



SONOMA ECOLOGY CENTER
RESEARCH & INFORMATION SERVICES

**Metadata Training and Data Coordination
Agreement 08HQAG0030
Interim Report
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By

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Prepared for

NSDI Grants Officer
U.S. Geological Survey
NSDI Cooperative Agreements Program
Metadata Training & Outreach Project

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Executive Summary

At Sonoma Ecology Center (SEC), we are reaching two different communities with metadata training –conservation GIS professionals, and future professionals now enrolled in the regional university’s Geography curriculum. We plan a two-pronged approach of workshops and classroom teaching, and continued metadata program support through the San Francisco Bay Area Conservation Commons (SFBACC). We held a one-day workshop for GIS professionals in August, we are teaching a metadata module at Sonoma State University (SSU) in the introductory GIS class this winter, and we are providing on-going metadata program support for workshop participants and other colleagues in the region. We plan to host the Sonoma County Conservation GIS Group meeting in early 2009, where we will provide an additional metadata training workshop.

In early summer we publicized the August workshop through three regional conservation GIS groups and the Society for Conservation GIS Conference. The morning session focused on the basic metadata curriculum, and in the afternoon we addressed practical aspects of a successful metadata program, as well as issues in publishing and sharing metadata.

Project Narrative

This project further builds upon the establishment of the San Francisco Bay Area Conservation Commons, partially funded by two previous NSDI CAP grants (2004 and 2006).

SEC and our CERES partner recognize the need to regionalize geographic information management and data development. Multiple projects are creating and using similar types of information, and the sharing and integration of the information is known to be lacking. This lack of coordination hampers efforts in water conservation, water supply, ecological restoration of fisheries and wetlands, sustainable water use, water quality management, flood protection, environmental education, and land use planning. In response to this need, The North Bay Initiative for an Environmental Information Commons had its first official meeting on May 12, 2005 wherein it established an online forum for discussion of issues, a Mission Statement, and draft set of Specifications for a Regional Environmental Digital Library Network. The NBI groundwork continues today as the San Francisco Bay Area Conservation Commons (see <http://calconservationcommons.net/about-the-commons-1>).

The current project provides the necessary outreach and education to promote a regional inventory of spatial data and environmental information. To accomplish this, the CERES Environmental Information Clearinghouse is being used for the creation and posting of FGDC-compliant metadata to the state’s NSDI Node at <http://ceic.resources.ca.gov/>. Interest in the San Francisco North Bay region regarding the effective exchange of environmental information remains very high, as was reflected in the attendance at the one-day environmental data management workshop we conducted in August for regional conservation GIS practitioners. Most of the workshop participants plan to serve their metadata catalogs from their own organizations, for active or automatic harvest into the Clearinghouse at CERES. These catalogs are updated from the source of the information, as the organizations make changes directly to their own in-house libraries. All of these live-updated collections will be maintained at CERES for inclusion in the NSDI.

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The Commons continues to plan additional software and techniques for this digital library network that will enable and support metadata creation and use, from the local library to the regional network. This is becoming increasingly important since CERES intends to abandon the online metadata editor function in the Clearinghouse, and focus on metadata harvest to populate the catalogs.

Products and activities of the current project:

1. One workshop was held to teach members of the Conservation Commons to create libraries of FGDC-compliant metadata and share them using the technology under continuing development by both the Commons and CERES.
2. Ongoing metadata and metadata program support is made available through the Commons' communication portal, by phone, email, and in person by project staff.
3. Focused support for SSU's Map Library and intern program.
4. Project staff is writing a metadata curriculum module for Sonoma State University's Introduction to Geography class, and will teach both the lecture and lab classes during the last week of October and first week of November 2008.
5. A second workshop together with CERES Clearinghouse staff is planned for early 2009, to take place at the semi-annual meeting of the Sonoma County Conservation GIS Group.

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Metadata Training and Outreach Assistance Activities

1. Metadata training workshop for GIS professionals

A one-day workshop was conducted by Deanne DiPietro and Pat Stiefer at SSU's Geographic Information Center Computer Lab, on Wednesday, Aug. 20, 2008. Both trainers conducted several metadata training workshops under previous CAP grants (2004 and 2006), and Ms. Stiefer attended the FGDC Train-the-Trainer workshop in 2007. Ms. DiPietro is the Manager of the Research & Information Services Program at Sonoma Ecology Center, and has 14 years experience in mapping and environmental data systems, remote sensing, and digital libraries. In earlier work for the California Resources Agency she was a co-developer of the CERES Program and its Environmental Information Catalog, and has taught hundreds of data owners how to catalog and share their environmental data. Ms. Stiefer is a professional librarian and GIS practitioner, with 25 years of experience in the organization and documentation of both spatial and non-spatial information resources.

