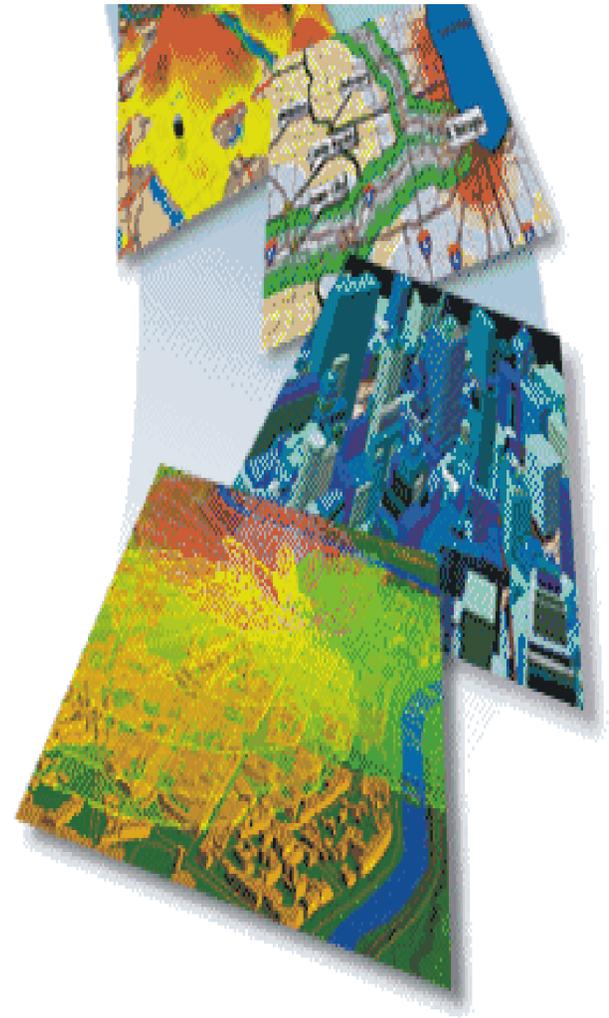


# Practical Applications For GIS

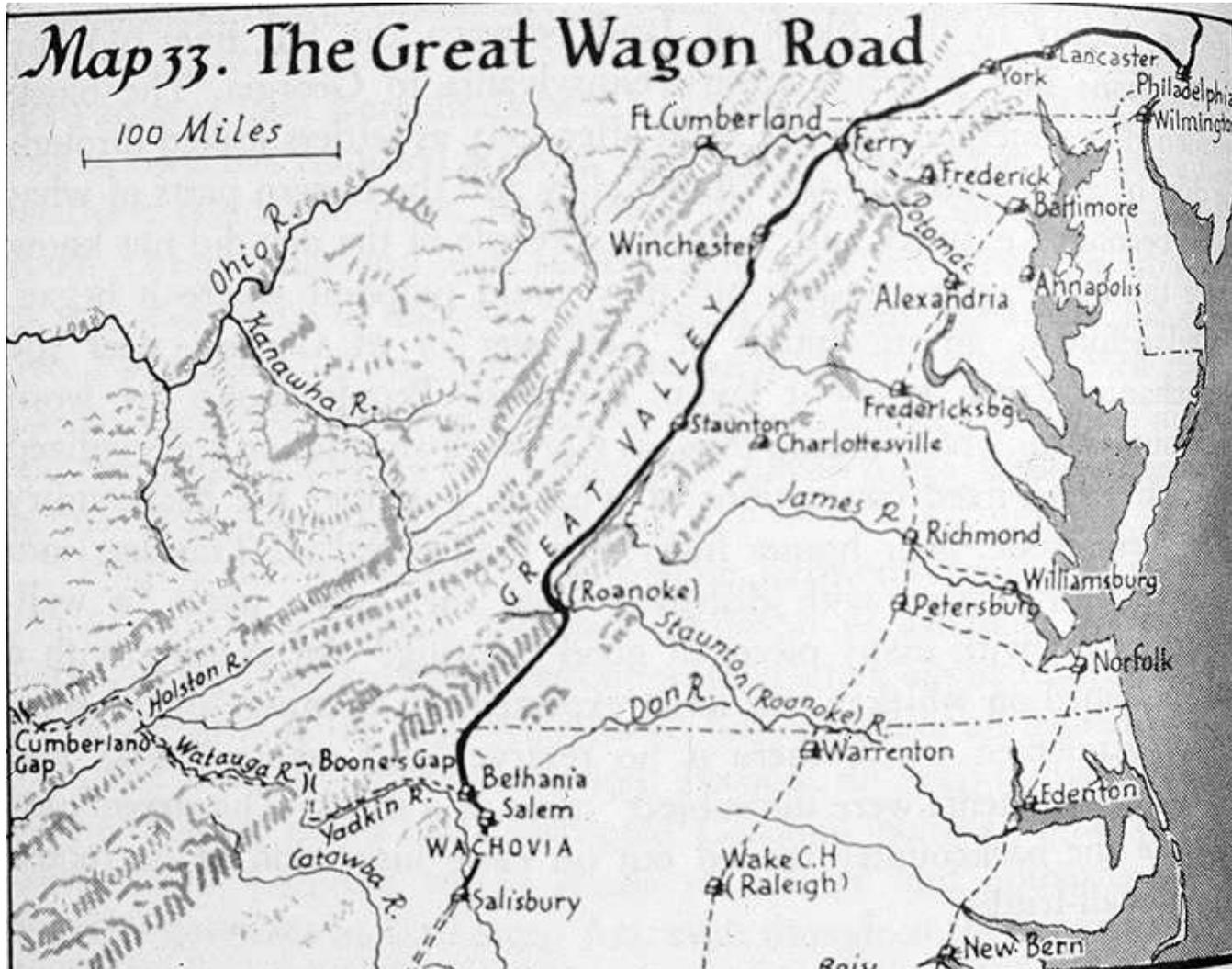
*Mapping  
For The Future*

dep

west virginia department of environmental protection



# Maps Have Always Been Important



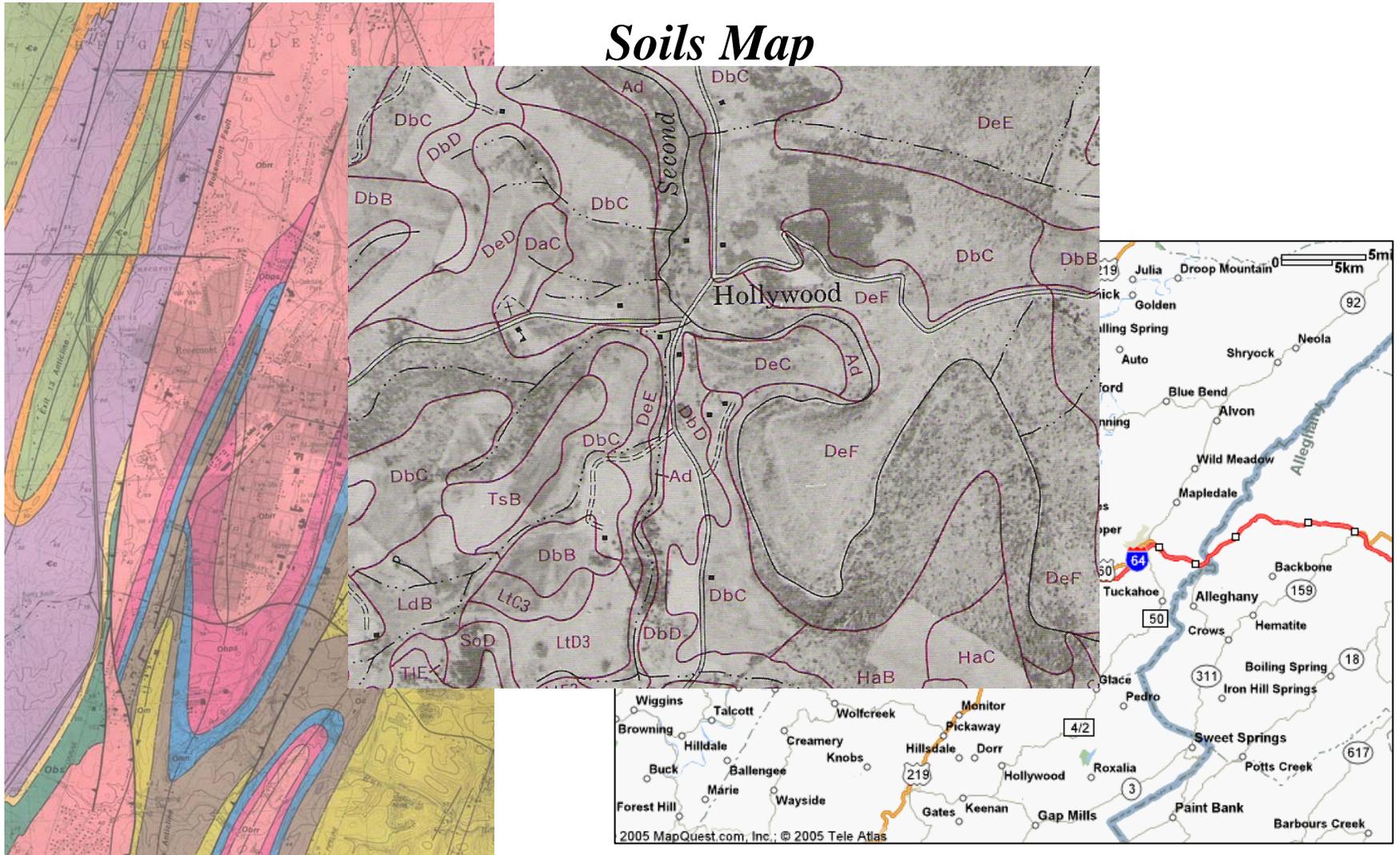
# Maps Answer Important Questions Like:



***Are We There  
Yet?***

