RAS 2025

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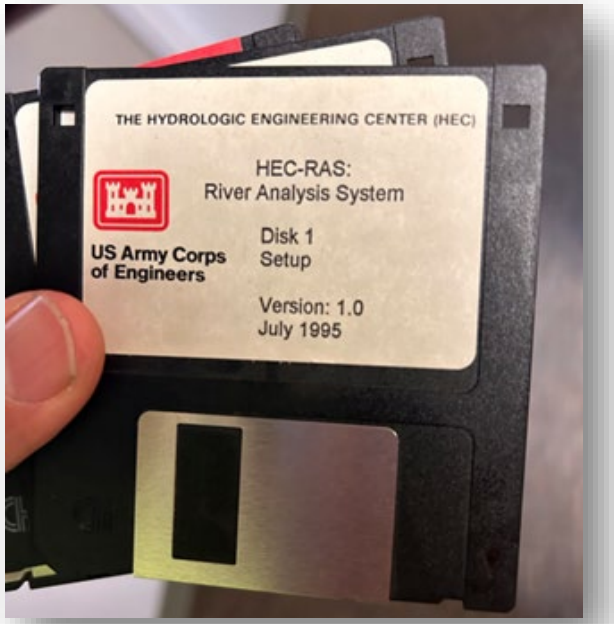
Outline

- Motivations for an HEC-RAS rewrite
- Objectives for the week
- HEC-RAS 2025 preface with case studies
- Development and training timeline

Why Move to HEC-RAS 2025?

- HEC-RAS has been in the wild for 30 years!
- Over those years we've tacked on loads of features to this foundation
- Codebase expanded to 4 different programming languages



- Fresh start in RAS 2025:
  - Simplify into a cohesive, sustainable codebase
  - Leverage lessons learned from previous development
  - Design with modern tech in mind

HEC-RAS Rewrite Motivation

Threats	Opportunities

Technical Debt
• 3 million lines of code concatenated over decades in multiple languages is fragile
  • Bugs are difficult to find
  • New features are more expensive (and becoming untenable because they create bugs)
	Design RAS for Modern Applications and Workflows
	• Geospatial first
	• Lead with 2D, 1D as necessary instead of the opposite.
	• New meshing paradigms (much more on this later).
	• “Breakline Obedience”

Legacy Technology No Longer Sustainable • VB could push a patch making applications no-longer functional on USACE machines • Cannot hire FORTRAN programmers	**Leverage New Technology and Data** • Multi-Core/SSD Machines, Full-Time Internet Connection, and Cloud Computing all predate current architecture and are difficult to accommodate through retrofits • GPU • USGS, NWS, NOAA, USDA, NASA, USACE Data all available online and served through APIs.
1D-2D Discontinuity • 1D is Finite Difference (less stable) and 2D is Finite Volume. The “hand off” between these in 1D-2D models can be unstable (and impossible for the constituent models: sediment and water quality)	**Flexibility and Stability** • FV ←→ FD connections are unstable, let’s stop that. • Build seamless 1D-2D constituent models, and open the opportunity for intermediate complexity models (e.g. 3-cell “stream tube” models)

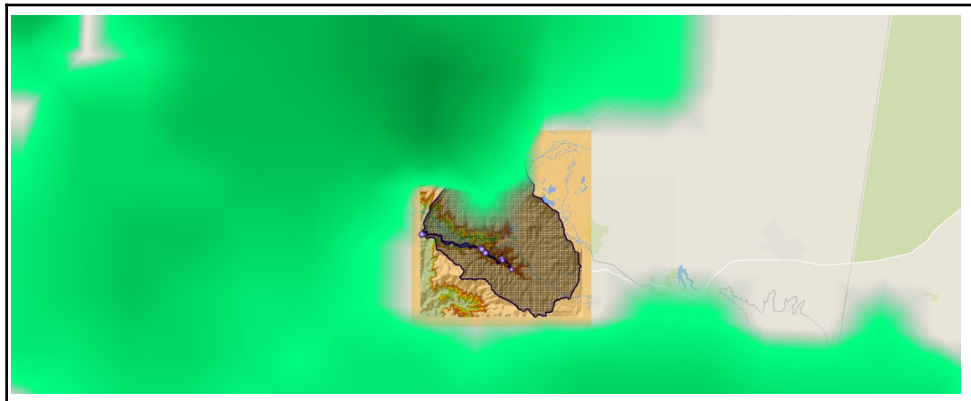
Objectives of the week

- Familiarize with HEC-2025
- Project management
- Conceptual Mesh
- Computational Mesh
- Boundary Conditions
- Plans
- Viewing Results
- Exporting Meshes to 7.0

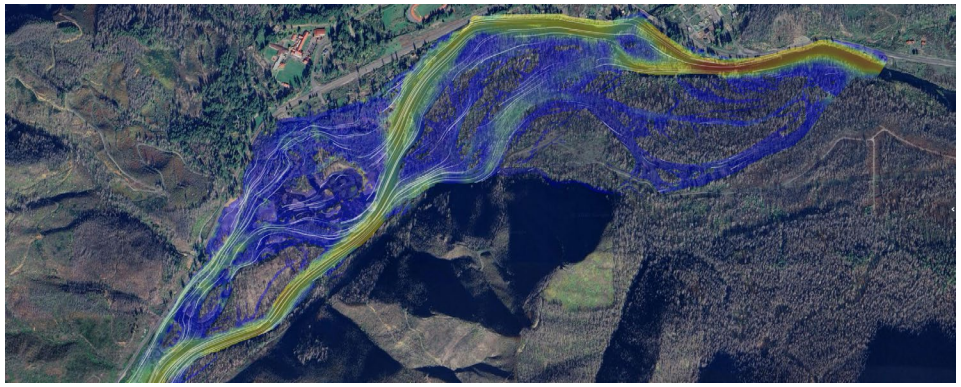
- **Goal of the week is to learn how to make a computational mesh in 2025 for use in 7.0**

