Name: _____

Class Period: _____

Date: _____

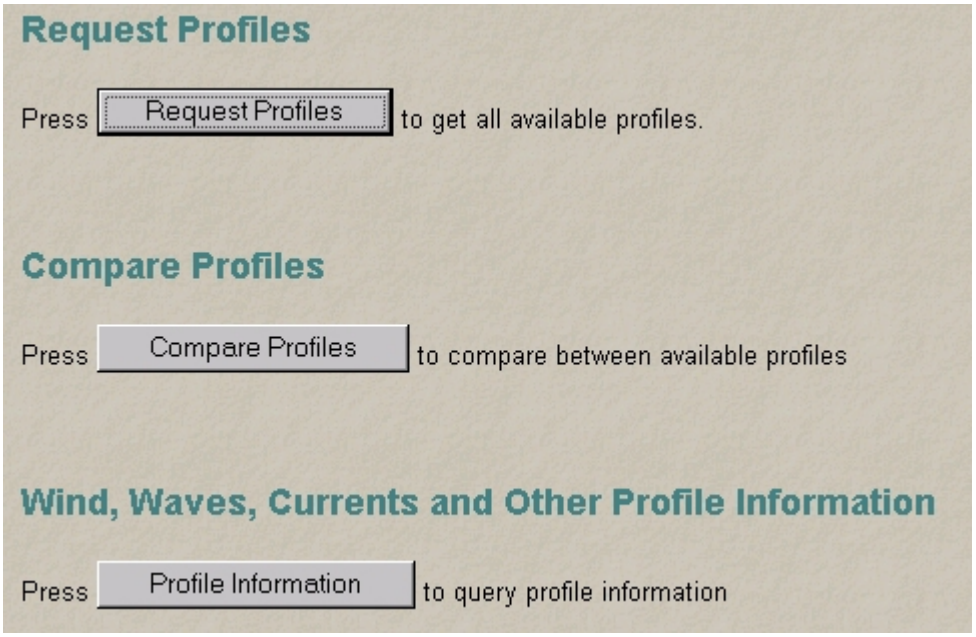
Beach Profile Analysis

OBJECTIVES

The objectives of this exercise are to plot topographic profile data from XZ data, to recognize the significant features of the beach, and to gain some understanding of how a beach may change through time.

PROCEDURE

Launch Internet Explorer or Netscape. Type in the URL for the main page of the Texas High School Coastal Monitoring Program (THSCMP): http://txcoast.beg.utexas.edu/thscmp/. On the left side of the screen click on the Access Database link. This is your access to all of the data collected by students at Ball, Port Aransas, and Port Isabel High Schools. You have two options at this point to retrieve beach profile data: request a single profile or compare two different profiles. Both options will produce a graph of the data as well as tables with the XZ coordinate values (X=horizontal distance, Z=vertical change). In order to retrieve notes about coordinate points, you will have to use the request single profile option.



Press Request Profiles button. This page is your link to retrieving XZ coordinate values for the profile you specify. The naming convention for the profiles is as follows:

xxxxx-yyyyyy-zzzz (ex. BAF01-010319-1519)
xxxxx = name of profile (ex. BEG01, SPI06, etc)
yyyyyy = date profile measured in year, month, day format (ex. 980511 = May 11, 1998)
zzzz = start time of profile in 24-hour format.

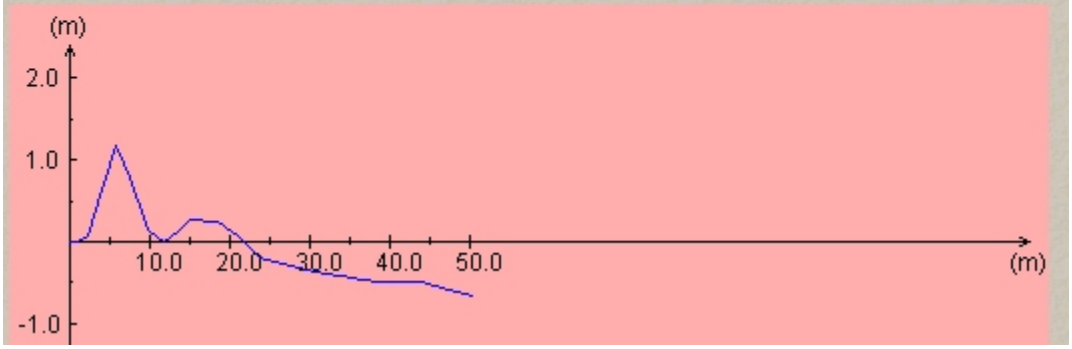
The naming convention for the profiles is very simple. The first three letters represent the location of each site. For example, SPI stands for South Padre Island, WST is Galveston West Bay, and so on. The only exception to this rule are BEG and GLO. Profiles with this name can be on either Galveston or Follets Islands or Bolivar Peninsula. The two numbers following the location designation represent the site number for that particular island or bay. These profiles were established in order for students and researchers at the Bureau of Economic Geology to measure multiple times. The date and start time distinguish profiles at the same location.

