SDA SWAT Edition: Efficient Spatial Data Analysis & Visualization for SWAT Results

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Outline

- Background of SDA
- Purpose
- SDA General Capabilities
- SDA *SWAT Edition*
- Example Applications
- Conclusions

Background of SDA

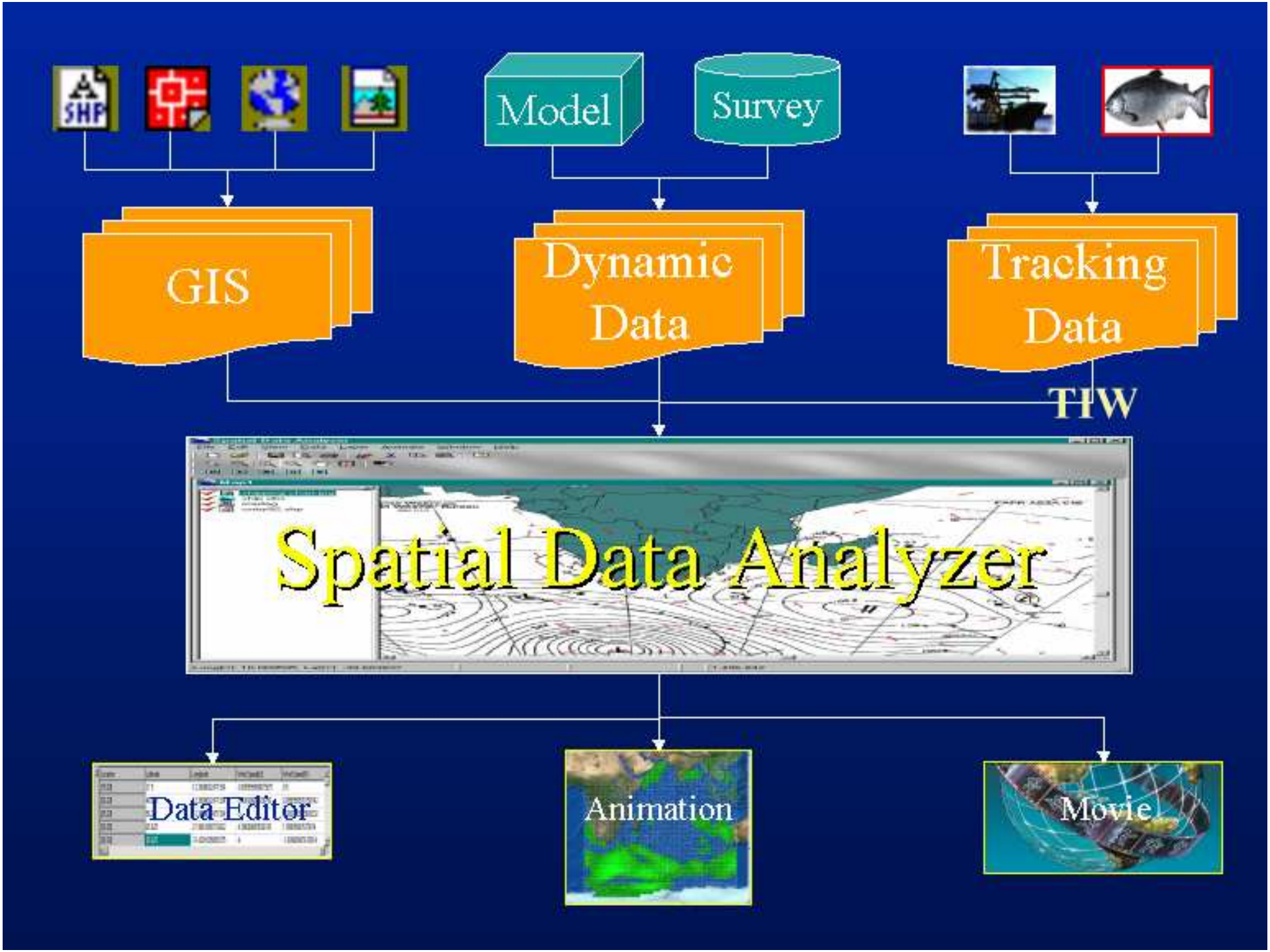
- SDA – Spatial Data Analyzer
- Baird developed software
- Visualization and analysis of numerical model data in a GIS environment
- Complements X-Vision visualization package
- Customized user interfaces
- Currently supported models:
  - STWAVE, MIKE21, MIKE3, ADCIRC, RMA2/SED2D, ECOM-SED, MISED, HEC6, GSSHA, SWAT

