Department of Defense

Legacy Resource Management Program

PROJECT NUMBER 10-111

Development of a Management System and Geographic Interface for Biological Resource Data: Final Report

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February 15, 2012

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1 Executive Summary

Many military installations have extensive survey data on diverse aspects of the natural environment and its biological resources. These data are often the result of ad hoc investigations for specific projects or part of ongoing monitoring efforts. Because consultants often implement such projects, the data generated by them are rarely integrated into a single system that is easy for managers to access. Even then, raw survey data on species occurrence may not be included and the results of surveys languish in reports and are not able to inform ongoing management decisions pertaining to those resources. Furthermore, even when geographic data are centrally archived, there is no easy way for non-specialist managers to access them in a timely manner. This project developed an online interface and data management scheme that could address this systemic problem.

The objective of the project was to develop an online tool to view and archive biological resource data that would be accessible to non-specialist users and be consistent with current technology specifications for the Department of the Defense and its contractors at a pilot location, the Defense Fuel Support Point in San Pedro, California. Further desired specifications were 1) that the data would be searchable using both standard metadata and biological metadata developed for data layers, 2) that the interface allow end users to download the data for further use, and 3) that the software solution be deployable on any computer in use at the pilot location.

Following consultation with contractors at the installation and in the Department of Navy (the property owner), we decided to develop an in-browser viewer with the data managed in ArcGIS Server, rather than using software that would require installation. We then investigated the various options for this viewer and developed it. Concomitantly all of the available biological resource data were obtained from consultants who worked on the installation and used to develop layers that could be searched by users. To keep the interface simple, we programmed the most likely desired layers into three default maps for the use of end users. Finally, we developed a download tool for the data.

The benefit of the dataviewer is twofold. First it has started a central archive of geographic data for an installation that has a small staff and provides a template for doing so at other installations. Second, it has facilitated planning for the installation, allowing key decisionmakers to quickly access biological data that might constrain plans for maintenance and improvement of infrastructure. This was done in a real-time setting during a meeting where various scenarios for compliance with fenceline safety regulations were presented and the dataviewer was used to rapidly assess where clearance requirements might conflict with sensitive natural resources. By speeding the decisionmaking process, the tool contributes to readiness and achieving the installation's mission.

As part of this project we compiled the biological resource data for the Defense Fuel Support Point, added metadata to these layers, scoped end-user requirements for a viewer, developed a viewer and populated it with three pre-defined maps of management relevance, developed metadata search tools for XML and EML metadata, and presented the tool to installation tool in a real-time demonstration that aided in planning for maintenance to avoid high biological resource areas.

2 Introduction

Environmental decisionmaking depends on timely access to relevant and accurate information about an action and its potential consequences. The need for such information is especially great when there are both significant consequences to taking or not taking an action. On military lands, information about sensitive species and habitats that is up-to-date and easily accessible is critical to the Integrated Natural Resource Planning process and other natural resource planning in addition to informing day-to-day operational decisions. For smaller installations that do not have natural resource personnel on-site or sites where much of the biological (and cultural) survey and management tasks are outsourced to consultants, there may be substantial barriers between planners and decisionmakers and relevant data. These data are generally in a geographic format, and so mapping technology is key to improving these lines of communication.

In the past decade, advanced technology to view and archive geographic information has become much more widely available and easy to use. The combined ascendance of consumer-grade smartphones, geographic positioning systems, and online mapping interfaces such as Google Earth or Mapquest has exponentially increased the general public's access to and familiarity with computerized mapping and data management systems. These technologies have increased the number and sophistication of geographic data consumers, but have necessarily made better producers of these data.

On the production side of geographic information systems (GIS), successive iterations of the widely-used software ArcGIS (Esri, Inc., Redlands, CA) have only recently begun to offer tools that make for easily delivered online maps and the relatively simple publication of data layers for sharing with other users. Although these processes have been available in the past (through ArcIMS and various user interfaces), the ability to quickly publish layers, obtain and use default basemaps such as aerial imagery, and to have user-friendly interfaces for access by untrained users has only really come about in the last 18 months with the release of ArcGIS 10.0 and associated map viewer tools.

This project, to provide online tools for the archive and ready access of biological resource data at military installations, takes advantage of recent technological developments in online mapping. We recognize that despite existing data standards for the production and use of geographic data layers in the military, these are rarely followed and smaller/lower capacity installations may have significant difficulties in accessing timely data. We address this archetypical problem by developing a data viewer and online archive for a small (300 acre), fuel depot in San Pedro California that is operated by the Defense Logistics Agency on land owned by the U.S. Navy. The project is funded through Agreement No. W9132T-10-2-0041 between the Department of the Navy and the University of Southern California.

Defense Fuel Support Point (DSFP), San Pedro was constructed on the lower hills north of the Palos Verdes Peninsula, near the Port of Los Angeles. It was developed rapidly in response to the bombing of Pearl Harbor and has been used to receive, store, and distribute jet fuels for use in California, Arizona, and Nevada since 1943. The installation can store up to 1.5 million barrels of petroleum products in 3 above-ground and 27 underground

storage tanks. The tanks are connected by a pipeline network and the entire installation is connected by pipeline to a pier in the Los Angeles/Long Beach harbor complex to receive and send fuels. Because of the nature of tank locations on the flat mesas, many of the hillsides and canyons were left undeveloped and with their native vegetation somewhat intact, at least in those areas beyond the locations cleared for fire safety. In this manner DFSP became a de facto nature preserve, with significant stands of coastal sage scrub vegetation and associated species being preserved, albeit inadvertently, during the period of massive urbanization that started following the second World War. The site was off limits to the public through the end of the Cold War, but with the end of the Soviet threat, limited access was granted in the early 1990s. It was at this time that entomologists discovered that DFSP had served as a proverbial "ark" for the Palos Verdes blue butterfly (*Glaucopsyche lygdamus palosverdesensis*), which had been presumed extinct after all of its known habitats were either developed or severely degraded. In addition to this federally endangered species, the federally threatened California gnatcatcher (a bird; *Polioptila californica*) also breeds in the coastal sage scrub on this site.

