RIMORPHIS - Cyberinfrastructure

River Morphology Information System

1st Annual Stakeholder Workshop

May 12 & 19, 2021

Ibrahim Demir
University of Iowa

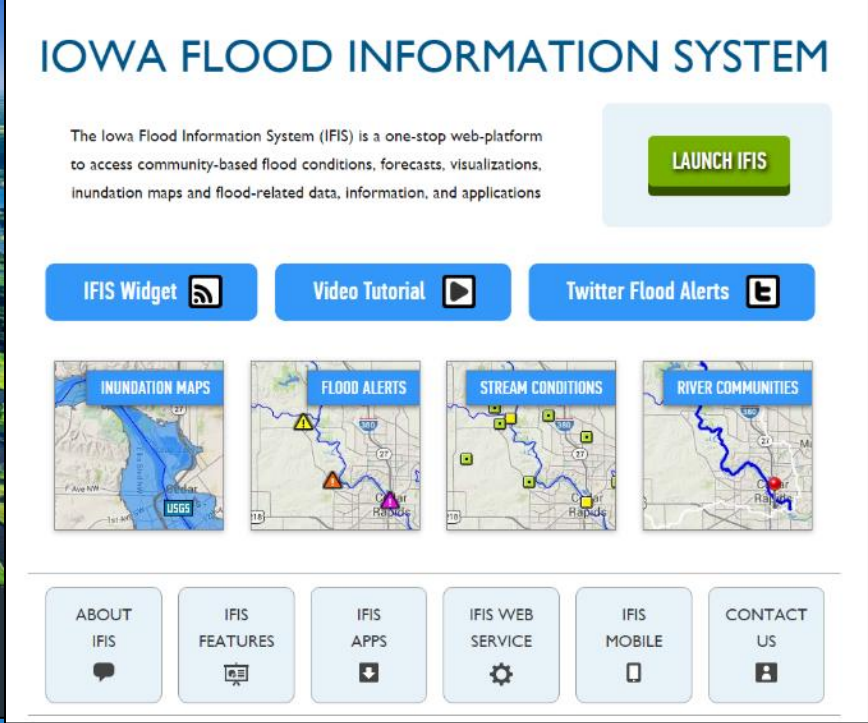


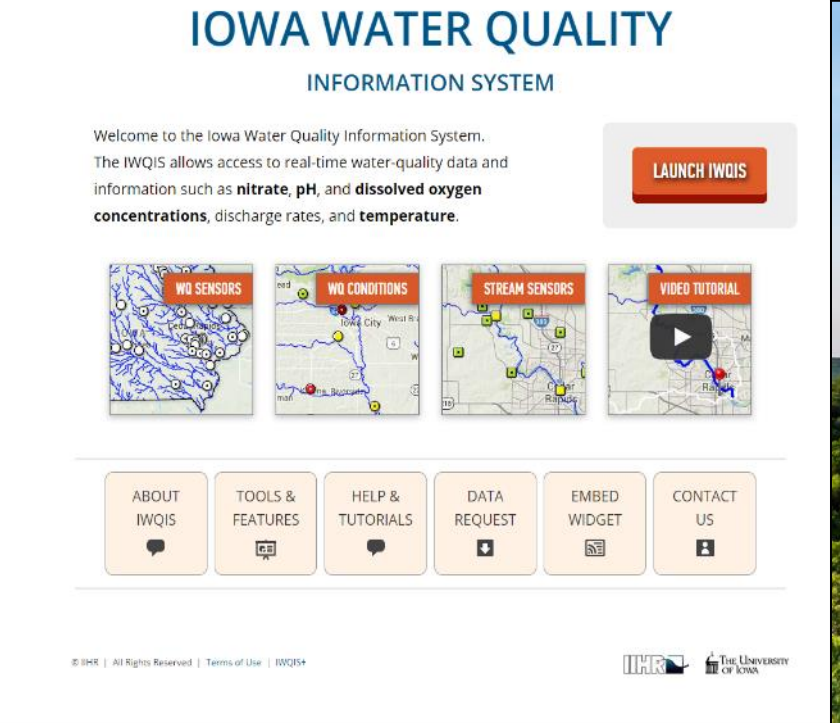
PURDUE UNIVERSITY | IOWA | SAINT LOUIS UNIVERSITY | University of Colorado Boulder

