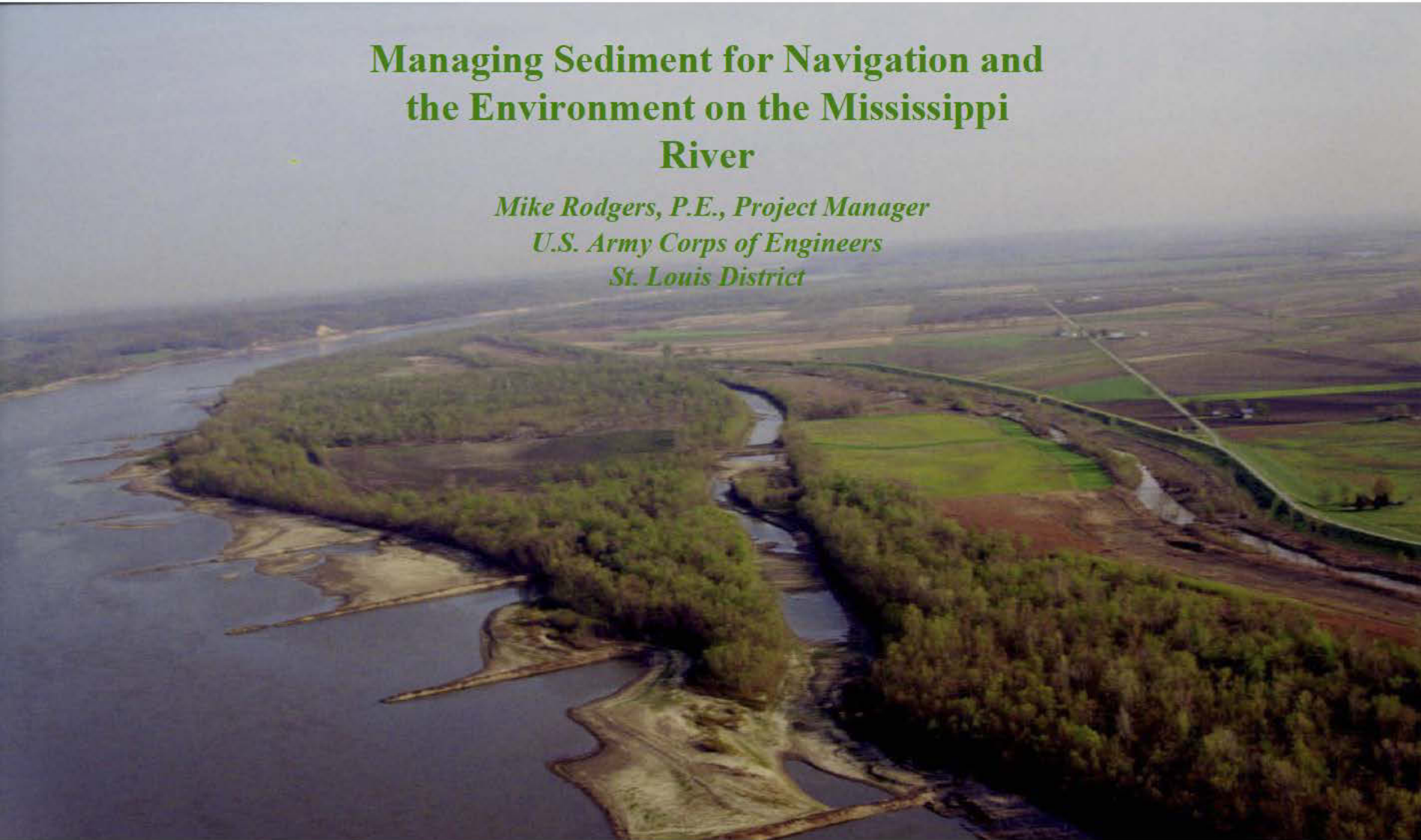




## Managing Sediment for Navigation and the Environment on the Mississippi River

*Mike Rodgers, P.E., Project Manager  
U.S. Army Corps of Engineers  
St. Louis District*



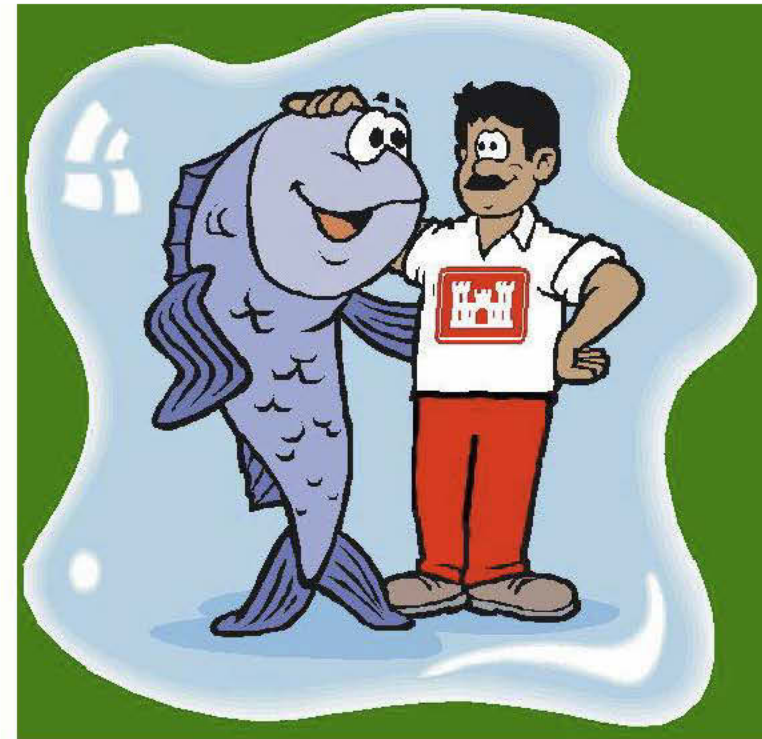


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# The Objective

Develop a Reliable, Safe and Environmentally Sustainable Navigation Channel







## The Design

9 feet (3m) deep, 300 feet (100m) wide,  
with additional width in bends as required





