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CE 394K
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Title: Initial Analysis of Natural and Anthropogenic Adjustments in the Lower Mississippi River since 1880

Status Overview on 24 October 2011

After becoming familiar with the variability in vertical datums, mean lower water, mean gulf level, and low water reference planes used in the historic surveys (all explained below), this project took on a level of complexity that I did not expect. As such, I would like to adjust the end goal of the project to "three dimensional models created in ArcGIS". Subsequent steps outlined in my proposal are crossed out below. The ending point of this project would be a three dimensional model in ArcGIS of each survey, using the same horizontal AND vertical datum/reference as every other survey. These models would be the starting point for subsequent comparison and analysis.

1. Data on hand - Complete

The author has dgn CAD files from various stretches of the river from the following survey years: 1915, 1937, 1948, 1964, 1975, 1983, 1992, 1997, 2004.

2. Data projected in correct projection- Complete

All data has been imported into ArcGIS and projected using the Louisiana State Plane System, NAD 83.

3. Vertical datums adjusted to same datum- Working

Each dgn file was georectified from the corresponding map at the link below and projected in the Louisiana state plane system.

http://www.mvn.usace.army.mil/eng2/hydsrv/MSHYD.asp

However, each vertical datum used on each original survey is still in use in the dgn file. Earlier surveys, such as the 1937 survey, are referenced to the mean low water (MLW). For contours above mean low water, the mean gulf level (MGL) was used as a reference. For later surveys such as the 1991 survey, the bottom depth is referenced to the low water reference plane (LWRP).

3.A.Collection of MLW, MGL and LWRP used in each survey- Working

The definition of each MLW, MGL and LWRP will need to be collected to set each survey to the same datum. This is the step where I am at now and I expect some challenges. From cursory searches on the New Orleans USACE website, recent LWRP definitions are available and are defined by 1/10 mile stretches of the river. Older definitions of MLW, MGL and LWRP were not immediately discovered. The engineer at USACE that provided me the dgn files did articulate the difficulty of comparing surveys

spanning nearly 100 years and offered as a solution keeping the vertical references in each survey "as is" and including a disclaimer. He stated that the variability in the river depths was much greater than any variability induced by varying datums. However, without actually doing this step I cannot articulate the error involved in keeping the vertical datums "as is" and my disclaimer would be similarly hollow. Regardless, these definitions exist and are surely available online or at USACE.

3.B. Setting each survey to the same LWRP- Not Started

I expect this step to be fairly simple, though require many steps. I will create a raster file that defines the difference between each stretch and my end definition of that stretch and conduct an addition exercise between the survey raster and my "difference" file. The survey raster here is an interpolated surface from the survey points.

4. Three dimensional models created in ArcGIS- Not Started

Once each survey is set to the same horizontal and vertical datums, this step is effectively complete.

~~**5. Quantitative Analysis Completed- Not started**~~

~~**6. Qualitative Analysis Completed- Not started**~~

~~**7. River adjustments related to engineering interventions- Not Started**~~