To link together the leading technology in online mapping, existing natural resource data, and a set of end users located in various locations, we developed an online data viewer, customized it for this application, and populated it with data and default maps that will be useful for planning and decisionmaking for the installation.

3 Methods

The project moved forward in several phases, which sometimes overlapped each other. These included scoping with potential users, acquisition of data, selection and development of the data viewer, development of metadata for data layers, testing and demonstration, and documentation through a transfer plan.

3.1 Scoping

To obtain input on potential users of the geographic data viewer, staff and contractors associated with DFSP were contacted to discuss the potential tool. These included: representatives of the DFSP operations contractor (David Gladden, United Paradyne), the

installation's environmental point of contact (Mr. Timothy J. Hutson, Facilities and Environmental Manager, Defense Logistics Agency Energy Americas West), the landowner's technical point of contact for biological issues (Dr. Albert Owen, Natural Resources Specialist, NAVFAC Southwest), the Navy's regional GIS specialist (Steve Lathrop, GIS Analyst, NAVFAC SW), and the contractor responsible for GIS data for DFSP (John Bonnett, GIS Program Coordinator, General Dynamics Contractor, Naval Weapons Station Seal Beach). Each of these individuals or groups was contacted and asked about the constraints and opportunities for online delivery of biological resource data in an open-ended interview.

3.2 Data Acquisition

As part of the scoping process, all those representatives who might have access to existing data were contacted to discuss availability of spatial or nonspatial datasets for DFSP. In addition, the contractor currently preparing the Integrated Natural Resources Management Plan for the installation was contacted (Tierra Data Systems, Escondido, CA), as was the contractor conducting surveys for Palos Verdes blue butterfly (The Urban Wildlands Group, Los Angeles, CA). All data were received in whatever form they were available by compact disk or electronic mail and organized for review.

3.3 Metadata Development

Two types of metadata were considered for inclusion with each data layer. Standard ArcGIS metadata was included as an XML file and Ecological Metadata Language (EML) was used for metadata for files containing significant biological data. Ecological metadata are also useful to document the information associated with data collection and methods so that it is not lost over time and does not require the data collector to be available to "interpret" remaining data records [1]. EML files were developed using the free software Morpho [2] for the Palos Verdes blue butterfly surveys and the hostplant surveys for the butterfly based on the final report presented for these products [3,4]. Morpho guides a user through a series of questions about the data regarding methodology, extent, temporal and taxonomic coverage, contact information, and other elements to produce a summary that

allows the data to be discoverable by researchers if submitted to an archive [2], or, in our application, if searched on these variables by an end user.

3.3.1 XML

Default ArcGIS metadata were stored in XML files with each layer. For layers without existing metadata, major fields were filled out based on obvious properties of the data.

3.3.2 EML

Ecological Metadata Language was developed to allow ecological data to be archived and searched on criteria that might be of interest to ecologists. That is, they allow data to be located based on the taxonomic information of the species being studied, in addition to a range of other criteria that aid in the ease of location of data and in ensuring that the data retain all necessary information to be interpreted when separated from associated publications and reports, or the investigators who collected the data.

3.4 Viewer Development

The base code for the data viewer was purchased from Esri and customized using Adobe Flash Builder. The viewer included a set of standard tools for mapping functions, including a layer list, legend, drawing tools, measuring tool, and printing. These were incorporated into the website. We had a need for tools (called "widgets") that would allow search and viewing of both the XML and EML metadata language. These widgets: metadata viewer, EML search, and XML search were programmed from scratch.

Based on experience with the management of the site, three default maps were programmed into the website. These included: 1) a map of the infrastructure and management emphasis (operations or natural resources) that copies the figure in the agreement for management between the Navy and Fish and Wildlife Service that establishes these zones (Biological Opinion on the Formal Section 7 Consultation for Routine Maintenance Operations, Defense Fuel Support Point, San Pedro, Los Angeles County, California (FWS-LA-08B0606-08F0704), dated July 2, 2010) and adds survey results along the, 2) a map of the distribution of the foodplants for the butterfly as

measured in surveys in 2006 and 2009 [3,5], and 3) a map depicting the rangewide distribution of Palos Verdes blue butterfly by survey polygon and results of transect surveys 1994–2011. A fourth set of layers was also included with other biological data.

The viewer was developed and deployed on usc.edu servers and made available to interested parties for review and comment. Full details on the website and its use are available in the Transfer Plan for this project.

3.5 Testing and Demonstration

The website address was provided to those Navy contractors and personnel who would have an interest in its use and feedback was sought on the content and use of the site. The site was demonstrated during a planning meeting for natural resources in the fall of 2011 and used during the meeting to address questions about the potential impacts of proposed infrastructure improvements. This demonstration allowed the participants to focus the areas of potential concern rapidly rather than waiting to gather additional data and setting a new meeting time.