# Types Of Maps

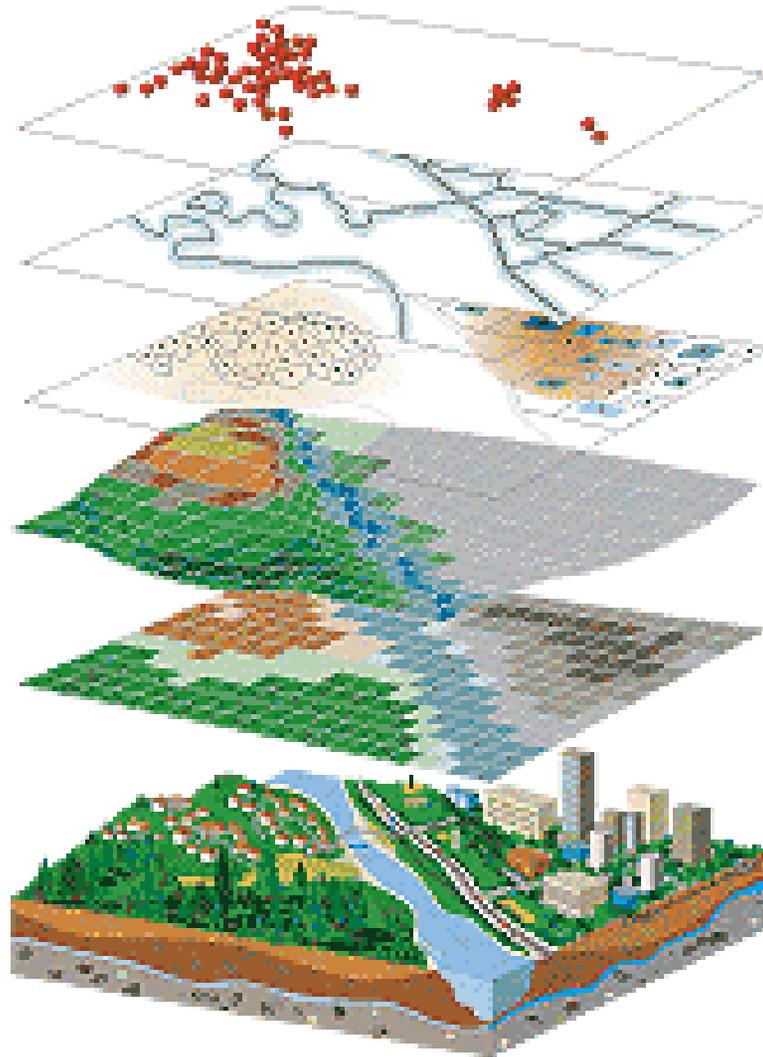
## Soils Map



## Geology Map

## Road Map

# Well, I Want Everything On One Map!



**And That Is GIS !**

# GIS is...

## **Geography**

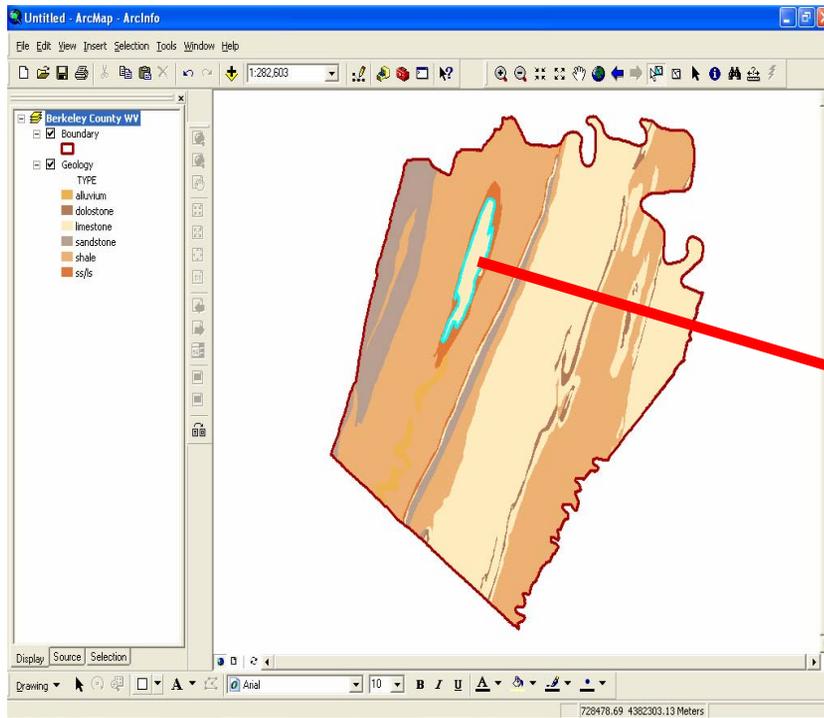
and the information about the earth's surface and the objects found on it. It is also a framework for organizing knowledge.

