



# **Linking ArcGIS to SQL Server to Merge and Analyze Large Geodata sets**

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**<http://wa.water.usgs.gov>**

# Topics

- **ArcGIS changes**
  - **Data storage**
  - **Programming**
  
- **New opportunities**
  - **Statistical analysis**
  - **Water-quality models**

# ArcGIS changes



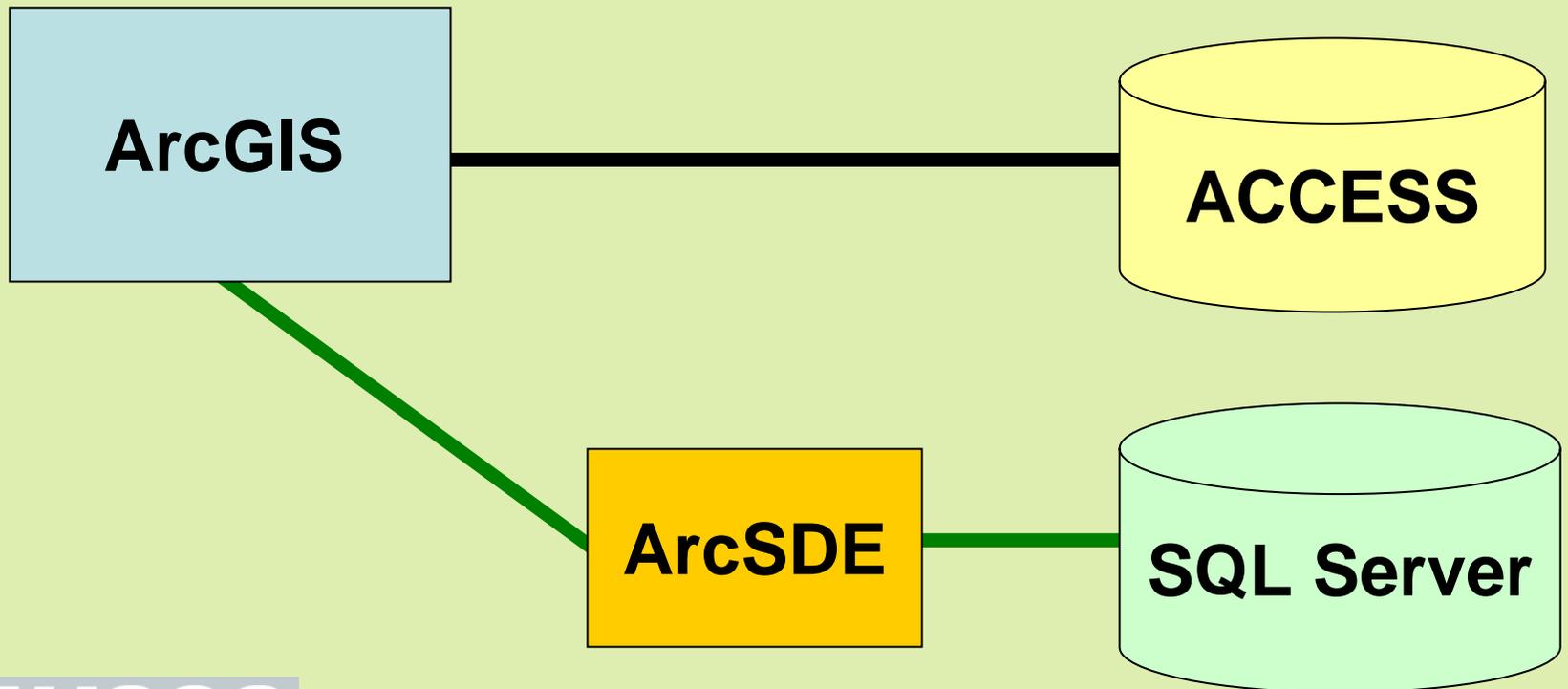
<b>Spatial data</b>	<b>Database</b>	<b>Programming language</b>
<b>Coverage</b>	<b>INFO</b>	<b>AML, INFO</b>
<b>Shape file</b>	<b>dBase4</b>	<b>Avenue</b>
<b>Features</b>	<b>SQL Server</b>	<b>Visual Basic SQL</b>

