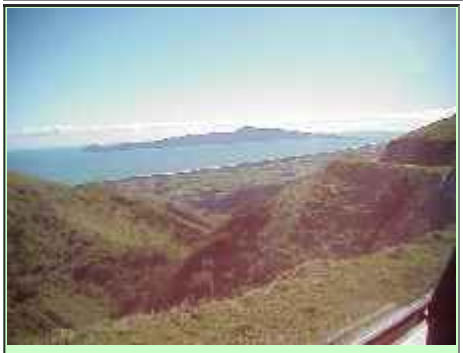
Teaching and Learning with the Degree Confluence Project

The goal of the **Degree Confluence Project** (http://www.confluence.org/) is for people to visit each of the latitude and longitude integer degree intersections in the world. They do so using a GPS receiver, taking photographs at each location, and writing a story about their journey.

As of July 2006, 4,578 successful confluences have been found and 421 secondary confluences have been found by a total of 8,619 visitors who have taken 55,574 photographs in 171 countries. Although confluences in the oceans and some near the poles have been excluded, there are still 11,602 yet to be found. Select any of the photographs below to enlarge.

Introduction



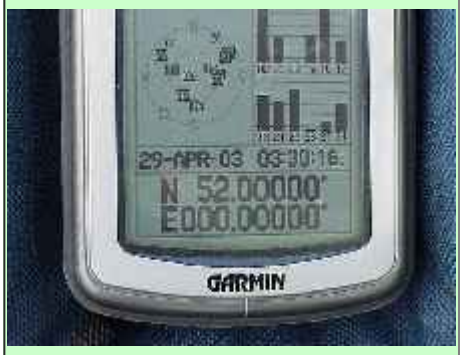
View of the Tasman Sea west of 41 South, 175 East, New Zealand.

Imagine having tens of thousands of photographs tied to specific locations on the Earth's surface. Imagine having access to first-hand accounts of those who journeyed to these locations. The Degree Confluence Project (DCP) brings this photographic and literary library to the university, secondary, and primary classroom.

The DCP represents an organized sampling of the world according to geographic location--latitude and longitude. Each of the photographs and stories have been reviewed so there is nothing objectionable to get in the way of rich geographic teaching content.

Educational Applications

Geography



GPS receiver on the prime meridian, 52 North, 0 East, northeast of London, England.

In the Geography curriculum, a teacher could use the project as follows:

Coordinate Systems

How do we determine relative locations on the Earth's surface (by giving directions, referring to places) and absolute locations on the Earth's surface (latitude and longitude, Universal Transverse Mercator coordinates, state plane coordinates, street addresses, and other means)?

What is latitude and longitude?

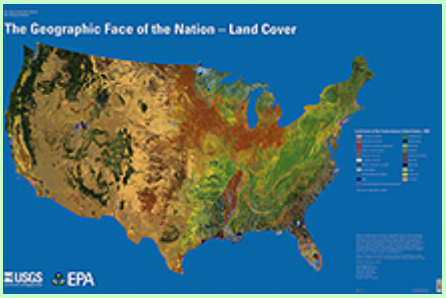
How does GPS work? Incorporate concepts of triangulation, measurement, and precision.

Is your community closer to the (North or South) pole or to the Equator? How do you know?

Is your community closer to the Prime Meridian or to 180 degrees longitude?

USGS world physical regions map.

USGS landforms of the conterminous USA map.



USGS land cover of the conterminous USA map.

Location and Region

Examine thematic maps from the US Geological Survey and other organizations of the world, and of specific regions of the world. The themes should include:

- population density
- culture
- language
- hydrology
- vegetation cover
- land use
- climate

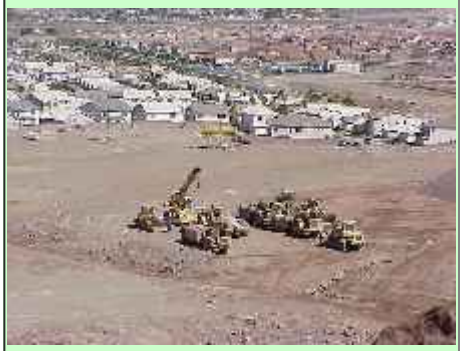
  and

- landforms.