## **A Geographic Information System**

of technology that manages, analyzes, and disseminates geographic knowledge.

# The Power of GIS

The connection between geographic information (where things are) and descriptive information (what things are).

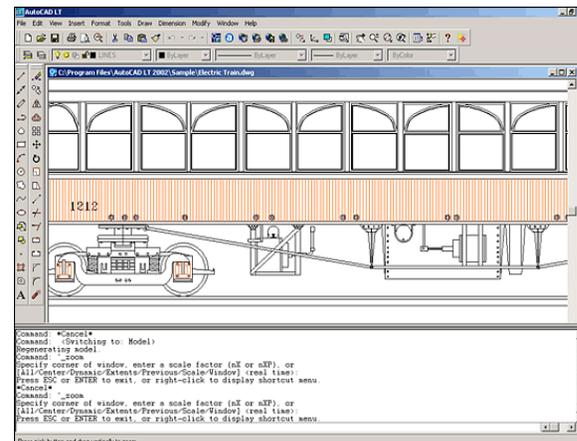
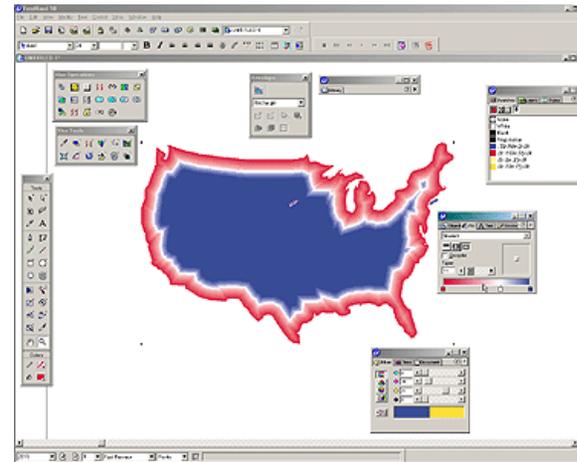


MAP_UNIT	ERA	PERIOD	CLASS	TYPE
Otbr	Paleozoic	Ordovician	sedimentary	limestone
Omc	Paleozoic	Ordovician	sedimentary	limestone
Osp	Paleozoic	Ordovician	sedimentary	limestone
Obps	Paleozoic	Ordovician	sedimentary	dolostone
Osp	Paleozoic	Ordovician	sedimentary	limestone
Stw	Paleozoic	Silurian	sedimentary	limestone
Dhs	Paleozoic	Devonian	sedimentary	shale
Osp	Paleozoic	Ordovician	sedimentary	limestone
Otbr	Paleozoic	Ordovician	sedimentary	limestone
Osp	Paleozoic	Ordovician	sedimentary	limestone
Smc	Paleozoic	Silurian	sedimentary	sandstone

Record: 1 Show: All Selected Records (1 out of 94 Selected.) Opti

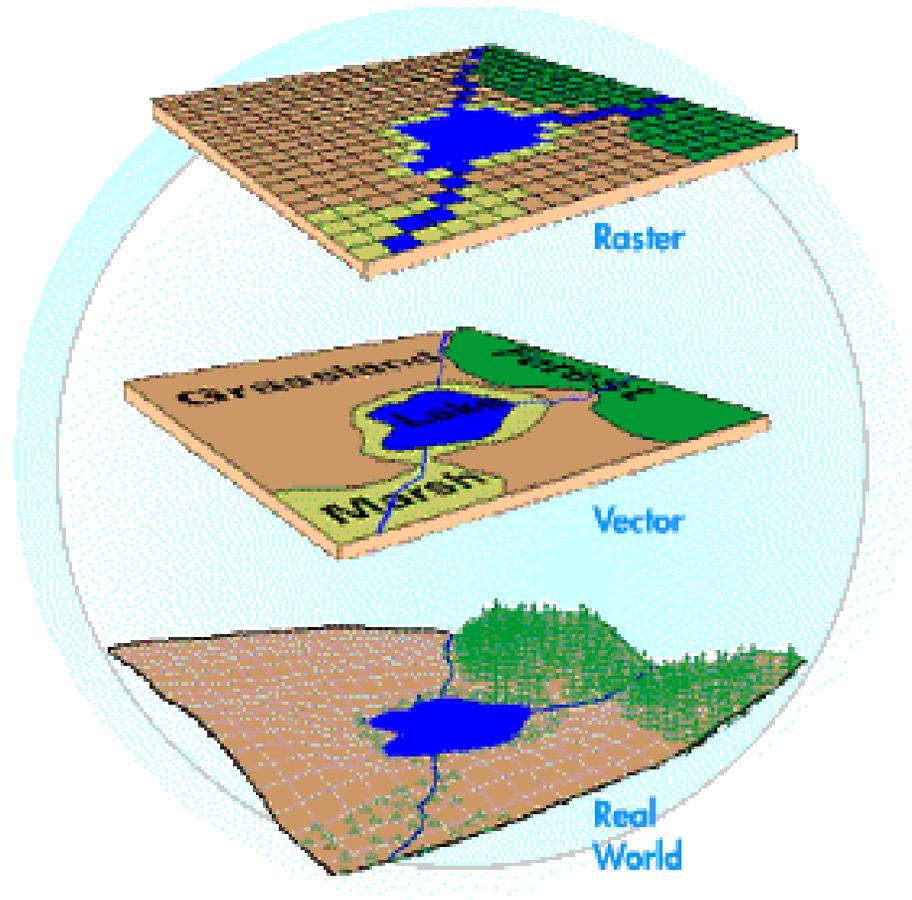
# GIS is not...

- Graphics software
- CAD (Computer-Aided Design)