# US Army Corps of Engineers



2 football fields long

9 feet deep

'94 5 11

Building a Stronger Future





US Army Corps of Engineers



# Primary Authority Maintain Navigation Channel





# While Minimizing the Impact to the Environment

Least Tern



Pallid Sturgeon







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# Historical River Training Methodology





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# Traditional Far Field Sediment Management







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# Modern Far Field Sediment Management



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## Bolter's Bar RM 225

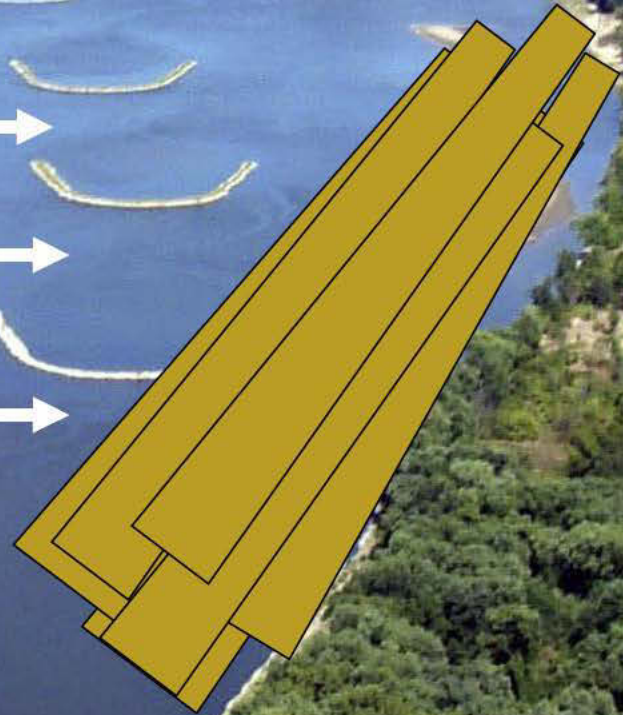
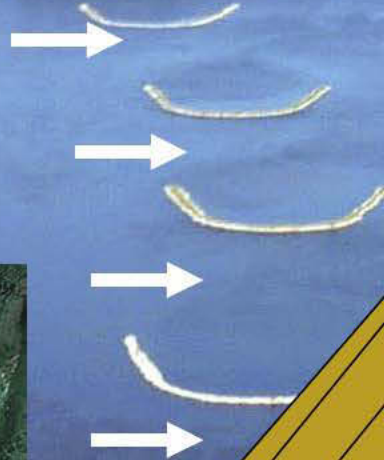
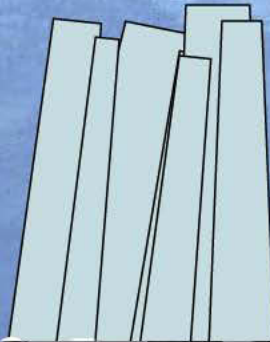








2002 Construction - \$1.5 mil







US Army Corps of Engineers



# St. Louis Harbor Chevrons



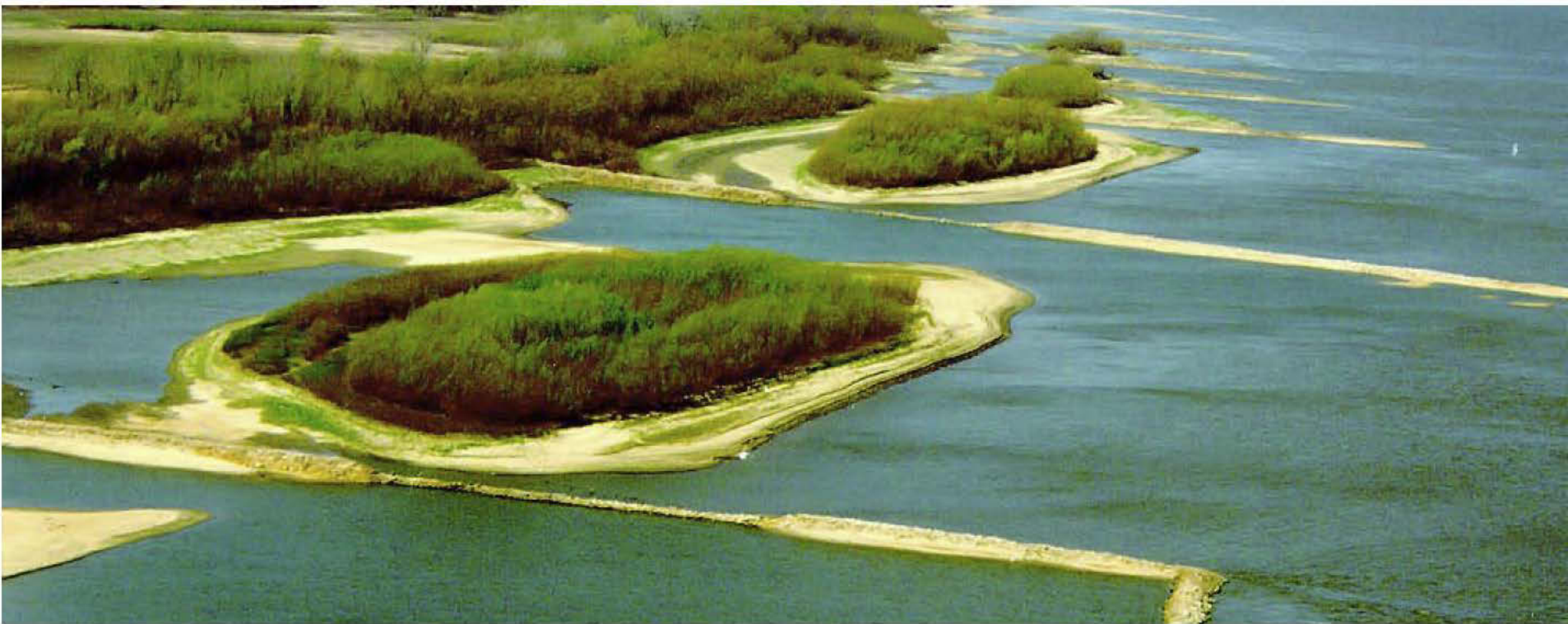
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# Notched Dikes



