IAFSM 2009 Annual Conference

Benefits of GIS Developed "Enhances Zone A's" Using Automated Floodplain Generator (AFG)

With

Mark Everett and Matt Faulkner

AMEC Earth & Environmental

Leading international firm

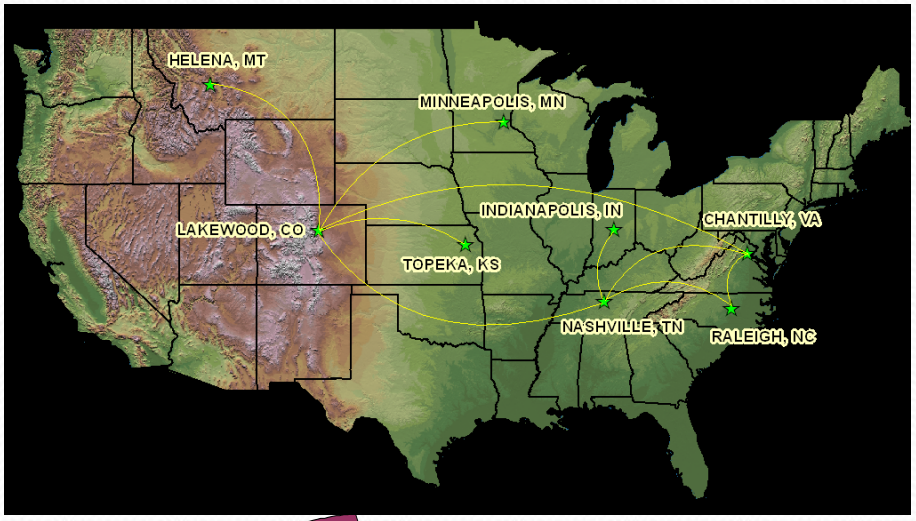
- 22,000 employees, 5th largest International Engineering Services Organization, 300 Offices, 40 Countries, in 6 Continents and annual revenue over 8 billion dollars.
- AMEC has 92 offices in North America employing 2,745 personnel.

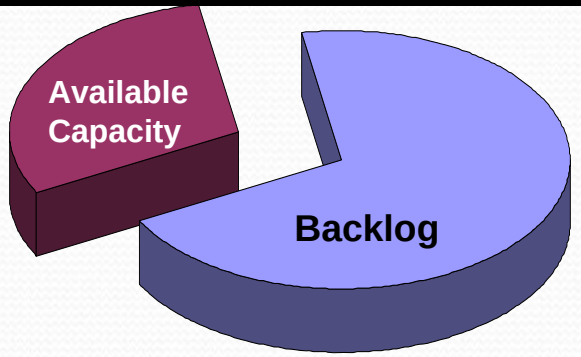
US Leader in Water Resources

- Dam Failure Analysis – China, Canada, USACE, States, & Locals
- FEMA Flood Hazard Studies- Regional IDIQ and State CTP Contractor
- State Map Mod Contractors – AL, IN, KS, KY, MO, NC, ND, SD, UT and others pending
- NC DFIRM to support FEMA Multi-hazard Flood Map Modernization
- Watershed Master Planning and Restoration
- Pre and Post Disaster Preparedness Planning/Recovery/Mitigation

KNOWLEDGE AND FEMA MASTERY

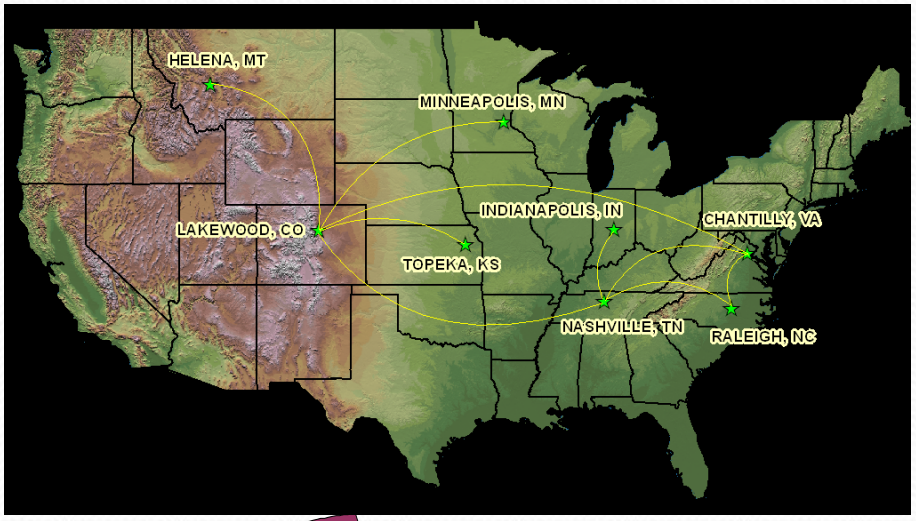
- Three Production Centers Dedicated to DFIRM Production
  - Chantilly, VA
  - Nashville TN
  - Topeka, KS
- Dedicated Staff
  - 50 H&H Engineers
  - 125 GIS Specialist

