

# Weaving Legacy Hydraulic Data into Current Flood Inundation Mapping Workflows

SESSION NUMBER:  
H21N-1540

OWP OFFICE OF  
WATER  
PREDICTION

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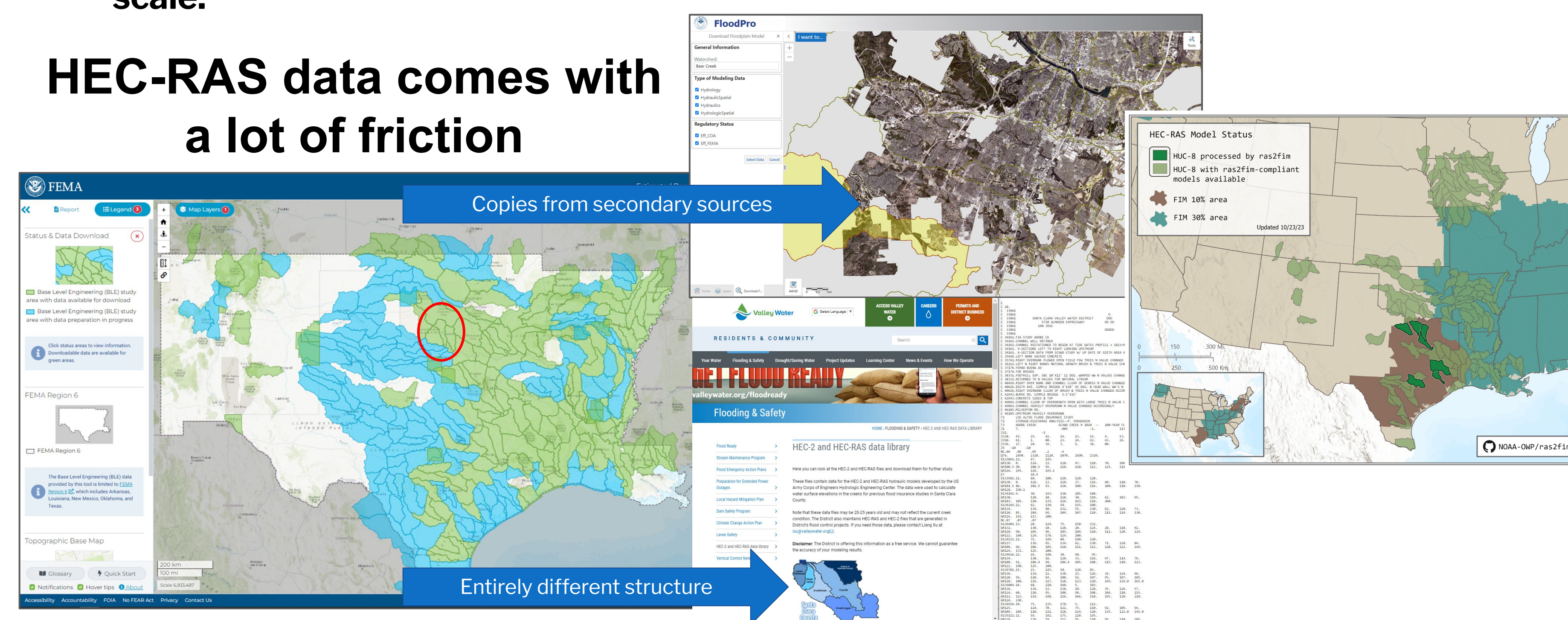
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## Challenges

Imagine trying to answer questions like "*What HEC-RAS models are available for my Area of Interest?*" or "*Do we have this HEC-RAS model in our catalog?*"

These questions are non-trivial because collections of HEC-RAS models are *rarely similarly formatted*. HEC-RAS has been in operational circulation for almost 30 years and is useful to a wide variety of hydraulic applications but *isn't organized in a standard spatial data format*. Identifying whether a HEC-RAS model is available and compliant for a given use case requires unsustainable manual inspection and intervention at scale.