- We are looking for feedback on version 2025 and this new class

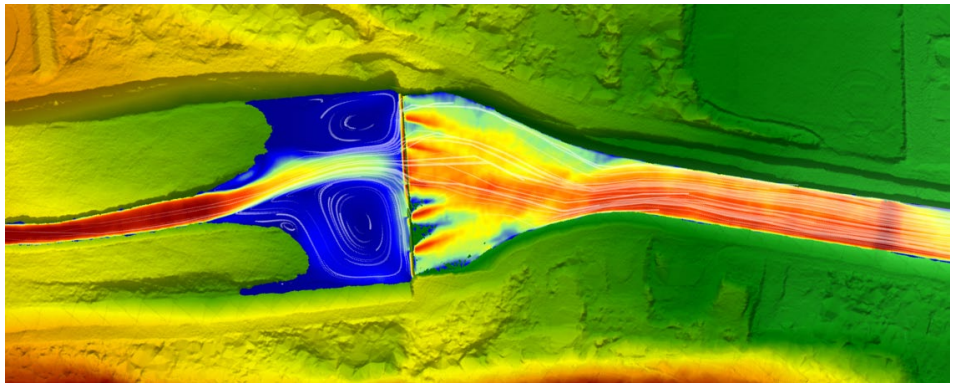
Three Brief Case Studies



Gila – Watershed Scale



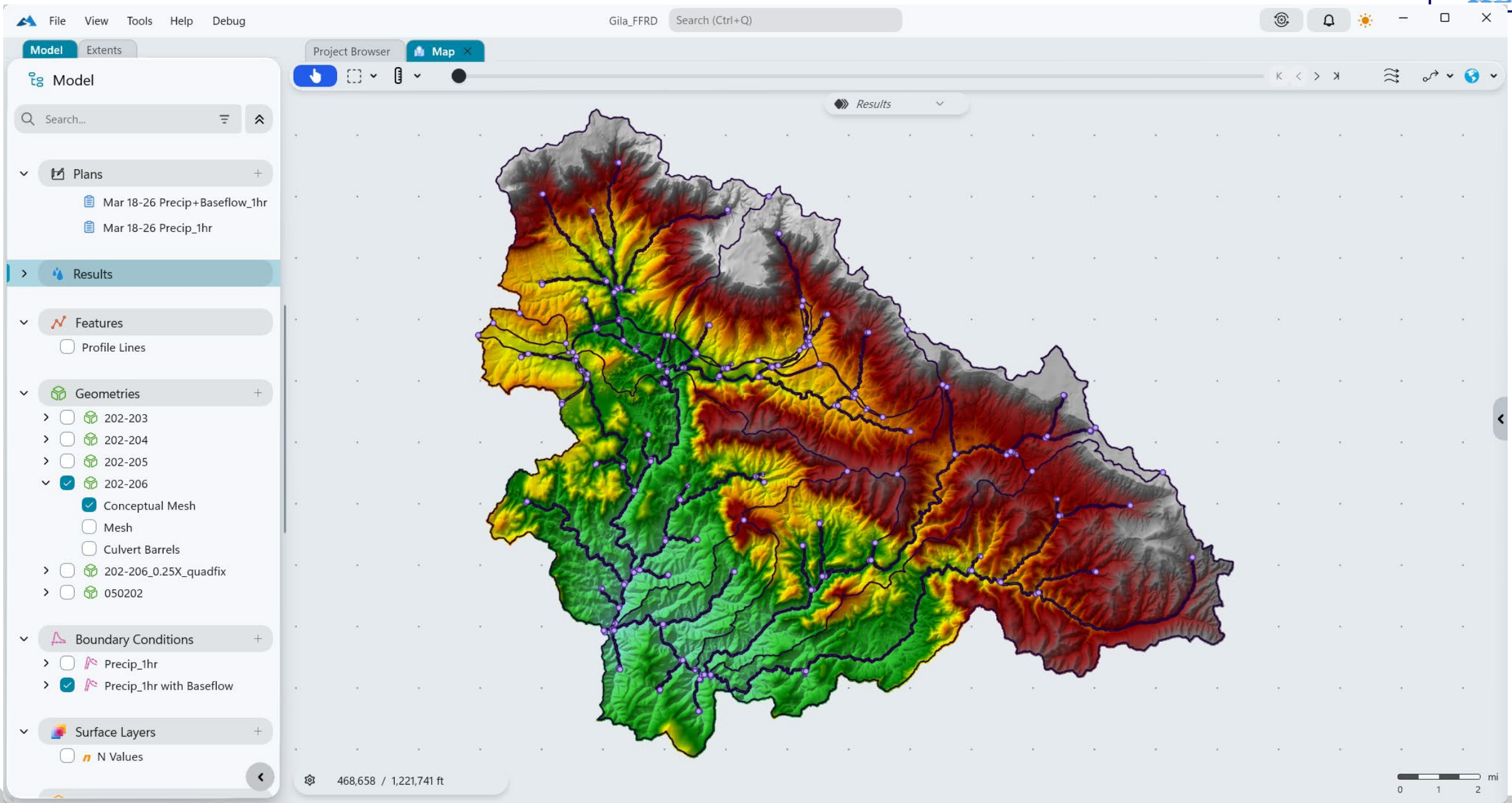
McKenzie – Complex Rivers



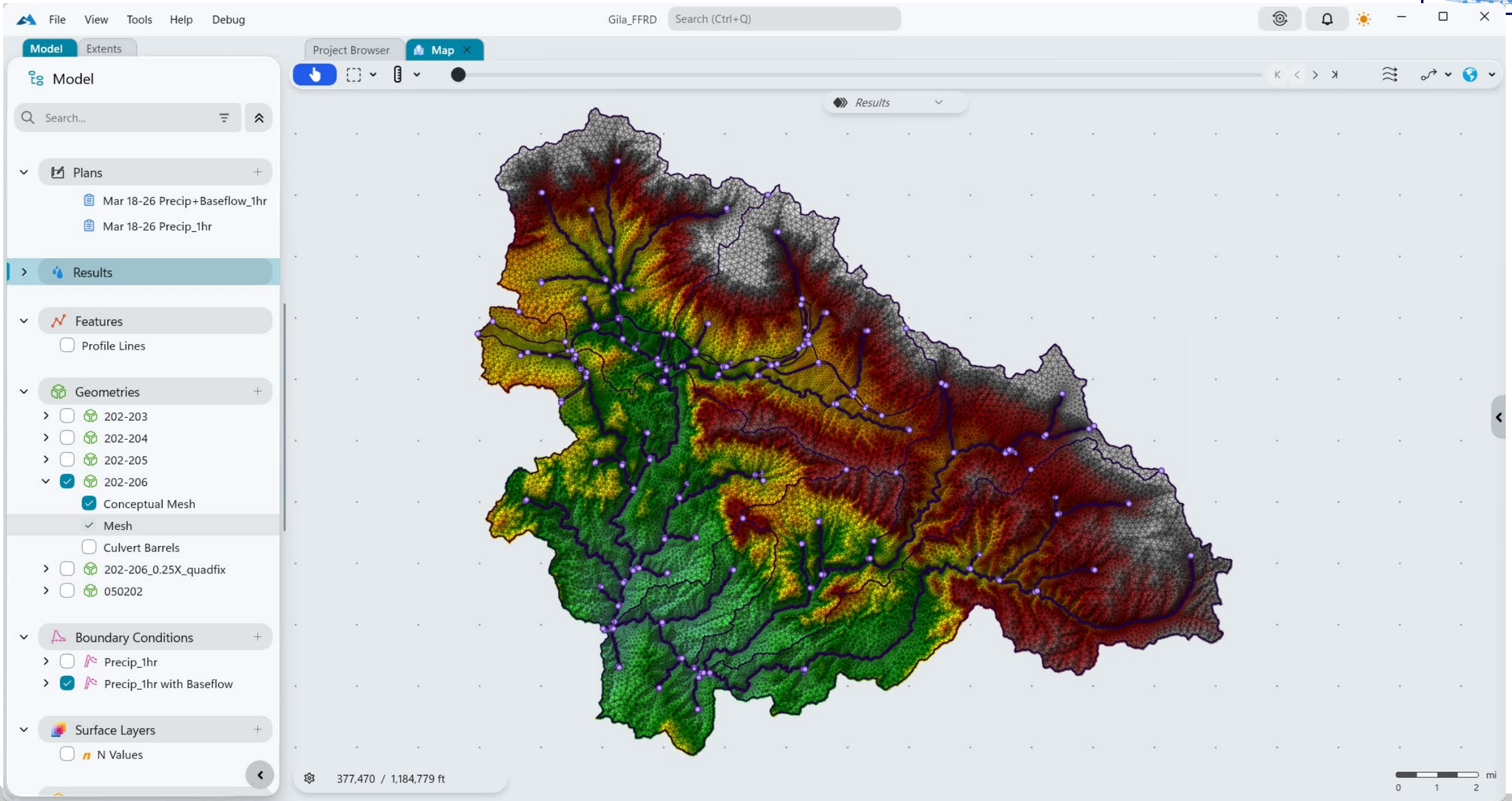
Iao – Hydraulic Structures

(Present and Future)

