

BASINS 4.0 (Open Source GIS)
Better Assessment Science Integrating
point and Non-point Sources

Spring 2007 GIS Workshop

BASINS Versions

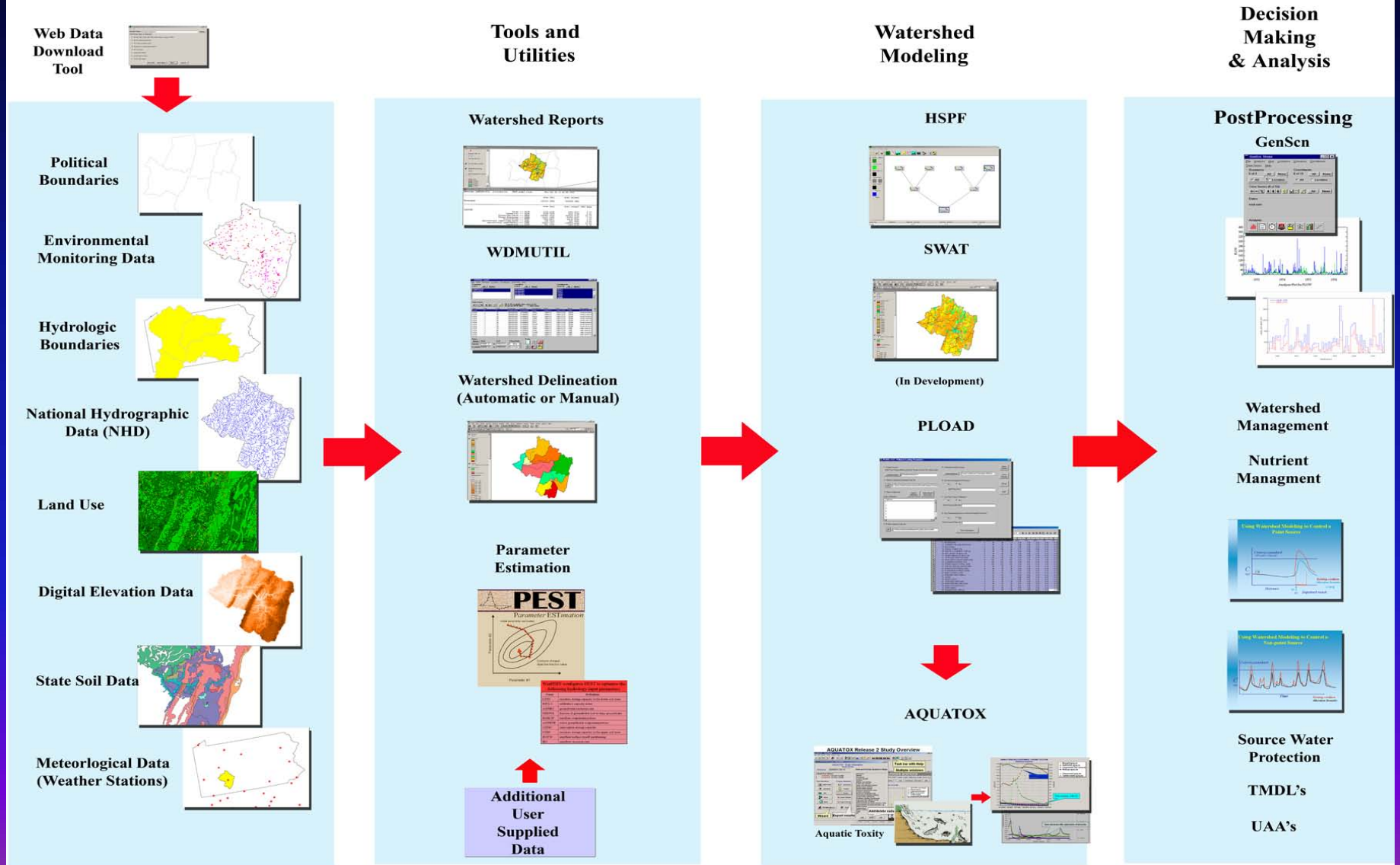
- 1.0 – May 1996 ArcView 2.x
- 2.0 – September 1998 ArcView 3.0a
- 3.0 – June 2001 ArcView 3.x w SA ext.
- 3.1 – August 2004 ArcView 3.x w SA ext.
- 4.0 – April 2007 open source Mapwindow GIS