## HEC-RAS data comes with a lot of friction



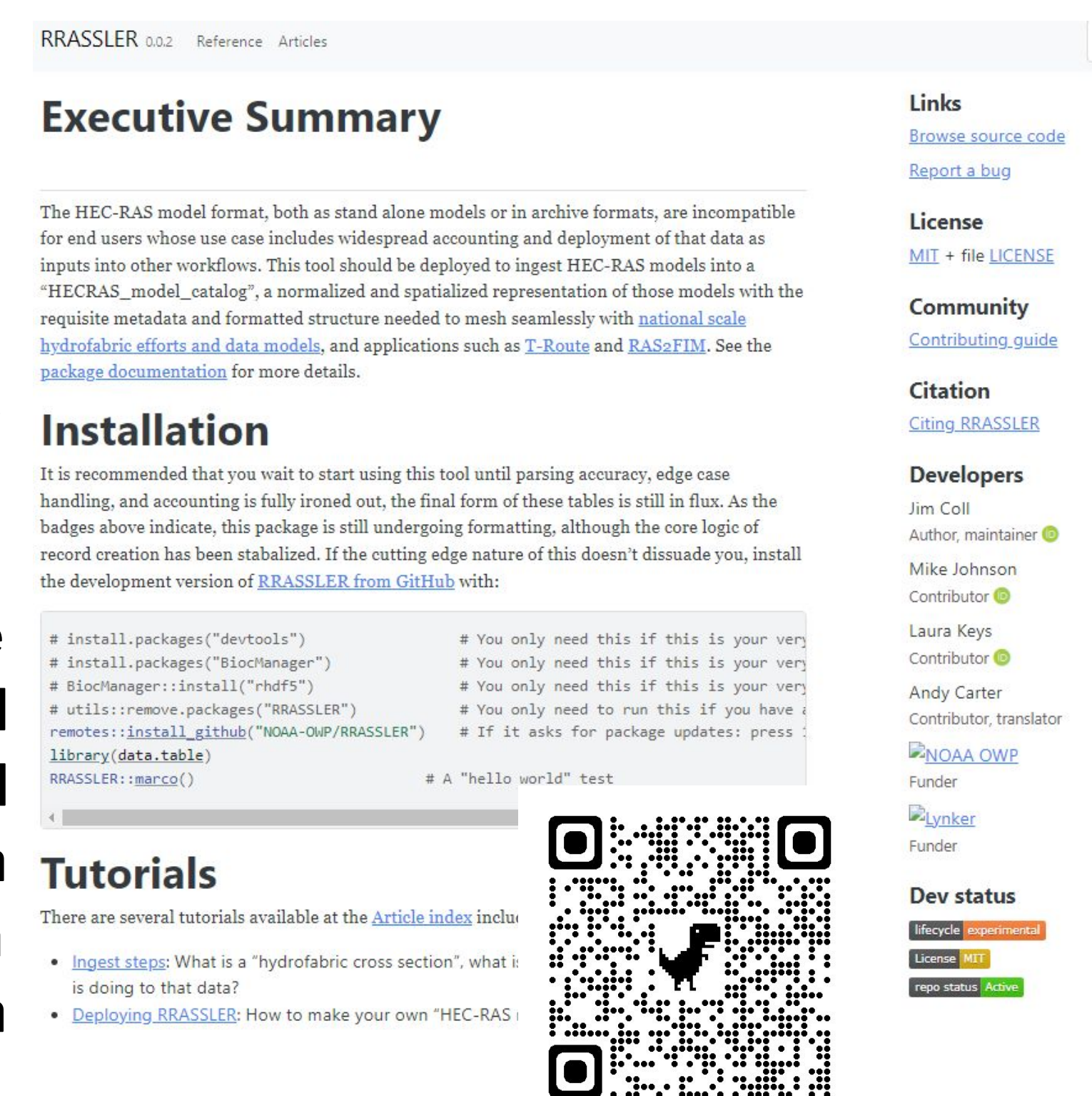
## Goal

F.A.I.R., or Findable, Accessible, Interoperable, and Reusable, are adjectives describing principles and requirements which are aimed at enhancing how users programmatically interact with data. We focus on applications which use HEC-RAS data to automate the generation of FIM libraries (RAS2FIM), and extraction of cross sections across the terrain. To accomplish that, **we need to make provided HEC-RAS data more F.A.I.R.**

## Solution

### A package to restructure HEC-RAS data to an interoperable data model

Many of the F.A.I.R. principles hinge on a unified source of metadata and a globally unique ID. We developed the R-based RRASSLER repo to ingest HEC-RAS models into common geospatial formats and conflate them with reference catchments. The result is a model placed in space with the requisite metadata and formatted structure needed to mesh seamlessly with national scale hydrofabric efforts and related data models. Every model is uniquely identified based on space, model name, and last-modified timestamp.



