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Mississippi River Sediment Availability Study: Summary of Available Data

by Sandro Filippo

PURPOSE: This Coastal and Hydraulics Engineering Technical Note (CHETN) summarizes research about the sediment data of the Lower Mississippi River and its tributaries in support of the project "Mississippi River Sediment Availability Study (MRSAS) Considering Sensitivity to Climate Change Effects on River Water Discharge." The MRSAS involves exploring a sensitivity range of river water discharge linked to climate change effects, such as changing watershed precipitation patterns and sea level rise. The goal is demonstrating a capability for prognosticating long-term variability and uncertainty in river suspended sediment availability to support investigation of large-scale sediment diversion alternative tradeoffs in coastal Louisiana, considering resource limitations. This CHETN presents an inventory of the sediment data available from different sources and reports, including the U.S. Army Corps of Engineers (USACE) Districts, U.S. Geological Survey (USGS), Technical Reports (Thorne et al. 2008, 2001; Demas and Curwick 1987).

BACKGROUND: Several studies and reports describe how land loss and the degradation of the Louisiana coastal ecosystem are the result of both natural and human induced factors. Establishing the relative contribution of natural and human-induced factors is difficult in many cases. Changes in hydrologic and ecologic processes manifest gradually over decades and over large areas, while other effects occur over relatively short durations and impact localized areas, as was the case after Hurricanes Katrina and Rita. Most of these studies indicate that natural factors of coastal land loss and ecosystem degradation include: geologic faulting, subsidence, compaction of sediment, river floods, global sea level change, prevailing daily wave erosion, and periodically occurring tropical storm events.

To reduce land-loss and restore natural features of coastal Louisiana, the Water Resources Development Act of 2007 - Title VII presents several solutions (Heikkila et al. 2008). These solutions include flood and storm damage reduction and the remediation of damaged ecosystems. These are separated into short-term priorities and long-term planning. More specifically, long-term planning goals involve creating multiple lines of defense against storms and hurricanes. Short-term priorities include projects which have been identified as having the potential to impact the largest area of degraded wetland, thus having the greatest potential for near-term wetland restoration (Heikkila et al. 2008).

The sediment load of the Mississippi River has been reduced through lock and dam construction and bank stabilization in the Mississippi basin and this fact could adversely impact the effectiveness of diversion plans (National Research Council 2008; Kesel et al. 1992; Blum and Roberts 2009). Figure 1 shows the evolution of suspended-sediment discharge loads (tons/year) for the lower Mississippi River at Tarbert Landing, MS, and the Atchafalaya River at Simmesport, LA, for the period from 1975 to 2008. The curves show the decrease of suspended-sediment

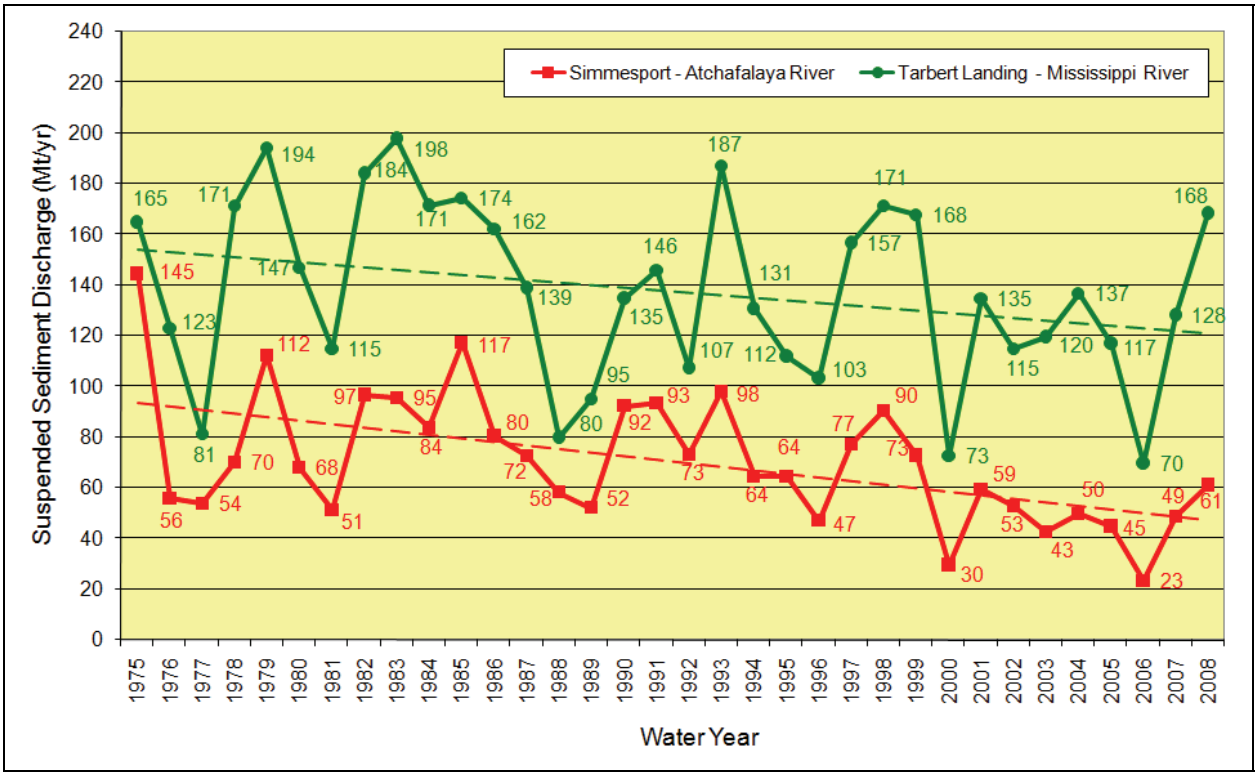

Figure 1. Suspended-sediment discharge for lower Mississippi River at Tarbert Landing, MS, and for Atchafalaya River at Simmesport, LA (USGS data, Blum and Roberts 2009).

load over time. Because modern loads are less than the time-averaged rates for sediment storage that was necessary to construct the late Holocene delta plain, the modern delta plain is supply limited (Blum and Roberts 2009). The average suspended-sediment load for the Mississippi River at Tarbert Landing, MS, in the decade 1999-2008 was 123 million tons/year versus 134 million tons/year in the prior decade 1989-1998. For the Atchafalaya River at Simmesport, LA, the numbers are 48 millions of tons/year (1999-2008) versus 75 millions of tons/year (1989-1998).

The Mississippi River is one of the most artificially regulated rivers in the world. According to Kesel et al. (1992), it is difficult to examine the natural meandering processes, which are often altered or masked by human modifications. According to Kesel (2003) the construction of locks and dams on major tributaries and placement of revetments on the main-stem channel have greatly reduced the natural sediment input to the river. Prior to the 1930s, when major modifications were introduced, the Lower Mississippi River was an aggrading meandering river and the flood plain was the major sediment source due to bank caving. Today the flood plain provides only a minor amount of sediment and the major degradation to the channel, including the growth of channel bars, has occurred as a result of these engineered modifications. The study of Kesel (2003) also indicates that the different geomorphic regions respond to modifications in different ways.

Finally, in evaluating long-term trends in fluvial sediment concentration data, it is critical to recognize uncertainties due to variations in sampling methodology during different time periods.

Prior to the 1950s, sediment data were collected with non-isokinetic samplers and these data may be non-correlative with sediment concentration data collected with modern samplers.

TRENDS IN SEDIMENT SUPPLY: The Lower Mississippi River, extending from Cairo, IL, to the Gulf of Mexico, annually transports approximately 170 million tons of suspended sediment (Thorne et al. 2008). Most studies of sediment movement report a large decrease in measured suspended-sediment loads at selected monitoring stations along the Mississippi River over the last 50 years (Blum and Roberts 2009; Kesel 1988; Dardeau and Causey 1990).

There is an indication that bed material load may have increased since the 1940s, based on analysis of morphological changes observed along the river that have led to an overall increase in slope and available stream power, coupled with the fact that bed material sizes along the river have remained almost constant (Biedenharn et al. 2000). Probably the overall decrease in total measured loads in the Lower Mississippi River masks an increase in the amount of bed material load carried by the river, causing implications for the morphological evolution of the channel as it responds to flow events and past engineering interventions (Thorne et al. 2000). Other studies about changes in morphology, behavior and trends of sediment transportation on the Lower Mississippi River are related in: Thorne et al. (2001), Kesel et al. (1992), Kesel (1992, 2003), Biedenharn et al. (1999), Demas and Curwick (1987), Smith and Winkley (1996), Albertson and Patrick (1996), Harmar et al. (2005), and Julien and Vensel (2005).

To rebuild wetlands and barrier islands, investigations of the Louisiana Coastal Protection and Restoration (LACPR) team (USACE 2009) indicated that, in addition to riverine sediments from proposed diversions along the Mississippi Rivers and its Tributaries (MR&T), significant sediment would need to be acquired either from offshore sources or from interior bay and lake bottoms. Offshore sources represent relatively costly options. These sediments potentially introduce a highly saline component into less saline and fresh water environments, possibly producing adverse responses and adjustment periods prior to the return of system equilibrium at a new state. Removal of sediment from interior water bottoms can alter the hydrodynamics of the estuaries and may have far reaching impacts (USACE 2009).

AVAILABLE SEDIMENT DATA - RESEARCH METHODOLOGY: The first phase of the MRSAS project involved conducting an inventory of available discharge, stage and sediment data to define the sites that will be investigated. This search was based mainly on the following sources and reports: USACE Districts, USGS, and three Technical Reports (Thorne et al. 2008, 2001; Demas and Curwick 1987). This CHETN presents an overview of the sites that have extensive sediment data, and those with limited data. Despite the fact that bedload is clearly an important component of sediment availability, this technical note and the MRSAS project focus mainly on suspended sediment. The methodology of investigation and documentation of the available sediment data in this search considered the following criteria and aspects:

- Coverage includes the Lower Mississippi River and the main stations of the tributaries. For the tributaries, stations considered were those closest to the main stream of the Lower Mississippi River.

- The tributaries included in this study are the Ohio, Middle Mississippi, Obion, Hatchie, Wolf, St. Francis, White, Arkansas, Yazoo, Big Black, Bayou Pierre, Homochitto, and

Buffalo rivers (Figure 2). The Old River Control Structure as well as the Red, and Atchafalaya rivers were also included.

- Consultation was made to the extensive and significant reports by Thorne et al. (2008, 2001) and their attachments as well as the information available on the CD-ROM that accompanies the report.

Figure 2 shows the USGS and USACE stations reported in this study, including other stations presented in the consulted reports. Many stations are operated in cooperation between USGS, USACE, and other organizations.

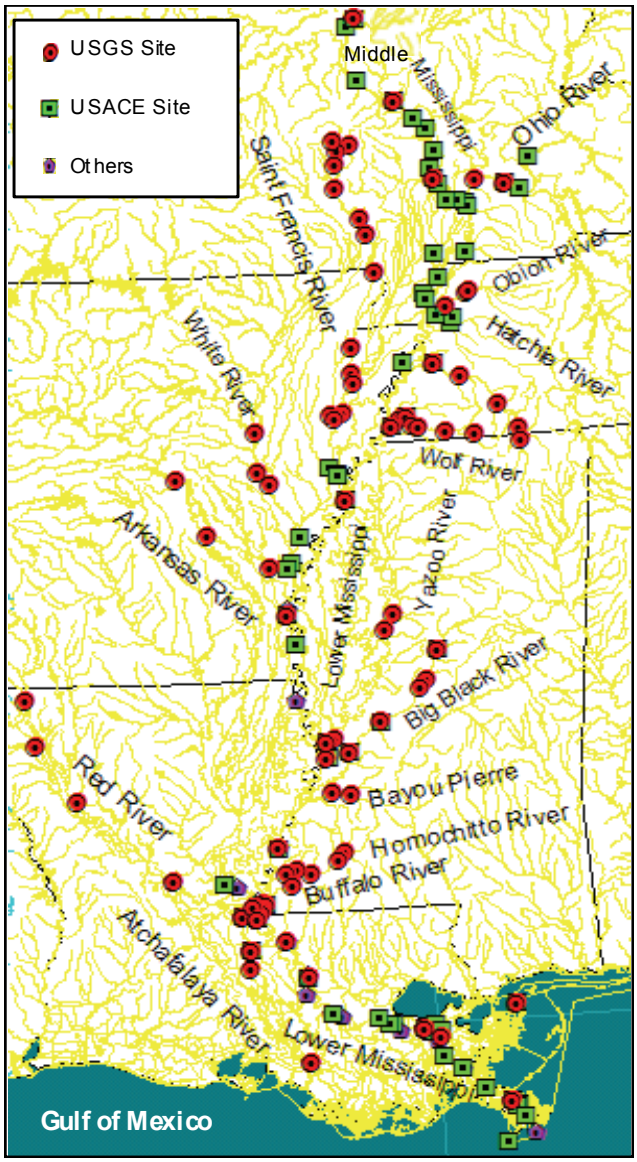

Figure 2. Lower Mississippi River and main tributaries - USGS and USACE stations.

The results of the search, concerning available sediment, discharge, and stage data are presented in the Appendices A, B, C, D, and E:

- Appendix A: A summary of sediment, discharge, and gage height available from the USGS Surface-Water Data Web-site, http://waterdata.usgs.gov/nwis/sw, for 80 stations. Available historical daily, monthly, and annual data are summarized, including the count of records. It also provides available USGS water-quality data for sediments, including the period of record, count, and type of sediment. Other available historical daily data records (temperature, precipitation and salinity) are provided in Tables 1 to 5.

- Appendix B: The USGS sediment parameter codes to support Appendix A (Table 6).

- Appendix C: A summary of available sediment, discharge, and gage readings data reported by the studies of Thorne et al. (2008, 2001), Demas and Curwick (1987) and Robbins (1977). It also summarizes the sampling strategies for sediment (type of sampler, number of verticals, samples per vertical) when the information is available in these reports. (Tables 7 to 10).

- Appendix D: A summary of daily stage data available for 68 gage stations of the USACE Districts in the Lower Mississippi River and tributaries, showing the beginning date for stage data available in the RiverGages.com Web site and the oldest date (year) for available stage data in USACE Districts (Table 11).

- Appendix E: A summary of sources for sediment, discharge, gage height, and hydrographic surveys (charts and maps). It also includes the links to Web pages where the information is available.

Inventory Presented in Reports. Thorne et al. (2008, 2001) and Robbins (1977) collected extensive data from different sources. Demas and Curwick (1987) shows the results of measurements during a specific period (1982-1985) for the Lower Mississippi River. This sequence of reports for the Lower Mississippi River are very important because they compiled data from existing measured sediments for use in subsequent investigations.

