

# *Iowa's Settlement Patterns (1850-2000), Natural Resources, and Environmental Impacts*

Working draft Aug. 2010

## **Summary & Teacher notes –**

Variable population trends are one of the easiest variables to overlook when considering environmental change. This activity seeks to delineate some of the general interrelationships between settlement patterns, population variability through time (1850, 1930, and 2000), natural resource availability, geologic processes, and the subsequent environmental and anthropogenic impacts. The students should look at this problem in two ways: 1) the effects of the environment upon people and 2) the effects of people upon the environment.

## **Context Type and level of course**

Entry level - Introduction to Geology, Inquiry into Earth Science, and In-service teacher training

**Geoscience background assumed in this assignment** – None, but if we are in the process of locating two or three readings that would assist the student in interpreting this activity from multiple view points.

**GIS/remote sensing skills/background assumed in this assignment** - None

**Software required for this assignment/activity:** ArcGIS 9.2 – 10.0

**Required data files:** Downloaded from the IADNR GIS Database

*Provided -*

1. Counties of Iowa
2. Iowa Population
3. Rivers
4. Coal mines
5. Aggregate quarries
6. Groundwater
7. Soil

*Not provided -*

**\*\*Will also require students to download or acquire their own files as they see necessary.**

**Time required for students to complete the assignment:**

Approx. 2 (1hr and 50 min.) lab periods and a lot of out of class homework...

## **Goals –**

1. Delineate population trends through time in Iowa with respect to...
  - A. Rivers
  - B. Natural resources
  - C. Political centers
2. Engage students in digital observations and interpretations from multiple data sources (anthropogenic, environmental, and political)
3. Engage students in a debate regarding Iowa's population trends, economic growth, and quality of life.
4. Provide students an opportunity to creatively use data to make their own predictions

## **GIS/remote sensing techniques students learn in this assignment**

1. Data acquisition
2. Basic tool and query skill development

## **Other content/concepts goals for this activity**

Begins to prepare the user to be a self-sufficient GIS user in Iowa by

1. Teaching them how to acquire their own data
2. Use the software's identify tools and help section

## **Higher order thinking skills goals for this activity**

1. Requires the user to use multiple sources of data to make observations, interpretations, and recommendations.
2. Prepares the user to envision how different end users may use their data and plan for future research

## **Description of the activity/assignment**

This is an interdisciplinary activity that encourages the students to interpret the interrelationships between anthropogenic and environmental processes within a familiar setting.

# *The Activity*

## **Title -**

Iowa's Settlement Patterns (1850-2000), Natural Resources, and Environmental Impacts

## **Purpose questions –**

- A. Characterize the quality of life of an Iowan with respect to environmental variables in 2010.
- B. What are the correlations between Iowa's bedrock and surficial geologies and its ecologic regions and/or environmental patterns?
- C. How have Iowa's natural resources influenced population trends since 1830?

Answer these questions and turn them in before continuing with your challenge (12 points)

## **Challenge –**

- A. What are the interrelationships between Iowa's population trends and environmental impacts?
- B. Determine audiences (end users for your deliverables). E.g. Who would find them useful and why? How might these answers influence your future work within this research?
- C. Produce an environmental plan for Iowa's future. Your plan should include
  - 1. Available resources
  - 2. Conservation
  - 3. Agriculture
  - 4. Population trends (past, present, and future)

## **Deliverables** (What you will produce) –

Maps:

- A. Basic map of Iowa's counties (5 points)
- B. Population maps 1850, 1930, and 2000 (15 points)
- C. Natural resources map/s of Iowa (10 points)
- D. Your choice 1 (construct a map that you believe addresses the purpose, challenge, or internal questions most effectively) (5 points)
- E. Your choice 2 (construct a map that you believe addresses the purpose, challenge, or internal questions most effectively) (5 points)

Communication:

- A. Summary paper (2 page max)
  - Specifically address the purpose questions with supporting information from your deliverables. (12 points)
  - Specifically address the challenge statements (12 points)
- B. Presentation (8 min.) [10 points (5 peer/ 5 professor)]  
The majority of your presentation should address

Action –

Iowa like many states in the Northern Plains has a relatively low population density (people per square mile). You've been hired by Iowa's governor to investigate the relationships between population and the environment. The governor is interested in increasing Iowa's population base and keeping its recent college graduates. Your first job is to create a geographic information system (GIS) that assist the governor in make informed decisions regarding Iowa's natural resources and population trends.

\*\* You may need to use the lectures and technical appendix to help you implement your project GIS.

Internal questions to address within your GIS and provide answers to (in a logical location) within your final report/presentation.

1. Compare and contrast the most populated counties in Iowa (1850 vs. 1930 vs. 2000)
2. What patterns exist between Iowa's natural resources and settlement patterns (population trends)?
3. What environmental impacts might increase population centers have upon the most populated Iowa counties?
4. What effects might changes (shifts) in settlement patterns have upon environmental impacts from either an increasing population (e.g. rural to urban) or depopulating county (e.g. urban to rural)?
5. Are Iowa's natural resources evenly distributed throughout the entire state? What are the relationships between proximity to natural resources and population size?
6. What is the proportion of farmlands to natural (unfarmed) lands in Iowa? What are the benefits of agriculture in Iowa? What are the possible negative aspects of agriculture in Iowa? What can be done to increase the benefits and reduce any negative aspects of agriculture in Iowa? What is the NRCS? Are the NRCS offices evenly spaced throughout the State? How might access to NRCS facilities facilitate or reduce conservation efforts around the State?

\*\*What recommendations do you think could help Iowa's governor?

7. What natural resources in Iowa could be enhanced to increase Iowa's population?
8. What political policies could be enacted to increase Iowa's population?