



US Army Corps
of Engineers®
Rock Island District

Upper Mississippi River System Flow Frequency Study

(Upper Mississippi, Lower Missouri & Illinois Rivers)

Public Involvement "Special Edition" Newsletter Nov. 2004

FREQUENTLY ASKED QUESTIONS

In October 1997, the U.S. Army Corps of Engineers, in partnership with State and Federal agencies, initiated a study to update flow frequencies for the main-stem Upper Mississippi, Lower Missouri, and Illinois Rivers.

As part of the study's public involvement program, newsletters have been sent to keep interested persons informed of the study's progress and preliminary results.

This "Special Edition" newsletter has been written to share some of the more Frequently Asked Questions (FAQs) about the Upper Mississippi River System Flow Frequency Study.

These questions and answers, plus additional study information including previous newsletters and meeting minutes, are available on the study's website at <http://www.mvr.usace.army.mil/pdw/pdf/FlowFrequency/flowfreq.htm>.

WHAT IS THE PURPOSE OF THE FLOW FREQUENCY STUDY?

The purpose of the Upper Mississippi River System Flow Frequency Study is to update¹ the discharge frequency relationships and water surface elevations for the Mississippi River and Illinois River above Cairo, Illinois, and the Missouri River downstream from Gavins Point Dam. (See the study map on page 4 of this newsletter.)

Once the water surface elevations are updated, they will be used by governmental agencies, local communities, and private citizens for purposes of improved land use planning, floodplain mapping and regulation, flood damage reduction, environmental restoration, etc.

WHO ARE THE STUDY'S PARTICIPANTS?

The study is being conducted by the U.S. Army Corps of Engineers in close collaboration with Federal and State agencies. The Corps and these agencies have formed a Federal/State Study Team, or Task Force. The composition of the Task Force follows:

¹ Existing flow frequency data for the upper and middle reaches of the Mississippi River were prepared by the Corps of Engineers in 1979. Existing flow frequency relationships for the Missouri River were developed in 1962.

- * Corps of Engineers: Headquarters, Washington D.C.; Institute of Water Resources, Alexandria, VA, and Davis, CA; Mississippi Valley Division, Vicksburg, MS; North western Division, Missouri River Region, Omaha, NE; and Kansas City, Omaha, Rock Island, St. Louis, and St. Paul Districts
- * Bureau of Reclamation
- * Federal Emergency Management Agency (FEMA)
- * National Weather Service
- * Natural Resources Conservation Service
- * United States Geological Survey
- * Tennessee Valley Authority
- * States of Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, and Wisconsin

The Task Force is assisted by the Technical Advisory Group, a panel of nationally renowned scientists who are knowledgeable and experienced in flood issues.

Additionally, a Citizens' Public Involvement Group was formed to assure that the Task Force is well informed as to the concerns of the citizens in the study area.

WHAT IS THE DIFFERENCE BETWEEN HYDROLOGY AND HYDRAULICS?

Hydrology is a science dealing with the quantity and distribution of water (e.g., how much?).

Hydraulics, as related to this study, is the determination of water surface elevations (e.g., how high?).

WHAT ARE THE STUDY'S ASSUMPTIONS?

Hydrology Assumptions and Methodology

(The assumptions listed below have been approved by the Flow Frequency Study Technical Advisory Group and the Federal Interagency Advisory Group.)

1. **Period of Record** – The period 1898-1998 has been chosen as the period of record for this study because - land use was relatively consistent, the period of record flows can be adequately adjusted for the affects of channelization by using hydraulic models, and the long period of record available greatly reduces the statistical significance of the historic floods in the flood frequency analysis.

2. **Climate Change** – The climate for the period of record, 1898-1998, is assumed to be stationary; i.e., not significantly changing. The analysis by the Corps of Engineers' Institute for Water Resources (IWR) showed possible trends for some stations but no clear climate change trend for this period. IWR's recommendation was to assume that the period of record was stationary given the difficulty in distinguishing a climatic trend from over all climatic variability.

3. **Statistical Methodology** (Unregulated Flow Frequency) – In general, "Guidelines for Determining Flood Flow Frequency, Bulletin 17B" will be used for flow frequency analysis which incorporates currently accepted technical methods with sufficient detail to promote uniform application. The log-Pearson Type III analytical frequency distribution will be used for the unregulated (without dams) flow-frequency analysis. Several new analytical distributions and estimation methods were evaluated. Significant differences between the application of the log-Pearson and other distributions were not found and hence it was decided to continue to use this standard distribution. The regional skew coefficient will be obtained by taking a best average estimate from gages situated in similar hydrologic and meteorologic conditions.

4. **Unregulated Flow Frequency** – The unregulated flow frequency relationships will be developed from gage data at gage sites using the statistical methodology explained in hydrology assumption 3 (above).