3.6 Transfer Plan

Following completion of the website, a Transfer Plan was written that describes the elements of the website and gives detailed instructions on the use of the site and for its deployment by the Department of Defense.

4 Results

4.1 Data Layers

Most data were obtained either from the contractor who is preparing the Integrated Natural Resources Management Plan (Tierra Data Systems) or those under contract for managing resources (The Urban Wildlands Group, Inc.). The Navy provided a recently completed survey for an endangered bird species. These data were assembled and metadata added as was possible with the information available.

Name	Summary	Date
Astragalus	Point incidences of *Astragalus trichopodus*	2007
Boundary	Outline of installation	2001
Buildings	Building outlines	2007
Contamination Sites	Sites that are contaminated, some known as former disposal sites for waste materials	1999
Fenceline	Fenceline with 10-foot buffer as polygon	1997
Fences	Fences as line layer	1997
Fuel Pipelines	Underground fuel pipelines.	2007
Gnatcatcher_Habitat_2003	Outline of California gnatcatcher habitats.	2003
Gnatcatcher_Observations_2003	Point layer of California gnatcatcher observations	2003
Gnatcatcher_Territories_2003	Ovals that presumably identify territories of California gnatcatcher	2003
Habbuff	Two polygons at edges of installation that map habitat adjacent to other habitat layers.	????
Habitat Restoration	Vegetation types within areas identified as restoration areas, which correspond roughly to current natural resource management areas	2007
Hostplant_Distribution	Distribution of hostplants for Palos Verdes blue butterfly	????
Hostplant_Survey_Areas	Polygons used for basewide hostplant and butterfly surveys	2006
Hostplant_Survey_Basewide	Results of basewide hostplant survey from 2006 and 2009	2009
Hydrants	Locations of hydrants on installation	2007
Hydrants_10ft_Buffer	A buffer of 10 feet around hydrants	????
LACSD_Easement	Pipeline easement that cuts across installation	????
Leases	Parts of installation leased to outside entities for playing fields and shooting range	????
Lotus_Points	Point layer with Lotus scoparius	????
Management_Areas	Polygons that delimit management priorities at DFSP	2010
Mow_Avoid	Polygons where mowing was avoided until butterfly flight season was over	????
Mowed_Area	Area of grasses mowed, but not exhaustive	????
Mowed_Area_A	Area of grassland mowed, contains most of these for installation	????
Native_Vegetation	Polygons of native vegetation	????
Parcels	Parcel lines from Los Angeles County Assessor Database	2006
Pipeline_Easements	Easements for underground pipelines across installation	2001
PVB_Occupied_1999	Aggreate area occupied by Palos Verdes blue butterfly	1999
Pvb_suvey_areas_wgs1984	Areas occupied by Palos Verdes blue butterfly from basewide survey	2006
PVB_Transects	Transect route used for Palos Verdes blue butterfly surveys	2011
Rare_Plants	Point locations for rare plants, but no attribute	1997

	table with species identity	
Restor_wgs1984	Areas under natural resource management priority	????
Restoration2_wgs1984	Areas under natural resource management priority	????
Restoration_wgs1984	Areas under natural resource management priority	????
Road_Lines	Line network for installation roads	2006
Roads	Subset of installation roads as line network	????
Rudres2_wgs1984	Probably ruderal vegetation within restoration areas	????
Rudres3_wgs1984	Probably ruderal vegetation within restoration areas	????
Rudres_wgs1984	Probably ruderal vegetation within restoration areas	????
SDSU_Restoration	Area restored by San Diego State University SERG organization	????
Tank_Buffer_100ft	A 100 foot buffer around aboveground and belowground fuel storage tanks	????
Tanks	Aboveground and belowground fuel storage tanks	????
Topography	Line contours for installation	2006
Valves	Valve pits with 3-foot buffer	????
Vegetation	Vegetation type map for installation	????
Vegeation_Sliver	Additional vegetation type map along one border	????
Water_Lines	Underground water lines	????
Wells	Locations of wells as point layer	????

4.2 Data Viewer

The main results of the project are the website/dataviewer, which can be accessed at http://geoserv.usc.edu/flexviewer. The website works on Adobe Flash without the installation of any additional site-specific software. In late testing, however, we discovered that some Department of Defense computers block Flash code and consequently blocked site access. This is a problem for which a work-around would need to be found in subsequent project implementation. It has not been an issue with the Navy, Defense Logistics Agency, and contractor personnel involved directly with DFSP and so should not pose a significant issue for use of the tool at other installations.

4.3 Default Maps

The three default maps are available to the user upon opening the website and are easily switched. Individual layers within these maps can also be toggled off and on by the user. These maps are the infrastructure and management areas (Figure 1), butterfly foodplant (Figure 2), and butterfly distribution (Figure 3).

Figure 1. Infrastructure and management priorities for Defense Fuel Support Point in customized flexviewer map.

