



# WaM-DaM: A Relational Model to Organize and Discover Systems Water Management Data



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A Utah-Wyoming water science and  
cyberinfrastructure collaboration



## Contributions

- **Propose** a persistent Water Management Data Model (WaM-DaM) to synthesize systems water management data
- **Organize** multiple data formats like time series, text, multi-column, and parameters from different sources
- **Overcome** semantic and syntactic heterogeneity in water management data
- **Discover** water management data for models

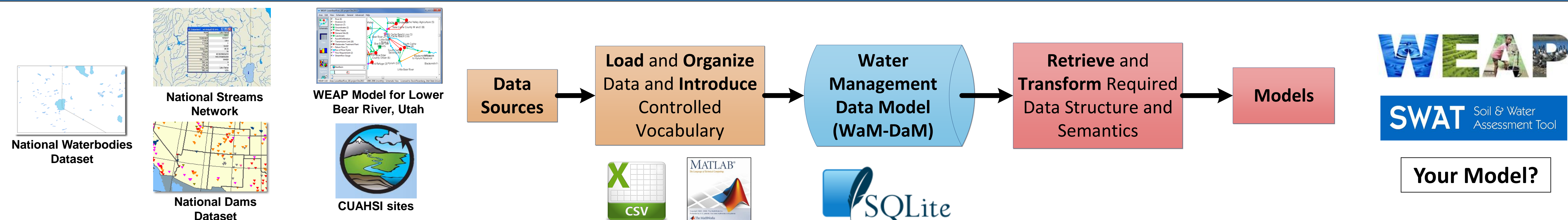
## Prior Approaches and WaM-DaM Principles

#	Principle	HEC-DSS	ODM	Hydro Platform	Arc Hydro	WEAP	RiverWare	WaM-DaM
1	Flexible and extensible modular design		X	X				X
2	Networks			X	X	X	X	X
3	Scenarios	X				X	X	X
4	Conditional query	X	X					X
5	Dynamic controlled vocabulary		X		X			X
6	Reusable descriptive & explicit metadata		X					X
7	Multiple data formats for systems models	X		X		X	X	X
8	Open-source environment		X	X	X			X

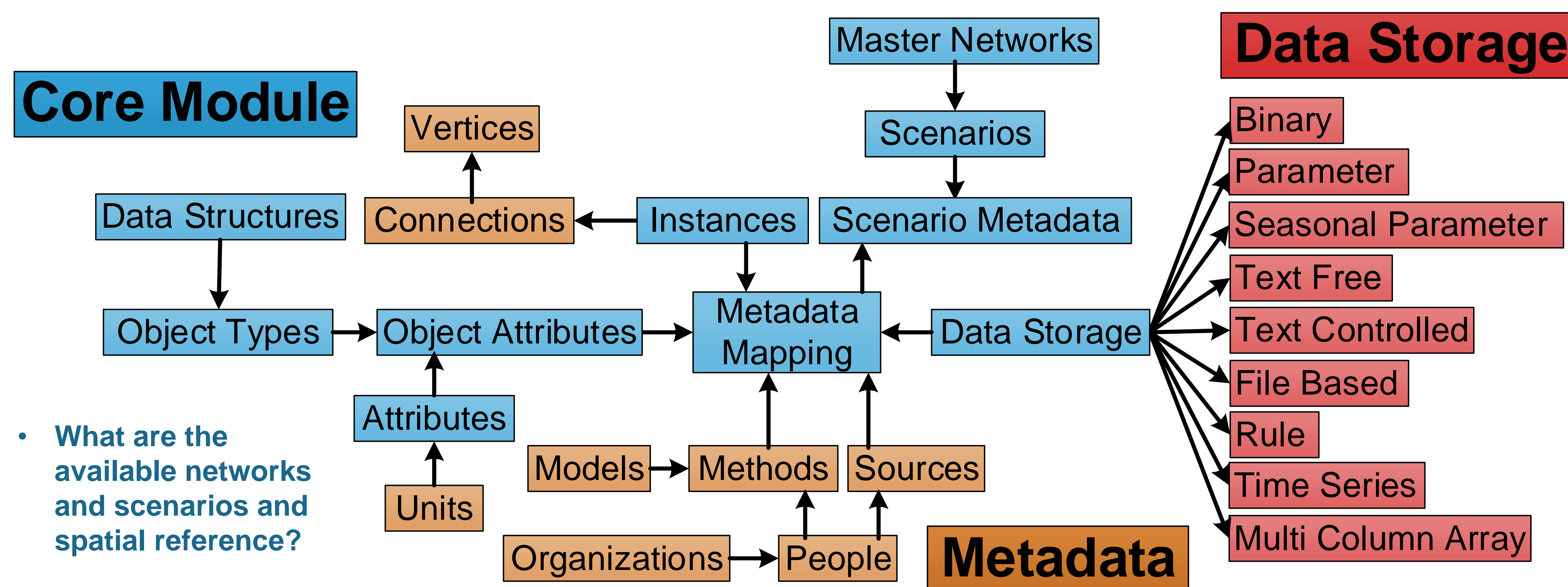
## Further Work

- **Automate** the process to discover data for models
- Develop web-services to **publish** water management data
- **Define** WaM-DaM as a Resource in HydroShare
- **WaM-DaM** to organize and serve your water management model data?

## WaM-DaM Workflow



## WaM-DaM Logical Data Model and Key Design Questions



## Discover Data to Expand Bear River WEAP Model

### Common data in lower (modeled) part of the Basin

Controlled Object Name	Native Object Name	Controlled Attribute Name	Native attribute Name	Unit Name	Parameter Value	Source
Reservoir	Water Body	Surface area	Area_mi	square mile	0.705	Water bodies
Reservoir	Dam	Surface area	SURF_AREA	acre	480	National Dams
Demand Site	Reservoir	Priority	Priority	NA	5	WEAP model
Site	NWIS CUAHSI	Precipitation	Precipitation	inch/year	20.5	CUAHSI HIS
River	Stream	Length	Length	mile	10.5	Streams Network

### Available data in upper (un-modeled) part of the Basin

Object Name	# Instances	# Attributes	Source
Gage Station	44	3	CUAHSI Sites
Reservoir	11	20	National Dams
Stream	20	3	National Streams

### No data present in upper Basin for:

Object Name
Demand Site
Groundwater
Transmission Link
Diversion