# GIS represents reality in two ways

- Vector
- Raster



# Vector

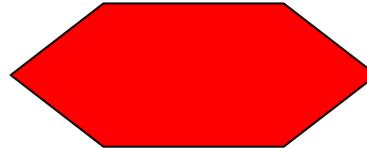
- Points

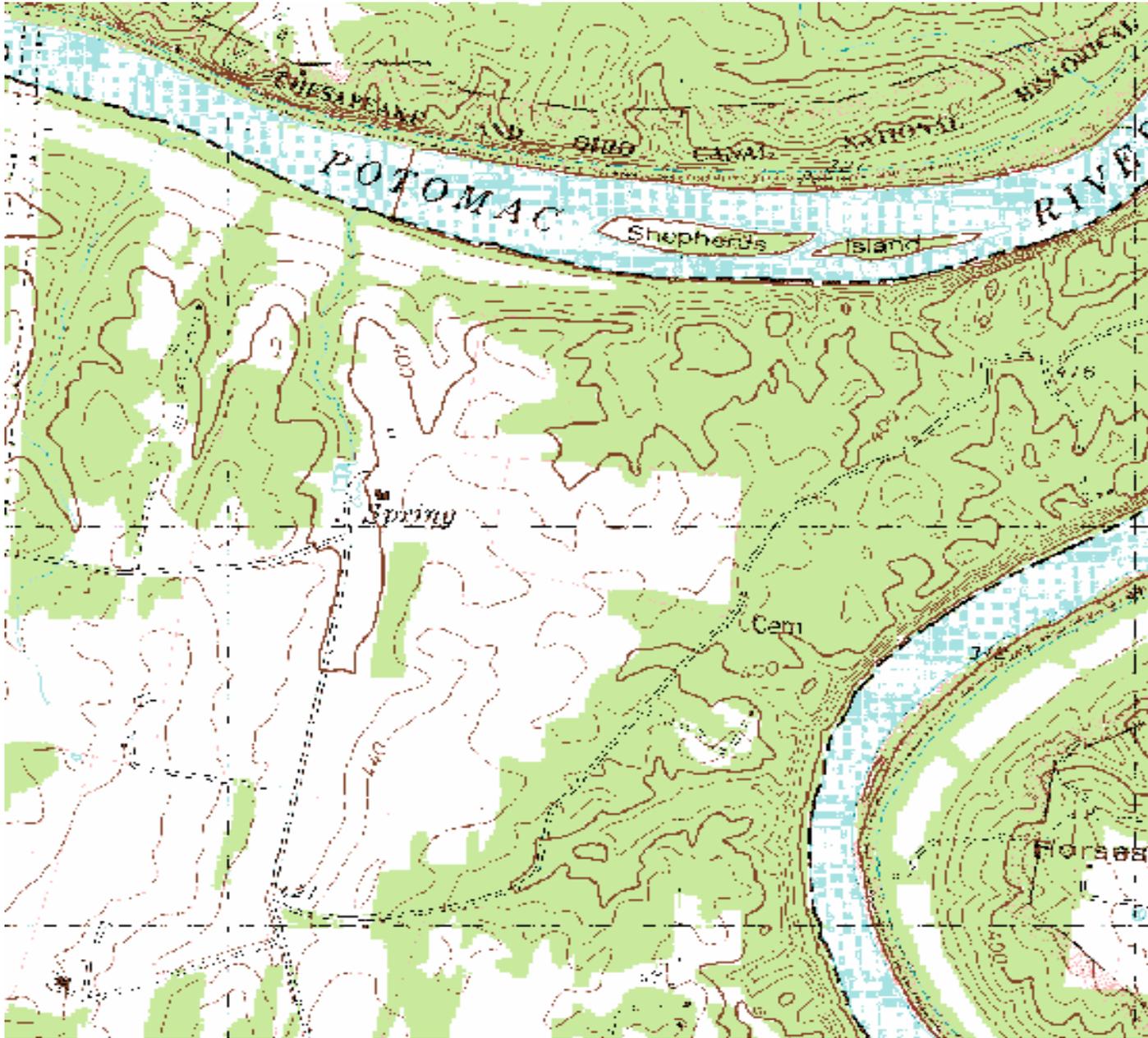


- Lines



- Polygons





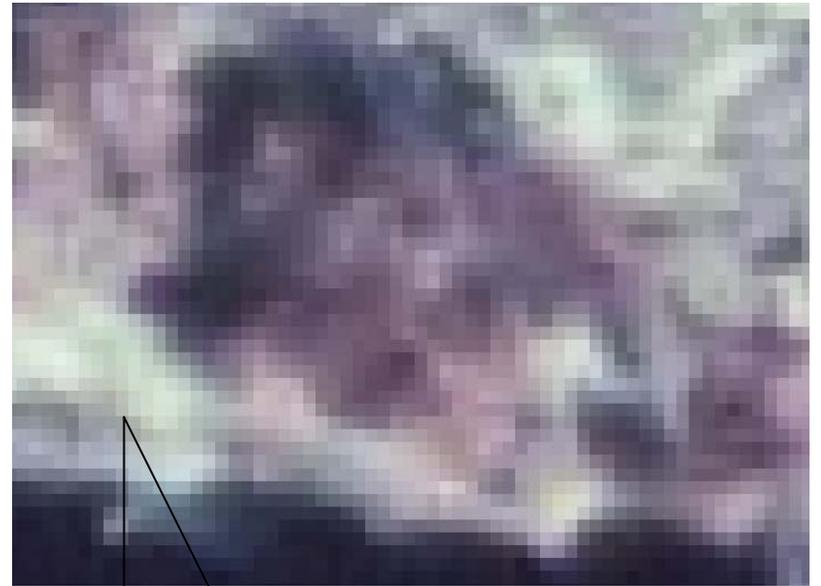
Can you find an example of each vector type?

**Points?**

**Lines?**

**Polygons?**

# Raster



Digital Number (DN)

# ***Background***

***West Virginia Department of Environmental Protection (WVDEP) is the lead agency for groundwater protection.***

***How Did “WVDEP”  
Get Involved With GIS?***



west virginia department of environmental protection



west virginia department of environmental protection

**In 1991, WVDEP established a comprehensive groundwater management program for the protection and remediation of the State's groundwater resources.**

*Groundwater  
Program*

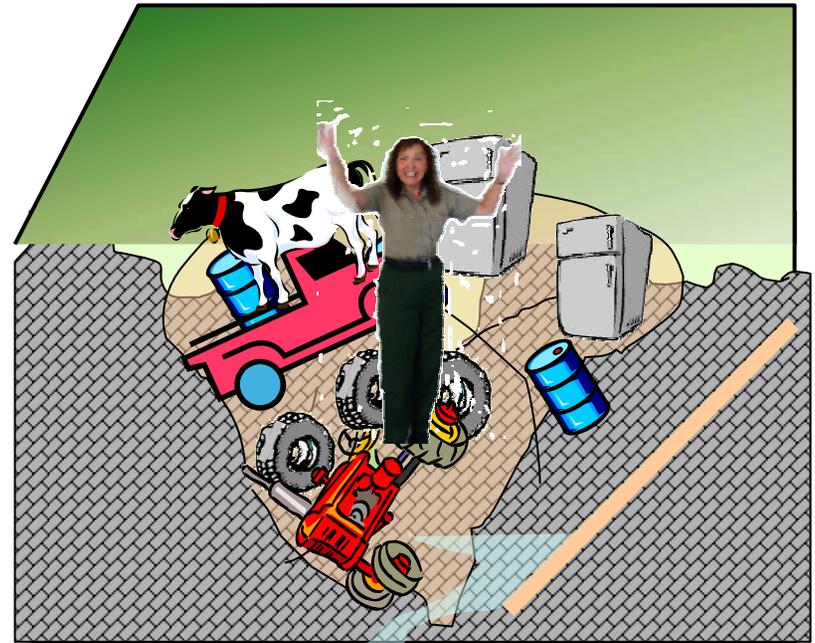
**A Groundwater Protection Plan (GPP) is required to protect the groundwater.**

**All stormwater management operations, processes, materials, and activities whether industrial, commercial, or residential that may contaminate the groundwater, must be inventoried and practices implemented to prevent potential contamination by means of an approved GPP.**