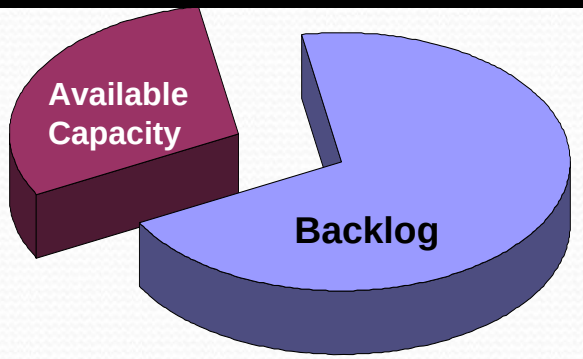




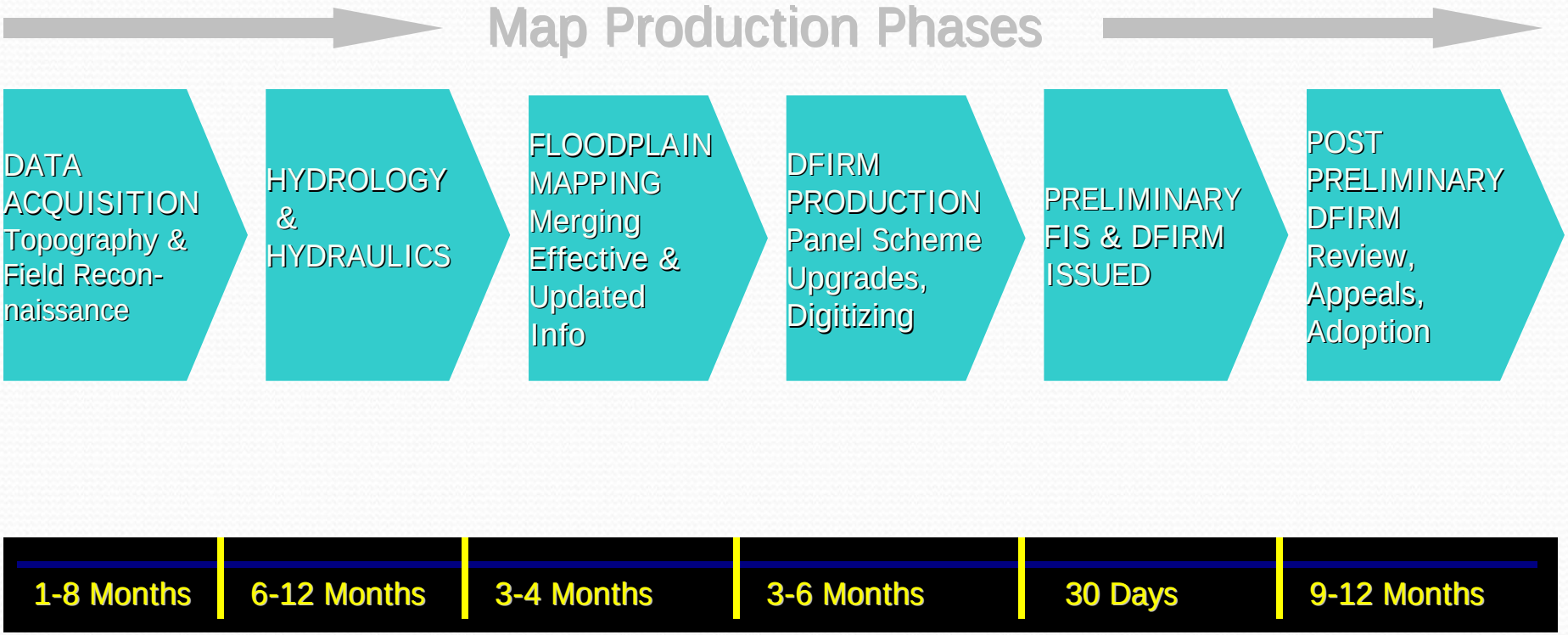
KNOWLEDGE AND FEMA MASTERY

- Annual Production Capacity
  - 4,000 miles detailed H&H
  - Unlimited miles of Enhanced A (40,000 annually
  - 2,300 panels
- Knowledge of FEMA's New Procedures for Levees (PAL)





Process for Flood Mapping Production



Time frames given are approximate, sometimes concurrent, and may vary from study to study

Components of Zone A Mapping

- Data Setup/ Hydrology
  - Stream Centerline / DEM
  - Regression Equation Input
- AFG Pre RAS
  - Cross Section Layout and Geometry
  - Mannings “n” Selection
- AFG Run HEC RAS
  - Verify Ineffective Flow Areas
  - Bridge Cross Sections
- AFG Post RAS
  - Floodplain Generation