## ACKNOWLEDGEMENTS:

Credit to the packages used in the development, testing, and deployment of RRASSLER listed in the repo DESCRIPTION. We are appreciative of the FEMA region 6 group and the BLE data they make publicly available. Built copying patterns from RAS2FIM.

## REFERENCES:

### Links to repositories:

<https://github.com/NOAA-OWP/RRASSLER>  
<https://github.com/NOAA-OWP/ras2fim>  
<https://github.com/NOAA-OWP/hydrofabric>  
<https://github.com/NOAA-OWP/t-route>  
<https://doi-usgs.github.io/nhdplusTools/>

### Links to images:

<https://webapps.usgs.gov/infrm/estBFE/>  
<https://maps.austintexas.gov/FloodPro/>  
<https://www.valleywater.org/flooding-safety/hec-2-and-hec-ras-data-library>



## CONTACT

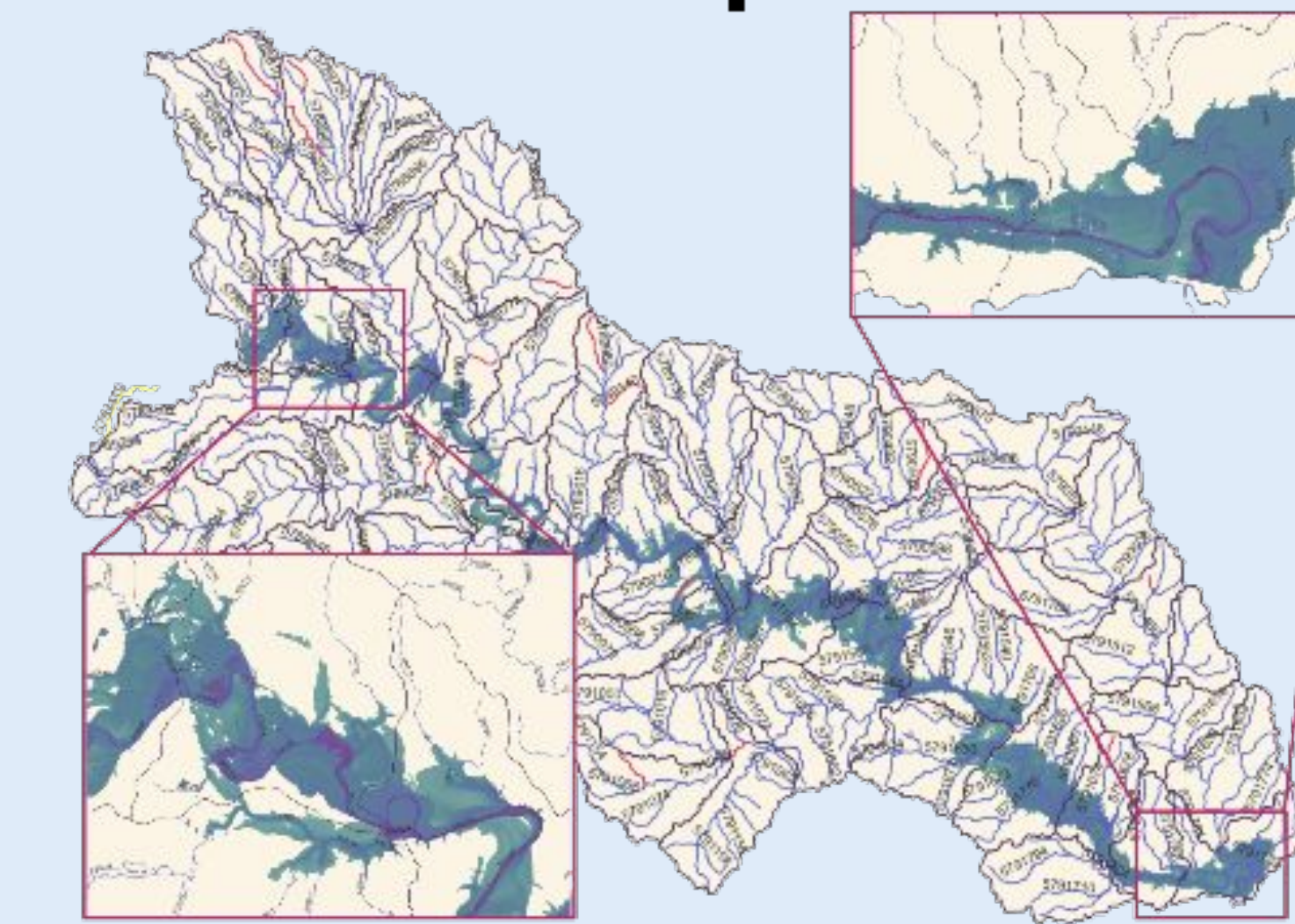
Website: <https://water.noaa.gov>  
Email: [nws.nwc@noaa.gov](mailto:nws.nwc@noaa.gov)