*Building Strong*





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# Rootless Dikes





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# Bullnose Revetments



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# Alternating Hardpoints





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# Offbank Revetments





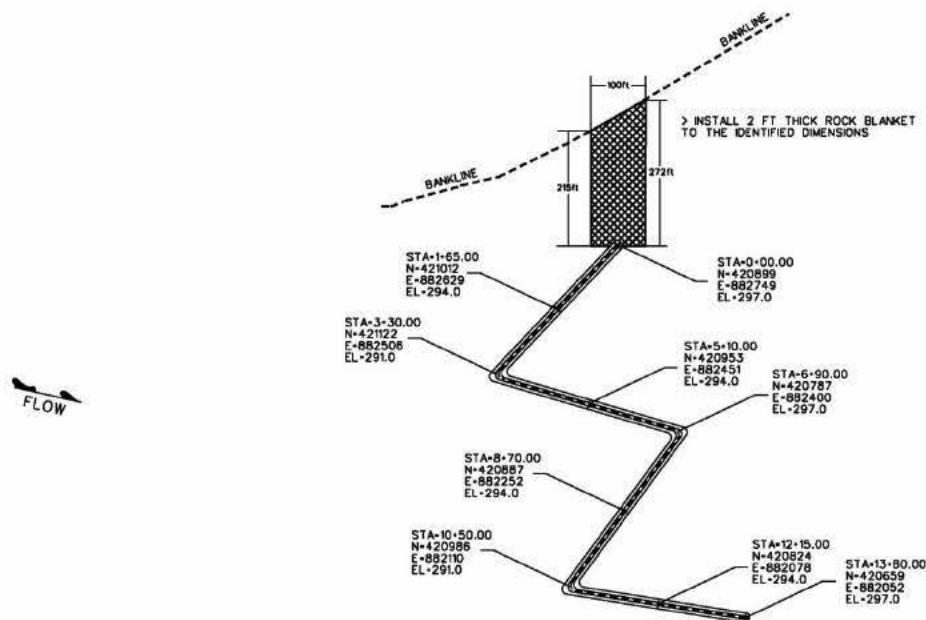


## “W” Dikes

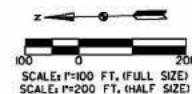




# US Army Corps of Engineers



W-DIKE 4.2 L



US Army Corps  
of Engineers  
St. Louis District

REVISION BLOCK

U.S. Army Engineer Division	Corps of Engineers	Upper Mississippi River Basin	PT 88 MISS	RIVER MILES 26.8 - 8.8
U.S. Army Engineer Division	Corps of Engineers	Upper Mississippi River Basin	PT 88 MISS	RIVER MILES 26.8 - 8.8
U.S. Army Engineer Division	Corps of Engineers	Upper Mississippi River Basin	PT 88 MISS	RIVER MILES 26.8 - 8.8

ELIZA PT / GREENFIELD BEND  
RIVER MILES 26.8 - 8.8  
MISSISSIPPI RIVER  
STONE DIKE CONSTRUCTION AND MODIFICATION  
CONSTRUCTION PLATE 4.2 (L)

