

## Exercise Three

# Aerial Photographs, Satellite Images, and Topographic Maps

### MATERIALS REQUIRED

The following materials are necessary to complete this exercise and should be available in the laboratory. The quantities depend upon the number of students in the laboratory and whether or not students are to work independently or in groups.

stereoscope

ruler

topographic map (preferably local)

hand lens or magnifying glass

Note: A drafting compass, divider, or piece of string can be useful for measuring distance on a topographic map, especially the length of a river.

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### PROCEDURES AND STRATEGIES

- Due to the length of the exercise, some sections may have to be completed outside of the allotted laboratory time or, at the discretion of the instructor, eliminated.
- Some students may not have the capability of stereoscopic vision. Only minor adjustments will be necessary for these students to successfully complete the exercise.
- To complete the entire exercise requires the use of a USGS topographic map that illustrates the Public Land Survey (PLS) system for designating the location of land areas. If you wish to use a map from a region that has not been surveyed with the PLS, then either the exercise will have to be modified or more than one map will be necessary.
- To illustrate different scales, we recommend that samples of the various types of USGS topographic maps be displayed in the laboratory and that students be encouraged to look at them.
- Some students have difficulty working with topographic contours and/or topographic profiles. Often having access to raised relief maps or models helps them understand these concepts.

## ANSWERS TO EXERCISE THREE QUESTIONS

### Activity 3.1

1. See completed Figure 3.2.
2. See completed Figure 3.2.
3. Road
4. See completed Figure 3.2.

### Activity 3.2

1. The outermost extent of both impact craters can be identified by the abrupt change in topography.
2. Figure 3.4 A.

### Activity 3.3

- 1–5. Answers will vary with the map supplied.
6. Highways and roads: red and black

Buildings: black

Urban areas: red

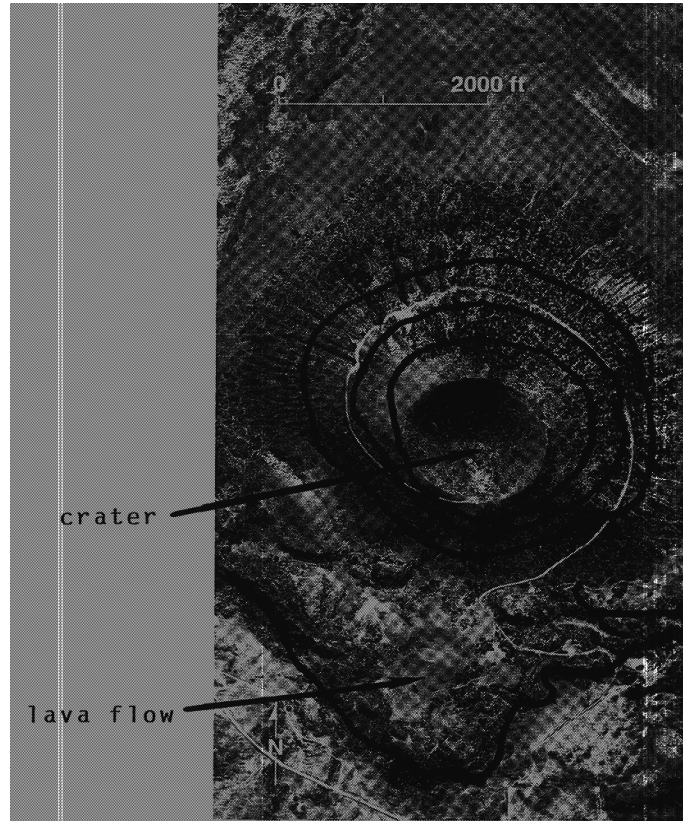
Wooded areas: green

Water features: blue

7. 7 ½ minutes of latitude and longitude.

### Activity 3.4

1. 62,500: 1 mile on Earth  
250,000: nearly 4 miles on Earth
2. larger; less      smaller; more
3. Answers will vary with the map supplied.
4. Answers will vary with the map supplied. However, a 15-minute topographic map will cover from 197–281 square miles, and the quadrangle area of a 7.5-minute topographic map ranges from 49–70 square miles.



**Figure 3.2**

**Activity 3.5 A**

1. Label the townships and ranges on Figure 3.8 following the example of Figure 3.7.
2. Label the sections on Figure 3.8 following the example of Figure 3.7.
3. Y) NE 1/4, SE 1/4, Sec. 14, T2N, R4E  
Z) NW 1/4, SW 1/4, Sec. 34, T4S, R2E

**Activity 3.5 B**

- 1-4. Answers will vary with the map supplied.

**Activity 3.6**

1. Contour interval: 40 feet
2. 120 feet.
3. 800 feet, 1000 feet, 1200 feet
4. 1 is the steepest; 3 is the least steep.
5. D and E.
6. F.
7. Draw appropriate arrows on the three streams.
8. N = 870 feet.
9. a) Relief = 400 feet;      b) relief = 200 feet.