# Sinkholes

**That is one reason  
WVDEP uses  
ArcView to review the  
site selection of  
proposed and existing  
development.**



*You never know what goes  
into a sinkhole!*

# **ArcView Allows WVDEP**

**to visualize, explore, and  
analyze the geographical  
data, revealing patterns,  
relationships, and trends  
that are not readily  
apparent.**



west virginia department of environmental protection

*Groundwater Program*

# **Groundwater Protection GIS Layers May Include But Are Not Limited To:**

**# Geology Formations**

**# Faults and Fractures**

**# Soils**

**# Caves**

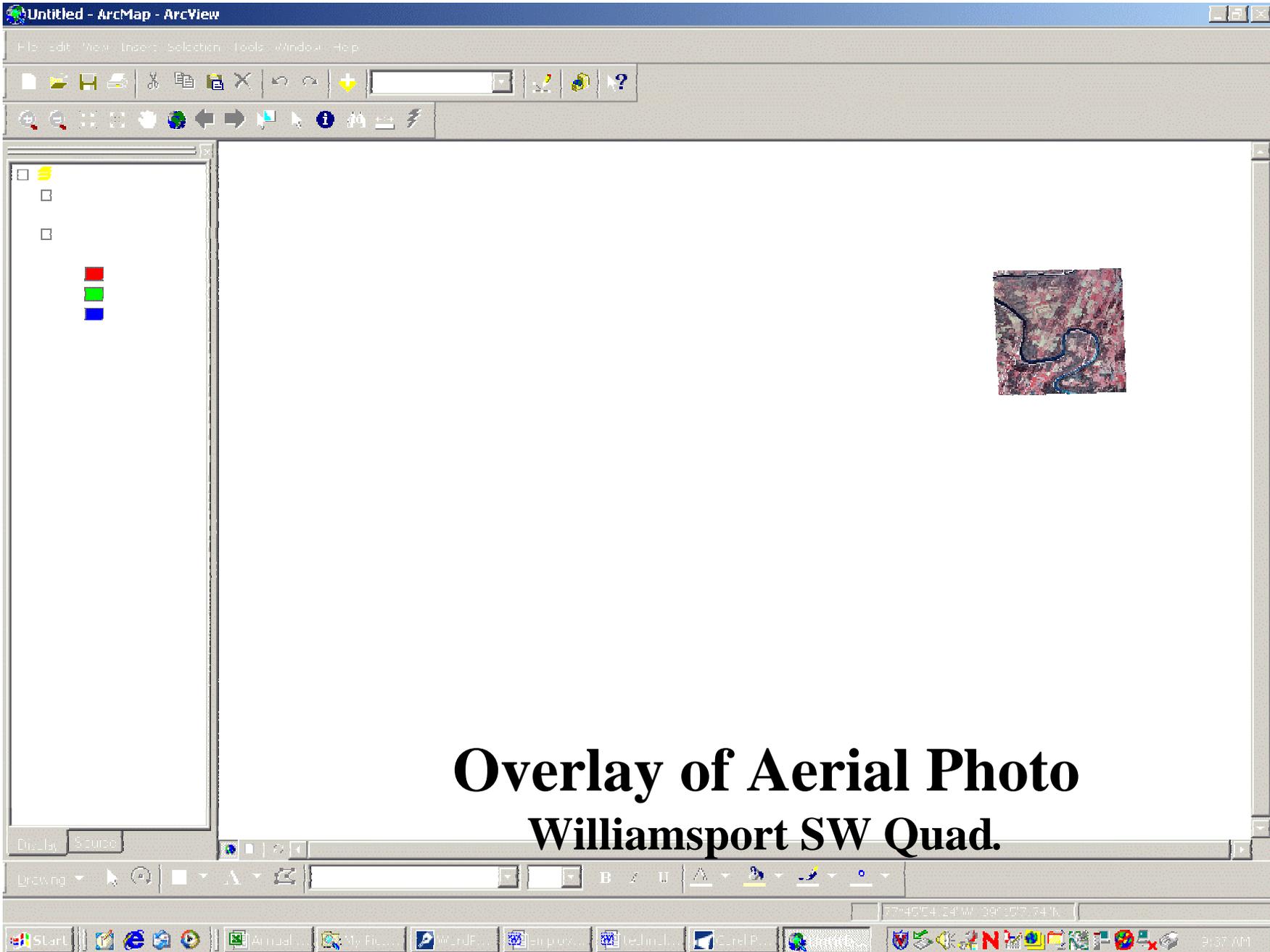
**# Springs**

**# Wellhead Protection Areas**

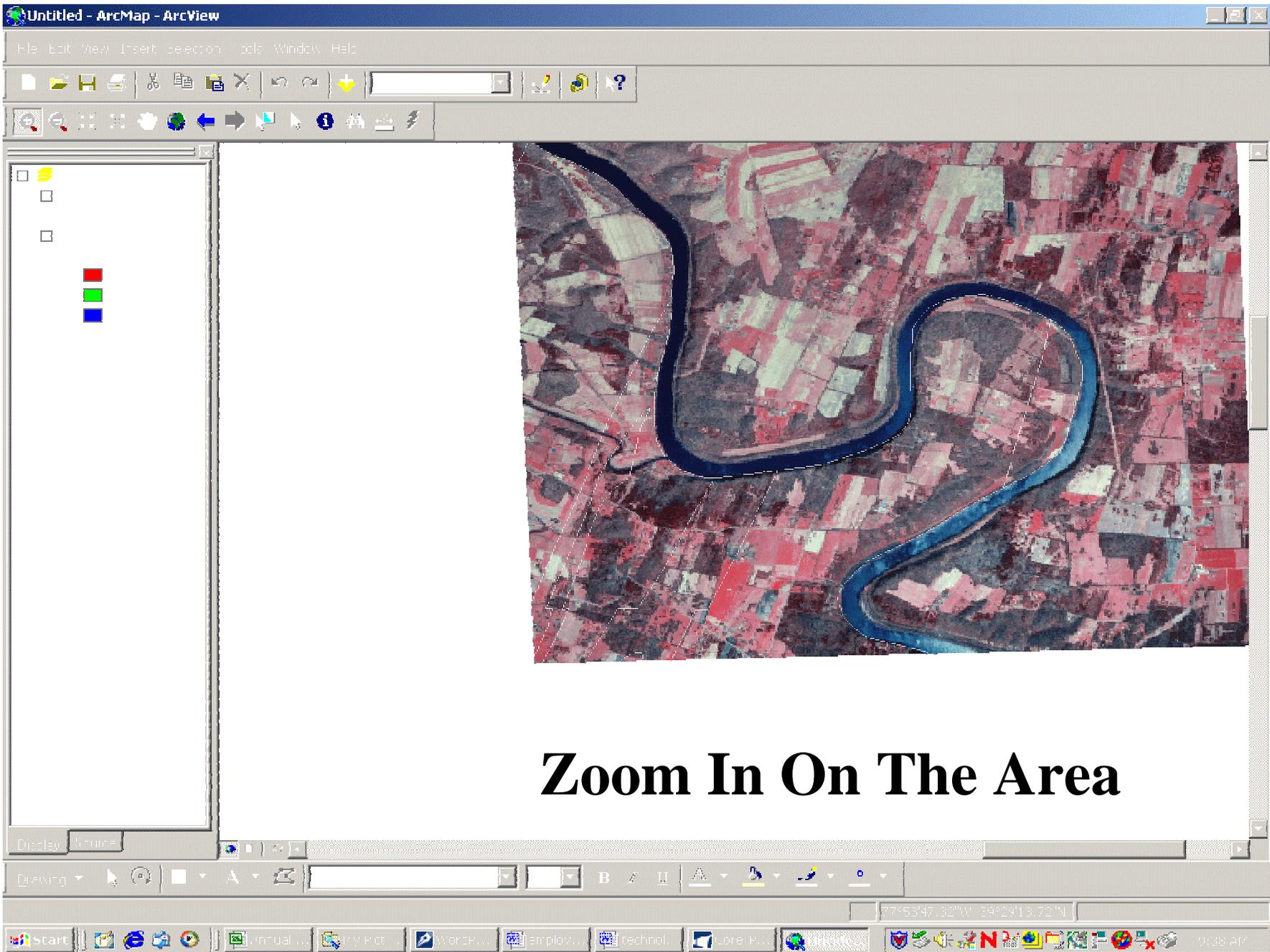
**# Wetlands**

**# Land Application Sites**





# Overlay of Aerial Photo Williamsport SW Quad.



**Zoom In On The Area**



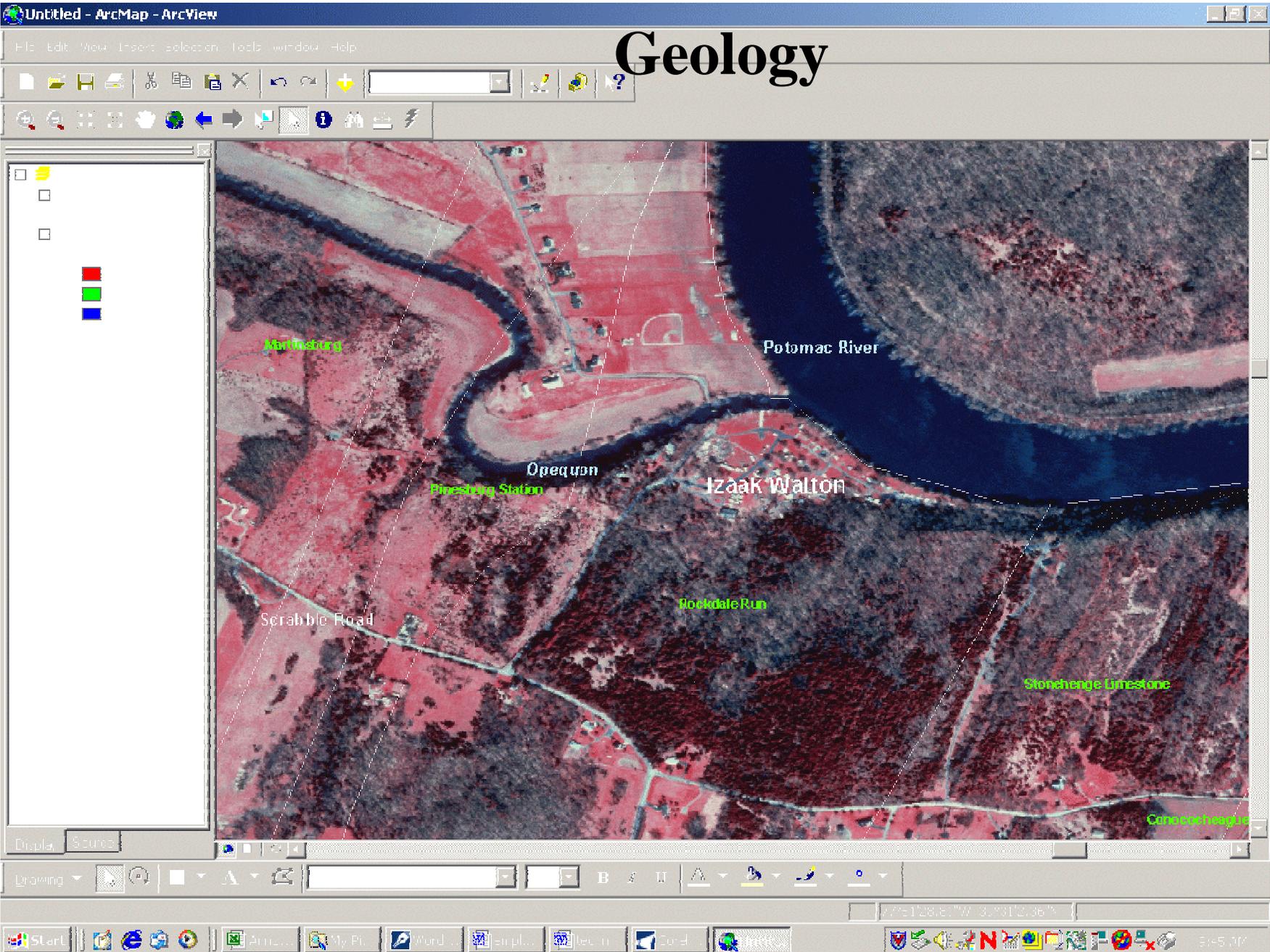
# IZAAK WALTON

The layer list panel shows a tree structure of map layers. At the top is a yellow sun icon. Below it are several layers with different symbols: a green cross, a green triangle, a light blue square, and several layers with red, green, and blue squares. Each layer has a checkbox to its left. At the bottom of the panel are 'Display' and 'Source' buttons.



