

Estimate the Change in Size of Petit Bois Island Using Google Earth Pro

In addition to allowing you to view the world through its own satellite imagery, Google earth lets you import data layers (other satellite images, historic maps, demographic information, etc.) into Google earth. (After you open Google earth, have a look at the Layers section on the left to see the data layers already included.)

Google earth takes a flat satellite image (or a flat map) and georectifies it -- i.e., when importing the image, it takes into consideration the curve of the earth and matches key coordinates in Google earth to those in the image, and bends the image to fit.

You will be using Google Earth to estimate the change in size of Petit Bois Island. You will be exploring how SkyTruth does this type of analysis in its work.

There are 4 steps to estimating the change in size:

1. Open Google earth pro and familiarize yourself with Petit Bois Island as it appears in Google's most recent imagery.
2. Open the KMZ file that includes satellite imagery of Petit Bois Island, and save it, if you wish.
3. Draw a polygon around the island in each satellite image, and get perimeter and area measurements.
4. Compare the area of the island over the several years and analyze your findings.

Google Earth Pro Tips:

Click + R - Re-oriens your view to looking straight down with North at the top.

The Exit ground-level view button (top right) will get you back to viewing the world from above.

Drawing polygons - the dialog box must stay open in order to draw. Don't click OK until you are finished and ready to save your work.

The New Polygon dialog box will almost always cover up your work area but you can drag it out of the way.

① Open Google earth pro and familiarize yourself with Petit Bois Island as it appears in Google's most recent imagery.

1. Open Google earth pro.
2. You will see a search bar at the top left of your screen. Type in **Petit Bois Island** and click or tap Search.
3. Take a minute to zoom in and really look at the island. You can see waves, and even some boats. The

resolution of the imagery in Google Earth Pro is very high, much higher than what you will see in the satellite imagery, especially from 1984. Satellite technology has greatly improved over the last three decades.

② Open the KMZ file and save it

To open and the view satellite images of Petit Bois Island in Google earth:


1. Click on the link to the Petit Bois Island KMZ file in the left column of the SkyTruthing for Schools website. (<http://skytruth.org/schools/petit-bois-island/>)
2. Save the file to your desktop or another area that has been specified by your teacher. (Your teacher or school's tech support person may have already done this step.)
3. Double-click the saved KMZ file to open it in Google earth.
4. The KMZ file will automatically take you to Petit Bois Island, if you are not already there. The small island just to the northwest of Petit Bois Island is Sand Island, a man-made "spoil island" creating from dredging the Horn Island Pass.
5. Before you begin working with the satellite image, move the KMZ file from Temporary Places to My Places. If you don't do this, any changes you make to the KMZ file will be lost if Google earth unexpectedly closes for some reason. To do this:
 - a. Right-click on the KMZ file in Places >> Temporary Places on the left side of Google earth. Select Save to My Places. This moves the KMZ file from Temporary Places to My Places.
 - b. If multiple people will be using the computer you're working on, you may want to save your KMZ file by a different name. To do that, right-click on the KMZ file and select Rename.

③ Draw a polygon around the island to measure its perimeter and area

It's easiest to draw a polygon around the island if you are looking straight down on the map with North at the top. To adjust the map, click on the satellite image, then type R. (You can do this any time the map orientation needs adjusting, as long as no dialog boxes are open.)

Before you start to draw your polygon, make sure that you have the island sized large enough to be able to draw a polygon around it. Also make sure that the entire island is visible on the screen. While you are drawing a polygon, you can't move or resize the map.

To draw a polygon around the island:

1. Choose a year to start with and click the radio button next to that year. The satellite image for that year will appear as an overlay.
2. Click the polygon icon in the top menu:  (If you hover your mouse over the icons, you'll see a tooltip that describes what each tool does.)
3. A "New Polygon" dialog box opens. This box must be open while you are drawing your polygon. (It may open on top of your map; if this is the case, you can drag it out of the way so you can see the island.)
4. Give your polygon a name, then click the Style, Color tab to select colors for the fill and outline of your

polygon. Try setting your Polygon Area opacity to 0% so you can see the island while you draw it. You can change the outline and fill settings after you've drawn your polygon.

5. Use your mouse to draw a line around the island. You can draw freehand or use your mouse to click points and these will stitch themselves together into a polygon. If you want to adjust your points, you can tap and move them. You can also delete a point by selecting it (click on it) and then right-clicking.
6. When you are finished, click the OK button at the bottom of the New Polygon dialog box. (This saves your work.)
7. Do this for each year in the set.

④ Get the perimeter and area measurement measurements for each year

1. Right click the polygon layer that you just created and select Properties.
2. Click the Measurement tab. Write down the perimeter and area measurements in kilometers and square kilometers.
3. You can print out the worksheet in this Guide to write down measurements and then use them to evaluate the change in the island's size.

You can see a lot of strange and wonderful things using satellites. Plug these coordinates into the Search box (top left of Google earth) to see a few. Some are pretty small, you may have to zoom in to see them.

19°56'56.96"S 69°38'1.83"W
 38°29'0.16"N 109°40'52.80"W
 -25.344375, 131.034401
 51.848637, -0.55462
 35.027185, -111.022388
 44.525049, -110.83819
 -33.350534, -71.653268
 -33.867886, -63.987
 26.357896, 127.783809

Petit Bois Island Change in Size Worksheet

Use this worksheet to record your perimeter and area measurements for each year in the satellite imagery data set.

year	perimeter (km)	area (km ²)
1984		
2004		
2006		
2015		

- ① What is the average percentage of change in the area of Petit Bois Island per year for the following:
 - a) From 1984 to 2015?
 - b) From 1984 to 2004?
 - c) From 2004 to 2006?
 - d) From 2006 to 2015?

- ② Do your measurements show that the rate of change is increasing or decreasing over time? Other than change in size, what other trends do you see? In what other ways has the island changed over time?

- ③ Using the average rate of change in size of Petit Bois Island from 1984 to 2015 (from 1.a, above), in how many years might the island disappear altogether?