In early summer we publicized the workshop through regional conservation GIS groups and at the Society for Conservation GIS Conference in Monterey, CA. We had a full house of 24 participants from county, state, and federal agencies, small non-government organizations, and private industry. The workshop included lecture with hands-on exercises using ArcCatalog and CERES online software. Workshop presentation materials are posted at the San Francisco Bay Area Conservation Commons website (see <http://calconservationcommons.net/training>).

The feedback during and after the workshop was very positive, especially when we opened the floor for participants to share their metadata program successes and challenges. This community-building exercise encouraged one participant in particular, who had long touted his opinion that metadata was something he couldn't be bothered with, to adopt a new attitude about the value of "doing the metadata". He had been disseminating crucial environmental planning spatial datasets representing the work of 20 – 30 regional scientists, without any metadata. He now intends to remedy the lack, and knows he can include resources for data/metadata management into future project planning.

Twenty-four representatives from 18 organizations, with varying levels of metadata experience received training in several methods of producing and sharing metadata. Although eight organizations had also sent representatives to one of our 2006 metadata training workshops or programming sprints, only 3 of the attendees this year were repeats. Organizations and number of attendees include

- Bay Area Open Space Council (Regional, 1)
- Sonoma State University (State, 2)
- California Dept. of Fish & Game (State, 1)
- Circuit Rider Productions (NGO, 1)
- Laguna de Santa Rosa (NGO, 2)
- Mendocino County GIS Department (County, 2)
- The Coastal Land Trust (NGO, 1)
- San Francisco Bay Joint Ventures/Ducks Unlimited (NGO, 1)
- Sonoma County Agricultural Preservation and Open Space District (County, 3)
- Cypress Grove Research Center (NGO, 1)
- North Coast Regional Water Quality Control Board, TMDL Unit (State, 1)

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- Point Reyes Bird Observatory Conservation Science (NGO, 2)
- California Dept. of Forestry and Fire Protection (State, 1)
- NOAA/National Marine Fisheries Service (Federal, 1)
- University of California Cooperative Extension Service, Ukiah (State/Federal, 1)
- West Coast Watershed (Private consulting firm, 1)
- Dow & Associates (Private consulting firm, 1)
- Mattole Restoration Council (NGO, 1)

The morning session focused on the basic metadata curriculum, and in the afternoon we addressed practical aspects of a successful metadata program, as well as issues in publishing and sharing metadata. We demonstrated how spatial data managers can create basic metadata necessary for organizing, finding, and sharing spatial datasets; how documenting the data helps others to use it, and suggested methods for organizing the data files on in-house servers. The afternoon session taught how to publish FGDC-standard metadata for search and discovery in the California Environmental Information Clearinghouse at CERES, and eventual harvest by NSDI.

An evaluation form (Appendix A) provided by FGDC was distributed to participants, and seventeen forms were returned. Only two of the respondents rated their prior knowledge as near expert. Respondents agreed with all other statements on the questionnaire, with one exception. Responses to challenging nature of the content on fell in the middle of the spectrum of agreement/disagreement. Responses to questions on page 2 varied widely. Most liked the inclusion of ‘further information’ references. Some thought it was a lot of information to cover in one day and should have been a two-day workshop, while others thought it could have been compressed into just half a day. Some thought it was useful having the computer hands-on experience; others thought it was too distracting to go from discussion to computer. Some thought learning about standards was helpful, while others thought discussion of FGDC/ISO standards was too remote a topic to be interesting. There were several requests for more information about other metadata editors, especially ones that would help create metadata for non-GIS resources, and that would create a searchable local catalog.

Responses varied to the handouts of the PowerPoint slides, which were designed for note-taking during the workshop. Most found them useful, but others wanted more information to take away; hopefully the many URLs to resources in the handouts themselves will serve that need. All presentations and a guide to further resources were posted on the SFBACC website after the training (see <http://calconservationcommons.net/training>).

2. Ongoing metadata program support

We have encouraged the workshop participants to stay in touch with us regarding their metadata questions and program issues, and have maintained contact through mass emailing about follow-up topics. We have had significant follow-ups with three organizations by email or personal meetings. In addition to a scheduled meeting with Dr. Mateo Clark at SSU, after the workshop we provided follow-up assistance to attendees from California Department of Forestry and Fire Protection, The Laguna Foundation, and North Coast Regional Water Quality Control Board.