PLATE  
NUMBER  
W-UN-26/R-15



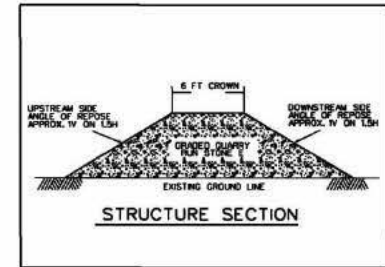


# US Army Corps of Engineers

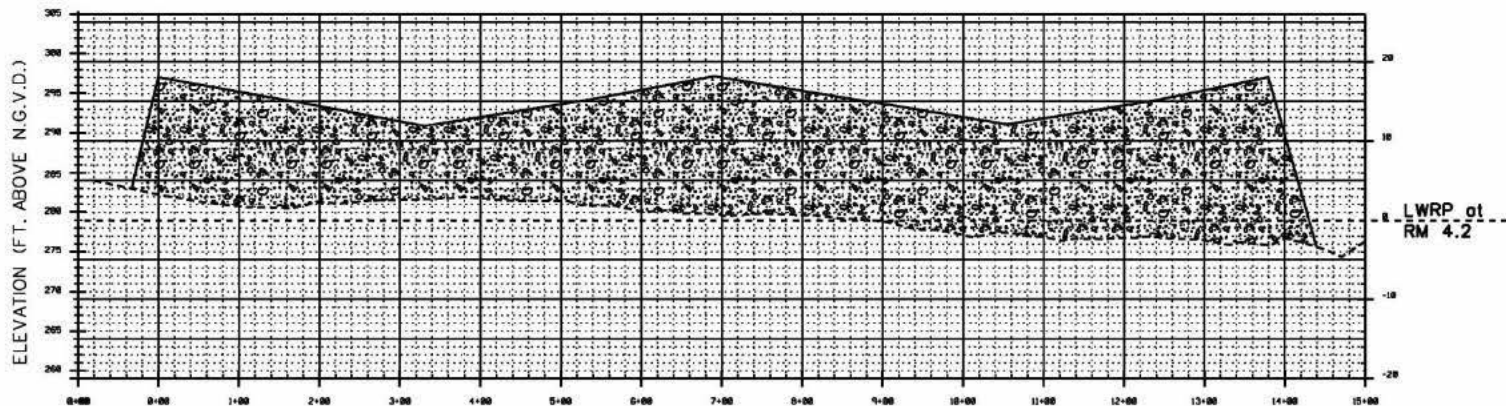


GAGE RECORD				
	WATER SURFACE		THOMPSON	BROS PT
ZERO N.G.V.D.			280.0	274.5
MILE			20.2	2.0
L.W.R.P.			289.0	277.9

ELEVATIONS ARE REFERRED TO N.G.V.D. - CONTOURS ARE BELOW 1956-57  
LOW WATER REFERENCE PLANE (L.W.R.P.) (54,000 C.F.S.)



W-DIKE 4.2 L LOOKING DOWNSTREAM



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St. Louis District

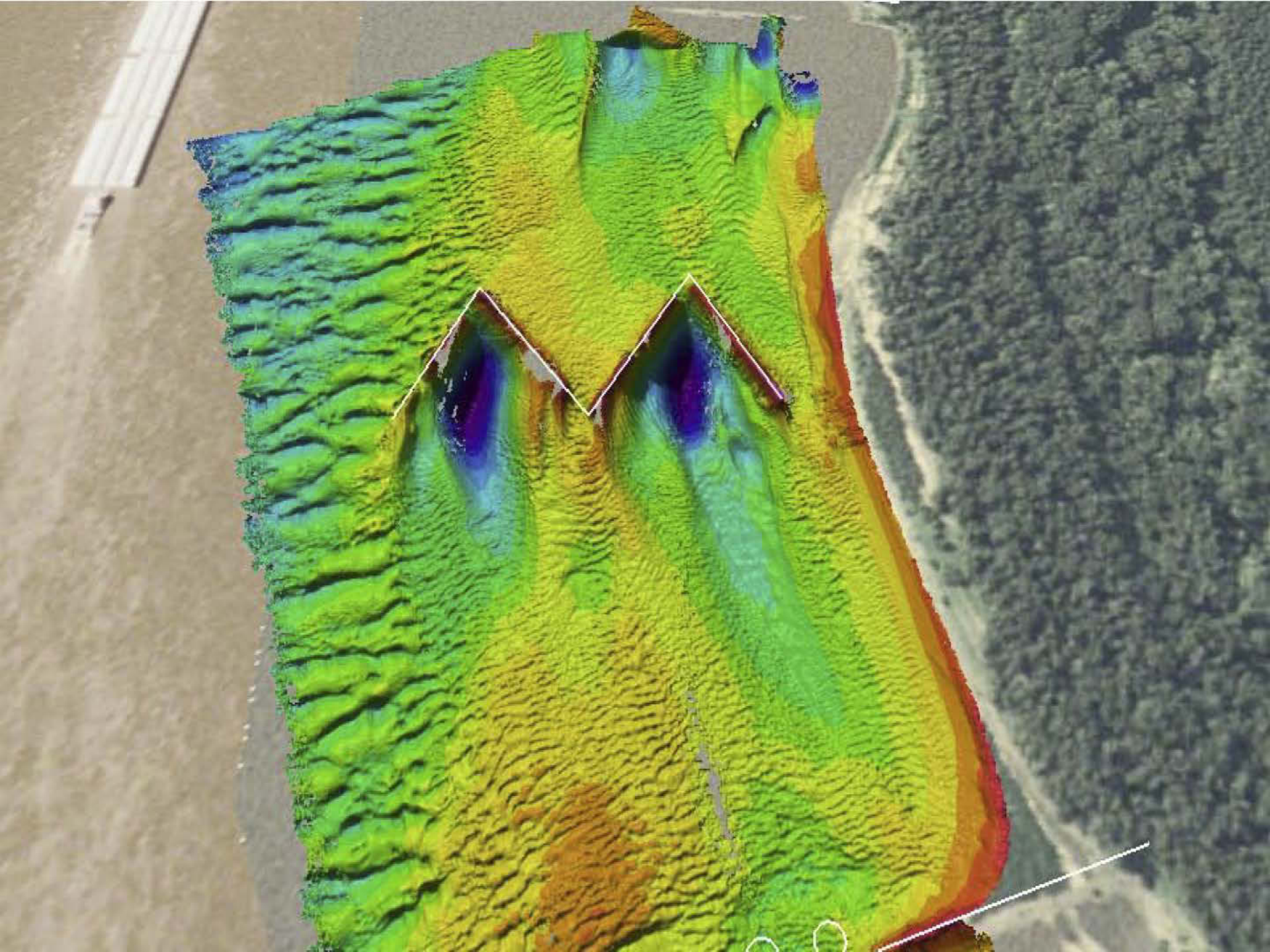
REVISIONS

DESIGNED BY: [blank]  
CHECKED BY: [blank]  
APPROVED BY: [blank]  
DATE: [blank]  
PROJECT: [blank]  
SHEET: [blank]