# ArcGIS goes mainstream

- **One database**
- **Visual Basic**
- **SQL statements**

# ArcSDE

- Use to connect ArcGIS to relational database

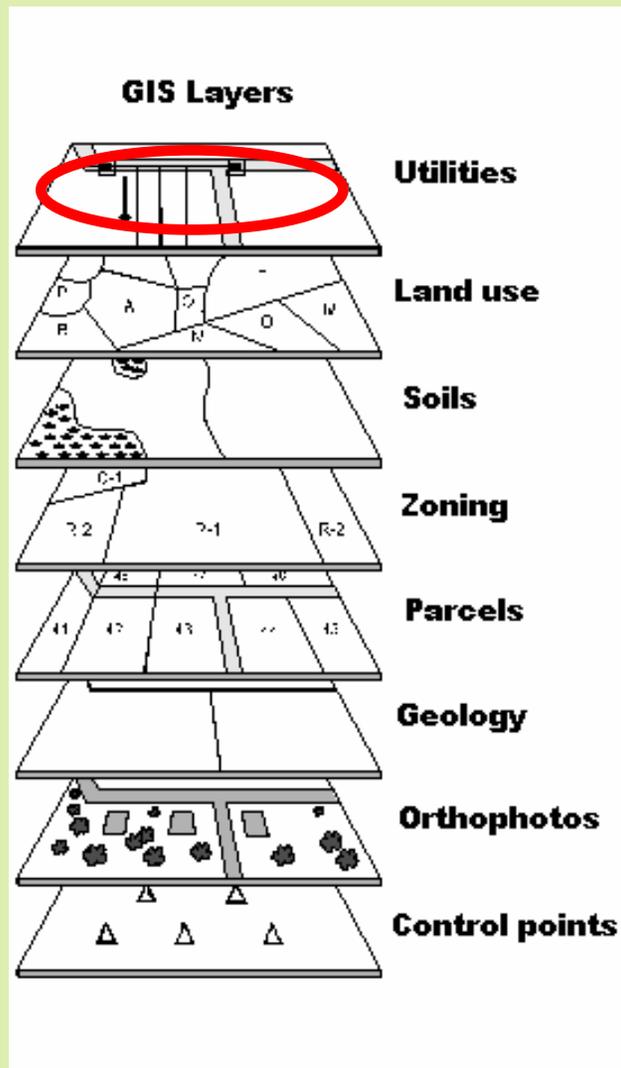


# Lower cost regression analysis

# Logistic regression

How do conditions around a well affect the concentration of contaminants found in the well?





