

GIS: U.S. Public Lands and Population Pressures

Summary

After reading a National Geographic article on U.S. public lands, students use ArcView 3.x to explore public lands, population change reflected in the 2000 Census, and potential land use conflicts created. An optional extension activity puts students in the shoes of a Utah GIS Specialist.

Materials

- August 2001 National Geographic article "The Big Open"
- "The Big Open" Student Response Sheet
- PCs (one for each student or pair of students)
- ArcView 3.2 software
- publiclands.apr file loaded on each computer or computer network
- U.S. Public Lands and Population Pressures ArcView Activity Student Response Sheet

Instructional Procedures

Objectives:

- Use spatial analysis skills to interpret ArcView maps and graphs
- Analyze location and distribution of federal lands
- Explore current issues related to U.S. public lands
- Identify government agencies that manage U.S. public lands
- Consider impact of population growth on U.S. public lands
- Analyze the role GIS can play in communicating spatial information about public lands and public land issues.
- Practice ArcView skills:
 - Turn Themes on and off
 - Make a Theme active
 - Zoom in and out
 - Use the Identify tool
 - Open Theme tables
 - Sort Theme tables
 - Open and close Charts

U.S. Public Lands and Population Pressures Lesson Instructions

Introduction:

In this lesson, you will use an ArcView maps and chart to explore U.S. federal lands, and several issues related to their public use. You will identify the government agencies which manage most U.S. public lands and analyze U.S. population growth patterns and their potential impact on public lands. An extension activity puts you in the shoes of a Utah GIS Specialist.

NOTE : Before completing this activity, read the August 2001 National Geographic article "The Big Open" and complete "The Big Open" Student Response Sheet. Discuss the article as a class. Record your responses to the questions below on the separate U.S. Public Lands and Population Pressures ArcView Activity Student Response sheet.

Procedures:

- Start ArcView
 - Double click on the ArcView icon on your desktop.
 - Click Open an existing project, then OK.
- Open the publiclands.apr file.
 - Navigate to the drive where your instructor has stored this project. Click on the file name

publiclands.apr, then OK.

Open the View of U.S. Federal Lands.

In the Table of Contents (left side of the screen), you will see that two Themes are turned on (check mark in box next to Theme name): States and U.S. Federal Lands. To turn themes on and off, click on the box next to the theme name to remove or add the check mark.

Explore the Map of U.S. Federal Lands

In the Table of Contents, click on the States theme to make it active (raised up), if it is not already active. Now, click the Zoom to Active Theme button. Zoom in and out as necessary using the Magnifying Glass tools and/or the Zoom In and Zoom Out buttons.

Describe the general location of federal lands in the U.S. How do you explain this pattern?

Using the Magnifying Glass tools or Zoom buttons once again, look at your home state.

Describe the general location of federal lands in your home state. How do you explain this pattern? (If there are no federal lands, why not?)

Now, in the Table of Contents, click on the U.S. Federal Lands theme to make it active (raised up). Use the Identify tool to identify several of the federal lands that you find in your home state.

When you're finished, click the Zoom to Active Theme button to return to the View of the U.S Federal Lands.

Federal Lands in the News

You may have noticed that not all "federal lands" would be considered "public lands". For example, Department of Defense lands, Bureau of Prisons lands, etc. How would you differentiate?

In the Table of Contents, turn off the U.S. Federal Lands theme. Leave the States theme turned on. In the Table of Contents, scroll up to find the Department of Energy Lands, Arctic National Wildlife Refuge and National Monuments themes. Turn them on.

In the Table of Contents, click on the Arctic National Wildlife Refuge theme to make it active. If you can't see it, use the Zoom to Active Theme button to find it. You may need to zoom out. You may be aware that the Bush Administration would like to expand oil drilling in the Arctic National Wildlife Refuge. To learn more, see the August 2001 National Geographic article "Oil Field or Sanctuary".

In the Table of Contents, click on the Department of Energy Lands theme to make it active. Use the Zoom to Active Theme button to find it. With the theme active, use the Identify tool to find the Nevada Test Site. Yucca Mountain is located just west of the Nevada Test Site. The Department of Energy has proposed the creation of a permanent nuclear waste storage facility at Yucca Mountain in Nevada . To learn more, see the July 2002 National Geographic article " America 's Nuclear Waste".