ELIZA PT / GREENFIELD BEND  
RIVER MILES 20.0-20.2  
MISSISSIPPI RIVER  
STONE DIKE CONSTRUCTION AND MODIFICATION  
CONSTRUCTION OF DIKE 4.2 (L)  
PROFILE VIEW

PLATE  
NUMBER  
N-101-28/R-16







# Navigating Bends “Flanking”



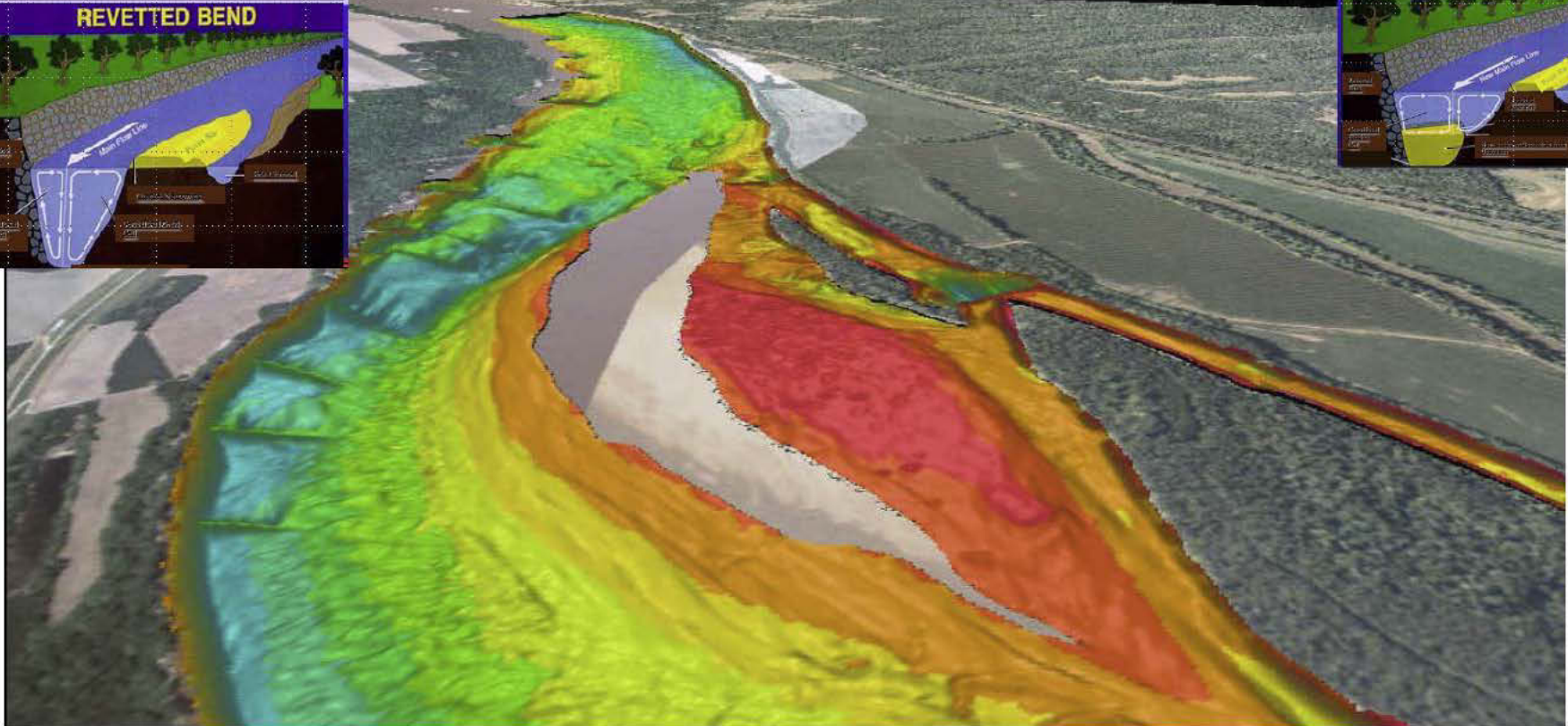
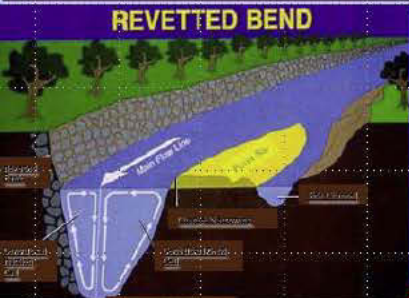