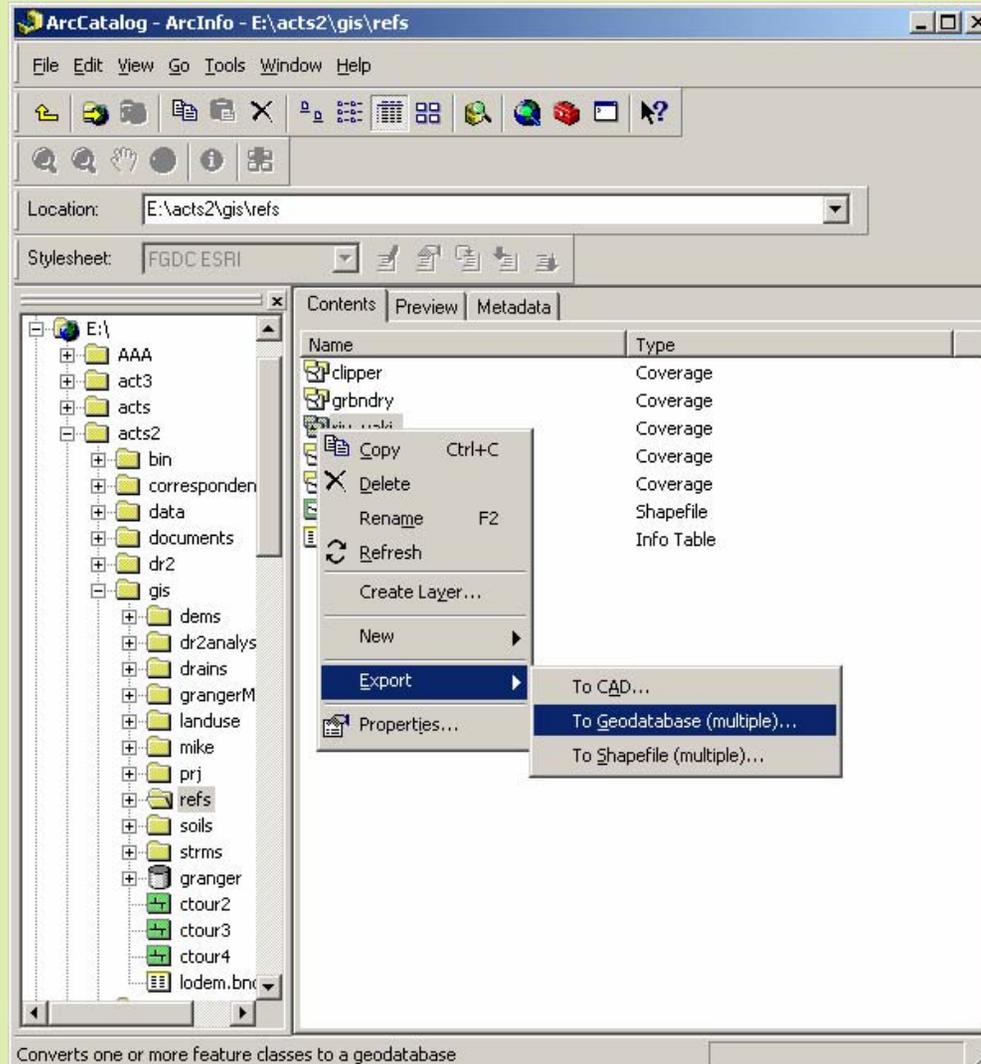
# Process

- Compile data
- Draw buffer around well
- Calculate values within buffer
- Export to stats

