

**GY 301: Geomorphology**  
**Lab 3: Introduction to Topographic Maps; Coastal Geomorphology**

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**Your Task:** Today's lab is your first opportunity to closely examine topographic maps. You will be asked to answer various questions about map format (e.g., scale, layout etc.), will be required to locate features using the most common grid systems (Township and Range; Mercator Grid System), and will also get a chance to interpret geomorphological features associated with coastal processes.

Please note that the topographic maps you will be using come in different scales and that we don't necessarily have a lot of copies of each map. For some maps, we only have 3 or 4 copies. When necessary, you will be provided with scanned portions of maps (e.g., today's lab contains a scan of the Point Reyes, CA Quadrangle). Other times, you will have to share maps.

The most common scale (1:24,000) will not easily fit on the small desks that we have in room 42 so it might be a good idea to push a couple of them together to form a larger table surface. Please put the desks back in rows when you are done. Outside of the normal lab session, maps are available in the storage cabinets in room 337. They are alphabetically sorted.

**Due Date: 5:00 PM Sept 11th**

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**PART I: SIMPLE MAP READING EXERCISES**

A) Refer to the **Ontario, California** topographic map and answer the following questions. Note, on this map, roads often follow section lines.

- 1) What is the RF of the map? \_\_\_\_\_. What is the CI of the map? \_\_\_\_\_ [2 points]
- 2) Which direction is East Etiwanda Creek (sections 16 and 21), T1N, R6W flowing? (Compass direction please) \_\_\_\_\_ [2 points]
- 3) Which map sheet attaches to the northwest corner of the Ontario California map sheet?  
\_\_\_\_\_ [2 points]
- 4) What is located in the E<sup>1</sup>/<sub>2</sub> of the NW<sup>1</sup>/<sub>4</sub> of section 27 T2N, R7W? \_\_\_\_\_ [2 points].
- 5) How many houses (buildings) are wholly contained within Section 29, T1N, R8W?  
\_\_\_\_\_ [2 points]

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B) Refer to the **Bottomless Lakes, NM** topographic map and answer the following questions.

1) What is the topographic gradient in feet/mile, from the NW corner to the SE corner of Section 24, T11S, R26E? \_\_\_\_\_ [3 points]

2) When was this map surveyed? \_\_\_\_\_ [1 point]

3) What was the magnetic declination in this area at the time the map was surveyed (in degrees please) \_\_\_\_\_ [1 point]

4) Which way is the Pecos River flowing? (compass direction please) \_\_\_\_\_ [2 points].

5) Here is your first interpretation question. The map show several intermittent streams flowing from sections 14 and 15 (T12S, R26E), but they suddenly stop in section 16. Why? (think outside the box on this question. The explanation is a simple and important geological process)

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\_\_\_\_\_ [3 points]

C) Refer to the **Fennville, Michigan** topographic map and answer the following questions. Note that on this map sheet, the township and range grid system is in black ink.

1) As accurately as possible, give the grid location of Mud Lake in the south eastern corner of the map sheet \_\_\_\_\_ [2 points]

2) What is located in the NE $\frac{1}{4}$  of the NW $\frac{1}{4}$  of section 20 T2N, R16W? \_\_\_\_\_ [2 points]