For specific locations on the Earth's surface, ask the students to predict the following variables: At any given location:

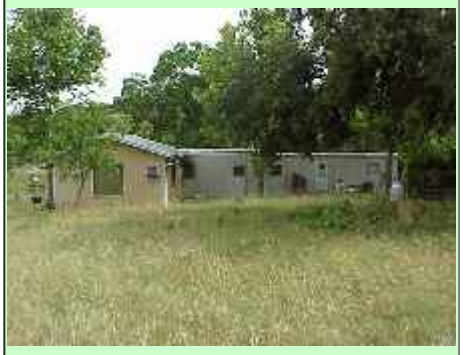
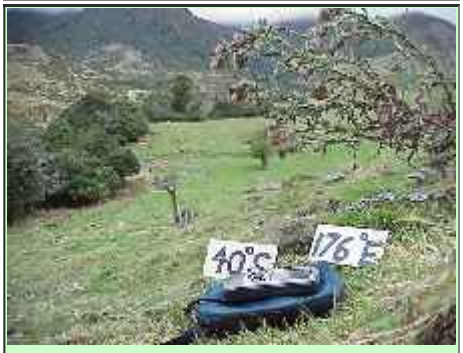
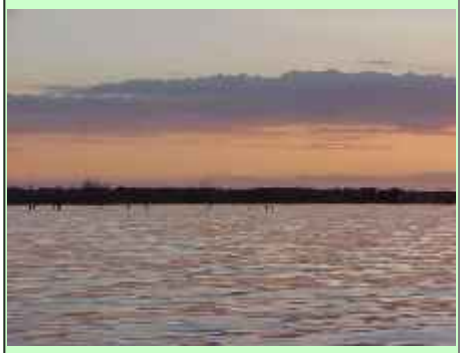
Would you expect to find evidence of human beings? What is the population density in this area? How can you determine the population density from a ground photograph? Why?

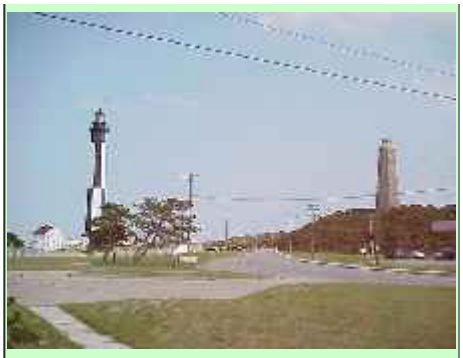
These maps, and more, can be viewed on the USGS Education Map Catalog.



Human-Environment Interaction

Is this an area undergoing rapid population change? What clues do you find on the photographs? What is the reason why the area is or is not undergoing rapid population change?

Residential construction in the Nevada desert, 36 North, 115 West.	Are more people moving into this area or moving out of this area? How have humans modified the land here? For what reasons have they done so?
 Texas home, 30 North, 99 West.	**Dwellings** What kinds of dwellings do people live in? Are they for one person, one family, or numerous families? Why? What material are the dwellings made of? Why? What other buildings and human-built structures exist in the area, and what are they used for?
 Hilly terrain in New Zealand at 40 South 176 East.	**Landforms** What landforms are found in this location? Why? What sort of "hike" do you think you would face to reach this location--easy or difficult? Why? What are the predominant physical processes in this location? In this region? In this country? What types of soils are dominant in this area?
 Devils Lake, North Dakota, at 48 North, 99 West. This confluence was formerly on land, but due to increased rainfall in the past decade in the closed basin, it is now under water.	**Water** Is standing or flowing water evident in this area? Why or why not? If no standing or flowing water is visible, what other signs are there of the presence of water? Is this an area that is drained of water, or an area where water is brought in from elsewhere (irrigated)? What are the dominant water-influenced processes operating here?



Lighthouses at Fort Story military base, near 37 North, 76 West, on the Atlantic Coast of Virginia.

Cultural and Political Geography

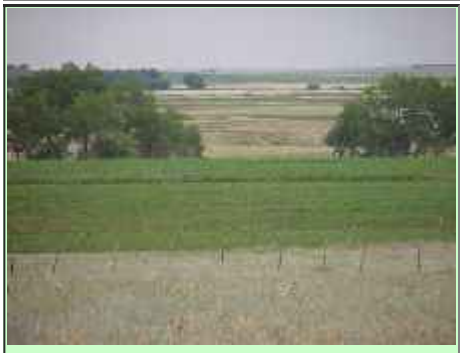
What evidence is there of the:

- race,
- ethnicity,
- religion,
- cultural values
- and
- language

of the people living in this area? How do people "mark" their culture on the landscape?

Is the area near a border of countries or cultures, and can the presence of that border be detected here?

What influence does the political structure of the country or region have on the way people live here, or on the travelers to the confluence?