The purpose of the Robbins (1977) report entitled "Suspended-sediment and Bed Material Studies on the Lower Mississippi River" was to show the data that had been collected and analyzed to date (1929-1974) and to demonstrate trends in quantities and sizes of suspended and bed sediments for the USACE Vicksburg District. The data was available for Vicksburg and Arkansas City on the Mississippi River for study periods from 1929 to 1932 and 1967 to 1974. The earlier records were used in additional studies and are particularly important because they provide data on the sediment transport characteristics of the river prior to the reported decrease in sediment loads associated with the wide-scale engineering and management actions performed under the MR&T Project (Thorne et al. 2008).

The report of Demas and Curwick (1987) was a cooperative effort between the Louisiana Department of Transportation and Development and the USGS. This effort included collecting monthly suspended-sediment from December 1982 to February 1985 at eight fixed sites from Tarbert Landing, MS, to Venice, LA; a total distance of 295.6 river miles. Several of the sites

were also sampled for bed material. The sediment data published in that report includes suspended-sediment concentrations, suspended-sediment and bed material particle size distributions. Discharge was concurrently measured with water-quality sampling.

The technical reports titled "Sediment Transport in the Lower Mississippi River" (Thorne et al. 2000) and "Morphodynamics of the Mississippi River" (Thorne et al. 2001) investigated the recent history of sediment transport in the Lower Mississippi River. The second study was contracted to expand the scope of the first study, specifically to conduct initial data analysis using the database compiled in the sediment transport study. To achieve these objectives, the authors located and collected historical records of suspended load concentration, discharge and bed size gradation measurements from USACE and USGS archives for the Lower Mississippi Valley. The researchers compiled all data into a spreadsheet database and developed computer macros to perform a range of quality control checks to detect errors and inconsistencies. One of the specific objectives was to perform selected initial evaluation of spatial and temporal trends in sediment loads for fine and coarse fractions over the period of record. Years later, Thorne et al. (2008) produced the report "Current and Historical Sediment Loads in the Lower Mississippi River," whose focus was measured suspended-sediment loads in the Lower Mississippi River. The project also collected information on the behavior of sediment at diversions. Statistical techniques were used to analyze database records from selected stations (especially Tarbert Landing) to establish how sediment loads changed historically and to examine how they vary seasonally, annually, and decadally. The study used records of measured loads and dredging to assess the availability of the sediment in the Mississippi River. These data sources were built upon as a database of existing suspended-sediment and bed-material measurements, compiled by Thorne et al. (2001), and include sediment measurements collected on the Lower Mississippi River, Atchafalaya River, Red River, and the Old River since the 1970s. Some features of the Thorne et al. (2008) report are:

- Extended the existing database for the Lower Mississippi River by compiling all available historic measurements within the USACE Vicksburg District and the New Orleans District (i.e., downstream from Arkansas City) from a variety of sources including: Vicksburg District, New Orleans District, USGS, and a wide range of historical records extending back to the 1850s.

- All of the data that have been compiled as part of the Thorne et al. (2008) study, and the earlier study in 2001, was included on a CD-ROM.

- Data were obtained in a variety of formats and with differing amounts and types of post-collection processing from the original field measurements.

- A summary of post-1930 data sets were presented including the sampling locations, the organization undertaking the data collection, the time covered, and a brief description of information contained within each data set.

- A pre-1930 data inventory was presented including the collector, period, location, sampling frequency and strategy, and laboratory analysis and results, where they were known.

Search in USGS Database. The USGS provide real-time data, daily values summarized from time-series data, and statistics computed from approved daily mean time-series data at each site, including historical values for daily, monthly, and annual (water year or calendar year) time periods. Two basic types of sediment records are published by the USGS: daily and periodic. According to the USGS Web site http://co.water.usgs.gov/sediment/introduction.html, daily records are prepared for sites where sufficient determination of sediment concentration and water discharge are obtained to justify computation of daily sediment discharge. The end product is a tabulation of daily streamflow, daily mean concentration of suspended sediment, and daily suspended-sediment discharge. These data are provided by the National Water Information System (NWIS) Web Interface using the USGS Surface-Water Data on http://waterdata.usgs.gov/nwis/sw.

For the data search presented in this CHETN, information from 80 stations was collected from the USGS Web database stations, for the Lower Mississippi River, tributaries, and Atchafalaya River. Some results of the search in the USGS Database through the NWIS Web are presented below and in Appendix A. Since the data in the NWIS Web site are updated periodically, the numbers could be different for the present. The information from the NWIS web site was retrieved on 12 July 2009.

Suspended-Sediment Daily Data from USGS Database. Figure 3 shows the stations that have daily data for suspended sediment load (USGS code #80155) and the period of record for which this data is available. The stations are the Middle Mississippi River at St Louis, MO (USGS 07010000); Chester, IL (USGS 07020500); and Thebes, IL (USGS 07022000); the Lower Mississippi River at Tarbert Landing, MS (USGS 07295100); and the Atchafalaya River at Simmesport, LA (USGS 07381490). For St. Louis, Chester, and Thebes the USGS database also provides daily data for suspended-sediment concentration (USGS code #80154). The daily suspended sediment data for the Mississippi River at Tarbert Landing and Atchafalaya River at the Simmesport stations were calculated using a program developed by USACE in the 1970s (C. R. Demas, personal communication, 6 October 2009 and A. J. Horowitz, personal communication, 30 July 2009).

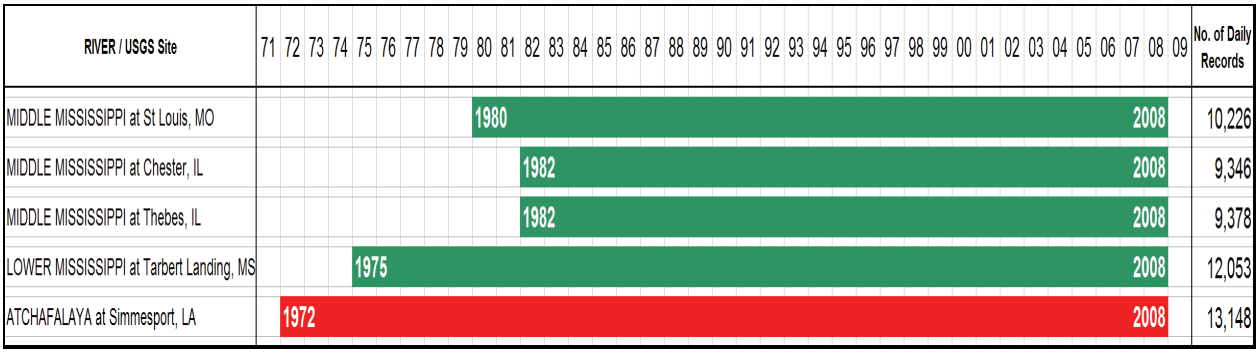

Figure 3. Stations with suspended-sediment daily data (#80155 - suspended-sediment discharge, tons per day) for Lower Mississippi and Atchafalaya Rivers - USGS Surface-Water Data.

Sediment Data from USGS Water-Quality Database. The USGS NWIS Web site provides the observations/measurements for water-quality samples. Appendix A presents the sediment data available from water-quality sampling, including the period, count, and type of records

(see Appendix B for parameter codes). Figures 4 and 5 show the count and time period of records for sediment data available from water quality sampling from 40 of the 80 stations reported in this search.

The St. Francis River stations at Lake City, AR (USGS 07040450); Riverfront, AR (USGS 07047900); Fisk, MO (USGS 07040000); and St. Francis, AR (07040100), have the greatest number of sediment water-quality records, over 3,000, collected over a long period of record, at least 33 years (Figures 4 and 5). The Lower Mississippi River at Tarbert Landing and Atchafalaya River at Simmesport also have a large number of samples (over 2,800) collected over a long period of record (37 years). Generally, the sediment data from water-quality field samples are sparse, not continuous. The most common parameters found in the USGS water-quality database are: #80154 (suspended-sediment concentration, milligrams per liter); #80155 (suspended-sediment discharge, tons per day); and #70331 (suspended-sediment, sieve diameter, percent smaller than 0.0625 mm). However, some available data for parameters codes related to bed material load (#80158, 80160, 80163, 80164, etc) are also available.

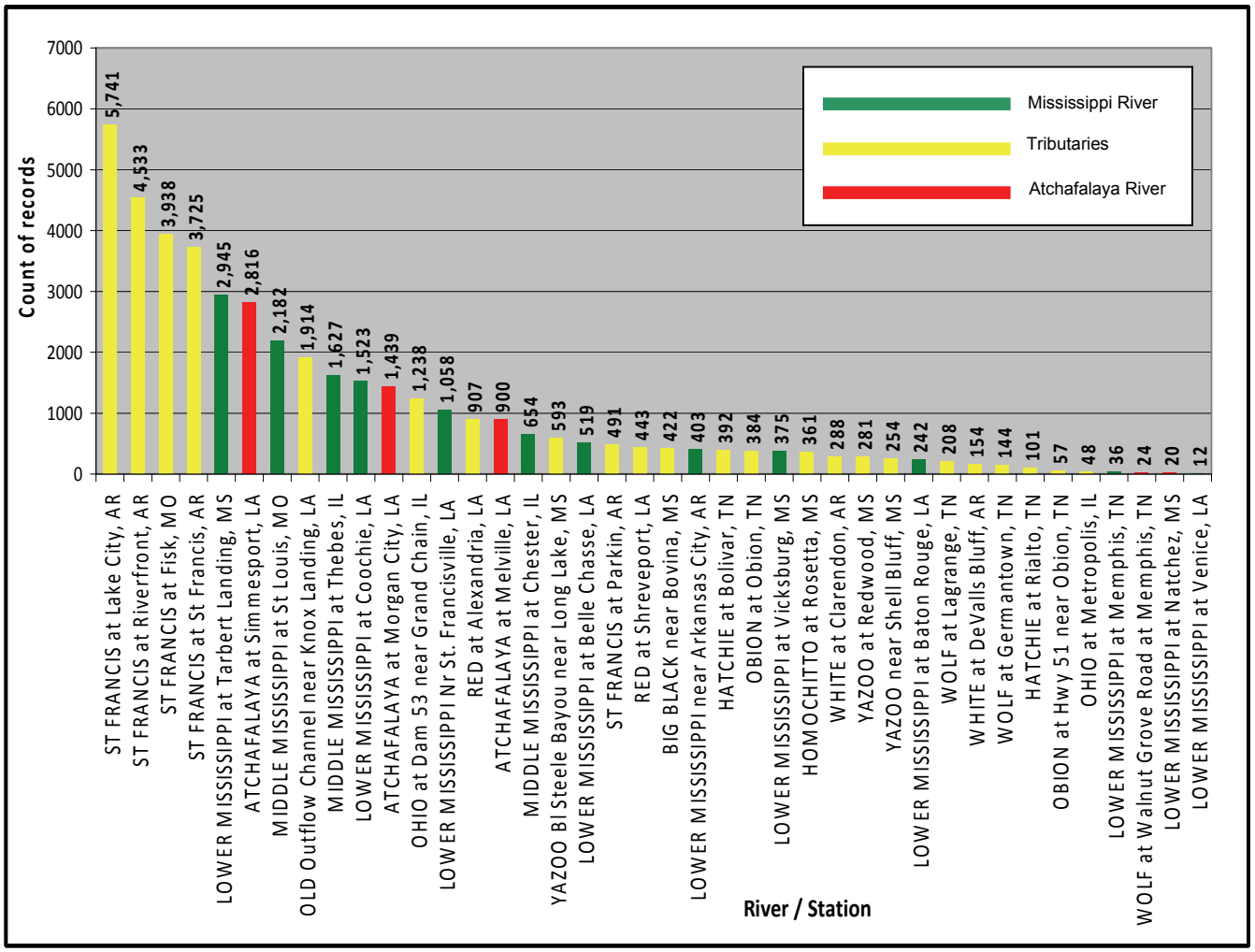

Figure 4. Count of records for sediment data available from USGS Water-quality sampling for Lower Mississippi River and main tributaries (status on 12 July 2009).

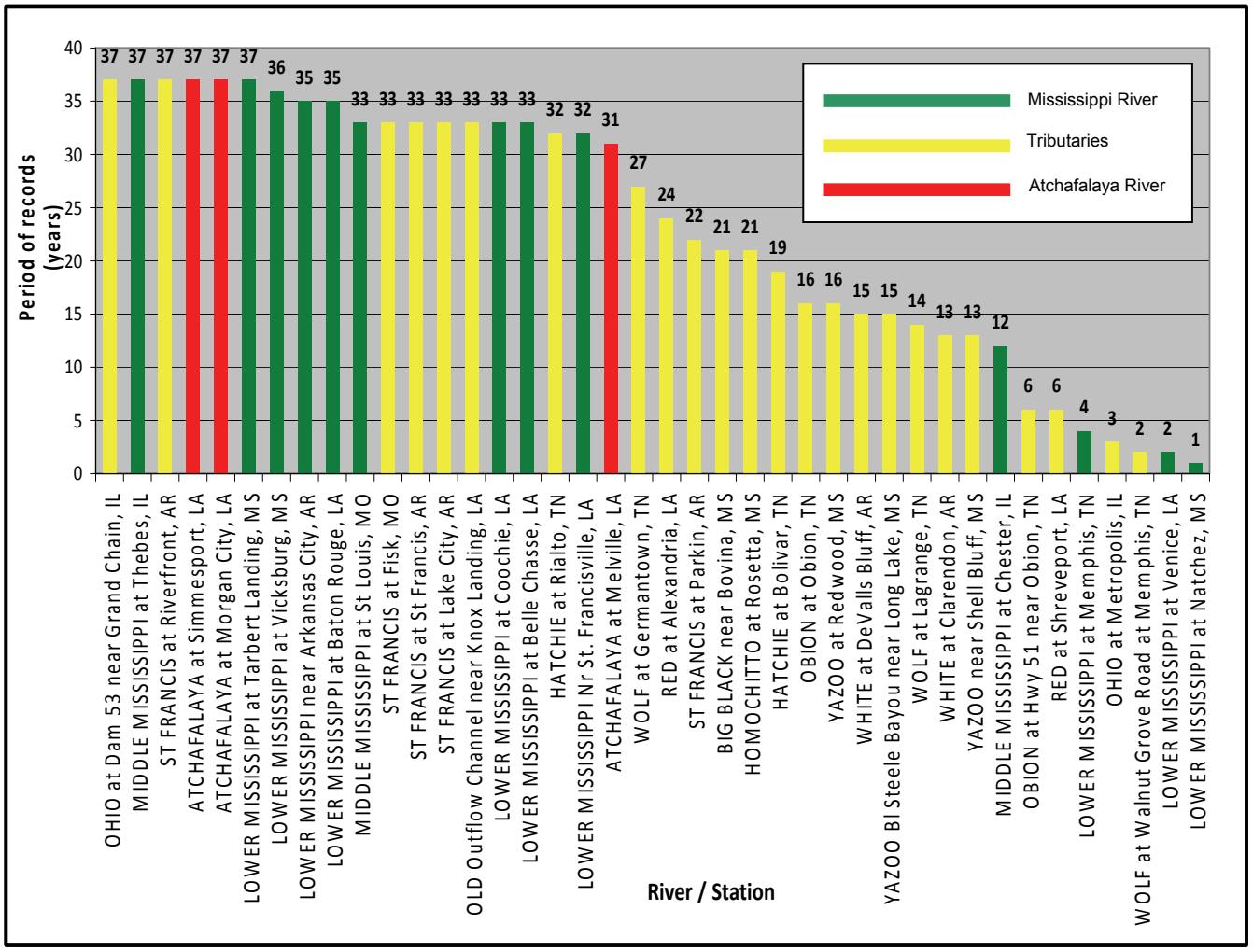

Figure 5. Period of records for sediment data available from USGS Water-quality sampling. Stations for Lower Mississippi River and tributaries, including Atchafalaya River (status on 12 July 2009).