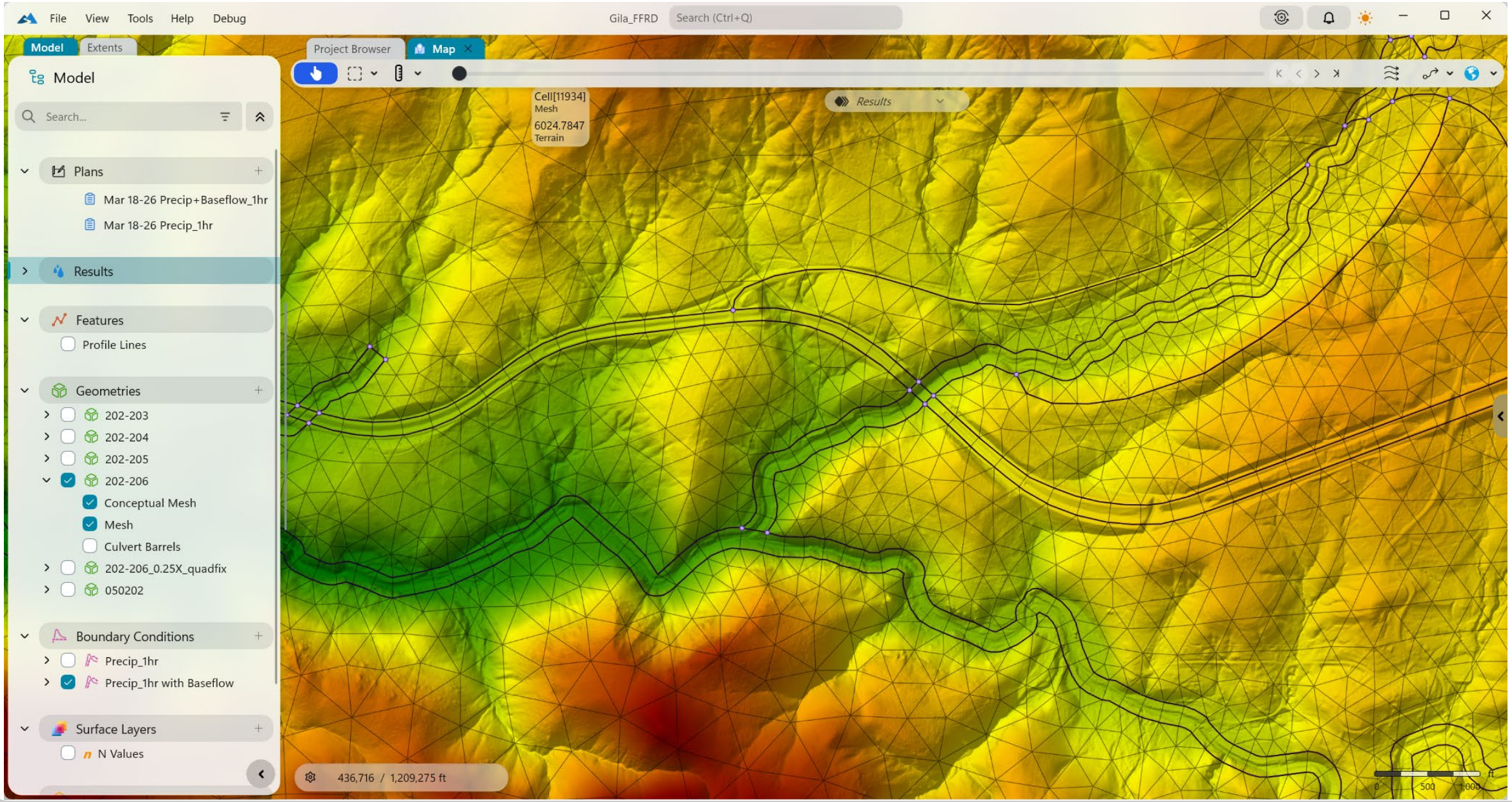
Gila Watershed – Conceptual Model



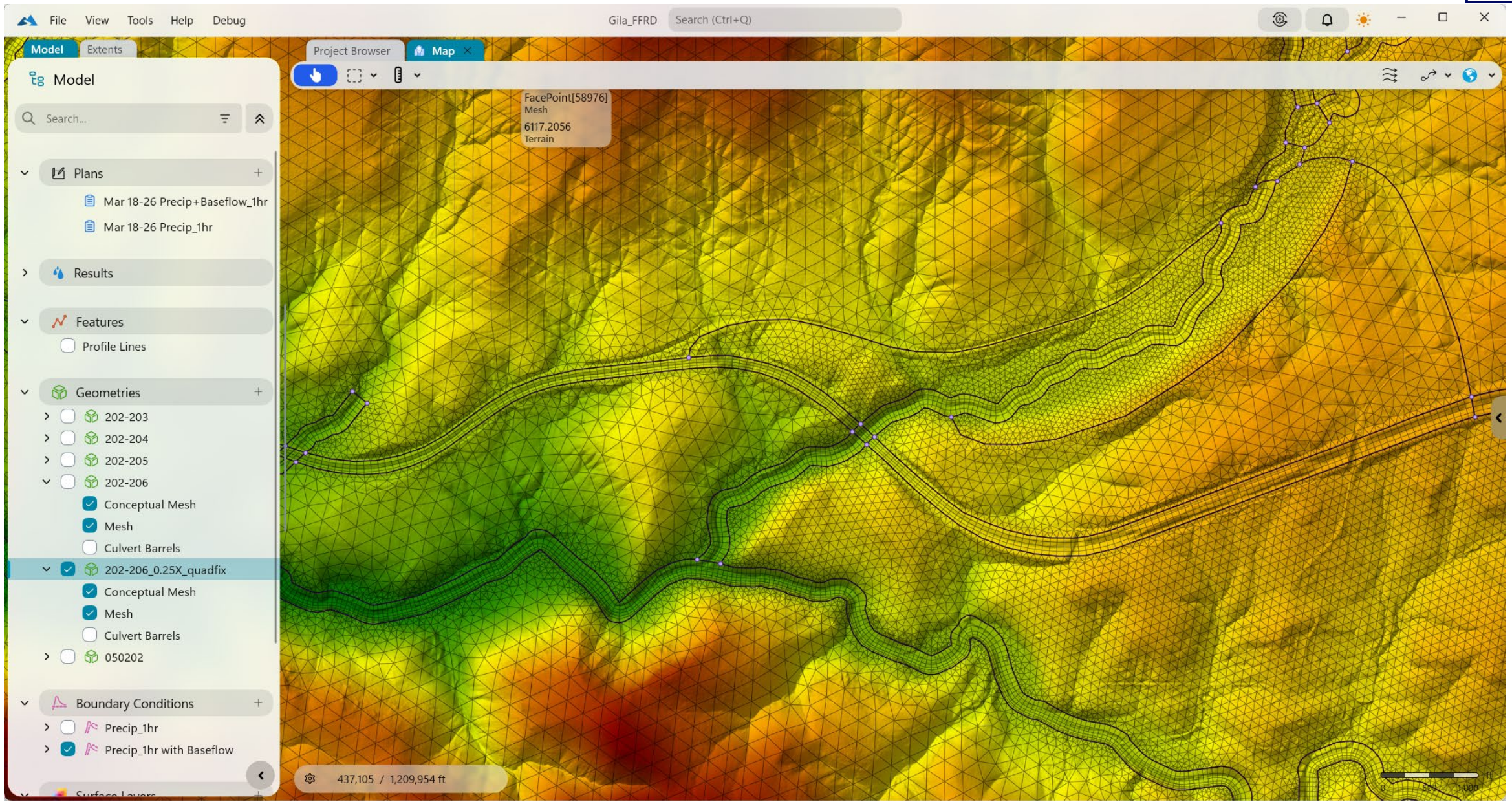
Gila Watershed – Mesh



Gila Watershed – Mesh Detail



Gila Watershed – Mesh Detail with 2x Resolution



Three Brief Case Studies

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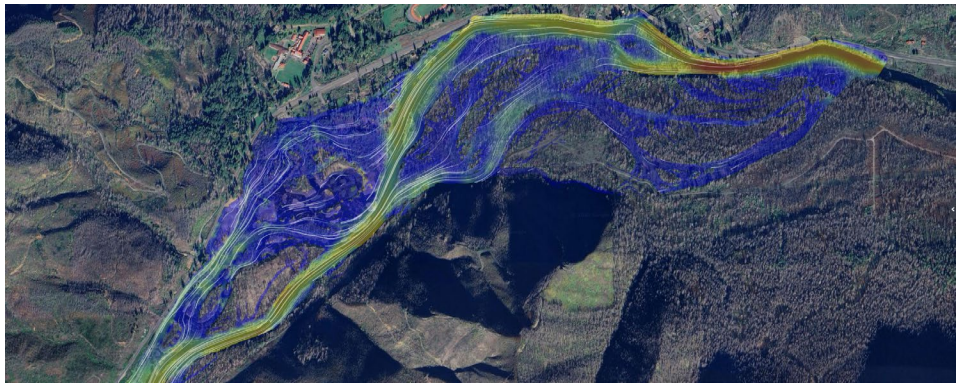
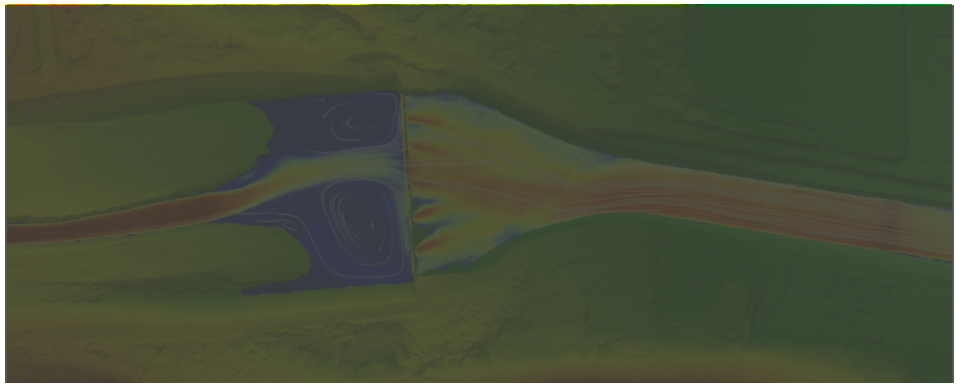
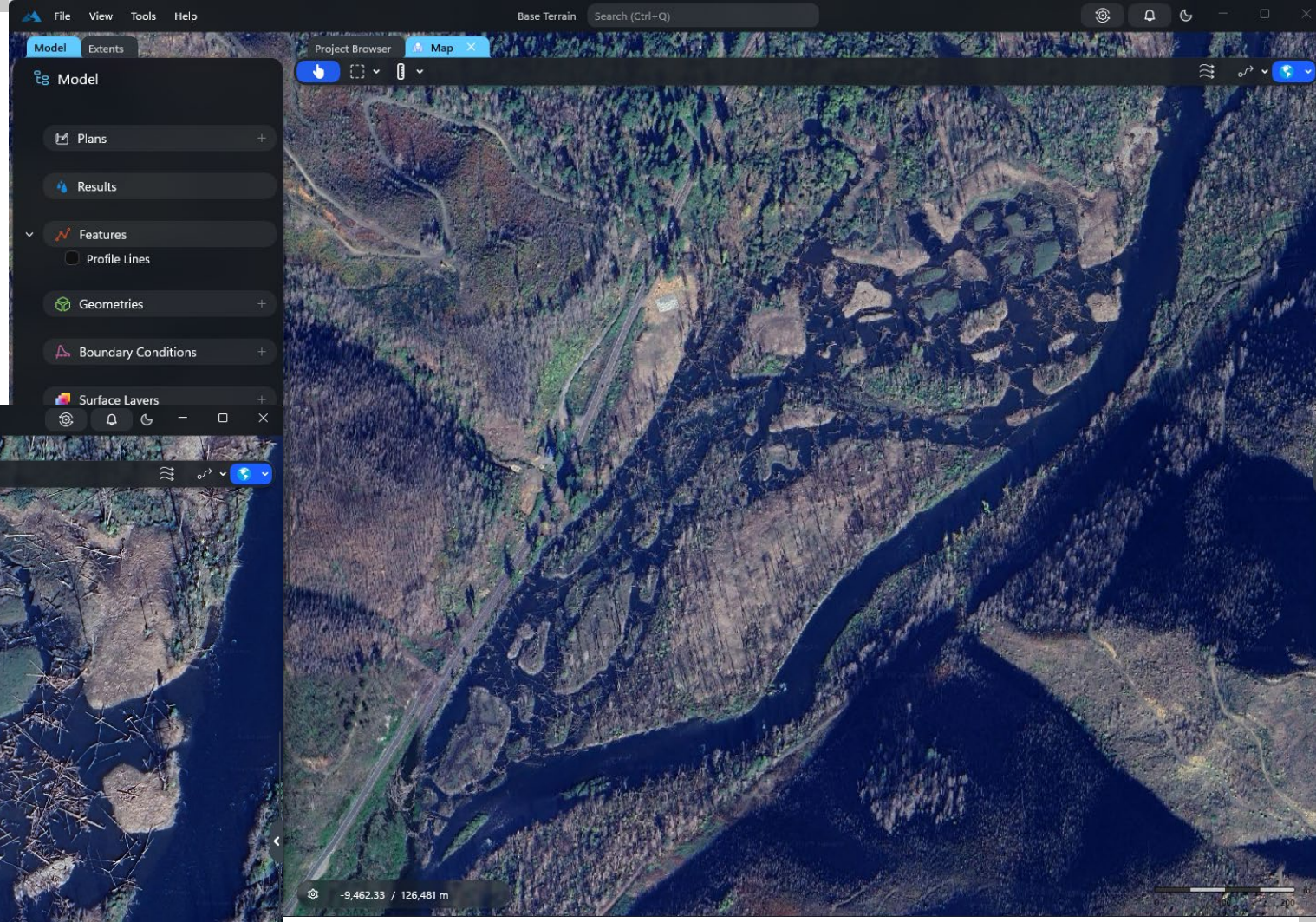
	McKenzie – Complex Rivers
	Iao – Hydraulic Structures (Present and Future)