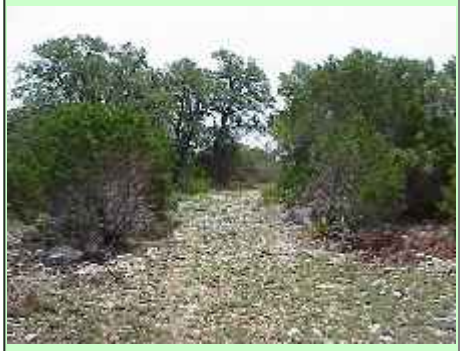


Colorado corn and wheat fields at 39 North, 104 West.

Occupation

What would you say is the predominant occupation of people living here?

What clues in the photographs and narratives helped you come to the conclusion that you did? How accurate would you say your conclusion is?



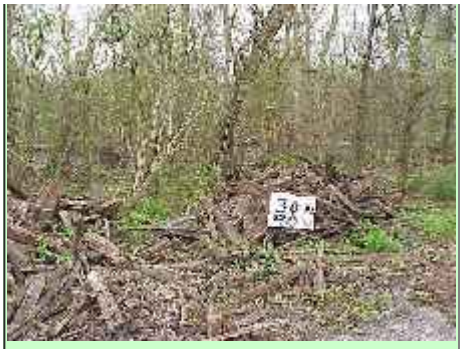
Juniper and pinon vegetation in central Texas at 30 North, 100 West.

Climate

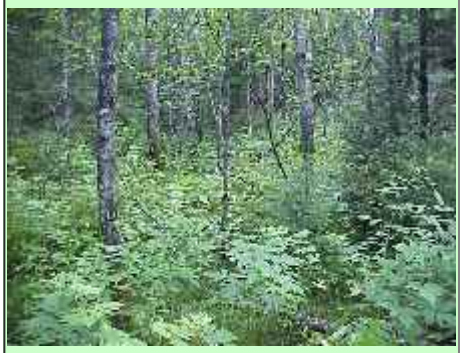
What can you infer about the climate of this area?

What clues from the photographs and narratives give you an indication of the climate of this area--precipitation amount, sunshine, average temperature, seasonal variability, extremes, and so on?

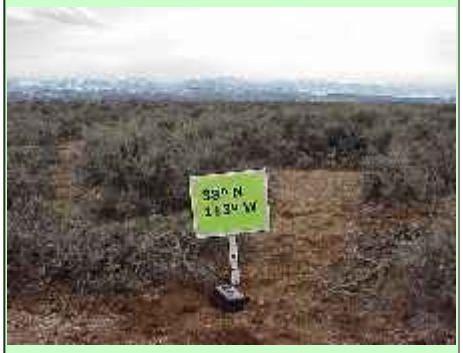
In what form does most precipitation fall in this area--as snow, rain, sleet, hail, or several of the above?



Bayou vegetation in Louisiana at 30 North, 90 West.



Tree cover in Michigan's Upper Peninsula at 46 North, 88 West.



Sage growing in southern Utah at 38 North, 113 West.

Vegetation

What natural vegetation types can you detect in this area?

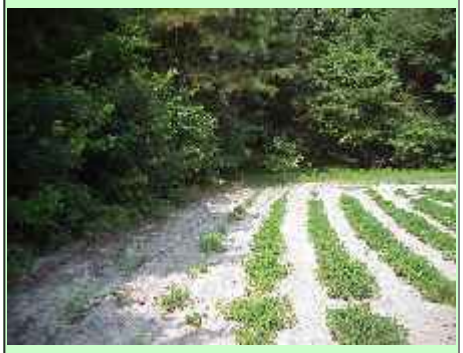
What is the height of the vegetation? Why?

Are the vegetation types grown in the area natural, or were they planted by humans?

How do the seeds for the vegetation become dispersed?

How would you describe the variety of vegetation in this area?

What is the connection between climate and vegetation in general, and the connection in this area specifically?



Peanut field in Virginia at 37 North, 77 West.

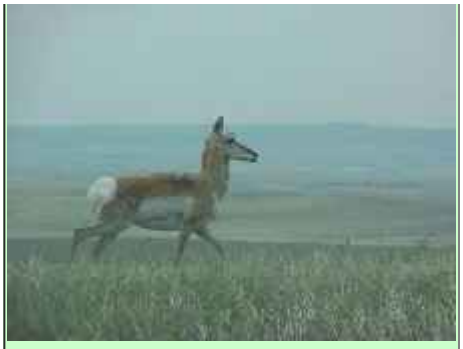
Agricultural Land Use

If the area has been planted by humans, what type of vegetation is grown there? If the area has not been planted, what are the reasons why?

Why is this particular type of crop grown there?

When is the crop harvested? Why?

Who consumes the crops grown here -- people, animals, or both?