# Time consuming

- **Many wells**
- **Many data layers**
- **Many buffer sizes**
  
- **Now – easier to automate**

# Convert coverages and shape files to features in geodatabase

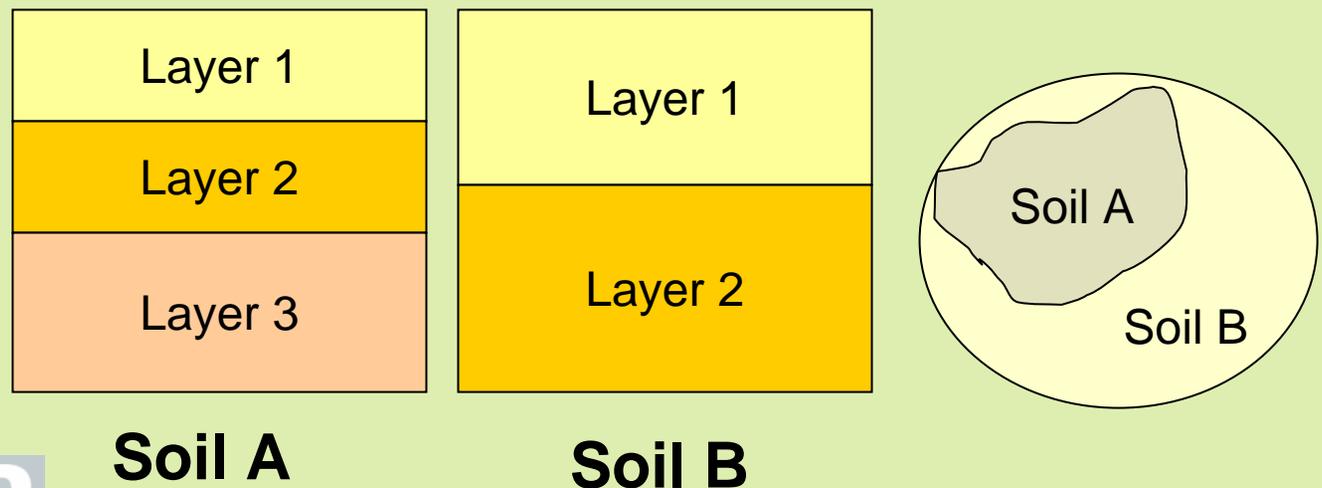


# Import raster data into geodatabase

- **Easy to import**
- **Improved display, storage, and management methods**