Mckenzie “Stage Zero”

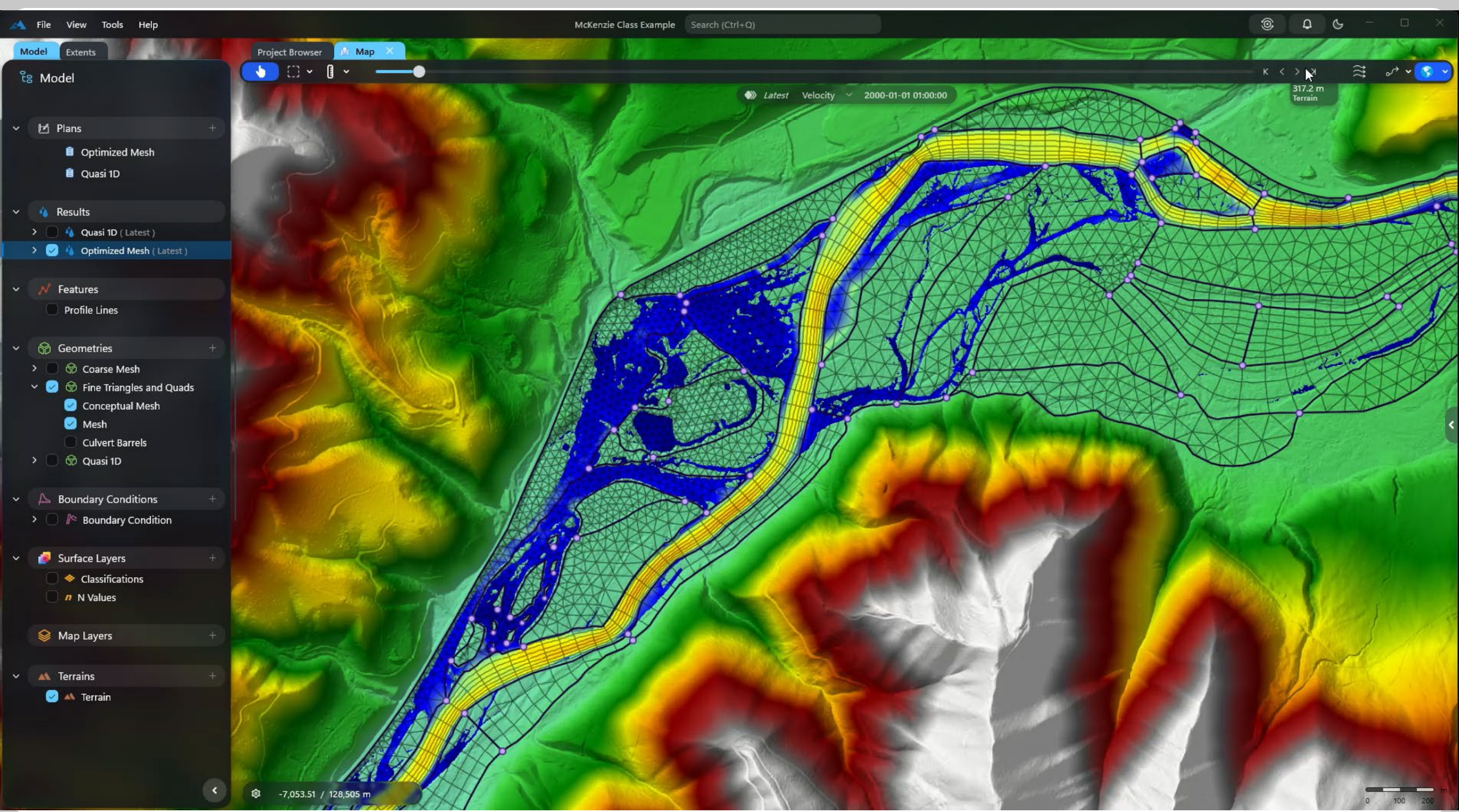
Multi-thread River



Restoration river alignments are getting more complex.

The new meshing tools and computational approach handles complex river settings elegantly.

McKenzie “Stage Zero” Restoration Project


File
View
Tools
Help
McKenzie Class Example
Search (Ctrl+Q)
Model
Extents
Project Browser
Map
Model
Plans
Optimized Mesh
Quasi 1D
Results
Quasi 1D (Latest)
Optimized Mesh (Latest)
Features
Profile Lines
Geometries
Coarse Mesh
Fine Triangles and Quads
Conceptual Mesh
Mesh
Culvert Barrels
Quasi 1D
Boundary Conditions
Boundary Condition
Surface Layers
Classifications
N Values
Map Layers
Terrains
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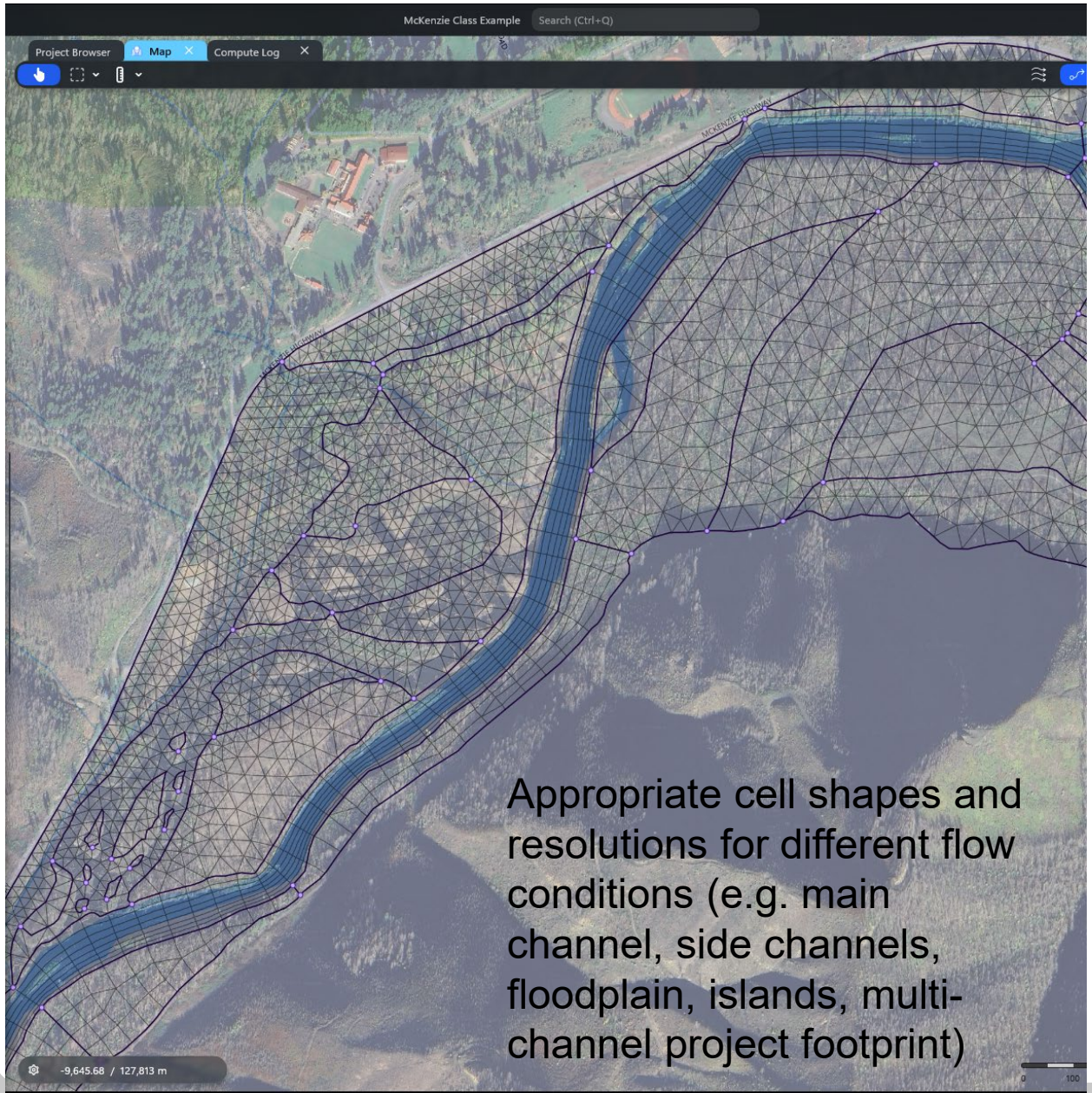
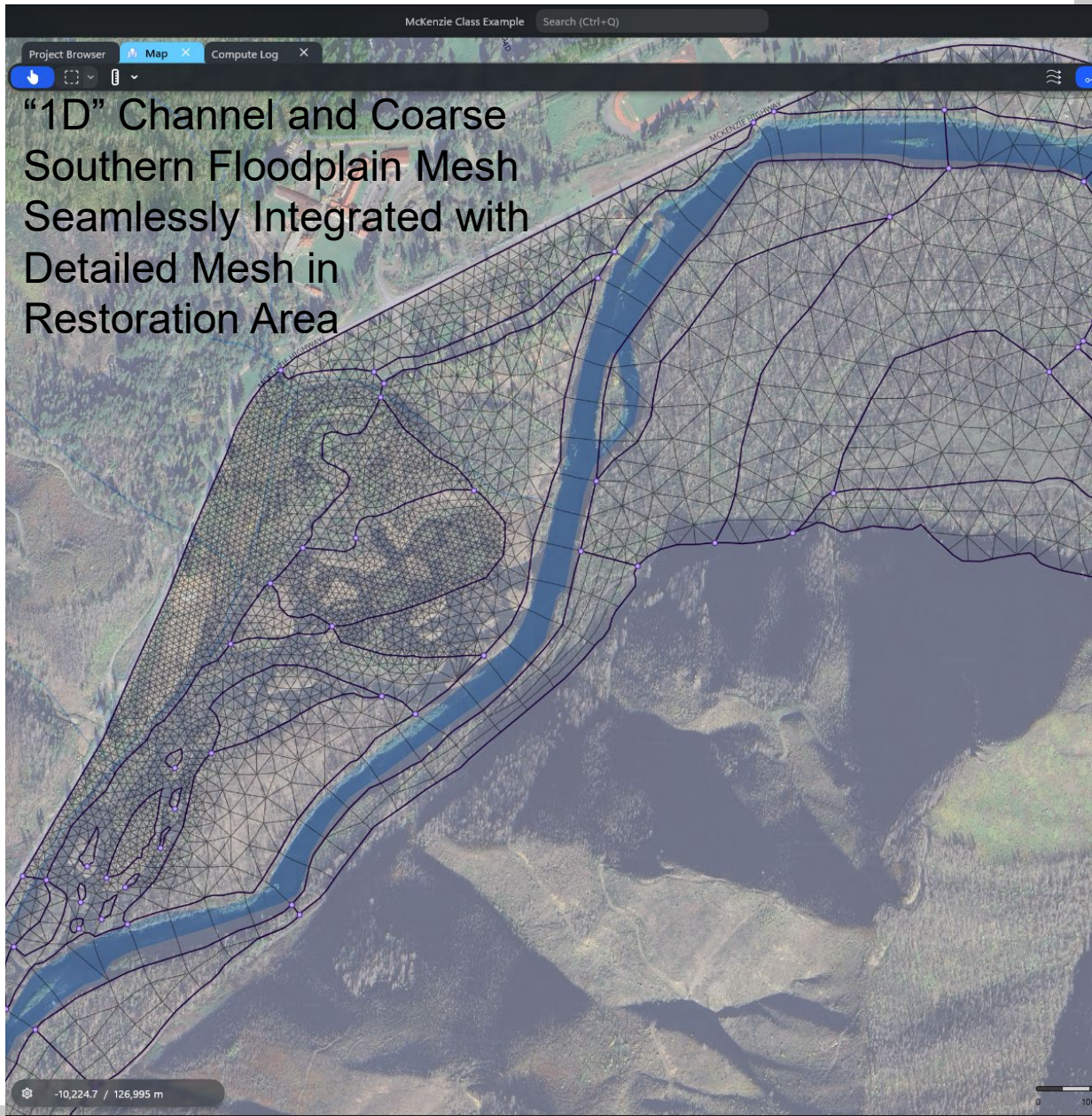
Flexible Meshing Tools and Seamless 1D-2D

