

BASINS: Better Assessment Science Integrating point and Nonpoint Sources

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BASINS: Better Assessment Science Integrating Point and Nonpoint Sources

"BASINS is a multipurpose environmental analysis system for use by regional, state, and local agencies in performing watershed- and water-quality-based studies."

It was developed by the U.S. Environmental Protection Agency's (EPA's) Office of Water to address three objectives:

- To facilitate examination of environmental information
- To support analysis of environmental systems
- To provide a framework for examining management alternatives

(BASINS 3.0 Documentation)

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BASINS is a fully comprehensive watershed management tool.

Watershed and water quality studies are easier by bringing key data and analytical components "under one roof".

Analysts can efficiently access national environmental information, apply assessment and planning tools, and run a variety of proven, robust nonpoint loading and water quality models.

The analysis time is significantly reduced, a greater variety of questions can be answered, and data and management needs can be more efficiently identified with the input components in one system.

(BASINS 3.0 Documentation)

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A geographic information system (GIS) provides the integrating framework for BASINS.

GIS provides techniques for analyzing landscape information and displaying relationships.

Through the use of GIS, BASINS has the flexibility to display and integrate a wide range of information (e.g., land use, point source discharges, water supply withdrawals) at a scale chosen by the user.

The scale can be designated to examine data at a multi-state scale or at a much smaller scale such as examining a particular river segment.

This "zooming" capability of BASINS makes it a unique and powerful environmental analysis tool.

(BASINS 3.0 Documentation)

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The assessment component, working under the GIS umbrella, allows users to quickly evaluate selected areas, organize information, and display results.

The modeling component module allows users to examine the impacts of pollutant loadings from point and nonpoint sources.

Working together, BASINS modules support several specific aspects of watershed-based analysis by:

- Identifying and prioritizing water-quality-limited waters.
- Supplying data characterizing point and nonpoint sources and evaluating their magnitudes and potential significance.
- Integrating point source and nonpoint source loadings and fate and transport processes.
- Evaluating and comparing the relative value of potential control strategies.
- Visualizing and communicating environmental conditions to the public through tables, graphs, and maps.

(BASINS 3.0 Documentation)

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Overview/Background:

The first version of BASINS was released in September of 1996.

This version included GIS tools to target and assess water quality as well as data mining features.

Predictive models included the nonpoint source model HSPF, the TOXIRoute model, the QUAL2E model and an output post processor to visualize results.

Data analysis and management are done using ArcView GIS.

The version of BASINS currently available is 3.0.

This new version contains the SWAT model in addition to HSPF for watershed modeling.

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Author:

U.S. Environmental Protection Agency –
Created as a multipurpose environmental analysis system designed to support the watershed-based modeling approach.

Program Downloadable from EPA at:

<http://www.epa.gov/waterscience/ftp/basins/system/BASINS3/>

Program CD Available for Purchase from NTIS:

CDROMs, by EPA Region may be purchased from the National Technical Information Service (NTIS) at <http://www.ntis.gov/>

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New Functionality of Version 3.0:

- Automatic delineation tool** - Users can automatically delineate watersheds based on Digital Elevation Model (DEM) data layer. (Requires Spatial Analyst)
- Enhanced Manual Delineation Tool** - Provides additional flexibility in editing shapes & attributes of manually delineated watersheds.
- Soil Water Assessment Tool (SWAT)** This watershed model can be used to simulate transport of nutrients, pesticides and sediments in the watershed, along the channels and through reservoirs. (Developed by the U.S. Department of Agriculture's ARS.) (Requires Spatial Analyst.)
- WDMUtil** - Time series data management utility can be used to create WDM files for the HSPF model. (Developed by U.S. Environmental Protection Agency.)
- PLOAD model** - Uses Export Coefficients to estimate watershed loading. (Developed by CH2M-Hill.)
- Grid Projector** - Extends ArcView projection tool to also project grid data. (Requires Spatial Analyst.)
- Capability of using the new **MultiResolution Land Cover (MRLC) data** (grid format) with the watershed models.

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Internet EPA Data:

The BASINS' parent directory has a link to "GIS Data", selectable by EPA's Hydrological Unit Code (HUC)

Ex:

Upper Rock (includes Dane County) = 7090001
Lower Fox (includes Brown County) = 04030204

http://www.epa.gov/waterscience/ftp/basins/gis_data/huc/

Locate Your Watershed:

To determine the HUC for your watershed, use EPA's interactive map:

<http://cfpub.epa.gov/surf/locate/index.cfm>

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Future of BASINS:

EPA encourages users to continue to provide comments and recommendations for further development.

EPA foresees future development of BASINS to include:

- Adding additional types of information,
- Using higher-resolution data,
- Providing Internet access to data and model updates,
- Expanding assessment and evaluation capabilities,
- Providing enhanced data management and display tools, and
- Adding a wider range of nonpoint source water quality & ecological modeling techniques.

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BASINS In-Class Exercise