Name: _____

Lab day: Tuesday Wednesday

CEEES/SC 10110L-20110L Planet Earth Laboratory

Laboratory #11: Arid Environments & Landforms

Readings: See handout at http://www.nd.edu/~cneal/PhysicalGeo/Lab-Deserts/index.html. This lab is out of 52 points.

1) What do the following terms mean/refer to? (10)

   a) Piedmont: _____

   b) Pediment: _____

   c) Bajada: _____

   d) Inselberg: _____

   e) Monument: _____

   f) Plateau: _____

   g) Mesa: _____

   h) Butte: _____

   i) Playa: _____

   j) Perennial Stream: _____

2) The map (on pages 3 & 4) represents a portion of Bennetts Well, California, 1:62,500 quadrangle. This is in the heart of Death Valley. The lowest elevation in the United States, 282 feet <u>below</u> sea level, occurs within this quadrangle. Because Death Valley is below sea level, all of the drainage in this area flows into the valley – no streams flow out! The Amargosa River flows North – when it flows at all. Rainfall averages *about* 5 centimeters or 2 inches per year, but it commonly comes in big storms after years of virtually no rain. Most erosion occurs during these storms.

   a) Most valleys form as erosion moves loose material and streams transport it out of the valley. But that cannot happen here. The valley was formed by faulting and the faults are still active. Movement on a near-vertical fault on one side of the valley caused that side of the valley to drop.
   On which side of the valley is this fault [Assume North is to the top of the page]? **Cite at least two pieces of evidence to back your choice**. (3)

b) What name is given to the landform between the valley and the mountain front on the west side of the map? (1)

What is the gradient of this feature, in feet/mile, between BM -242 (***negative*** 242) on the road and the "19" in Section 19 to the west (both highlighted by red arrows)? (4)

