

Upper Mississippi River System Hydraulic Model Update

We appreciate your interest, questions, and comments. We have addressed the questions and comments that pertain to the updated HEC-RAS model scope of work. The completed updated HEC-RAS model will provide a base condition hydraulic model that would require modifications for various hydraulic modeling applications (sediment, water quality, etc.)

Questions/Comments and Answers

- 1. Question:** How will model parameters be determined?
The updated HEC-RAS model parameters will be determined by the technical team using standard modeling practices, professional judgment, and through calibration of the model to observed data. The model parameters will be reviewed by the technical review team.
- 2. Question:** How is the HEC-RAS model going to reflect the requirements for the National Flood Insurance Program?
Federal and State agency partner collaboration will include how programs can be aligned for regulatory uses.
- 3. Question:** How will the model reflect the encroachments above the “base flood elevation”? How will the 200-year or 500-year flood flow be shifted by levees on only one side of the river?
Floodplain topography and significant features (levees, road embankments, etc.) will be included in the model up to elevations that exceed the 500-year (.2%) event. The levied areas are generally modeled as storage areas connected to the main channel by overflow, lateral weirs.
- 4. Question:** Will levee breaches be part of the modeling?
Yes, the model will consider a full range of flows up to and including events exceeding the “base” flood event. Breach parameters will be discussed by the technical team.
- 5. Question:** Who will have access to an electronic copy of the model?
The updated HEC-RAS model will be available to the public in addition to all Federal, state, and local communities and their engineering consultants. During model implementation, a process will be developed to maintain the updated model, document model updates, communicate updates to the public. The need for a model update would be identified by significant changes in the system hydrology or topographic features.
- 6. Question:** Will the operation of the river system reflect opinions and concerns expressed by the local communities?
The dam operating routines included in the model will reflect operational practices contained in the currently approved water control manuals. This effort would not include revisiting or otherwise updating the existing water control plans.
- 7. Question:** Will the USACE be continuously updating the model to account for changes in the river system, both flow and physical changes in the river? What mechanism triggers model review?
Federal and state users of the model will periodically evaluate when the HEC-RAS model will need updating. The need for a model update would be identified by significant changes in system hydrology or topographic features.
- 8. Question:** The HEC-RAS model has components for sediment transport modeling, water quality modeling, as well as steady and non-steady state flow modeling. What goals has the USACE considered for using these other components of the model?
The updated HEC-RAS model could provide a base condition for future sediment transport modeling, water quality modeling as well as steady state flow modeling, if desired.
- 9. Question:** How do you plan on modeling a floodway considering the different state’s floodplain regulations?
The updated HEC-RAS model could provide a base condition for future flow frequency studies and follow-on floodway computation, collaboration and coordination, if desired.