Water-Discharge from USGS Database. Figure 6 shows 62 of 80 stations that have daily discharge data on the USGS Web site. On the main stem of the Mississippi River, stations with long record periods include: St Louis, MO. Thebes, IL, Memphis, TN, Helena, AR, Arkansas City, AR, Vicksburg, MS, and Baton Rouge, LA. The Mississippi River at Vicksburg, MS, has a long period of daily discharge data, but actually the USGS Web site presents water discharge data only for the 2008-2009 period. The Mississippi River at St Louis, MO, has the longest period of record (1861-2009) and the greatest number of records (54,249) for water-discharge.

The USGS web site also provides the Hydro-Climatic Data Network (HCDN) that consists of stream flow records for 1,659 sites throughout the United States and its territories. These sites are unaffected by artificial diversions, storage, or other works of man in or on the natural stream channels or in the watershed and are intended to provide an account of hydrologic responses to fluctuations in climate. Records cumulatively span the period 1874 through 1988, inclusive, and

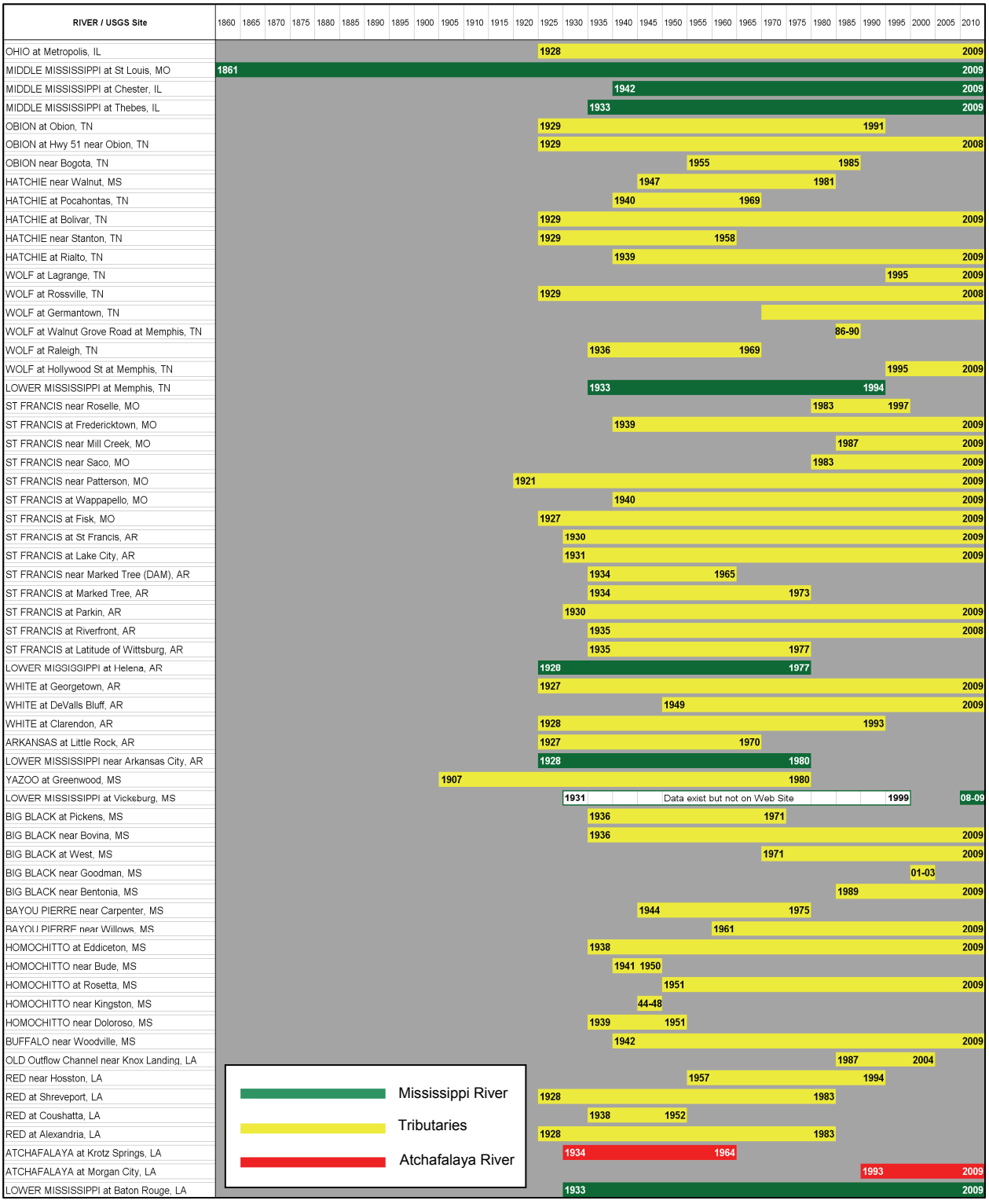

Figure 6. Period of daily discharge data for Lower Mississippi River and tributaries, including Atchafalaya Rivers - USGS Surface-Water Data (status on 12 July 2009).

represent a total of 73,231 water years of information. The records include tables of daily, monthly, and annual data. For the main stem of the Lower Mississippi River, the HCDN provides the following discharge datasets (site number/site name/period/number water years):

- 07032000 Mississippi River at Memphis, TN: 1934-1988 (54 water years).
- 07265450 Mississippi River nr Arkansas City, AR: 1929-1980 (52 water years).
- 07289000 Mississippi River at Vicksburg, MS: 1932-1988 (57 water years).

Stage Data from USACE Database. Table 11 in Appendix D shows a list of 68 gage stations of the USACE Districts in the Lower Mississippi River and tributaries, showing the beginning date for stage data available in the RiverGages.com web site and the beginning year for stage data available in USACE Districts. The web page "RiverGages.com" shows the water levels of rivers and lakes from USACE Districts. Water level data can be searched by district, basin, stream state, and city. On the USACE Districts web sites, stage data can be different from the RiverGages.com. Table 11 also shows the beginning year for stage data available on USACE Districts. The following stations can be highlighted in terms of oldest beginning year for stage data:

- Middle Mississippi River and tributaries: Chester, IL (1891), St. Louis, MO (1861), and Cairo, IL (1858).
- Lower Mississippi River: New Madrid, MO (1879), Memphis, TN (1871), Helena, AR (1871), Natchez, MS (1871), Vicksburg, MS (1901), Red River Landing, LA (1851), Donaldsonville, LA (1890), Baton Rouge, LA (1872), New Orleans (Carrollton), LA (1872), and Head of Passes, LA (1875).
- Atchafalaya River: Simmesport, LA (1887), and Melville, LA (1885).

For some stations, historical water discharge data can also be founded in USACE Districts web pages.

Dredging Data from USACE New Orleans District. The last line of Table 10 (part 3) presents a summary of dredging material data provided by the New Orleans District. These dredging material data are partial and cover the period of 1996 until 2008 (almost 1,500 sample records). The map in Figure 7 identifies three main regions between Baton Rouge and the Gulf of Mexico, LA. Almost 87 percent of available dredging sample data is located in group 3 (Figure 8). These data include particle size distribution reports with the percentage of cobbles, gravel, sand, silt, and clay. A spreadsheet in Excel format contains sample location, time, visual classification of soil, and the following parameters: D_{50} (median particle size), Cu (uniformity coefficient), Cc (curvature coefficient), density, porosity and Phi Angle. Generally, the D_{50} is used in bed load equations to represent the size of the material.

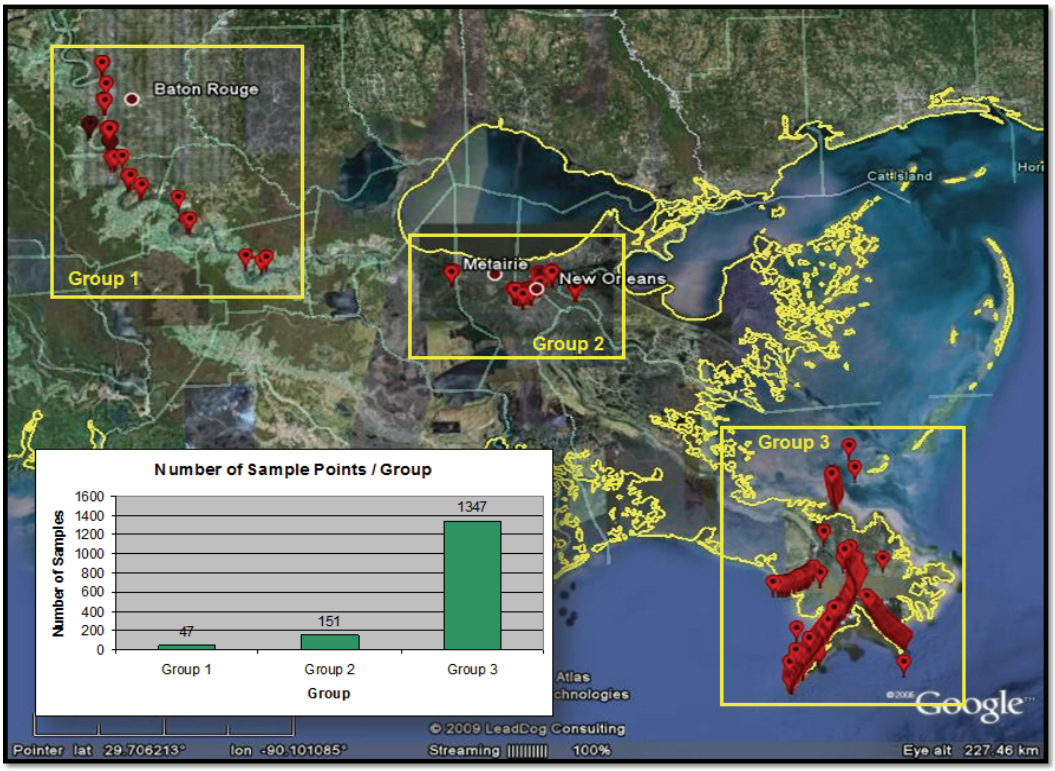

Figure 7. Location and number of dredging sample points from USACE New Orleans District.

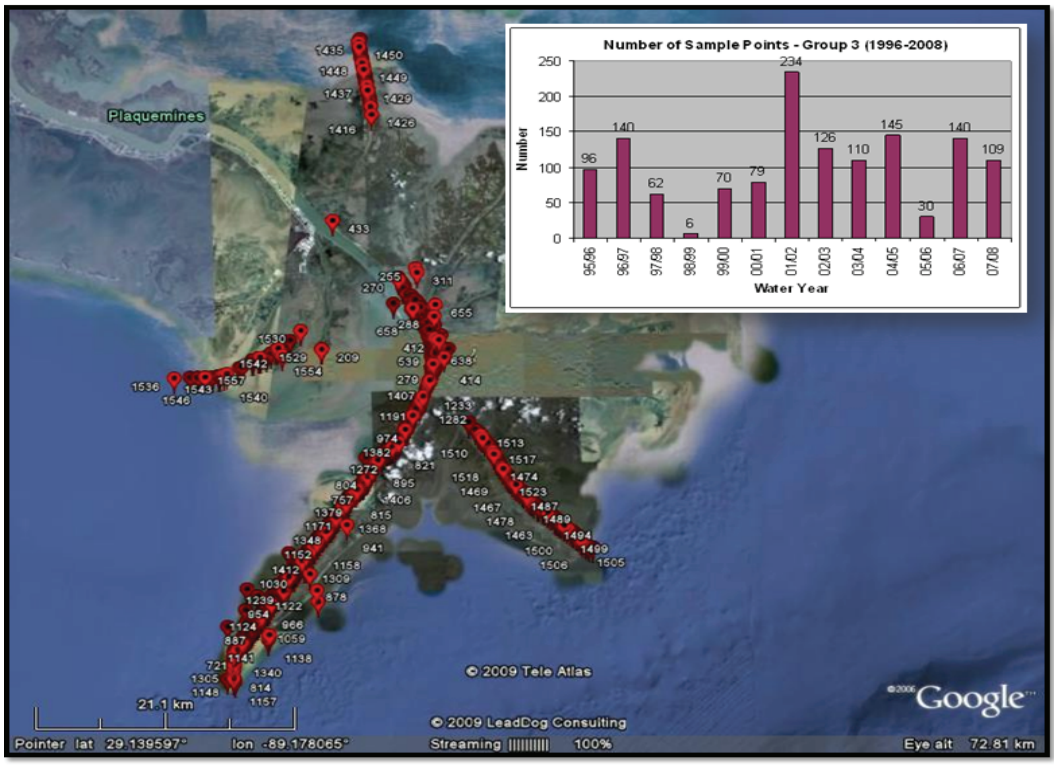

Figure 8. Location and number of dredging sampling points – group 3.

CONCLUSIONS ABOUT THIS SEARCH: This CHETN presents an overview of sediment data available for the Lower Mississippi River and tributaries, including the middle parts of the Mississippi and Atchafalaya Rivers. Only a few gage stations record daily suspended-sediment data. For the Atchafalaya River at Simmesport, LA, the Mississippi River at Tarbert Landing, MS, and some stations located in the middle part of the Mississippi River, continuous daily data are available based on field measurements and mathematical approach. In terms of water-quality data, the tributary St. Francis River provides the largest number of records in the USGS database. These conclusions are based on the data available in the web pages and as provided by the consulted reports.