- **Mosaic into a single dataset**

# Process soils data

- Bring needed SSURGO / STATSGO tables into SQL Server
- Relate tables together
- Calculate values for soils parameters



# Automate

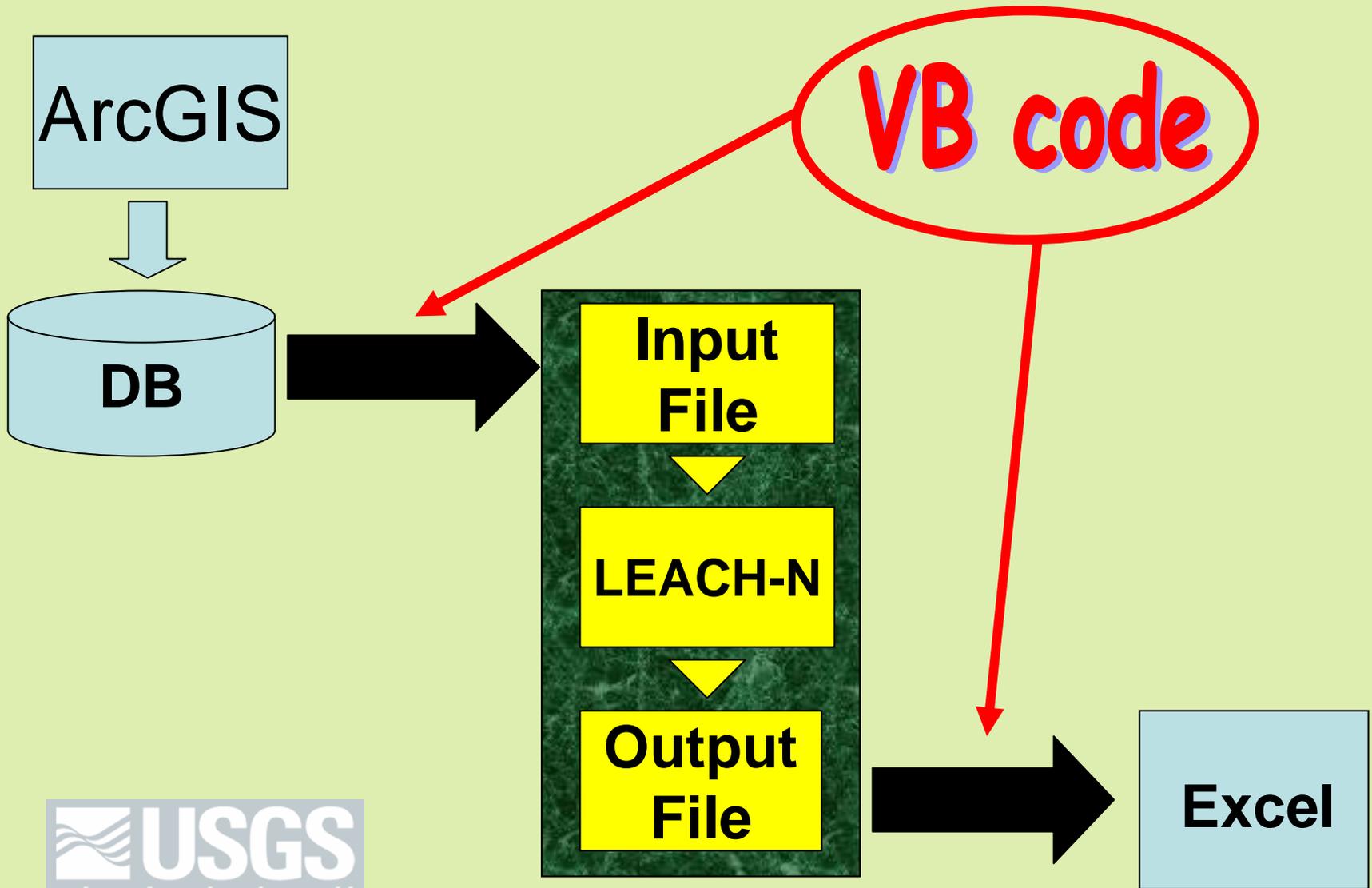
- **Processing soils data**
- **Calculating values in buffer**
- **Transferring data**