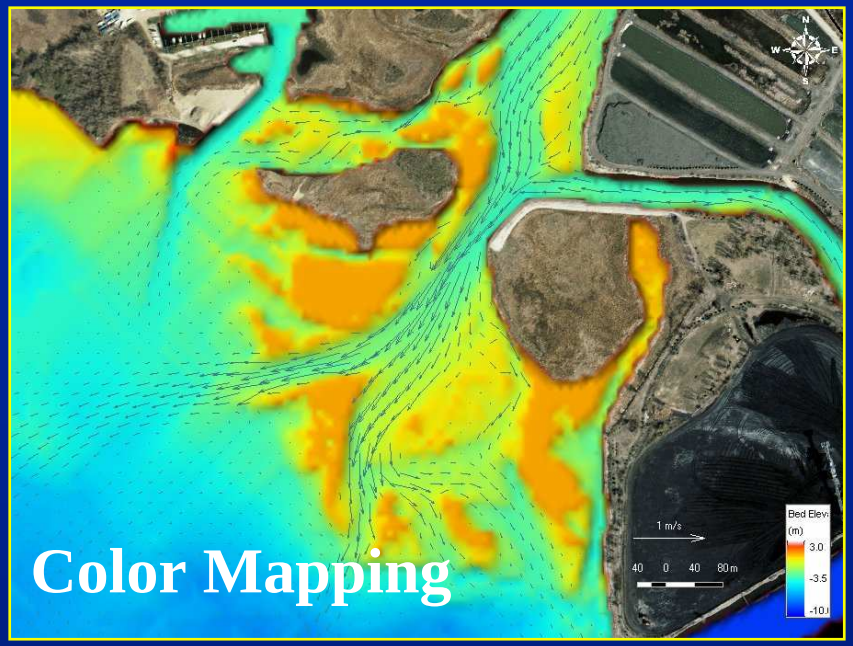
Purpose

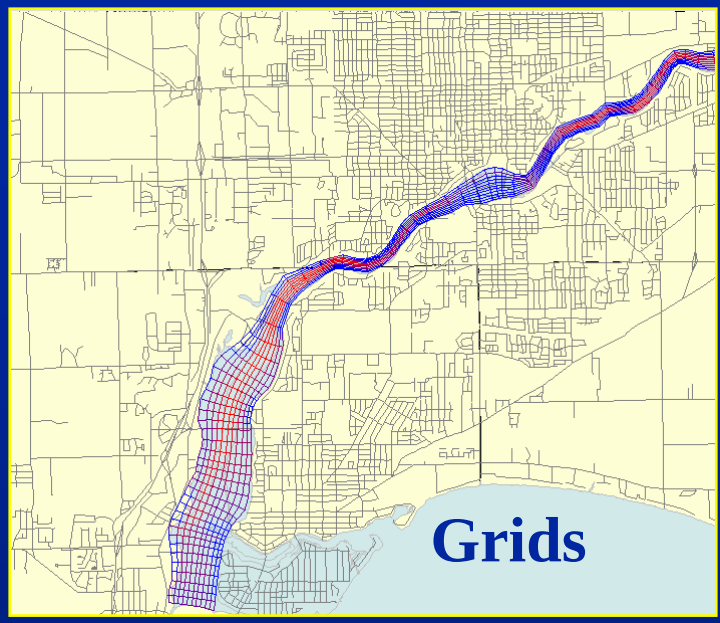
- Need for more efficient output analysis
- Limitations of ArcView interface
  - *Map results for one time step at a time*
  - *Problems reading daily results to dbf file*
- Limitations of Excel
  - *File size (number of rows)*
  - *Filtering & sorting*
- Need to communicate model results

SDA Capabilities

- GIS based data visualization tool
- Supports most GIS layers, dynamic data, and time series data in ASCII format
