CueTip™

Adding a New Geoid Model in GeoCue

Applies to GeoCue, versions 3.0 and above.

GeoCue Group Support
January 14, 2015
Revision 3.0

Introduction

Geoid models in GeoCue are grid-based. The required file format is simply a rectangular grid of geoid undulation values, N, where h = H+N, with h representing the ellipsoid height and H the geoid height. The grid contains only undulation values. The grid points are required to be at regular geographic intervals in latitude and longitude. The grid file may have an optional header, followed by an array of single precision floating point values (4 bytes each). The first point of the array must represent the minimum latitude and longitude of coverage for the model. The second point is the same latitude, but for the next increment of longitude. The array proceeds likewise for as many columns as the grid covers in longitude and then row-wise for increasing latitude. In the example that follows, we'll let the file **myGeoid.bin** represent such a geoid grid file.

If you believe that your geoid model is one that should be natively implemented within GeoCue please let us know so that we can look at adding it into a future release.

Requirements

Implementing a new geoid in GeoCue requires the user to be logged into the GeoCue Server as a GeoCue Admin or to possess the correct password for the geocueadmin user on the system.

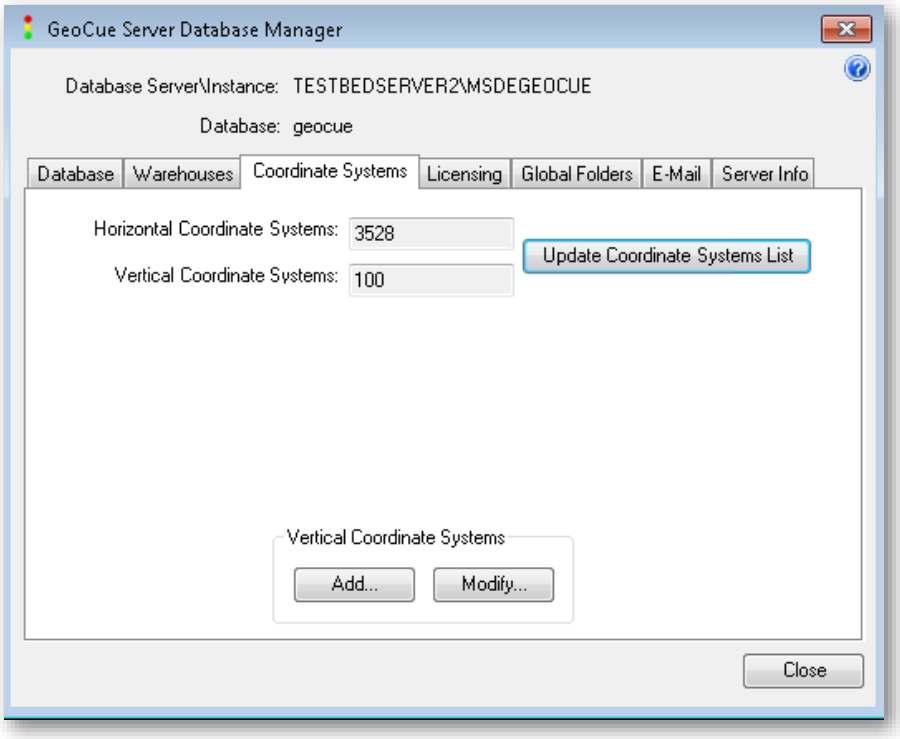
GeoCue can read NOAA's National Geodetic Survey (NGS) binary geoid model format. As provided in the readme files accompanying those files, "the files (ASCII and binary) all follow the same structure of a one line header followed by the data in row-major format. The one line header contains 4 double (real*8) words followed by three long (int*4) words. These parameters define the geographic extent of the area:

SLAT: Southernmost North latitude in whole degrees. Use a minus sign (-) to indicate South latitudes.
WLON: Westernmost East longitude in whole degrees.
DLAT: Distance interval in latitude in whole degrees (point spacing in E-W direction)
DLON: Distance interval in longitude in whole degrees (point spacing in N-S direction)
NLAT: Number of rows (starts with SLAT and moves northward DLAT to next row)
NLON: Number of columns (starts with WLON and moves eastward DLON to next column)
IKIND: Always equal to one (indicates data are real*4 and endian condition)