- 10. Question:** What programs could possibly fund this effort?
The USACE team will seek funding from multiple sources including: The Upper Mississippi River Comprehensive Plan, Corps Water Management System (CWMS), Planning Assistance to the States (PAS), and Floodplain Management Services (FPMS) Silver Jackets.
- 11. Question:** Will all submerged structures (i.e. wing dams, chevrons, etc.) be included in the model?
HEC-RAS does not attempt to model the near-field, multi-dimensional effects of river training Structures; rather, the model incorporates the observed river geometry bathometric data which reflects the impacts of these structures on the river morphology. **[CHECKING W/ MVS OC]**
- 12. Question:** Is there a process for continuous updates to the base model to fix problems and/or errors that are discovered after the model is released?
Future updates require a source of funding. As stated for Question 7, Federal and state users of the model will periodically evaluate when the HEC-RAS model will need updating. The need for a model update would be identified by significant changes in system hydrology or topographic features. Updates required to support water management will be made through future Operation and Maintenance funding. Other modifications to the model will require project funds related to the purpose of the changes.
- 13. Question:** The newest HEC-RAS software has not been made available to the public community at this point. How can we be sure that the scope of work outlined for this model is achievable with the software that will become available?
The completed model will use HEC-RAS software which is available to the public:
<http://www.hec.usace.army.mil/software/hecras/>
- 14. Question:** No new data collection is proposed. However, there may be instances where the regulator or regulated communities know the existing data is inaccurate. Will there be a process to update the "final" model with that new information? What about Quality Assurance/Quality Control (QA/QC)?
During updated HEC-RAS model implementation, a QA/QC review process will be developed as well as a process to update existing data.
- 15. Question:** Understanding the modeling will be as accurate as possible and use current levee and bridge data to the extent possible, will there be an outreach effort requesting updated survey data to be provided by others who may have more recent survey data, for example?
During implementation, outreach for updated bridge and levee elevation data will be accomplished and only data certified by a licensed land surveyor will be included in the updated model where appropriate.
- 16. Question:** For ecological questions, we generally want to know where water goes within the floodplain as discharge rises, water velocities, water depths, and how long water remains in depressions, floodplain lakes, and behind levees as discharge drops. Desired model outputs regarding inundation include number of days inundated (and continuously inundated), current velocity, and depth of inundation. Are these capabilities and outputs you expect to include in the new model?
The updated HEC-RAS model can provide a variety of outputs related to ecological analyses. Consultation with a trained and experienced hydrologic modeler should be conducted to determine whether the updated model is appropriate for the required analyses.
- 17. Question:** Ecological questions often require assessments at different spatial scales of interest, such as a reach, pool, section of a pool, or the scale of a single habitat rehabilitation project. Will the new system-wide model be able to be downscaled to address issues at the scales listed above? If so, will the user be able to do the downscaling, or will they need to come to Corps model developers for downscaling?
The updated HEC-RAS model can be broken down to pool reaches; however, the modeler would need to use the appropriate upstream and downstream boundary conditions for that specific pool reach. Additional downscaling may require the use of other modeling programs. Consult a trained and experienced hydraulic modeler to determine these requirements.

- 18. Question:** Who will be able to run the model? Will it require a model developer to conduct model runs or will the model include a user friendly interface so it can be run by scientists or managers in workshops?
- An experienced HEC-RAS hydraulic modeler will be able to run the model. It is important to have an experienced hydraulic modeler to assure appropriate use of the model inputs and modeling results. Most likely a scientist or manager would not have the training or experience to make modeling run in a workshop setting.
- 19. Question:** A valuable use of modeling is to explore alternative actions and “what if” scenarios and compare them to baseline or “no action” options. Alternative actions and scenarios often involve modifying structures in channels or the floodplain (islands, closing dikes, levees, levee breaches, wing dikes, etc.), running the model under a sequence of user-defined hydrographs, modifying dam operations, etc. Will these sorts of modifications to model geometry, model inputs, or dam control be possible in the new model? If so, could the user make these modifications or will a model developer need to make them?
- Alternatives can be modeled by modifying the updated HEC-RAS model. The alternative would need to be incorporated into a copy of the base condition (i.e. existing condition model) by a hydraulic modeler that has HEC-RAS modeling training and experience.
- 20. Question:** Do you expect the model to include sediment transport (suspended and/or bed load), now or in the future?
- The completed updated HEC-RAS model will provide a base condition hydraulic model that would require modifications for various hydraulic modeling applications (sediment, water quality, etc.) by an experienced HEC-RAS hydraulic modeler with the appropriate HEC-RAS modeling training.
- 21. Question:** How will model assumptions, development, and computational results be reviewed?
- Similar to the Upper Mississippi River System Flow Frequency Study, the HEC-RAS model update will be a coordinated effort involving the Corps of Engineers; the Federal Emergency Management Agency; the National Weather Service; and the U.S. Geological Survey; the States of Illinois, Iowa, Minnesota, Missouri, and Wisconsin; and interested private individuals as members of the public involvement group. In addition, technical advisory groups consisting of nationally-renowned experts will be formed to help address the complex issues of hydrology and hydraulics. The study will also include comprehensive quality assurance, quality control, and independent technical reviews through several iterations and levels of review.