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ADDITIONAL INFORMATION: This CHETN was prepared as part of the project "Mississippi River Sediment Availability Study (MRSAS) Considering Sensitivity to Climate Change Effects on River Water Discharge" by CHL, U.S. Army Engineer Research and Development Center.

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APPENDIX A: Summary of USGS Available Data - National Water Information System, Web Interface

Table 1. USGS available data for Ohio, Middle Mississippi, Obion, and Hatchie rivers.

RIVER / Station	USGS Site ID	Parameter	Daily Data			Daily Statistics			Monthly Statistics		Annual Statistics		Peak streamflow			USGS Water quality data - Field/Lab Samples Group: Sediment				
			Begin Date	End Date	Count	Begin Date	End Date	Count	Begin Date	End Date	Begin Date	End Date	Begin Date	End Date	Count	Sediment Parameter Code	Number Samples	Count	First Date	Last Date
OHIO																				
at Metropolis, IL	03611500 (a)	Discharge, cfs	4/1/1928	7/12/2009	30070	4/2/1928	9/30/2008	29402	Apr-28	Sep-08	1928	2008	4/7/1913	1/25/2007	79	80154-80155	24	48	6/27/1942	4/5/1944
		Gage height, feet	6/1/1991	7/12/2009	19184	10/1/1991	9/30/2008	3830	Oct-91	Sep-08	1992	2008								
at Dam 53 near Grand Chain, IL	03612500	Precipitation, total, inches	2/9/1987	7/12/2009	4092	-	-	-	-	-	-	-	-	-	-	50279-70331-80154-80155-80156-80165-80180	432	1238	2/14/1973	3/11/2009
		Gage height, feet	12/31/1990	7/12/2009	6578	10/1/1996	9/30/2008	2915	Oct-96	Sep-08	1997	2008								
MIDDLE MISSISSIPPI																				
at St Louis, MO	07010000 (a)	Discharge, cfs	1/1/1861	7/12/2009	54249	1/1/1861	3/2/2009	54117	Jan-1861	Mar-09	1861	2009	6/27/1844	6/30/2008	148	70326-70327-70328-70329-70330-70331-70332-70333-70334-70335-70337-70338-70339-70340-70341-70342-70343-70344-70345-70346-70347-80154-80155-80158-80159-80160-80161-80162-80163-80164-80165-80166-80167-80168-80169-80170-80171-80172-80173	214	2182	12/8/1959	4/26/1991
		Gage height, feet	10/1/1982	7/12/2009	9656	-	-	-	-	-	-	-								
		Suspended sediment concentration, mg / liter	10/1/1980	9/30/2008	10190	10/1/1980	9/30/2008	10190	Oct-80	Sep-08	1981	2008								
		Suspended sediment discharge, tons per day	10/1/1980	9/30/2008	10226	10/2/1980	9/30/2008	10225	Oct-80	Sep-08	1981	2008								
at Chester, IL	07020500 (a)	Precipitation, total, inches	8/18/1985	7/12/2009	5133	-	-	-	-	-	-	-	6/30/1844	1/7/2008	84	70335-70337-70338-70339-70340-70342-70343-70344-70345-70346-80154-80164-80165-80166-80167-80168-80169-80170-80171-80172-80173	65	654	9/4/1980	4/24/1991
		Discharge, cfs	7/1/1942	7/12/2009	24484	7/1/1942	3/4/2009	24354	Jul-42	Mar-09	1942	2009								
		Gage height, feet	10/1/1982	7/12/2009	9606	-	-	-	-	-	-	-								
		Suspended sediment concentration, mg / liter	10/1/1982	9/30/2008	4084	10/1/1982	9/30/2008	4084	Oct-82	Sep-08	1983	2008								
		Suspended sediment discharge, tons per day	10/1/1982	9/30/2008	9346	10/2/1982	9/30/2008	9345	Oct-82	Sep-08	1983	2008								
at Thebes, IL	07022000 (a)	Discharge, cfs	4/1/1933	7/12/2009	27132	4/1/1933	2/3/2009	26973	Apr-33	Feb-09	1933	2009	7/4/1844	7/3/2008	77	50279-70331-70337-70338-70339-70340-70342-70343-70344-70345-70346-80154-80155-80164-80165-80166-80167-80168-80169-80170-80171-80172-80173	428	1627	1/30/1973	4/6/2009
		Gage height, feet	10/1/1982	7/12/2009	9569	-	-	-	-	-	-	-								
		Suspended sediment concentration, mg / liter	10/1/1982	9/30/2008	9187	10/1/1982	9/30/2008	9187	Oct-82	Sep-08	1983	2008								
		Suspended sediment discharge, tons per day	10/1/1982	9/30/2008	9378	10/2/1982	9/30/2008	9377	Oct-82	Sep-08	1983	2008								
OBION																				
at Obion, TN	07026000	Discharge, cfs	8/1/1929	1/1/1991	19512	8/1/1929	1/1/1991	19512	Aug-29	Jan-91	1929	1991	1/11/1930	2/7/1990	53	70330-70331-80154-80155-80165-80164-80165-80166-80167-80168-80169-80170	134	384	3/26/1975	7/17/1990
at Hwy 51 near Obion, TN	07026040 (a)	Discharge, cfs	8/1/1929	9/30/2008	23899	8/1/1929	9/30/2008	23899	Aug-29	Sep-08	1929	2008	12/24/1990	4/8/2008	12	70331-80154-80155	19	57	11/27/1990	8/2/1995
		Gage height, feet	12/15/1990	7/12/2009	4056	12/15/1990	9/30/2008	3772	Dec-90	Sep-08	1991	2008								
near Bogota, TN	07026300	Discharge, cfs	10/1/1955	9/30/1985	10915	10/1/1955	9/30/1985	10915	Oct-55	Sep-85	1956	1985	2/4/1937	3/7/1977	40	-	-	-	-	-
HATCHIE																				
near Walnut, MS	07029270	Discharge, cfs	10/1/1947	9/30/1981	12112	10/1/1947	9/30/1981	12112	Oct-47	Sep-81	1948	1981	1/4/1947	4/16/1980	34	-	-	-	-	-
at Pocahontas, TN	07029400	Discharge, cfs	11/1/1940	12/31/1969	8827	11/1/1940	12/31/1969	8827	Nov-40	Dec-69	1941	1970	4/11/1942	3/6/1977	35	-	-	-	-	-
at Bolivar, TN	07029500	Discharge, cfs	8/1/1929	7/12/2009	29198	8/1/1929	9/30/2008	28916	Aug-29	Sep-08	1929	2008	1/9/1930	4/7/2008	78	70331-80154-80155-80164-80165-80166-80167-80168-80169-80170	134	392	3/4/1977	8/3/1995
		Gage height, feet	2/20/1989	7/12/2009	6832	2/20/1989	9/30/2008	6562	Feb-89	Sep-08	1989	2008								
near Stanton, TN	07030000	Discharge, cfs	8/1/1929	9/30/1958	10653	8/1/1929	9/30/1958	10653	Aug-29	Sep-58	1929	1958	1/9/1930	4/11/2008	34	-	-	-	-	-
at Rialto, TN	07030050 (a)	Discharge, cfs	1/7/1939	7/12/2009	20109	1/7/1939	9/30/2008	19824	Jan-39	Sep-08	1939	2008	1937-00-00	4/13/2008	45	70331-80154-80155	42	101	10/2/1977	11/7/2008

(a) Station operated in cooperation with the U.S. Army Corps of Engineers

Table 2. USGS available data for Wolf, White, Arkansas, and Yazoo rivers, and Bayou Pierre.

RIVER / Station	USGS Site ID	Parameter	Daily Data			Daily Statistics			Monthly Statistics		Annual Statistics		Peak streamflow			USGS Water quality data - Field/Lab Samples Group: Sediment				
			Begin Date	End Date	Count	Begin Date	End Date	Count	Begin Date	End Date	Begin Date	End Date	Begin Date	End Date	Count	Sediment Parameter Code	Number Samples	Count	First Date	Last Date
WOLF																				
at Lagrange, TN	07030392	Temperature, water, degrees Celsius	9/18/1996	7/12/2009	3753	9/18/1996	9/30/2008	989	Sep-96	Sep-08	1996	2008	3/27/1996	4/5/2008	13	70331-80154-80155-80164-80165-80166-80167-80168	109	208	10/19/1995	12/10/2008
		Discharge, cfs	9/1/1995	7/12/2009	5064	9/1/1995	9/30/2008	4414	Sep-95	Sep-08	1995	2008								
		Gage height, feet	8/23/1995	7/12/2009	17427	8/31/1995	9/30/2008	4303	Aug-95	Sep-08	1995	2008								
at Rossville, TN	07030500	Discharge, cfs	8/1/1929	9/30/2008	22273	8/2/1929	9/30/2008	17844	Aug-29	Sep-08	1929	2008	1/9/1930	4/5/2008	49	-	-	-	-	-
		Gage height, feet	5/25/2001	7/12/2009	8553	5/25/2001	9/30/2008	2214	May-01	Sep-08	2001	2008								
at Germantown, TN	07031650	Discharge, cfs	10/1/1969	7/12/2009	13067	10/1/1969	9/30/2008	12782	Oct-69	Sep-08	1970	2008	4/26/1970	4/4/2008	35	70331-80154-80155-80164-80165-80166-80167-80168-80169-80170-80171-80172	59	144	9/7/1979	4/27/2005
		Gage height, feet	1/1/1991	7/12/2009	6537	1/1/1991	9/30/2008	6275	Jan-91	Sep-08	1991	2008								
at Walnut Grove Road at Memphis, TN	07031660	Discharge, cfs	10/1/1986	12/30/1990	1218	10/1/1986	12/30/1990	1218	Oct-86	Dec-90	1987	1991	11/8/1986	2/5/1990	4	80154-80155	12	24	5/13/1986	8/11/1987
at Raleigh, TN	07031700	Discharge, cfs	6/1/1936	12/31/1969	12175	6/1/1936	12/31/1969	12175	Jun-36	Dec-69	1936	1970	1/20/1935	12/12/1972	38	-	-	-	-	-
at Hollywood St at Memphis, TN	07031740	Discharge, cfs	2/1/1995	7/12/2009	5075	2/1/1995	9/30/2008	4791	Feb-95	Sep-08	1995	2008	2/16/2001	12/31/2006	7	-	-	-	-	-
		Gage height, feet	10/1/2004	7/12/2009	1551	10/1/2004	9/30/2008	1270	Oct-04	Sep-08	2005	2008								
WHITE																				
at Georgetown, AR	07076750 (a)	Discharge, cfs - Cross-section: 0.	2/4/2000	5/29/2000	345	-	-	-	-	-	-	-	1/19/1913	3/24/2008	96	-	-	-	-	-
		Discharge, cfs	10/1/1927	7/12/2009	15581	10/1/1927	11/4/2008	7333	Oct-27	Nov-08	1928	2009								
at DeValls Bluff, AR	07077000	Discharge, cfs	10/1/1949	7/12/2009	29356	10/1/1949	11/5/2008	15011	Oct-49	Nov-08	1950	2009	4/23/1927	4/17/2008	62	70331-80154-80155-80164-80165-80166-80167	52	154	9/19/1995	3/5/2009
		Gage height, feet	10/5/1988	7/12/2009	21306	10/5/1988	11/5/2008	6953	Oct-88	Nov-08	1989	2009								
at Clarendon, AR	07077800	Discharge, cfs	10/1/1928	9/30/1993	19631	10/1/1928	9/30/1993	19631	Oct-28	Sep-93	1929	1993	4/23/1927	4/27/1999	72	70331-80154-80155	96	288	11/6/1974	7/1/1986
ARKANSAS																				
at Pendleton, AR	07265280 (a)	Gage height, feet	8/15/1991	7/12/2009	18912	8/15/1991	11/12/2007	5707	Aug-91	Nov-07	1991	2008	2/19/2001	4/14/2008	8	-	-	-	-	-
at Pine Bluff, AR	07263650 (a)	Gage height, feet	9/11/1987	7/12/2009	20146	9/11/1987	12/4/2008	6498	Sep-87	Dec-08	1987	2009	2/18/2001	4/13/2008	8	-	-	-	-	-
at Little Rock, AR	07263500 (a)	Discharge, cfs	10/1/1927	9/30/1970	15706	10/1/1927	9/30/1970	15706	Oct-27	Sep-70	1928	1970	6/18/1923	3/21/2008	51	-	-	-	-	-
		Gage height, feet	8/22/1987	7/12/2009	7346	8/22/1987	10/23/2008	7094	Aug-87	Oct-08	1987	2009								
YAZOO																				
at Greenwood, MS	07287000	Discharge, cfs	10/1/1907	9/30/1980	21186	10/1/1907	9/30/1980	21186	Oct-07	Sep-80	1908	1980	2/26/1908	1/1/1983	61	-	-	-	-	-
near Shell Bluff, MS	07287120	Temperature, water, degrees Celsius	8/11/1976	8/31/1981	4689	9/11/1976	8/31/1981	1562	Nov-76	Aug-81	1977	1981	-	-	-	70331-80154-80155-80164	103	254	11/5/1974	8/26/1986
at Redwood, MS	07288800	Temperature, water, degrees Celsius	10/1/1978	9/30/1981	2910	10/2/1978	9/30/1981	969	Oct-78	Sep-81	1979	1981	-	-	-	70331-80154-80155-80164	104	281	1/4/1978	8/3/1993
Bl Steele Bayou near Long Lake, MS	07288955 (a)	Gage Height, feet	10/7/1996	7/12/2009	4000	10/7/1996	9/30/2008	3960	Oct-96	Sep-08	1997	2008	4/26/1996	2/7/2006	11	70331-80154-80155-80164-80165-80166-80167	234	593	12/30/1994	9/10/2008
BAYOU PIERRE																				
near Carpenter, MS	07290500	Discharge, cfs	10/1/1944	6/30/1975	2951	10/1/1944	6/30/1975	2951	Oct-44	Jun-75	1945	1975	1/1/1910	1/28/1994	35	-	-	-	-	-
near Willows, MS	07290650	Temperature, water, degrees Celsius	10/1/1961	6/11/1962	231	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Discharge, cfs	6/1/1961	7/12/2009	17574	6/1/1961	9/30/2008	17289	Jun-61	Sep-08	1961	2008	4/19/1959	3/21/2006	48		-	-	-	-
		Gage height, feet	7/30/1996	7/12/2009	4581	10/1/1996	9/30/2008	4235	Oct-96	Sep-08	1997	2008	-	-	-		-	-	-	-

(a) Station operated in cooperation with the U.S. Army Corps of Engineers

Table 3. USGS available data for St. Francis River.