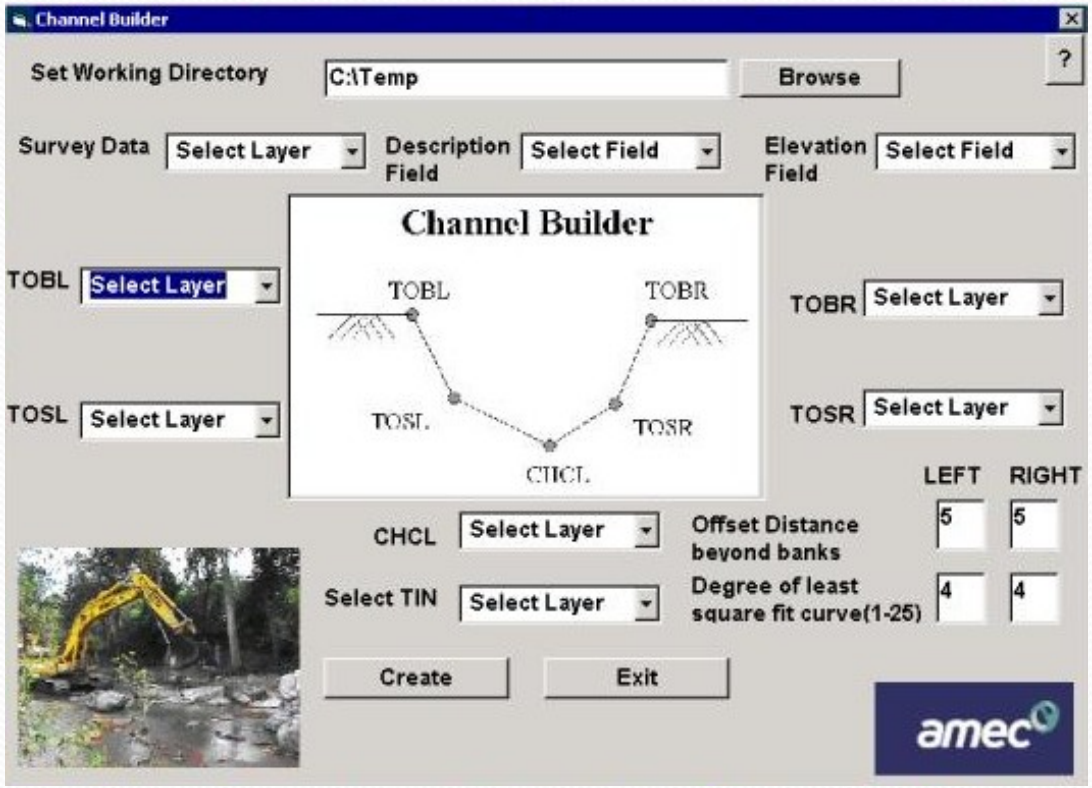
Identifying Topographic Data Needs and Sources

- Topographic data are required to complete stream studies.
- New topographic data is a significant investment by community/county to acquire (up to 50% of map update cost)
- Mapping process will utilize the best available topography data.
- All new DFIRM's will be based on NAVD 1988 datum, which may require adjustment/conversion

REVIEW HYDROLOGY

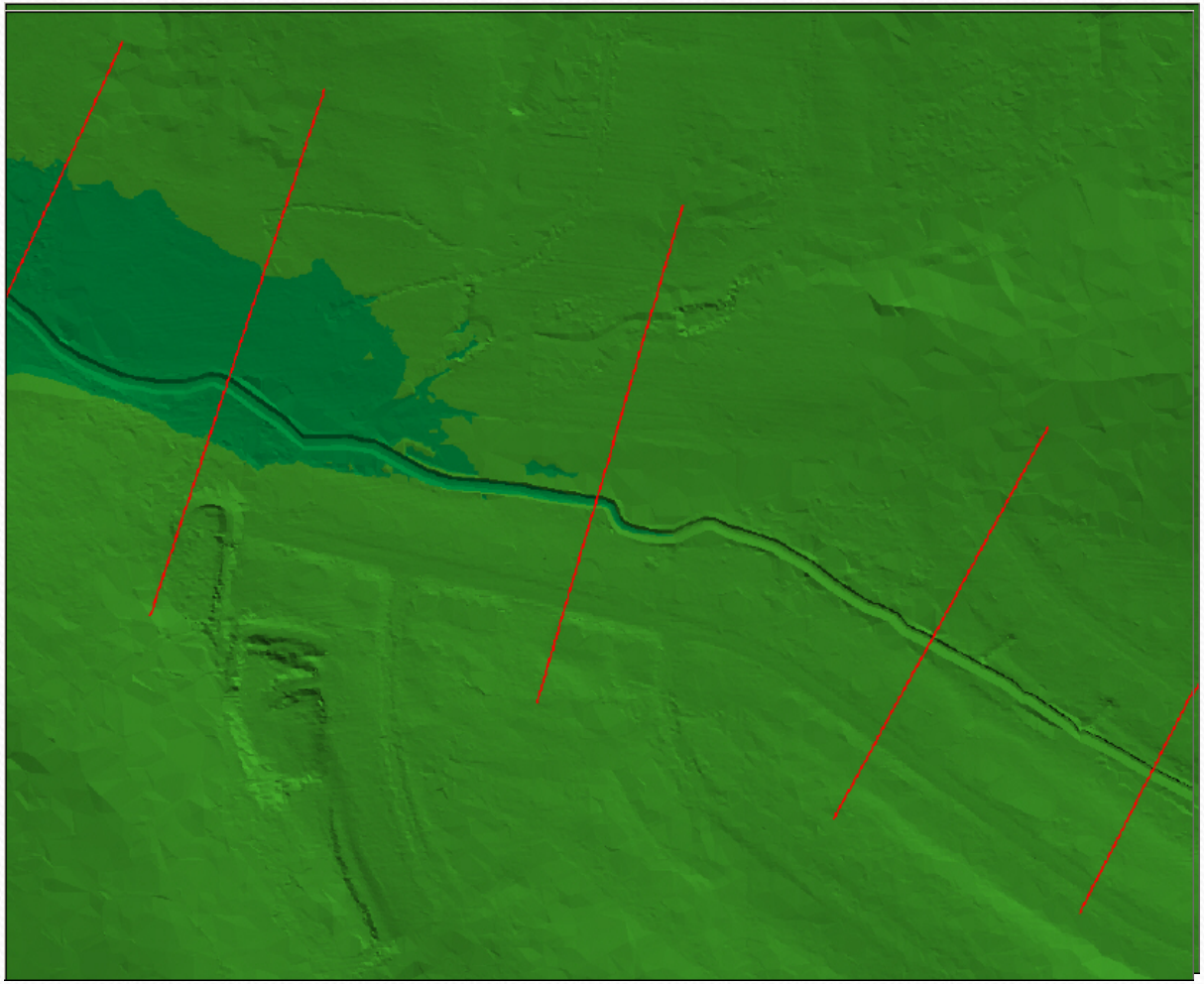
- Check DEM
- Check Stream Names and Stream connectivity.
- Check for Stream Orientation
- Check Catchments
- Check Streams running in and out of the county
- Verify Regression equations used