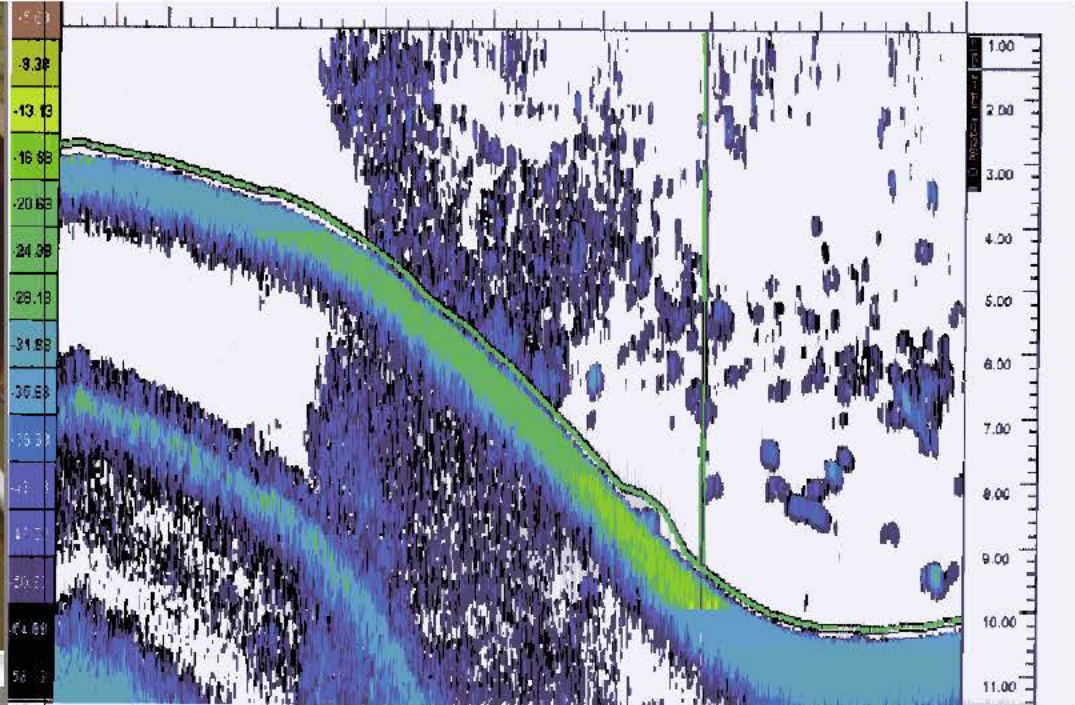
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# Bendway Weirs











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# Side Channel Enhancement Alternating Dikes







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# 1950 to 1993 Environmental Plan Formulation on the Mississippi River “Title Bouts”

Biologist

Engineer







# HSR Modeling





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# Incorporates Partners with Engineering Alternatives



*Building Strong*



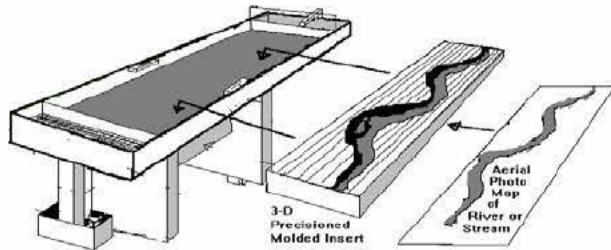


# Moveable Bed Models

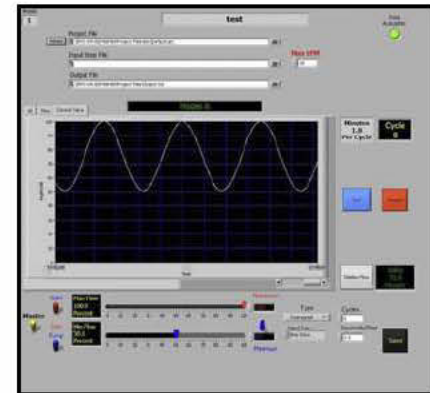




MICRO MODEL INSERT



## HSR Model Basics

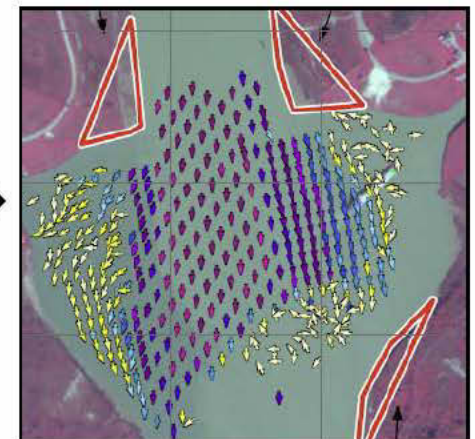
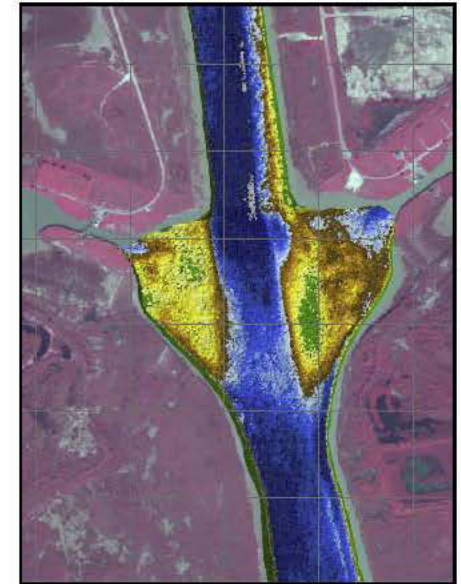