77°52'9.41"W 39°31'5.25"N

# Geology

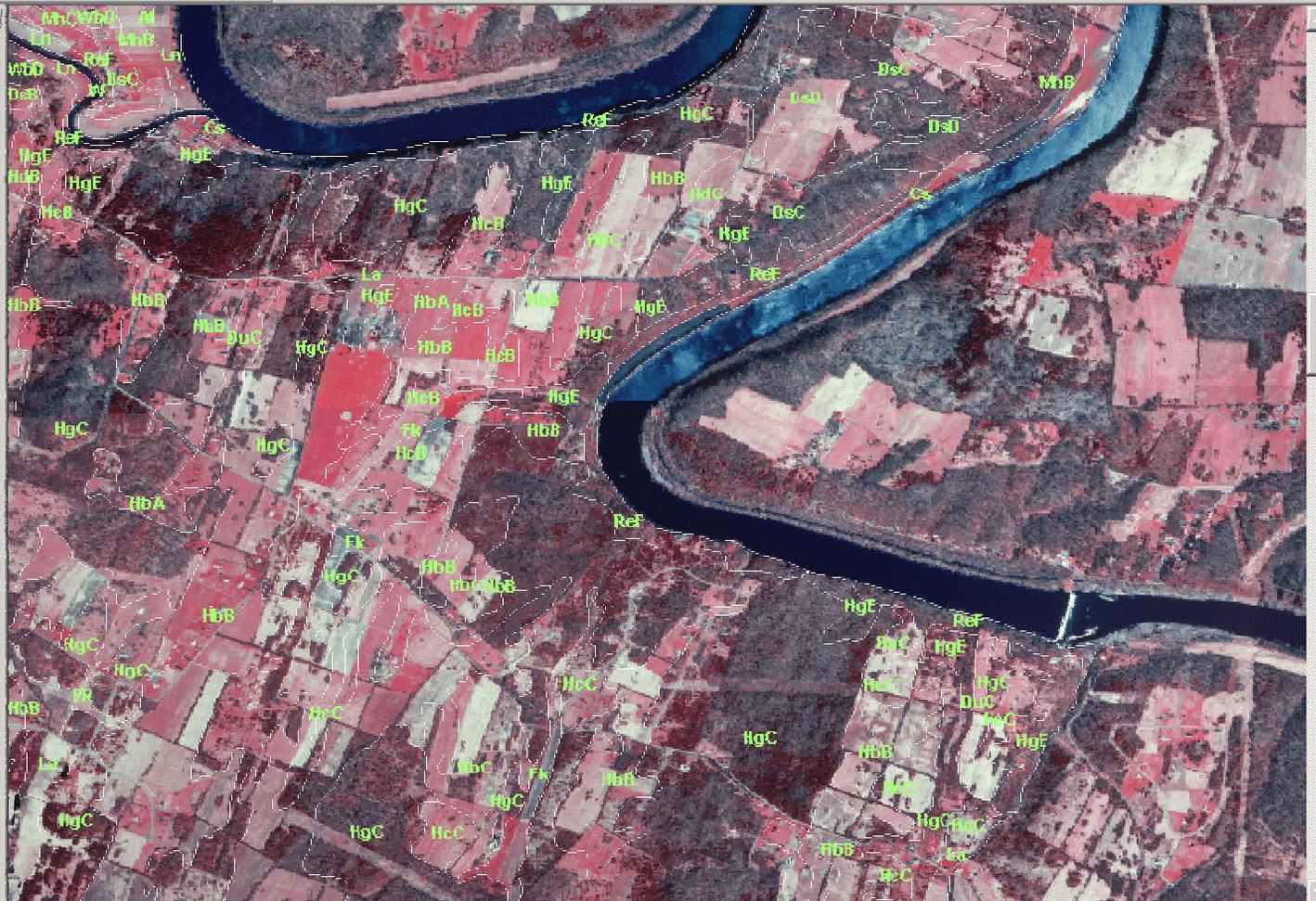




# Soils

Legend for soil polygons:

- Legend title: wv703\_a polygon
- Legend items: A list of soil codes (e.g., HgC, HbB, Ref) with corresponding color swatches (red, green, blue).

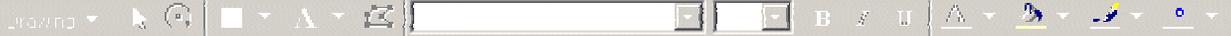




# Caves

Legend panel showing a list of symbols and colors:

- Yellow rectangle
- Green plus sign
- Green triangle
- Light blue square
- Red square
- Green square
- Blue square
- Red square
- Green square
- Blue square
- Red square
- Green square
- Blue square
- Red square
- Green square
- Blue square