Digital Channel Builder

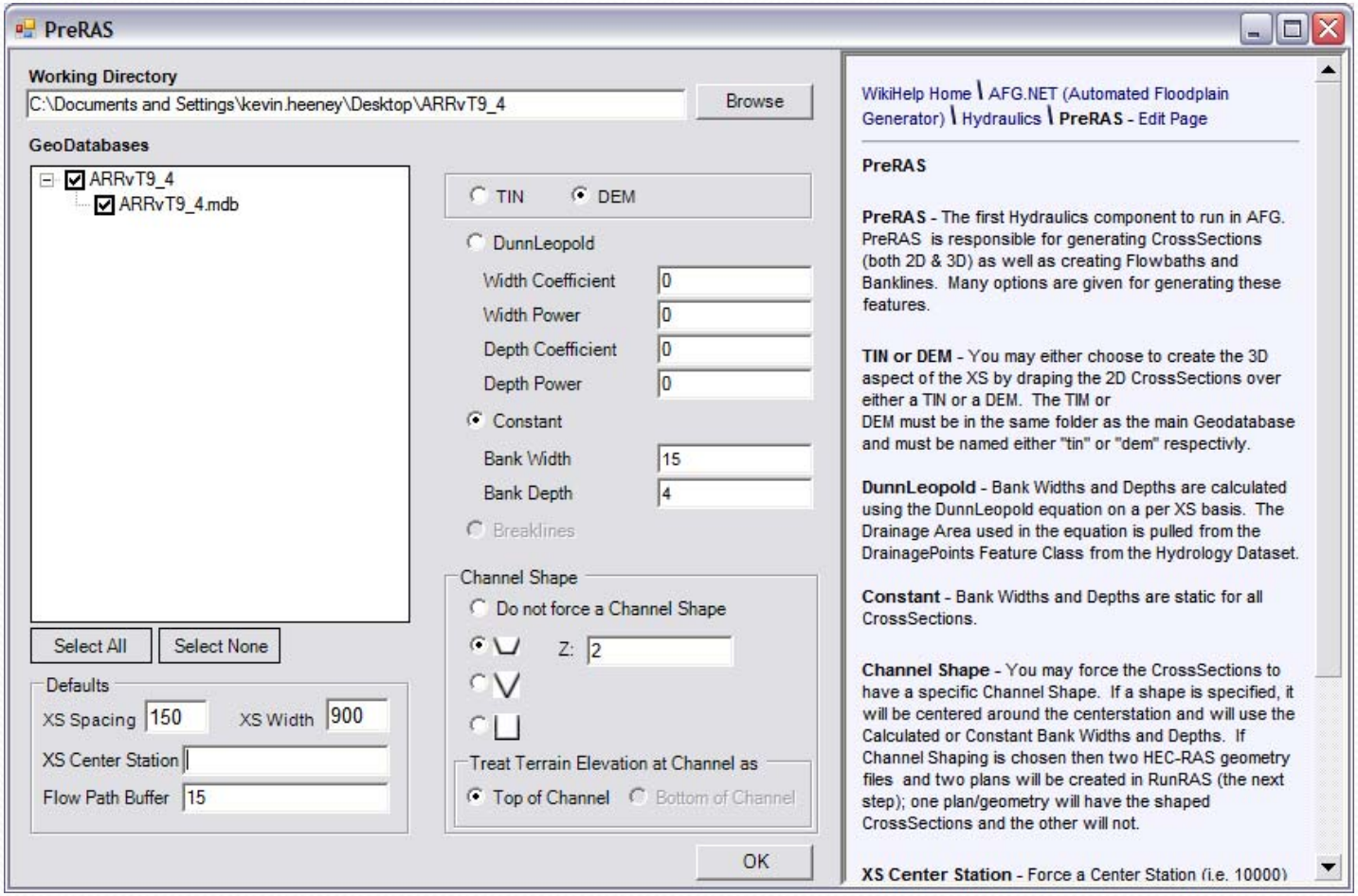


- **The Digital Channel Builder uses field survey data to 'burn' a channel into a digital ground surface. Makes hydraulic model creation easier and floodplain delineation smoother.**

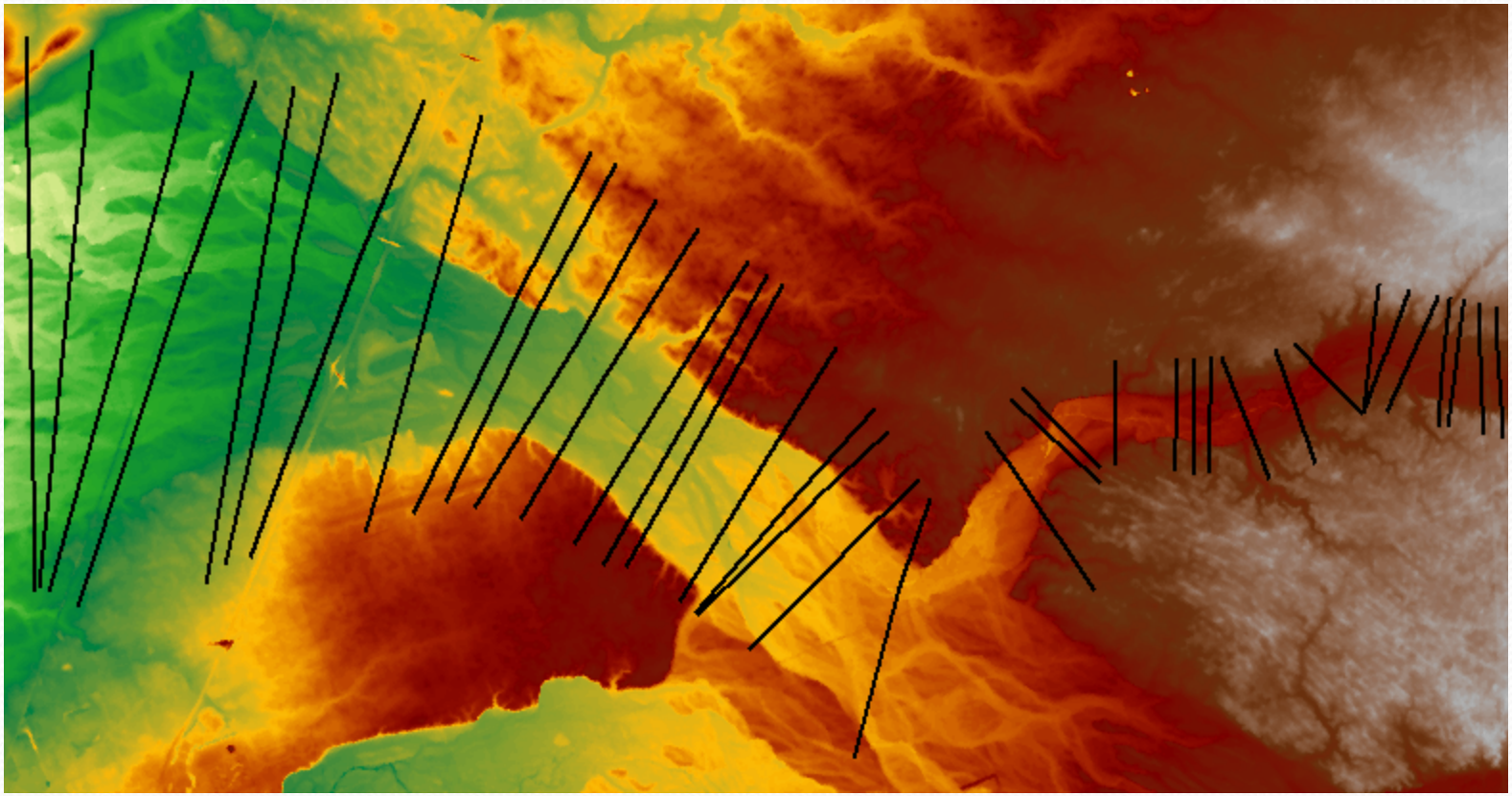
Digital Channel Builder



Hydraulics – PreRAS



Cross Section Layout



AFG Hydraulics

RUN RAS

- Imports Cross Section and flow data from Pre-RAS
- Creates a HEC-RAS model
- Runs a HEC-RAS model based on initial Manning's n and contraction/expansion coefficient