In the Table of Contents, click on the National Monuments theme to make it active. Use the Zoom to Active Theme button to find it. President Clinton (1992-2000) designated 21 National Monuments, 15 of which were on BLM Lands. This theme includes some, but not all of the national monuments. This is in part due to the date of the data (2000), and the need to meet a minimum-mapping criterion of 640 acres. Controversy continues to swirl around these National Monument designations, as there are a variety of conflicting land use interests.

See this site for information on these conflicts:

<http://www.nwf.org/grasslands/nationalmonumentsrisk.html>

See this site for more information on National Monuments in general:

<http://www.wilderness.org/standbylands/monuments/>

- *Which other federal lands that have been in the news recently? For what reasons?*

In the Table of Contents, click on the States Theme to make it active. Zoom to Active

Theme. Now, turn off the Arctic National Wildlife Refuge, Department of Energy Lands, and National Monuments themes. Leave the States theme on.

Agencies Which Manage Public Lands

In the National Geographic article “The Big Open”, four government agencies are mentioned that manage the majority of U.S. public lands. We will now take a look at the lands managed by each of these four agencies.

In the Table of Contents, scroll up to find the BLM Lands , Forest Service Lands , Fish and Wildlife Service Lands and National Park Service Lands themes. Turn them on, one by one.

- *Explain the varying patterns you see in the locations of lands managed by these four agencies.*

You may need to turn them on and off a few times to observe the patterns. (FYI: The BLM manages 42% of federal lands, the U.S. Forest Service 30%, the U.S. Fish and Wildlife Service 15% and the National Park Service 13%. The BLM also has responsibility for 700 million acres of subsurface minerals.)

To learn more about these four agencies, visit their Home Pages:

Bureau of Land Management (BLM) at <http://www.blm.gov/nhp/>

U.S. Forest Service at <http://www.fs.fed.us/>

U.S. Fish and Wildlife Service at <http://www.fws.gov/>

National Park Service at <http://www.nps.gov/>

Now, turn these four themes off.

Recreational Visits to BLM Lands

Turn on the 2001 Recreational Visits to BLM Lands in Thousands Theme. These states are the eleven primary BLM states, meaning those states with the greatest amount of BLM land. Make active the State Recreational Visits to BLM Lands in Thousands Theme. Open the Theme table by clicking on the Open Theme Table button. Click on the 2001 Visits column title in the table. It will darken. Now, click on the Sort Descending button to see a ranking of state recreational visits from most to least. Look at the list carefully.

- *List the most and least popular states in this ranking. How do you explain this pattern?*

Close the table by clicking in the box in the upper right hand corner of the table. Be careful not to click in the box to close the ArcView project.

Population Growth 1990 to 2000

Leaving the 2001 Recreational Visits to BLM Lands theme on, turn on the Top 10 States for Population Growth 1990 to 2000 Theme.

- *Which five of the primary BLM states are also Top 10 States for Population Growth 1990 to 2000?*

Minimize the U.S. Federal Lands View by clicking on the minus sign in the upper right hand corner of the View. Be careful not to click on the minus sign to minimize the ArcView project. In the Project Window, click on the Charts icon, click on the Chart name Top 10 States for Population Growth 1990 to 2000, then click Open.

- *List the top 5 states in descending order of population growth 1990 to 2000 on your student handout. **How does Utah rank on the list?***

Now close the table. Return to the U.S. Federal Lands View. In the Project Window, click on the View icon, click on the View name U.S. Federal Lands, then click OK.

Now, turn off the 2001 Recreational Visits to BLM Lands and Top 10 States for Population Growth 1990 to 2000 themes. Leave the States theme turned on.

Utah Case Study

The photograph at the beginning of the National Geographic article “The Big Open” features four men riding All Terrain Vehicles (ATVs) on BLM land near Moab , Utah . Now we will focus on Utah as a case study for several issues related to population growth and public

lands.

Turn on the Utah theme, make it active, and Zoom to Active Theme.

Turn on the Utah Cities and Utah BLM Lands themes.

- *Describe the relationship between the location of Utah cities and Utah BLM lands.*

(For some extra insight, see the Utah Digital Elevation Model available at

<http://www.flag.wr.usgs.gov/USGSFlag/Data/maps/UtahDEM.html>)

Now turn on the Utah County Population Growth Rates 1990 to 2000 theme. Make the theme active. Use the Identify tool to identify counties. Turn off the Utah BLM Lands theme if it interferes with your ability to distinguish counties.