WEST SIDE

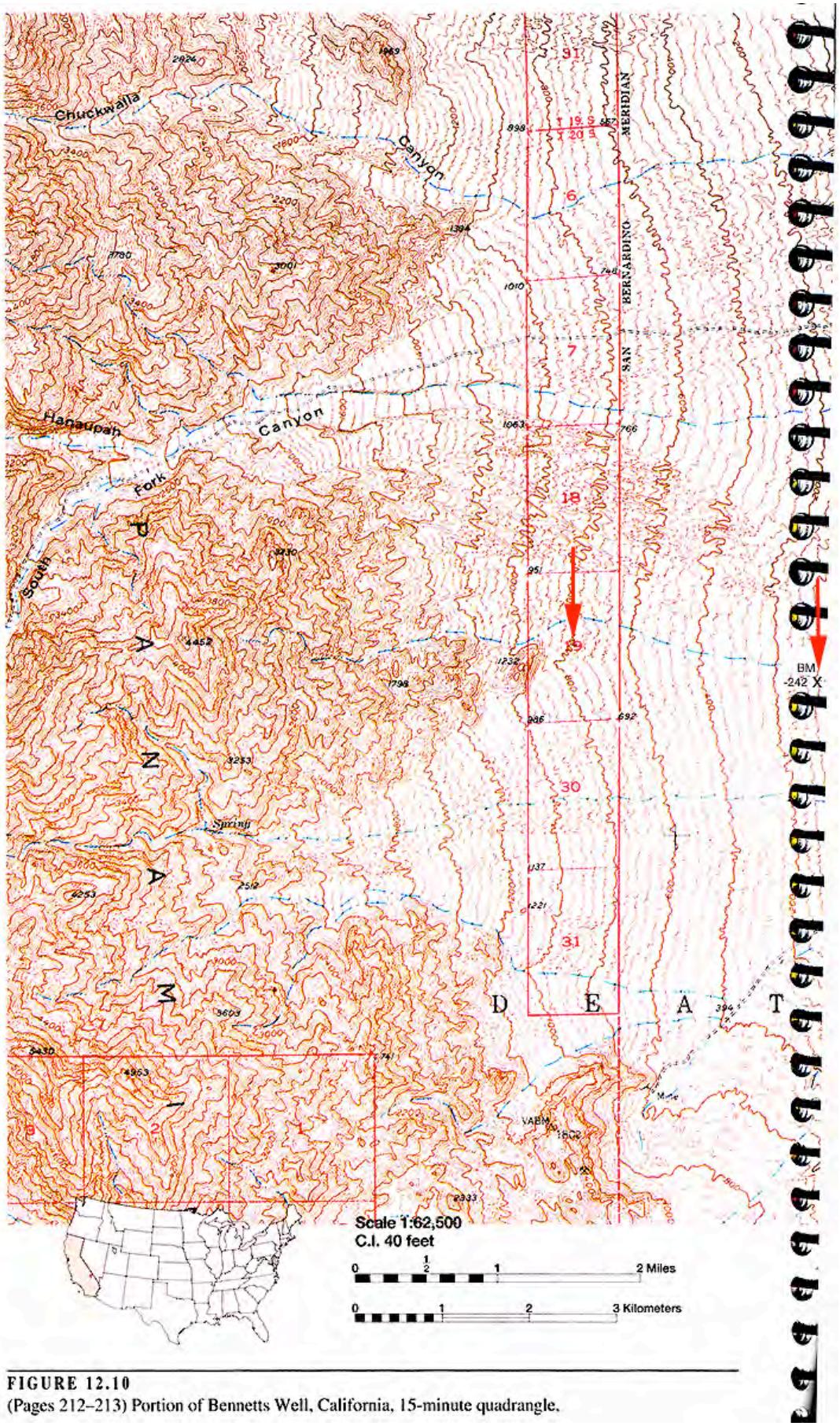
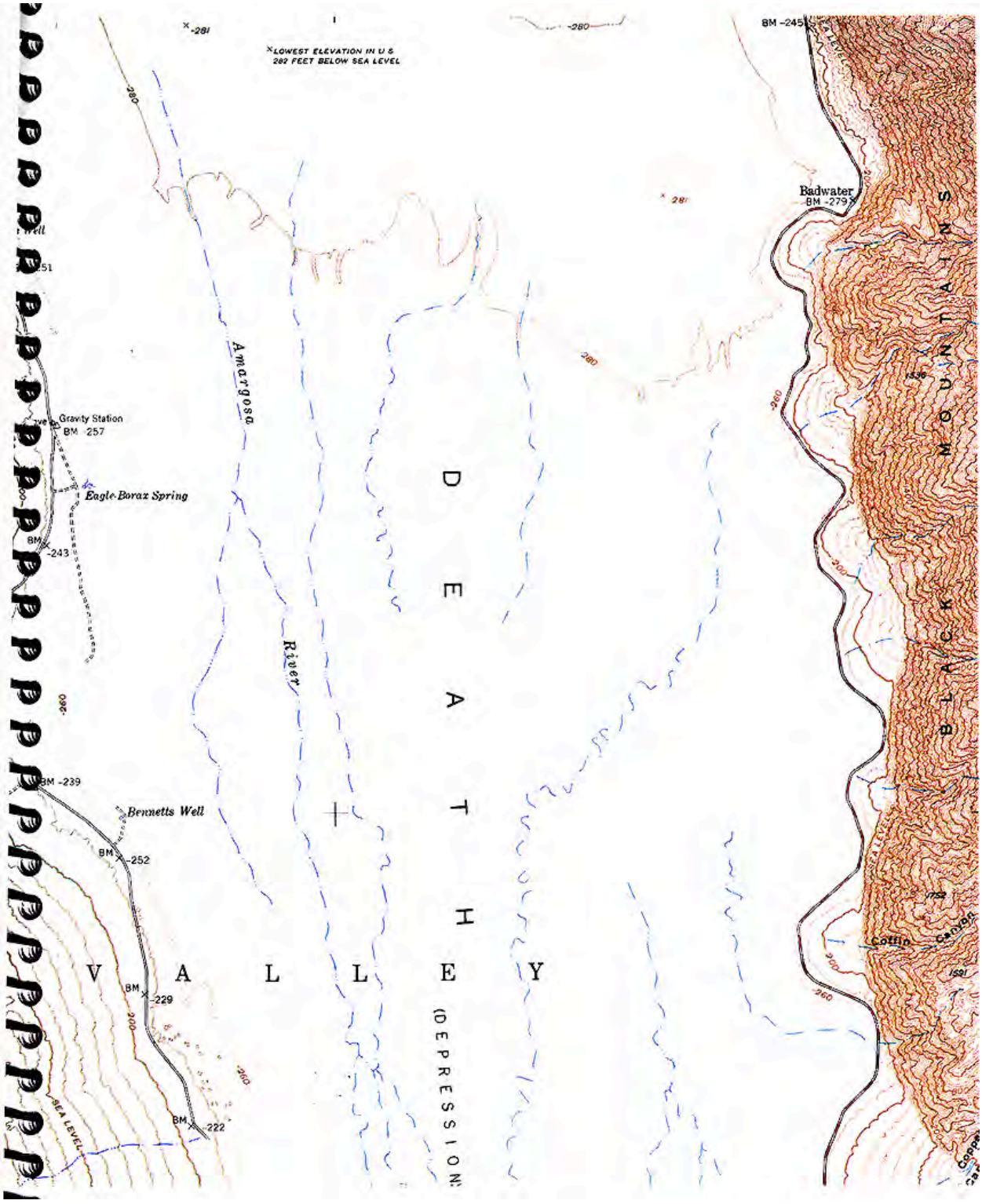