AFG Hydraulics

POST-RAS

- WSEL data from HEC-RAS is used to generate a Floodplain.
- Populates Hydraulics feature dataset with the appropriate feature classes

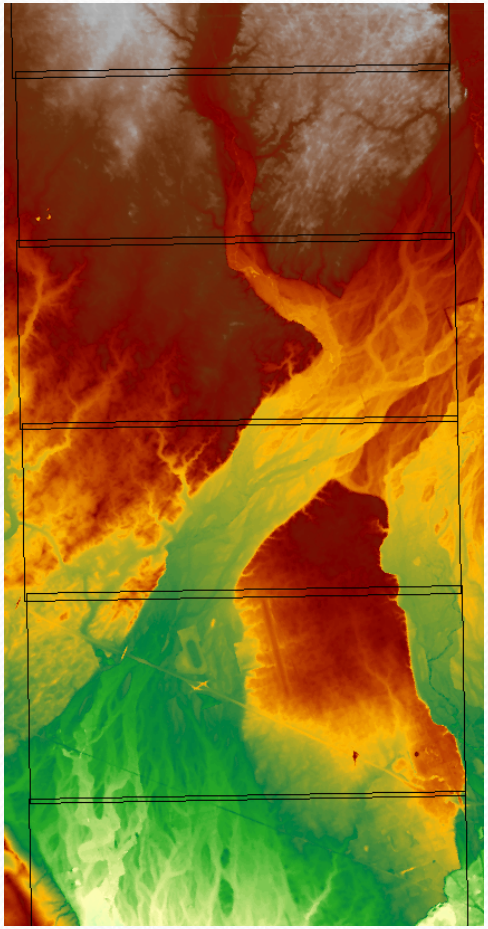
Surface Creation

Create Buffer

Clip Surface DEM or Topo

Resolution of DEM Can Have an Effect on How The Surface Is Clipped

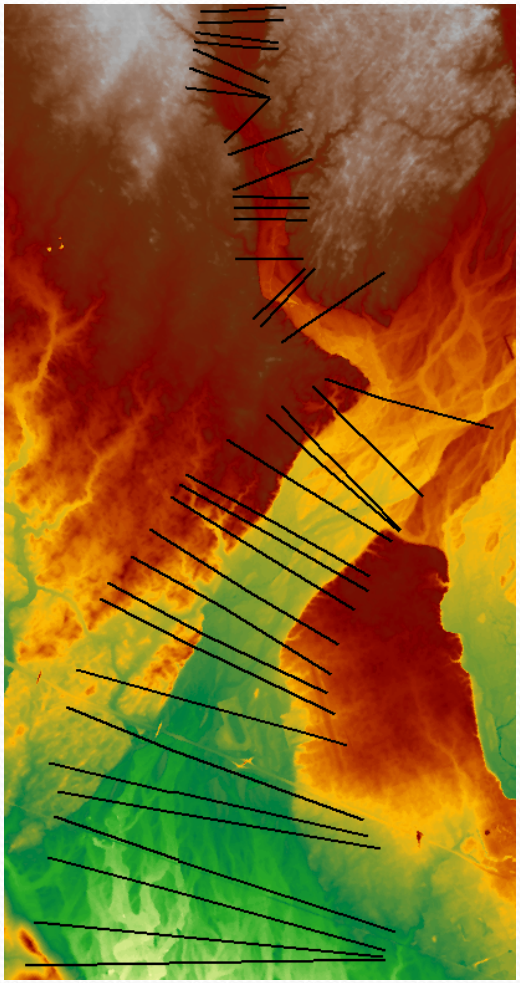
Create Ground Surface TIN



