

Looking at WMS through Google Earth

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When planning to report or model water quality in an area, a good start is to get an overview of available data.

One way to do this is to use Google Earth, which provides a convincing planetary view composed of thousands of satellite images pasted onto the Shuttle Radar Topography Mission digital globe.

The illusion is dramatic, letting us go from the general to the particular and back again at phenomenal speed. Well-oiled algorithms download fragments of satellite images and elevation data to construct a realistic 2 1/2 D landscape in seconds... before Google Earth, we tried very hard to make useful perspective images in remote sensing or GIS products, but they took hours to set up and fly-throughs were even more difficult.

Google, which Star Trek fans will identify as the Borg, assimilated a company called Keyhole and brought out Google Earth little more than two years ago. Keyhole Markup Language is an XML method for adding your own data to the Google Landscape. KML allows control of symbols, viewing position, table of contents hierarchy and temporal characteristics. KML popup balloons permit the display of additional text, images and HTML links at a site.

I would like to bring you up to date with our use of Google Earth as a viewport into the Water Management System inventory, and links to static graphs and data. By static, I mean that I pre-generate the information rather than run jobs on the server in real time. Without Google's considerable expertise in search and display, the process would be prohibitively slow.

Pre-generation of the 40 000 graphs takes about three weeks on a Sun Fire server running Arcinfo.

In an attempt to reduce the number of things that can go wrong, I have prepared a short canned presentation (*play movie*).

We start out in space, and zoom into the fairest G catchment. In 1955 one site existed in the area. If we broaden the time slider, we can see the general spread of sampling, with different symbols for the main data types.

If we set the timespan to a narrow period and scan from 1955 to 2007, the change in sampling (or data capture) effort becomes apparent.

Let's now take a closer look at the sites near Macassar and Somerset West. Here is the outflow from a sewage works. Clicking on the site brings up a balloon with links to a succession of data items:

- a PDF graph of the main inorganic solutes (pre-generated and static)
- a data file of the variables used to plot the PDF graph (now based on year-old data)
- a Maucha ionic diagram
- a link to the document explaining the Maucha diagram

Now we move along the Strand to a flow gauging weir near the mouth of the Lourens. Here the balloon contains an additional link to DWAF's Hydrological Services Internet flow data. It passes the station code to the data extraction routine, saving the user the trouble of translating between our disparate site numbering systems.

Now, let's zoom over to the Berg River valley and place Maucha diagrams all over the place, illustrating that we are not limited to Google Earth's markers. All these are in computer memory... now we'll add all 10 000 1:500 000 rivers with their names, and the 2000 quaternary drainage boundaries with their codes.

And the computer falls over under the weight (*end of movie*).

For professional use, consultants can subscribe to Google Earth Pro for \$400 a year (that's R250 a month, cheaper than DSTv) and get faster image downloads (theoretical with our Internet speeds), the ability to outline and calculate areas, import GIS data directly, print at high resolution (A3) and call for technical support.