For this exercise you will be gathering data from one of the following seven sites: BEG02, BEG08, MUI01, MUI02, MUI03, SPI01, or SPI02. These are the sites that have been established for the Texas High School Coastal Monitoring Program. Choose one of the sites from the drop-down list (sites listed alphabetically) and click Select. You will see some notes at the top of the page about the profile as well as the coordinates for the starting point. Below this

is a plot of XZ data points. Below the plot is a table containing the X and Z data values as well as notes about individual points.

The Data Below Have Not Been Verified.

Profile Name: BEG02 **Date:** 030423 **Start time:** 1220
Notes:
Profile Azimuth:
Datum Type: Corner of concrete pad
Datum Point Coordinates in UTM NAD83: Northing 3231059.16, Easting: 310255.2,



Profile Data:

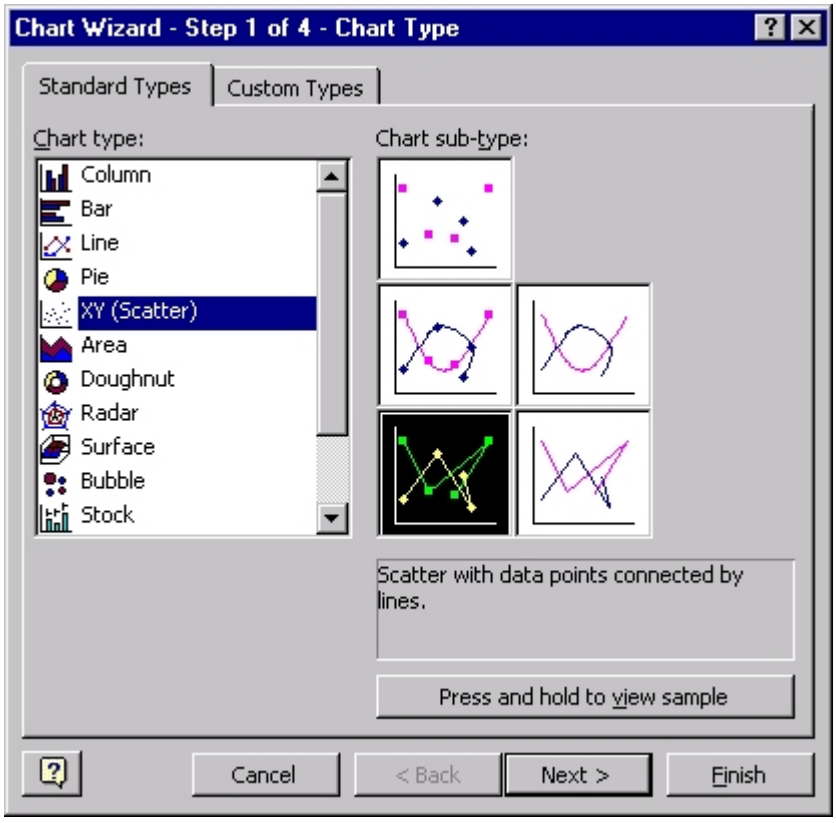
x	z	Beach Feature
0	0	datum
0	0.01	
1.05	0.02	
2.2	0.09	
4.02	0.63	
5.82	1.17	dune crest
7.52	0.77	
9.77	0.15	
11.62	-0.01	
13.27	0.13	
14.87	0.27	dune crest
18.27	0.26	
20.67	0.08	
23.27	-0.2	vegetation line
24.42	-0.22	
26.37	-0.28	
29.02	-0.34	

Using your mouse, you can highlight all of the data in the table on the THSCMP web site.

a. Position the cursor to the left of the “x” at the top of the table.
b. Press down and hold the left mouse button.
c. While still pressing down on the left button, reposition the cursor to the right of the last entry in the table.
d. Release left button.
e. Under the Edit pull down menu select Copy.
f. Open Microsoft Excel.
g. Under the Edit Menu in Excel select Paste.
h. Repeat for another date you want to retrieve (same location, just different date).
i. Remember to write down the dates for the profile you retrieve. You don’t want to forget which dataset you are using for your observations.