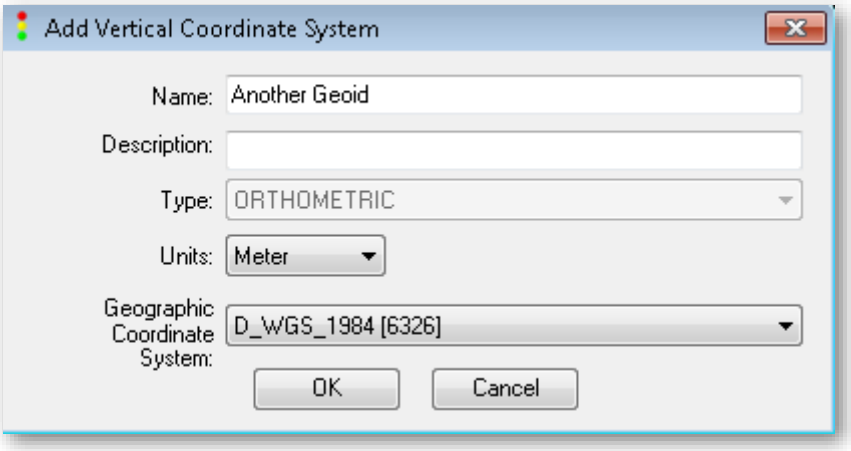
After this one line header, the data follow. The first row represents the southernmost row of data with the first data point being in the SW corner. The row is NLON values wide spaced at DLAT intervals, and then increments to the next row which is DLAT to the north.
This continues until the last row where the last value represents the northeast corner.
The easternmost longitude is = WLON + (NLON - 1) * DLON, while the northernmost latitude is = SLAT + (NLAT - 1) * DLAT."

Add New Geoid as a Vertical Coordinate System

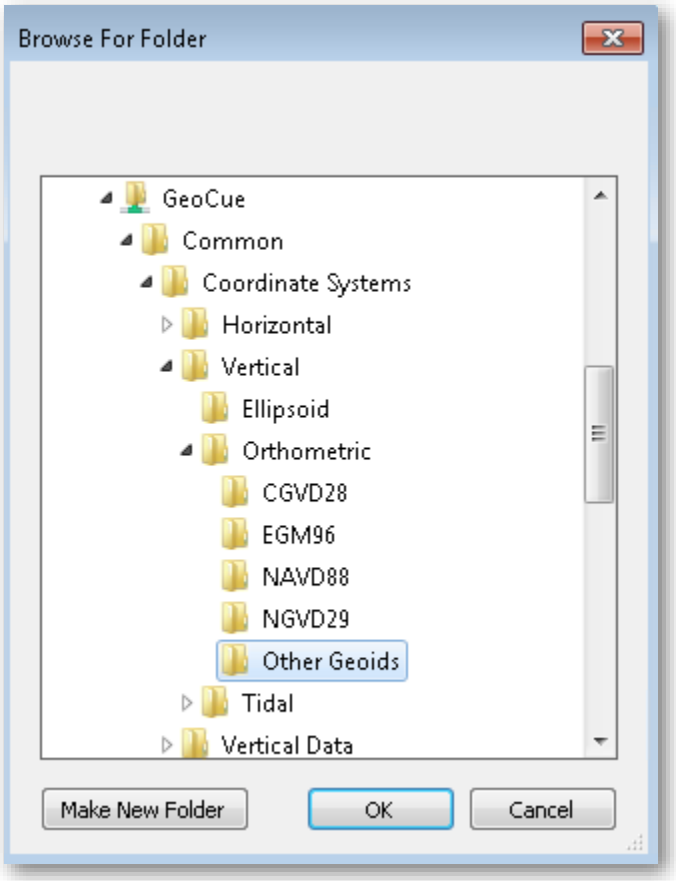
To add this new geoid model, run the Database Manager on the GeoCue Server.



Select the 'Coordinate Systems' tab and click the 'Add' button in the Vertical Coordinate Systems group box. The 'Add Vertical Coordinate System' dialog appears. Enter a Name and optionally, a description for your new geoid model. Select the vertical Unit and the Horizontal Datum on which your grid is based. Click 'OK'.