Antelope at 43 North, 103 West on the grasslands of South Dakota.

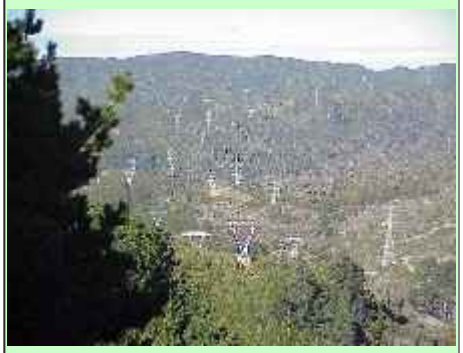
Animals and Birds

What birds and ground animals do you predict live in this area?

What shelters do they build, and out of what materials?

What is their primary food source?

How does the vegetation and climate influence the type of birds and animals that live here?



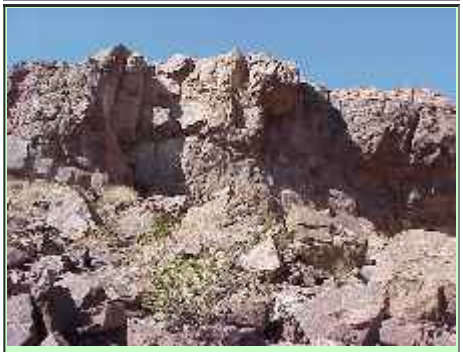
Transmission towers at 41 South, 175 East in New Zealand.

Change

What did this area look like 100 years ago? How will it change over your lifetime?

What forces are acting to change the area?

Is the area rapidly changing or slow to change compared to other areas nearby or elsewhere in the world? Why?



Cliff in southern Nevada at 36 North, 115 West.

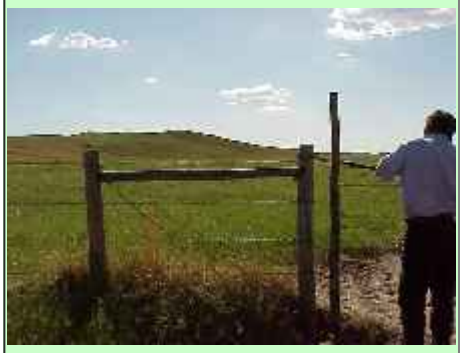
Natural Hazards

What are the most common natural hazards in this area? Why?

Is this area more hazardous than the area you live in? Why or why not?

Are there specific time(s) during the year when these hazards are more prevalent than others? Why?

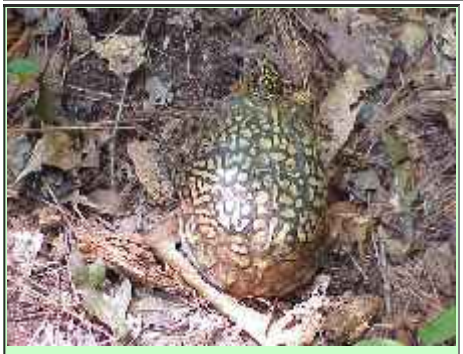
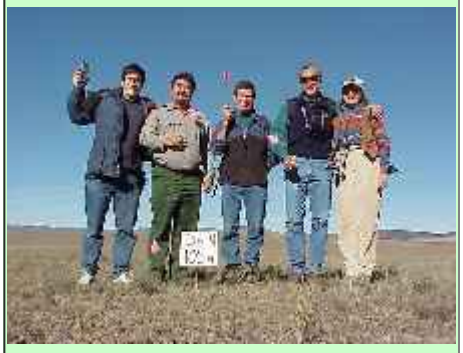
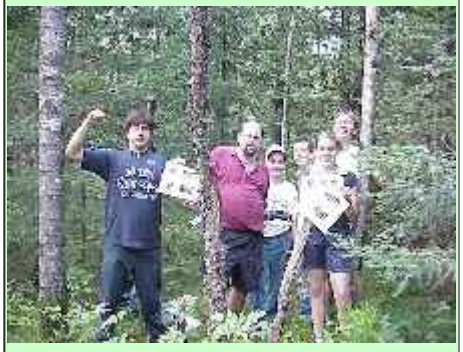
History

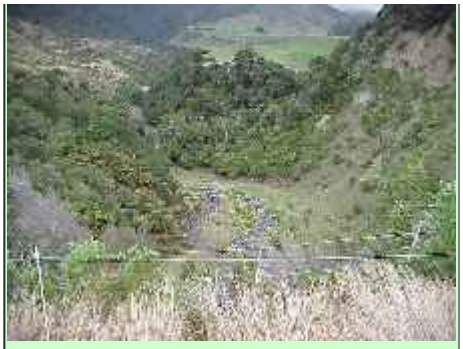


How has the area changed over the past year? The past century? The past 2,000 years? Why?