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## FAIR HEC-RAS data reduces friction across a suite of Applications

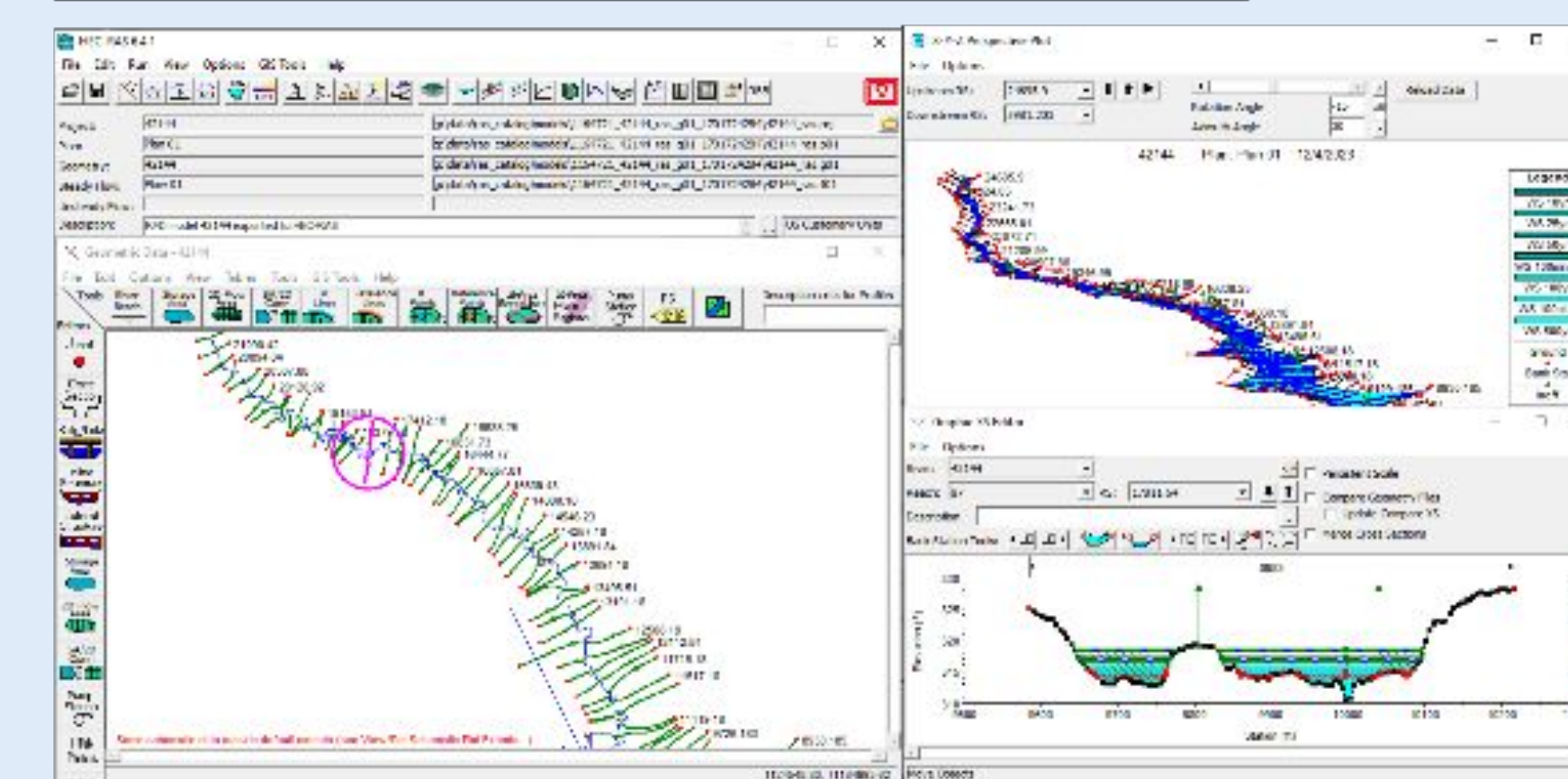
### Flood Inundation Mapping RAS2FIM Input Models