# Benefit

- **Less time on data processing**
- **More time for analysis**
- **Lower cost regression analysis**

# Water-Quality Models

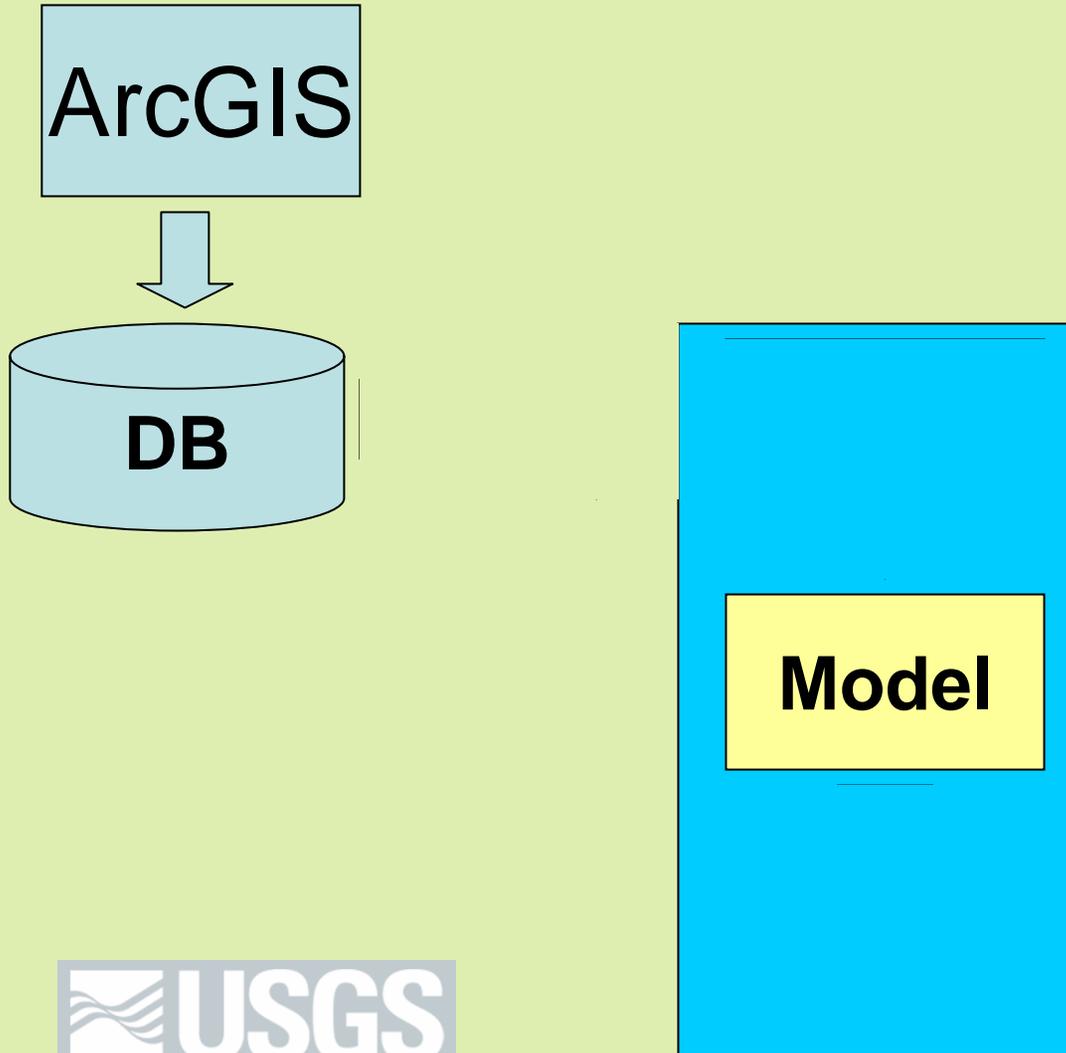
