# Metadata++
# A Digital Library for Natural Resource Managers

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## 1. Introduction

The main goal of this project is to develop a digital library system for natural resource managers, such as the forest supervisors of the USDA Forest Service national forest system, and their technical staff. This project has a goal of "knowledge management" in that the scientific assessment, opinions, experience, and judgment of agency personnel are embodied in the various internal and external documents produced as part of various projects and decision-making processes. The idea is to make it very easy to find documents relevant to the current projects or problems and thus reuse information.

Our system, Metadata++, provides for the indexing, browsing, and searching for documents based on a large set of keywords appropriate for natural resource management. We have identified, evaluated and loaded keywords for natural resource domains (commonly used by practitioners) including: timber, recreation, watershed management, forest transportation management, wilderness management, soil management, air quality management, forest fire, fish and wildlife management, and mining. We have also included keywords for ecological science domains such as: plants, plant communities, animals, habitats, geology, pedology (soil science), and hydrology. Figure 1 shows a small portion of the hierarchy in Metadata++, with a few items expanded.

## 2. The Demo

Metadata++ uses the broader term/narrower term hierarchy as the main structure for keywords and documents. Keywords are displayed in the hierarchy; matching documents are displayed in the hierarchy; even compound searches are displayed within the hierarchy. Unlike most knowledge representation systems, Metadata++ allows a term to appear in multiple locations in the hierarchy. One contribution of Metadata++ is that we

use the fully qualified path of terms, from the root of the hierarchy, to disambiguate such terms. Another contribution of Metadata++ is displaying search results directly in the hierarchy, rather than using a ranking algorithm. Thus, the user is able to see the documents that match the search term directly, plus, in separate lists, the documents that match each descendant term in the hierarchy. Metadata++ also supports a compound search facility that fully exploits the synonyms and narrower terms of all terms in the search expression.

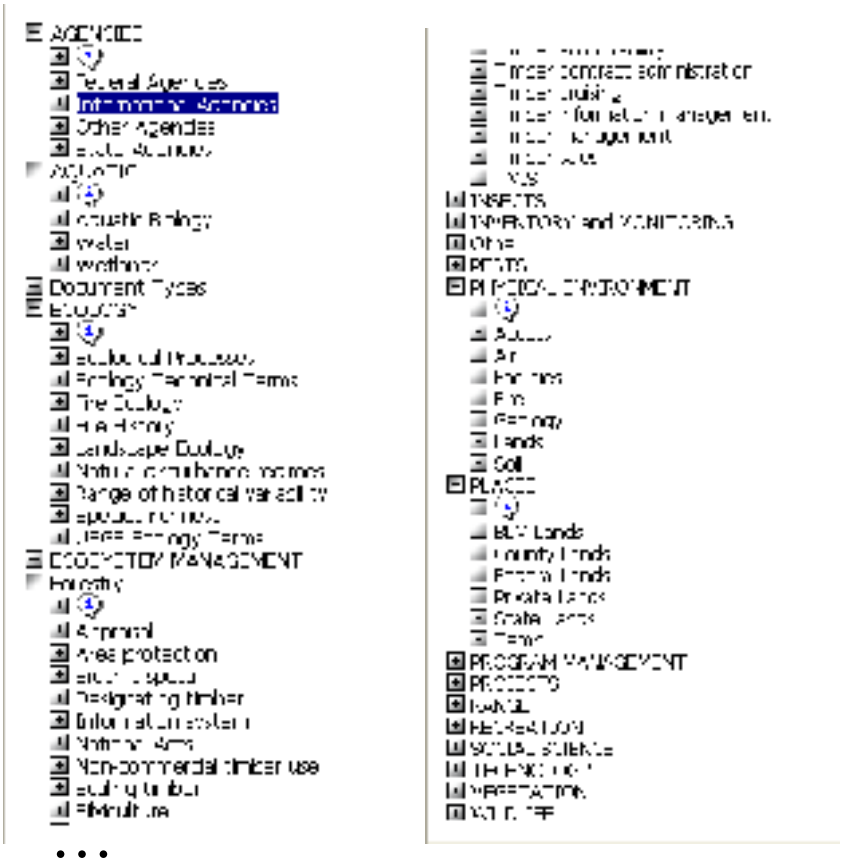


Figure 1: Portion of the Metadata++ Controlled Vocabularies

## 3. Status

The project team is currently working on steps to facilitate the deployment of Metadata++ for the USDA Forest Service. Agency personnel are working to enter a complete set of documents, with appropriate keywords, for one of the national forests in the Pacific Northwest. Plans for user testing are in progress. We are concentrating on the use of Metadata++ for indexing and searching, with particular attention on the features described in the preceding section.