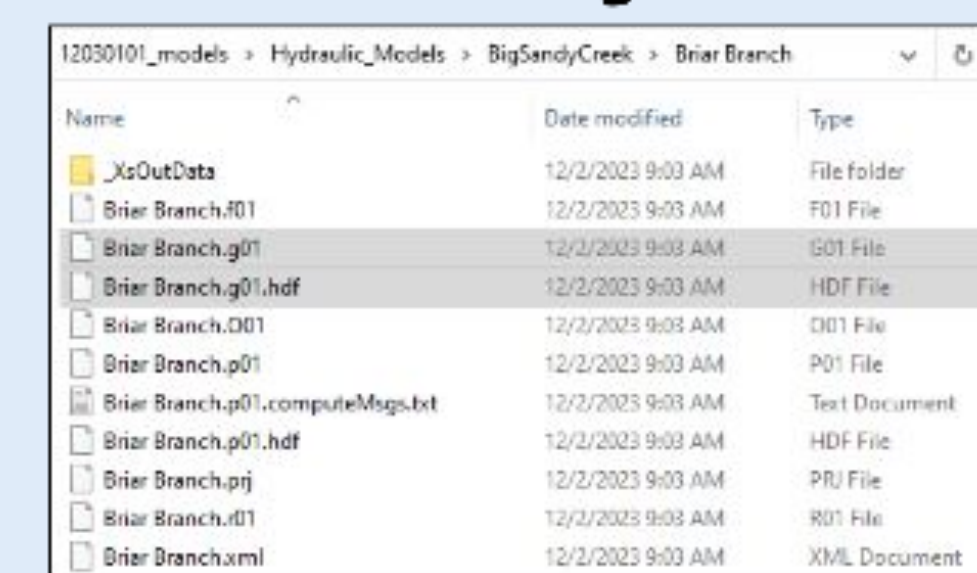
### Channel Routing T-Route Cross Sections