BASINS 4.0 System Overview

Water Quality Modeling



www.epa.gov/waterscience/basins



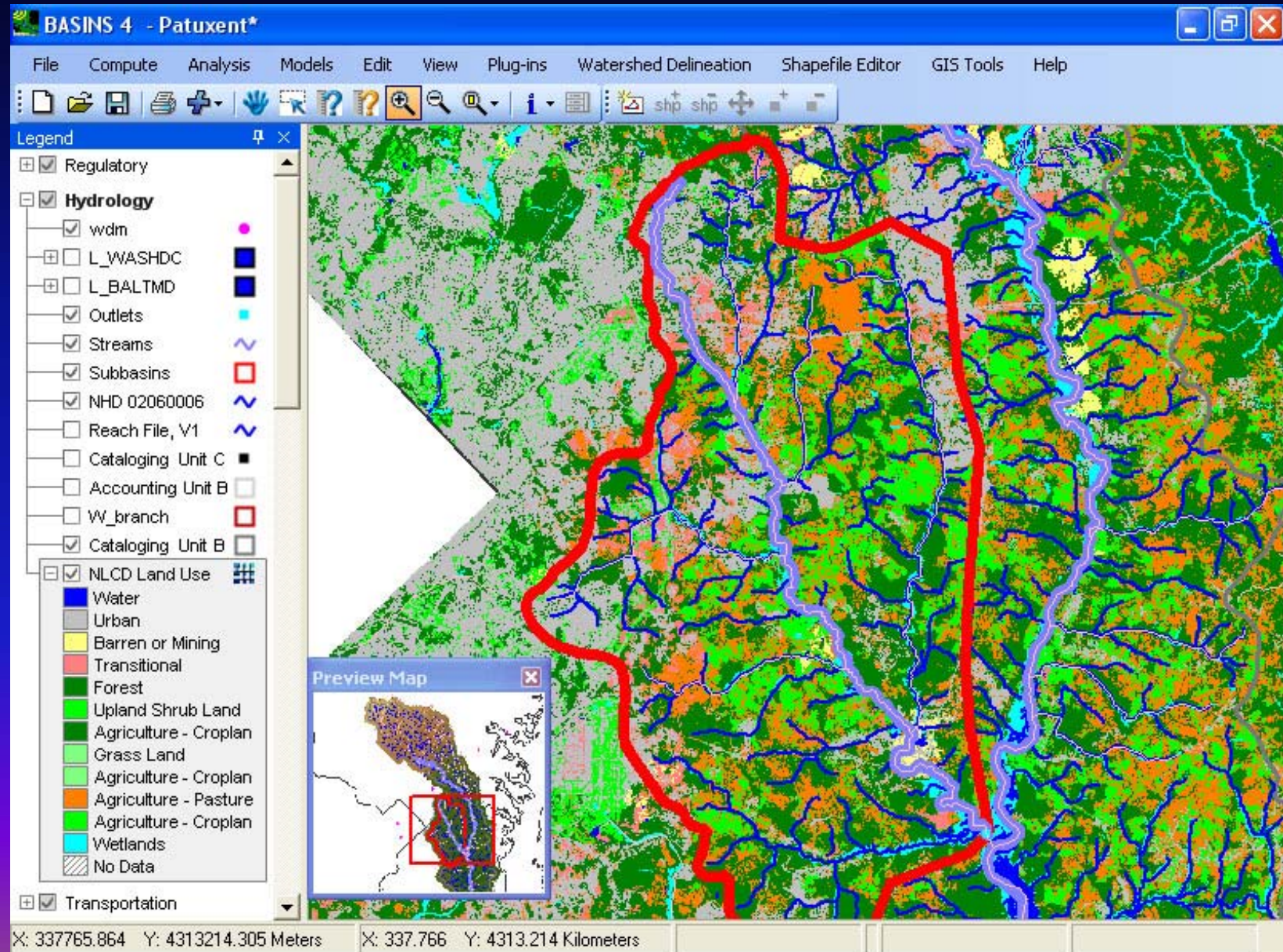
MapWindow is

- An open source “Programmable GIS” (VB, C++, .NET, and Active X controls) that supports manipulation, analysis, and viewing of geospatial data and associated attribute data in several standard GIS data formats.
- A mapping tool and a GIS application programming interface (API) all in one convenient redistributable open source solution.
- Requires Microsoft Internet Explorer version 5.01 & .NET Framework version 2 (Windows 2000 SP3 or higher , ME, XP)
- www.mapwindow.com

