

# Ad Hoc DOE GIS Users Group Newsletter



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## Beyond Customization— Improving the ArcIMS HTML Viewer

### **Bob Almodovar**

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With customized toolbars and layers, Western Area Power Administration improved the ArcIMS viewer, giving users an easily accessible snapshot of transmission line structures, access roads, and cultural and biological sites.

Western's Corporate Services Office implemented a GIS group in 1999 to assist the regions in collecting,

processing, integrating, and displaying accurate spatial data representing Western's transmission lines, related facilities, and access routes. Additionally, GIS provides information pertaining to the environment and other data that supports Western's mission. The GIS program is housed in Western's Natural Resources Office.

In September 2003, Western's Sierra Nevada Region requested that our GIS staff build an intranet ArcIMS Web site to support regional environmental staff. These staff members did not want the standard out-of-the-box look, but wanted a user-friendly page with a menu bar to access non-spatial data and help documentation and to provide links to other internal and external web pages.

## Upcoming Events

- User Group meeting at the ESRI User Conference – July 27, 2005, 5:30 – 7:00 PM. Room 23-C (SDCC)

## Feedback

Your feedback regarding the DOE GIS user group newsletter and planned user group activities is welcomed and would be greatly appreciated. Please send comments to:

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**DOE GIS User Group at ESRI Conference in San Diego (August 2004) (top). User Group Members enjoying Fine Wine and Dinning at Bucca di Beppo following the meeting (bottom).**

At Western we have customized the ArcIMS HTML viewer by incorporating HTML, JavaScript, CGI scripts, and Java Applets. This improves the look and feel of the site and increases the Web site's functionality (see Figure 1).

We started with a basic rework of the viewer's frame structure and added a Java applet menu bar. This menu bar applet allows us to link to other pages or to JavaScripts to create unique functions. SNR also requested to have as much real estate showing on the map as possible.

We created more space by moving the toolbar above the map and by moving the overview map to its own frame below the Table of Contents. For the Table of Contents setup, we used David Bollinger's latest version of "dbGroupToc" JavaScript, which is easier to use than his earlier versions. This toolbar allows us to have more than 40 data layers available to the viewer. We also added a clock applet that allows us to post a revision date.

