

Introduction to ImageJ

Measuring Urchins in Photo Plots

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1 Downloading ImageJ

Go to ImageJ (source: <https://imagej.net/ij/download.html>)

Follow instructions for Mac or Windows. For Macs, you may need to right click to open the downloaded file or it may not be trusted by your machine.

2 Open image in ImageJ

2.1 Download photo from Box

Go to Box and download your photo plot. (source: <https://oregonstate.app.box.com/folder/294649331958>) Save the photo to a folder on your machine.

2.2 Open photo in ImageJ

File and Open and select the photo you want to analyze.

3 ImageJ Setup

3.1 Set the measurement scale

Select the line tool from the toolbar and draw a line between two points of known distance. In this case, each photo has the quadrat in it. The quadrat is 50cm by 50cm. Draw a line that spans the length of the quadrat. Go to Analyze and Set Scale. In the Set Scale window, type the known distance (50) and the units of measurement (centimeter) in the appropriate boxes and click OK.

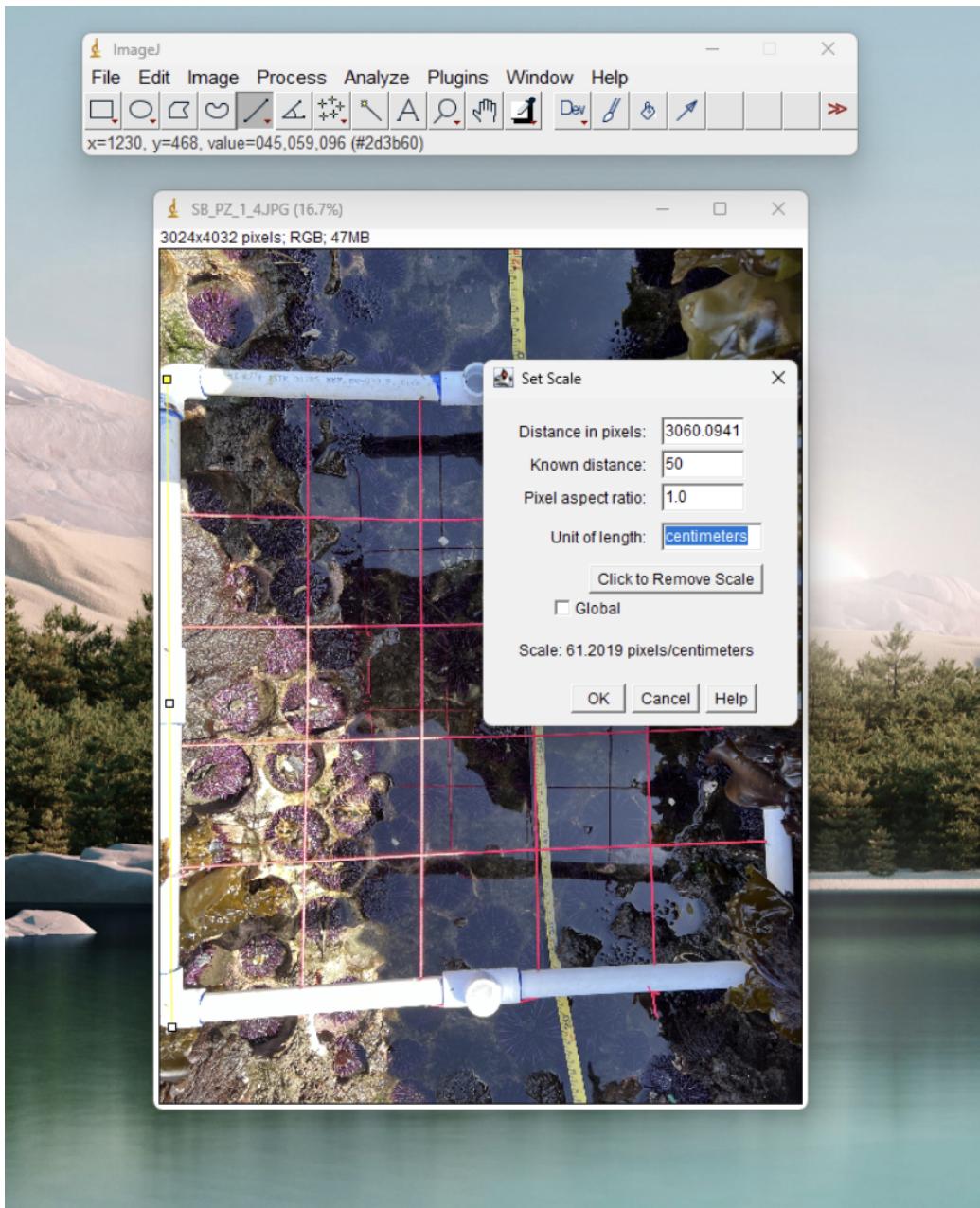


Figure 1: Setting the scale.

3.2 Set the measurement to area

Go to Analyze and Set Measurement. In the Set Measurement window, select Area

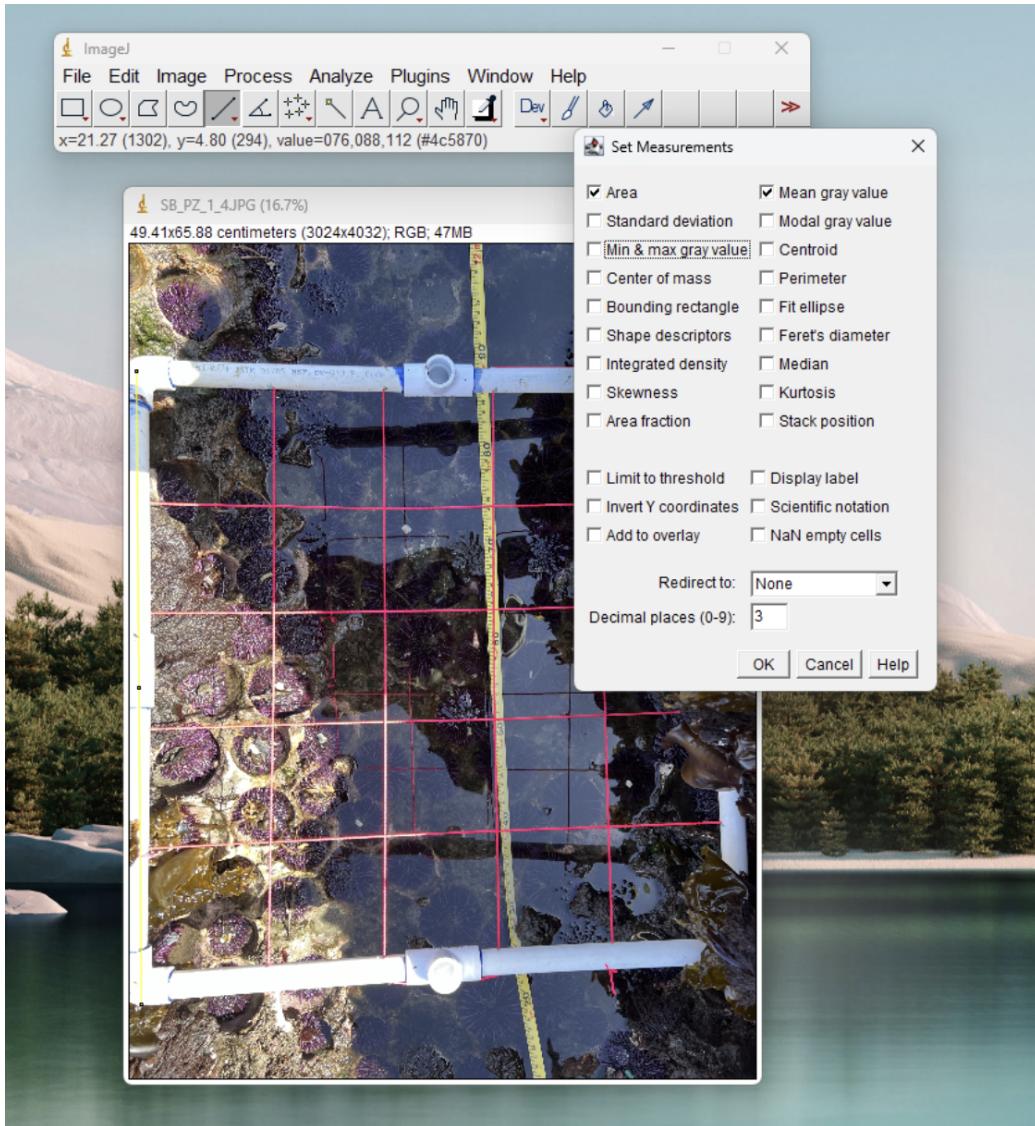


Figure 2: Setting the Area measurements.