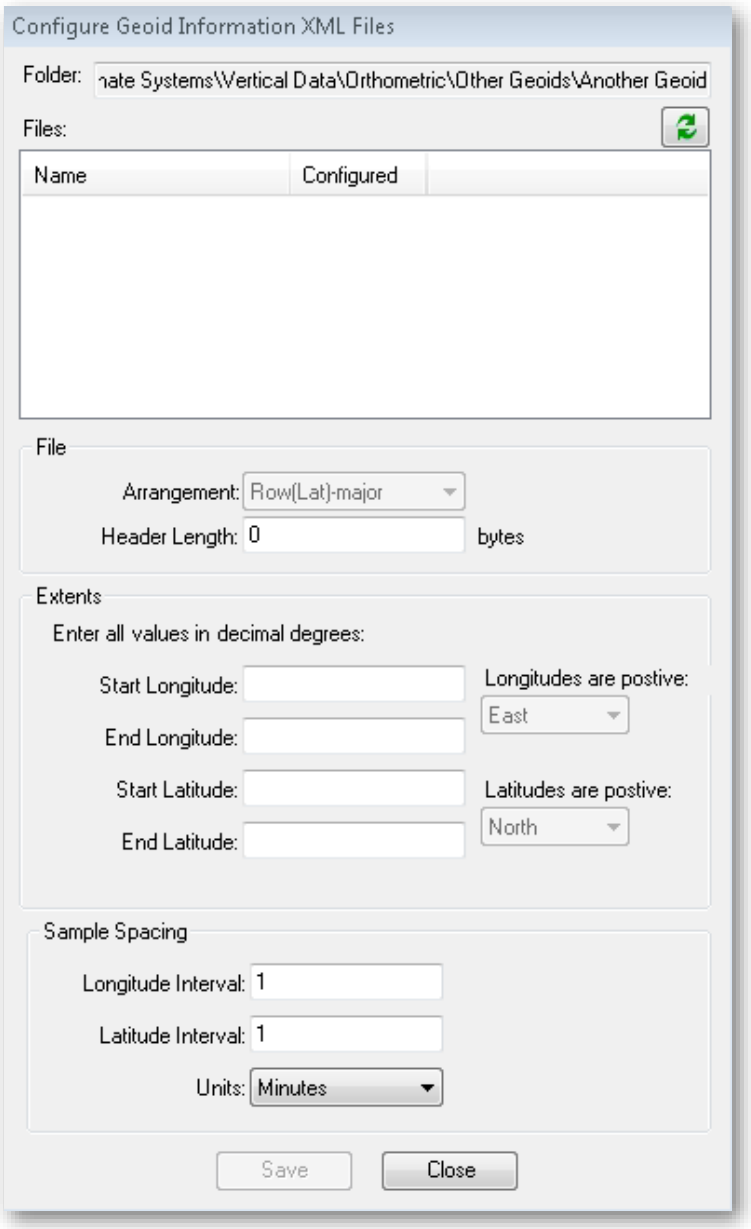


A 'Browse for Folder' dialog appears. Either create a new folder, or select an existing folder beneath the default 'Orthometric' folder. *You cannot create new geoids directly in the 'Orthometric' folder*. For this example we've created 'Other Geoids'. Click 'OK' on the browse dialog.



The 'Configure Geoid Information XML Files' dialog appears. The purpose of this dialog is to allow you to describe the coverage of the geoid grid file you are adding. Note the folder specified at the top of this dialog. Copy your geoid file to this folder and click the refresh button to the right and just below the folder field. **MyGeoid.bin** will appear in the 'Files' listbox.