We remain in close contact with CERES regarding their re-engineering, and are relaying their new developments or problems solved to workshop participants. In addition, we offer workshop participants and other colleagues free web-enabled data archive space on the SFBACC website (see

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<http://calconservationcommons.net/data-archive>), enabling smaller organizations to post the data behind the metadata for download via the FGDC standard field, "Online Linkage".

3. Support for SSU's Map Library and intern program

In early September SEC completed a series of consultations with Sonoma State University Geography department about cataloging their Map Library and publishing the metadata for ultimate harvest by NSDI. Although we remain available for further consultation, the Spring 2008 interns have already produced a prototype catalog and procedures that can be carried out by the incoming interns in Fall 2008 and following semesters. A short report made to Dr. Mateo Clark appears as Attachment B to this document).

4. Metadata curriculum module for Sonoma State University

Not yet completed; will be included in Final Report.

5. Second Workshop

Not yet completed; will be included in Final Report.

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Status of Metadata Service

Metadata is served by the owners at their individual metadata catalogs on CERES California Environmental Information Clearinghouse (see <http://ceres.ca.gov>). After establishing an individual metadata catalog, an organization can upload individual FGDC-xml files, use an interactive metadata editor form, or post the FGDC-xml files to a web-accessible file for harvest by CERES, which is in turn harvested by NSDI. Additional spatial and nonspatial metadata records may have been posted directly to CERES by organizations after the metadata workshop, but no count of postings has been made at this time.

CERES is in the midst of significant re-engineering of the California Clearinghouse services, and there is a need for a second half-day workshop on metadata publishing using these tools, once the changes have been completed. Feedback from the workshop participants, both during the workshop and in the following weeks, has been used by our CERES partner in this project to refine some of the metadata displays.

There is a need for assistance in providing continuing education and support services to the organizations that we trained and engaged in these first two metadata workshops. The organizations are now facing the task of delving into their information resources, some for the first time, with the goal of organizing it and cataloging it so it may 1) be found and used again in-house, and 2) shared with other organizations. The general message to us from them is “we can use help!” The task is big, especially for organizations that have existed for many years and have accumulated a lot of information resources. And in most cases, the work of cataloging has to be done in between all the day-to-day work. Consequently, it goes slowly, and the people trained need help remembering the techniques we taught them and getting the process underway in their own settings. Our sense is strongly that this cannot be the end of the story, or our investment will only be partially returned with successful catalogs that are kept up to date. We should keep offering workshops to increase our audience’s skill and confidence, continue answering questions that come up, and to have the opportunity to update them on new software and techniques released by the CalEDLN project.

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Next Steps (to be completed for the final report)

Feedback on Cooperative Agreements Program (to be completed for the final report)

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APPENDIX A

Evaluation Form

Please respond to each of the following questions, they are intended to allow us to improve specifics of the workshop. Take your time in order to provide us with the most accurate assessment of your experience.

Date: August 20, 2008

Instructor(s): Deanne DiPietro, Patricia Stiefer, Sonoma Ecology Center

Title of workshop: Environmental Data Management

Circle 1 – 5 with your evaluation.

	Strongly Disagree				Strongly agree
The overall experience of the outreach materials is positive.	1	2	3	4	5
My knowledge of the subject matter prior to the experience was at expert level.	1	2	3	4	5
The amount of information was appropriate for the time allowed.	1	2	3	4	5
The materials provided me useful information.	1	2	3	4	5
The pace, style, and use of presentation media was effective.	1	2	3	4	5
The workshop content was challenging.	1	2	3	4	5
Participation was encouraged.	1	2	3	4	5
The instructors responded to questions effectively.	1	2	3	4	5
The presenter(s) was knowledgeable about the subject.	1	2	3	4	5
Accomplishment of learning objectives.	1	2	3	4	5
The workbook/ handout materials were useful and effective.	1	2	3	4	5

More questions on page 2.

What were the major strengths of the workshop? What was the most useful?

What aspects of the workshop could be improved and how?

Can the workbook, if provided or other handout be improved and how?