Advantages

- BASINS becomes available to everyone
- It uses open-source GIS tools and non-proprietary, standard data formats to accommodate users of several different GIS software platforms
- The core of BASINS becomes independent of any proprietary GIS platform and open for useful “plug-ins”

BASINS 4.0 Interface



BASINS 4 Startup



Welcome to BASINS 4



Show this dialog at startup

Close

[Build BASINS Project](#)

[Convert BASINS 3 Project](#)

[BASINS Help](#)

[Open Existing BASINS Project](#)

[Patuxent](#)

[severn](#)

[02070010-5](#)

[02070010-4](#)

Build Project

BASINS 4 - national

File Compute Analysis Models Edit View Plug-ins Watershed Delineation Shapefile Editor GIS Tools Help

Legend

- Political
 - States
 - Counties
- Hydrology
 - Cataloging Units

Build New BASINS 4 Project

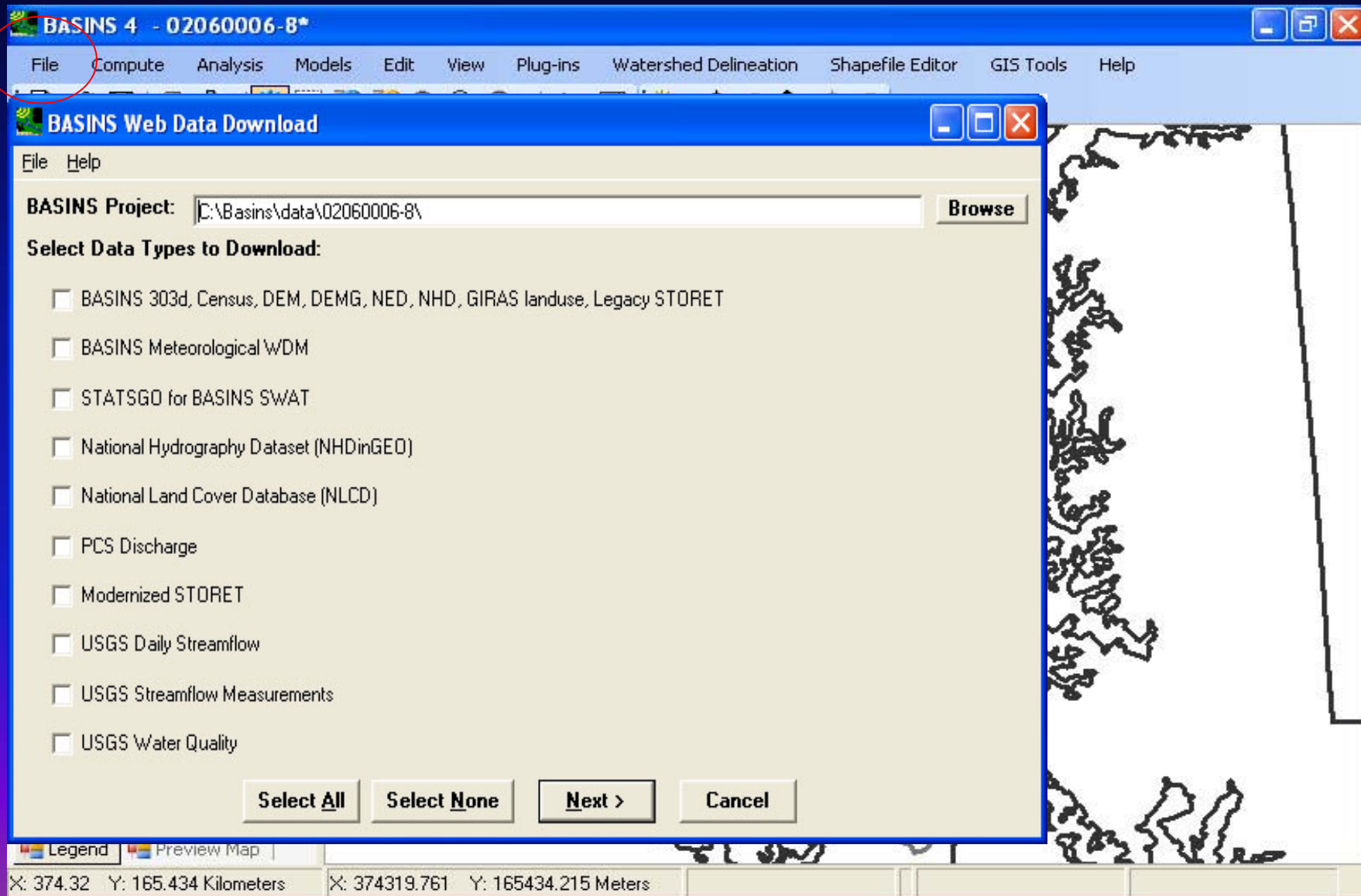
To Build a New BASINS Project, zoom/pan to your geographic area of interest, select (highlight) it, and then click 'Build'. If your area is outside the US, then click 'Build' with no features selected to create an international project.