Model Entrance

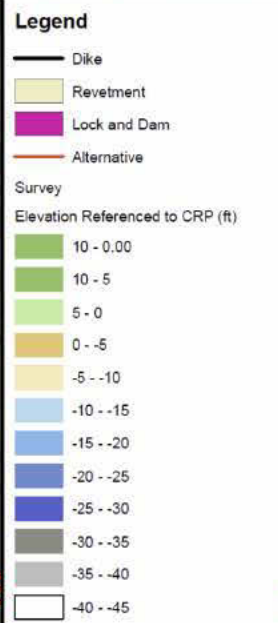
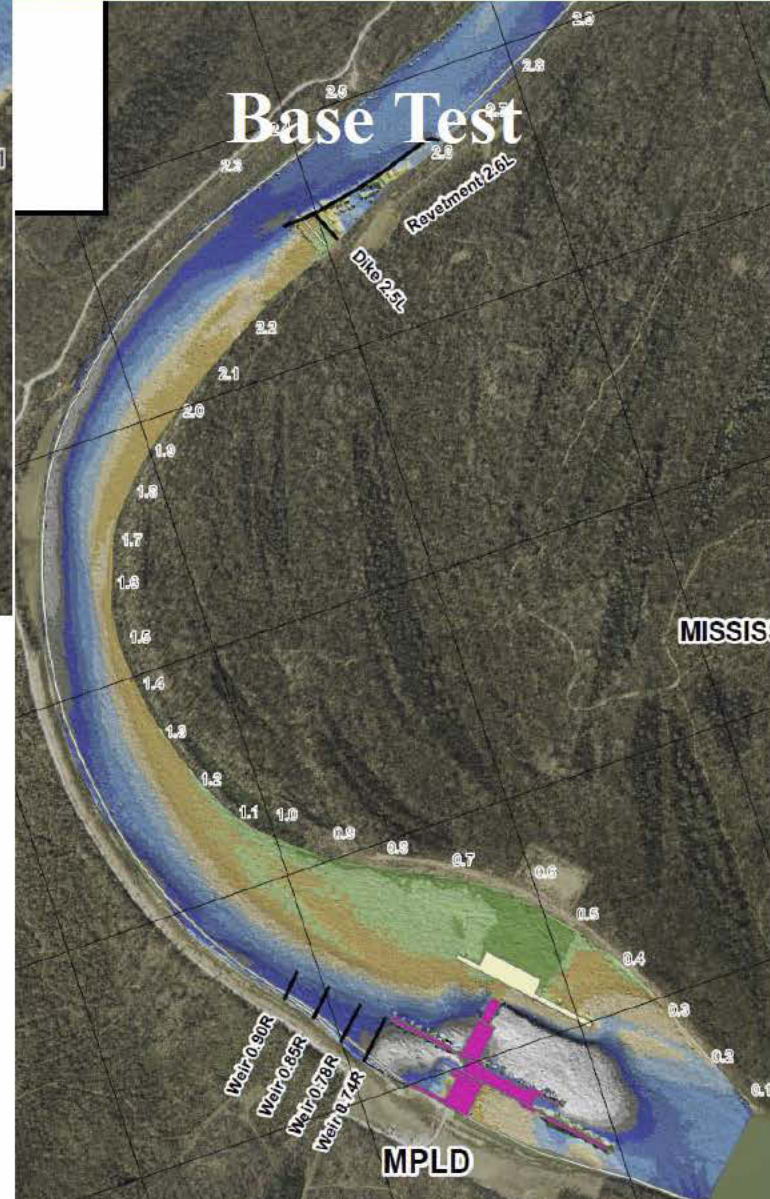
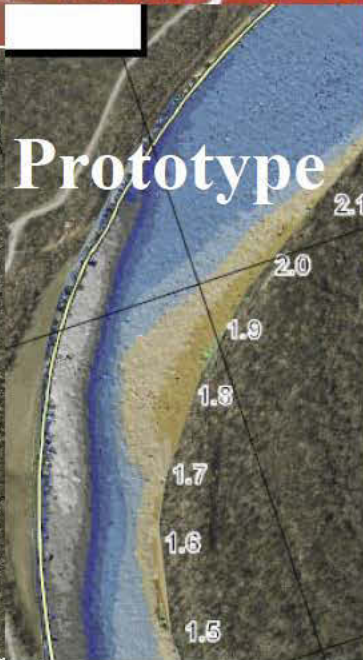
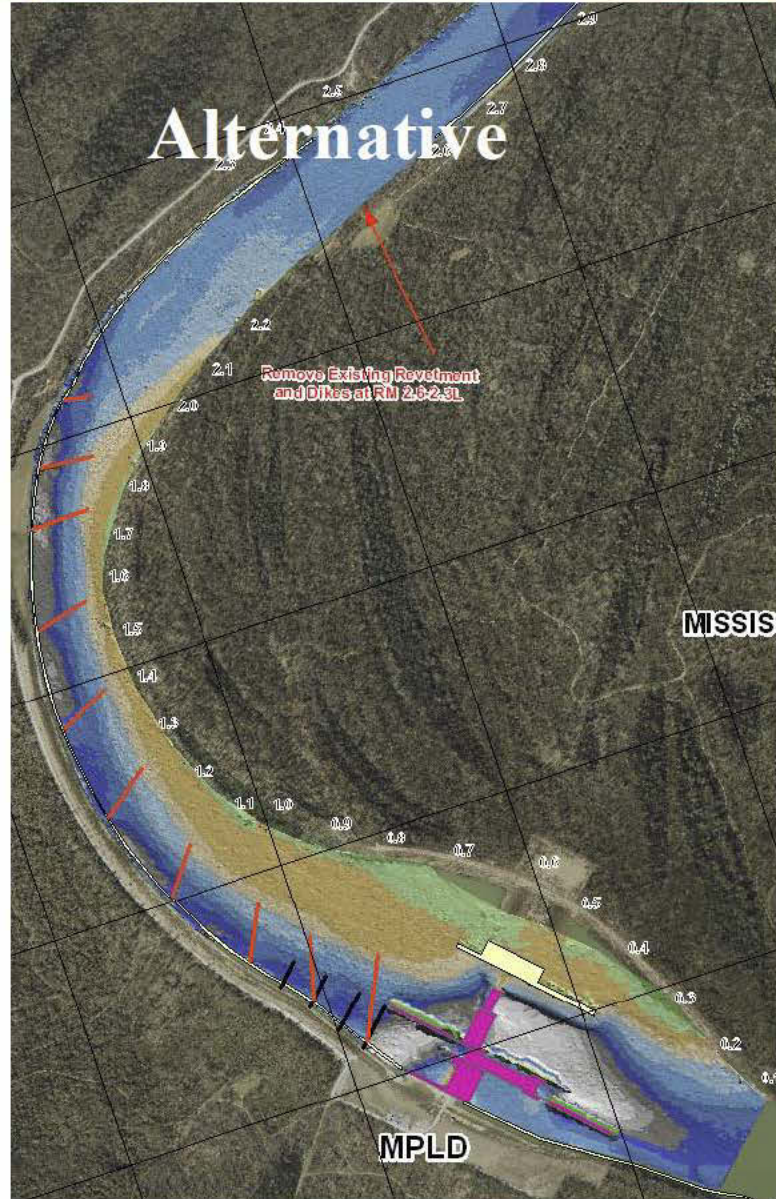