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APPENDIX B

Consultation with Sonoma State University Map Library Intern Program

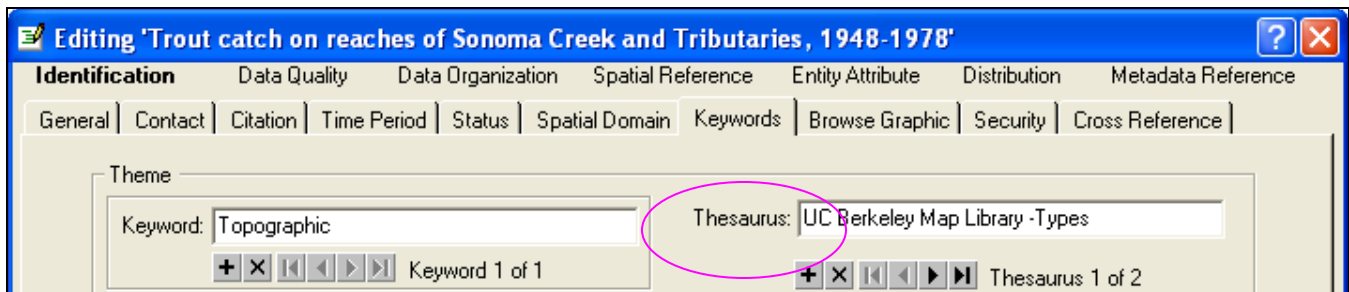
**Pat Stiefer, Digital Librarian
Sonoma Ecology Center
September 9, 2008**

CREATING METADATA FOR THE MAP LIBRARY

A. RESPONSES TO MAP INTERNS NOTES, SPRING 2008

The physical organization of the map library, processing of the paper map collections into a metadata library, and the overall library workflow are already so well-planned after an earlier consultation between SEC and Mateo that I find little of substance to add at this time. Here are three minor items in response to the May 2008 “Notes for Map Librarians” document.

1. The “Notes for Map Librarians” document makes a very valuable contribution – making the place or theme keywords co-extensive with the geographic or intellectual extent of the item being cataloged. This concept often eludes newcomers to subject-indexing, and the document conveyed the idea succinctly, illustrating retrieval implications with an example. I would suggest only the following:
 - **Theme keywords:** For future reference, add to SSU’s “Notes” document the source of the controlled vocabulary listed in the section “Keywords for Map Library Metadata Entry” – I’d love to have it for my own reference and can’t remember where to find it on the UC Berkeley website.
 - Name the thesaurus and add it into the corresponding **Thesaurus** field along with your keywords.



The screenshot shows a web-based metadata entry form titled "Editing 'Trout catch on reaches of Sonoma Creek and Tributaries, 1948-1978'". The form has several tabs: Identification, Data Quality, Data Organization, Spatial Reference, Entity Attribute, Distribution, and Metadata Reference. The "Keywords" tab is selected. Within the "Keywords" tab, there are sub-tabs: General, Contact, Citation, Time Period, Status, Spatial Domain, Keywords, Browse Graphic, Security, and Cross Reference. The "Theme" section is visible, containing a "Keyword" field with the text "Topographic" and a "Thesaurus" field with the text "UC Berkeley Map Library -Types". The "Thesaurus" field is circled in pink. Below the "Keyword" field are navigation buttons (+, x, left arrow, right arrow) and the text "Keyword 1 of 1". Below the "Thesaurus" field are similar navigation buttons and the text "Thesaurus 1 of 2".

Figure 1. Use the thesaurus name along with the map type keywords.

2. The Map Library interns suggested adding a field in the Keywords tab to describe the location of the map in the Map Library. Since the metadata editor isn't easily edited, and since a metadata record can have keyword(s) from multiple thesauri, I suggest simply make a list of locations and use it as another Thesaurus (whatever you want to name it). The list could be incorporated into "Notes to Map Librarians" document.

FYI, just click on the "+" under Thesaurus field to add another thesaurus, then add keywords from the additional thesaurus. The keyword fields are searchable in ArcCatalog, using the Advanced search tab.