- *What are the two fastest growing Utah counties? What was their population growth rate between 1990 and 2000?*

Now, turn on the Top 15 U.S. Counties for Population Growth 1990 to 2000 theme.

What correlations do you see between the Utah County Population Growth Rates theme and the Top 15 U.S. Counties for Population Growth 1990 to 2000 theme?

Turn off the Utah Cities , Utah , Utah BLM Lands and Utah County Population Growth Rates 1990 to 2000 themes. Leave the Top 15 U.S. Counties for Population Growth 1990 to 2000 and States themes on.

With the Top 15 U.S. Counties for Population Growth 1990 to 2000 theme active, Zoom to Active Theme. Now, turn on the BLM Lands theme.

- *What relationship do you see between the Top 15 Counties for Population Growth 1990 to 2000 theme and the BLM Lands theme?*
- *As population grows, what types of issues would you hypothesize will be created for BLM lands and public lands in general?*
- *What should our priorities for public lands be? Protection or use? How should conflicts over public land use be resolved?*

Turn off the BLM Lands and Top 15 U.S. Counties for Population Growth 1990 to 2000 themes. Turn on the U.S. Federal Lands theme and leave the States them on. Now the project is as you found it originally. Under the File menu, select Exit. You will see "Do you want to save changes to publiclands.apr? Click no. If you are interested and able, continue to the Extension activity below.

Extension Activity: Off Road Vehicles

The National Geographic article "The Big Open" identifies Off Road Vehicles (SUVs, dune buggies, dirt bikes, ATVs, etc.) as the new # 1 problem of the BLM.

Consider this quote from the Utah State BLM Director : "The growth in the use of OHVs on the public lands has substantially increased over the past few years. In 1999 alone, sales of all terrain vehicles in Utah jumped more than 30%. This increase can be attributed in general to a booming economy; a focus by the public on outdoor sports recreation and the desire to find unconfined recreation opportunities; advances in OHV technology that allow greater ability to access previously inaccessible locations; and the rapid growth of urban population centers expanding the interface with the public lands. The Bureau of Land Management (BLM) in Utah has become increasingly concerned over the nature and scale of impacts from OHVs. As a result, we need to continually assess our existing land use plans to ensure they effectively address increased OHV use. Also importantly, we need to try to ensure we have the resources needed to effectively implement and enforce on-the-ground actions." (Source:

<http://www.ut.blm.gov/OHV/ohvinfo.html>)

Imagine yourself as a GIS Specialist for the Utah Bureau of Land Management. The Utah State BLM Director has asked you to create a series of maps which illustrate critical issues related to the use of Off Highway Vehicles (OHVs) on public lands in Utah . Use a separate sheet of

paper.

Based on the information above, what you've learned, and your own thoughts, describe 4 types of maps that you would create for your boss. (Use clear and concise map titles.)

List the types of GIS data that you would need to create your maps.

Use the Internet to locate your suggested map data. List the URLs of your data sources.

Helpful Internet Resources on U.S. Public Lands , Utah , and Off Road Vehicles

All-Terrain Vehicle Association <http://www.atvaonline.com/>

American Frontiers: A Public Lands Journey <http://www.americanfrontiers.net/>

Blue Ribbon Coalition <http://www.sharetrails.org/>

Bureau of Land Management Home Page <http://www.blm.gov/nhp/index.htm>

Geography Action! America 's Backyard <http://www.nationalgeographic.com/geographyaction/>

National Off -Highway Vehicle Conservation Council <http://www.nohvcc.org/>

National Wilderness Preservation System <http://www.wilderness.net/nwps/default.cfm>

Recreational Opportunities on Public Lands www.recreation.gov

Shattered Solitude: Off Road Vehicles on Our Public Lands

<http://www.sierraclub.org/wildlands/ORV/factsheet.asp>

Stand By Your Lands: Off Road Vehicles at <http://www.wilderness.org/standbylands/orv/blm.htm>

Utah Bureau of Land Management <http://www.ut.blm.gov/>

Utah Demographics <http://www.governor.state.ut.us/dea/Demographics/demographics.html>

Conclusion / Note to teacher: Students will discover that most federal lands are located in the Western U.S. and managed by the Bureau of Land Management (BLM). Several of the states with large tracts of federal land are popular public recreation sites, and were among the top population growth areas in the U.S. in the 1990s. This rapid population growth is creating conflicts over land use that will need to be resolved.

Bibliography

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[Utah LessonPlans](#)