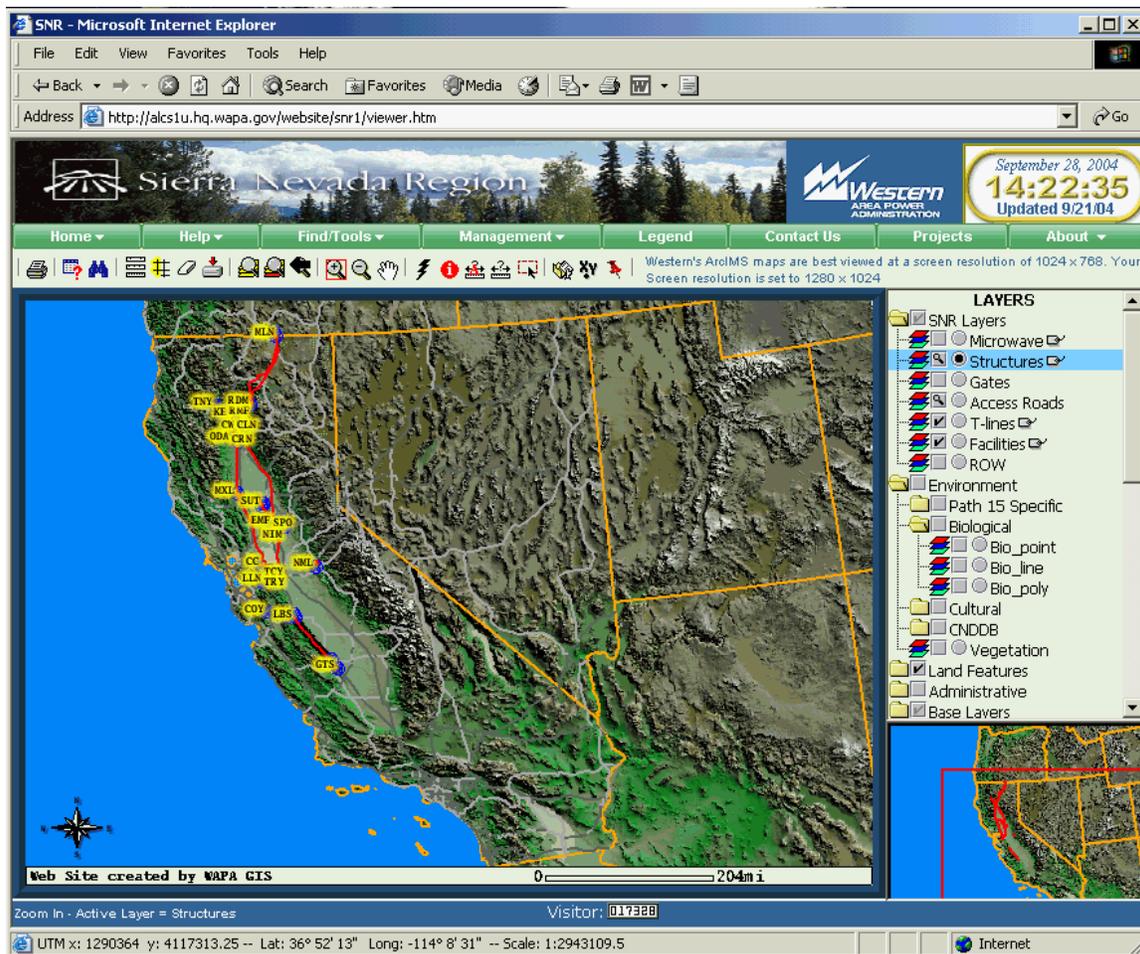


Figure 1 Customized ArcIMS Web Page

Due to the sensitive nature of some cultural data, we added a password protection script to prevent unauthorized access to this data.

The menu bar functions that were added include a “Map Edit” tool, a “Topo Map Library” and a “Database/Find” tool. For the “Map Edit” tool (see Figure 2), we purchased a Java paint applet that allowed us to pull in the map image as a background. Using drawing tools, we can add text, lines and/or symbols on top of the map image and then e-mail or print it. We also captured the map image coordinates in a URL format, which is sent with the e-mail, so the recipient can copy and paste this in a browser and zoom directly to the extent of the map image being sent. The “Topo Map Library” tool is a link to the digital 7.5-minute quads for the 14 states that Western serves. This tool allows users to

view, download and print any quad. The “hotlink” toolbar button lets the user click on the map and provides a link directly to the quad sheet selected.

Speed is a major concern with any ArcIMS Web site. By implementing a “Database/Find” tool (see Figure 3), we eliminated several calls to the server to view the tabular data for some of our primary layers. These tables now pop-up almost instantly when compared to the 20 to 30 seconds it takes for the standard calls to the server to show the 5,000 plus records. This tool also allows us to search and sort the table. By creating a link back to the MapFrame, we can zoom to and highlight a selected feature. The downside with using this tool is that a flat file of the dbf file must be created for the tool to work, though this can easily be done in Microsoft Excel.