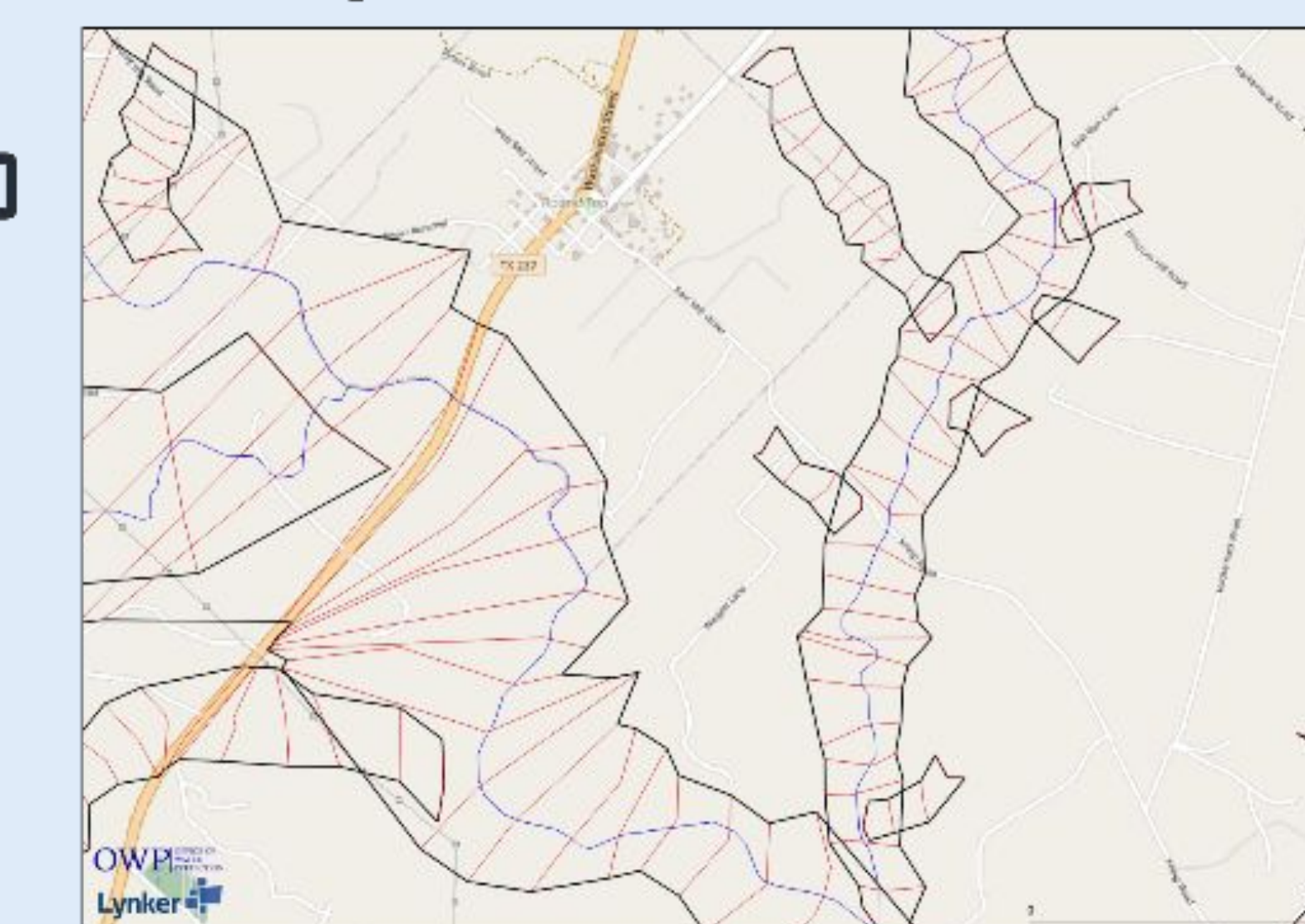
### HEC-RAS Model Data



### Geometry Files



### Geospatial Data



### Points of station / elevation

	id	length	id_d	x	y	z	n	source	master_id
1:	1231.8369	[m]	0.00000	-97.29359	29.98529	137.8367	0.05	3	1
2:	1231.8369	[m]	0.85344	-97.29358	29.98528	137.8367	0.05	3	1
3:	1231.8369	[m]	2.56032	-97.29358	29.98527	137.6843	0.05	3	1
4:	1231.8369	[m]	4.23672	-97.29357	29.98525	137.6233	0.05	3	1

### HEC-RAS Models

- hull.fgb
- ras\_xyz.parquet
- UNT 90 in DavidsonCrN.f01
- UNT 90 in DavidsonCrN.g01
- UNT 90 in DavidsonCrN.g01.hdf
- UNT 90 in DavidsonCrN.O01
- UNT 90 in DavidsonCrN.p01
- UNT 90 in DavidsonCrN.prj
- UNT 90 in DavidsonCrN.r01

### Unified Cross Sections

master_id	12390
1	12390
2	12911
3	12571
4	12650

### Cataloged Model Metadata

start_master_id	Name	crs	units	path	source	end_master_id
1	1 ALUM 006	EPSG:2277	Foot	2_ALUM 006_g01_1690523282	FEMA Region 6:12090301	10
2	11 ALUM 008	EPSG:2277	Foot	2_ALUM 008_g01_1690523282	FEMA Region 6:12090301	21
3	22 ALUM 014	EPSG:2277	Foot	2_ALUM 014_g01_1690523282	FEMA Region 6:12090301	31
4	32 ALUM 017	EPSG:2277	Foot	2_ALUM 017_g01_1690523282	FEMA Region 6:12090301	40