FIGURE 12.10
(Pages 212–213) Portion of Bennetts Well, California, 15-minute quadrangle.

EAST SIDE


LOWEST ELEVATION IN U S
282 FEET BELOW SEA LEVEL
BM -245
Badwater
BM -279
Gravity Station
BM 257
Eagle Borax Spring
BM -243
Amargosa
River
BM -239
Bennetts Well
BM -252
BM -229
BM -222
SEA LEVEL
DEATH VALLEY
(DEPRESSION)
SNOWSTORM MOUNTAINS
Coffin Canyon

3) The map on Page 7 is a portion of the Antelope Peak, Arizona, quadrangle. U.S. Interstate 8 crosses the area on its way from San Diego, California, to Tucson, Arizona. The area is within the Basin and Range province, but the basin-bounding faults have long since been covered by alluvium. The piedmont is extensive and occupies a large part of the map area. The rocks exposed in the mountains in this quadrangle are mostly metamorphic and igneous rocks of Precambrian age.

   a) How does the map-view shape of the mountain front differ from the mountain fronts in the previous map and why? (3)

   b) Determine the gradient in feet/mile along a line extending from the southwest corner of Section 26 (near the center of the map) to the southwest corner of Section 6 (northeast corner of the map) (both are highlighted by red arrows). (4)

      How does the general contour pattern on the piedmont differ from the contour pattern on the western side of the map in Question 1 and why? (3)

   c) Note that the piedmont area north of the interstate is punctuated with a few hills to the northeast of the mountain front. What are they and how did they form? (3)

      What part of the piedmont lies between these hills and the mountain front? Explain. [Note: Figure 12.4 will be useful to look at]. (4)

   d) Based on the differences you have observed between the Antelope Peak and Death Valley areas, which area appears to have been subjected to erosion for the longest period without rejuvenation (for example, by tectonic activity or change in base level)? Give 2 pieces of evidence supporting your answer. (4)

e) Note the water wells in the northeast part of the map. In what part of the piedmont are they likely to be located? Why? (3)

What is the probable origin of the groundwater tapped by the wells? Explain. (3)