**Activity 3.7**

1. See completed Figure 3.12.
2. South.
3. See completed Figure 3.12.

**Activity 3.8**

1. See completed Figure 3.14.

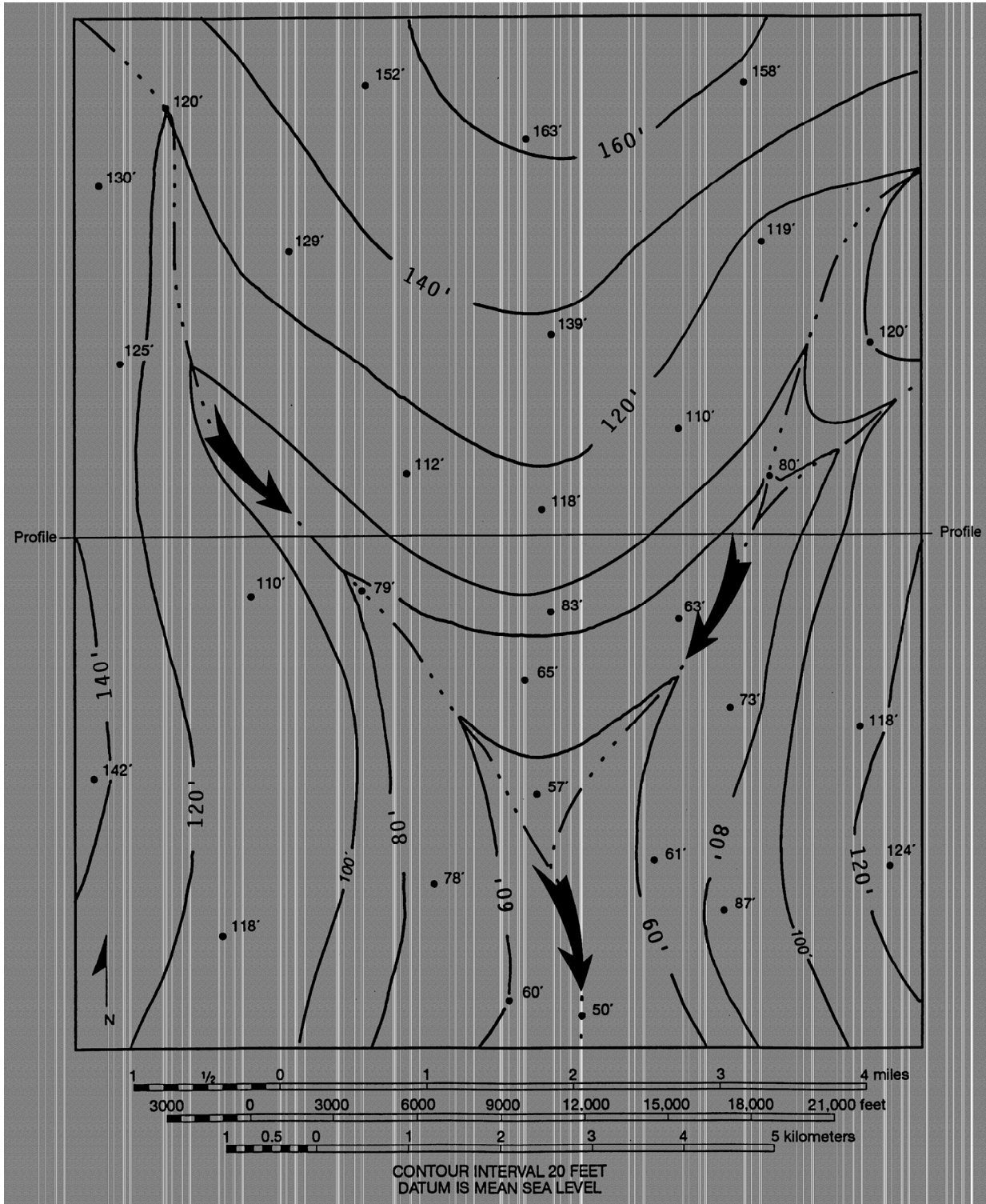
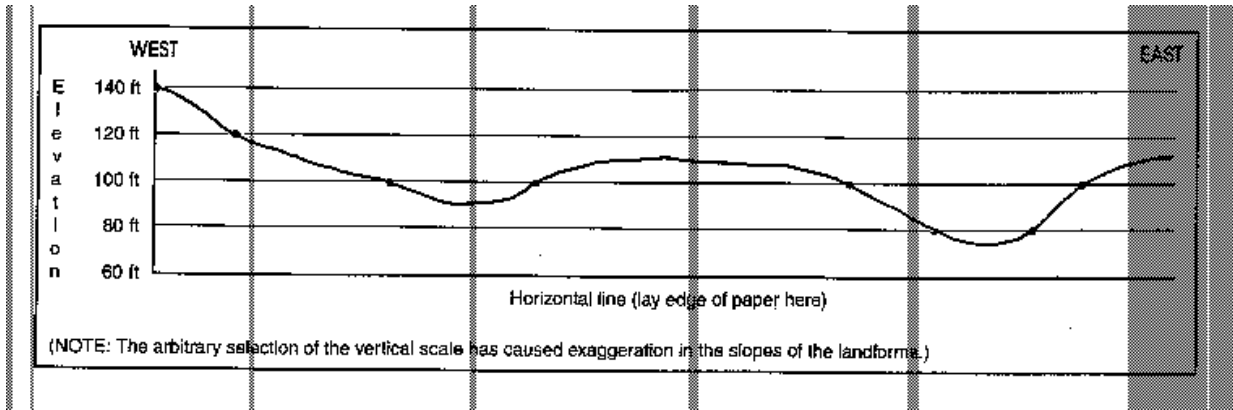