## HSR Model Basics

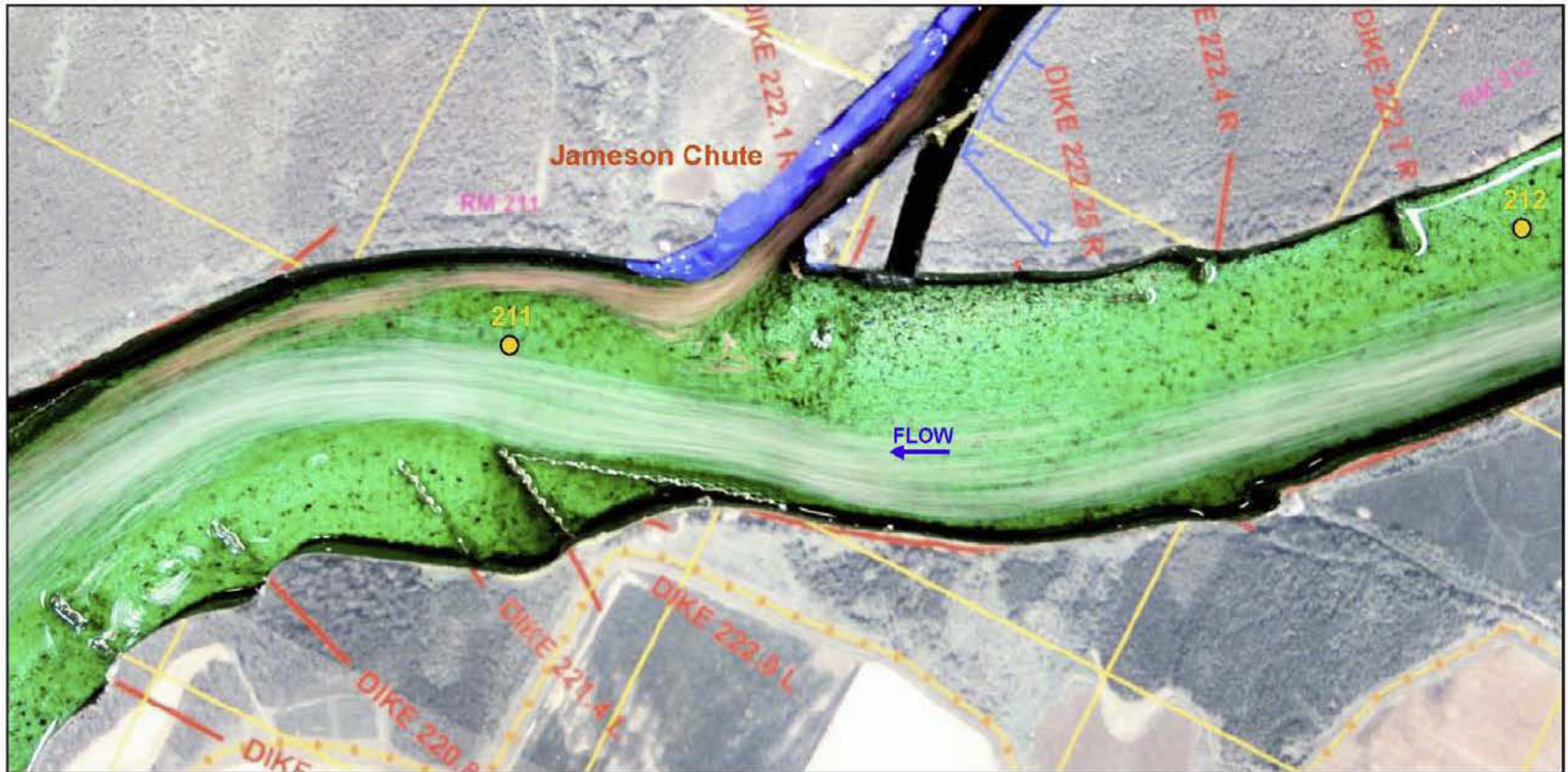








## Flow Visualization





## Questions

