

Initial Analysis of Natural and Anthropogenic Adjustments in the Lower Mississippi River since 1880

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CE 394K
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Eads Jetties

Year	Tons Shipped to Europe
1875	6,857
1880	453,681

Barry (1997)

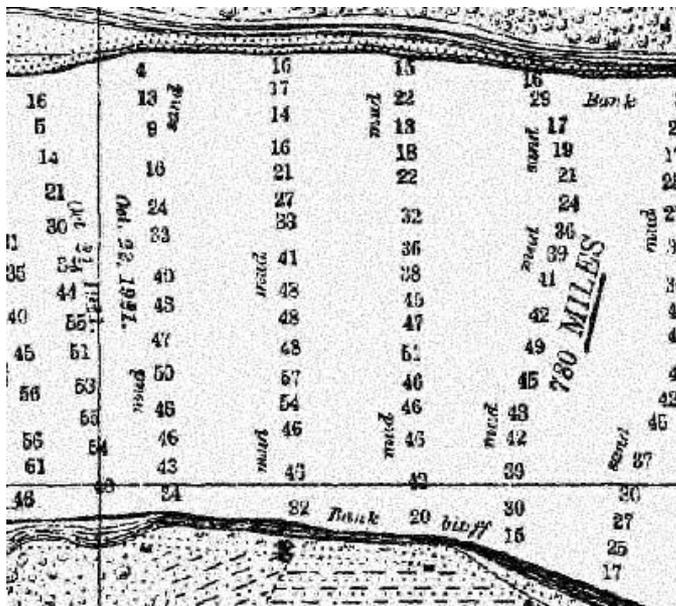


Old River Control is the “keystone of the comprehensive flood-protection project for the lower Mississippi Valley” and has been described as **America’s Achilles heel**

USACE Hydrographic Surveys- My Primary Source

Survey Years: 1880, 1915, 1937, 1949, 1964, 1975, 1983, 1991, 1997, 2004...