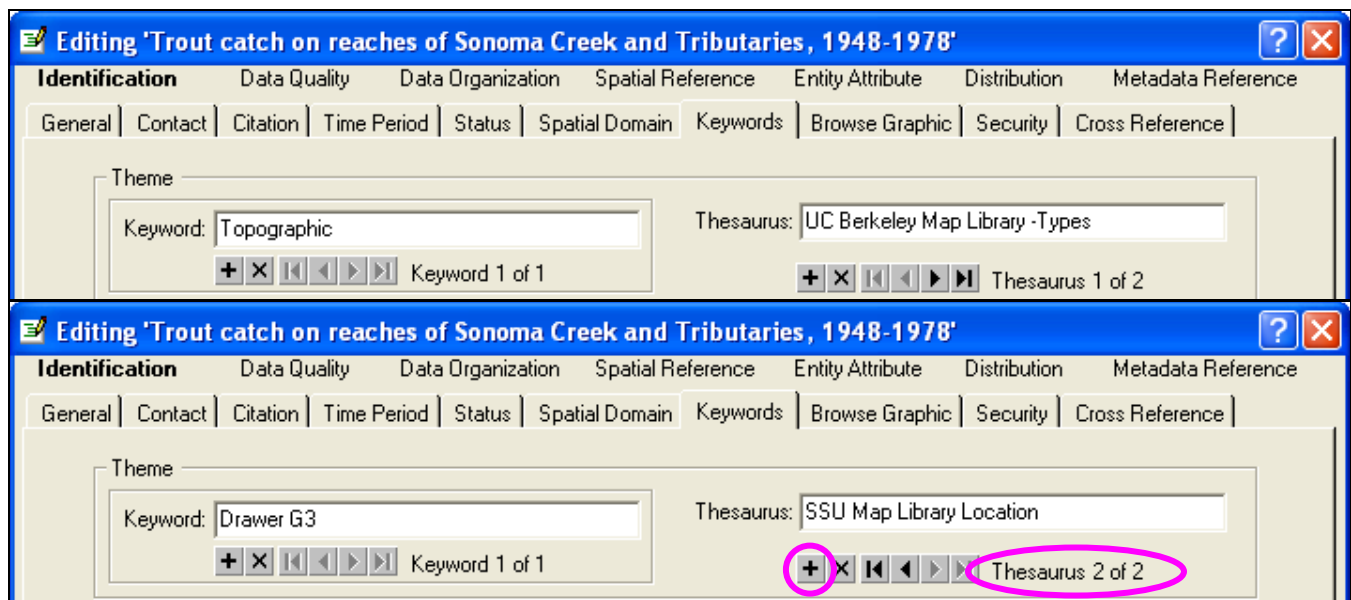


Figure 2. Adding (or deleting) Thesauri, and Keywords to an individual thesaurus.

- From the Map Interns' suggestions, "adding a field under the General tab for Miscellaneous information such as unique numbers, data, or characteristics that should be recorded to benefit a wide range of searchers....". Consider adding that information to the **Supplemental Information** field on the same "General" tab, or to the **Abstract** field, whichever is more appropriate.

Editing 'Trout catch on reaches of Sonoma Creek and Tributaries, 1948-1978'

Identification | Data Quality | Data Organization | Spatial Reference | Entity Attribute | Distribution | Metadata Reference

General | Contact | Citation | Time Period | Status | Spatial Domain | Keywords | Browse Graphic | Security | Cross Reference

Description

Abstract: Total trout catch on reaches of Sonoma Creek and Tributaries as reported by Jordan Basileu's "Fishin' and Huntin'" column in the Sonoma Index-Tribune, 1948-1978, as well as information from SEC's Oral History Report (2002).

Purpose: Mapped under grant from DFG to inform salmonid restoration

Language: en

Supplemental Information:

Access Constraints: none

Use Constraints: THE DATA INCLUDED IN THIS APPLICATION ARE BASED ON INTERPRETATION OF AVAILABLE INFORMATION AND SHOULD NOT BE CONSTRUED AS LEGALLY BINDING.

Data Set Credit:

Native Data Set Environment: Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 3; ESRI ArcCatalog 9.2.6.1500

Native Data Set Format: Shapefile

Save Cancel Help

Figure 3. Use the Supplemental Information field to add other descriptive information.

B. SUGGESTIONS FOR ADDITIONS TO YOUR TEMPLATE FOR PAPER MAPS

1. In your metadata records for paper maps, add a content type code, “Offline Data” in the Distribution section, General tab. This FGDC-standard field is a required field for publishing to an ArcIMS Metadata Service, and may be required by other metadata publish/harvest techniques.

Editing 'Trout population change in Sonoma Valley Watershed from the 1960s to the 1970s'

Identification Data Quality Data Organization Spatial Reference Entity Attribute **Distribution** Metadata Reference

General Distributor Standard Order Process Available Time Period

Resource Description: Offline Data

Distribution Liability:

Custom Order Process:

Technical Prerequisites:

+ X Navigation icons Distribution Information 1 of 1 Save Cancel Help

Figure 4. Include a content type code for some publishing/harvesting services.

2. You want to make it clear that these are metadata records for paper maps. Note that the “Native Data Set Format” field on the General tab in the ArcCatalog FGDC editor is part of the ESRI profile, and does not export to FGDC xml. While you can use this catalog locally by viewing and searching with ArcCatalog, you will always see “Personal GeoDatabase Feature Class” here because you are creating a point feature class in a geodatabase.