5. **Adjustments to Flow Statistics Between Gages** – The Technical Advisory Group recommended the adjustment by statistics versus drainage area.

6. **Regulated Flow Frequency** – The regulated flow frequency curve will be developed from the unregulated data with applicable modifications such as reservoirs.

Hydraulic Methodology and Assumptions

Flood Profiles – The Flow Frequency Study will develop flood profiles for the 2-, 5-, 10-, 50-, 100-, 200-, and 500-year flood events. First, elevation versus flow relationships will be developed using a hydraulic model (UNET). The regulated flow values for various flood events are then converted to elevations using this relationship.

The five U.S. Army Corps of Engineers Districts are about to begin hydraulic modeling on the Upper Mississippi, Illinois, and Lower Missouri Rivers. A letter seeking the concurrence of each member of the Upper Mississippi River System Flow Frequency Study Task Force on the hydraulic model assumptions has been sent to the Task Force members. The assumptions are:

1. The UNET model will utilize existing line and grade of all levees.
2. Levee failure will be modeled to occur at the actual over topping elevation of the levee.
3. Potential future modifications of any structure should not be incorporated into the existing conditions profiles which will be used for regulatory purposes.

WHAT IS THE CORPS' RESPONSIBILITY AT LOCATIONS WHERE THE NEW WATER SURFACE PROFILES ARE HIGHER THAN THE EXISTING PROFILES?

The U.S. Army Corps of Engineers is responsible for administering the Public Law (PL) 84-99 Flood and Coastal Storm Emergencies Program. Under the current policy, PL 84-99 has no provisions for or against Federal or non-Federal levee raises. Raising existing non-Federal levees is the responsibility of the levee owners and must meet the State requirements.

HOW WILL CHANGES IN FLOOD FREQUENCY PROFILES BE IMPLEMENTED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)?

Before the flood flow frequency profiles being prepared by the U.S. Army Corps of Engineers can be reflected on revised FEMA Flood Insurance Rate Maps (FIRMs), several key steps have to be addressed:

- * The structural adequacy of existing levees has to be assessed based on the new study results. In accordance with Section 65.10 of the National Flood Insurance Program (NFIP) regulations, FEMA only recognizes those levee systems on FIRMs as providing protection from the 1% annual chance flood (commonly referred to as the 100-year flood) that meet minimum design, operation, and maintenance standards.
- * The need for floodways has to be assessed, and necessary computations and mapping performed. The floodway is the stream channel plus that portion of the overbanks that must be kept free from encroachment in order to discharge the 1% annual chance flood without increasing flood levels by more than 1.0 foot. The floodway is one of the available floodplain management tools that communities participating in the NFIP use to ensure safer development. States and communities may require more restrictive floodway delineations than those required by the Federal minimum.
- * The revised flood flow frequency profiles have to be mapped on suitable topographic maps, and the results depicted on base maps that can then be converted to FIRMs.

(A base map covers the entire geographic area of the community and is used as the source for physical features – most notably roads and road names, railroads and names, streams, corporate limits and section lines – on the FIRM.)

The necessary funding for this effort is substantial. Unfortunately, the funding has not been made available to date. FEMA has proposed a cost-sharing plan, whereby one-third of the required funds will be provided by FEMA, one-third by the Corps of Engineers, and one-third by the impacted States.

Contact persons are:

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FEMA Region V is located in Chicago, Illinois, and has jurisdiction over the States of Minnesota, Wisconsin, and Illinois. FEMA Region VII is located in Kansas City, Missouri, and has jurisdiction over the States of Nebraska, Kansas, Iowa, and Missouri.

CAN LEVEE DISTRICTS REVIEW DRAFT LEVEE ELEVATIONS PRIOR TO DATA ENTRY IN HYDRAULIC MODELS?

The Corps welcomes the assistance of the States, local governments, and landowners in performing quality control of the new floodplain digital elevation model data. Levee elevations used within the hydraulic models will be provided to the Citizens' Public Involvement Group Chairperson, who will coordinate with levee districts and agencies.

WILL DIGITAL ELEVATION DATA BE MADE AVAILABLE TO THE PUBLIC?

Digital elevation data will be made available to the public and are projected to be available by next year. The Corps of Engineers is currently coordinating with the Engineering Research and Development Center, Cold Regions Research and Engineering Laboratory in Hanover, New Hampshire, to disseminate this data via the Internet. The data will reside in their native format (UTM Coordinates, which are easily converted to State Plane Coordinates). Procedures for obtaining these data will be provided to the Citizens' Public Involvement Group Chairperson for dissemination.

WHAT IS A STANDARD PROJECT FLOOD?

A Standard Project Flood (SPF) is a very large flood, but not the largest flood possible.