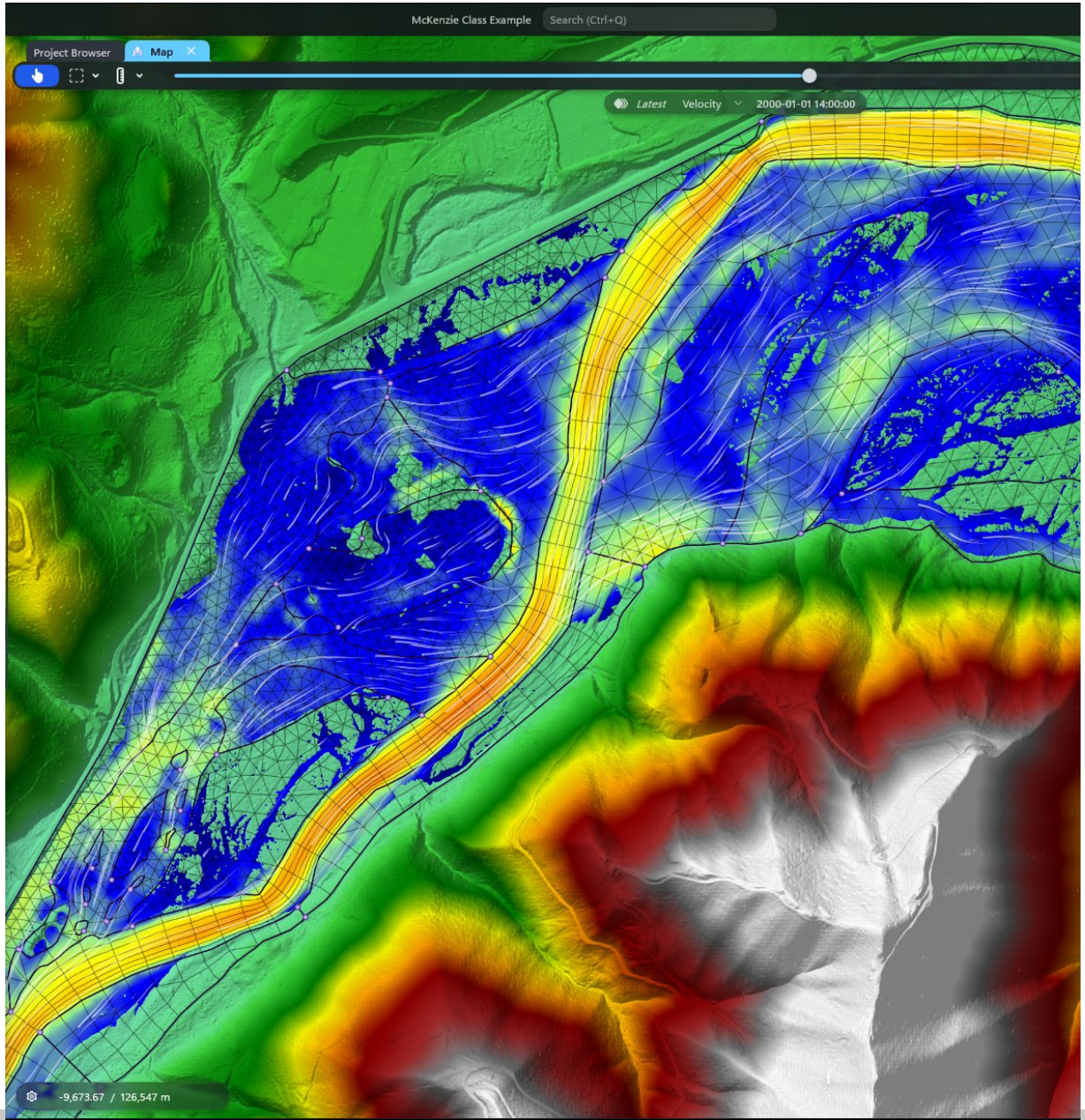


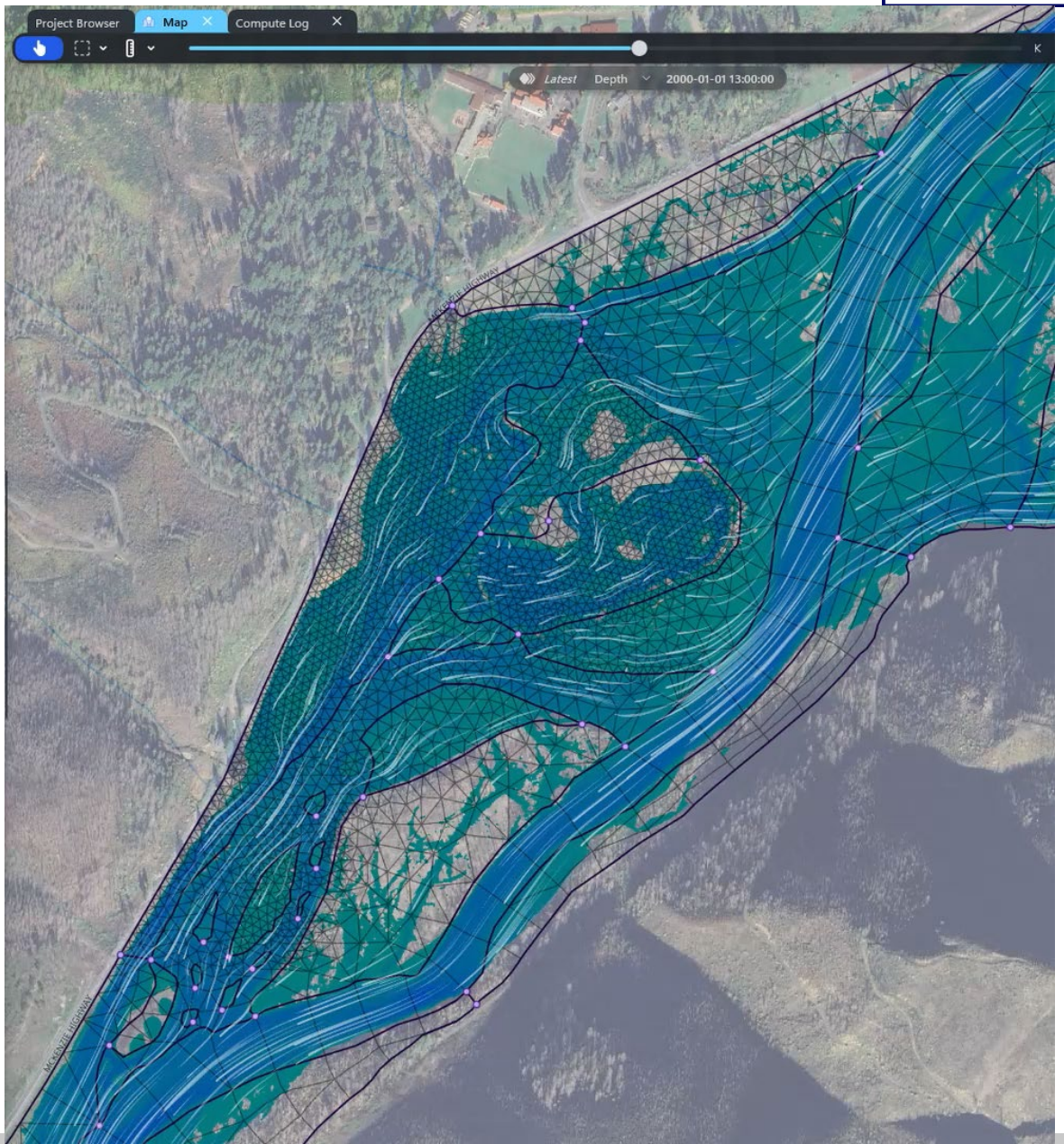
Appropriate cell shapes and resolutions for different flow conditions (e.g. main channel, side channels, floodplain, islands, multi-channel project footprint)