- Navigate and explore data in four dimensional space (3D space + time)
- Powerful data analysis and data extraction tools
- Convenient user interface
- Fast animation and quick reporting


SHP
Model
Survey
GIS
Dynamic Data
Tracking Data
TIW
Spatial Data Analyzer
Data Editor
Animation
Movie


Color Mapping
1 m/s
40 0 40 80 m
Bed Elevi
(m)
3.0
-3.5
-10.


Grids


Tracking
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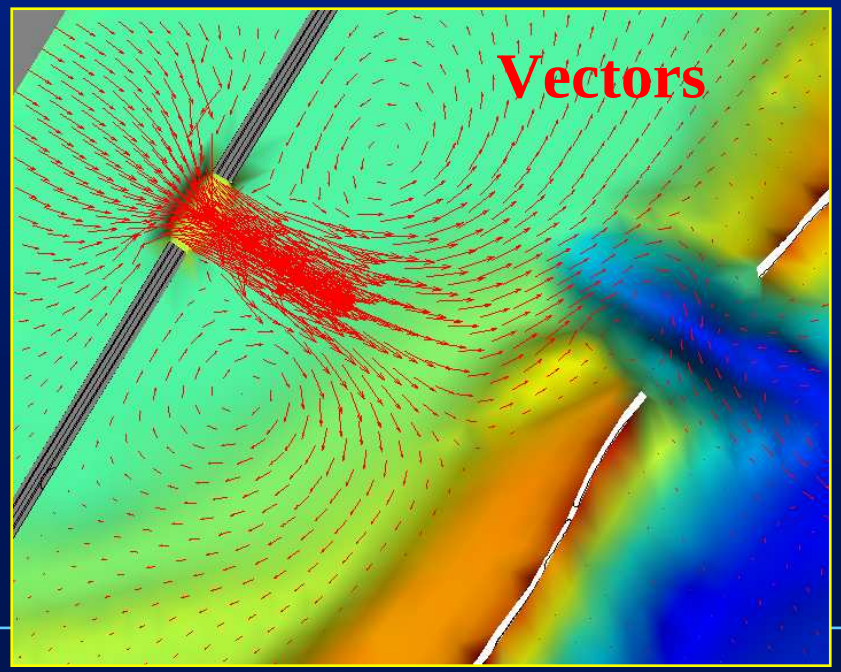
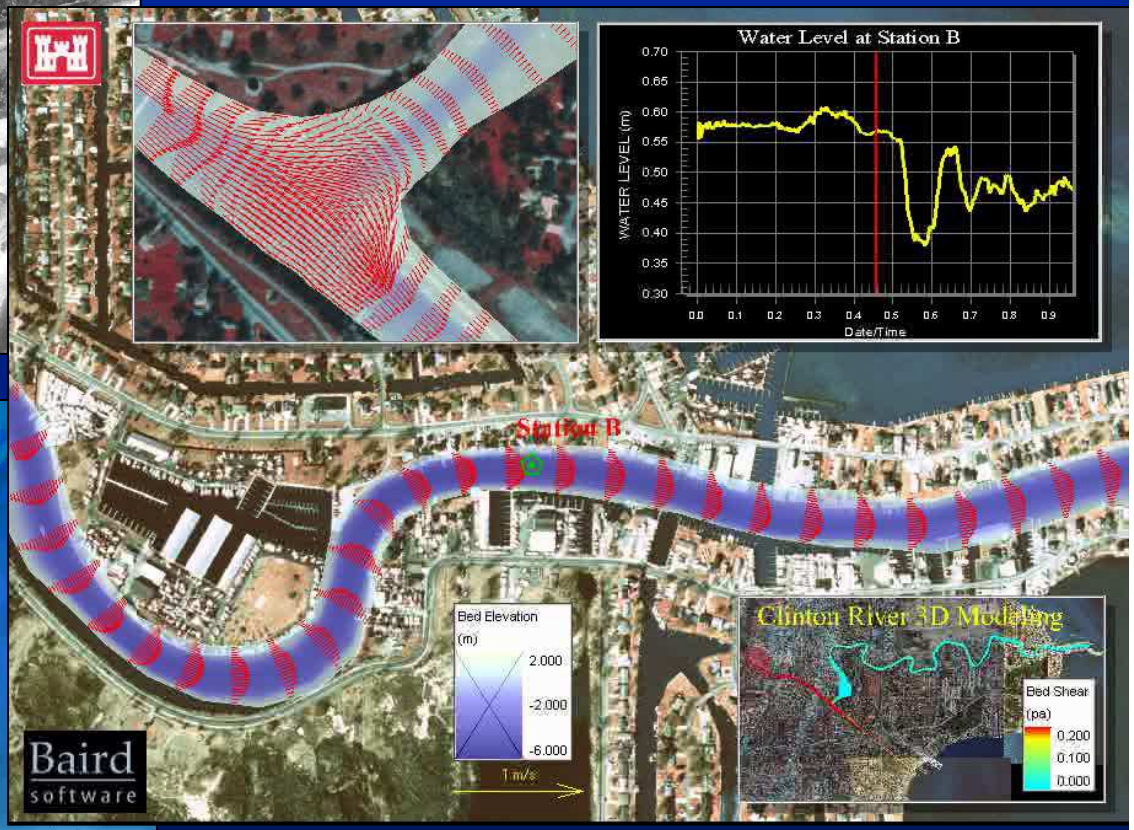
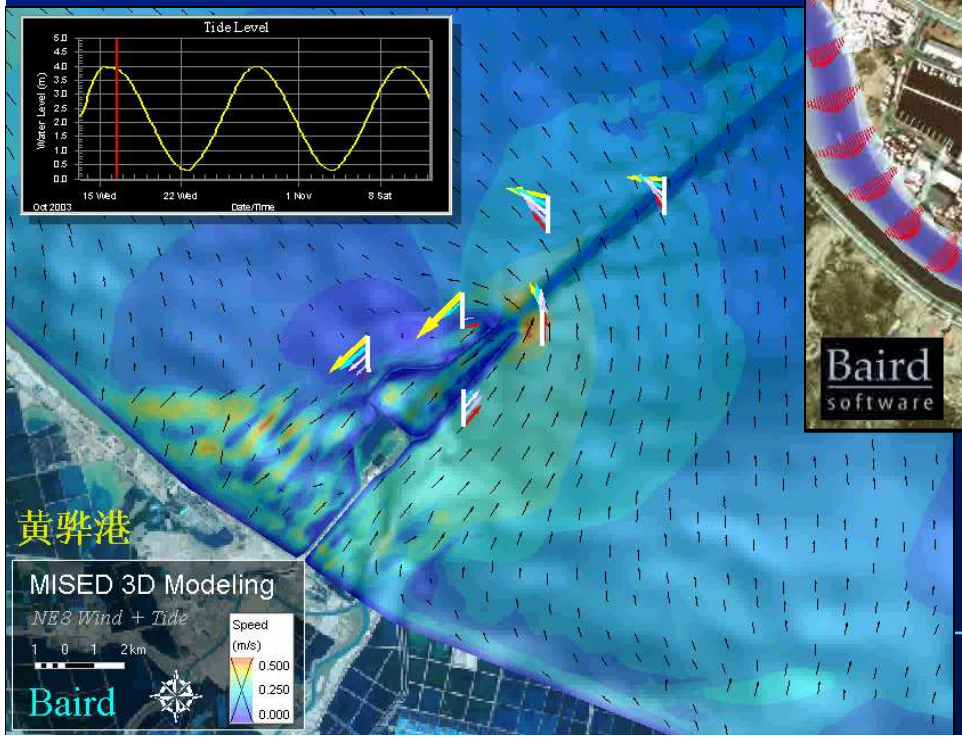