Team Projects

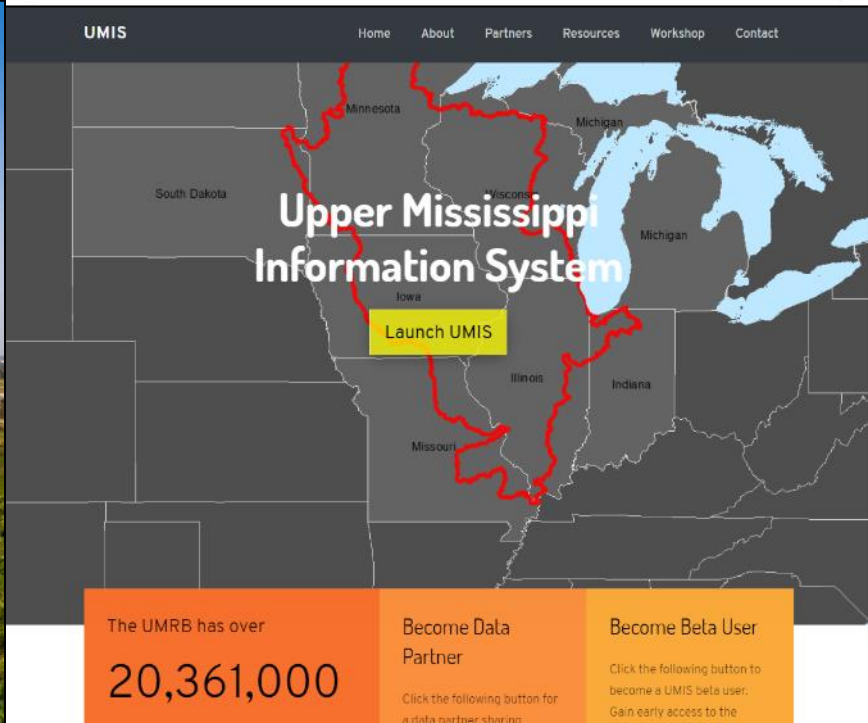












RIMORPHIS - Cyber Activity Plan

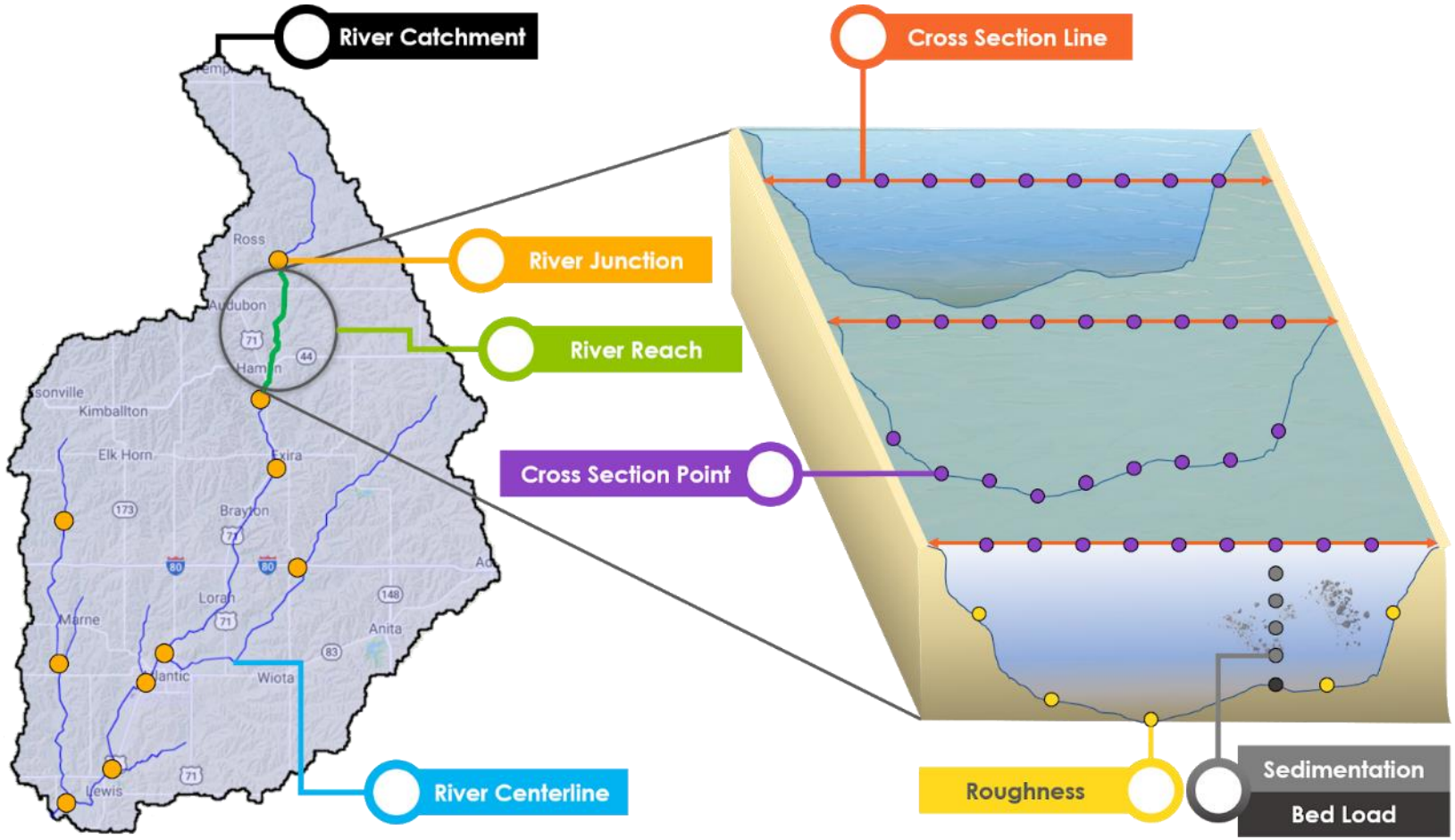
- Project Website (rimorphis.org) — Year 1
- Data Specification and Relational Data Model — Year 1
- Reference Data Collection from NHDPlus — Year 1
- Data Collection from Partners — Year 1 & 2
- Data Exchange Services - API — Year 1 & 2
- Design and Development of Web-based Platform — Year 2 & 3
  - Integration of data from NHDPlus and data partners
  - Designing data exploration and visualization tools
- RIMORPHIS Platform Pilot & Launch — Year 2 & 3