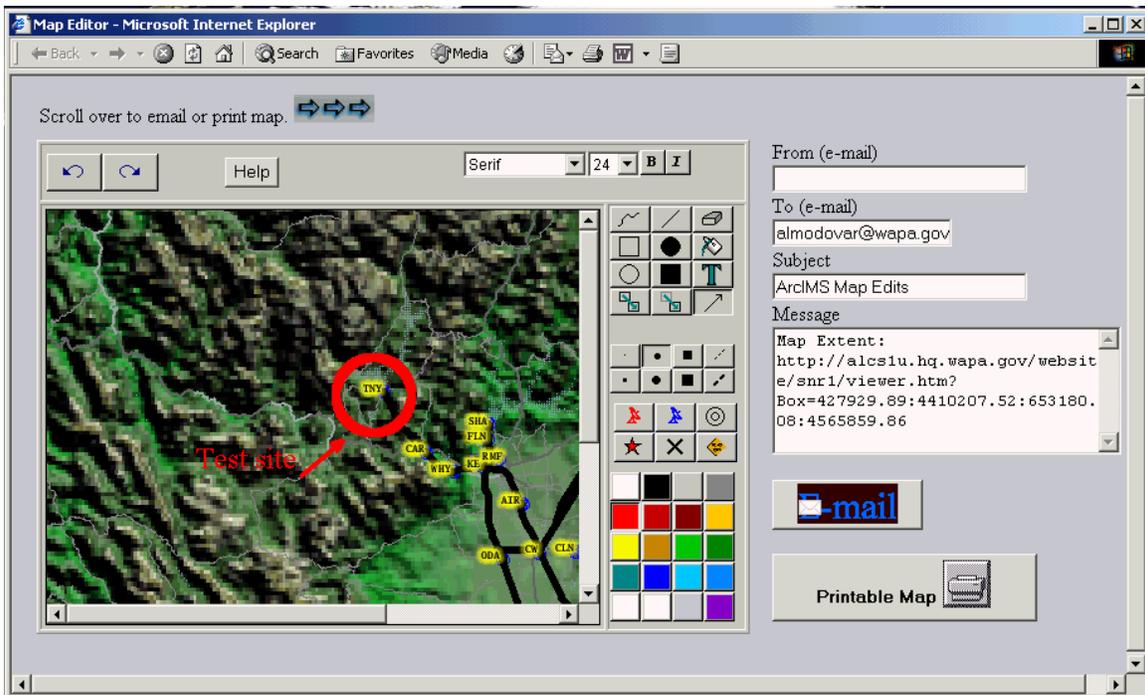
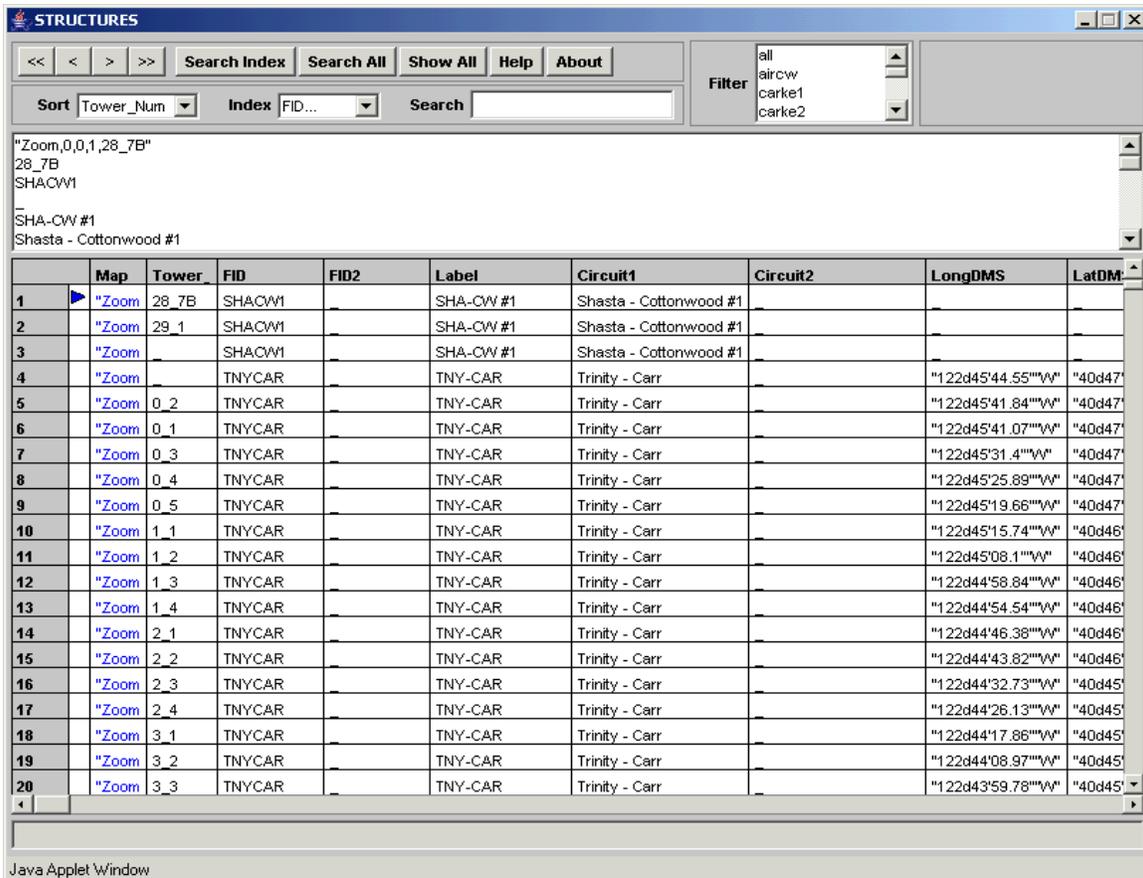