Figure 3.12



**Figure 3.14**

**Activity 3.8**

1. 40 feet.
2. 200 feet.
3. 1 mile wide and 1 mile deep.
4. Westward. Direction can be determined by examining elevations or the V's that point upstream.
5. 10,060 feet.
6. 280 feet.
7. Gradually sloping to flat terrain.
8. Marsh or swampy area.
9. Moderate uphill, relatively flat, moderately to steeply downhill, relatively flat.
10. 10,000 feet.
11. Answers will vary.
12. Two townships.

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1. Contour interval: 20 feet
2. 100 feet; 200 feet.
3. Point A: 160 feet      Point B: 120 feet      Point C: 45 feet (approximate)
4. Approximately 15 feet

5. See completed Figure 3.16. Close spacing of contour lines indicate steep terrain.
6. Low.
7. 290 feet.
8. Lower elevation. Point Y is 20 feet lower than point X.
9. Maximum relief = 290 feet.
10. Sunset trail would be the more gradual route.
11. a) Wider            b) From 1985 to 2010, the water level of Lake Mead has dropped considerably.  
c) Increased amount of water being withdrawn from the lake and perhaps less rainfall and runoff.

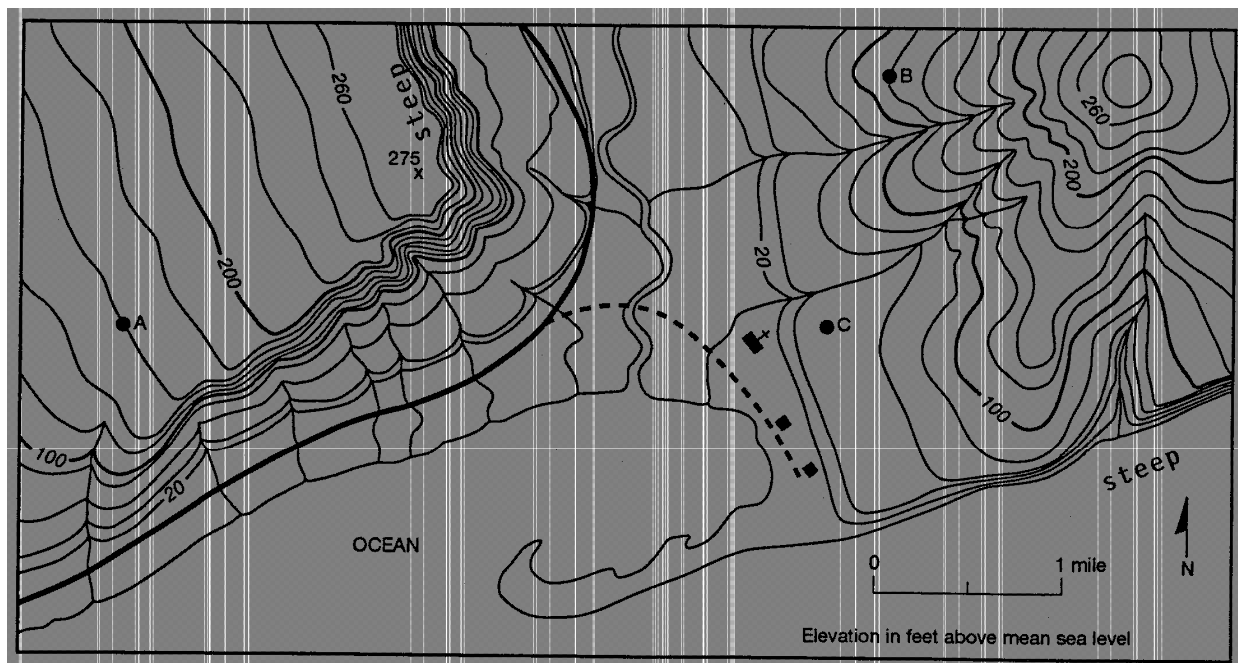


Figure 3.16