RIMORPHIS - Project Website www.rimorphis.org



RIMORPHIS - Data Organization

Point to Watershed Scale Data Structure

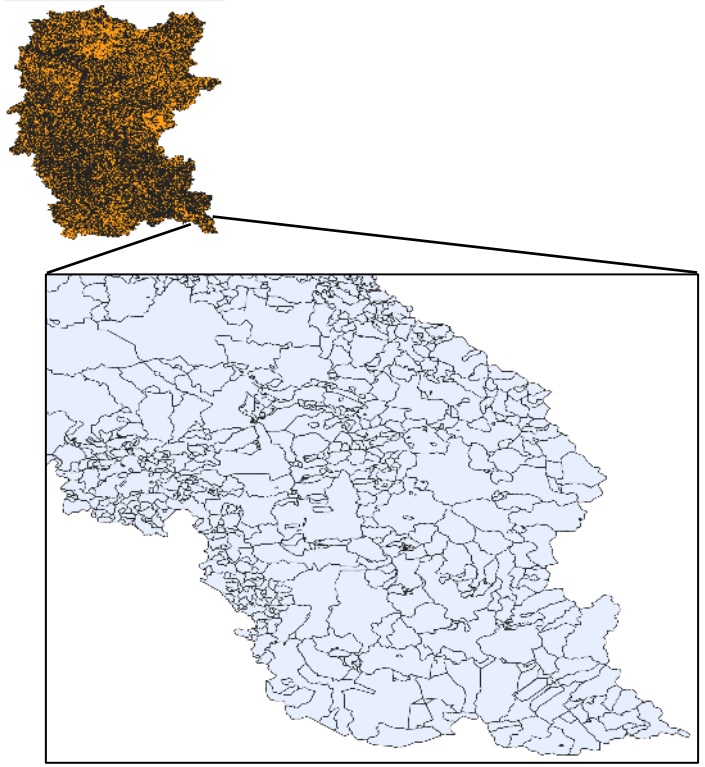


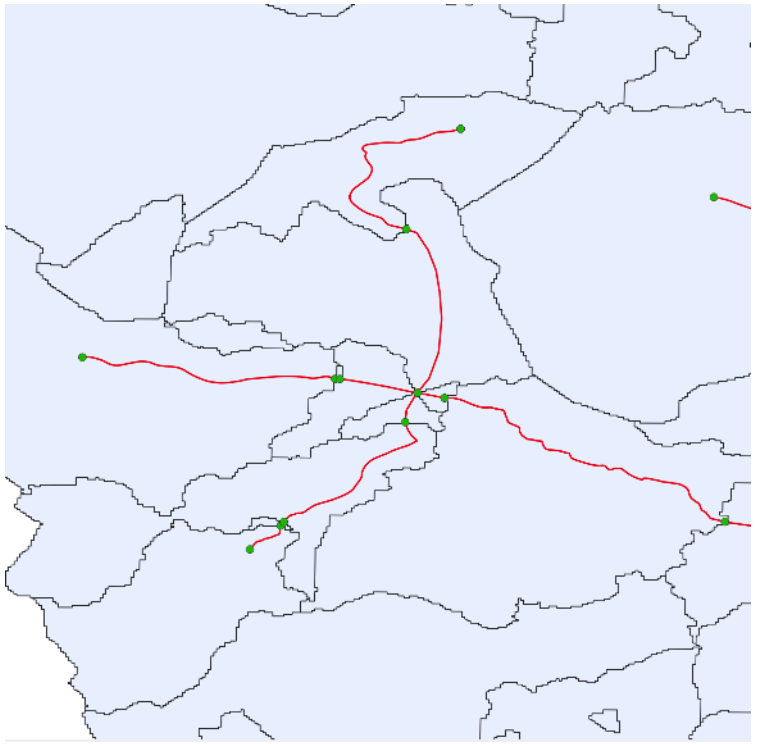
RIMORPHIS - Data Organization

NHDPlus HR based referencing structure

HUC4 Catchment → NHD Catchments → Flowlines & Junctions







RIMORPHIS – Relational Data Model and Specification

Catchment
NHDPlusID
Geometry
Area (Km^2)

Flowline
NHDPlusID
Reach Code
Geometry
Length (Km)

FlowlineVAA
NHDPlusID
Reach Code
Up & Down Flowline
Slope
Path Length
…

Flow
NHDPlusID
Direction
From Flowline
To Flowline
Node ID

Junction
latitude
longitude

HUC 2,4,6,8,10
shape

HUC 12
shape
downstream

RIMORPHIS – Relational Data Model and Specification

RiverCatchmentNHD
RiverCatchmentNHDID
Area (Km^2)

Catchment geometry (polygon) will be stored as JSON, and can be accessed with convention:

nhd-catchment-nhdplusID.json

RiverFlowline
RiverFlowlineID
ForeignID
ForeignReachCode
DownFlowlineID
FromJunctionID
ToJunctionID
RiverName
Length (Km)
Slope

Similarly, save as JSON:

nhd-flowline-nhdplusID.json

RiverJunction
RiverJunctionID
Location (point)
ForeignID (nodeid)
DownJunctionID

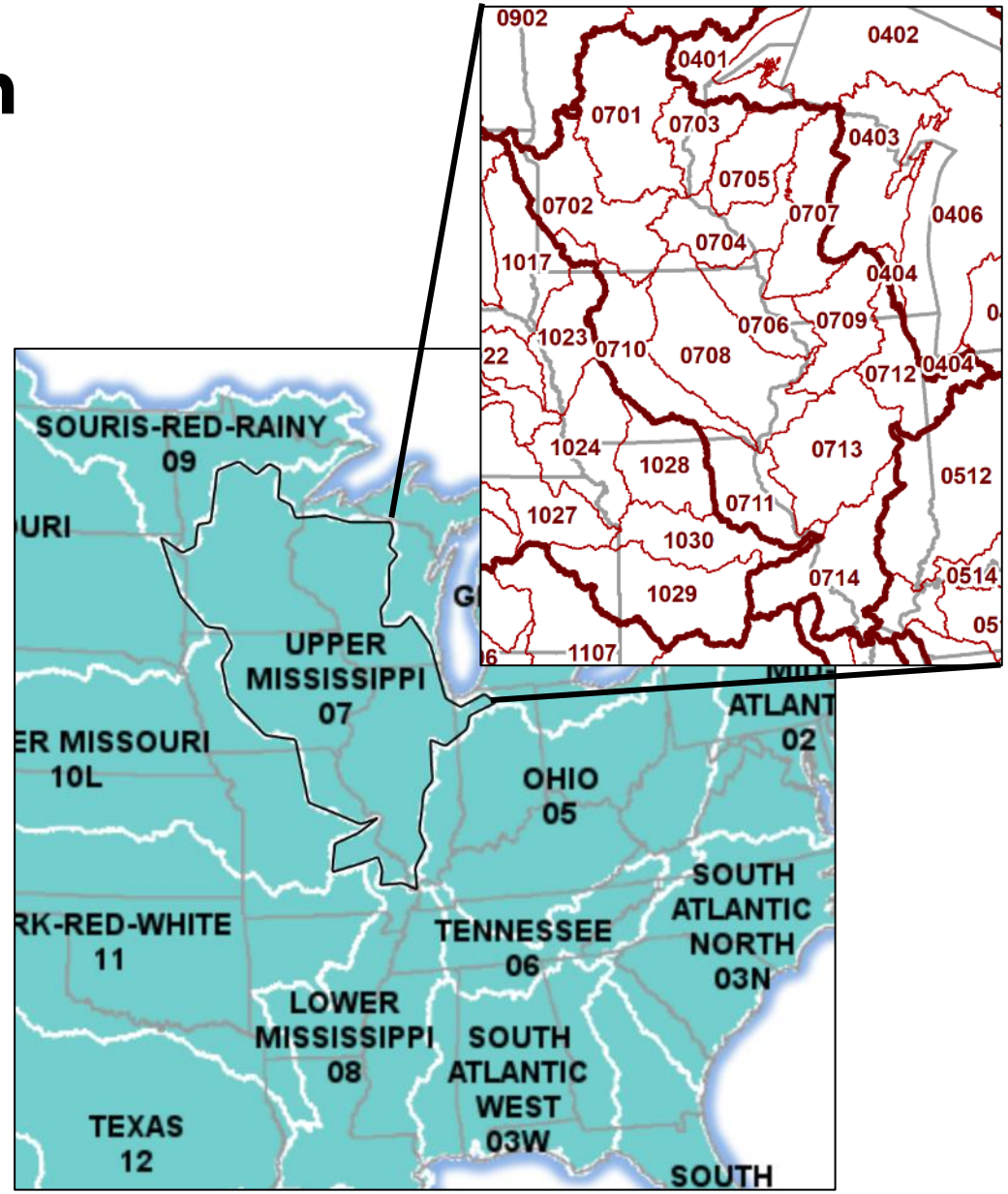
RIMORPHIS – Pilot Data Collection

Data Stats for Region 07 (Upper Mississippi)

	CATCHMENT	FLOWLINE	JUNCTION
Data Size	4.47_{gb}	462_{mb}	14_{mb}
# of Records	1,148,826	627,746	623,616

Data Stats for Region 05 (Ohio)

	CATCHMENT	FLOWLINE	JUNCTION
Data Size	8.55_{gb}	1.96_{gb}	60_{mb}
# of Records	2,194,880	2,214,488	2,182,492