Vectors

Overlay on GIS layers

Multiple views

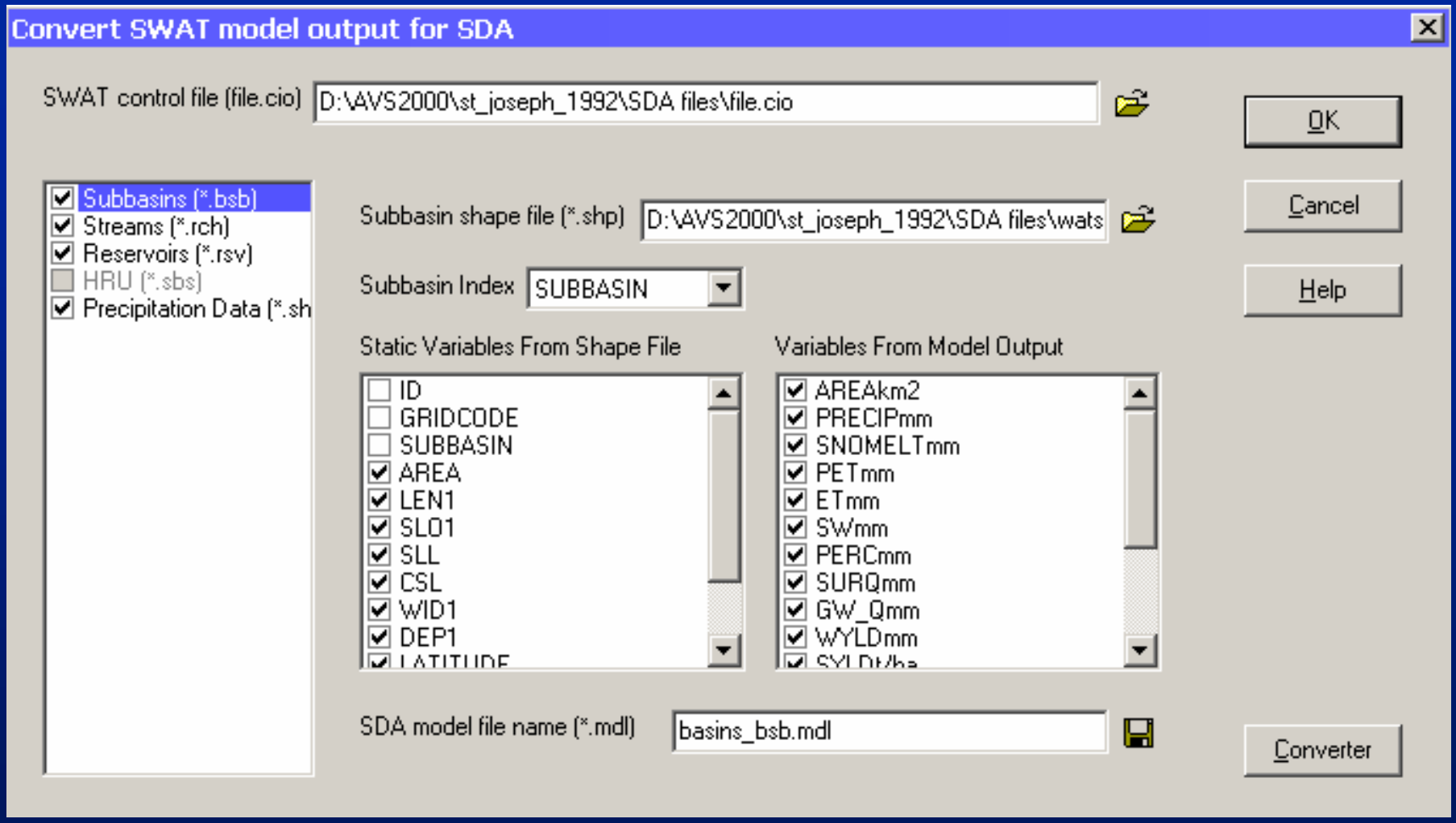




Time series viewer

SDA *SWAT Edition*

- Custom conversion tools
- View results by subbasin and reach
- View inputs & outputs
- View reservoirs & others
- View observed values along with model results
- Perform mathematical operations and transformations on data sets



Custom Conversion Tools

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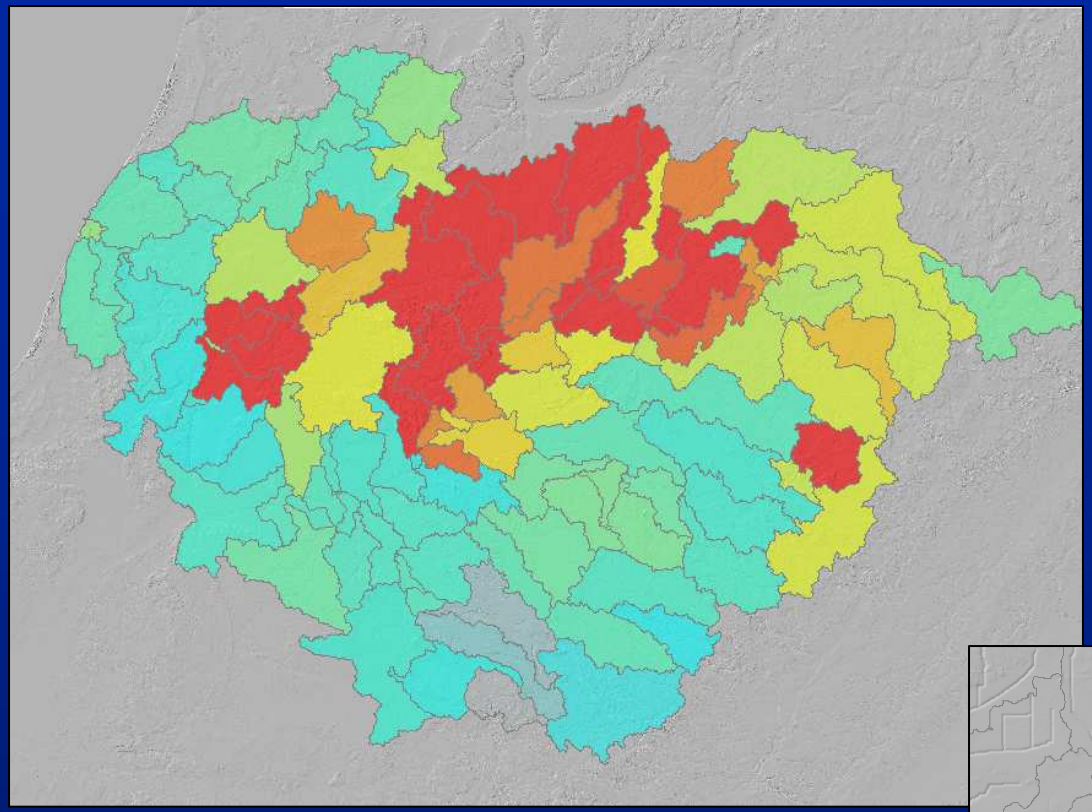