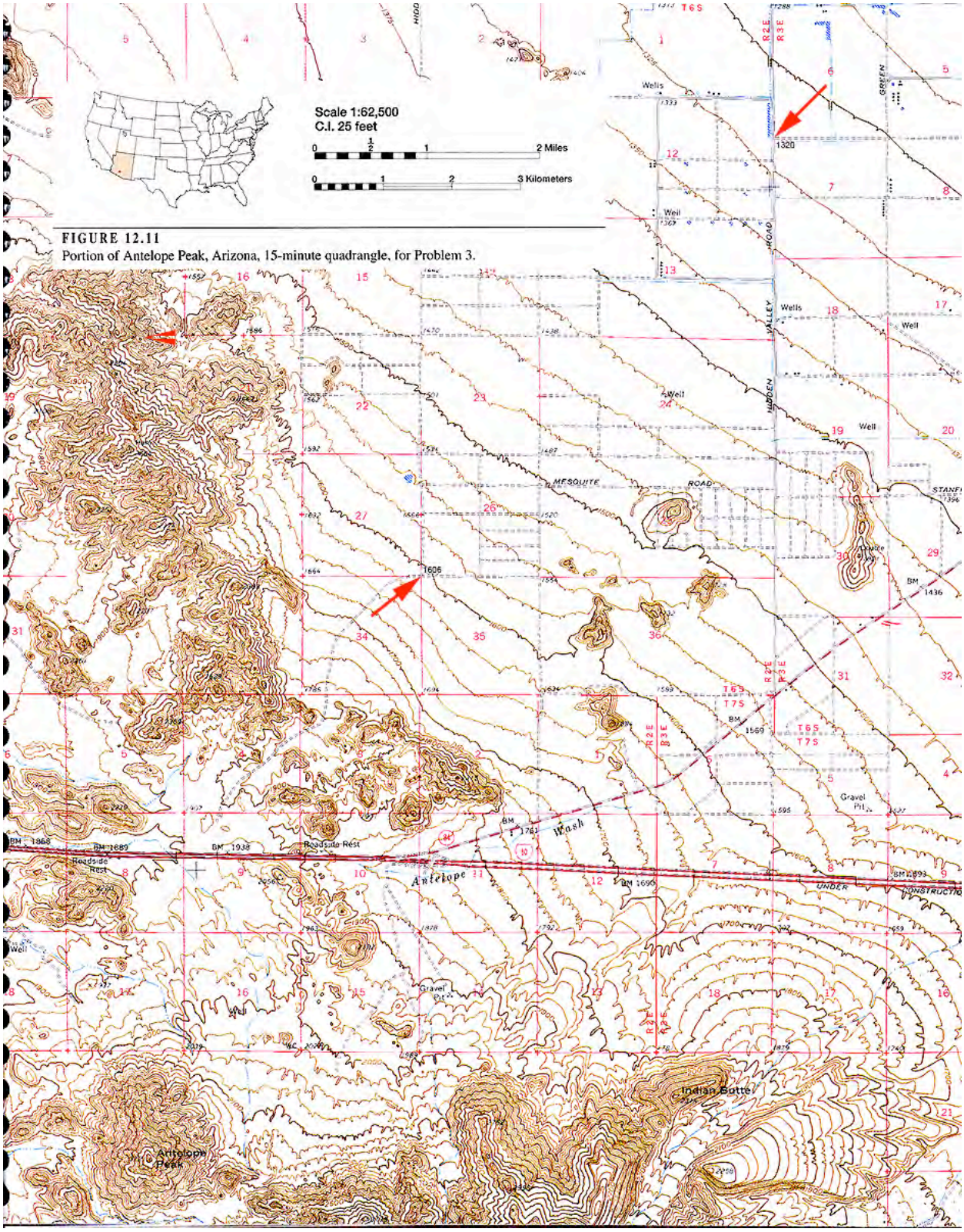


FIGURE 12.11
Portion of Antelope Peak, Arizona, 15-minute quadrangle, for Problem 3.

4) The map on Page 9 is a portion of the Upheaval Dome, Utah, 1:62,500 quadrangle. It is within Canyonlands National Park, an area with beautiful canyons cut by the Colorado and Green Rivers. Reddish sedimentary rocks, with nearly flat-lying layers, are carved into a series of cliffs and benches that gradually descend to the two rivers.