Selected Features:
02060006 : Patuxent, Maryland.

Build Cancel

X: 1541884.857 Y: 2055845.397 Meters X: 1541.885 Y: 2055.845 Kilometers

BASINS Data Download Tool



OR Add Your Own Data to Your Project

The screenshot displays the BASINS 4 software interface for project '02060006-8'. The 'Analysis' menu is active, and the 'Add Data' dialog box is open, showing a list of supported file formats. The 'File name' field is empty, and the 'Files of type' dropdown is set to 'All supported formats'. The background shows a map of a watershed with various data layers visible in the legend.

Legend

- Hydrology
 - Reach File, V1
 - Cataloging Unit C
 - Accounting Unit B
 - Cataloging Unit B
- Observed Data Station
 - Water Quality
 - Water Quality Obs
 - WDM Weather Da
 - Weather Station S
 - USGS Gage
 - Bacteria
 - Weather Station A
 - NAWQA Study Ar
- Point Sources & Withdra
 - Permit Complianc
- Political
 - Urban Area Name
 - County Names
 - County Boundarie
 - EPA Region Boun
 - State Boundaries
 - Urban Area Bound

02060006-8

- landuse
- pcs
- wqobs
- acc
- bac_stat
- cat
- catpt
- cnty
- cntypt
- ecoreg
- epa_reg
- fhards
- gage
- lulcndx
- mad

All supported formats

- ESRI Shapefiles (*.shp)
- USU Binary (*.bgd)
- BIL (ESRI HDR/BIL Images) (*.bil)
- ASCII Text (ESRI Ascii Grid) (*.asc, *.arc)
- GeoTIFF (*.tif)
- ESRI Grid
- ESRI FLT
- USGS SDTS 30m (*.ddf)
- PAux (PCI .aux Labelled) (*.aux)
- PIX (PCIDSK Database File) (*.pix)
- DTED (DTED Elevation Raster) (*.dhm, *.dt0, *.dt1)
- ArcInfo Grid Images (hdr.adf)
- ASCII Grid Images (*.asc)
- Binary Terrain Images (*.bt)
- BIL (ESRI HDR/BIL Images) (*.bil)
- Bitmap Images (*.bmp)
- ECW (Enhanced Compression Wavelet) (*.ecw)
- Erdas Imagine Images (*.img)
- GIF Images (*.gif)
- PC Raster Images (*.map)
- JPEG2000 Images (*.jp2)
- JPEG Images (*.jpg)
- SID (MrSID Images) (*.sid)
- Portable Network Images (*.pgm, *.pnm, *.png, *.ppm)
- GeoTIFF (*.tif)
- Windows Metafile (*.wmf)

File name:

Files of type: All supported formats

X: 374.32 Y: 165.434 Kilometers

Identification Tool

BASINS 4 - Patuxent*

File Compute Analysis Models Edit View Plug-ins Watershed Delineation Shapefile Editor GIS Tools Help

shp shp

Identifier

Shape Index: 2439

Field Name	Field Value
RCH_	2453
RCH_ID	2454
COM_ID	81715509
RCH_CODE	02060006000226
RCH_DATE	19970508
LEVEL	2
METERS	3137
GNIS_ID	00598240
NAME	Western Branch Patuxent River
RCHID	81715509
DSRCHID	81704219