Using Microsoft Excel, you can make plots of the profiles you uploaded from the THSCMP web site.

a. Look at your data in the Excel spreadsheet. Using the mouse, move the cursor to the first value in the “z” column of the first profile you want to plot. Press down and hold on the left mouse button. Reposition mouse over last value in that same “z” column and release the mouse.
b. Select the Chart option under the Insert menu or click on the Chart Wizard  . This will open the Chart Wizard Dialogue Box.



c. Select XY (Scatter) as the type of chart and the bottom left option for the sub-type. Click the Next button.

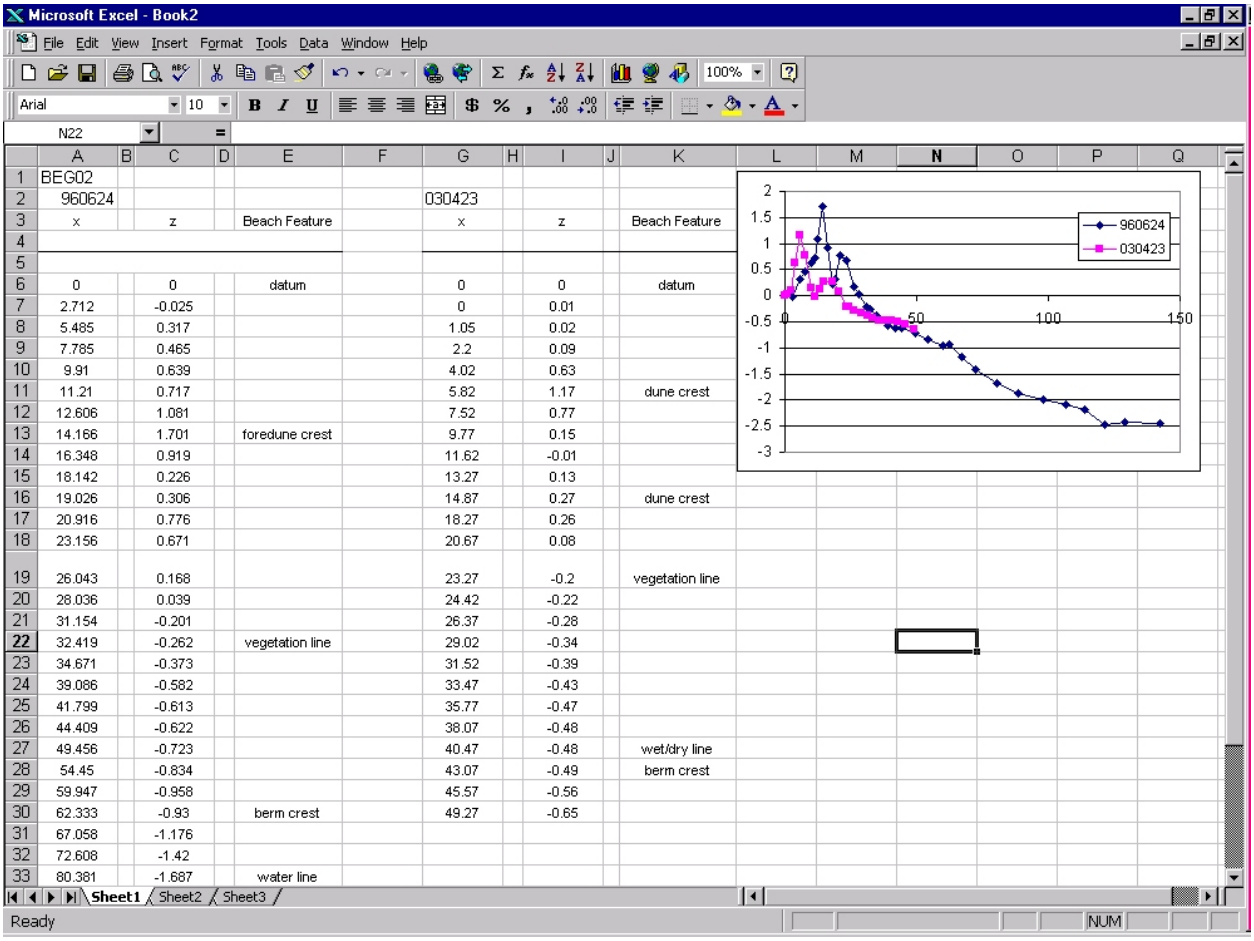
d. In Step 2 you want to first click on the Series Tab at the top of the box.

