Chapter 6: Data Management

Overview

In this thematic area of CRG Phase 2, we focused on three primary areas for data management: mapping, data integration, and digital repositories for long-term ecosystem monitoring.

CalJep

CalJep is a spatially enabled database that reconciles or cross-walks the two prominent electronic plant distribution lists for California: CalFlora and Jepson. We intersected the distribution information from the two data sources to create a refined spatial distribution repository that can be used to examine patterns of plant diversity, distribution ranges of individual plant species or infrataxa, or vegetation associations. These data will allow scientists and resource managers to examine potential range maps for non-native plants, create range maps for plant species of restoration interest, and corroborate lines of evidence for determining appropriate management and conservation activities. We present here a detailed description of the methods used to create the CalJep geodatabase, data rendered from its creation, and a discussion of its applicability to a wide range of biogeographical and ecological questions, including restoration planning and adaptive management for the Bay-Delta ecosystem. CalJep records 7,887 plant species, subspecies, and varieties mapped onto 228 ecological subunits with corresponding distributional information for vascular plant species at varying levels of confidence. Information derived from this geodatabase is inherently as accurate as the digital floras used to create it; hence, its utility is best realized when implemented at the regional or statewide scale. CalJep provides a previously unavailable service to vegetation science in California and to resource managers operating within the Bay-Delta ecosystem.

Geodatabases

By combining the advantages of a geographic information system for mapping and data storage with the advantages of a relational database for data management, a geodatabase offers the potential to store monitoring data in a format which is visibly and organizationally accessible. We have developed a ESRI ArcGIS 9 versioned geodatabase designed specifically to track population dynamics of vegetation patches over time.

Use of standardized data storage methods is fundamental good science, and provides the basis for incremental experimentation over the long term. Thus, we advovate for standardized framework methodologies within a geodatabase to provide a measure of certainty in future research. Our approach was to provide the opportunity to examine environmental conditions at the scale of hectares to square kilometers, and landscape parameterization at the watershed scale.

Data Management Strategies

The Cosumnes Research Group II (CRG) has employed open standards and used open source software as part of an overall data management strategy and in the process has created a data storage framework that can serve as the basis for future data transactions. We feel this has been an important data architecture decision from the inception of CRG.

We constructed the [CRG website](http://baydelta.ucdavis.edu) using the [Drupal Content Management System](http://www.drupal.org) integrated with the [Coppermine Photo Gallery](http://coppermine.sf.net). In addition, the database, webserver, operating system, and programming language running this website have an Open Source software license.

Documents

The following documents are available for more detailed information on the results of our efforts, including links to data stores:

* [CalJep: A Spatial Distribution Database of CalFlora and Jepson Plant Species, *San Francisco Estuary and Watershed Science*, Viers, J.H., Thorne, J.H., Quinn, J.F.](http://baydelta.ucdavis.edu/files/crg/reports/CalJep_Viers_etal_2006-1.pdf) or External link: [CalJep Publication](http://repositories.cdlib.org/jmie/sfews/vol4/iss1/art1/)
* [Geodatabase Application for Invasive Plant Tracking and Coordinated Habitat Restoration, (Joshua H. Viers, Ingrid B. Hogle, Deanne DiPietro, Samir Arora, Marat Gubaydullin, and James F. Quinn).](http://baydelta.ucdavis.edu/files/crg/reports/ESRI_Viers_etal_2005.pdf)
* [Data Management Strategies Report (Waetjen, et al)](http://baydelta.ucdavis.edu/files/crg/reports/DataMgmt_Waetjen_etal2006.pdf)