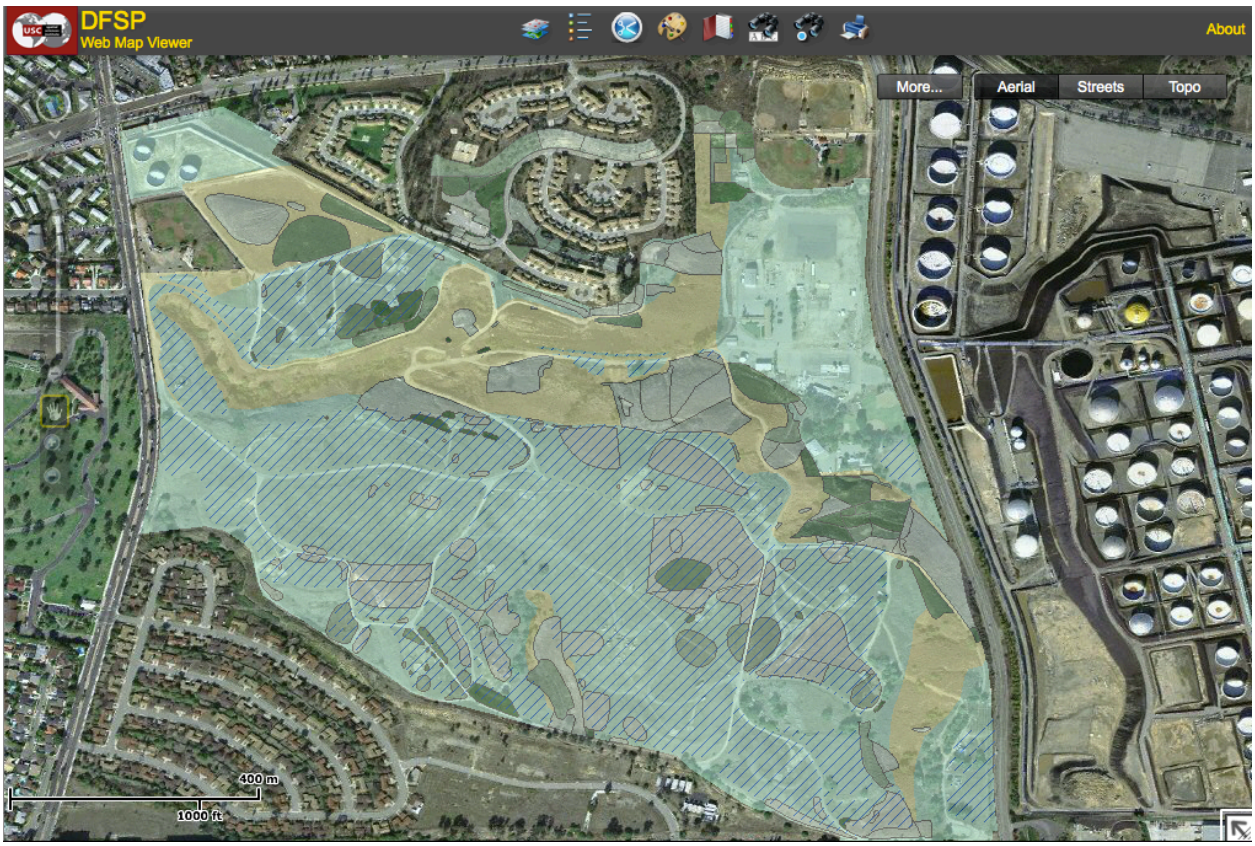

Figure 2. Distribution of host plant and mowing zones at Defense Fuel Support Point in customized flexviewer map.