When you publish the metadata records, you want to make it clear that these are paper maps. The Data Organization tab contains FGDC-standard fields that will be exported with FGDC xml. The Direct Spatial Reference method is auto-populated with fields you don’t want. Make sure these fields are blank in your template. For paper map metadata records, it is a good idea to turn OFF the Automatic Metadata Create/Update functions for the FGDC Editor. Otherwise, ArcCatalog will fill in the blanks again for you.

The screenshot shows the 'Editing' window for a feature class named 'Trout population change in Sonoma Valley Watershed from the 1960s to the 1970s'. The 'Data Organization' tab is active. The 'Direct Spatial Reference Method' is set to 'Point'. The 'SDTS Terms' section shows 'Feature Type' as 'Simple', 'Topology' as 'FALSE', 'Feature Count' as '88', 'Spatial Index' as 'FALSE', and 'Linear Referencing' as 'FALSE'. The 'SDTS' section shows 'Point and Vector Object Type' as 'String' and 'Point and Vector Object Count' as '88'. The 'ESRI Terms Description' section is also visible.

Figure 5. Make sure these fields are blank in your template.

METADATA PUBLISHING

A. MAKING A CEIC CATALOG FOR THE SSU MAP LIBRARY

1. Go to <http://ceres.ca.gov> and click on “CEIC” button
2. Click “Start a new catalog”
3. The "Start a New Catalog" entry form is now only accessible after passing a "ReCaptcha" challenge. This is necessary because CEIC has been receiving too many nefarious postings of late. This is same method used by the comments function.

CEIC

To enable contribution and feedback features

Please enter the words you see in the box, in order and separated by a space.
If you cannot read the words click the reload icon. This prevents automated programs from abusing this service.
Advanced features for contribution and user feedback will be enabled for the current browser session.



Type the two words:
power Moltke



submit

4. The form remains the same, if you don't have a Harvest URL yet, you can add one later by editing your Catalog record, or by informing Roger Kunkle at CEIC (see contact information at http://www.ceres.ca.gov/prog_info/staff.html).

CEIC

In order to start a new catalog you will need to provide a point of contact and some basic information about your catalog.

After submitting this form you can proceed to add datasets to your catalog. Until your catalog and contact information has been reviewed and verified by CERES, it will be visible only to users who have logged in using your provided password.

An email notification will be sent when your catalog has been reviewed and you will then have the option of making your catalog publicly viewable.

Contact Name (*)	
Contact Email (*)	
Catalog Name (*)	
Organization (*)	
Organization URL:	http://
Metadata Harvest URL:	http://
Password (min 8 chars) (*)	
Retype Password (*)	
A brief description of your catalog:	

Submit Cancel

B. PUBLISHING METADATA TO SSU's CATALOG AT CALIFORNIA ENVIRONMENTAL INFORMATION CLEARINGHOUSE (CEIC)

Geographic Limitations?

1. There is no exclusion of materials geographically located outside of the state of California. Contributed metadata records that contain a bounding box will be “found” in the map-based search tool, currently running on Google Maps, which is world-wide.
 - This tool allows the user to zoom and pan to an area of interest, and metadata records within that extent automatically are retrieved and appear in a list at the bottom of the screen.
 - When a record with a populated bounding box is “moused over”, a Google Map-style flag appears in the map search window (centroid of the bounding box).
 - The map search tool currently opens by default to the extent of the state of California, but you can move beyond California.
2. Roger Kunkle cautions only this: future development could conceivably use other geographic discovery tools and there is no guarantee this tool will always have worldwide coverage.
3. There will always be an option to turn off the map search radio button, and use other search tools. – search by catalog, by keyword, etc.

Transferring the data

1. Interactive:
 - upload individual FGDC xml
 - use CEIC data entry form to create FGDC record
2. Harvest
 - Include URL for harvesting FGDC xml when creating your catalog, or edit form later.
 - Or call Roger Kunkle later to inform him of your harvest location
 - Ultimately, your records will be harvested from CEIC by NSDI.

