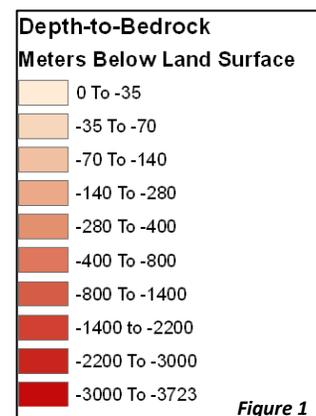


Detrital Valley, Hualapai Valley, and Sacramento Valley Basins Depth-to-Bedrock 3D GeoPDF

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The Detrital Valley, Hualapai Valley, and Sacramento Valley Basins 3D GeoPDF illustrates the basin configuration and depths for all three groundwater basins. There were three major steps for creating the 3D Geo PDF:

1. Create a modified Digital Elevation Model (DEM) incorporating ADWR depth-to-bedrock data for the Detrital Valley (Mason et al, 2007), Hualapai Valley (Ivanich et al, 2009), and Sacramento Valley (Conway et al, 2008) basins. The depth-to-bedrock raster from each groundwater basin was merged into a single depth-to-bedrock raster which consisted of negative values. A constant value raster (value of zero) was created so that all rasters had the same extent for raster calculations. The depth-to-bedrock raster was merged with the constant value raster. The modified constant value raster was then added to the 30-meter DEM, creating a modified DEM with bedrock elevations in the Detrital Valley, Hualapai Valley, and Sacramento Valley Basins.
2. Create a suitable view to illustrate depth-to-bedrock configuration and depth variations in the Detrital Valley, Hualapai Valley, and Sacramento Valley Basins. ArcGIS (ESRI, 2011) was used to apply a color ramp (light to dark red) to the depth-to-bedrock raster to symbolize the intervals of bedrock depths (Figure 1). The depth-to-bedrock raster was overlaid on a 30-meter hill shade (derived from DEM) and the final view was exported as a GeoTiff and then imported into ArcScene (ESRI, 2011). The exported GeoTiff and the elevation data from the modified DEM from step 1 were combined and vertically exaggerated 3 times in ArcScene, creating a 3D enhanced view. The 3D enhanced ArcScene view was exported as a 3D .wrl file, serving as the view for the final product.
3. Create the 3D GeoPDF. The exported 3D .wrl file was imported into Adobe Acrobat Professional (Adobe Systems, Inc, 2011) using Tetra4D 3D PDF Converter (Tetra4D, 2011) and Terra Go PDF Composer (Terra Go Technologies, 2011). The PDF was geo-registered using the Terra Go software and the coordinates from the modified DEM, creating the Detrital Valley, Hualapai Valley, and Sacramento Valley Basins Depth-to-Bedrock 3D GeoPDF. The 3D GeoPDF uses UTM NAD 83 coordinates and the elevations are in meters. When the GeoPDF is opened, a limited Terra Go Toolbar will become visible. It is recommended that the user download the full Terra Go toolbar to be able to view the cursor location and elevation data from: <http://www.terragotech.com/products/terrago-toolbarReferences>



Adobe Systems, Inc., 2011. Adobe Acrobat Professional.

Conway, Brian and Ivanich, Paul, 2008, Preliminary Estimate of Groundwater in Storage for the Sacramento Valley Groundwater Basin, Arizona Department of Water Resources; Phoenix, Arizona; OFR-10.

ESRI, 2011. ArcGIS ArcMap and ArcScene.

Ivanich, Paul and Conway, Brian, 2008, Preliminary Estimate of Groundwater in Storage for the Hualapai Valley Groundwater Basin, Arizona Department of Water Resources; Phoenix, Arizona; OFR-11

Mason, Dale, et al, 2007, Preliminary Estimate of Groundwater in Storage for the Detrital Valley Groundwater Basin, Arizona Department of Water Resources; Phoenix, Arizona; OFR-9.

Terra Go Technologies, 2011. 3D Composer.

Tetra4D, 2011. 3D PDF Converter.