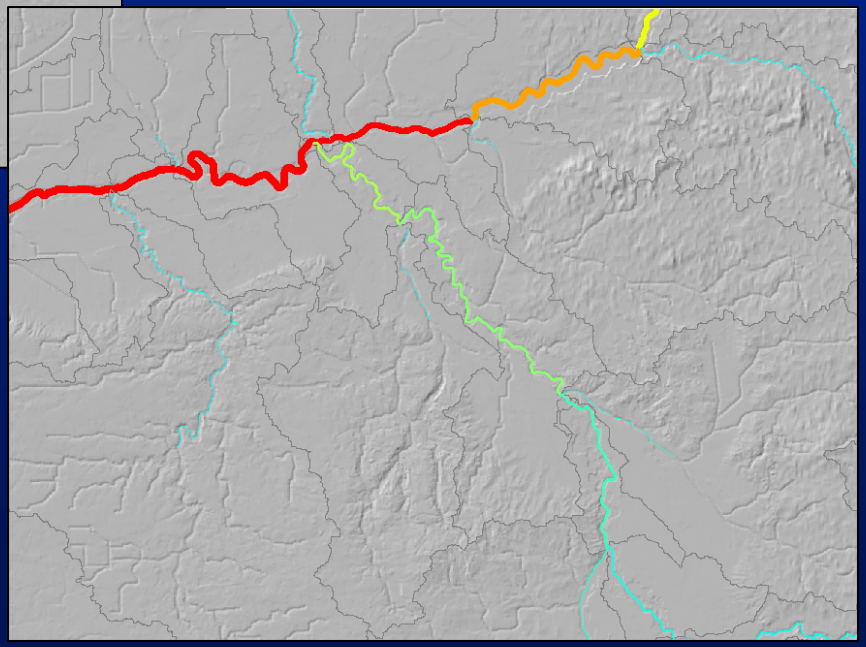

View results by
subbasin or reach

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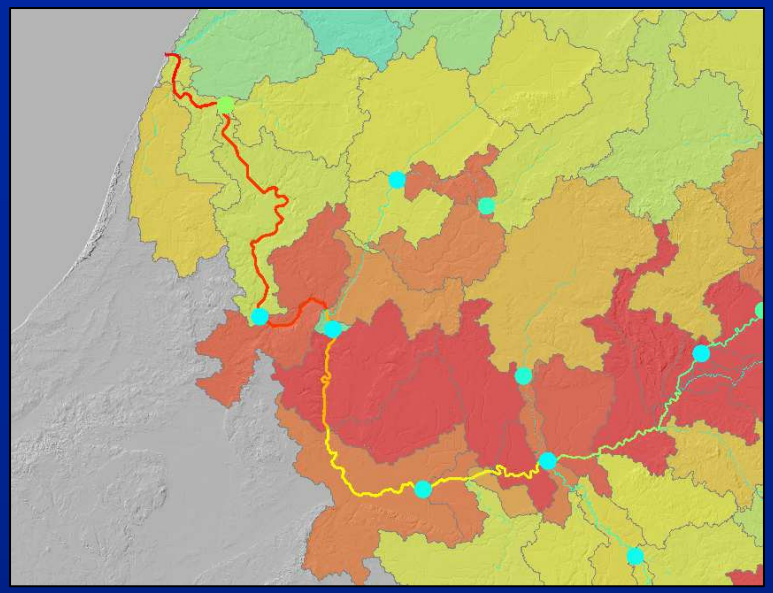
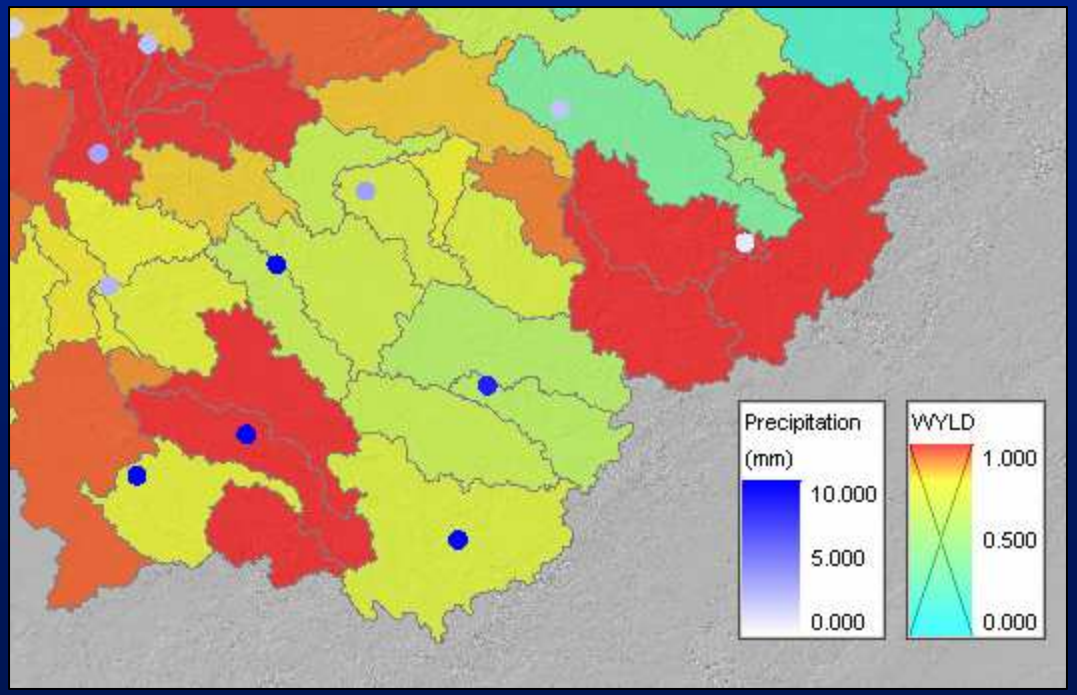


