# PLOTVIEW SOFTWARE FOR RETRIEVING PLOT-LEVEL IMAGERY AND GIS DATA OVER THE WEB[1]

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**Abstract**—-The Minnesota Department of Natural Resources Division of Forestry Resource Assessment office has been cooperating with both the Forest Service's FIA and Natural Resource Conservation Services's NRI inventory programs in researching methods to more tightly integrate the two programs. One aspect of these ongoing efforts has been to develop a prototype intranet application to provide interactive, map-based access to "raw" FIA and NRI plot data. The application runs on a password-protected web site at http://www.ra.dnr.state.mn.us/plotview. Products retrievable for any given plot on the interactive map include scanned aerial photographs, scanned field plot sheets, scanned USGS quad maps, digital ortho quad photography, and, in the case of the NRI program, database outputs of the raw data collected for the plot. All software driving the interface is freely distributable under open source licenses.

## INTRODUCTION

PlotView is a web-based intranet application designed to provide online access to centrally maintained stores of plot data from anywhere that an internet connection is available. The design of the system obviates any need for duplication of large image datasets, while simultaneously providing instantaneous access to those datasets from virtually any location. Field data gatherers, crew managers, quality control personnel and data analysts are all enabled to access the data they need when they want it, thereby avoiding the lengthy delays encountered in the past when trying to access plot data.

## MAP INTERFACE

One of the great strengths of the PlotView application is that it enables users to view plot locations in a landscape context via online maps. The maps are easily navigated through a variety of means, including place name searches, public land survey specifications, map coordinate input, or point-and-click pan and zooming on the map itself. The map view may be toggled to a satellite image view, allowing users to readily identify both cultural and natural features in proximity to the plot(s) of interest.

## PLOT DATA ACCESS

Data pertaining to a given plot can be accessed either by entering the plot ID into a text box in the interface, or by clicking on the plot centroid symbol on the map. The data returned for a given plot may include any or all of the following:

Scanned aerial photographs—these can include any number of inventory-specific photos taken over the plot through the years, and/or more generic photo resources such as NHAP, NAPP or state and local photographic holdings.

Scanned plotsheets—available only for the FIA program, included specifically for access to the hand-drawn maps indicating plot access routes.

Plot-specific database contents—available currently only for NRI plots. Taps into the "dataview" web application at Iowa State for database outputs specific to a given plot. Integration with FIA plot databases is also possible.

DRGs (scanned USGS quad maps)—presented in a "seamless" fashion, so that users can view any area without regard to the boundaries of the original paper maps. Presented with GIS overlays, including plot centroid and label.

DOQs (quad-based orthorectified photography from USGS) —as with the DRGs, above, DOQs are presented in a "seamless" mode, so that any area of interest may be viewed without regard to original photo boundaries. Also presented with GIS overlays, including plot centroid and label.

## SUPPORTING SOFTWARE

PlotView is supported by a number of freely-distributable open source software packages, listed below.

MapServer (http://mapserver.gis.umn.edu)—provides the interactive web-mapping capabilities.

Perl (http://www.perl.com)—the scripting "glue" that holds the various pieces together.

MySQL (http://www.mysql.com)—the database system that holds the metadata for the variety of data elements associated with the plots. Note that MySQL is not required for the PlotView application to work, and may be supplanted with nearly any web-accessible database system (Oracle, Sybase, Informix, etc.)

Apache Web Server (http://www.apache.org)—Web serving software. May be supplanted by a variety of other web serving software packages.

PDFlib (http://www.pdflib.com)—PDF file format generator. Enables the PDF encapsulation of images and maps for printing.

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There are a couple of proprietary software products that, while not required to run PlotView, are indispensable in preparing GIS and image data for web distribution.

ArcView and/or ArcInfo (http://www.esri.com)—GIS software used to prepare the map datasets served with the MapServer. Note that the MapServer is presently poised to incorporate the OGR and GDAL open source software libraries, which will greatly expand the sources of both vector and raster GIS data that the MapServer can work with.

MrSID Encoder (http://www.lizardtech.com)—Software for the wavelet compression of image data; enables speedy delivery of large image datasets over the internet.

## FURTHER INFORMATION

PlotView is best understood by visiting the web site itself. Visit http://www.ra.dnr.state.mn.us. Note that you will need a user ID and password in order to access the site, though for security reasons these cannot be printed here. Contact your FIA program manager or NRI ICCS leader for this information.

Feel free to direct any technical or administrative questions concerning PlotView to the author of this paper.