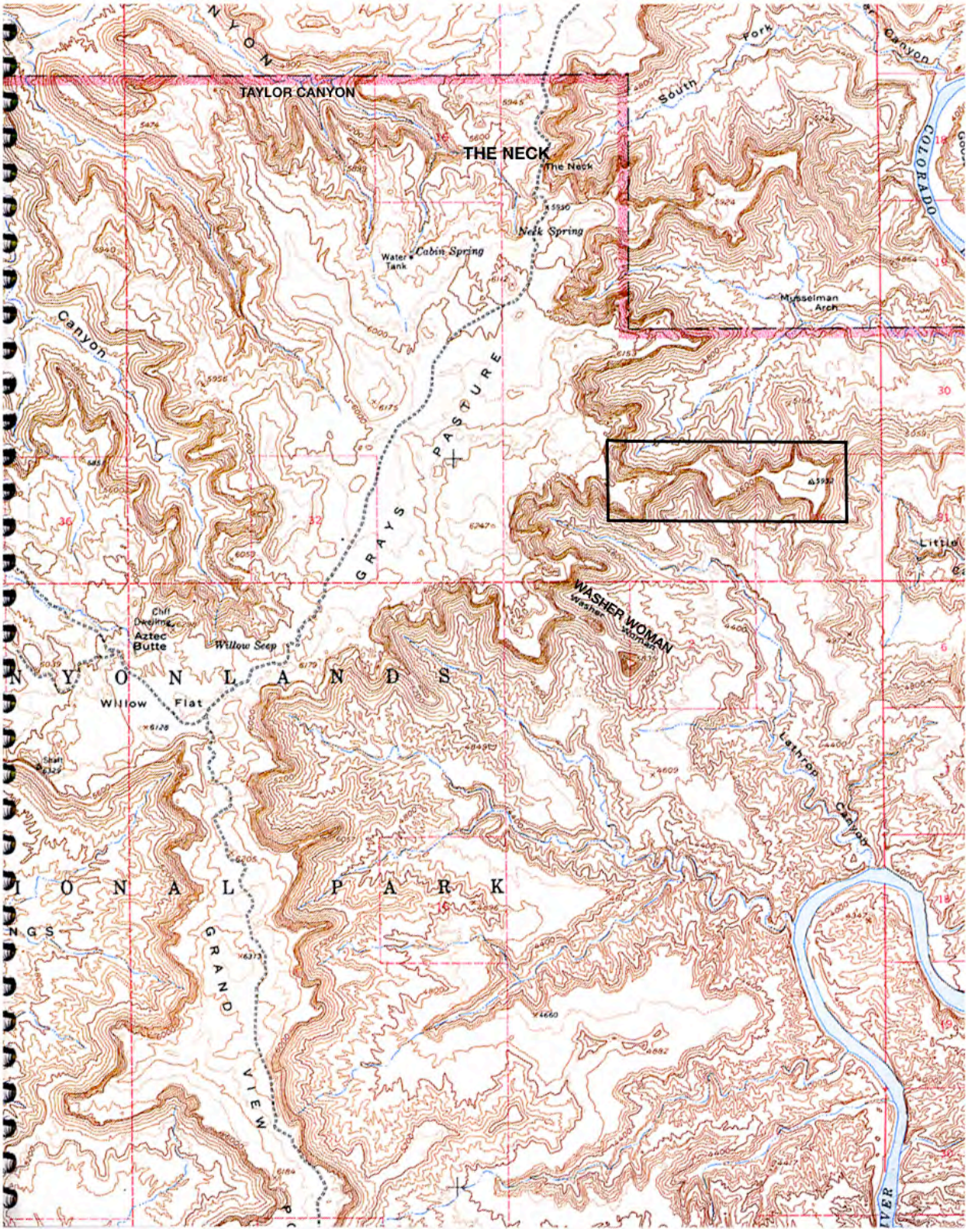
   a) Locate The Neck on the road just northeast of Grays Pasture. The Neck connects the plateau to the north to an area known as Island in the Sky. Island in the Sky is the "Y-shaped", relatively flat area that includes Grays Pasture, Grand View Point, and the unnamed area to the west.
   What is the approximate width of The Neck (in miles)? (2)

   With the head of Taylor Canyon to the west, and the South Fork of Shafer Canyon to the east, what erosional process will occur and what does the future hold in store for The Neck? (2)

   Should your prediction come true, what kind of landform will the Island-in-the-Sky area become? (1)

   b) Extending to the east of Grays Pasture are three, small, rather flat areas bounded by steep cliffs and connected by "necks" (outlined by a black box); the high point on the easternmost area is marked with its elevation of 5,932 feet. What landform name would be given to these areas if the necks were to be severed by erosion? Assume that their base is at 4,500 feet. (1)

   c) Washer Woman is just southeast of Grays Pasture. What type of landform is just south of the word "Woman"? (1)


TAYLOR CANYON
THE NECK
The Neck
Neck Spring
Water Tank
Cabin Spring
Canyon
GRAYS PASTURE
Musselman Arch
WASHER WOMAN
Aztec Butte
Willow Spring
Willow Flat
GRAND VIEW
Leatherop Canyon
South Fork
COLORADO