X: 331079.021 Y: 4318434.936 Meters X: 331.079 Y: 4318.435 Kilometers

Manual Watershed Delineation

The screenshot displays the BASINS 4 software interface, titled "BASINS 4 - Patuxent*". The main window shows a map of a watershed network with a red boundary and a blue stream network. A "Manual Watershed Delineator" dialog box is open on the left, containing the following sections:

- Manual Delineation**: Subbasin Layer: Cataloging Unit Boundaries. Buttons: Delineate Subbasin, Commit, Cancel.
- Subbasin Parameters**: Elevation Layer: DEM Shape. Button: Calculate Subbasin Parameters.
- Stream Network**: Reach Layer: NHD 02060006. Button: Define Stream Network and Outlets. Checkboxes: Include PCS as Outlets, Force continuous flow path. Button: Close.

The software's menu bar includes File, Compute, Analysis, Models, Edit, View, Plug-ins, Watershed Delineation, Shapefile Editor, GIS Tools, and Help. The toolbar contains various icons, with the "shp" icons circled in red. The status bar at the bottom shows coordinates: X: 333974.622 Y: 4316037.636 Meters and X: 333.975 Y: 4316.038 Kilometers.

Automatic Watershed Delineation

BASINS 4 - Patuxent*

File Compute Analysis Models Edit View Plug-ins Watershed Delineation Shapefile Editor GIS Tools Help

shp shp

Automatic Watershed Delineation

Setup and Preprocessing

Elevation Units: Centimeters
Base Elevation Data (DEM) Layer: National Elevation Dataset (02060006ned)

Burn-in Existing Stream Polyline
NHD 02060006

Use a Focusing Mask

Use Current View Extents for Mask Set Extents

Use Grid or Shapefile for Mask

Select a Mask Grid or Polygon Shapefile or Use Extents

Draw Mask Select Mask 0 Selected

Use Existing Intermediate Files Run

Network Delineation by Threshold Method

122501 # of Cells: 36.4953 sq. mi

Use Existing Intermediate Files Run

Custom Outlet/Inlet Definition and Delineation Completion

Use a Custom Outlets/Inlets Layer

Outlets

Draw Outlets/Inlets Select Outlets/Inlets 1 selected

Snap Preview Snap Threshold: 300.0000 Run

Advanced Settings Close Run All

12.437 Kilometers

Watershed Characterization Reports

BASINS Watershed Characterization Reports [X]

Area of Interest Layer: [v]

ID Field: [v]

Name Field: [v]

Available Reports:

- 1990 Population and Sewerage by Census Tract Table
- 2000 Population by Census Tract Table
- 303d Listed Segments Table
- GIRAS Landuse Table in Acres
- NLCD Landuse Table in Acres
- Permitted Point Source Facilities Table
- Point Source Discharge Concentration and Loading Table
- Water Quality Observation Stations Table

Report Folder:



GIS Tools Pull Down Menu

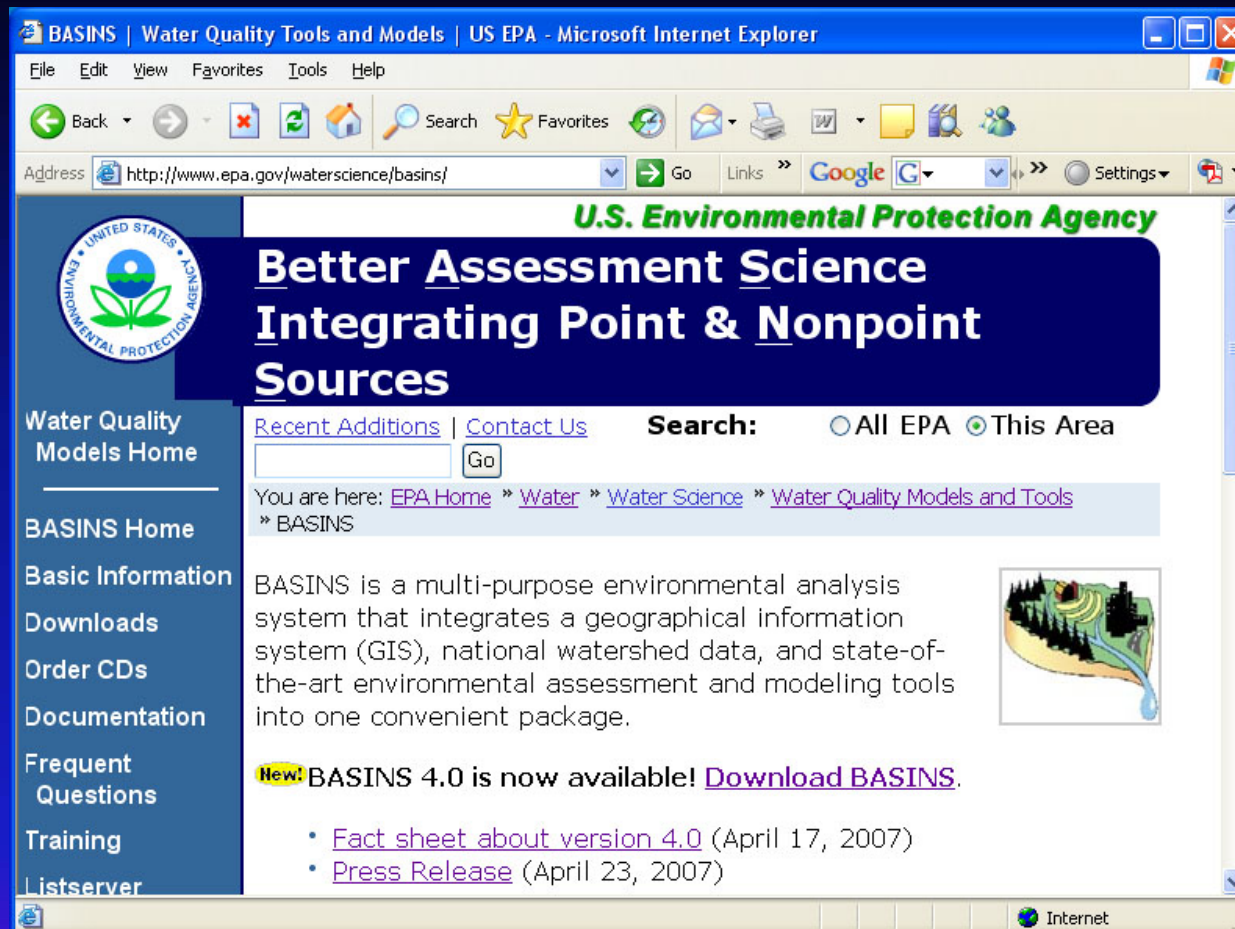
- Assign a projection to a shapefile or raster
- Reproject a shapefile or raster
- Clip polygon with a line shapefile
- Clip shapefile or raster with a polygon
- Erase shapefile with a polygon
- Merge shapefiles or raster
- Generate a contour line shapefile from a raster
- plus others



Help Pull Down Menu

- [BASINS Online Documentation](#)
- [BASINS Web Site](#)
- [MapWindow Web Site](#)
- [Check for BASINS 4 Updates](#)
- [Send Feedback-Basins4@hspf.com email](mailto:Basins4@hspf.com)
- [Keyboard Shortcuts Window](#)
- [About BASINS 4 Window](#)

www.epa.gov/waterscience/basins



The screenshot shows a Microsoft Internet Explorer browser window displaying the EPA BASINS website. The browser's address bar shows the URL <http://www.epa.gov/waterscience/basins/>. The website header features the U.S. Environmental Protection Agency logo and the text "U.S. Environmental Protection Agency". The main heading reads "Better Assessment Science Integrating Point & Nonpoint Sources". A search bar is present with the text "Search:" and radio buttons for "All EPA" and "This Area". Below the search bar, a breadcrumb trail indicates the current location: "You are here: EPA Home » Water » Water Science » Water Quality Models and Tools » BASINS". The main content area describes BASINS as a multi-purpose environmental analysis system that integrates a geographical information system (GIS), national watershed data, and state-of-the-art environmental assessment and modeling tools into one convenient package. A small graphic of a watershed is shown to the right. A "New!" announcement states "BASINS 4.0 is now available!" with a link to "Download BASINS.". Below this, two links are provided: "Fact sheet about version 4.0 (April 17, 2007)" and "Press Release (April 23, 2007)". The left sidebar contains a navigation menu with links for "Water Quality Models Home", "BASINS Home", "Basic Information", "Downloads", "Order CDs", "Documentation", "Frequent Questions", "Training", and "Listserver".

Email basins@epa.gov
basinsinfo EPA Listserver