HUC2 Watersheds

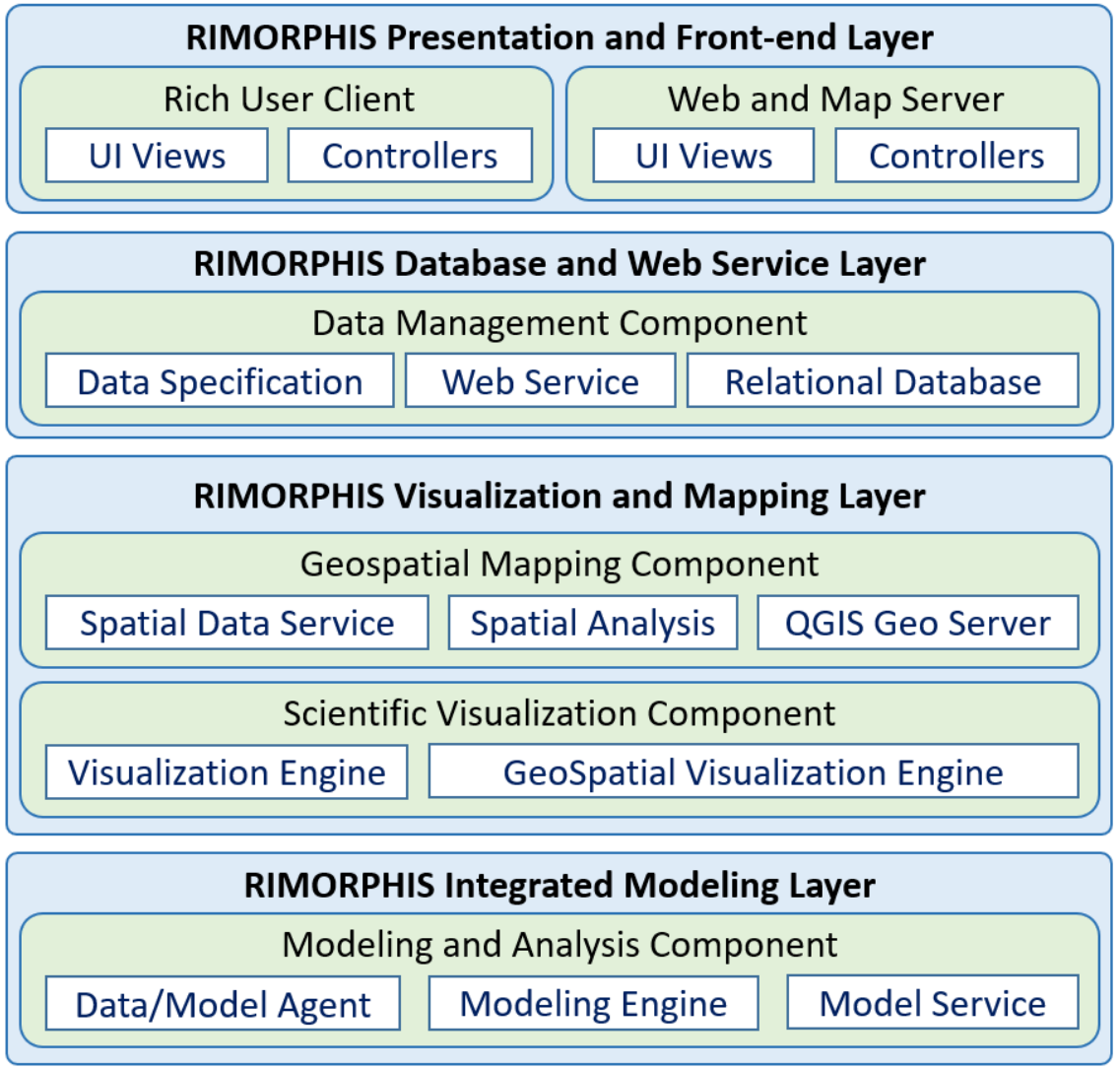
RIMORPHIS – Data and Tools

Potential Datasets and Tools for using with RIMORPHIS

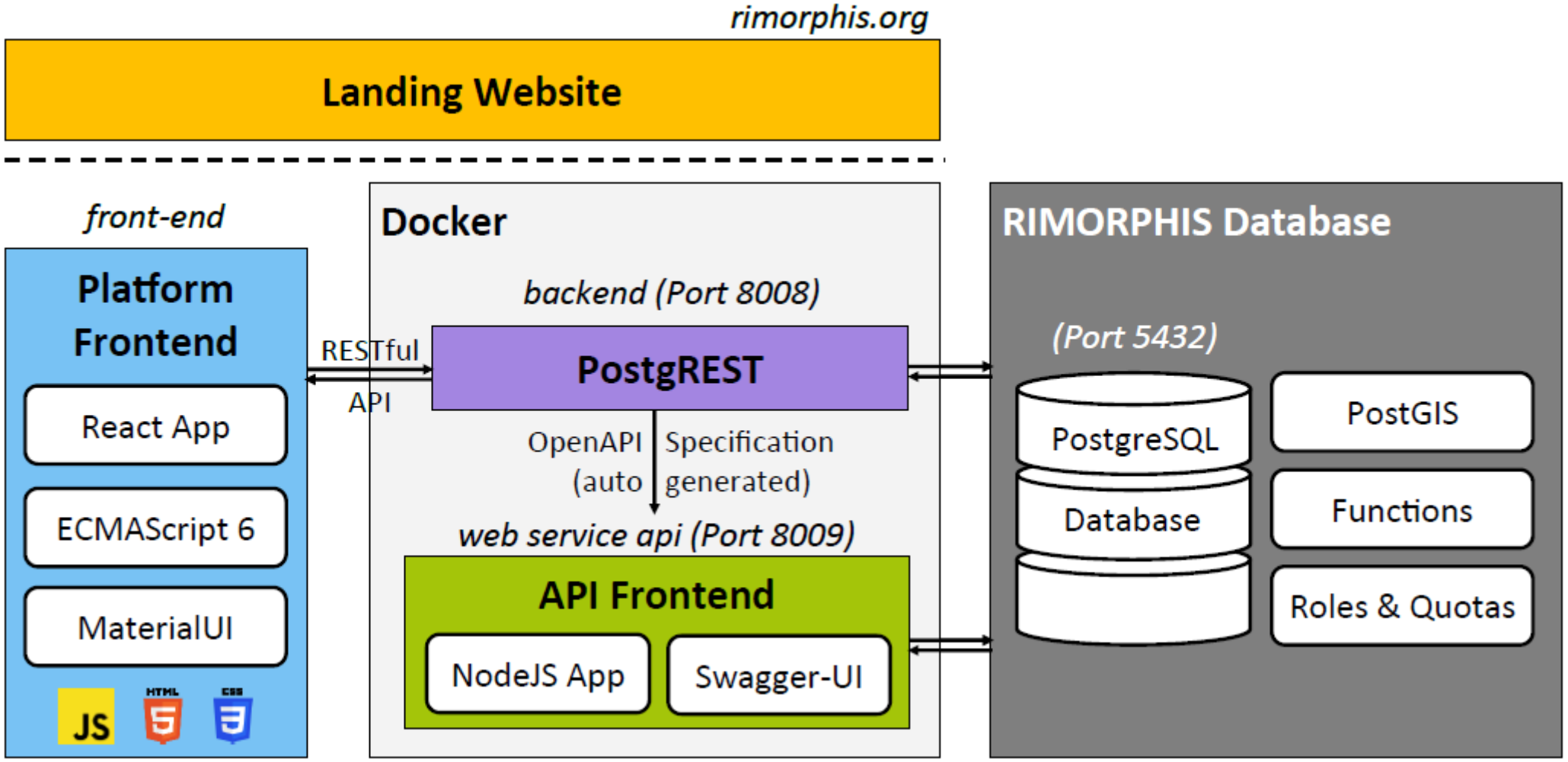
Datasets	USGS National Hydrography Dataset (**NHD**)	USGS 3-D Elevation Program (**3DEP**)
	USACE Reservoir Sediment Information (**RSI**)	USGS **StreamStats**
	USACE* Hydrographic Surveys (**eHydro**)	USGS **Vigil Network**
	USGS National Water Information System (**NWIS**)	NRCS **Regional Curves** Datasets
	USGS Surface Water Oceanographic Topography (**HYDRoSWOT**)	