"1D" Channel and Coarse Southern Floodplain Mesh Seamlessly Integrated with Detailed Mesh in Restoration Area

Detailed flow field in the area of interest





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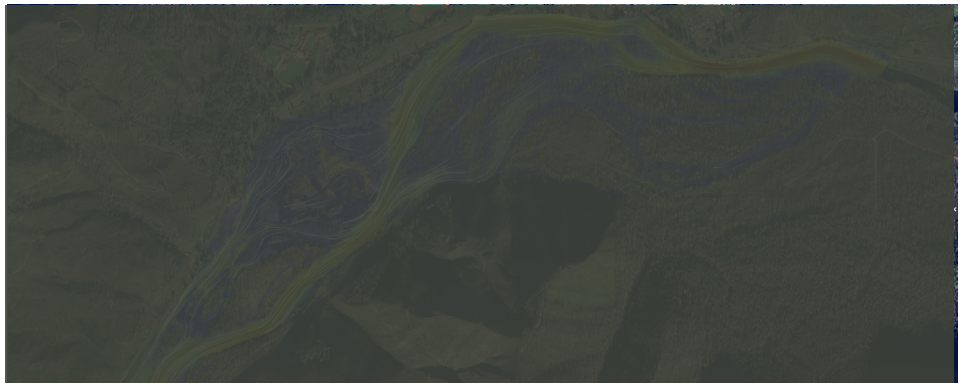
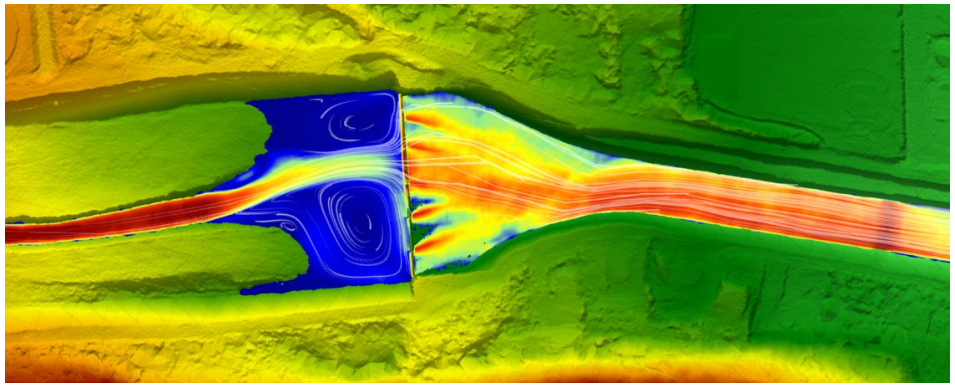
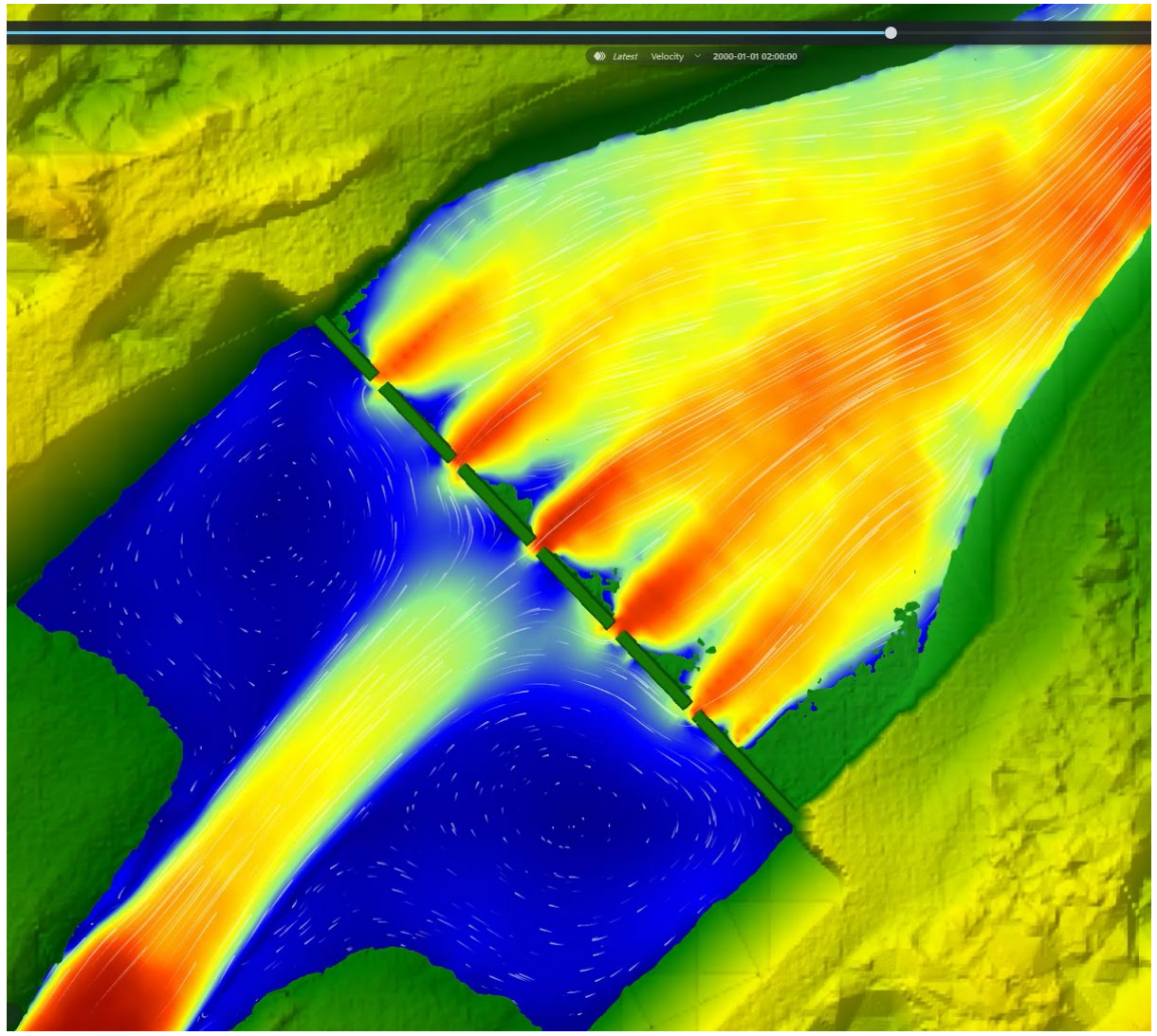
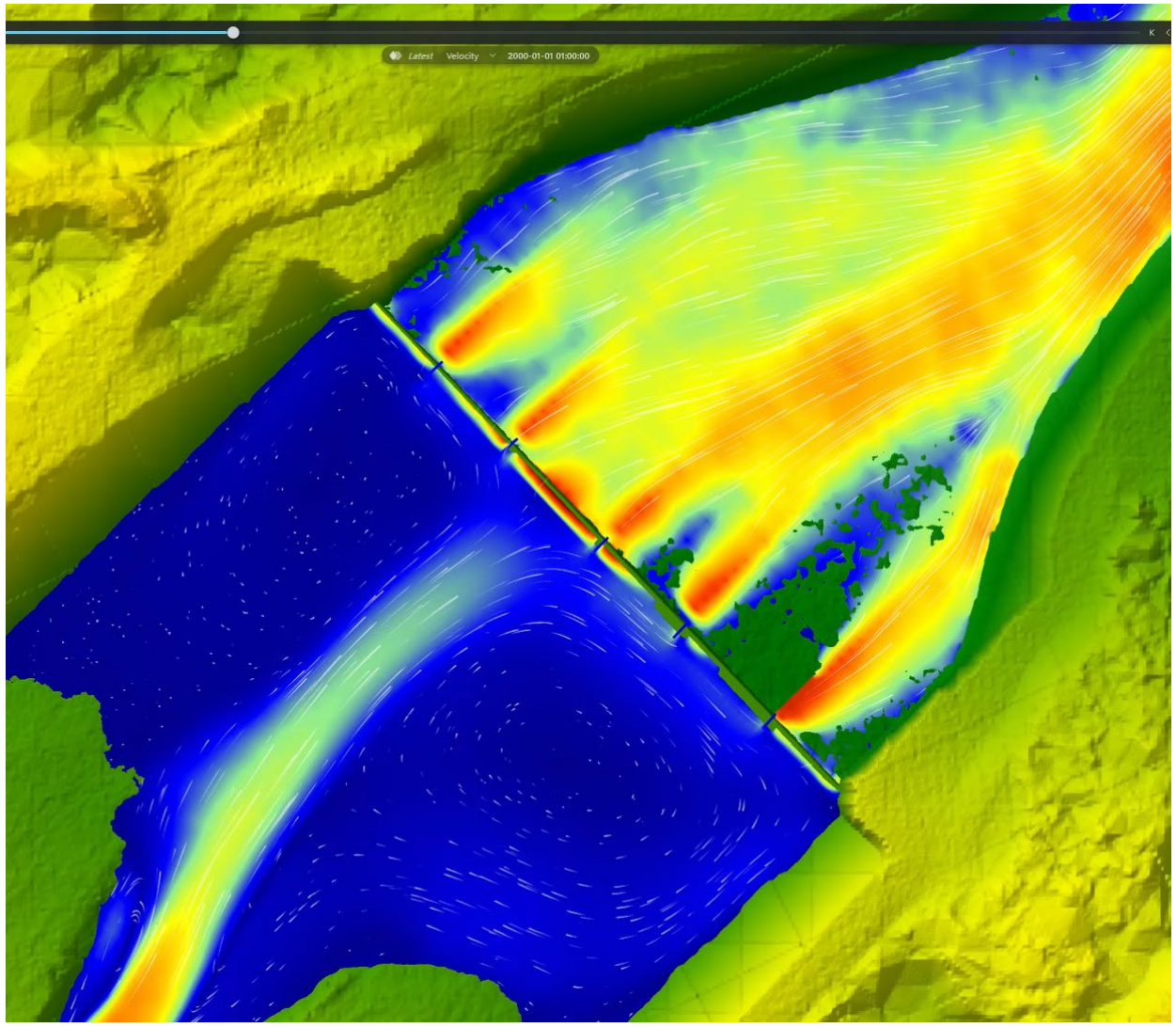
	McKenzie – Complex Rivers
	Iao - Hydraulic Structures (Present and Future)