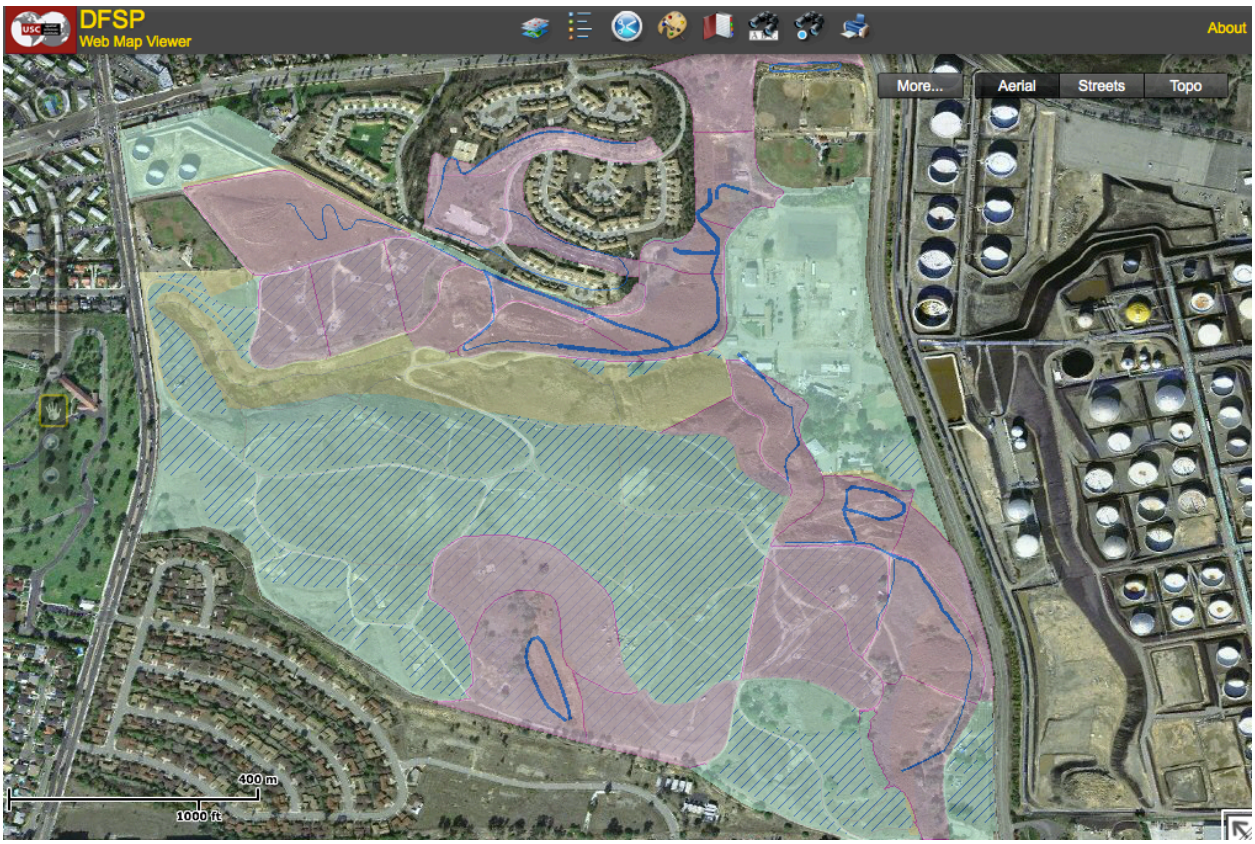

Figure 3. Management areas and butterfly distribution for Defense Fuel Support Point in customized flexviewer map.

4.4 Custom Widgets

We developed three custom widgets for the flexviewer map interface: Search EML, Search XML, and View Metadata.

4.4.1 Search EML

The *Search EML Metadata* widget allows users to search for a specific keyword in different attributes in a given metadata EML file (Figure 4). An attribute is any nonspatial information about a geographic feature stored in a table associated with the feature (point, line or polygon). This feature would become useful when searching for information about particular taxonomic groups (e.g., insects, birds). The EML data contain higher-level taxonomic information and make it searchable. The user can search on words in a layer title, abstract and more. When a search is successful, the widget then displays the content of the matched metadata as the search result.

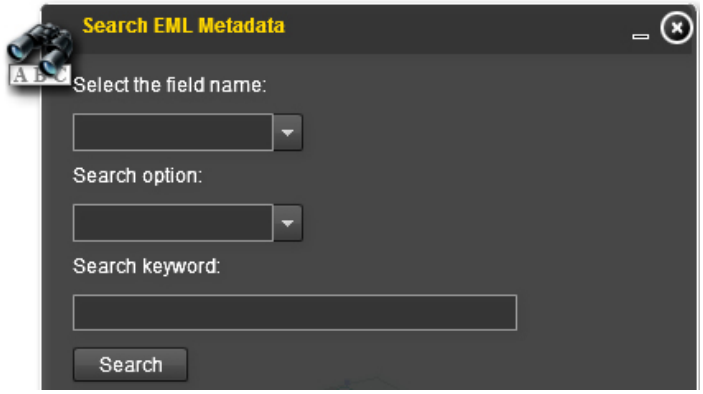

Figure 4. Search EML metadata widget.

The user first selects the field name to search for the search keyword (i.e., Title, Abstract, Keyword or Creator) from the drop-down list shown in Figure 5. Next the user selects a search option (Exactly, Contains or Starts with). After typing in a search keyword, the user clicks the Search button. These search options are designed assist users in identifying metadata whose given field contains search keywords of interest to them.

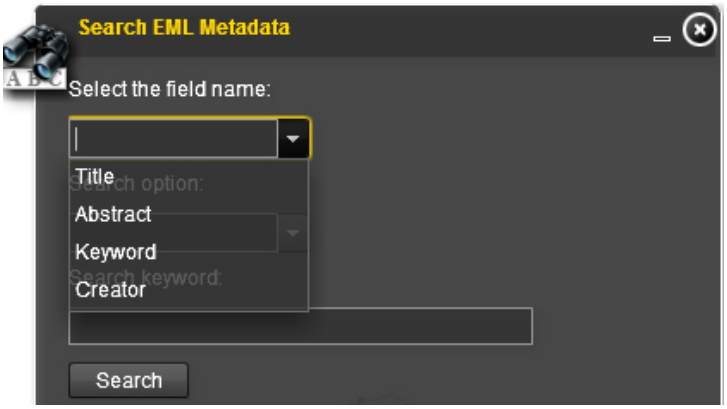

Figure 5. The *Search EML Metadata* dropdown list options for searching metadata based on a field (attribute) name

For example, Figure 6 shows the result of selecting the field name "Title", search option "Contains", and searching on the keyword "San Pedro" in field of XML metadata files.