Survey Maps at <http://www.mvn.usace.army.mil/eng2/hydsrv/MSHYD.asp>



Digitized by
USACE



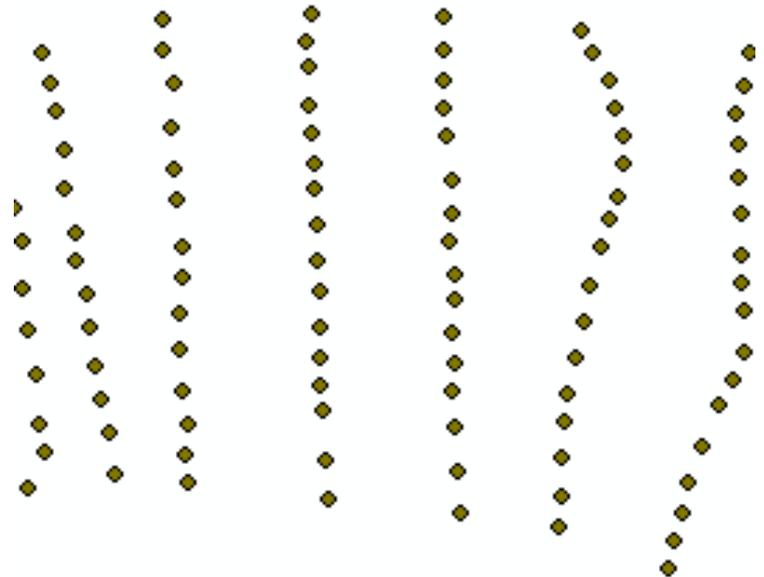
Projected

in

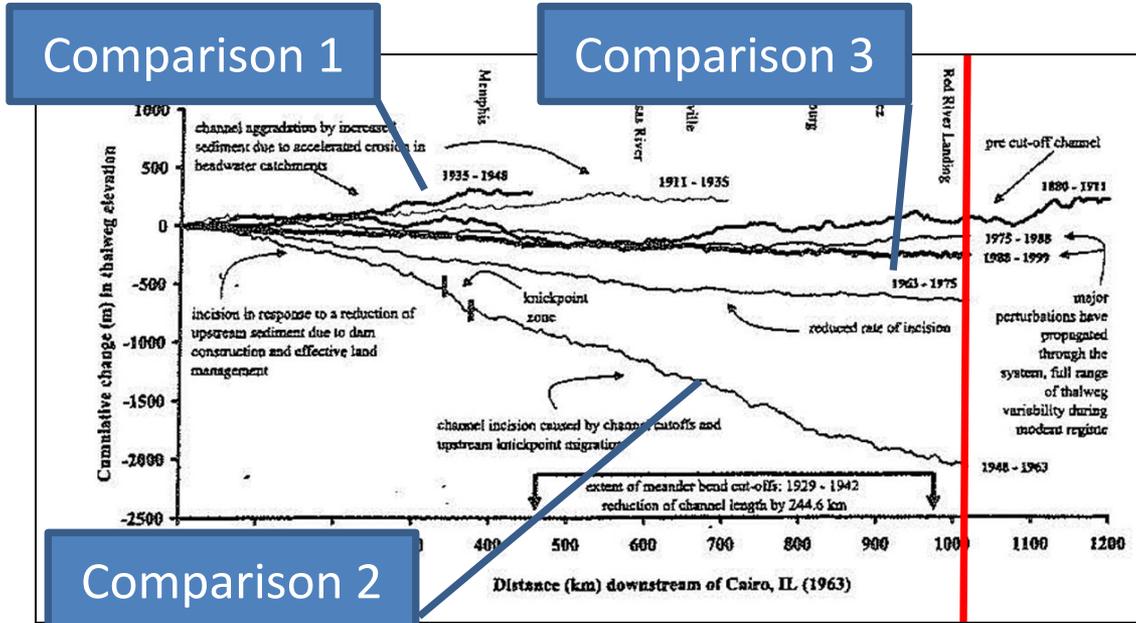
Louisiana

State

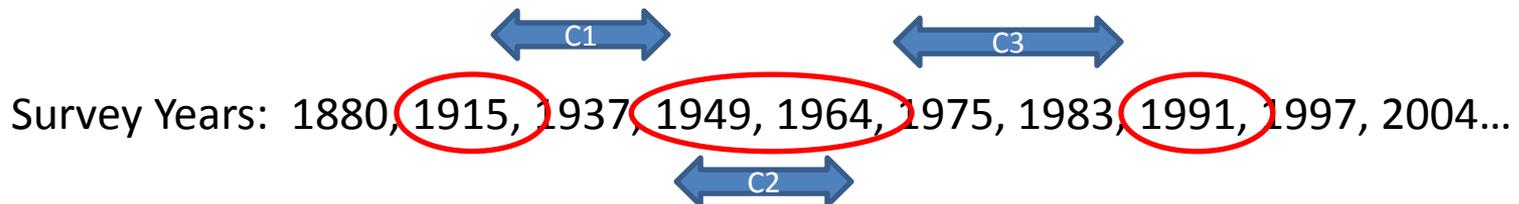
Plane NAD 83



Selection of Surveys and Location



Cumulative change in thalweg profile through time. The three temporal areas used in the presented research are indicated. The red line denotes the study area. (Hudson & Kesel 2006)



