Name _____

Land Use Change

Part 1: Making Predictions

Look at the five Land Use Change Image pairs carefully. Predict what type of **changes** you think each image pair shows. [**Helpful hint**: How are the images different?]

Site #1: _____

Site #2: _____

Site #3: _____

Site #4: _____

Site #5: _____

Part 2: Exploring land use change in natural-color and false-color images

Background information review:

A **natural-color composite image** consists of blue, green, and red visible light portrayed in a natural manner. The appearance of the image often resembles a color photograph. Active vegetation appears green, bare soil and fallow (not cultivated) fields are brown, urban structures are white, and clean water is often blue.

A **false-color composite image** consists of green, red, and near-infrared light portrayed in a false-color manner. Active vegetation appears red-pink, bare soil and fallow (not cultivated) fields are green, and urban structures are bluish-white. Clean water bodies appear black.

Residential areas, however, may have a speckled appearance of light blue/white and red. The light blue/white indicates buildings and pavement, and the red indicates the grass and trees that may line the streets and surround places where people live.

Helpful hints to identify features in false-color images:

- Red represents actively growing green vegetation. A large red area could be a forest.
- Black represents water. Black areas may be oceans, lakes, ponds, or rivers.
- Green usually represents fields in agricultural areas.
- Blue-white represents urban areas.

Site #1:

Site #1 displays **false-color composite images** of the Las Vegas area in 1972 (left image) and 1992 (right image). Each image is approximately 26 miles wide.

1. What types of land cover features can you identify in these images? Support each claim with evidence. **Hint**: Remember to think about tone, size, texture, pattern, site, or association in the image.

2. What do you think is the black color in the image pairs?

3. Bright red areas occur in many places in the 1992 image. What might these areas be?

4. What color do you think represents residential neighborhoods?

5. How has the Las Vegas area **changed** from 1972 to 1992? Support your answer with **evidence** from the image pairs.

6. The population of Las Vegas in 1992 was 863,000. The projected 2008 population is 2,156,313. Lake Mead, Las Vegas's main water source, is shrinking. How should further development occur to conserve water? What could communities do to help conserve water?

Site #2:

Site #2 displays **false-color composite images** of the city of Dubai in 1973 (left image) and 2006 (right image). Dubai is located on the Persian Gulf coast in the northern part of the United Arab Emirates in the Middle East. Each image is approximately 13 miles wide.

7. Describe **four features** in the 2006 image that are **not** present in the 1973 image.

Dubai is one of the fastest-growing cities in the world. The population of Dubai in 1985 was 183,000. The population in 2006 was 1,200,000.

8. Notice the "Palm structures" located in the Persian Gulf in the 2006 image. What do you think these might be?

Site #3:

Site #3 displays **true-color composite images** of the Acheh Province in Indonesia. The Acheh Province is located on the northern end of Sumatra (part of Indonesia). Each image is approximately 37 miles wide.

9. What major changes do you observe between the two images? **Hint**: Remember to think about tone, size, texture, pattern, site, or association in the image.

10. What type of natural event do you think might have caused such changes?

Site #4:

Site #4 displays **true-color composite images** of the New Orleans and Lake Pontchartrain area. Each image is approximately 37 miles wide. New Orleans sits between Lake Pontchartrain and the Mississippi River.

11. What color is the city of New Orleans in the April 2000 image?

12. What color is the city of New Orleans in the August 2005 image?

13. What major changes do you observe between the two images? **Hint**: Remember to think about tone, size, texture, pattern, site, or association in the image.

14. What type of natural event do you think might have caused such changes?

Site #5:

Site #5 displays three **true-color composite images** of the Mt. St. Helens area in Washington. Each image is approximately 35 miles wide.

15. What **major changes** do you observe between the three images? **Hint**: Remember to think about tone, size, texture, pattern, site, or association in the image.

16. What type of **natural event** do you think might have caused the observed changes between the 1972 image (left image) and the 1990 image (middle image)?

17. What type of **natural event** do you think might have caused the observed changes between the 1990 image (middle image) and the 1999 image (right image)?

Part 3: Applications

18. How can city planners use time-sequenced satellite images to plan for the future population growth of a city?

19. How can emergency management planners use satellite images to prepare for a natural disaster? Provide a specific example.