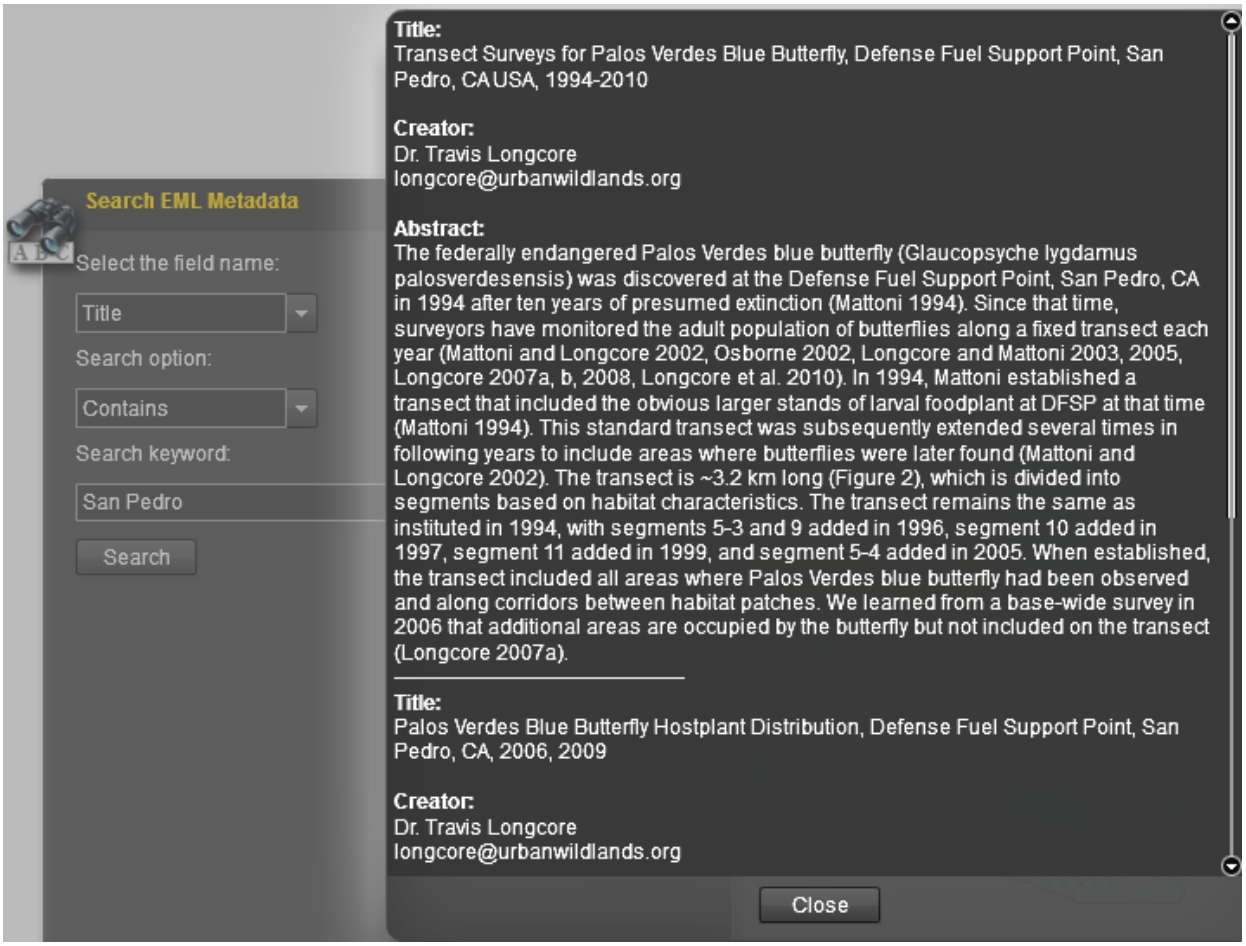

Figure 6. Example result using the *Search EML metadata* widget.

4.4.2 Search XML

The *Search XML Metadata* widget has a similar functionality as the *Search EML Metadata widget.* However, in this widget, the search is going through XML metadata files instead of EML metadata files.

The workflow for using the *Search XML Metadata* is very similar to that of the *Search EML Metadata* widget discussed above (select field name, search option and search keyword, respectively). Figure 7 shows and example of metadata retrieved by searching on the keyword "San Pedro" in "Description" field of the *Search XML Metadata* widget.

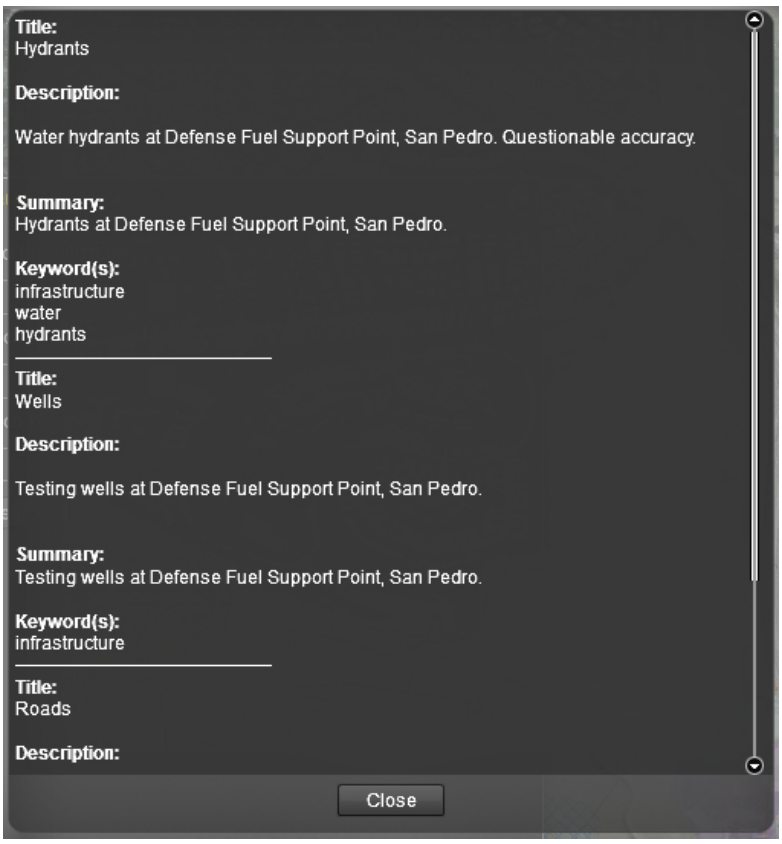

Figure 7. Example result using the *Search XML Metadata* widget.