Figure 2 Map Edit Tool



**Figure 3 Database/Find Tool**

Some other features added to the toolbar include an area calculation tool, a bookmark tool, an XY conversion tool, and a pushpin tool. While both the XY conversion tool and the pushpin tool (see Figure 4) are similar, and both will display a point and coordinates, the XY tool is based on CGI scripts and will display coordinates in both decimal degrees and degrees, minutes, seconds.

With the abundance of free data available on the Web, we decided to add some raster OGC layers of digital aerial photos (DOQQs) and digital USGS Quad sheets (DRGs) to the Web page, but since ArcIMS is not fully compatible with OGC layers we could only bring in the images as backgrounds. However, when we tried to project images to UTM

we could only view one zone at a time. Western's area for the Sierra Nevada Region covers two zones. We solved this problem by first calling the OGC layers into a MapServer Web site, which is fully compatible with OGC layers and allows for reprojection, then made the call for the OGC layers from the MapServer page. We can now view seamless DOQQs and DRGs for the whole United States in our ArcIMS site.

We added many other enhancements to the site to improve work flow and provide more information to the user including a visitor counter, coordinates in both UTM and DMS, active tool and layer display, and recommended screen pixel size as compared to set screen size. We also created links to external tools

such as Microsoft Media Player to view video of our lines, and a magnifying glass tool to see some details without having to zoom in and out on the map.

Most of the scripts and code changes that we made can be readily found at ESRI's scripts page. Others were pulled from various JavaScript or Java source code pages. When these approaches were unsuccessful, we would contact someone who had done something similar to what we were trying to do and cannibalize their code to fit our needs. Some of the scripts and applets were purchased from private sources, but most are available on the web for free. The list

below contains links to some of the scripts and applets that we used to customize our site.

Customizing ArcIMS is only limited by your imagination, creativity and your willingness to search through thousands of lines of code for what you need. One of the barriers to making these changes is the number of places that the code needs to be changed in the ArcIMS JavaScripts for a function to work. Keeping track of when and where to make these edits can be frustrating, to say the least.