Initial Processing

CAD Data / Mostly Unusable in ArcGIS



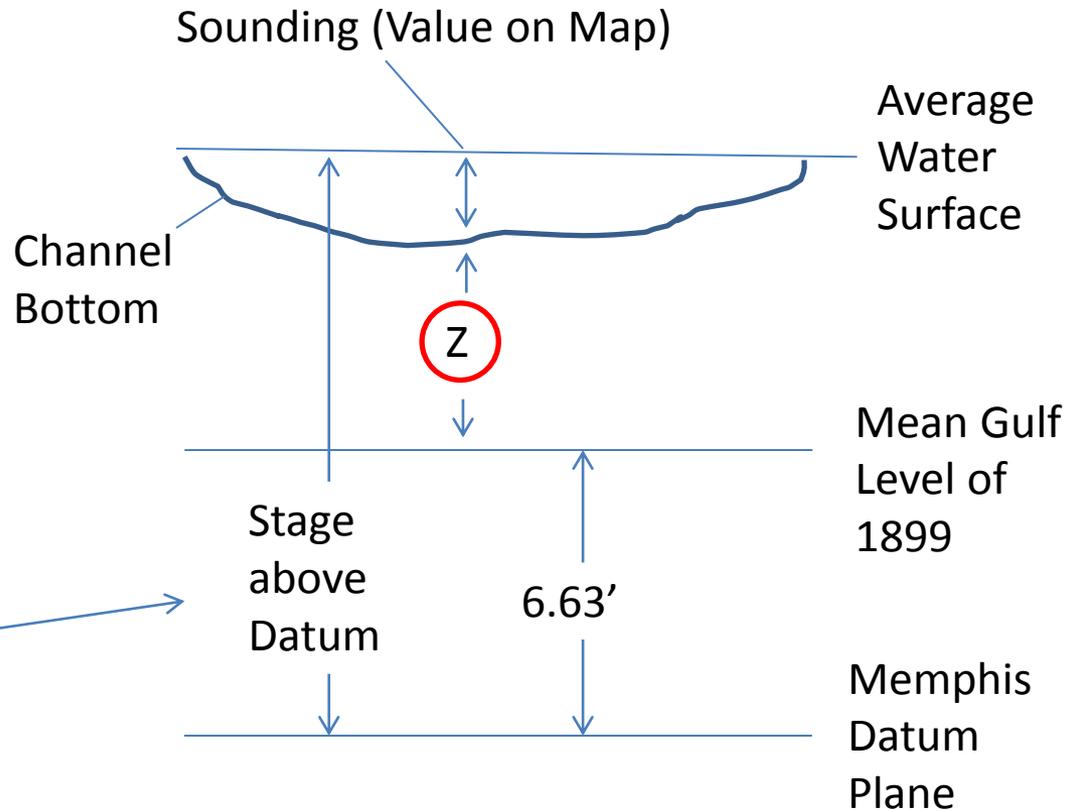
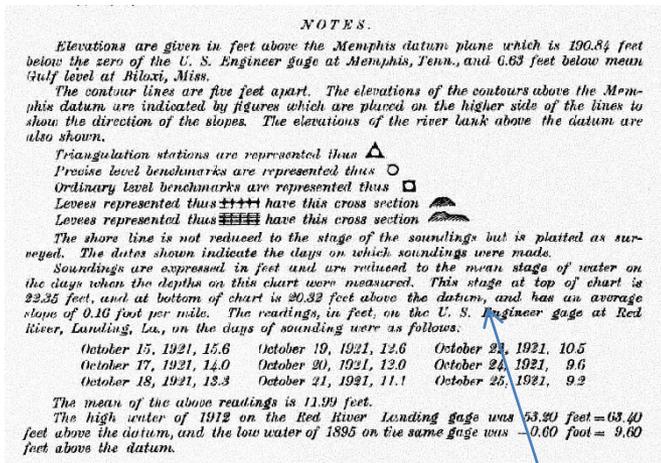
- “CAD to Geodatabase”
- Edit, then delete data outside study area.
- “Feature to Point”



Ready for Processing!

Conversion to “Channel Bottom in Feet above _____”

Example: 1915 Survey



$$Z = (\text{Stage above datum}) - (6.63') - (\text{Sounding})$$

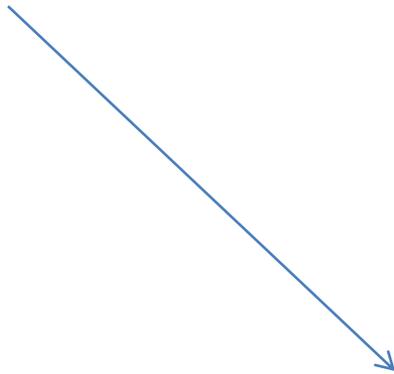
1949/1964 Surveys

1915/1991 Surveys

How to interpolate and clip to the channel width?