# Linking model to GIS



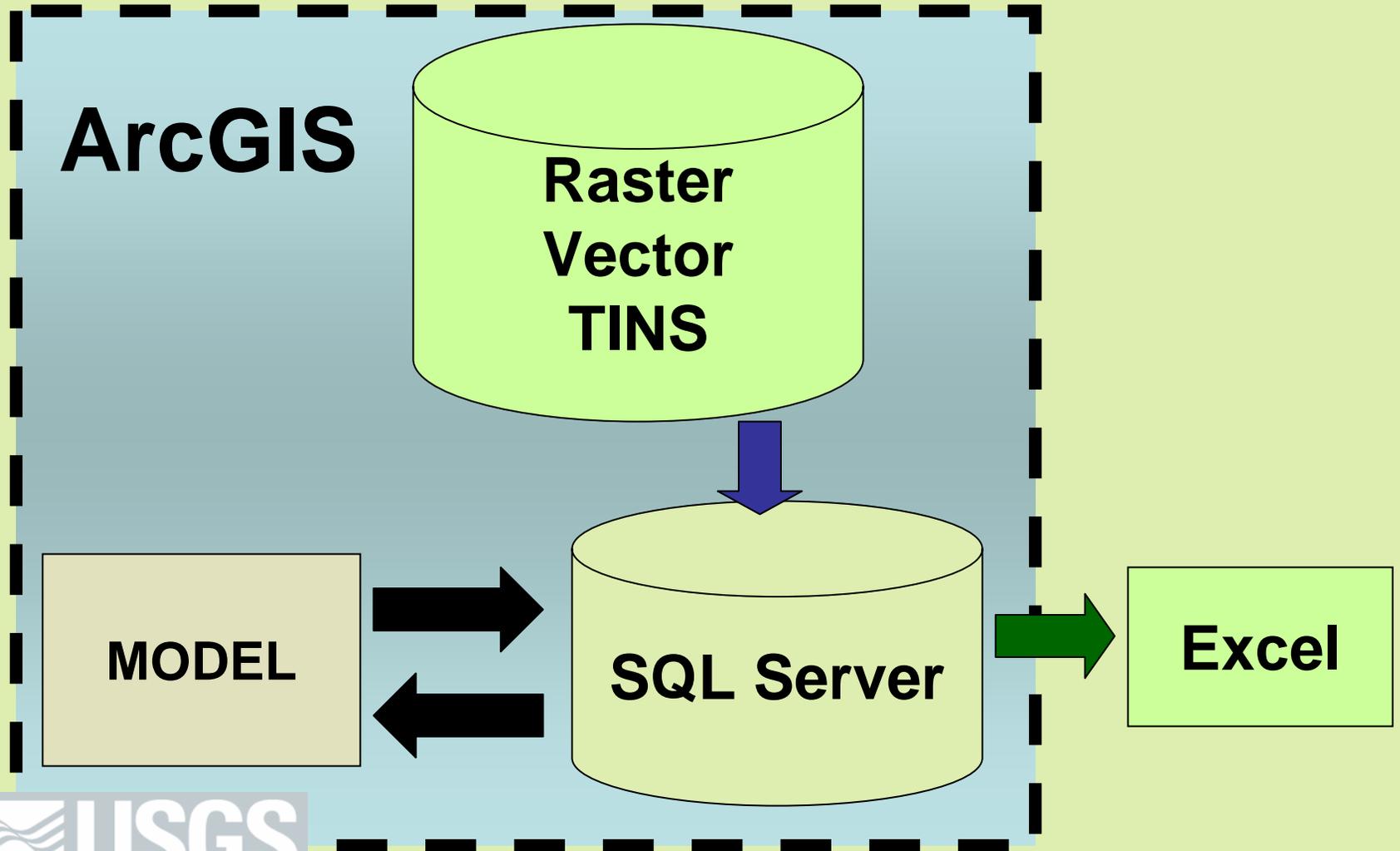
# Benefits

- **Develop database not input files**
- **Model hundreds of sites**
- **Model at different scales**
- **Use different models with same GIS/database system**