e. Place the cursor in the X Values box. This will allow you to select the values in the X column of your data. You can add the date of the measurement as the name of the series.

f. Now press the Add button under the Series box. This will allow you to graph your second beach profile data on top of the first plot. Note: Y Values are actually the "z" values.

g. When done adding series you can press the Finish button.

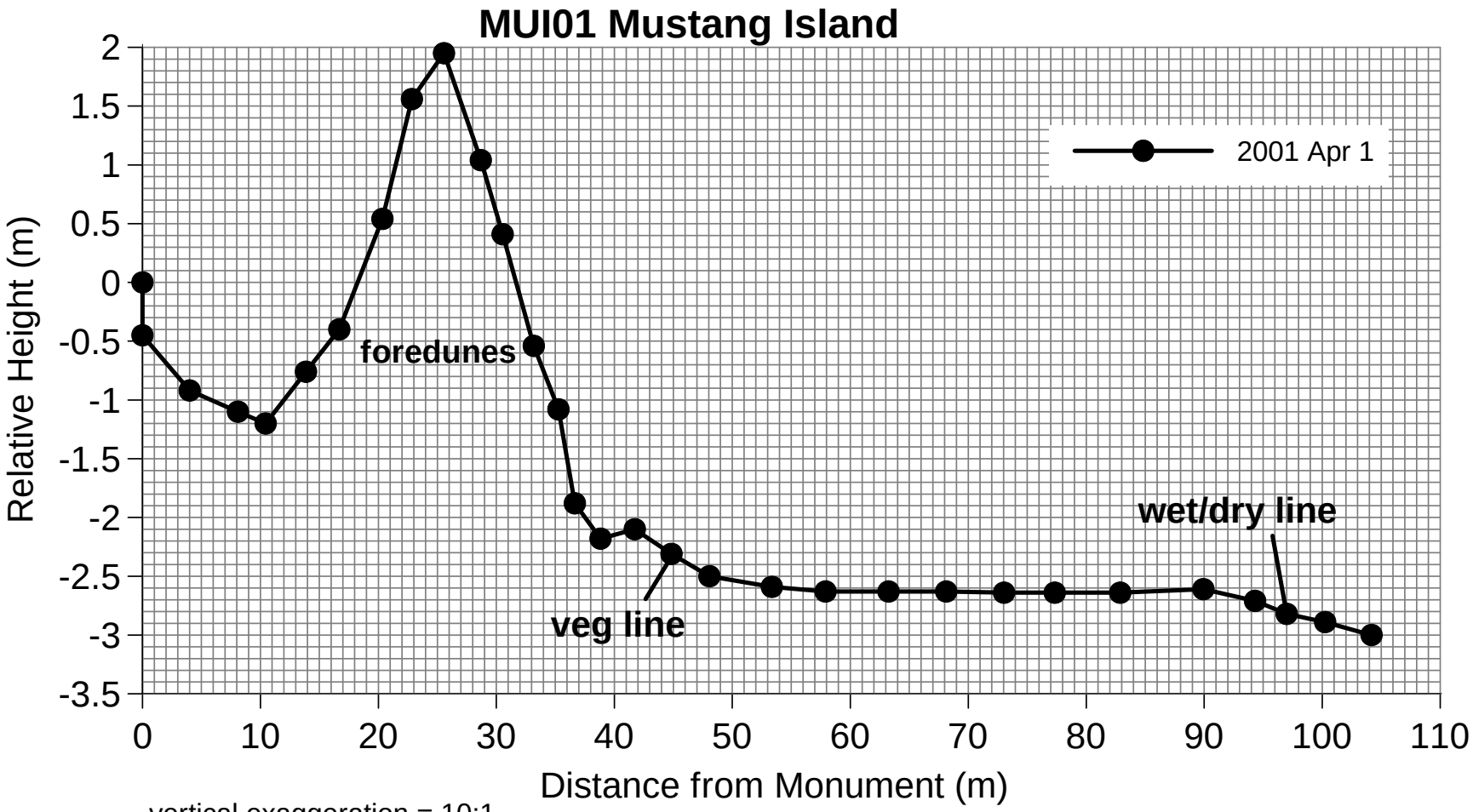
h. Your final graph in the Excel spreadsheet should look similar to the example below (some of the formatting has been changed). The plot created with excel will give you a general idea of how the two dates you have chosen differ from each other.