Reservoirs

View inputs and outputs

Precipitation stations



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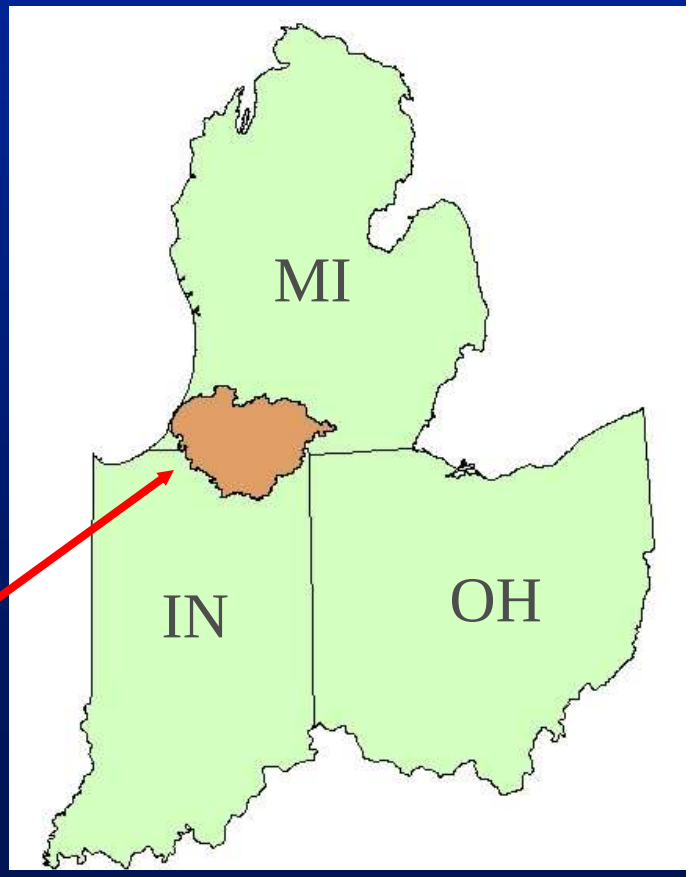
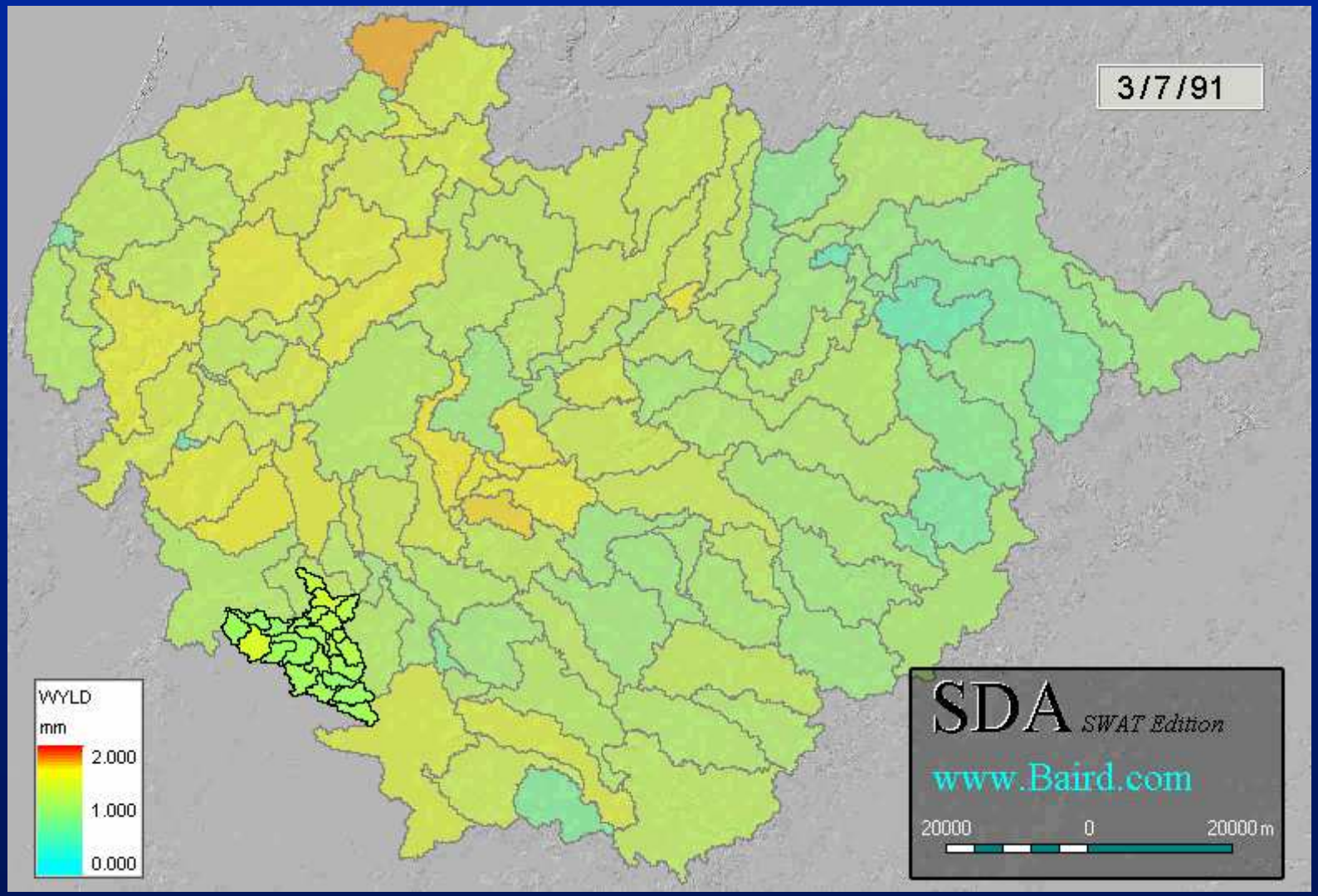
Other Features

- Export timeseries data from any point in model domain
- Plot observed values and simulated results together
- Apply mathematical operations to data sets
- Share results