RIVER / Station	USGS Site ID	Parameter	Daily Data			Daily Statistics			Monthly Statistics		Annual Statistics		Peak streamflow			USGS Water quality data - Field/Lab Samples Group: Sediment				
			Begin Date	End Date	Count	Begin Date	End Date	Count	Begin Date	End Date	Begin Date	End Date	Begin Date	End Date	Count	Sediment Parameter Code	Number Samples	Count	First Date	Last Date
ST FRANCIS																				
near Roselle, MO	07034000 (a)	Discharge, cfs	6/9/1983	9/30/1997	5228	6/9/1983	9/30/1997	5228	Jun-83	Sep-97	1983	1997	10/1/1986	5/30/1997	11	-	-	-	-	-
		Gage height, feet	10/1/1984	7/12/2009	8427	-	-	-	-	-	-	-								
at Fredericktown, MO	07035000 (a)	Discharge, cfs	2/10/1939	2/2/2009	7647	2/10/1939	2/2/2009	7647	Feb-39	Feb-09	1939	2009	11/23/1983	3/18/2008	17	-	-	-	-	-
		Gage height, feet	6/3/1983	7/12/2009	8942	-	-	-	-	-	-	-								
near Mill Creek, MO	07035800 (a)	Discharge, cfs	2/5/1987	7/12/2009	7464	2/5/1987	4/6/2009	7367	Feb-87	Apr-09	1987	2009	2/28/1987	3/19/2008	20	-	-	-	-	-
		Gage height, feet	2/6/1987	7/12/2009	7900	-	-	-	-	-	-	-								
near Saco, MO	07036100 (a)	Discharge, cfs	6/10/1983	4/6/2009	6511	6/10/1983	4/6/2009	6511	Jun-83	Apr-09	1983	2009	11/23/1983	3/19/2008	17	-	-	-	-	-
near Patterson, MO	07037500 (a)	Discharge, cfs	6/16/1921	7/12/2009	31804	6/16/1921	4/6/2009	31707	Jun-21	Apr-09	1921	2009	1/1/1921	3/19/2008	87	-	-	-	-	-
		Gage height, feet	10/1/1983	7/12/2009	9143	-	-	-	-	-	-	-								
at Wappapello, MO	07039500 (a)	Discharge, cfs	10/1/1940	7/12/2009	24757	10/1/1940	4/7/2009	24661	Oct-40	Apr-09	1941	2009	8/1/1915	4/4/2008	67	-	-	-	-	-
		Gage height, feet	10/1/1982	7/12/2009	9206	-	-	-	-	-	-	-								
at Fisk, MO	07040000 (a)	Precipitation, total, inches	12/28/1998	7/12/2009	3792	-	-	-	-	-	-	-	3/24/1998	4/4/2008	10	70331-70332-70333-70334-70335-70342-70343-70344-70345-70346-80154-80155-80158-80159-80160-80161-80162-80163-80168-80169-80170-80171-80172	373	3938	10/19/1977	2/9/2009
		Discharge, cfs	10/1/1927	7/12/2009	16966	10/1/1927	1/5/2009	9229	Oct-27	Jan-09	1928	2009								
		Gage height, feet	10/1/1997	7/12/2009	7583	10/1/1997	1/5/2009	3633	Oct-97	Jan-09	1998	2009								
at St Francis, AR	07040100 (a)	Precipitation, total, inches	3/1/1990	7/12/2009	3926	-	-	-	-	-	-	-	2/1/1916	4/5/2008	89	70331-70332-70333-70334-70335-70342-70343-70344-70345-70346-80154-80155-80158-80159-80160-80161-80162-80163-80169-80170-80171	372	3725	10/6/1977	3/24/2009
		Discharge, cfs	4/1/1930	7/12/2009	33869	4/1/1930	1/6/2009	22197	Apr-30	Jan-09	1930	2009								
		Gage height, feet	10/1/1986	7/12/2009	23878	10/1/1986	1/6/2009	7957	Oct-86	Jan-09	1987	2009								
at Lake City, AR	07040450 (a)	Discharge, cfs	1/1/1931	7/12/2009	27989	1/1/1931	10/20/2008	20100	Jan-31	Oct-08	1931	2009	4/13/1917	4/5/2008	86	70331-70332-70333-70334-70335-70336-70342-70343-70344-70345-70346-70347-80154-80155-80158-80159-80160-80161-80162-80163-80164-80165-80166-80167-80168-80169-80170-80171-80172-80173	528	5741	10/4/1977	4/9/2009
		Gage height, feet	10/1/1990	7/12/2009	18439	10/1/1990	10/20/2008	5562	Oct-90	Oct-08	1991	2009								
near Marked Tree (DAM), AR	07047000	Discharge, cfs	10/1/1934	9/30/1965	11323	10/1/1934	9/30/1965	11323	Oct-34	Sep-65	1935	1965	3/25/1935	1/27/1993	50	-	-	-	-	-
at Marked Tree, AR	07047500	Discharge, cfs	10/1/1934	10/1/1973	14246	10/1/1934	10/1/1973	14246	Oct-34	Oct-73	1935	1974	3/26/1935	5/7/1973	39	-	-	-	-	-
at Parkin, AR	07047800 (a)	Precipitation, total, inches	3/1/1990	7/12/2009	3549	-	-	-	-	-	-	-	1/31/1930	12/17/2007	72	70331-70332-70333-70334-80154-80155-80164	168	491	2/27/1973	7/27/1994
		Discharge, cfs	1/1/1930	7/12/2009	34808	1/1/1930	11/13/2008	26417	Jan-30	Nov-08	1930	2009								
		Gage height, feet	8/22/1987	7/12/2009	21852	8/22/1987	11/13/2008	7337	Aug-87	Nov-08	1987	2009								
at Riverfront, AR	07047900 (a)	Discharge, cfs	1/1/1935	11/18/2008	31616	1/2/1935	11/18/2008	24951	Jan-35	Nov-08	1935	2009	3/28/1935	4/12/2008	70	70331-70332-70333-70334-70335-70336-70342-70343-70344-70345-70346-80154-80155-80158-80159-80160-80161-80162-80163-80164-80169-80170-80171	546	4533	2/26/1973	4/9/2009
at Latitude of Wittsburg, AR	07047902	Discharge, cfs	1/1/1935	9/30/1977	15412	1/1/1935	9/30/1977	15412	Jan-35	Sep-77	1935	1977	5/1/1936	5/4/1993	55	-	-	-	-	-

(a) Station operated in cooperation with the U.S. Army Corps of Engineers

Table 4. USGS available data for Big Black, Homochitto, Buffalo, and Red rivers and Old River Control Structure.

RIVER / Station	USGS Site ID	Parameter	Daily Data			Daily Statistics			Monthly Statistics		Annual Statistics		Peak streamflow			USGS Water quality data - Field/Lab Samples Group: Sediment				
			Begin Date	End Date	Count	Begin Date	End Date	Count	Begin Date	End Date	Begin Date	End Date	Begin Date	End Date	Count	Sediment Parameter Code	Number Samples	Count	First Date	Last Date
BIG BLACK																				
at Pickens, MS	07289500	Discharge, cfs	10/1/1936	9/30/1971	12783	10/1/1936	9/30/1971	12783	Oct-36	Sep-71	1937	1971	1892-00-00	5/1/1983	50	-	-	-	-	-
near Bovina, MS	07290000	Temperature, water, degrees Celsius	10/1/1977	9/23/1981	1413											70331-80154-80155-80164	155	422	10/10/1974	8/19/1994
		Precipitation, total, inches	8/13/1988	9/28/1995	2218															
		Discharge, cfs	2/1/1936	7/12/2009	26700	2/1/1936	9/30/2007	26175	Feb-36	Sep-07	1936	2007	2/10/1936	3/2/2006	71					
		Gage height, feet	8/13/1988	7/12/2009	7343	8/16/1988	9/30/2007	6453	Aug-88	Sep-07	1988	2007								
		Specific conductance	10/1/1977	9/23/1981	1444															
at West, MS	07289350	Precipitation, total, inches	12/1/1990	9/30/1991	302											-	-	-	-	-
		Discharge, cfs	9/1/1971	7/12/2009	13826	9/1/1971	9/30/2008	12179	Sep-71	Sep-08	1971	2008	12/1/1926	2/26/2006	72					
		Gage height, feet	10/1/1990	7/12/2009	6651	10/1/1990	9/30/2008	6013	Oct-90	Sep-08	1991	2008								
near Goodman, MS	07289460	Discharge, cfs	10/1/2001	9/30/2003	730	10/1/2001	9/30/2003	730	Oct-01	Sep-03	2002	2003	12/17/2001	2/26/2006	5	-	-	-	-	-
near Bentonia, MS	07289730	Discharge, cfs	11/13/1989	7/12/2009	6228	10/1/1995	9/30/2008	4749	Oct-95	Sep-08	1996	2008	3/27/1929	2/27/2006	67	-	-	-	-	-
		Gage height, feet	11/10/1989	7/12/2009	6934	10/1/1995	9/30/2008	4684	Oct-95	Sep-08	1996	2008								
HOMOCHITTO																				
at Eddiceton, MS	07291000	Precipitation, total, inches	10/3/1991	9/30/1994	625	-	-	-	-	-	-	-								
		Discharge, cfs	10/1/1938	7/12/2009	25853	10/1/1938	9/30/2008	25568	Oct-38	Sep-08	1939	2008	3/29/1939	3/20/2006	68	-	-	-	-	-
		Gage height, feet	7/3/1990	7/12/2009	6869	7/4/1990	9/30/2008	6583	Jul-90	Sep-08	1990	2008								
near Bude, MS	07291500	Discharge, cfs	10/1/1941	9/30/1950	3287	10/1/1941	9/30/1950	3287	Oct-41	Sep-50	1942	1950	5/15/1942	4/14/1974	14	-	-	-	-	-
at Rosetta, MS	07292500	Temperature, water, degrees Celsius	3/4/1980	9/30/1981	540	-	-	-	-	-	-	-				70331-80154-80155-80164	135	361	10/10/1974	7/7/1994
		Precipitation, total, inches	10/1/1990	9/30/1994	610	-	-	-	-	-	-	-								
		Discharge, cfs	10/1/1951	7/12/2009	21095	10/1/1951	9/30/2008	20820	Oct-51	Sep-08	1952	2008	3/31/1949	3/21/2006	58					
		Gage height, feet	4/7/1990	7/12/2009	6676	4/8/1990	9/30/2008	6404	Apr-90	Sep-08	1990	2008								
		Specific conductance	8/1/1980	9/30/1981	421	-	-	-	-	-	-	-								
near Kingston, MS	07293500	Discharge, cfs	10/1/1944	9/30/1948	1461	10/1/1944	9/30/1948	1461	Oct-44	Sep-48	1945	1948	12/23/1941	11/27/1948	6	-	-	-	-	-
near Doloroso, MS	07294500	Discharge, cfs	10/1/1939	9/30/1951	3652	10/1/1939	9/30/1951	3652	Oct-39	Sep-51	1940	1951	4/7/1938	5/28/1984	45	-	-	-	-	-
BUFFALO																				
near Woodville, MS	07295000	Discharge, cfs	3/1/1942	7/12/2009	24597	3/1/1942	9/30/2008	24321	Mar-42	Sep-08	1942	2008	4/9/1942	12/15/2005	65	-	-	-	-	-
		Gage height, feet	10/1/1990	7/12/2009	6198	10/1/1990	9/30/2008	5922	Oct-90	Sep-08	1991	2008								
OLD RIVER CONTROL																				
Outflow Channel near Knox Landing, LA	3103550914115 00	Discharge, cfs	10/1/1987	9/30/2004	732	10/1/1987	9/30/2004	731	Oct-87	Sep-04	1988	2004	-	-	-	70331-80154-80155	638	1914	3/10/1976	10/7/2008
		Suspended sediment discharge, tons per day	10/1/1978	9/30/2008	10589	10/1/1978	9/30/2008	10589	Oct-78	Sep-08	1979	2008								
RED																				
near Hosston, LA	07344400	Discharge, cfs	10/1/1957	10/4/1994	5339	10/1/1957	10/4/1994	5339	Oct-57	Oct-94	1958	1995	5/7/1958	1/1/1996	35	-	-	-	-	-
at Shreveport, LA	07348500	Discharge, cfs	8/1/1928	9/30/1983	20149	8/1/1928	9/30/1983	20149	Aug-28	Sep-83	1928	1983	1849-8-1	2/1/1980	109	70331-80154-80155	149	443	1/26/1977	8/18/1982
at Coushatta, LA	07350500	Discharge, cfs	10/1/1938	9/30/1952	5114	10/1/1938	9/30/1952	5114	Oct-38	Sep-52	1939	1952	1889-2-12	3/30/1978	42	-	-	-	-	-
at Alexandria, LA	07355500	Discharge, cfs	10/1/1928	9/30/1983	20088	10/1/1928	9/30/1983	20088	Oct-28	Sep-83	1929	1983	1849-1-1	4/20/1980	111	70331-80154-80155-80164	311	907	9/28/1972	8/29/1995

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Table 5. USGS available data for Atchafalaya and Lower Mississippi rivers.