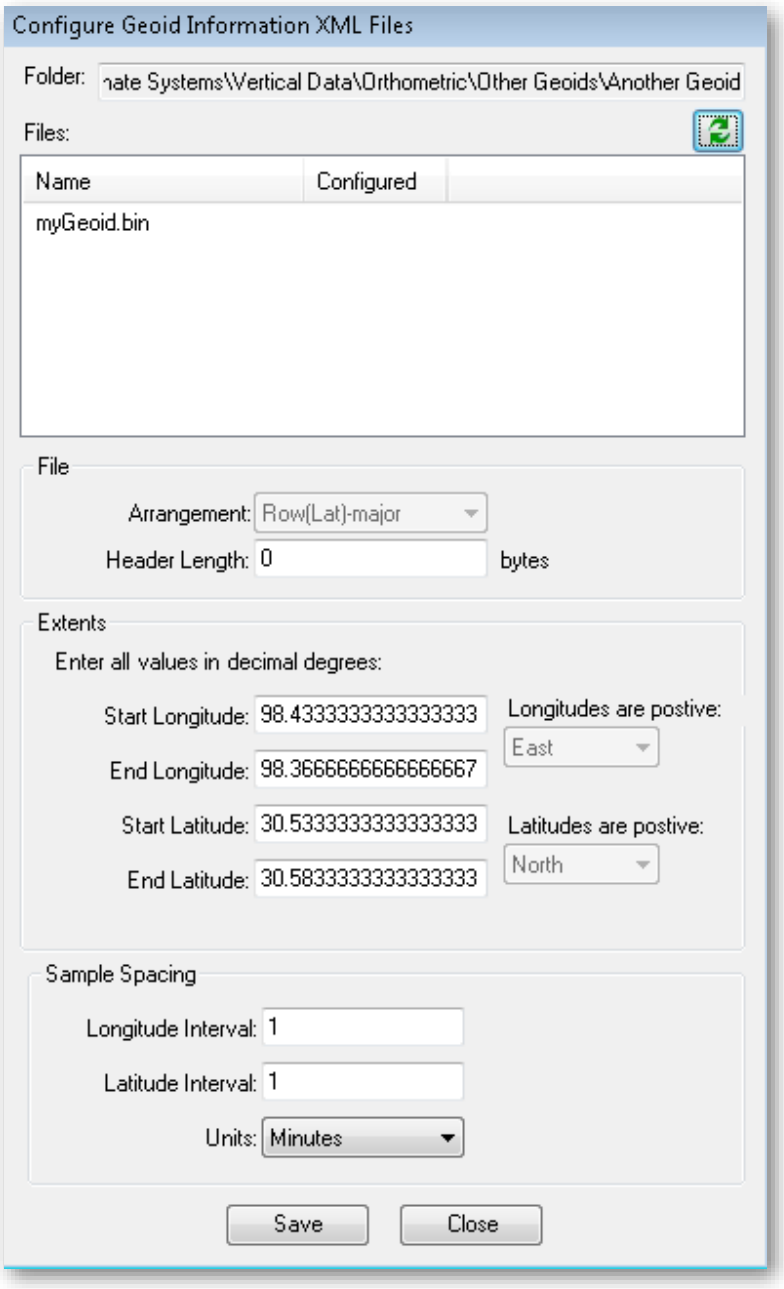
NOTE: For the current implementation only use: "Row(Lat)-major", "East" and "North" for the File and Extents settings.



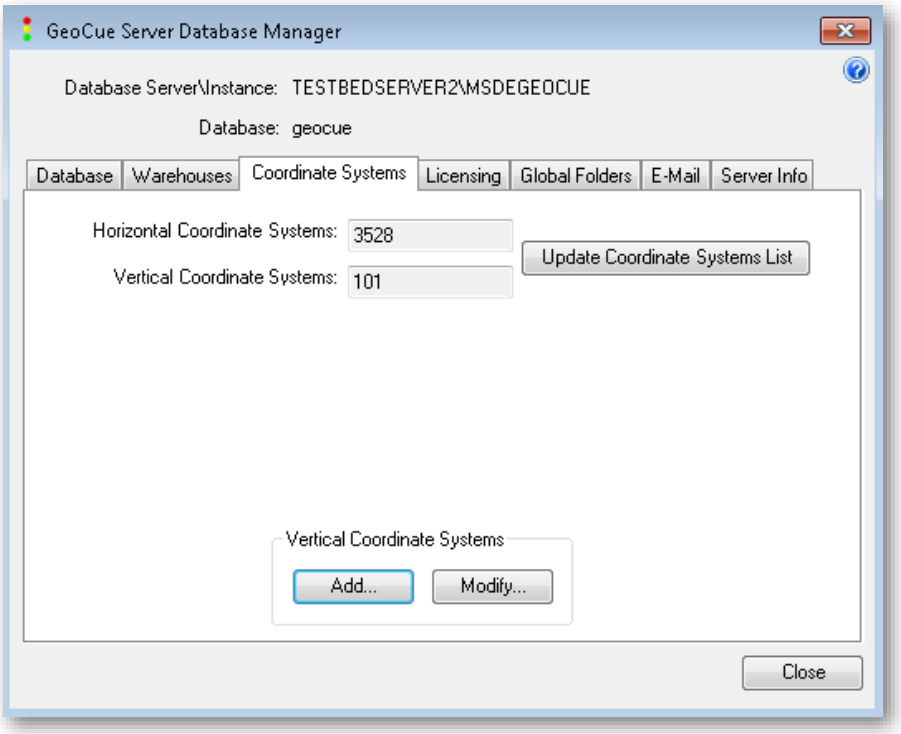
MyGeoid.bin contains undulation values from longitude 98º 22' W to 98º 26' W. Latitudes are from 30º 32' N to 30º 35' N. The grid spacing is 1 minute in both latitude and longitude directions. Note that the Starting and Ending Longitudes and Latitudes must be entered in decimal degrees (see dialog below) and that the 'Starting' values are south-most and west-most values, while the 'Ending' values are north-most and east-most. Enter only positive values for longitudes (i.e. for -86.5, enter 273.5).