4 Choosing urchins to measure

The way you choose which urchins to measure is to pick one relatively in the center of the plot and then one in each of the four corners. This will sort of look like a dice that has been rolled to a 5. If there are urchins only in one region of the plot, then choose urchins closest to each corner and the center. If there are not 5 total urchins, just measure how many are present.

This way we have some semblance of randomization and we are not biased towards picking the largest urchin.



Figure 3: Note here that I selected the urchins I could make our fully. They may not perfectly be in the corner but I wanted to make sure I could reasonably see the urchin.

5 Measuring urchins

Draw a line

Draw a line using the line function on the first urchin and then measure the length of the urchin.



Figure 4: Measure only the test size (not including the spines), or as close as you can get.

Go to Analyze and Measure. This should open the measurement window and display your length measurement.

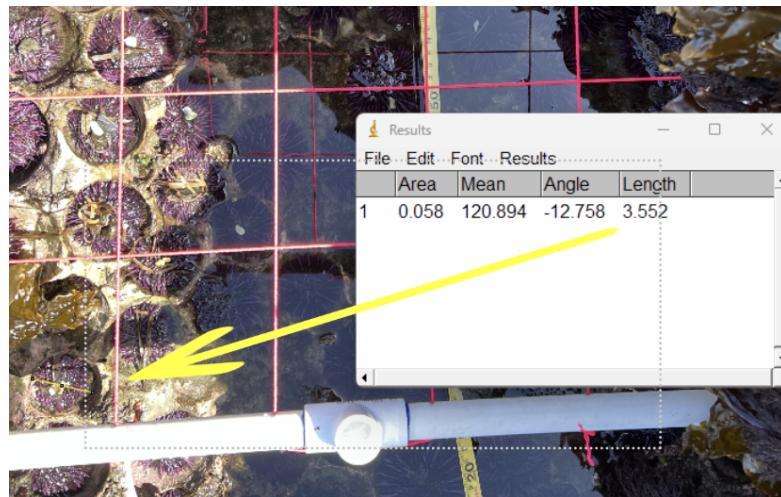


Figure 5: Repeat this for the remaining 4 urchins

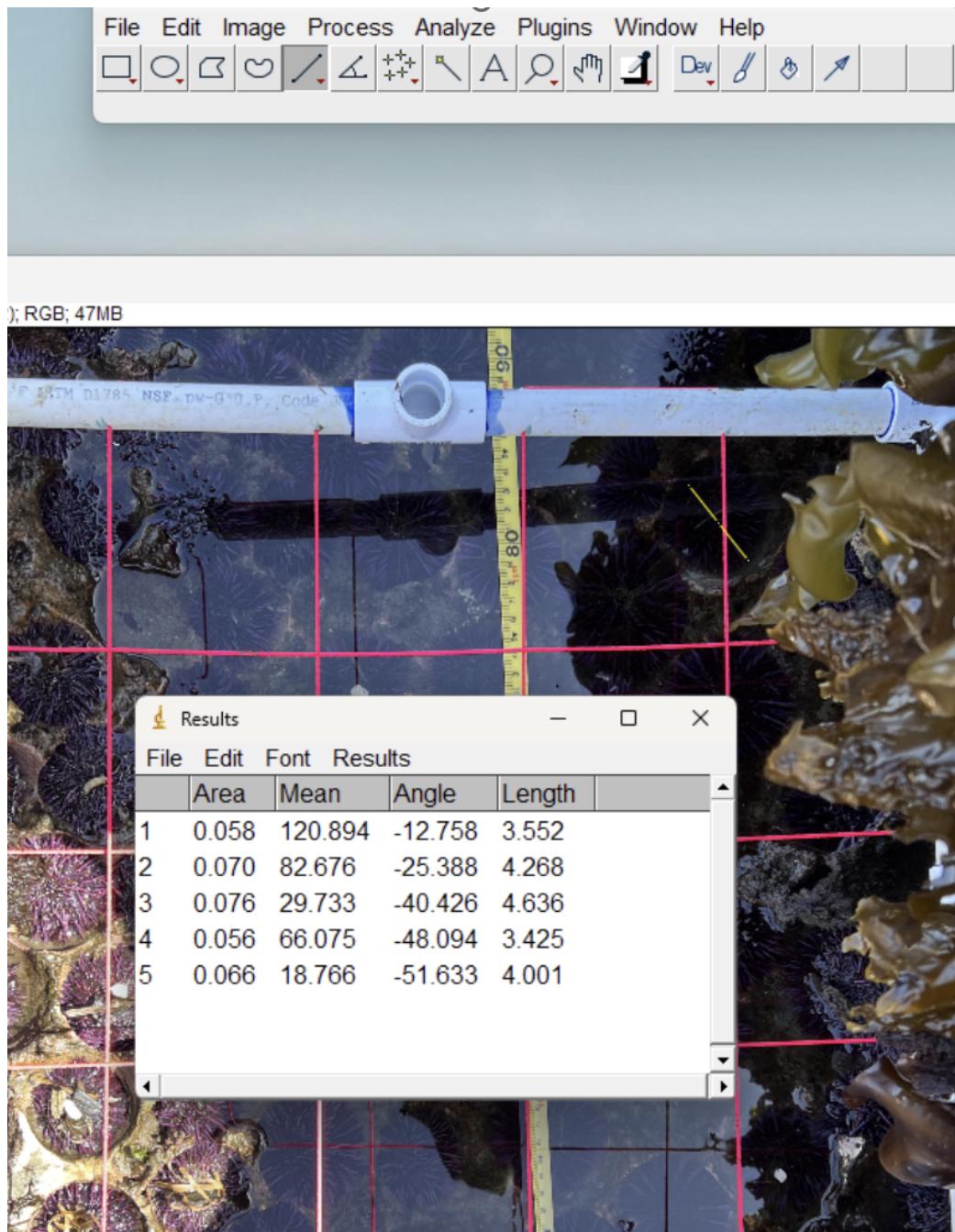


Figure 6: Here are all five measurements from this plot.

6 Entering Data

Input your measurements into the correct lanes in the Excel spreadsheet for each plot. The urchin measurements will have a lavender background.

You just want to report the length for each urchin.