RIVER / Station	USGS Site ID	Parameter	Daily Data			Daily Statistics			Monthly Statistics		Annual Statistics		Peak streamflow			USGS Water quality data - Field/Lab Samples Group: Sediment				
			Begin Date	End Date	Count	Begin Date	End Date	Count	Begin Date	End Date	Begin Date	End Date	Begin Date	End Date	Count	Sediment Parameter Code	Number Samples	Count	First Date	Last Date
ATCHAFALAYA																				
at Simmesport, LA	07381490 (a)	Precipitation, total, inches	12/7/1998	4/5/2005	2170	-	-	-	-	-	-	-	5/12/1973	4/16/1980	7	70331-80154-80155	947	2816	9/22/1972	10/1/2008
		Gage height, feet	5/7/1996	7/12/2009	3929	-	-	-	-	-	-	-								
		Suspended sediment discharge, tons per day	10/1/1972	9/30/2008	13148	10/1/1972	9/30/2008	13148	Oct-72	Sep-08	1973	2008								
at Melville, LA	07381495 (a)	Precipitation, total, inches	12/7/1998	7/12/2009	3239	-	-	-	-	-	-	-	-	-	-	50279-70331-70337-04065-80154-80155-80164	296	900	11/9/1979	6/2/2009
		Gage height, feet	10/5/1996	8/27/2008	3201	-	-	-	-	-	-	-								
at Krotz Springs, LA	07381500	Discharge, cfs	10/1/1934	9/30/1964	10958	10/1/1934	9/30/1964	10958	Oct-34	Sep-64	1935	1964	7/8/1935	4/11/1978	44	-	-	-	-	-
at Morgan City, LA	07381600	Discharge, cfs	6/5/1993	7/12/2009	4722	10/1/1995	9/30/2008	3902	Oct-95	Sep-08	1996	2008	1/1/1978	4/25/2008	32	50279-70331-80154-80155-80164	496	1439	4/18/1973	5/19/2009
		Gage height, feet	12/14/1987	7/12/2009	7174	10/1/1992	9/30/2008	4692	Oct-92	Sep-08	1993	2008								
LOWER MISSISSIPPI																				
at Memphis, TN	07032000	Discharge, cfs	1/1/1933	9/30/1994	22553	1/1/1933	9/30/1982	18170	Jan-33	Sep-82	1933	1982	4/24/1872	4/23/1994	123	70331-80154-80155	12	36	10/11/1988	7/11/1991
at Helena, AR	07047970	Discharge, cfs	1/1/1928	9/30/1977	18171	1/1/1928	9/30/1977	18171	Jan-28	Sep-77	1928	1977	1/1/1828	4/14/1993	132	-	-	-	-	-
near Arkansas City, AR	07265450	Discharge (Mean)	1/1/1928	9/30/1980	19267	1/1/1928	9/30/1980	19267	Jan-28	Sep-80	1929	1980	3/24/1887	4/11/1980	92	70331-80154-80155	139	403	11/8/1974	4/27/2008
at Vicksburg, MS	07289000	Discharge, cfs	1/1/2008	7/12/2009	553	1/1/2008	9/30/2008	274	Oct-31	Sep-08	1932	2008	6/24/1858	2/13/1999	87	70331-80154-80155-80164	148	375	4/5/1973	4/30/2008
		Gage height, feet	11/7/1989	7/12/2009	2348	11/8/1989	9/30/2008	2070	Nov-89	Sep-08	1990	2008								
at Natchez, MS	07290880	Gage height, feet	6/12/1992	9/9/2002	3165	6/12/1992	9/24/1994	741	Jun-92	Sep-94	1992	1994	-	-	-	70331-80154	10	20	4/17/2008	4/29/2008
at Coochie, LA	3105520913612 00	-	-	-	-	-	-	-	-	-	-	-	3/6/1976	10/15/2008		70331-80154-80155	509	1523	3/6/1976	10/15/2008
at Knox Landing, LA	07294800 (a)	Gage height, feet	12/30/1996	7/12/2009	3718	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
at Tarbert Landing, MS	07295100	Suspended sediment discharge, tons per day	10/1/1975	9/30/2008	12053	10/1/1975	9/30/2008	12053	Oct-75	Sep-08	1976	2008				70331-80154-80155	977	2945	9/21/1972	10/2/2008
at Red River Landing, LA	07373290 (a)	Precipitation, total, inches	3/20/1977	7/12/2009	3950	-	-	-	-	-	-	-	4/1/1851	4/12/1978	111	-	-	-	-	-
		Elevation above NGVD 1929, feet	3/20/1997	7/22/2008	10977	-	-	-	-	-	-	-								
Nr St. Francisville, LA	07373420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50279-70331-70333-80154-80155-80164	359	1058	6/5/1978	5/20/2009
at Baton Rouge, LA	07374000	Temperature, water, degrees Celsius	8/12/2004	7/12/2009	4672	10/1/2004	9/30/2008	1250	Oct-04	Sep-08	2005	2008	1/1/1828	4/25/2008	124	50279-70331-80154-80155	87	242	3/25/1975	5/21/2009
		Gage height, feet	7/1/1997	7/12/2009	5158	7/1/1997	9/30/2008	1727	Jul-97	Sep-08	1997	2008								
		Specific conductance	8/12/2004	7/12/2009	4380	10/1/2004	9/29/2008	1183	Oct-04	Sep-08	2005	2008								
		Salinity, water, unfiltered, parts per thousand	8/12/2004	7/12/2009	4290	10/1/2004	9/28/2008	1129	Oct-04	Sep-08	2005	2008								
at New Orleans, LA	07374510 (a)	Precipitation, total, inches	12/7/1998	7/12/2009	3639	-	-	-	-	-	-	-	4/1/1828	4/12/1978	123	-	-	-	-	-
at Belle Chasse, LA	07374525	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50279-70331-80154-80155-80164-80212	188	519	10/12/1977	6/3/2009
at Venice, LA	07374550 (a)	-	-	-	-	-	-	-	-	-	-	-	5/30/1953	5/24/1978	26	70331-80154	6	12	7/11/1980	18/8/1981
at Grand Pass, LA	3007220891501	Temperature, water, degrees Celsius	6/24/1999	7/12/2009	6078	10/1/1999	9/30/2006	1311	Oct-99	Sep-06	2000	2006	9/7/2000	9/22/2003	4	-	-	-	-	-
		Gage height, feet	6/24/1999	7/12/2009	5697	10/1/1999	9/30/2006	1226	Oct-99	Sep-06	2000	2006								
		Specific conductance	6/24/1999	7/12/2009	5697	10/15/1999	9/30/2006	1286	Oct-99	Sep-06	2000	2006								
		Salinity, water, unfiltered, parts per thousand	10/1/2002	7/12/2009	2853	10/1/2002	9/30/2006	681	Oct-02	Sep-06	2003	2006								

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APPENDIX B: USGS Sediment Parameter Codes

Table 6. USGS parameter codes.

50279 - Suspended-sediment concentration, flow-through centrifuge, milligrams per liter
70326 - Suspended-sediment, fall diameter (native water), percent smaller than 0.002 millimeters
70327 - Suspended-sediment, fall diameter (native water), percent smaller than 0.004 millimeters
70328 - Suspended-sediment, fall diameter (native water), percent smaller than 0.008 millimeters
70329 - Suspended-sediment, fall diameter (native water), percent smaller than 0.016 millimeters
70330 - Suspended-sediment, fall diameter (native water), percent smaller than 0.031 millimeters
70331 - Suspended-sediment, sieve diameter, percent smaller than 0.0625 millimeters
70332 - Suspended-sediment, sieve diameter, percent smaller than 0.125 millimeters
70333 - Suspended-sediment, sieve diameter, percent smaller than 0.25 millimeters
70334 - Suspended-sediment, sieve diameter, percent smaller than 0.5 millimeters
70335 - Suspended-sediment, sieve diameter, percent smaller than 1 millimeters
70337 - Suspended-sediment, fall diameter (deionized water), percent smaller than 0.002 millimeters
70338 - Suspended-sediment, fall diameter (deionized water), percent smaller than 0.004 millimeters
70339 - Suspended-sediment, fall diameter (deionized water), percent smaller than 0.008 millimeters
70340 - Suspended-sediment, fall diameter (deionized water), percent smaller than 0.016 millimeters
70341 - Suspended-sediment, fall diameter (deionized water), percent smaller than 0.031 millimeters
70342 - Suspended-sediment, fall diameter (deionized water), percent smaller than 0.0625 millimeters
70343 - Suspended-sediment, fall diameter (deionized water), percent smaller than 0.125 millimeters
70344 - Suspended-sediment, fall diameter (deionized water), percent smaller than 0.25 millimeters
70345 - Suspended-sediment, fall diameter (deionized water), percent smaller than 0.5 millimeters
70346 - Suspended-sediment, fall diameter (deionized water), percent smaller than 1 millimeter
70347 - Suspended-sediment, fall diameter (deionized water), percent smaller than 2 millimeters
80154 - Suspended-sediment concentration, milligrams per liter
80155 - Suspended-sediment discharge, tons per day
80156 - Total sediment discharge, tons per day
80158 - Bed sediment, fall diameter (deionized water), percent smaller than 0.0625 millimeters
80159 - Bed sediment, fall diameter (deionized water), percent smaller than 0.125 millimeters
80160 - Bed sediment, fall diameter (deionized water), percent smaller than 0.25 millimeters
80161 - Bed sediment, fall diameter (deionized water), percent smaller than 0.5 millimeters
80162 - Bed sediment, fall diameter (deionized water), percent smaller than 1 millimeter
80163 - Bed sediment, fall diameter (deionized water), percent smaller than 2 millimeters
80164 - Bed sediment, dry sieved, sieve diameter, percent smaller than 0.0625 millimeters
80165 - Bed sediment, dry sieved, sieve diameter, percent smaller than 0.125 millimeters
80166 - Bed sediment, dry sieved, sieve diameter, percent smaller than 0.25 millimeters
80167 - Bed sediment, dry sieved, sieve diameter, percent smaller than 0.5 millimeters
80168 - Bed sediment, dry sieved, sieve diameter, percent smaller than 1 millimeter
80169 - Bed sediment, dry sieved, sieve diameter, percent smaller than 2 millimeters
80170 - Bed sediment, dry sieved, sieve diameter, percent smaller than 4 millimeters
80171 - Bed sediment, dry sieved, sieve diameter, percent smaller than 8 millimeters
80172 - Bed sediment, dry sieved, sieve diameter, percent smaller than 16 millimeters
80173 - Bed sediment, dry sieved, sieve diameter, percent smaller than 32 millimeters
80180 - Total sediment concentration, milligrams per liter
80212 - Total sediment, sieve diameter, percent smaller than 32 millimeters

APPENDIX C: Summary of Available Data from Thorne et al. (2008, 2001), Demas and Curwick (1987), and USACE Districts

Table 7. Available data for Middle Mississippi, Red, and Atchafalaya rivers and Old River Control Structure.

RIVER / Station	Organization	Station ID	Years	Count	Interval	Sampling Strategies				Data Reported
						Type Suspended Sampler	Number Verticals	Samples per vertical	Bed sampler type	
MIDDLE MISSISSIPPI										
St Louis, MO	USGS	07010000 (a)	1948-1991	15810	daily	-	-	-	-	Discharge; total load and concentration (some gaps); temperature (Dec 59 - Sep 93 - # 95 records), bed material gradation (Dec 59 - Aug 89 - # 116 records), suspended gradation (Aug 60 - Sep 72 - # 19 records, with gaps); no point measurements.
Chester, IL	USGS	07020500 (a)	1980-1994	4569	daily	-	-	-	-	Discharge; coarse, fine, and total load and concentration; temperature (Oct 82 - Apr 91 - # 23 records), bed material gradation (Sep 80 - Aug 89 - # 27 records, some gaps); no point measurements.
Thebes, IL	USGS	07022000 (a)	1980-1994	4568	daily	-	-	-	-	Discharge; total load and concentration; temperature (Jan 73 - Mar 97 - # 342 records), bed material gradation (Sep 80 - Aug 89 - # 14 records), suspended gradation (Aug 73 - Sep 96 - # 165 records, for 0.062 mm); no point measurements.
RED RIVER										
Alexandria, LA	USACE New Orleans District	-	1971-1979	222	aprox. 2 weeks	P-46 / P-61 / hand	2-3-4-5	-	-	Discharge; gage reading; coarse, fine, and total load and concentration; temperature (Apr 71 - Dez 79 - # 222 records), suspended and bed material grain size analysis (Apr 71 - Dez 79 - # 222 records); no point measurements.
	USGS	07355500	1973-1995	296	irregular	-	-	-	-	Discharge; total load and concentration; temperature (Sep 47 - Feb 97 - # 237 records), suspended gradation (Sep 72 - Aug 95 - # 304 records, for 0.062 mm); no point measurements. Several gaps in records.
Madam Lee Revetment, LA	USACE New Orleans District	-	1992-1996	49	irregular	D-43 / P-61 / DH-59	2-3-4	-	-	Discharge; gage reading; coarse, fine, and total load and concentration; temperature (Jan 92 - Aug 96 - # 49 records), suspended and bed material grain size analysis (Jan 92 - Aug 96 - # 49 records); no point measurements.
OLD RIVER CONTROL										
Low Sill Outflow, LA	USACE New Orleans District	-	1989-1991	41	aprox. 2 weeks	P-61	1-3	-	-	Discharge; gage reading; coarse, fine, and total load and concentration (some gaps); temperature (May 89 - Abr 91 - # 41 records), suspended and bed material grain size analysis (May 89 - Abr 91 - # 41 records); no point measurements.
Knox Landing (C-89), LA	USACE New Orleans District	-	1974-1999	589	2 days - 4 weeks (irregular)	P-46 / P-61 / P-63 / Bucket	3-4	-	-	Discharge; gage reading; coarse, fine, and total load and concentration; temperature (Jan 74 - Oct 99 - # 589 records), suspended and bed material grain size analysis (Jan 74 - Oct 99 - # 589 records); no point measurements.
Vincinity of Torras, LA	Not informed (other)	-	Nov50-Jan51		only 2 days / month	P-46	3	5	-	Discharge; gage reading; total sediment, salinity concentration, depth and distance for each vertical and point.
ATCHAFALAYA										
Simmesport, LA	USACE New Orleans District	-	1950-1999	1050	2 weeks	P-46 / P-50 / P-61 / P-63	2-3-5	-	-	Discharge; gage reading; coarse, fine, and total load and concentration (some gaps); temperature (Jul 50 - Out 99 - # 1050 records, with gaps), suspended and bed material grain size analysis (Jul 50 - Out 99 - # 1050 records, with gaps).
	USGS	07381490	1973-1975	158	2-7 days (irregular)	-	-	-	-	Discharge; coarse, fine, and total load and concentration.
	USGS	07381490	1972-1989	4748	daily	-	-	-	-	Discharge; total load (some gaps); temperature (Dec 72 - Sep 77 - # 56 records), suspended gradation (Sep 72 - Oct 96 - # 614 records, for 0.062 mm); no point measurements.
	Not informed (other)	-	1951-1996	1113	1-2 weeks	-	-	-	-	Discharge; coarse, fine, and total load and concentration.
	Not informed (other)	-	1963-1967	122	1 - 2 weeks	-	-	-	-	Discharge; coarse, fine, and total load and concentration.
Melville, LA	USGS	07381495	1979-1993	116	irregular	-	-	-	-	Discharge; coarse, fine, and total load and concentration (gaps); temperature (Out 79 - Ago 95 - # 177 records), no point measurements.
Morgan City, LA	USGS	07381495	1973-1995	373	irregular	-	-	-	-	Suspended sediment concentration (gaps), % finer (several gaps in record).

(a) Station operated in cooperation with the U.S. Army Corps of Engineers

Table 8. Available data for Lower Mississippi River (Part 1).