Example Applications

- Multiple model domains
- Multiple scenarios
- GIS basemap
- Plot viewer



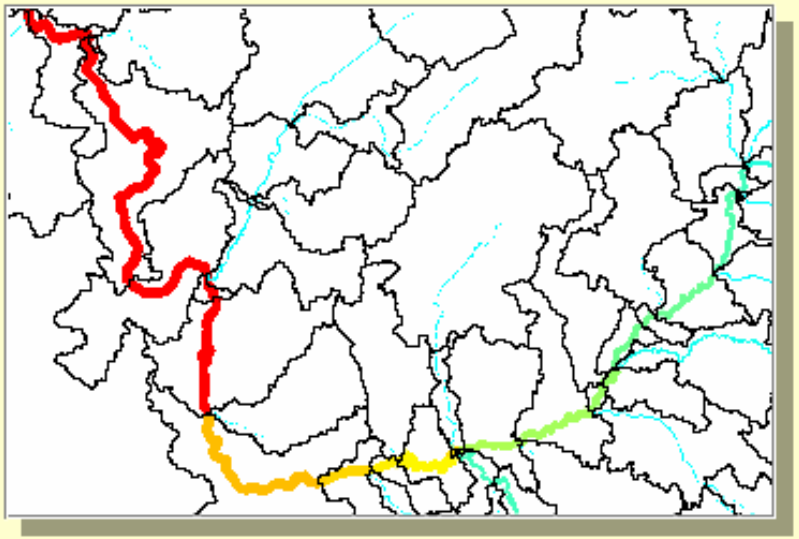


Multiple model domains

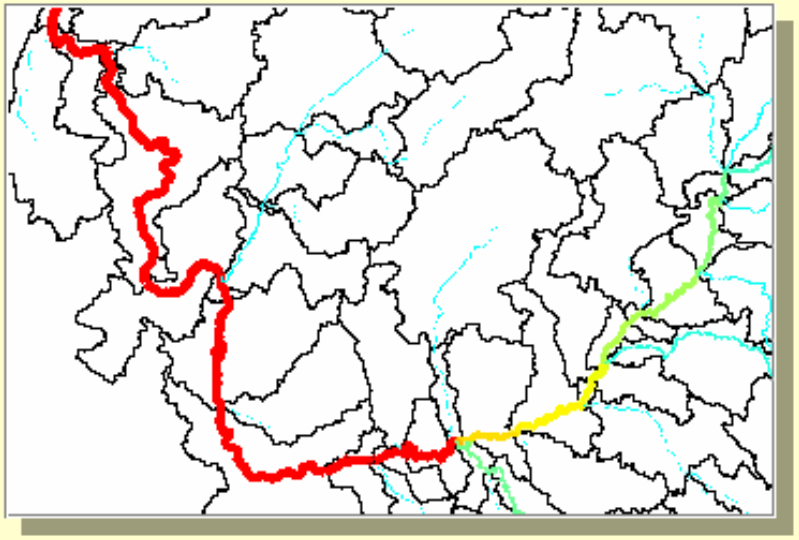
St. Joseph Watershed

Michigan, USA

SWAT Model Results



Existing Conditions with Dams



Scenario no Dams

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Multiple scenarios

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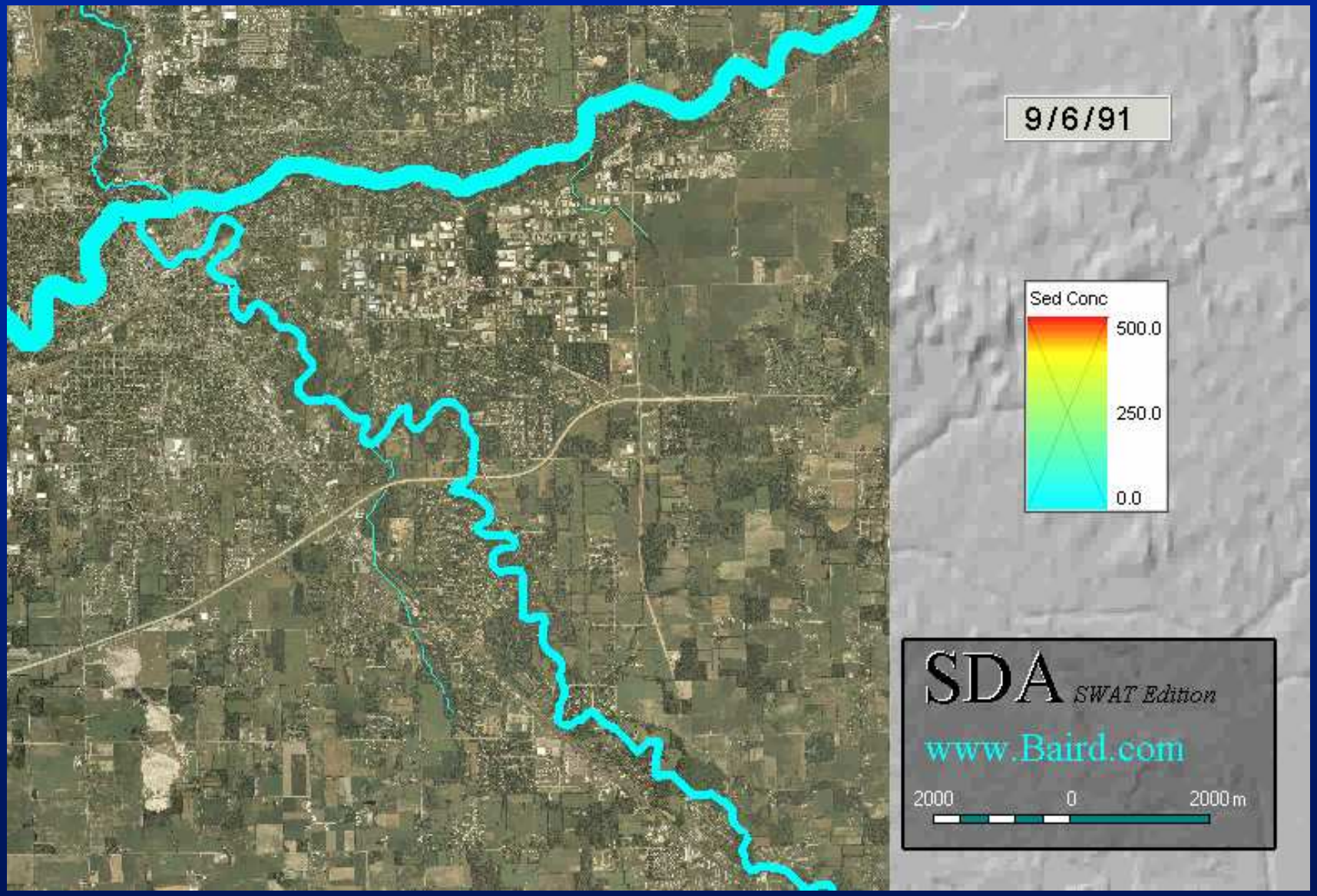

Aerial photo basemap

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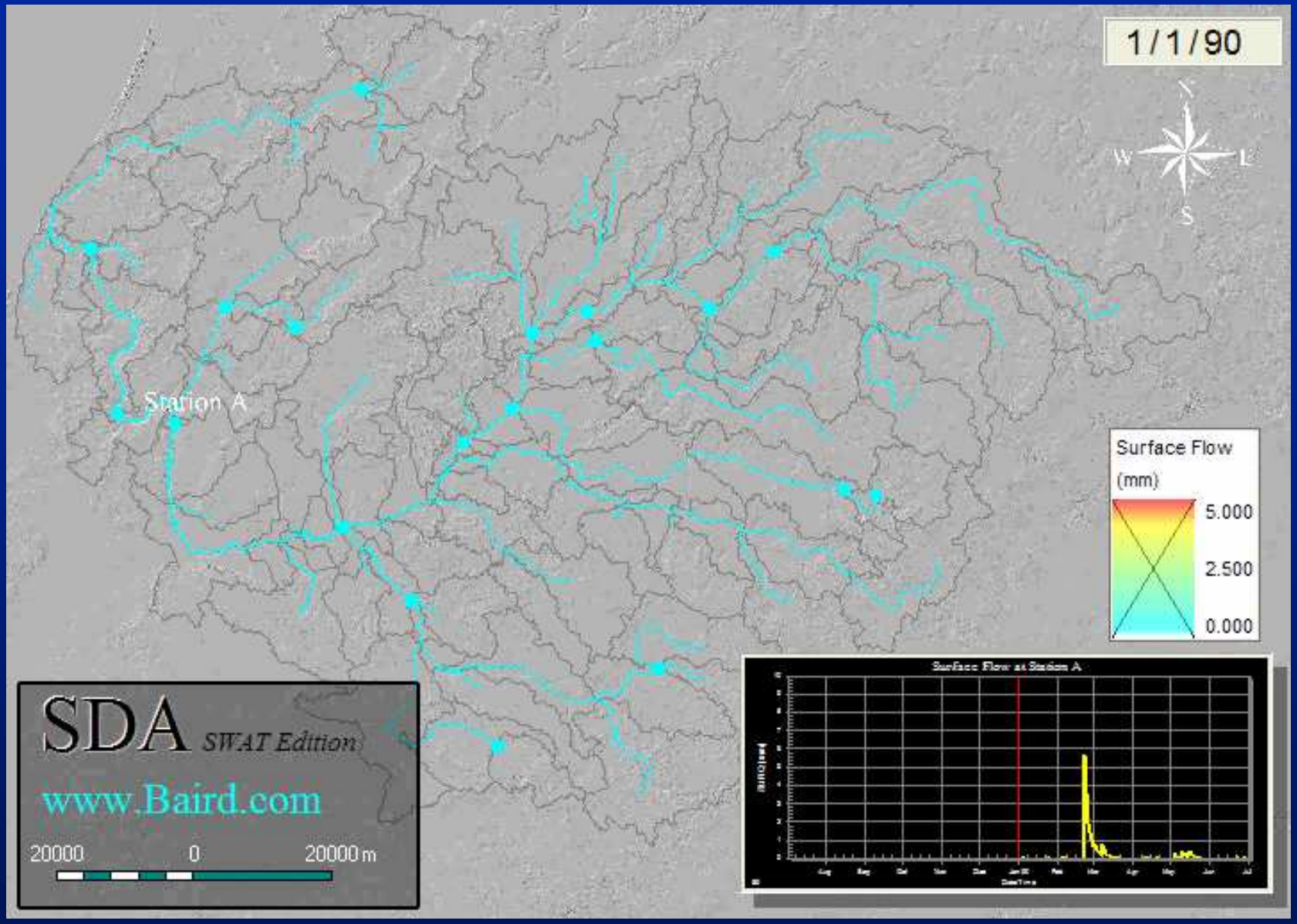