Tools	USGS Stream Channel and Floodplain Metric Toolbox (**SCDMT**)	USGS DEM **Geomorphology Toolbox**
	Geomorphic Change Detection (**GCD**) Software	USACE **Cross Section** Viewer
	USACE Sediment Analysis & Geo-App (**SAGA**)	

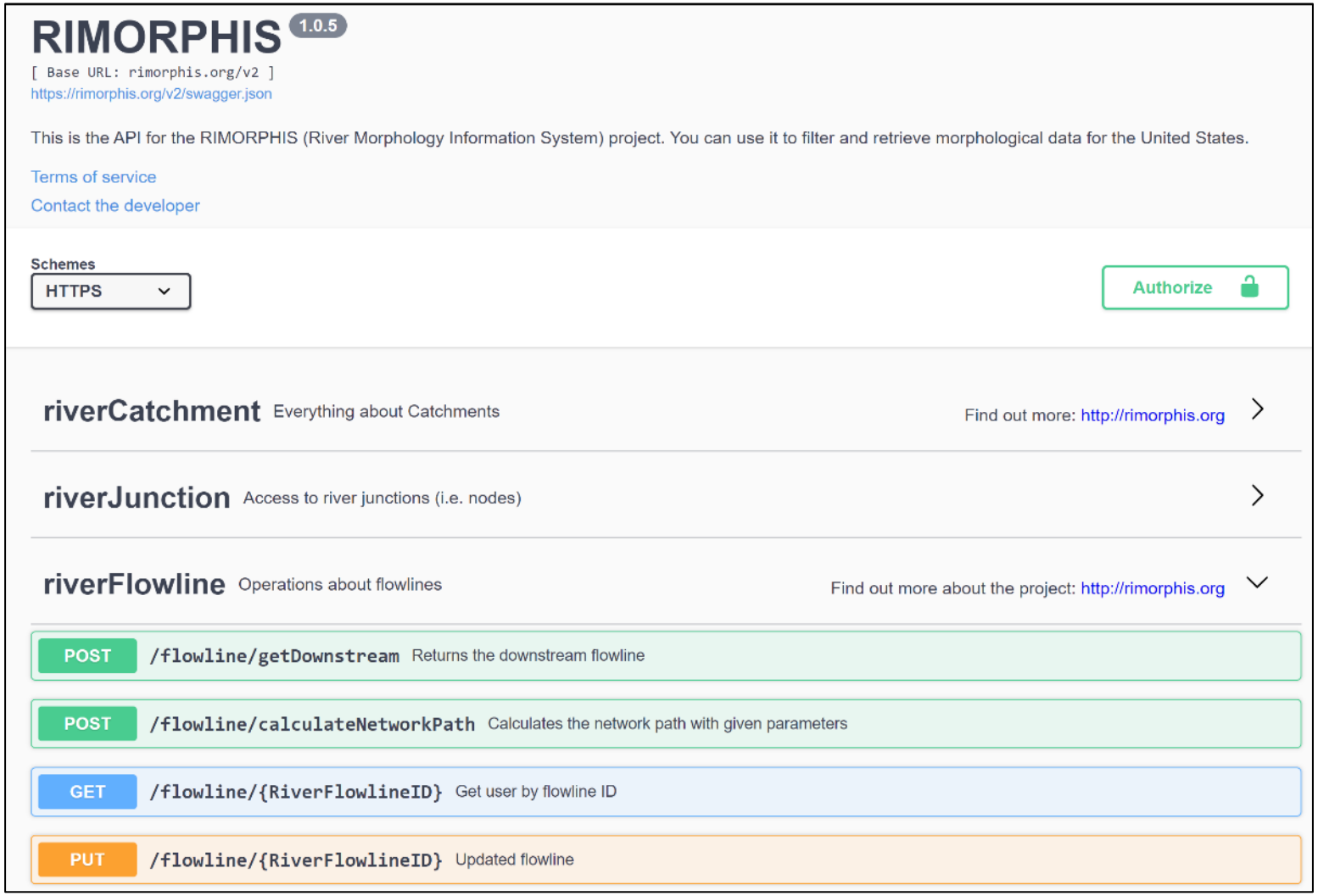
RIMORPHIS - System Architecture



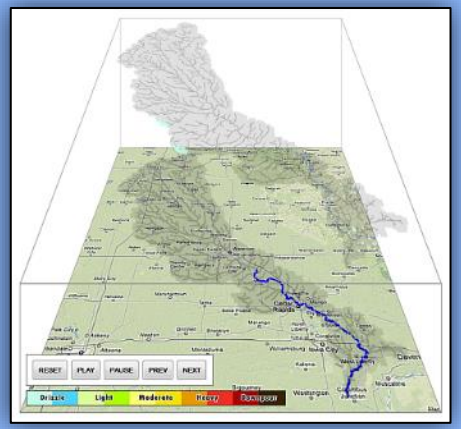
RIMORPHIS - System Implementation