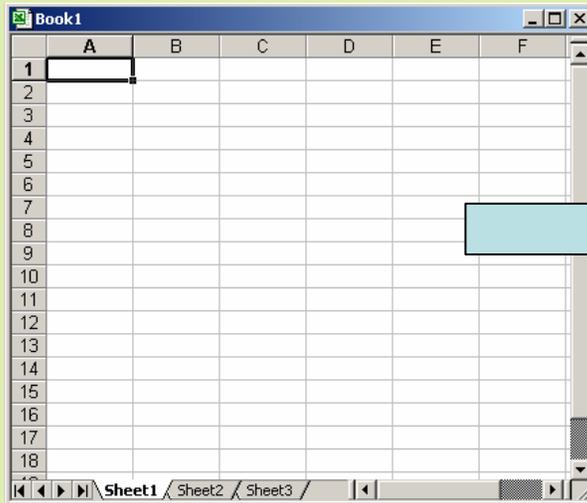
# Incorporating model into GIS



# Incorporating model into GIS

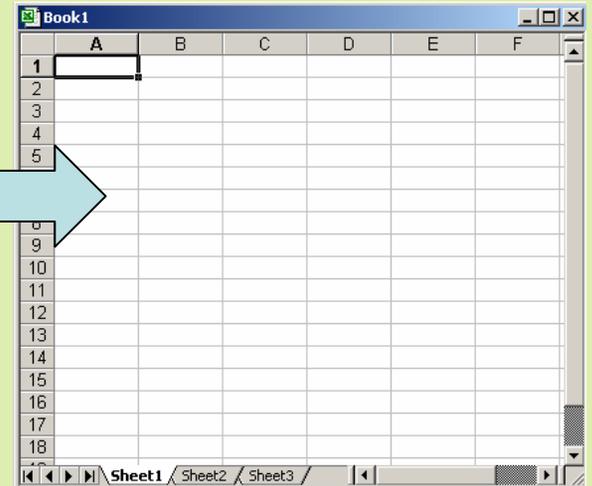


# QUAL2E in Excel



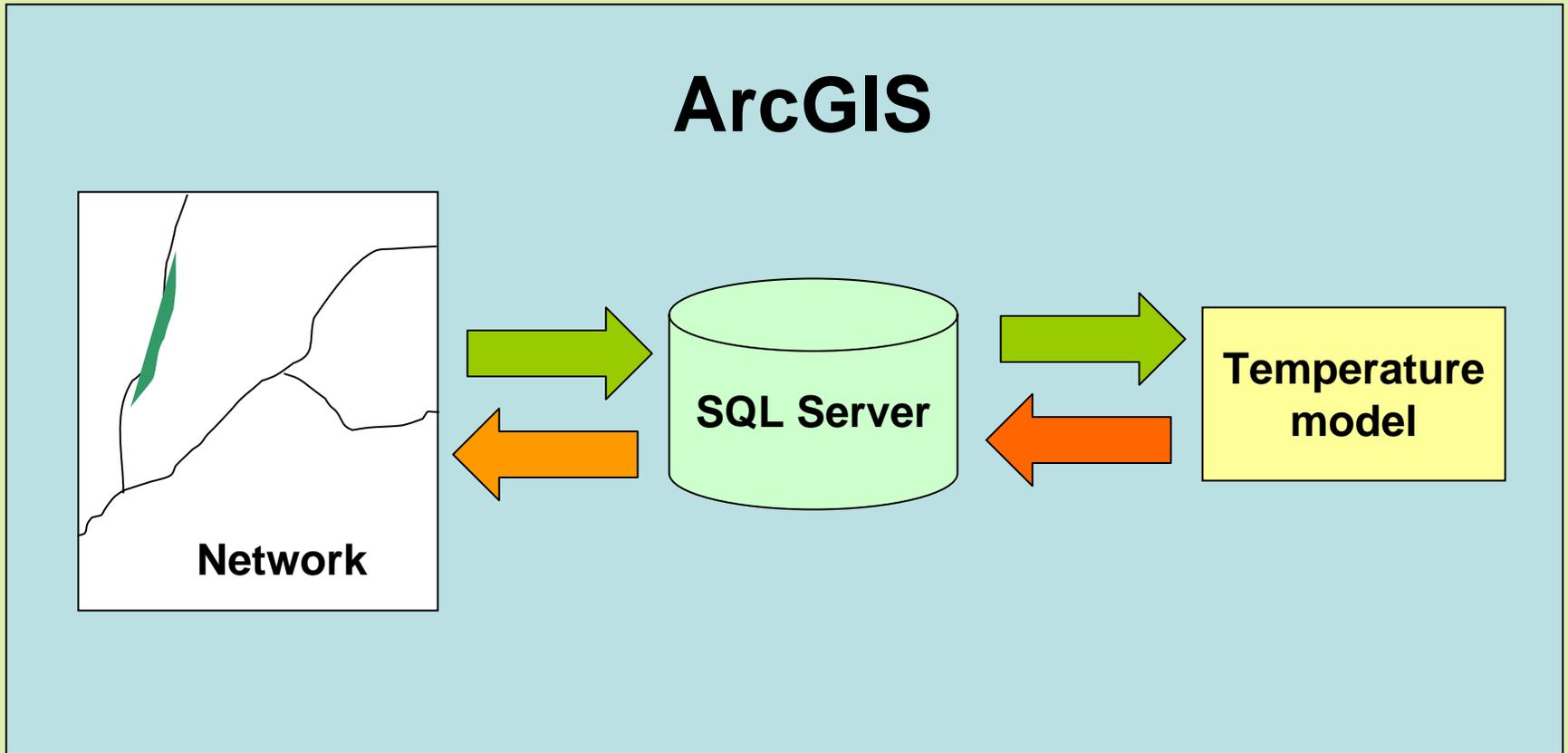
**Input**

**VBA Macro**



**Output**

# Stream temperature model



# Benefits

- Reduces model set-up time
- Reduces transcription errors
- Store stream data in ArcGIS networks
- GIS-DB-Model in one system

# Summary

## **New opportunities for analysis**

1. Low cost regression analysis
2. Link database to multiple models
3. Run models in ArcGIS