Plot viewer

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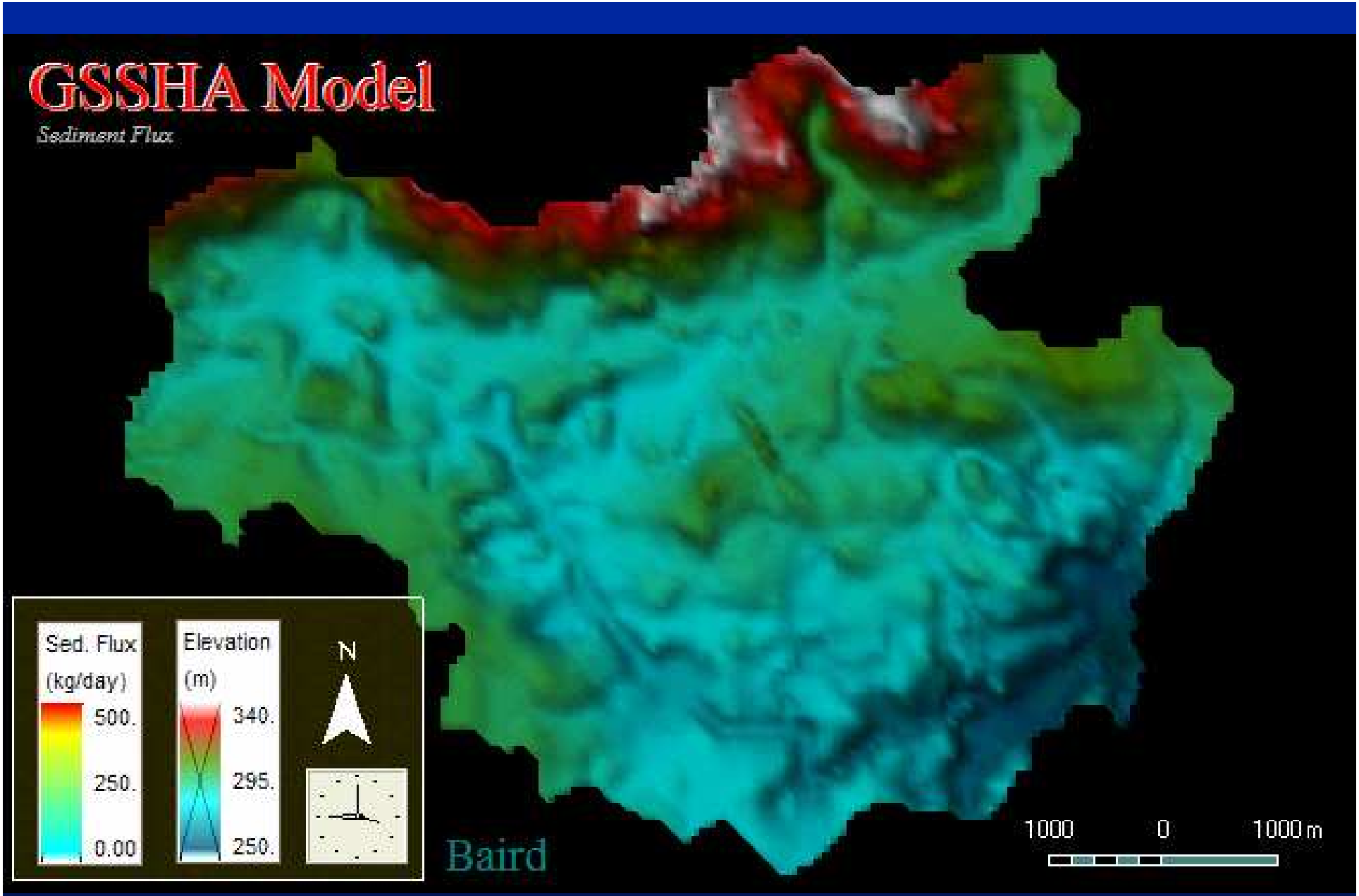
Future Development

- Calculate dataset and calibration statistics
- Transform results
- View results by HRU
- Custom line plots such as cumulative values and exceedence probability
- Overlay NEXRAD data
- More??


GSSHA Model
Sediment Flux
Sed. Flux
(kg/day)
500.
250.
0.00
Elevation
(m)
340.
295.
250.
N
Baird
1000
0
1000 m

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Conclusions

- Get more from SWAT results
- Efficient data handling
- View results in spatial context
- Easily share results

Thank you