Types of search on CEIC (see Figure 1 below)

1. Search term (free text, words or exact phrase)
2. Information type (GIS, Projects, other)
3. Map window (limits automatic search to window and displays results in list; can disable)
4. Broad subject area (ISO topic categories grouped)
5. Advanced search (see Figure 2 below; adds searches for place name, catalog, or organization)

Data Archiving, Browse Graphics

1. Browse graphics are part of the FGDC Standard, and are included in the CERES/CEIC records. They must be in a web-accessible folder (on a website somewhere), with correct URL in metadata.
2. Some options for making a web-accessible folder:
 - Establish your own website somewhere, possibly within SSU's domain.
 - Establish a project for your Map Library on the CASIL GForge site by going to <http://ceic.resources.ca.gov/>, click the CONTRIBUTE tab, then “Start a Project”
 - Establish a Data Archive account on the San Francisco Bay Conservation Commons, <http://sfbayarea.calconservationcommons.net/data-archive> , to store both your spatial data as well as the browse graphics.

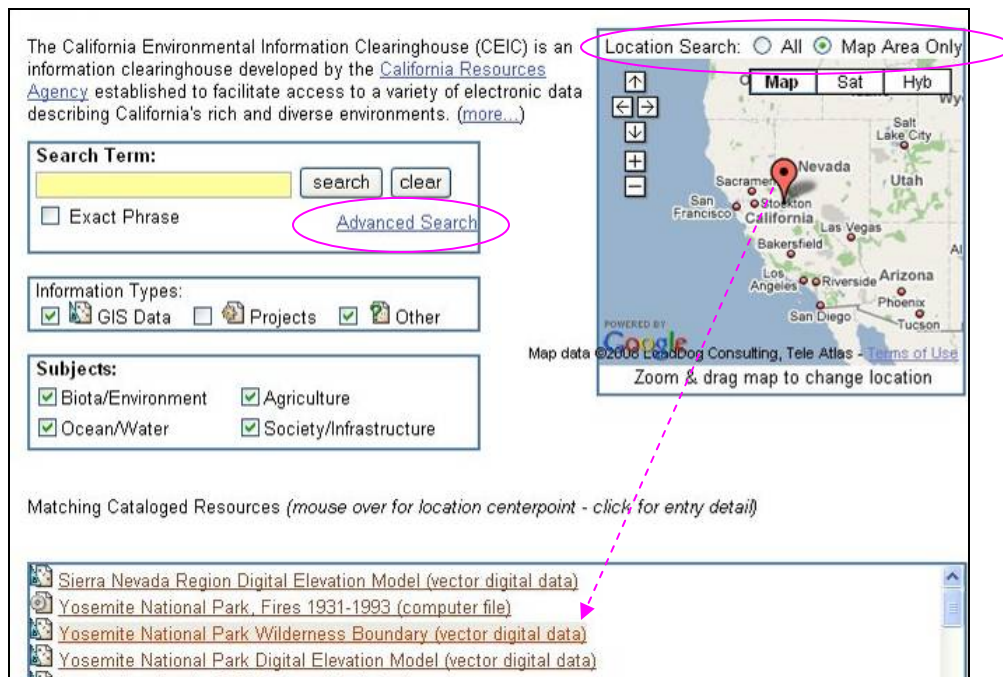


Figure 6. CEIC Search window

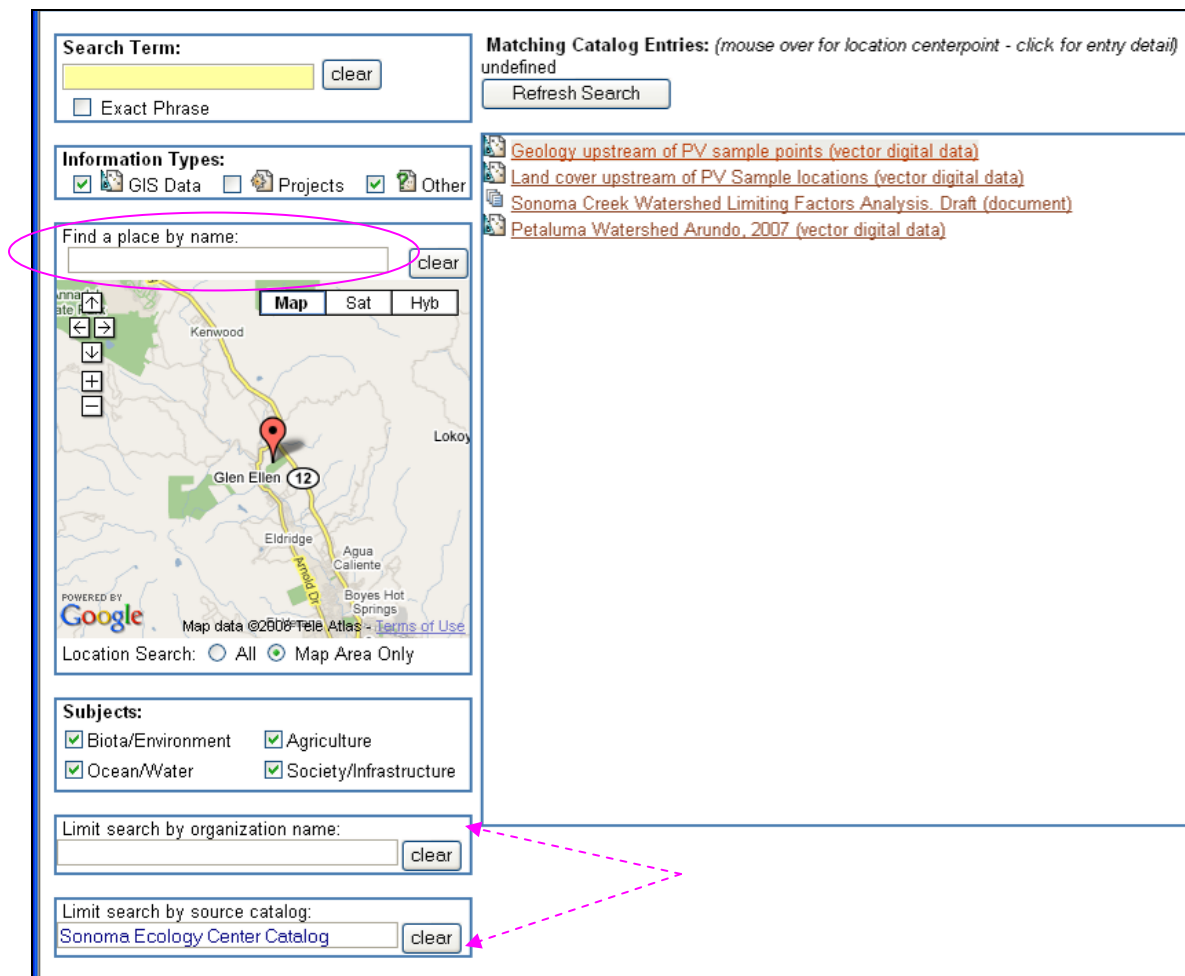


Figure 7. CEIC advanced search window

C. PUBLISHING METADATA DIRECTLY TO GEOSPATIAL ONE-STOP (geodata.gov)

This looks pretty straightforward, just go to <http://www.geodata.gov>, click on “Publish your Data and Map Services”, and follow instructions (see Figure 8 below). You will have to register for an account, there is background material for you to read, and their expectations of your organization as a publisher. Once you have contributed data, you can use your account to update, delete, or download your metadata records.

There are three ways to contribute metadata:

1. Harvest (use any one of these)