MyGeoid.bin does not contain any header data, so Header length is zero. Note that if your file contains header info, enter the length in bytes of the header – this must also be the byte offset in your file to where the array of undulation values begins. ***NGS format headers are 44 bytes in length***.

Be sure to select a geoid file in the listbox, then click 'Save'.

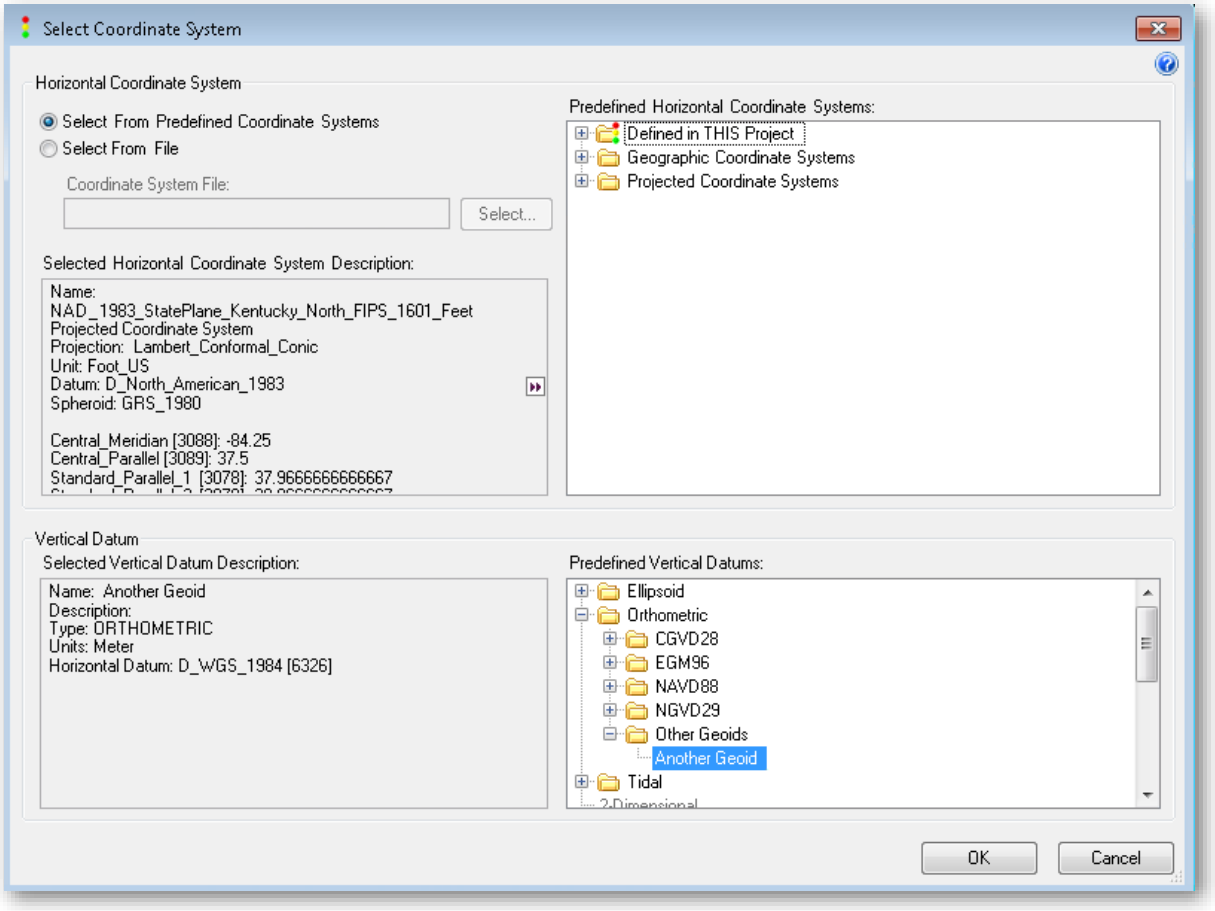


After saving the number of vertical coordinate systems on the GeoCue Server Database Manager will have incremented by one.



Using the New Vertical Coordinate System

The next invocation of the GeoCue 'Select Coordinate System' dialog will show the new geoid model in the 'Predefined Vertical Coordinate Systems' list box. See below.



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Find additional information and participate in our GeoCue Group user forums.

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