Iao Debris Basin

- The way structures are and the way they will be





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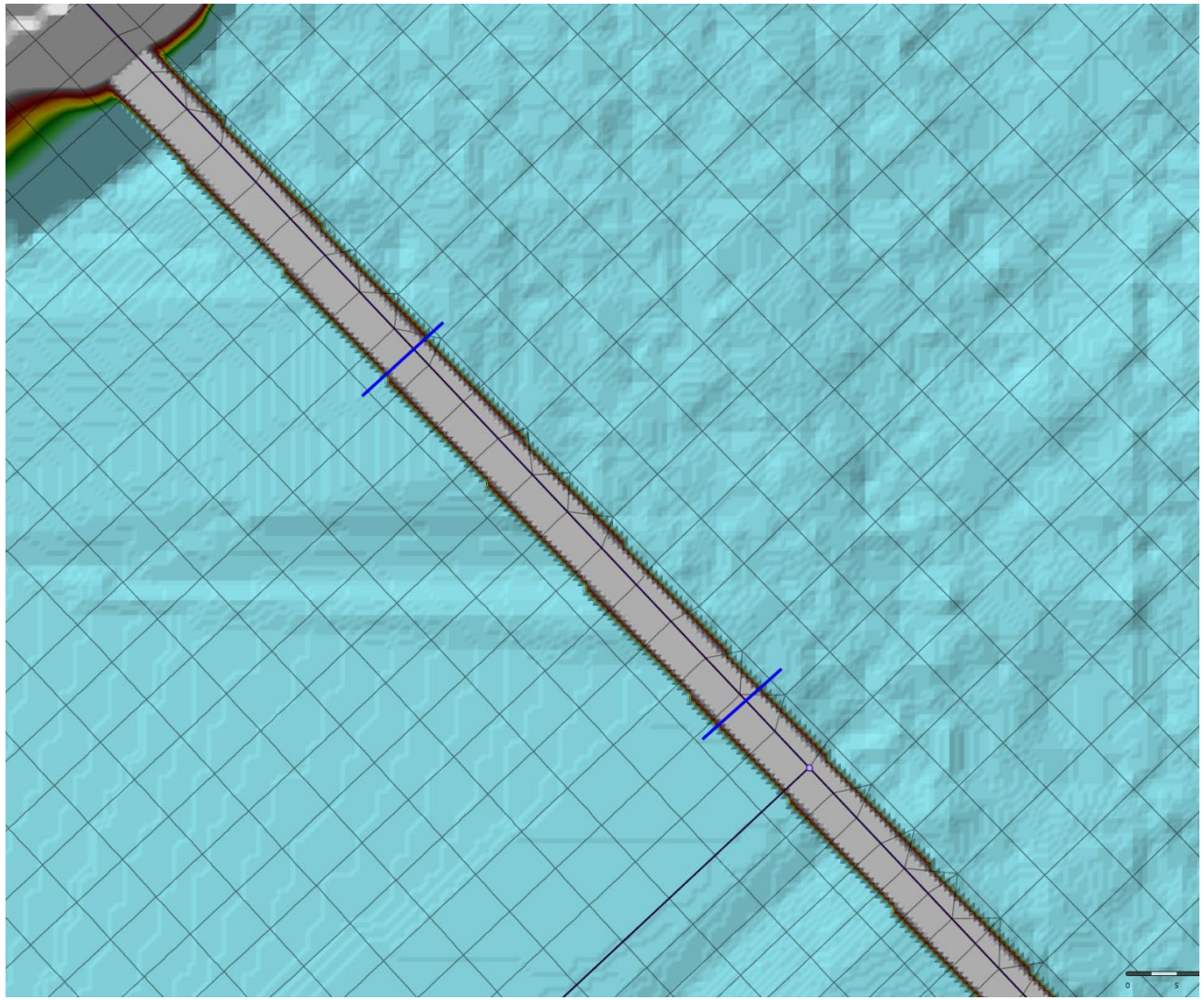
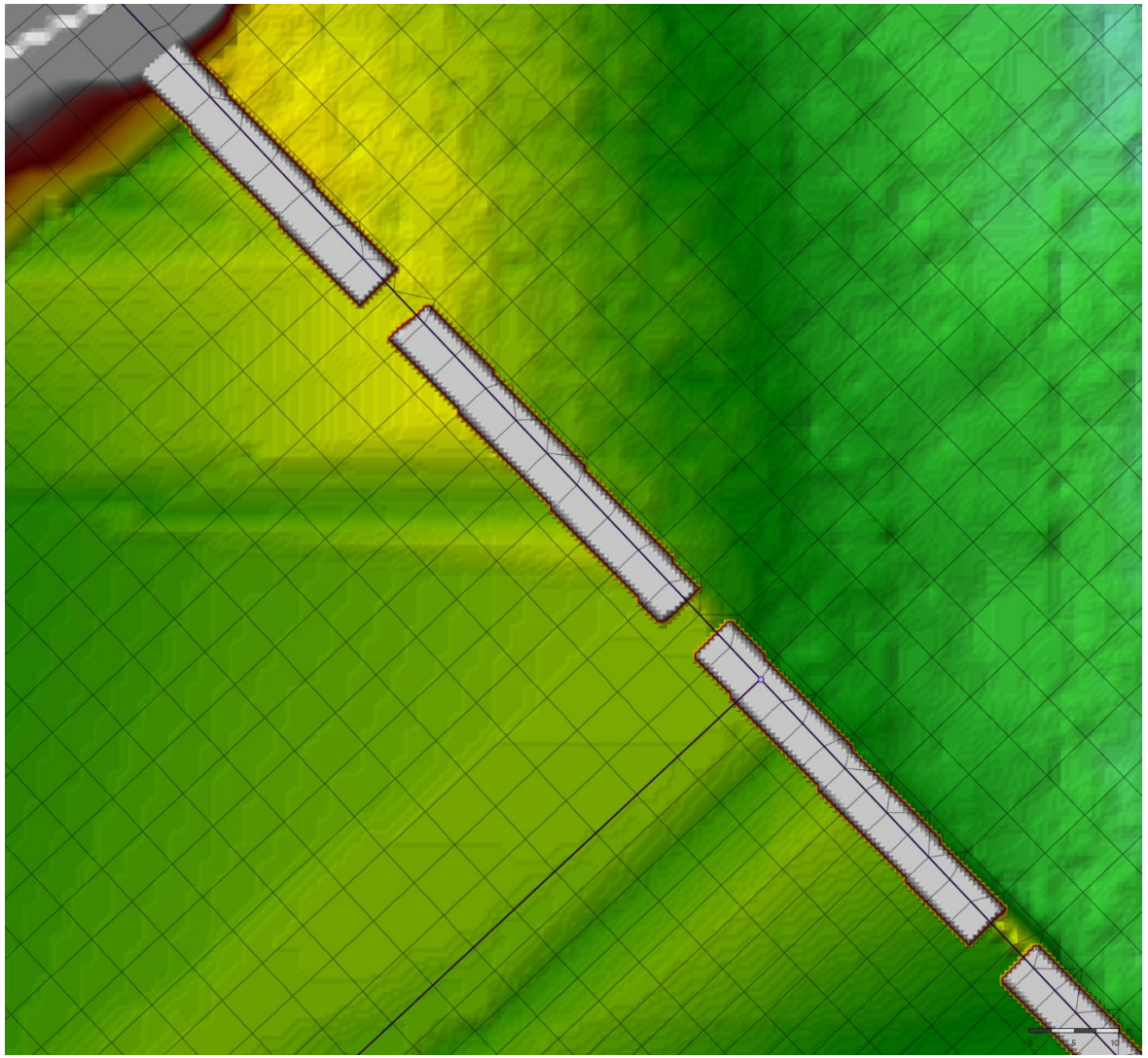
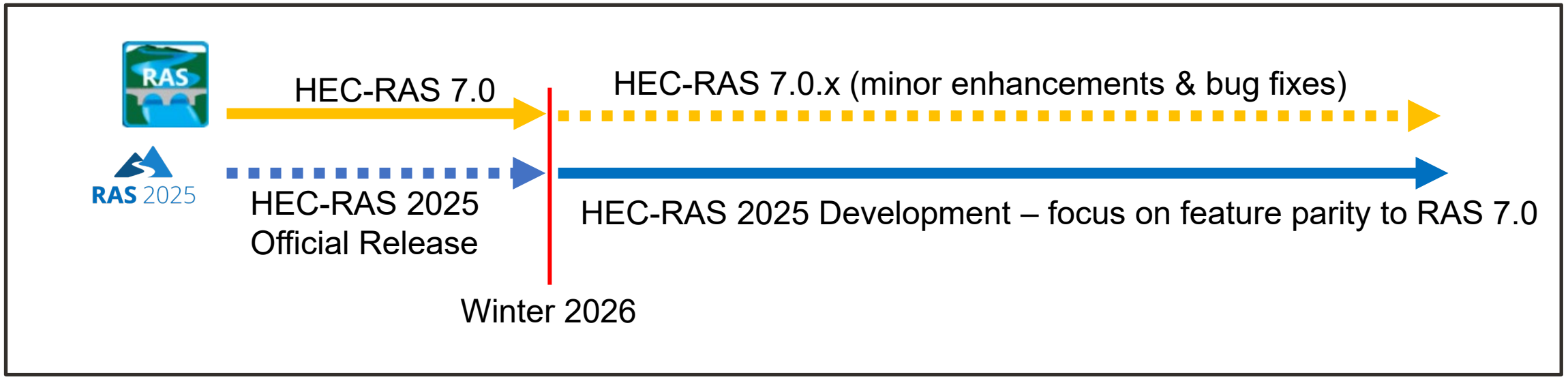