 - Z39.50 server – a server that follows **Z39.50** is a client-server protocol for searching and retrieving information from remote computer databases. It is covered by ANSI/NISO standard Z39.50, and ISO standard 23950. The standard's maintenance agency is the Library of Congress (<http://en.wikipedia.org/wiki/Z39.50>)
 - Open Archive Initiative for Harvesting Protocol data provider or services -- OAI-PMH is a protocol used to harvest the metadata descriptions of the records in an archive so that services can be built using metadata from many archives (<http://en.wikipedia.org/wiki/OAI-PMH>)
 - ArcIMS Metadata Server,
 - a Web-accessible folder (as with CERES/CEIC).
2. Online Metadata Creation Form
 - Complete an online metadata creation form for your Web service or geographic content.
 - geodata.gov will use this information to automatically create the metadata and publish it for you.
3. Online Upload Metadata File Utility
 - allows you to publish your metadata (in FGDC or ISO metadata standard) as xml files

Additional concerns, issues

There may be additional changes needed to your metadata, if you choose to contribute through harvest by GOS, such as inclusion of an ISO 19115 theme in the theme keywords.

GOS harvests data on a scheduled harvest so they need to determine if your metadata records have been updated or deleted, by comparing the unique identifier of each of your metadata records and the date that the document was last updated, to the information on geodata.gov. Your metadata records each must contain a unique identifier and date for a transaction-based harvest.

- The ArcCatalog xml contains a unique id (look at a metadata record using the XML stylesheet in ArcCatalog metadata editor. However, the FGDC xml exported by ArcCatalog does not contain this, because it is not an FGDC-standard element.
- The Metadata Date under the Metadata Reference tab is an FGDC-standard element, and consequently is exported by ArcCatalog in an FGDC xml export.



Figure 8. Getting started with Geodata.gov metadata publishing services.