4.4.3 View Metadata

The *View Metadata* widget enables end users to view metadata files associated with DFSP natural resource data layers. For those of data layers for which metadata was created by the data provider, two different data standards, XML (Extensible Markup Language) and EML (Ecological Metadata Language) are provided as alternative data viewing options. An example list of DFSP metadata files are provided in Figure 8.

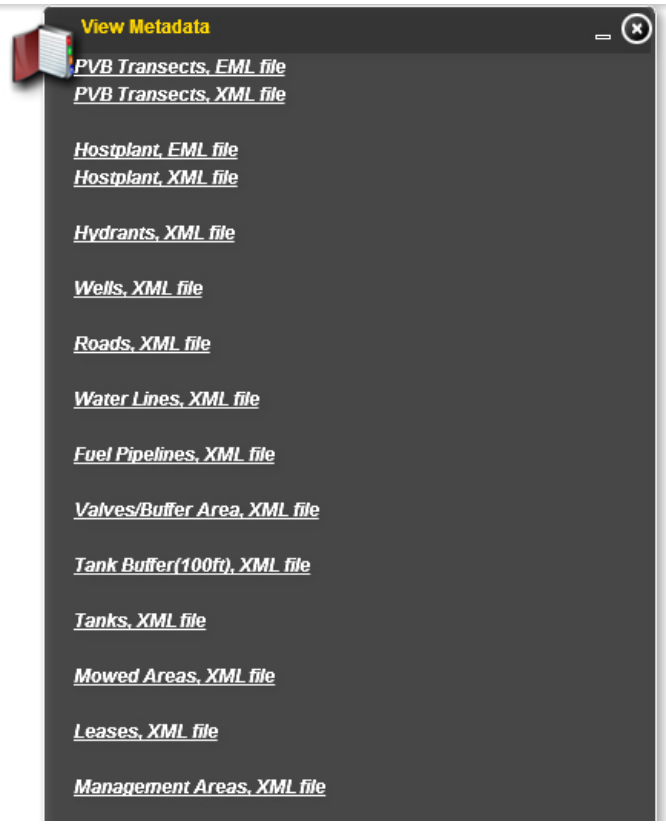

Figure 8. Example list of XML metadata files obtained using the *View Metadata* widget.

When a user clicks on a metadata link shown as a "layer name, XML File" in Figure 8, a new window will pop up displaying information contained within the selected data layer's metadata. For example, Figure 9 shows the *Fuel Pipelines* metadata in XML format, associated with that particular data layer.

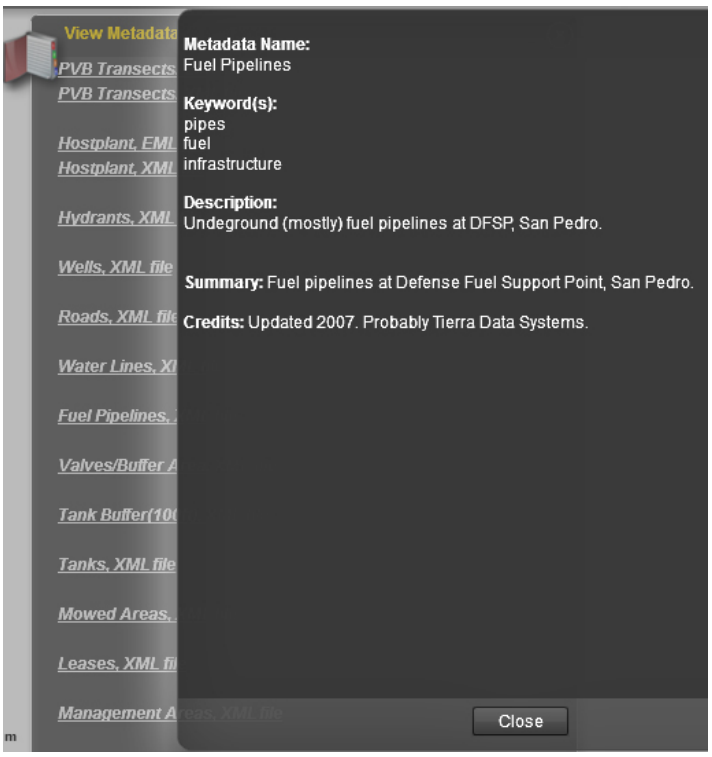

Figure 9. An example search result using the *View Metadata Widget*.

4.5 Clip-and-Ship Service

The "Clip and Ship" (C&S) tool developed for this project was built utilizing the ArcGIS geoprocessing framework. The purpose of this tool is to allow the end-user to download sub-sections of the geographic data underlying the data interface. As described in more detail in the the Transfer Plan, a user interacts with this tool to identify an area of interest by drawing an area on the map, selecting the desired layers for download, and picking the output format (shapefile, geodatabase, etc.). Upon selecting an area and preferences, the C&S request is sent to the server, which processes the request and sends the resulting geographic data back to the user who then saves these data to his/her local computer. The complete tool consists of two main components that work together to enable this functionality: (a) the web-based front-end that the user interacts with to select the area of interest and her/his preferences; and (b) the back-end geoprocessing tools that perform the data extraction and send the resulting geographic data back to the client.

The web-based front-end component is implemented as a set of interactive tools embedded in the web interface. These tools are currently based on the ArcGIS JavaScript application programmer interfaces (APIs) that provide the built-in abilities to: (a) draw an area of interest; and (b) list the layers available for download (drawn from the set of geographic data layers loaded to the system). In addition to these built-in tools, the C&S implementation provides the ability to convert the user-drawn area into a projected version consistent with the geographic projection of the underlying data. This function is required because the back-end geoprocessing services (described below) enforce that the geographic projection of the boundary used as the clip area (i.e., the area of interest drawn on the map by the user) be the same as the projection of the underlying data used to support the online data interface.