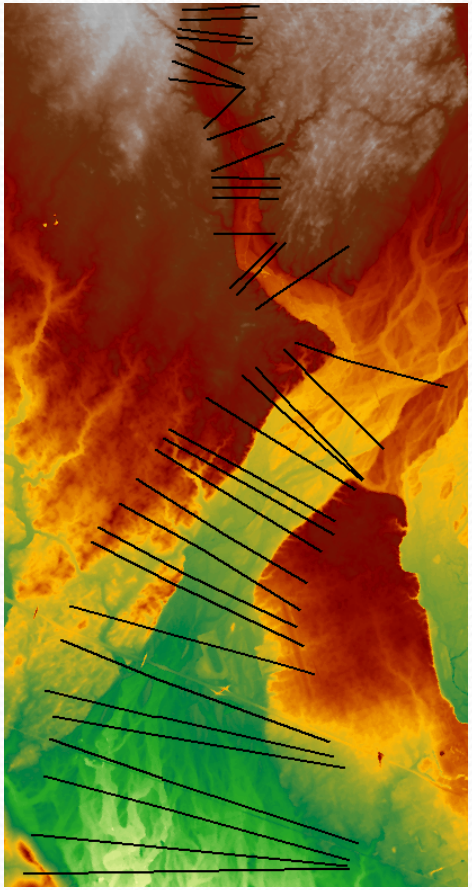
Cross Sections

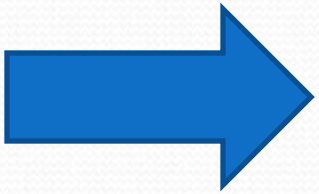
Import XS

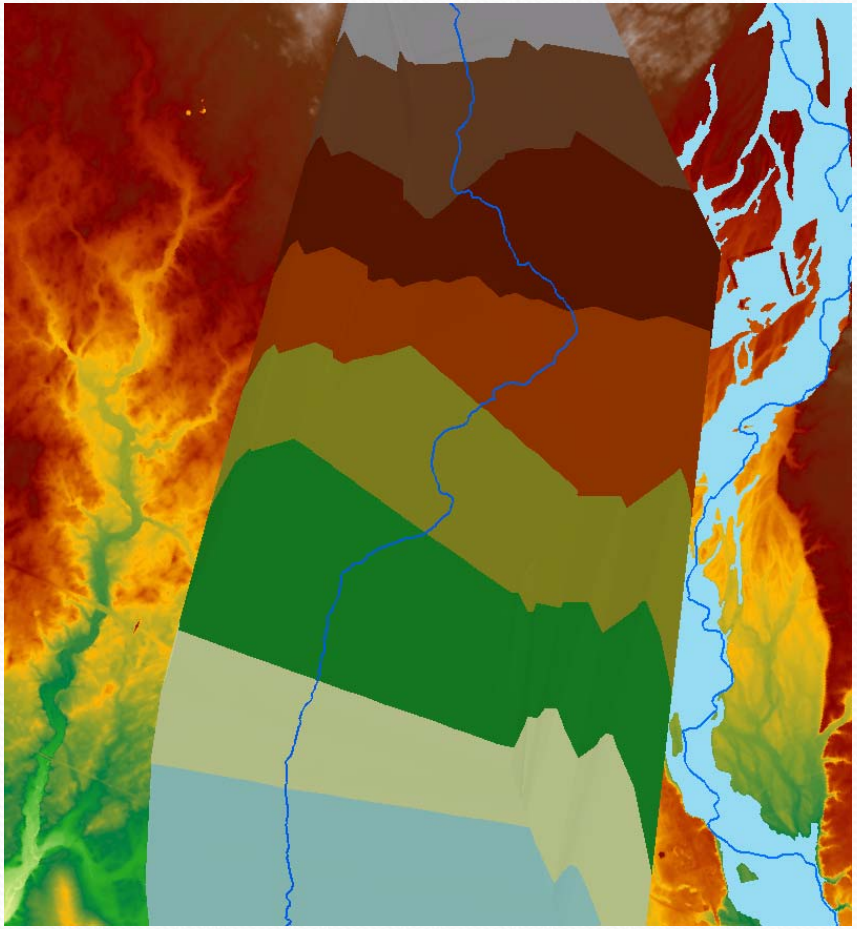
Confirm Cross Section Elevations



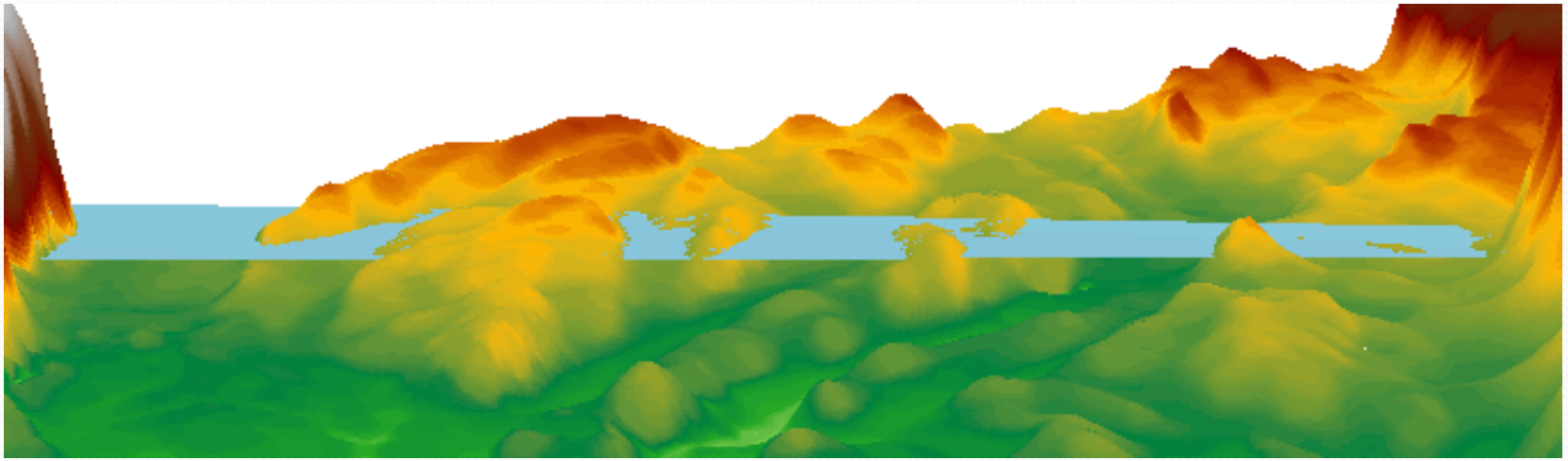
Water Surface TIN







Surface TIN Intersection



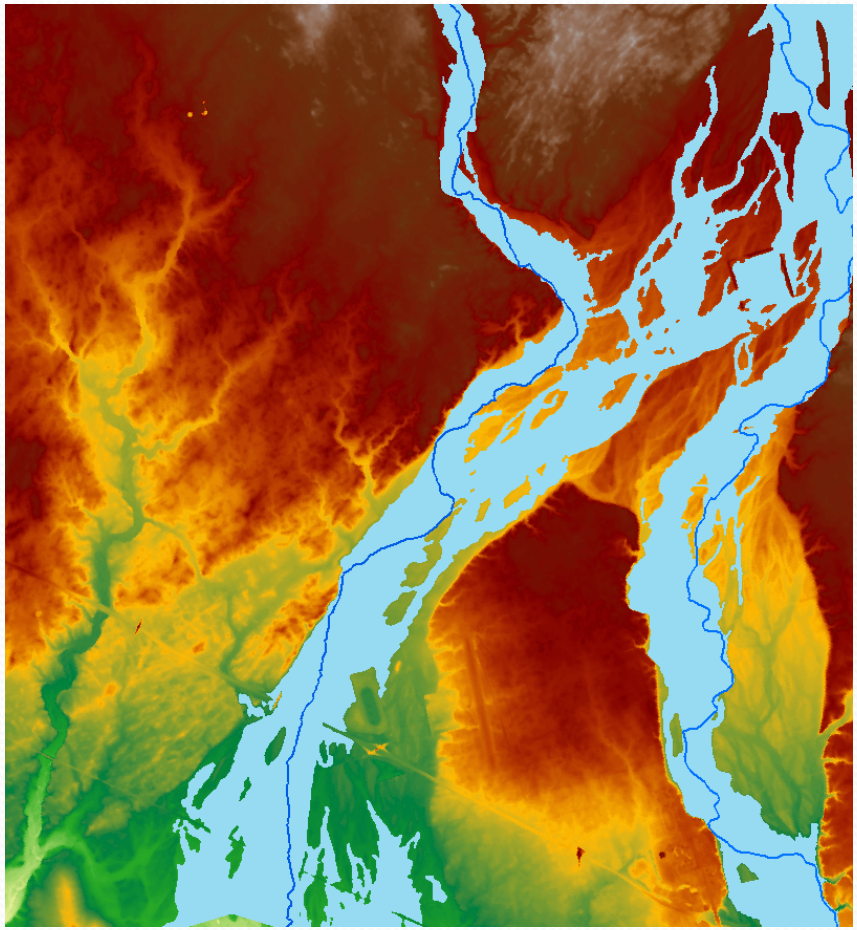
Resulting Floodplain