RIVER / Station	Organization	Station ID	Years	Count	Interval	Sampling Strategies				Data Reported
						Type Suspended Sampler	Number Verticals	Samples per vertical	Bed sampler type	
LOWER MISSISSIPI										
Memphis, TN	USGS	07032000	1973-1994	134	4 weeks (irregular)	-	-	-	-	Discharge; coarse, fine, and total load and concentration (gaps). Coarse and fine data to 1980 only, no point measurements.
Chicot Landing, AR	Not informed (Others)	-	1930-1931	81	1-3 days	-	-	-	-	Discharge; gage; sediment concentration (surface, mid-depth, bottom, mean) and load. Detailed in Vogel (1930)
Arkansas City, AR	USACE Vicksburg District	-	1985-2004	420	weekly to monthly (irregular)	P-61	6	4	BM-54 / DRAGE BUCKE	Discharge; coarse, fine, and total load and concentration most with bed-material gradation, summary, and point measurements data. Calculation of sediment load using simple average concentration, vertical averaging concentration and weighted methods.
	Robbins (1977)	-	1929-1931	100	1-4 days	Sediment trap	8	-	-	Discharge; total load and concentration (some gaps). No point measurements data.
		-	1967-1974	178	weekly to monthly (irregular)	P-61	6	-	-	Discharge; coarse, fine, total load and concentration; temperature. No point measurements.
	Not informed (other)	-	1969-1979	196	approx. 2 weeks	-	-	-	-	Lumped data, no dates given, sand and total loads. No point measurements.
Lake Providence, MS	Mississippi River Comission (MRC)	-	1879-1880	27	irregular	-	8	3 (surface, mid-depth, bottom)	-	Discharge; gage; sediment concentration and load (surface, mid-depth, bottom). Detailed in Vogel (1930).
Kings Point, MS	Not informed (Others)	-	1879	49	2-5 days	-	-	-	-	Discharge; gage; sediment concentration (surface, mid-depth, bottom) and load.
Vicksburg, MS	USACE Vicksburg District	-	1984-2004	434	weekly to monthly	P-61	6	4/2	BM-54 / DRAGE BUCKE	Discharge; coarse, fine, and total load and concentration, most with bed-material gradation, summary, and point measurements data. Calculation of sediment load using simple average concentration, vertical averaging concentration and weighted methods.
	USGS	07289000	1973-1994	137	irregular	-	-	-	-	Discharge; total load and concentration. No point measurements.
	Robbins (1977)	-	1929-1931	75	3 days to monthly	Sediment trap	8	-	-	Discharge; total load and concentration (some gaps). No point measurements data.
		-	1968-1974	193	3 days to monthly (irregular)	P-61	6	-	-	Discharge; coarse, fine, total load and concentration; water temperature. No point measurements.
	Not informed (other)	-	1958-2007	8472	2 days to weekly	-	-	-	-	Discharge and stage only, with gaps.
	Not informed (other)	-	1969-1979	218	aprox. 2 weeks	-	-	-	-	Lumped data, no dates given, sand and total loads. No point measurements.
	Mississippi River Comission (MRC)	-	1929-1931	78	irregular	-	-	3 (surface, mid-depth, bottom)	-	Discharge; gage; sediment concentration and load (surface, mid-depth, bottom). Detailed in Vogel (1930).
Natchez, MS	USACE Vicksburg District	-	1985-2004	436	weekly to monthly (irregular)	P-61	6	-	BM-54 / DRAGE BUCKE	Discharge; coarse, fine, and total load and concentration, most with bed-material gradation, summary, and point measurements data. Calculation of sediment load using simple average concentration, vertical averaging concentration and weighted methods.
	Not informed (other)	-	1970-1974	143	irregular	-	-	-	-	Discharge; coarse, fine, total load and concentration; water temperature. No point measurements.
		-	1969-1979	197	approx. 2 weeks	-	-	-	-	Lumped data, no dates given, sand and total loads. No point measurements.

Table 9. Available data for Lower Mississippi River (Part 2).

RIVER / Station	Organization	Station ID	Years	Count	Interval	Sampling Strategies				Data Reported
						Type Suspended Sampler	Number Verticals	Samples per vertical	Bed sampler type	
LOWER MISSISSIPI										
Coochie, LA	USACE New Orleans District	01020	1967-1998	447	approx. 1 or 2 weeks	P-46 / P-61 / P-63	3-4-5	-	-	Discharge; gage reading; water temperature; coarse, fine, and total load and concentration. Suspended and bed material grain size analysis.
Tarbert Landing, LA	USACE New Orleans District	01100	1959-2006	1452	irregular	-	-	-	-	Discharge; coarse, fine, total load and concentration; temperature. No point measurements.
	USACE New Orleans District	01100	1973-2005	904	1-4 weeks (irregular)	P-46 / P-61 / P-63	4-5-8	5	-	Discharge; gage reading; water temperature; coarse, fine, and total load and concentration. Suspended and bed material grain size analysis. Point measurements data for 2001 to 2005.
	USACE New Orleans District	01100	1967-1970/1974		irregular	P-46 / P-61	8	5	-	Suspended sediment observations. Coarse and fine suspended loads with bed-material grain size analysis. Sediment analysis by sieve and bottom withdrawal methods. Original data sheets. Point measurements data.
	Observations	-	1963-1974	389	irregular	-	-	-	-	Discharge; sand, silt, total load and concentration (observations). No point measurements.
	USGS	07295100	1930-2005	27740	daily	-	-	-	-	Discharge
	USGS	07295100	1982-1985	27	monthly	US P-63	5		Shipek Model 860	Concentration and particle-size distribution of suspended sediment, coarse and fine. Demas & Curwick (1987)
	USGS	07295100	1974-1986	2775	daily	-	-	-	-	Daily discharge (USACE) and calculated daily suspended sediment discharge (load), tons per day
	Not informed (Others)	-	1963-1967	187	3 days to 2 weeks	-	-	-	-	Discharge; suspended sediment observations, silt and sand concentration and load. No point measurements.
	Not informed (Others)	-	1959-1962	200	irregular	-	-	-	-	Sand, fine and total concentration. No point measurements.
	Not informed (Others)	-	1929	25	irregular	-	-	3 (surface, mid-depth, bottom)	-	Discharge; gage; sediment concentration and load (surface, mid-depth, bottom).
Red River Landing, LA	USACE New Orleans District	-	1973-1998	415	1-2 weeks (irregular)	P-61 / P-63	2-3	-	-	Discharge; gage reading; water temperature; coarse, fine, and total load and concentration. Suspended and bed material grain size analysis.
	Mississippi River Comission (MRC)	-	1929-1930-1931	90	2-4 days	-	-	3 (surface, mid-depth, bottom)	-	Discharge; gage; sediment concentration and load (surface, mid-depth, bottom).
	Not informed (Others)	-	1958-1961	1080	daily (with gaps)	-	-	-	-	Daily sediment concentration (sand, fine and total). No point measurements.
St. Francisville, LA	USGS	07373420	1978-1997	202	2-5 weeks (irregular)	-	-	-	-	Discharge; sand, fine and total concentration. No point measurements.
	USGS	07373420	1982-1985	28	monthly	US P-63	-	-	Shipek Model 860	Concentration and particle-size distribution of suspended sediment, coarse and fine. Demas & Curwick (1987)
Baton Rouge, LA	USACE New Orleans District	-	1956-1959	945	daily (with gaps)	-	-	-	-	Daily sediment concentration (sand, fine and total). No point measurements.
	USACE New Orleans District	-	1949-1970	21	yearly	-	-	-	-	Lower Mississippi River at Baton Rouge and Red River Landing, LA. Sand, silt and total yearly loads. Water year discharge. Average sediment concentration.
	USACE New Orleans District	-	1954	6	1 month	P-50	8	5	-	Gage reading; mean velocity; original raw data. Point measurements data. No discharge information.

Table 10. Available data for Lower Mississippi River (Part 3).

RIVER / Station	Organization	Station ID	Years	Count	Interval	Sampling Strategies				Data Reported
						Type Suspended Sampler	Number Verticals	Samples per vertical	Bed sampler type	
LOWER MISSISSIPI										
Plaquemine, LA	USGS	07374120	1982-1985	30	monthly	US P-63	5	-	Shipek Model 860	Concentration and particle-size distribution of suspended sediment, coarse and fine. Demas & Curwick (1987)
	Not informed (Others)	-	1954-1956	400	daily (with gaps)	-	-	-	-	Daily sediment concentration (sand, fine and total). No point measurements. Samples taken at Plaquenine Lock.
Donaldsville, LA	USACE New Orleans District	-	1949-1951	128	2-4 weeks	-	-	-	-	Inventory and sediment concentration record. Coarse and fine suspended loads with bed-material grain size analysis. Original data sheets. Point measurements data.
Union, LA	USGS	07374220	1982-1985	27	monthly	US P-63	5	-	Shipek Model 860	Concentration and particle-size distribution of suspended sediment, coarse and fine. Demas & Curwick (1987)
Luling, LA	USGS	07374400	1982-1985	27	monthly	US P-63	5	-	Shipek Model 860	Concentration and particle-size distribution of suspended sediment, coarse and fine. Demas & Curwick (1987)
Carrolton, LA	Forshey / Delta Survey	-	1851-1853	106	weekly	Keg	3	1-2-3 (surface, 0.5, bottom)	-	Discharge; gage; sediment concentration and load (surface, mid-depth, bottom).
	Mississippi River Comission (MRC)	-	1879-1880	28	weekly (irregular)	Slip Bottle	3	3 (0, 0.5,"near bottom")	-	Discharge; gage; sediment concentration and load (surface, mid-depth, bottom).
	Not informed (Others)	-	1929-1931	65	2-3 days	-	-	-	-	Discharge; gage; sediment concentration (surface, mid-depth, bottom, mean) and load. Detailed in Vogel (1930)
Belle Chasse, LA	USGS water quality data	07374525	1976-2008	182	1-4 weeks	-	-	-	-	Total suspended sediment concentrations and loads. Bed sediment (% fine)
	USGS	07374525	1982-1985	27	monthly	US P-63	5	-	Shipek Model 860	Concentration and particle-size distribution of suspended sediment, coarse and fine. Demas & Curwick (1987)
West Point a La Hache, LA	USGS	07374530	1982-1985	18	monthly	US P-63	5	-	Shipek Model 860	Concentration and particle-size distribution of suspended sediment, coarse and fine. Demas & Curwick (1987)
Venice, LA	USGS water quality data	07374550	1973-1999	6	1-4 weeks	-	-	-	-	Total suspended sediment concentrations and % fine sediment.
	USGS	07374550	1982-1985	20	monthly	US P-63	5	-	Shipek Model 860	Concentration and particle-size distribution of suspended sediment, coarse and fine. Demas & Curwick (1987)
South Pass, LA	Kessel	-	1879-1893	15	yearly	-	-	-	-	Calculated yearly sediment load (thousand tonnes/year)
Baton Rouge to Gulf of Mexico, LA (West Baton Rouge, Baton Rouge, Baton Rouge Harbor, Port Allen, GIWW, Baton Rouge, Iberville, Donaldsonville, Saint Charles, New Orleans Harbor, Plaquemine, Baptiste Collette, Southwest Pass, Cubit´s Gap, South Pass, Tiger Pass, etc.)	USACE New Orleans District (dredging and sampling contracts/projects)	-	1996-2008	1545	-	-	-	-	-	Contracts/Projects for dredging and sampling. Particle size distribution reports. Grain size curves (more than 3,600 curves in tif format): % cobbles, gravel, sand, silt and clay. Spreadsheet in Excel file contains date, sample location, time, visual classification of soil and parameters: D50, Cu, Cc, Density, Porosity, Phi Angle. (almost 1500 sample records - 1996-2008)

APPENDIX D: Summary of USACE Water Levels of Rivers and Lakes

Table 11. Begin date for stage (RiverGages.com) and stage measurements available (USACE Districts).

River / USACE Site	RiverGages.com Begin date	Records available from (year)	District
OHIO RIVER			
Ohio River at Metropolis	7/11/2007	-	Louisville
Ohio River at Paducah	7/12/2007	-	Louisville
Ohio River at Golconda	7/12/2007	-	Louisville
Ohio River at Cairo, IL	1/1/1898	1858	St Louis
MIDDLE MISSISSIPPI RIVER			
Mississippi River at Thebes, IL	1/1/2007	1934	St Louis
Mississippi River at Cape Girardeau, MO	1/1/2007	1896	St Louis
Mississippi River at Chester, IL	1/1/2007	1891	St Louis
Mississippi River at St. Louis, MO	1/1/2007	1861	St Louis
OBION RIVER/FORKED DEER RIVER			
Middle Fork Of Obion River Near Dresden, TN (Southeast)	1/2/2003	1969	Memphis
North Fork Forked Deer River At Dyersburg, TN	1/2/2003	1939	Memphis
Obion River Near Mengelwood, TN (Southwest)	1/2/2003	1960	Memphis
HATCHIE RIVER			
Hatchie River at Rialto, TN	1/2/2003	1939	Memphis
WOLF RIVER			
Wolf River at Raleigh, TN	12/5/1936	1936	Memphis
ST FRANCIS RIVER			
St. Francis River Below W.G. Huxtable Pumping Plant Near Marianna, AR	1/2/2003	1980	Memphis
St. Francis River Above W.G. Huxtable Pumping Plant Near Marianna, AR	1/2/2003	1980	Memphis
St. Francis River Near Marianna, AR (Northeast)	1/2/2003	1959	Memphis
ARKANSAS RIVER			
Arkansas River at Yancopin, AR	1/1/2005	-	Little Rock
YAZOO RIVER			
Yazoo River @ Long Lake, MS (Below Steele Bayou)	3/28/2006	-	Vicksburg
BIG BLACK RIVER			
Big Black River @ Bovina, MS	1/1/1947	-	Vicksburg
Big Black River @ Bentonia	4/10/1947	-	Vicksburg
Big Black River @ West, MS	1/10/2008	-	Vicksburg
OLD RIVER CONTROL			
Old River LowSill Inflow Channel near Knox Landing (ID 02050)	3/24/1987	1961	New Orleans
Old River Lowsill Outflow Channel near Knox Landing (ID 02100) - (Stage and Discharge)	3/23/1987	1961	New Orleans
Old River Auxiliary Inflow near Knox Landing (ID 02200) - (Stage and Discharge)	8/17/1994	1986	New Orleans
Old River Auxiliary Outflow near Knox Landing (ID 02210)	7/31/1994	1986	New Orleans
Old River Outflow Channel near Knox Landing, LA (Total Outflow) - (ID 2600) - (Discharge)	-	1961	New Orleans
RED RIVER			
Red River @ Lock & Dam No. 1 (lower)	1/1/1987	-	Vicksburg
Red River @ Lock & Dam No. 1 (upper), LA	1/1/1987	-	Vicksburg