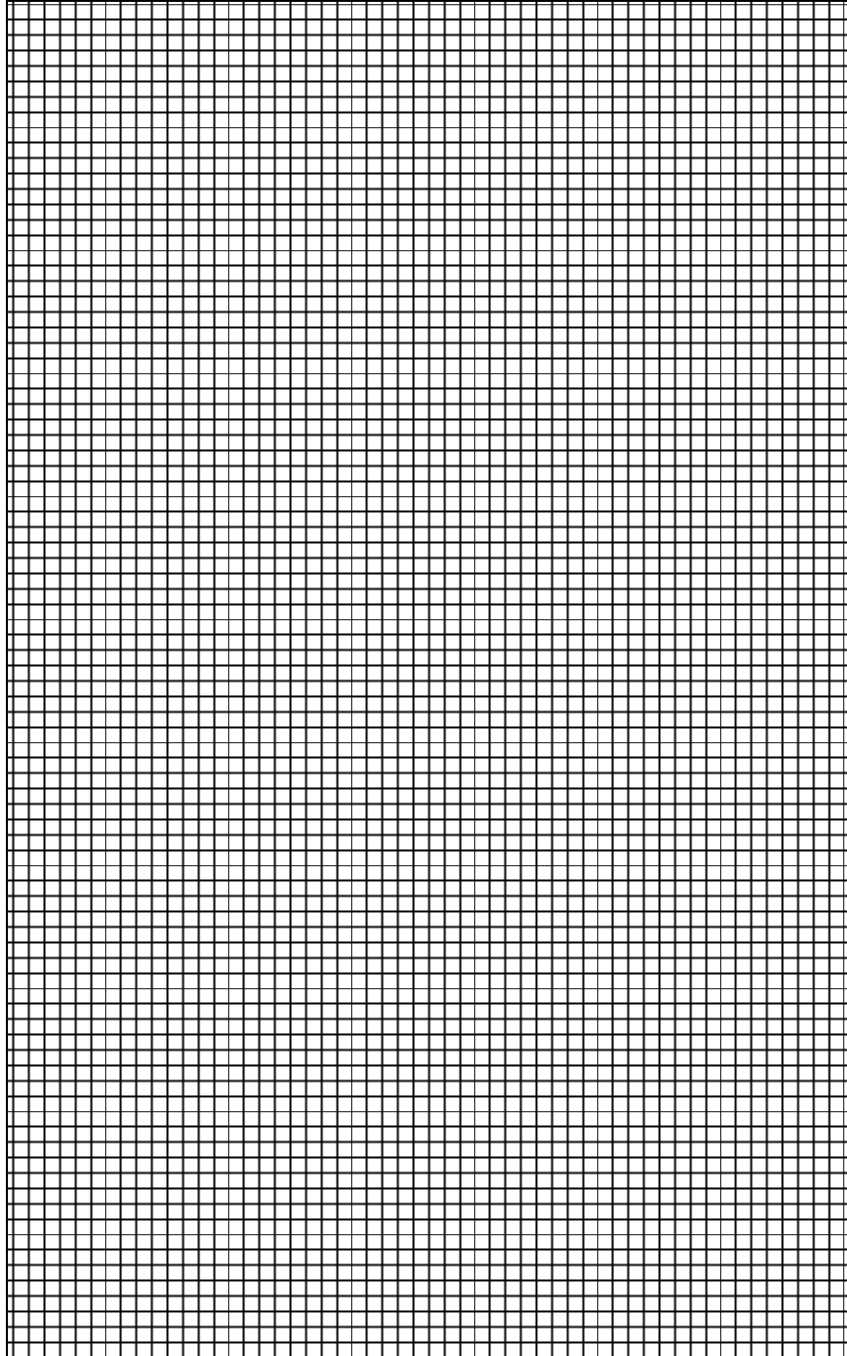
3) What is located in the SE $\frac{1}{4}$  of section 36 T4N, R15W? \_\_\_\_\_ [1 point]

4) Draw a topographic profile along East State Road from East Saugatuck (SE  $\frac{1}{4}$  of the SE  $\frac{1}{4}$  of Section 32, T4N, R15W) westward to Ridgewood Brach of the shoreline to Lake Michigan. Note that the elevation of Lake Michigan is 580 feet. Feel free to use the grid box on the next page to construct your profile or use your own graph paper. [10 points]

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EAST



WEST

Vertical exaggeration = \_\_\_\_\_ X

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**PART II: COASTAL GEOMORPHOLOGY**

A) Refer to the **Point Reyes, CA** attachment on the next page and answer the following questions about water and wind currents along shorelines. A larger map will also be available in the lab.

1) A series of sand dunes have formed along the beach north of Point Reyes. Draw a series of red arrows directly on the map showing the direction of the prevailing winds. **[2 points]**

2) Assuming that these winds are consistent over the entire map area, draw the mostly likely wave refraction pattern that would result around Point Reyes and into Drakes Bay. Use blue for the wave pattern. **[3 points]**

3) Based on your wave pattern, using a red arrow show the likely direction of beach drift in Drakes Bay, particularly in the vicinity of Limatour spit. **[3 points]**

4) Why is Point Reyes a steep cliff that is strewn with rocks and head lands? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**[3 points]**

5) How did the horseshoe shaped lake east of the D Ranch form? \_\_\_\_\_

\_\_\_\_\_

**[2 points]**

6) What do you think the shoreline here will look like 500 years from now? Why?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**[2 points]**

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B) Refer to the **Sandwich, MASS** topographic map and answer the following questions about beach processes

1) Which way is long shore drift in this area of Cape Cod? (specify a compass direction)

\_\_\_\_\_ [2 points]

How do you know? \_\_\_\_\_

\_\_\_\_\_ [3 points]

2) The blue contour lines on the map record bathymetric water depths. Notice that Scorton Ledge is an area of shallow water depth just offshore from Scorton Harbor. Similar “bumps” also occur off shore of Sandwich Harbor and Sandy Neck. What process is likely responsible for these bathymetric highs? \_\_\_\_\_

\_\_\_\_\_ [2 points]

3) What is the maximum width (in feet) of shoreline exposed during low tide?

\_\_\_\_\_ [3 points]

4) What is the blue grid directly south of Springhill Beach \_\_\_\_\_

\_\_\_\_\_ [2 points]

More importantly, why was it there back in 1957? \_\_\_\_\_

\_\_\_\_\_ [3 points]