The back-end geoprocessing framework used to perform the clip is hosted on the server running the web-based data interface and is based on the "Extra Data Task" geoprocessing service provided within the ArcGIS Server framework. This service is published as a geoprocessing service using the ArcServer infrastructure and performs the data manipulation on the geographic data underlying the web-based interface to derive the subsections of data relevant to the user's selected area. It accepts as input the boundary of the area of interest and the list of layers to be clipped and outputs a zip file containing the resulting portions of the geographic data sets of interest.

The web-based front-end prototype implementation of the C&S tool currently works only within the web maps created using the ArcGIS JavaScript API. This limitation is due to the requirement of the geoprocessing engine that the projection of the input data must match the projection of the underlying data. The Flex viewer currently used as the web interface for the DFSP data *does not yet* support a combination of clip and on-the-fly projecting of the clip area as implemented in the JavaScript version. Future work will extend the Flex viewer implementation to develop this additional capability.

The C&S implementation is included in the electronic versions of this report and includes the following files:

(1) clipAndShipFrontEnd.html – web-based front-end for interacting with the map to select an area, download preferences, and submit a C&S request to the server

(2) ClipAndShip.zip

a. TestNonProjected_2011-11-22.mxd – Map underlying the ArcServer Map Service which displays the data on the web-based front-end

b. TestNonProjected_2011-11-22_Extract.mxd – Map underlying the ArcServer Geoprocessing Service which performs the C&S task

c. Folder ToolData – the folder that contains the sample geographic data used in both the Map service and the Geoprocessing Service.

5 Discussion

The demonstration interface for biological data has already proved useful for real-time data access for planning purposes at DFSP, San Pedro. We were able to provide up-to-date information in response to management questions without delay as part of collaborative decision-making. From this perspective we consider the project to be successful and to have illustrated the benefits of centralized archiving and easy access of geographic data for biological resource planning.

In our review of available data for the DFSP pilot sited we learned that it was indeed true that the Navy (property owner) did not maintain very many biological data layers or even base layers for the installation. Those data that were available did not conform to any recognizable standard in terms of metadata and especially not to the Spatial Data Standards for Facilities, Infrastructure, and Environment. Only the most recently collected data had any metadata at all. The value of geographic data is dramatically diminished if information about its attributes, accuracy, date of collection, and other relevant information is lost. This is happening with the data for this installation and probably for many other similar sites that lack a GIS professional with responsibility for managing these data. This is potentially a serious problem should inaccurate and out-of-data layers be relied upon during an emergency or to estimate environmental impacts of proposed

actions. Although "as built" plans for recent installation improvements (e.g., to the electrical system) may be available to personnel on site, there does not appear to be any mechanism to transmit these changes to the GIS personnel for whom DFSP is a responsibility. At the very least, we were unable to obtain any base layers from a source other than consultants working on the INRMP and these had not been updated since the mid-2000s.

On the technology side, we learned quickly that access for military staff required an approach that did not require installation of additional software. By using the Flex viewer, we relied on Flash technology that is typically installed in web browsers. This worked fine with those DFPS-related personnel who accessed the website map — including staff from other federal departments — but upon review of the draft projects we found that some Legacy Program personnel were unable to use the site because of the reliance on Flash. We were unable to go back and change for this phase of the project, but in the event of follow-on funding we will consider switching from use of Flash to use of Javascript for the mapping interface. This would represent some lost effort (the Metadata viewer, XML search, and EML search would need to be transferred to Javascript, which would involve some effort), but would enable other benefits (use by computers that do not allow Flash, including mobile devices, and immediate functionality of the Clip and Ship code package for data export). On balance, the transfer to a Javascript coding environment would seem to be the appropriate direction for any future work.

Although it would be possible to suggest further technical innovations and tools that might be useful in the online data interface, our final conclusion is that further work should concentrate on a simple interface and core functionality. This would mean allocation of significant additional effort to coordinate with consultants and other researchers to bring biological resource data layers up to the military's SDSFIE standard. We suspect that this would be a necessary step for most installations and not just DFSP. We would keep the interface as simple as possible and ensure that the data export function (Clip and Ship) was functional. This combination of work on the data inputs, streamlined interface, and easy

output would, we believe maximize the benefits for environmental planners, biological consultants, and GIS professionals.

6 Literature Cited

1. Michener WK (2006) Meta-information concepts for ecological data management. Ecological Informatics 1: 3–7.
2. Higgins D, Berkley C, Jones MB. Managing heterogeneous ecological data using Morpho; 2002.
3. Longcore T, Osborne KH, Dalkey A (2010) Final report for 2009 Palos Verdes blue butterfly adult surveys on Defense Fuel Support Point, San Pedro, California. Los Angeles: The Urban Wildlands Group. 1–24 p.
4. Longcore T, Osborne KH (2011) Final report for 2011 Palos Verdes blue butterfly adult surveys on Defense Fuel Support Point, San Pedro, California. (NAVFAC SW Agreement # N62473-11-2-2304). Los Angeles: The Urban Wildlands Group. 1–18 p.
5. Longcore T (2007) Final report for 2006 Palos Verdes Blue Butterfly adult surveys on Defense Fuel Support Point, San Pedro, California (Defense Logistics Agency Agreement # N68711-06-LT-R0011). Los Angeles: The Urban Wildlands Group 1–13 p.