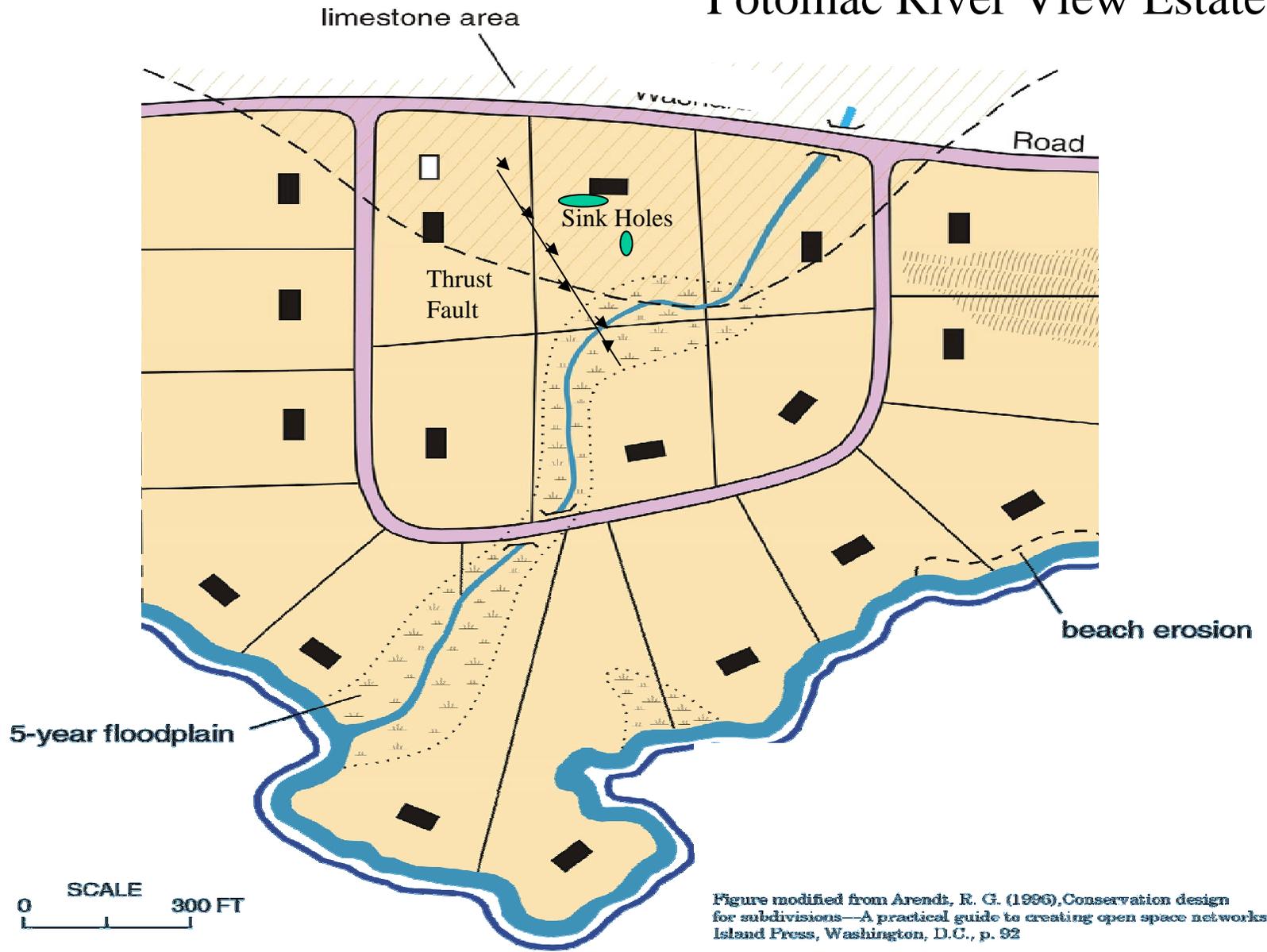


77°52'05" W 33°30'17" N

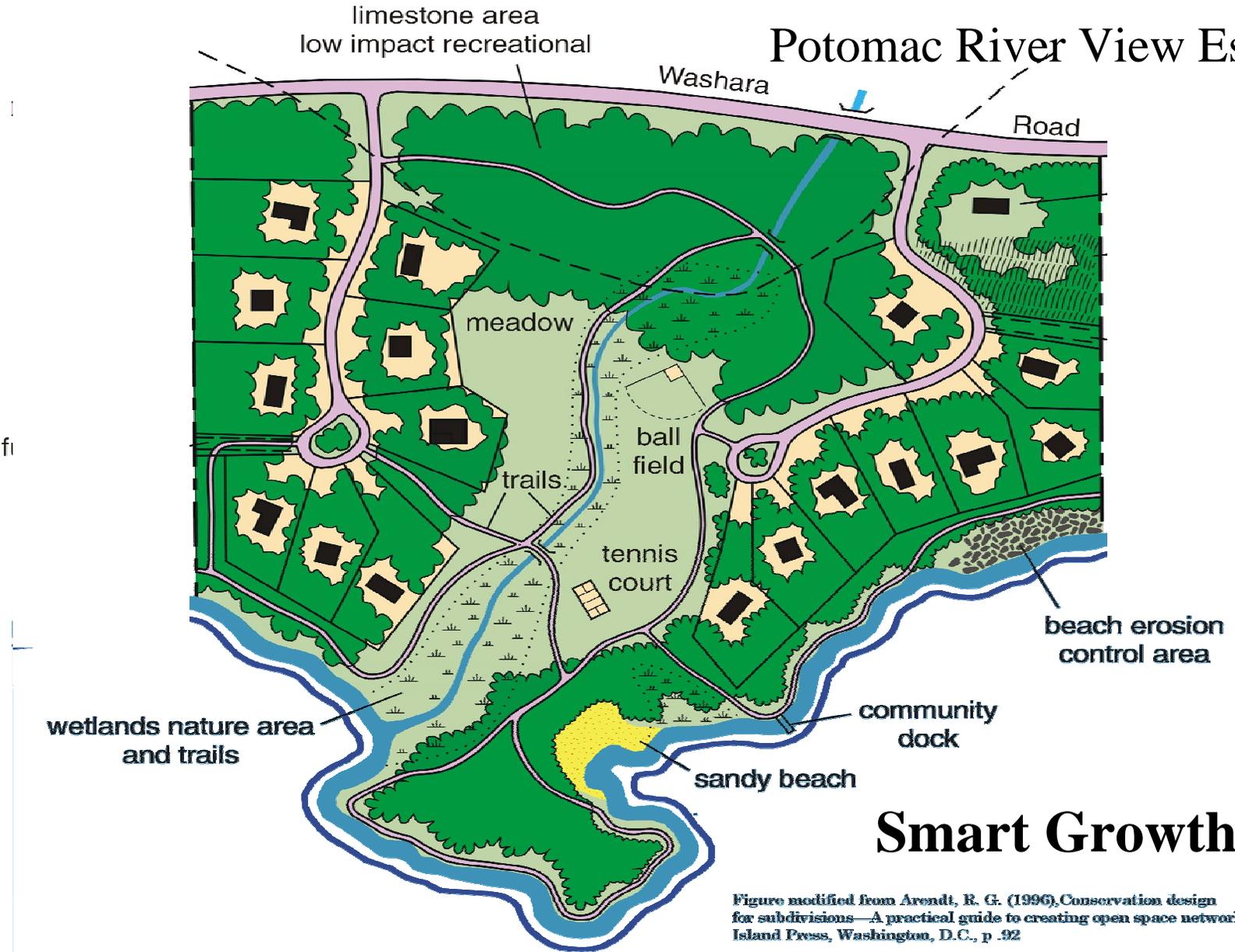
# And Then We Add Development!



# Potomac River View Estates



# Potomac River View Estates



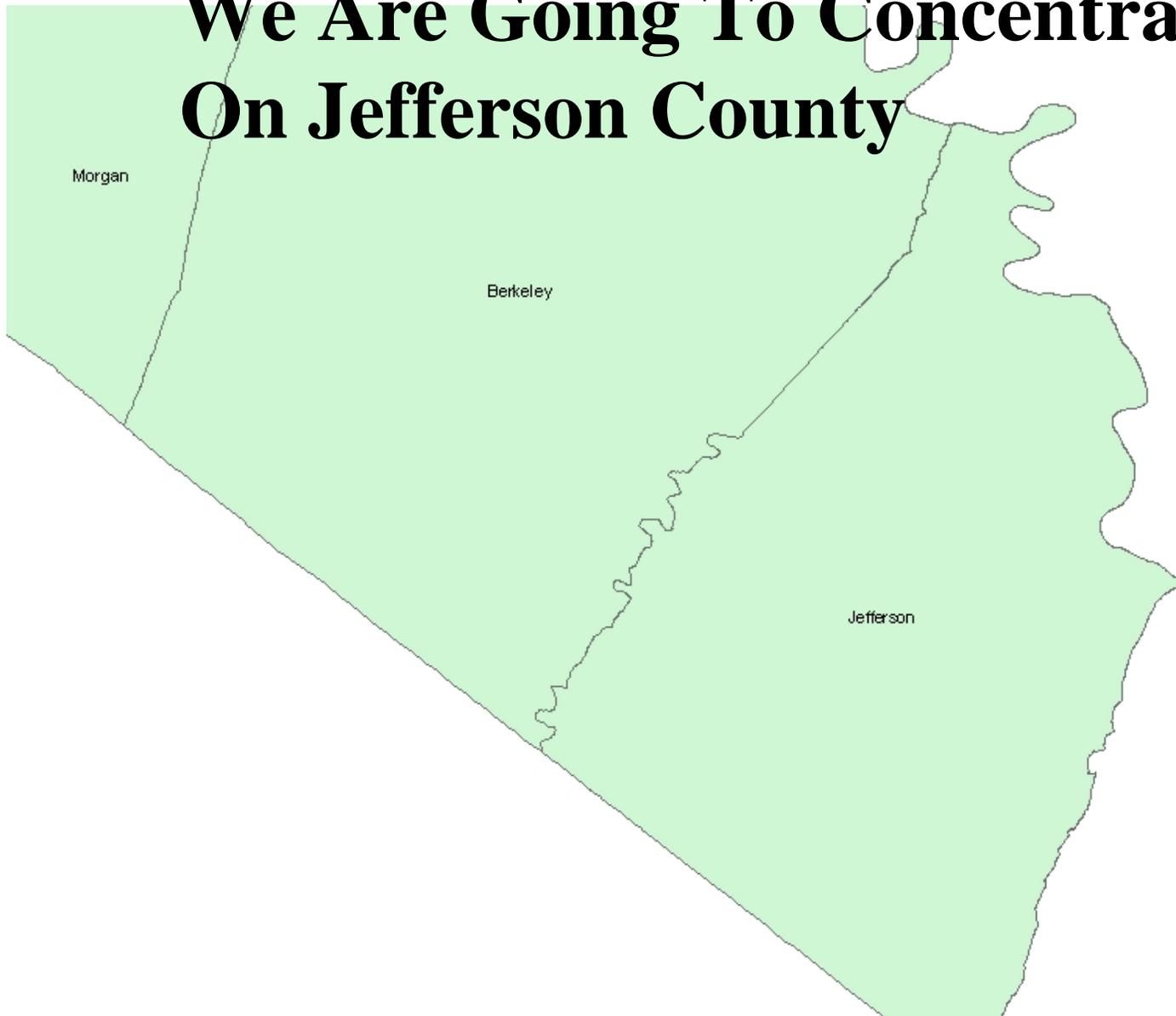
## Smart Growth

Figure modified from Arendt, R. G. (1996), Conservation design for subdivisions—A practical guide to creating open space networks: Island Press, Washington, D.C., p .92

# Let's Make A Map



# We Are Going To Concentrate On Jefferson County



# Jefferson County 2003 Aerial Photos



Berkeley

Jefferson



# Huntfield



# Add Geology



# Add Faults, Folds And Fractures





# Add Special Effects



# Add Wellhead Protection Areas



# Add Special Effects



# Zoom Out For A Better View





# Add Dwellings Until We Reach 3,200



**No That Wasn't 3,200 People,  
But 3,200 New Homes**

## Development

**That is a good Reason To Use GIS.  
To Evaluate Proposed Land Use  
Before It Happens.**



# So You Can Have It All *With* GIS!



*"I am sure you'll appreciate  
our new policy."*



*"Rumor has it that some of you  
have a life! I'm determined to  
change that!!!"*

***WVDEP Strives To Protect The  
Groundwater.***



west virginia department of environmental protection

***Thru ArcView GIS Programs,  
WVDEP helps to map unprotected  
groundwater areas and to stop  
potential environmental problems.***