RIVER / USACE Site	RiverGages.com Begin date	Records available from (year)	District
ATCHAFALAYA RIVER			
Atchafalaya River at Simmesport (03045) - (CORPS/USGS site) (Stage and Discharge)	1/9/1987	1887	New Orleans
Atchafalaya River at Melville (03060)	3/22/1987	1885	New Orleans
Atchafalaya River At Krotz Springs, LA (03075)	7/25/2008	1912	New Orleans
Atchafalaya River At Butte La Rose, LA (CORPS/USGS site) (03120)	11/21/1996	1928	New Orleans
Lower Atchafalaya River At Morgan City, LA (CORPS/USGS site)	9/13/2008	1905	New Orleans
LOWER MISSISSIPPI RIVER			
Mississippi River at Hickman, KY - (and discharge)	1/3/1930	1929	Memphis
Mississippi River at New Madrid, MO	11/22/1892	1879	Memphis
Mississippi River L.W. Gage 87.5 at Tiptonville, TN	1/1/1930	1929	Memphis
Mississippi River at Caruthersville, MO	12/20/1929	1928	Memphis
Mississippi River H.W. Gage 152 Near Osceola, AR (South)	1/1/1933	1928	Memphis
Mississippi River at Memphis, TN (Weather Bureau Gage)	1/02/1885	1871	Memphis
Mississippi River at Helena, AR	11/23/1871	1871	Memphis
Mississippi River @ Arkansas City, AR	1/1/1929	1929	Vicksburg
Mississippi River @ Greenville, MS	1/1/1925	1925	Vicksburg
Mississippi River @ Vicksburg, MS (15145)	1/1/1901	1901	Vicksburg
Mississippi River @ Natchez, MS (15155)	1/1/1940	1871	Vicksburg
Mississippi River near Knox Landing (01080)	3/24/1987	1955	New Orleans
Mississippi River At Tarbert Landing, MS (01100) - (Discharge)	-	1932	New Orleans
Mississippi River at Red River Landing (01120)	3/22/1987	1851	New Orleans
Mississippi River St. Francisville - South (01145)	3/12/2009	-	New Orleans
Mississippi River at Baton Rouge (01160)	3/27/1987	1872	New Orleans
Mississippi River at Donaldsonville (01220)	7/26/2008	1890	New Orleans
Mississippi River at Reserve (01260)	12/15/1997	1936	New Orleans
Mississippi River at Bonne Carre - North of Spillway (01275)	1/30/2007	-	New Orleans
Mississippi River at Bonnet Carre (01280)	1/1/1989	1930	New Orleans
Mississippi River at New Orleans (Carrollton) (01300)	7/18/1986	1872	New Orleans
Mississippi River at Harvey Lock (01320)	10/25/2006	1924	New Orleans
Mississippi River at IHNC Lock (01340)	10/25/2006	-	New Orleans
Mississippi River At Chalmette, LA (01360)	-	1923	New Orleans
Mississippi River at Algiers Lock (01380)	10/25/2006	1956	New Orleans
Mississippi River at Alliance (01390)	7/25/2008	-	New Orleans
Mississippi River at West Pointe a la Hache (01400)	11/21/2006	1926	New Orleans
Mississippi River At Port Sulphur, LA (01420)	-	1933	New Orleans
Mississippi River at Empire (01440)	6/19/2007	1960	New Orleans
Mississippi River at Venice (01480)	3/28/1987	1944	New Orleans
Mississippi River at West Bay (01515)	1/13/2005	-	New Orleans
West Bay Receiving Area - Outflow (01516)	1/13/2005	-	New Orleans
Mississippi River at Head of Passes (01545)	4/18/2008	1875	New Orleans
Mississippi River (Southwest Pass) at East Jetty (ID 01670)	10/4/2007	1926	New Orleans
Mississippi Sound at Grand Pass (USGS)	9/16/2008	-	New Orleans

APPENDIX E: Data Sources

Discharge, Sediment, and Stage

http://pubs.usgs.gov/wri/wri934076/1st_page.html - U.S. Geological Survey Hydro-Climatic Data Network (HCDN): Streamflow Data Set, 1874-1988, by J. R. Slack, Alan M. Lumb, and Jurate Maciunas Landwehr. USGS Water-Resources Investigations Report 93-4076. Records of streamflow that are unaffected by artificial diversions, storage, or other works of man in or on the natural stream channels or in the watershed that can provide an account of hydrologic responses to fluctuations in climate. A streamflow data set, which is specifically suitable for the study of surface-water conditions throughout the United States under fluctuations in the prevailing climatic conditions, has been developed. This data set, called the Hydro-Climatic Data Network, or HCDN, consists of streamflow records for 1,659 sites throughout the United States and its territories. Records cumulatively span the period 1874 through 1988, inclusive, and represent a total of 73,231 water years of information.

http://water.usgs.gov/ - Water Resources of the United States.

http://nwis.waterdata.usgs.gov/usa/nwis/qwdata - Instantaneous fluvial sediment data, in addition to other instantaneous water-quality and ancillary data collected by the U.S. Geological Survey (USGS), available on-line.

http://wdr.water.usgs.gov/ - Annual Water Data Reports (USGS).

http://waterdata.usgs.gov/nwis/sw - National Water Information System: Web Interface. USGS Surface-Water Data for the Nation. Real-time data are time-series. Daily values are summarized from time-series data for each day for the period of record and may represent the daily mean, median, maximum, minimum, and/or other derived value. Statistics are computed from approved daily mean time-series data at each site. These links provide summaries of approved historical daily values for daily, monthly, and annual (water year or calendar year) time periods (USGS).

http://co.water.usgs.gov/sediment/ - Daily Values of Suspended-sediment and Ancillary Data. This static database is current only through 30 September 1996, and will not be refreshed with new data (USGS).

http://water.usgs.gov/osw/sediment/ - Summary of U.S. Geological Survey On-Line Instantaneous Fluvial Sediment and Ancillary Data.

CD-ROM Database from Thorne et al. (2008) Report - Make available reliable sediment-transport data by extending the database compiled by Thorne et al. (2001). Work focused on measured suspended-sediment loads. Updating the database involved: (a) adding recent measurement collected by the USACE New Orleans and Vicksburg Districts; and (b) adding available historic measurements extending as far back as the earliest available records from the mid-19th Century. In compiling the database, considerable assistance was provided by the USACE ERDC, Vicksburg District, New Orleans District, Lower Mississippi Valley Division, and the United States Geological Survey (USGS).

Nordin, C. F.; Queen, B. S. Particle Size Distributions of Bed Sediments Along the Thalweg of the Mississippi River, Cairo, IL, to Head of Passes, LA, September 1989. Potamology Program (P-1). Report 7. Lower Mississippi Valley Division. Abstract: Changes in Mississippi River bed material gradations between Cairo, IL, and Head of Passes, LA, between 1932 and 1989 were determined. In September 1989, bed material samples were collected from the thalweg of the river along the 955-mile reach. In all, 504 samples were collected at 417 locations. Results were compared to a similar sampling program conducted in 1932.

http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA111263 - Characterization of the Suspended-Sediment Regime and Bed-Material Gradation of the Mississippi River Basin. Potamology Program (P-I): Report 1, Volume II. Accession Number ADA111263. Report 1, Volume II. Final Report. U.S. Army Engineer Waterways Experiment Station. Vicksburg, MS. Environmental Laboratory Report Date: August 1981.

USACE New Orleans District Dredging and Sampling Contracts and Projects: Particle size distribution reports. Grain size curves (more than 3,600 curves in PDF file format): percent cobbles, gravel, sand, silt and clay. Spreadsheet in Excel file contains date, sample location, time, visual classification of soil and parameters: D_{50}, *Cu*, *Cc*, Density, Porosity, Phi Angle. (1,545 sample records - 1996-2008).

Water Level/Stages

http://www2.mvr.usace.army.mil/WaterControl/new/layout.cfm - Water Levels of Rivers and Lakes (RiverGages.com). USACE (Data from Districts). Water level by district, basin, stream, state, and city.

http://www2.mvr.usace.army.mil/WaterControl/datamining2.cfm - Datamining for Stages (ft). USACE (Data from Districts). Water level by district, basin, stream, state, and city.

http://www.mvn.usace.army.mil/eng/edhd/wcontrol/dcp.asp - Stage Data: Near Real-Time Hourly Data Collection Platforms. Team New Orleans. Mississippi River Basin, Atchafalaya Basin and Calcasieu River/Mermentau Basin. USACE.

http://www.mvn.usace.army.mil/eng/edhd/watercon.asp - USACE New Orleans District, Water Management.

http://www.mvk.usace.army.mil/index.php?pID=6 - USACE Vicksburg District, Water Management.

http://www.mvm.usace.army.mil/hydraulics/memphis.asp - USACE Memphis District, Water Control.

http://mvs-wc.mvs.usace.army.mil/ - USACE St Louis Memphis District, Water Control.

Hydrographic Surveys - Charts and Maps

http://chart.tec.army.mil/ChartServerV2.0/jsp/index.jsp - Inland electronic navigation charts (IENCs). USACE.

http://crunch.tec.army.mil/enc/echarts/IENCShapeFileRequest.cfm - Download charts in SHAPEFILE format (USACE).

2007 Flood Control and Navigation Maps Mississippi River. Cairo, Illinois to the Gulf of Mexico. Mile 953 to mile 0 A.H.P. USACE. Lower Mississippi River. Mississippi Valley Division. 62nd Edition. Publication in PDF format - provides maps and mileages between points along the Mississippi Rivers.

https://inet.mvd.usace.army.mil/gis/private/hydro_surveys/html/memphis/mfshydro.html - USACE. Historic Comprehensive Hydrographic Surveys of the Lower Mississippi River - Memphis District:

1937 Cairo, IL, to Rosedale, MS.

1948 - 1949 Cairo, IL, to Arkansas River

1961 - 1963 Cairo, IL, to Mouth of White River, AR.

1973 - 1975 Cairo, IL, to Mouth of White River, AR.

1987 - 1989 Cairo, IL, to Mouth of White River, AR.

https://inet.mvd.usace.army.mil/gis/private/hydro_surveys/html/new_orleans/nodhydro.html - USACE. Historic Comprehensive Hydrographic Surveys of the Lower Mississippi River - New Orleans District:

1935 - 1938 Angola, LA, to Head of Passes.

1949 - 1952 Angola, LA, to Head of Passes, LA.

1961 - 1963 Black Hawk, LA, to Head of Passes, LA.

1973 - 1975 Black Hawk, LA, to Head of Passes, LA.

1991 - 1992 Black Hawk, LA, to Head of Passes, LA.

https://inet.mvd.usace.army.mil/gis/private/hydro_surveys/html/vicksburg/vxdhydro.html - USACE. Historic Comprehensive Hydrographic Surveys of the Lower Mississippi River - Vicksburg District:

1868 - 1880 Mouth of Ohio River to Gulf of Mexico.

1937 - Rosedale to Vicksburg, MS.

1937 - 1938 Vicksburg, MS, to Angola, LA.

1948 - 1949 Mouth of Arkansas River to Vicksburg, MS.

1948 - 1951 Vicksburg, MS, to Angola, LA.

1962 - 1964 Mouth of White River, AR, to Black Hawk, LA.

1973 - 1975 Mouth of White River, AR, to Black Hawk, LA.

1988 - 1989 Mouth of White River, AR, to Black Hawk, LA.

http://www.mvn.usace.army.mil/eng2/hydsrv/msHYD.asp - USACE. Historic Mississippi Hydrographic Survey Books. Survey years 1991, 1973, 1961, 1949, 1935, 1913, and 1883.

http://www.mvd.usace.army.mil/gis/navbook/main.html - 1998 Mississippi River Navigation Charts, Upper Mississippi River Mile 300 to Gulf of Mexico. USACE Mississippi Valley Division. SID format.

http://www.mvn.usace.army.mil/eng2/edsd/misshyd/misshyd.htm - Mississippi River - 1992 Hydrographic Survey Maps. USACE. New Orleans District. DGN format.

http://www.mvn.usace.army.mil/eng/edsd/index.asp - Geospatial Data Digital Map Products and GIS/CADD Data. USACE. New Orleans District.

http://www.mvn.usace.army.mil/eng2/hydsrv/MSHYD.asp- HISTORIC MISSISSIPPI HYDRO-GRAPHIC SURVEY BOOKS. Scanned Mississippi River Hydrographic Survey Books are maps of the Mississippi River, available for 1935 through 1992 series. The Mississippi River Commission Comprehensive Mississippi River Surveys of 1913 and 1883 were also scanned. These maps are valuable for both hydrographic and archeological studies. The scanned map plates are presented in a compressed format called MrSid (multiresolution scamless image database). A special plug-in may be required for the computer, which can be downloaded from the Lizard Tech web-page.

http://www.mvn.usace.army.mil/atch/hydro_ras.asp - Atchafalaya Hydrographic Survey Book. PDF and DGN formats.

http://www.mvn.usace.army.mil/atchafalaya/navbook_ras.htm - Atchafalaya River Navigation Book. USACE. New Orleans District in PDF format.

http://www.mvn.usace.army.mil/eng/2007MissRiverBooks/04_hydro_book.asp - The 2007 Mississippi River Hydrographic Survey Book (of 2004 data) in PDF and DGN formats.

http://www.mvk.usace.army.mil/maps.htm - Vicksburg District - USACE.

- 1998 Flood control and navigation Maps Mississippi River below Hannibal, MO, to the Gulf of Mexico.
- 1999 Navigation maps of Atchafalaya River System and Outlets to the Gulf.
- 2006 Navigation charts of J Bennett Johnson Waterway Red River (Shreveport, LA, to mouth of the Red River) mile 235 to mile 0.
- 1998 Red River Mosaics.
- Mississippi River Hydrographic Survey 1991-1992 Black Hawk, LA, to Head of Passes, LA, mile 0 to mile 324 (a.h.p.) (New Orleans District).

- Mississippi River Hydrographic Survey 1988-1989 Mouth of White River, AR, to Black Hawk, LA, mile 320 to mile 595.
- Mississippi River Hydrographic Survey 1987-1989 Cairo, IL, to mouth of White River, AR, mile 595 to mile 954 (Memphis District).
- 1993 Red River Hydrographic Survey, Shreveport, LA, to mouth of Red River.