A SPF is a flood producing discharges that may be expected from the most severe combination of meteorologic and hydrologic conditions that are considered reasonably characteristic of the geographical region involved, excluding extremely rare combinations.

WILL A STANDARD PROJECT FLOOD PROFILE BE INCLUDED IN THE STUDY?

A Standard Project Flood (SPF) and SPF profiles will not be developed as part of the Flow Frequency Study. The Flow Frequency Study will develop flood profiles for the 2-, 5-, 10-, 50-, 100-, 200-, and 500-year flood events.

WILL "NO LEVEE OVERTOPPING" SCENARIOS BE CONSIDERED IN THIS STUDY?

Computation of flow profiles based on assumption of no levee overtopping is unrealistic and will not be considered in this study.

"The Floodplain Management Assessment of the Upper Mississippi River and Lower Missouri Rivers and Tributaries," U.S. Army Corps of Engineers, June 1995 (Appendix A) summarizes a range of additional levee scenarios, assumptions, and results. The "no levee overtopping" scenarios are included in Appendix A. Appendix A can be viewed as six .pdf documents (table of contents and one document each for Kansas City, Omaha, Rock Island, St. Paul, and St. Louis Districts) on the Flow Frequency Study's website at <http://www.mvr.usace.army.mil/pdw/pdf/FlowFrequency/flowfreq.htm>.

Further evaluation of the "no levee overtopping" condition may be considered when the scope of work is written for the Upper Mississippi River System Comprehensive Plan, a Corps of Engineers study to develop an integrated flood control strategy for the Upper Mississippi River.

WHAT IS THE IMPACT OF URBANIZATION?

Urbanization can increase flood flows for local streams and small drainage areas. However, typically, these local flows will enter the Mississippi River well before the peak flow of the Mississippi River occurs.

WOULD MORE WETLANDS BE A SOLUTION TO FLOOD REDUCTION?

Wetlands definitely impact more frequent (smaller flood) events. However, several studies (including "Proceeding of the Scientific Assessment and Strategy Team Workshop on Hydrology, Ecology, and Hydraulics," February 1994, Volume 5 of "Science for Floodplain Management into the 21st Century," 1997) show that for larger floods (such as the 1% flood, commonly referred to as the 100-year flood, and greater), the impact is negligible.

HOW DOES THE FLOW FREQUENCY STUDY AFFECT THE MISSOURI RIVER MASTER PLAN?

The Flow Frequency Study has not influenced the Missouri River Master Water Control (Master Manual) Review and Update Study. On the other hand, a change in the current Water Control Plan in the Master Manual, as a result of the Missouri River Master Water Control Study, could have an impact on the Flow Frequency Study.

The Master Manual is the guide used by the U. S. Army Corps of Engineers to operate the six dams on the main stem of the Missouri River: Fort Peck, Garrison, Oahe, Big Bend, Fort Randall, and Gavins Point. The Revised Draft Environmental Impact Statement, released in August 2001, identifies the impacts associated with six alternative operational plans for the Missouri River main stem dams and their reservoirs. The Missouri River Master Water Control (Master Manual) Review and Update Study is scheduled to be implemented in March 2003.

If an alternative other than the current Water Control Plan were adopted, it could have an impact on the Flow Frequency Study results for the Missouri River below Gavins Point Dam, such as slightly higher discharges for the more frequently occurring floods.

HOW WILL THE PUBLIC FIND OUT ABOUT THE STUDY'S FINDINGS?

A public open house will be held in each State (currently planned for the fall of 2002). The purpose of the open houses will be to explain the reason for and the findings of the Flow Frequency Study to the general public. Study team members will be available to discuss the study's findings with each attendee on a one-to-one basis.

The draft study report also will be available for review on the Flow Frequency Study's website or at libraries at the Corps

of Engineers Districts participating in this study: Kansas City, Omaha, Rock Island, St. Louis, and St. Paul. Information on other locations where the draft report will be available for review and on how to obtain a report will be made available next fall.

HOW MANY NEWSLETTERS HAVE BEEN ISSUED TO DATE?

Four newsletters have been issued: December 1997, February 1999, November 1999, and December 2000. The newsletters have been sent to a mailing list of over 3,000 names, including congressional interests; Federal, State, county, and city representatives; drainage district representatives; businesses; organizations; environmental interests; media; and the general public. These newsletters, as well as other study information, are available on the Flow Frequency Study's website: <http://www.mvr.usace.army.mil/pdw/pdf/FlowFrequency/flowfreq.htm>.

Should you want a paper copy of any or all of these newsletters, or should you or someone you know want to be added to the study's mailing list, please contact Ms. Sue Simmons at 309/794-5573, FAX at 309/794-5883, email at suzanne.r.simmons@usace.army.mil, or write to the following address:

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WHO CAN I CONTACT IF I HAVE A QUESTION?

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