The Resulting Shapefile from the TIN Difference is the Floodplain Boundary

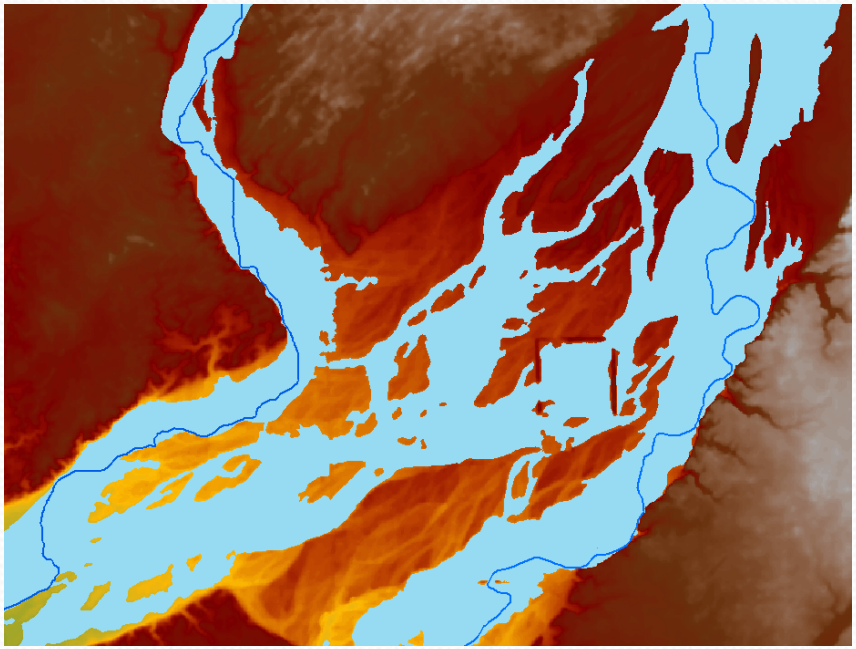
Check Centerline

Verify the Integrity of the Floodplain Boundary

Disconnected or Anomalies



Benefits of AFG



- Mapping Low and High Gradient Systems
- Mapping of Braided or Split Floodplains
- Integrating Zone A's into Detailed Studies or Redelineations
- Efficient County Wide Processing

Questions