and to fulfill requests for information, e.g., to comply with the Freedom of Information Act. Figure 1 shows the diversity of information sources, which can include maps, geographic information system (GIS) datasets, scientific datasets, and both paper and electronic documents. Our project focuses on documents because documents are important to resource managers and the current environment offers little support for systematically finding documents.

The natural resource management specialists, under the direction of Tolle and Toccalino, have identified twenty-eight topical domains of interest (e.g., location, hydrology, climate, vegetation) so far for classifying and searching for documents. Note that users often need information about a specific place, because they need to choose a course of action for that place. They also benefit from information about places that are similar to the place of interest, where similarity is defined based on the relevant domains.

3 Building the solution: a cross-disciplinary team of academics

The computer science team, led by Delcambre, Maier, and Shapiro, is focusing on representing and exploiting richly structured metadata using controlled vocabularies for the twenty-eight domains of interest. Often, multiple controlled vocabularies are in common use for a given domain. For example, location is one important domain with approximately a dozen, useful

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+ Kinley Campbell, Erin Cleary, Emily Langston, Qing Liu, and Jordan Wirfs-Brock and are also active participants in this project through the Apprenticeships in Science and Engineering Program, a program for high school students.

controlled vocabularies, including political locations (state/county/city), FS locations (region/national forest/ranger district), BLM locations (states/districts), and watersheds (hydrologic unit codes).

Metadata++ is our framework for representing and searching metadata attached to document proxies [WDM01]. Figure 2 shows a notional user interface for attaching metadata to a document. A user selects terms from a controlled vocabulary (shown on the left) and the system records the context where the term was selected. Metadata++ is inspired by concepts from traditional metadata, thesauri, and ontologies but Metadata++ offers greater flexibility to organize terms in the various controlled vocabularies.