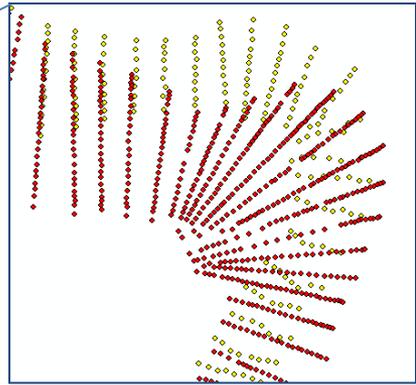
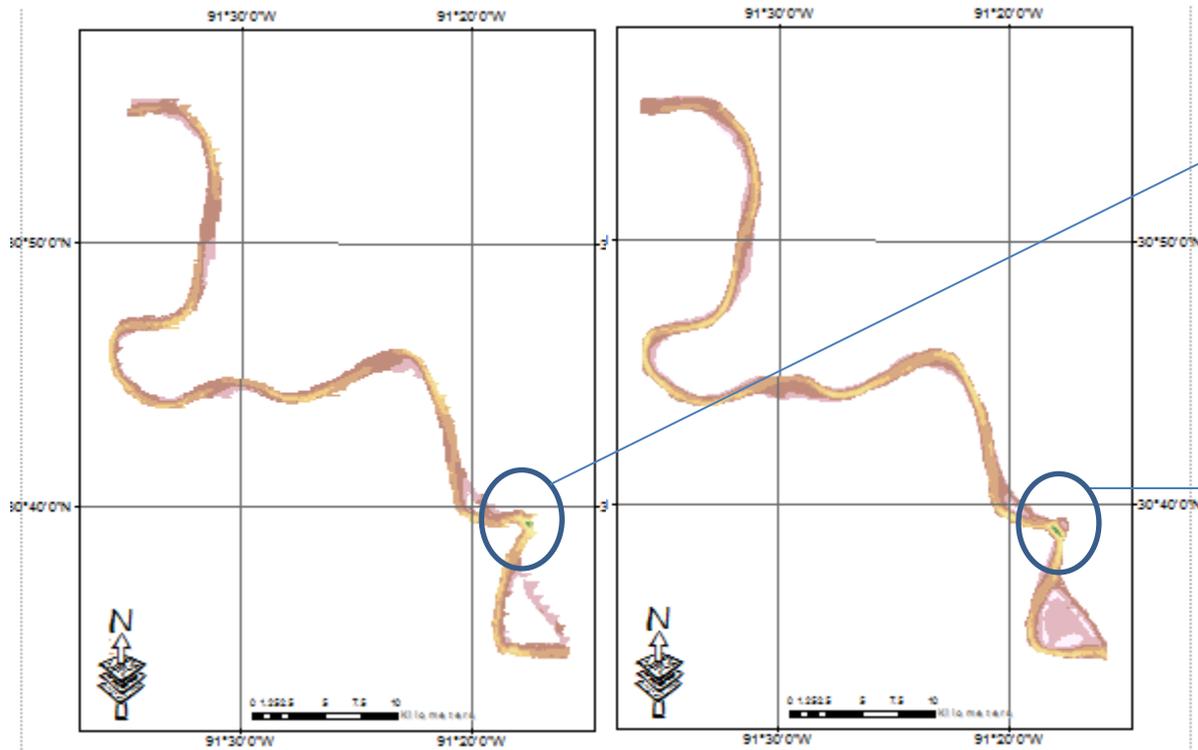
- CAD file **did** come with “mask”
- Point to raster interpolation (IDW)
- Clip with mask

- CAD file **did not** come with “mask”
- Point to raster interpolation (IDW)
- Create polygon mask
- Clip with mask



Raster surface clipped to channel width*!

Some findings...



Channel planform adjustment in the 1913 (yellow) and 1949 (red) surveys.

1913

Channel bottom, feet above MSL

1949

- 37.49246895 - 60.38619995
- 14.59873794 - 37.49246894
- 8.294993082 - 14.59873793
- 31.18872408 - -8.294993083
- 54.0824551 - -31.18872409
- 76.97618611 - -54.08245511
- 99.86991712 - -76.97618612
- 122.763648 - -99.86991713
- 145.6573792 - -122.7636481

Next Steps

- Identify and characterize **thalweg**
- Tackle Channel **Bank Issue**
- Characterize local **geologic formations**
- Define **specific engineering** in study area

Works Cited

Barry, J. *Rising Tide*. New York: Simon and Schuster, 1997. Print.

Hudson, P.F. and R.H. Kesel, Spatial and temporal adjustment of the lower Mississippi River to major human impacts. *Zeitschrift für Geomorphologie, Supplementbänd*, 143 (2006), pp. 17–33.

V.M. Merwade, D.R. Maidment and B.R. Hodges, Geospatial representation of river channels. *J. Hydrol. Eng.*, 10 3 (2005), pp. 243–251.