

E-10

MAYNORD

**DRAFT CONCLUSIONS ON
EVALUATION**

Draft Conclusions on Evaluation- 06 June 02

Conclusions and Recommended Capabilities and Limitations

The micro model, because of its small size and totally empirical design/operation, is different from previous MBM and does not fit into Graf's two categories of empirical or rational models. *— why different (see pg. 392 next to la. 9)* In addition to its size of as little as 4 cm channel width, differences which place the micro model in a category by itself are large vertical scale distortion, large Froude number exaggeration, and no correspondence of stage and discharge in model and prototype.

The use of the micromodel has been broken into 4 areas that depend on the capabilities of the micro model and the consequence of the model being wrong as follows:

- Demonstration/Education/Communication
- River Engineering- Qualitative
- River Engineering- Quantitative
- Navigability/Hydraulics Structures/Flow Details

This evaluator concludes that the micro model is an effective tool for the first area, Demonstration/Education/Communication.

This evaluator concludes the micro model should not be used for the 3rd and 4th areas, River Engineering-Quantitative and Navigability/Hydraulic Structures/Flow Details. This conclusion is based on:

- Model stages and discharges do not correspond to the prototype — *Can we relate to this?*
- Large vertical scale distortion and Froude number exaggeration
- Inability to achieve good verification in some previous micro model tests — *Some problems with some*
- Conclusions from consultant on applicability to only laterally constrained reaches
- Differences in Kate Aubrey plan tests
- Lack of repeatability of Kate Aubrey traditional micro model tests — ?
- Poor replication of currents in Vicksburg Front model
- Relatively low maximum stage used in ^{50m} micro model → *Nacogdoches P&T — EOL/WRP*

Unknown % flow splits in divided channel reaches

Unknown flow characteristics through notches/dikes

To this evaluator, the most difficult part of this evaluation is the determination of the applicability of the micro model in the 2nd area of River Engineering- Qualitative. This area is primarily use of the model as a screening tool. Because the micro model is totally empirical, the verification is the source of all confidence in the model. Without a good verification, the micro model should not be used as a screening tool. A good verification includes reproduction of the problem being addressed, reproduction of the plan view thalweg position within and upstream of the problem area, and no large deviations in bed elevations within and upstream of the problem area. The 3-step verification process used by Vernon-Harcourt is recommended for all micro models. Several study topics appear to be difficult to address in the micro model and include:

- 1) sharp bends- this conclusion based on Vicksburg Front model and bends in White River studies. This is almost certainly due to the large distortion
- 2) divided flow reaches- this conclusion based on Savannah Bay and Wolf Island Bar studies. Without measuring flow splits and not knowing discharge characteristics of model closure structures, flow in side channels is likely in significant error.
- 3) Reaches without lateral confinement.

Flow splits in side channels are likely to be significant. Without measuring flow splits and not knowing discharge characteristics of model closure structures, flow in side channels is likely in significant error.