	A	C	E	G	I	K
1	BEG02					
2	960624			030423		
3	x	z	Beach Feature	x	z	Beach Feature
6	0	0	datum	0	0	datum
7	2.712	-0.025		0	0.01	
8	5.485	0.317		1.05	0.02	
9	7.785	0.465		2.2	0.09	
10	9.91	0.639		4.02	0.63	
11	11.21	0.717		5.82	1.17	dune crest
12	12.606	1.081		7.52	0.77	
13	14.166	1.701	foredune crest	9.77	0.15	
14	16.348	0.919		11.62	-0.01	
15	18.142	0.226		13.27	0.13	
16	19.026	0.306		14.87	0.27	dune crest
17	20.916	0.776		18.27	0.26	
18	23.156	0.671		20.67	0.08	
19	26.043	0.168		23.27	-0.2	vegetation line
20	28.036	0.039		24.42	-0.22	
21	31.154	-0.201		26.37	-0.28	
22	32.419	-0.262	vegetation line	29.02	-0.34	
23	34.671	-0.373		31.52	-0.39	
24	39.086	-0.582		33.47	-0.43	
25	41.799	-0.613		35.77	-0.47	
26	44.409	-0.622		38.07	-0.48	
27	49.456	-0.723		40.47	-0.48	wet/dry line
28	54.45	-0.834		43.07	-0.49	berm crest
29	59.947	-0.958		45.57	-0.56	
30	62.333	-0.93	berm crest	49.27	-0.65	
31	67.058	-1.176				
32	72.608	-1.42				
33	80.381	-1.687	water line			

Counting Rectangles Method to Calculate Volume

To calculate the volume, you will need to plot your profiles by hand on graph paper. An example of a plotted profile is provided below. Note on this profile that on the X-axis 1 block=1 meter but on the Y-axis, 1block=0.1 meter. Your plot should be the same. Plot the XZ profiles you have chosen on graph paper using the example as a guideline. Plot all the XZ points for one of the dates then draw a line connecting them. We suggest using different colored pencils to distinguish between data from different dates. Don't forget to include a legend for your transects. Use the graph you created in Excel as a reference. Your hand drawn graph should look like the Excel generated graph. Label the significant profile features using the notes provided and answer the questions below.



vertical exaggeration = 10:1

QUESTIONS

Profile name _____ Dates of comparison _____

1. Has the beach grown ("accreted") or shrunk ("eroded") during the period(s) of comparison?

2. What part of the beach profile has changed the most? The least?

3. Approximately how far landward or seaward has the beach moved? To answer this question, pick an arbitrary height (e.g. -1m) or a significant feature (e.g. the seaward most berm crest) and note how this feature has moved horizontally.

4. How has the vegetation line changed?

The grid lines on your graph divide up the X-Z space into rectangles. The grid spacing in the X direction is 1 m and in the Y direction is 0.1 m. Assume that the profile has a "thickness" of 1 m. Therefore each small rectangle represents a certain volume of sand (height (m) x horizontal distance (m) x thickness (m) = volume (m^3)). By carefully counting the rectangles between the two profiles you can estimate the sand volume difference. You may want to have different categories; i.e. number of full rectangles, ½ rectangles, and ¼ rectangles.

5. Dunes: What volume of sand has been gained or lost in the dunes? Which portions of the dunes have changed most? Changed the least? If you have chosen SPI01 as your profile you will notice there are no dunes on this profile. The starting point for this site is the corner of a concrete picnic pavilion. The edge of the pavilion drops straight down to the beach. Determine the difference in the volume of sand at the base of the pavilion to 5 meters away from the wall.

6. Beach: What volume of sand has been gained or lost on the beach? Which part of the beach shows the most change in sand volume? Changed least?

7. What is the total (dune + beach) sand volume gain/loss?

Extra credit: Select another site from a different part of the Texas Coast. Compare and contrast the two sites.