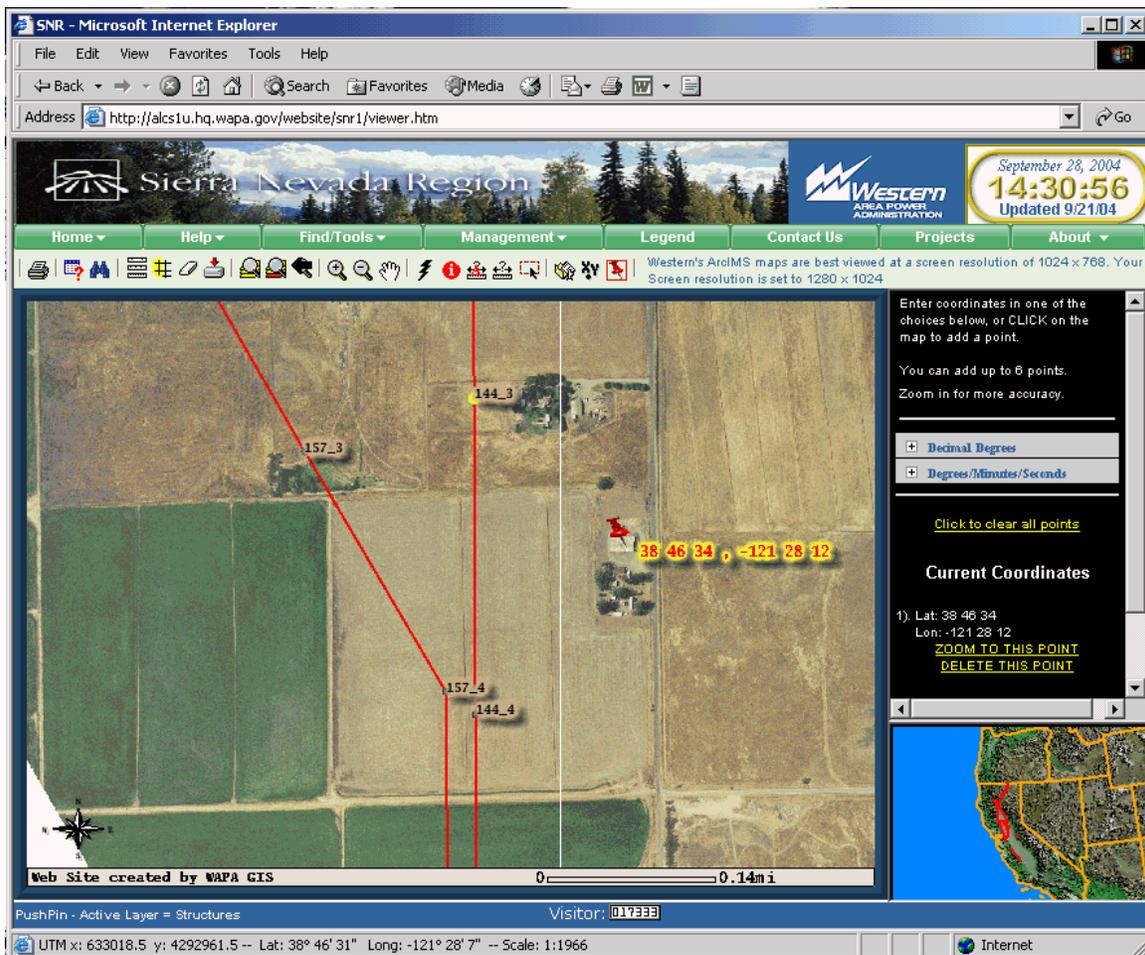


Figure 4 Pushpin Tool

## **Customizing Scripts:**

### **Adding OGC Backgrounds**

Any OGC map service may be added as a background image to the ESRI HTML viewer.

Cost: Free

<http://arcscripts.esri.com/details.asp?dbid=11981>

### **Apycom Web Menus**

This menu applet has powerful features can be additionally configured to fit different themes.

Cost: \$149.95

<http://www.apycom.com/ApycomSoftware>

### **Bookmarks**

Adds bookmark to tool to ArcIMS

Cost: Free

<http://arcscripts.esri.com/details.asp?dbid=13499>

### **Database/Find Tool**

Catalog View is a multiple purpose java database applet. It is easy for the user to browse and search in data records with Catalog View.

Cost: Free

<http://javaboutique.internet.com/CatalogView/InternationalStarchTradingA/S>

### **DJClock - The Digital Java Clock Applet**

Cost: Free

<http://www.xanasoft.com/djclock/>

## **Map Edit Tool**

J-Painter is an image editor which allows you to draw within a browser. The resulting image can be sent by e-mail.