What notable historical events have occurred here or near here?

What do you predict this area will look like in 1 year? In 10 years? In 100 or 2,000 years? Why?

Closing the ranch gate after visiting 43 North, 101 West in South Dakota.	
Biology	
 Turtle in forest in southeastern Virginia at 37 North, 77 West.	What is the predominant ecosystem in this area? The predominant biome? Would you characterize it as "healthy?" What threats does it face? Is this area in the center or near the edge of a biome or ecosystem? What species dominate in this area? How are they impacted by humans? What can you assess about the biodiversity in this area?
Language Arts	
 A geographer, park ranger, historian, and ranch landowners visit 36 North, 105 West in northern New Mexico.  Visitors to 46 North, 88 West include teachers, scientists, and students.	Use the stories on the site to analyze writing style and content by different people all over the world. Can you determine what is important to the writers by what they have included in their narratives, and how they have constructed the narratives? Can you determine what the visitors do for work, and what they do for recreation? What do you suppose the writer did during the day before and the day after he or she visited the site? Are the writers from the local area that they are writing about, or are they visitors from a distant land? How might their perspective be different if a local person was a visitor, or if a visitor actually lived in the local area?
Earth Science	



River valley at 40 South, 176 East, New Zealand.

What is the tectonic activity of this area?

What minerals and rock types predominate in this area? How can you determine this based on the photograph? Obtain other information (maps and reports) to support your investigation.

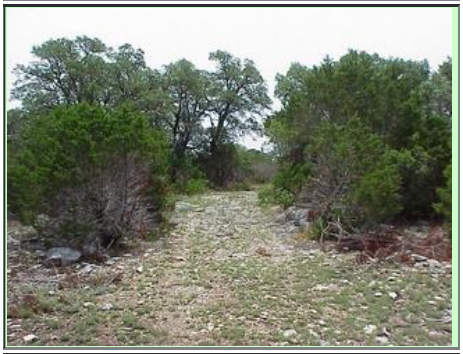
What natural hazards predominate in this area? Is there a specific time or times during the year when these hazards are more prevalent than others?

Example Activity

Examine these photographs taken on the 100th Meridian (longitude line) in North America.

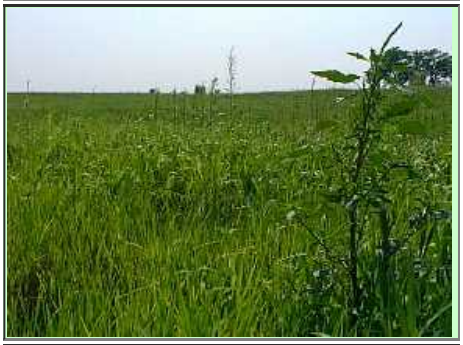
The photograph at left was taken at 19 North, 100 West, in Mexico.

Use the questions above and your own questions to analyze what changes in the physical and cultural environment as one moves north along the meridian, and why the changes take place. The photographs here are selections; use additional photographs that are each one degree along the meridian. Or, select sites along a different meridian, or parallel, or in your own country. What changes can you determine between each of these photographs, and why? Investigating the Whys of Where is the essence of geographic inquiry.



The photograph at left was taken 11 degrees north of the photograph above, at 30 North, 100 West, Texas, USA.

How is this area alike and different from the ones to the north and south of it? What natural forces are involved with shaping the landscape? How have humans modified the landscape?

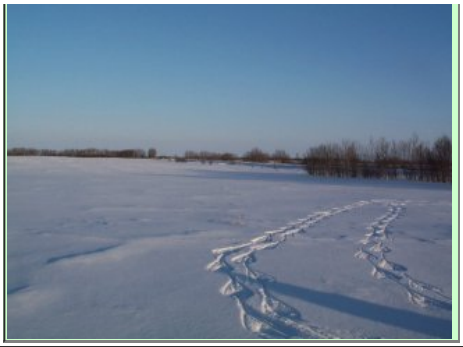


The photograph at left was taken 10 degrees north of the photograph above, at 40 North, 100 West, in Kansas USA.

How is this area alike and different from the ones to the north and south of it? What natural forces are involved with shaping the landscape? How have humans modified the landscape?

The photograph at left was taken 11 degrees north of the photograph above, at 50 North, 100 West, in Canada.

How is this area alike and different from the ones to the north and south of it? What natural forces are involved with shaping the landscape? How have humans modified the landscape?



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