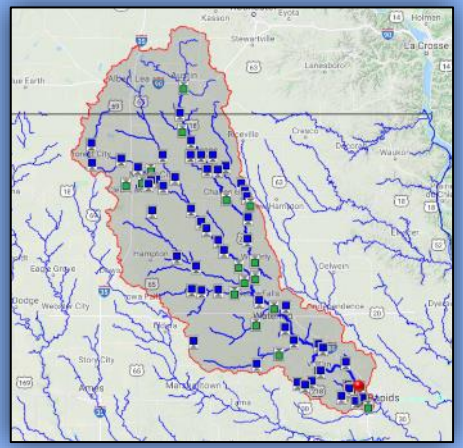


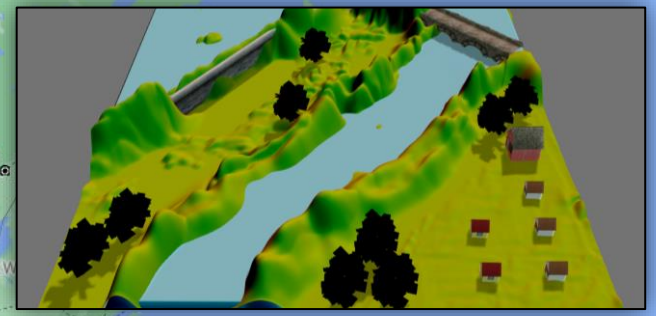
RIMORPHIS API - Data Exchange Service

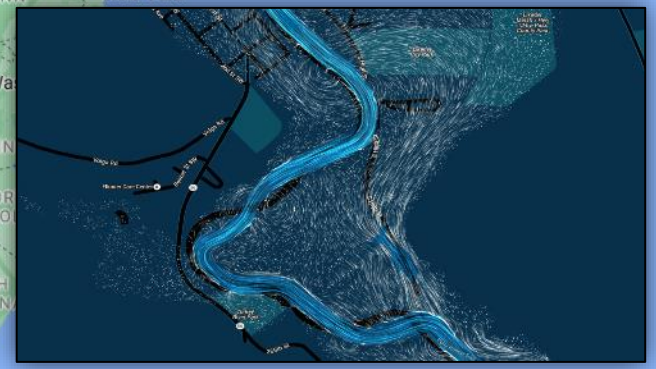


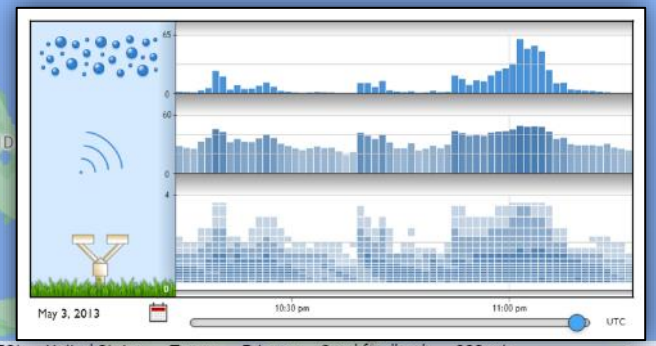
RIMORPHIS











Data Exploration and Visualization Platform

We need your feedback and suggestion for potential features and capabilities

Questions?