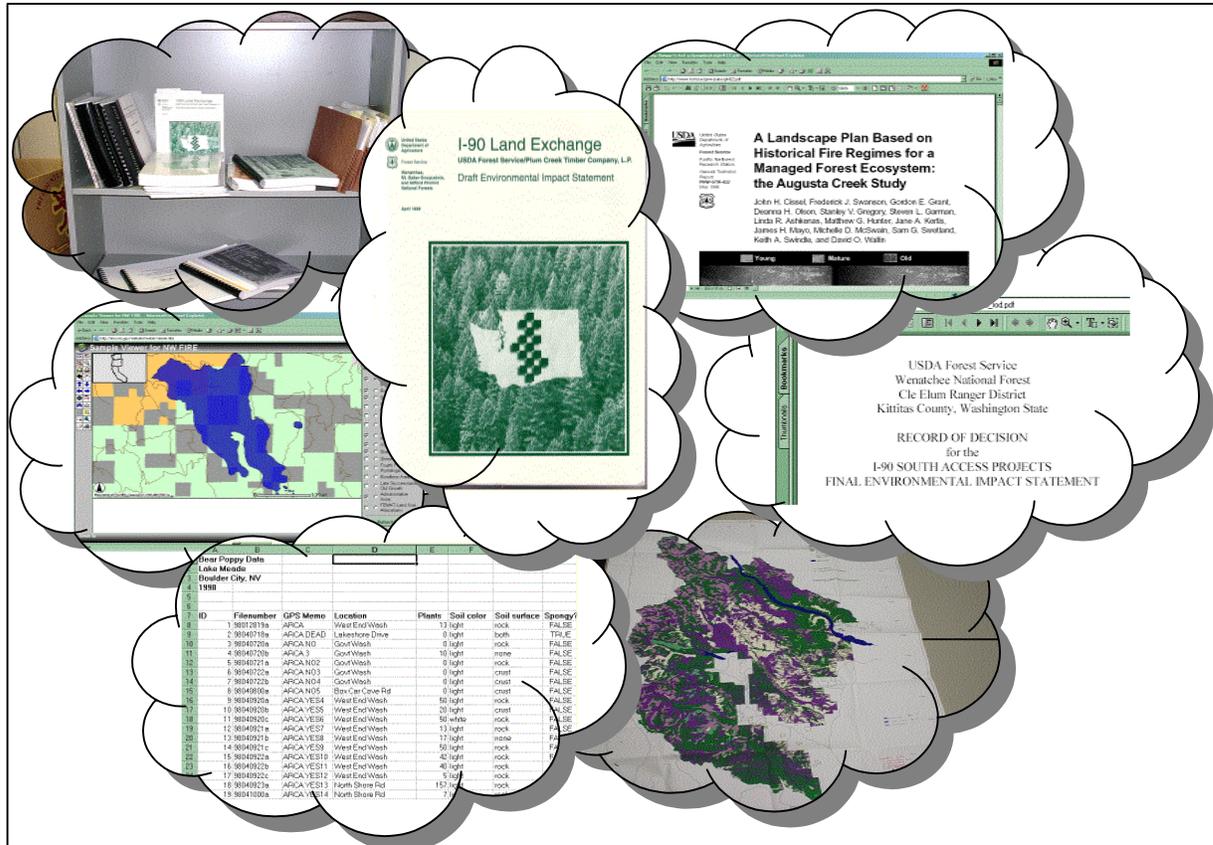


Figure 1: Information of Interest to Natural Resource Managers

The environmental science team, led by Toccalino, is evaluating controlled vocabularies, particularly climate, vegetation and soil classification schemes. Phillips is studying the success criteria for research consortia and evaluating business models of commercial portals. Steckler and Koch are studying inhibitors and facilitators for information sharing across agency boundaries.

This project will provide access to the tangible products that represent the knowledge created by natural resource managers and scientists. This project is also creating a rich knowledge base of terms and relationships for natural resource management that is useful in its own right.

References

[WDM01] "A Superimposed Architecture for Enhanced Metadata", Mathew Weaver, Lois Delcambre, David Maier, DELOS Workshop on Interoperability in Digital Libraries, held in conjunction with European Conference on Digital Libraries (ECDL 2001), Darmstadt, Germany, Sept. 2001.

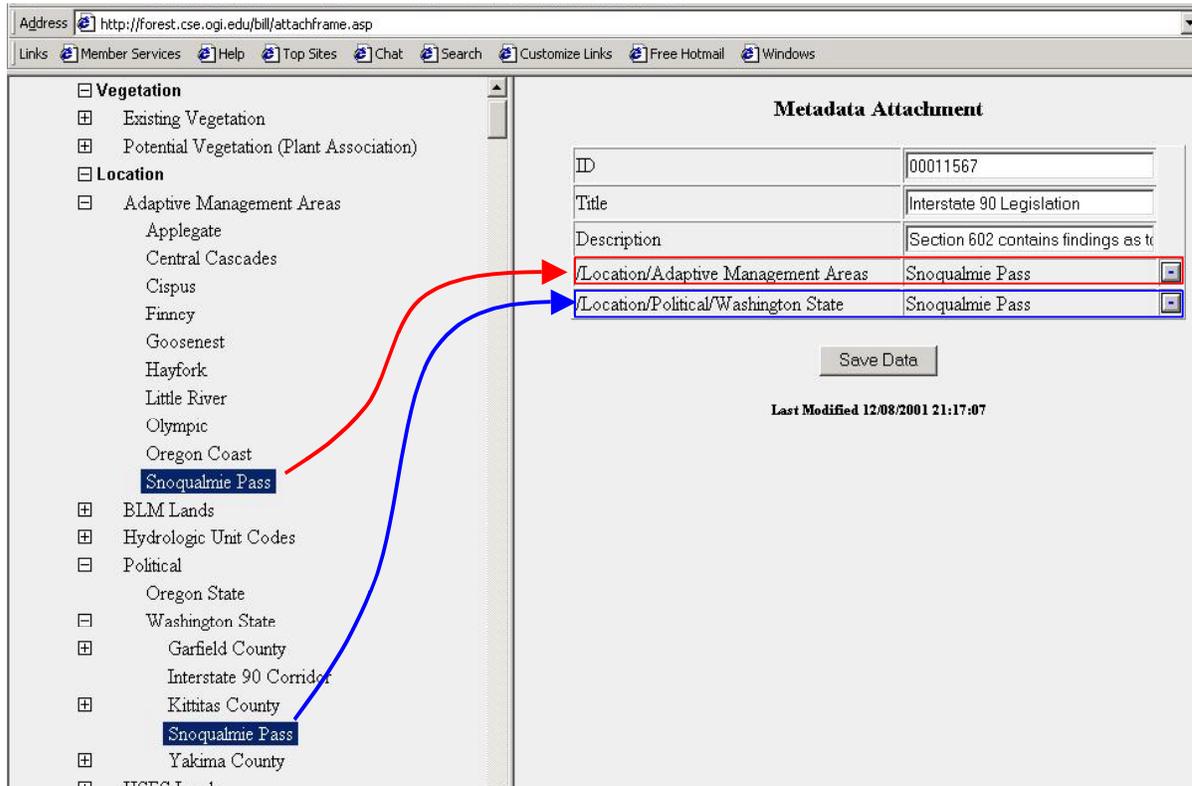


Figure 2: Notional User Interface for Attaching Metadata from Controlled Vocabularies