HEC-RAS 2025 and 7.0

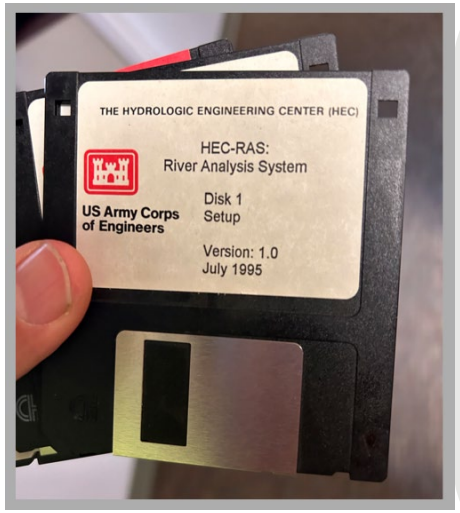


HEC-RAS 7.0 will be last feature release.

- Will continue to be supported with minor enhancements and bug fixes

HEC-RAS 2025

- Rewrite of the UI and computational engines
- Focus on feature parity with HEC-RAS 7.0



Create meshes in HEC-RAS 2025 using new mesh capabilities and import into HEC-RAS 6.6 or 7.0

HEC-RAS 2025 Development Timeline

FY25/26

- Mesh generation advancements
- Precipitation, wind, atmospheric pressure
- Culverts and weirs
- Basic Terrain Modifications
- Improved v6 Model Importer
- Initial GPU Solver
- Implicit 2D solver
- 1D/2D Hybrid solver

FY26/27

- Advanced Terrain Modifications
- Gates and pumps
- Advanced Mesh Post-Processor tooling
- 1D mesh components and simplified solver
- Improved Boundary Conditions (Rating Curve, Multi-Variate)
- Initial Conditions
- Breaching

FY27/28

- Geometry & Boundary Condition clipping: import and export.
- Sensitivity analysis framework
- Project management features (model delta charts, summary reports)
- Improved inundation mapping, particularly with precipitation and shallow flow

Training Plan

FY26 Training

MSC	Location	Instructors	Dates
RAS 2025 Training - NWD (east)	NWK	Stan, Mark, Alex K	Jan 13-15, 2026
RAS 2025 Training - SPD	SPK	Alex S, Eric, Alex K	Jan 27-29, 2026
RAS 2025 Training - SAD	SAJ	Stan, Eric, Alex K	Feb 3-5, 2026
RAS 2025 Training - MVD	MVS	Zach, Stan, Mark	Feb10-12, 2026
RAS 2025 Training - SPD	SPK	Alex S, Eric, Alex K	Feb 24-26, 2026
RAS 2025 Training - NWD (west)	NWS	Stan, Zach, Mark	Mar 3-5, 2026
RAS 2025 Training - NAD	NAE	Cam, Alex S, Alex K	Mar 17-19, 2026
RAS 2025 Training - SWD	**SWT**	**Eric, Cam, Zach**	**Mar 31 - Apr 2, 2026**
RAS 2025 Training - LRD	LRL	Cam, Alex S, Alex K	April 21-23, 2026

FY27 Training and into the future

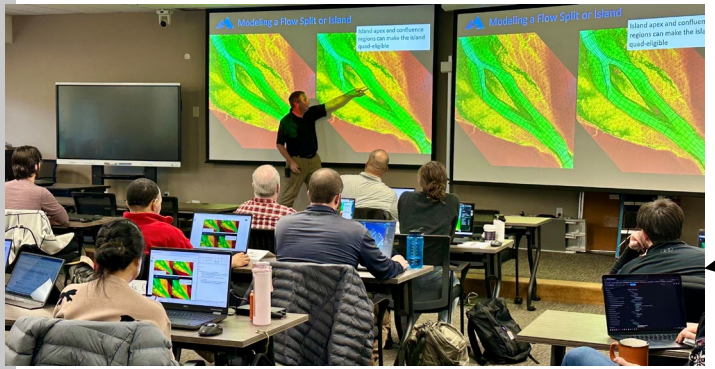
- Classes will be coordinated and hosted by HEC, not Prospect.
- Look for new HEC class registration site (USACE only).
- Registration will roughly align with Prospect timelines – sign ups available in late spring of FY26

HEC-RAS 2025 Training FY 26

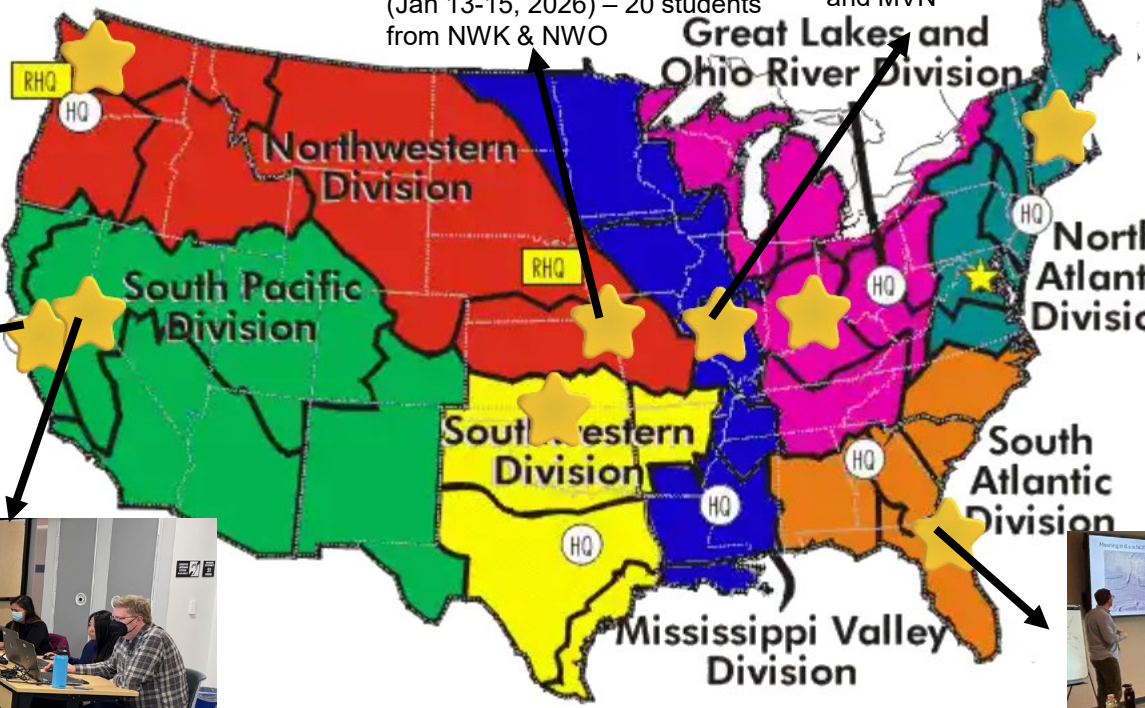
~250 USACE Master Builders trained

NWD East at Kansas City District (Jan 13-15, 2026) – 20 students from NWK & NWO

MVD at St. Louis District (Feb 10-12, 2026) – 27 students from MVR, MVM, MVK, MVP, and MVN



Pilot class at HEC (Dec 9-11, 2025) – 25 students



SPD at Sacramento District (Jan 27-29, 2026) – 35 students from SPK, SPD, SPA, SPL, & SPN

SAD at Jacksonville District (Feb 3-5, 2026) – 28 students from SAJ, SAA, SAC, SAM, SAS, SAD, RMC, & ERDC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