Cost: \$149

<http://www.izhuk.com/painter/IgorO.Zhukovsky>

## **MeasureArea Enhancement**

This code adds a third display field to the measure display as an estimated “snap-shut” area for the measure feature.

Cost: Free

<http://arcscripts.esri.com/details.asp?dbid=12059>

## **Table of Contents**

dbGroupToc version 1.5a 02/26/2000

Cost: Free

<http://arcscripts.esri.com/details.asp?dbid=12191DavidBollinger>

## **Toggle Layer Labeling**

The code shows how to add an extra checkbox in the layer list that turns labeling on and off. This can also be used with the dbGroupToc scripts.

Cost: Free

<http://arcscripts.esri.com/details.asp?dbid=11653>

## **Sort Table**

Javascript sort function from

Cost: Free

<http://javascript.internet.com/forms/sort-data-table.html>

## GIS at Sierra Nevada Region

### **Benita Moore**

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About eight years ago, the Environmental division in Western Area Power Administration's Sierra Nevada Region (SNR) started using GIS as a tool to locate and document cultural/biological, parcel, road, structure, and transmission line information. The GIS tool is now extensively incorporated within the environmental analysis of projects.

The Environmental Office uses GIS primarily in support of the Power Maintenance division's transmission operation and maintenance activities. One example is within SNR's Integrated Vegetation Management (IVM) Program. Vegetation growing in Western's rights-of-way (ROW) must be controlled in order to prevent operational hazards, protect facilities from fire, prevent safety problems for Western employees and neighboring members of the public, and to prevent interference with Western's ability to carry out both routine and emergency maintenance activities. Vegetation is a major cause of unplanned outages. It is Western's policy to prevent problems before they occur by regular maintenance of its transmission lines, towers, and access roads. Western's IVM Program utilizes manual, chemical, and mechanical methods to control unwanted vegetation.

The SNR GIS uses cultural/biological, parcel, road, structure, and transmission line datasets, layered together with high altitude photography, to map areas

identified by SNR for vegetation management. This information is then used as part of the environmental analysis required before performing the vegetation management work. Hardcopy maps are produced which include required paperwork for each vegetation management project and are used by SNR's Environmental Protection Specialists, Procurement personnel, Line Crews, and finally the contractor in the field performing the work. SNR's Environmental personnel will be able to track in GIS the sections of ROW that have been worked and set up a schedule for periodic review.

SNR's Lands division also uses GIS. Their primary objective has been to identify land owners within and adjacent to SNR's ROW. Lands has been able to acquire parcel datasets from many of the counties where SNR facilities are located. The parcel and transmission line datasets are layered in GIS to identify parcel Assessors Parcel Number (APN) numbers. Lands then uses the APN numbers to obtain current landowner contact information for use in project planning. GIS was rolled out to Power Operations this year. Dispatchers have been using it to locate reported fires in the vicinity of SNR's transmission lines and the Engineering and Planning group have been using GIS in several of their projects.

GIS technology will also be an invaluable tool for field crews. The first test of this has been with the Elverta Line Crew. A laptop was loaded with GIS software, real-time GPS functionality with sub-meter accuracy, facility, structure, transmission line, and Access road datasets for the new Path 15 500 kV transmission line in central

California. It was installed in one of the crew rigs and taken for a test drive during the Line Crew inspection of the transmission line in September and October. Laptops will soon be installed in all Line Crew rigs. An effort is underway by SNR GIS staff to collect access roads for the rest of SNR's ROW. Working with descriptions of the locations, access roads are digitized against recent orthophotography, structure and transmission line datasets. GIS is an excellent way to maintain current access road locations especially in urban areas undergoing rapid development.

The SNR GIS Project has been in an intense data acquisition mode this past year. Last April and September, a contractor flew SNR's ROW with a helicopter, collecting GPS data and still photography of tower structures and all other SNR facilities within five miles of the ROW, and streaming video of the ROW. As more geographically accurate line and facility data is added to GIS, other functional groups at SNR will be able to use GIS as a tool for their project planning and analysis.



**Elverta Linemen take GIS for a test drive**