Usually, urchins are somewhere between 3 and 10cm in length. If they are crazy big or teensy tinsky- check that your calibration is correct.

In the example here, the plot was SB PZ14. I have entered it here by rounding to the nearest tenth of a centimeter.

| Initial Entered | Date Entered | Call Number | SiteCode | Date | Year | Cape | Transect# | Quadrat# | Zone | Total number urchins present | Count adult urchins | Count juvenile urchins | Count nonadult urchins | Count pitted urchins | Count juvenile urchins | Count of Recruits | Number of empty pits | Number of plots present | Urchin size 1 | Urchin size 2 | Urchin size 3 | Urchin size 4 | Urchin size 5 | Drift Algae PercentCover | |
|-----------------|--------------|-----------------|----------|-----------|------|-------|-----------|----------|------|------------------------------|---------------------|------------------------|------------------------|----------------------|------------------------|-------------------|----------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|--------------------------|---|
| U | 6/18/2024 | SB_2024_AZ_1_1 | SB | 26-May-24 | 2024 | CA FB | Az | 1 | 1 | 10 | 10 | 0 | 0 | 0 | 0 | 0 | 1 | 11 | 2 | 31 | 0 | 0 | 1 | 1 | 0 |
| U | 6/18/2024 | SB_2024_AZ_1_2 | SB | 26-May-24 | 2024 | CA FB | Az | 1 | 2 | 28 | 28 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| U | 6/18/2024 | SB_2024_AZ_1_3 | SB | 26-May-24 | 2024 | CA FB | Az | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| U | 6/18/2024 | SB_2024_AZ_1_4 | SB | 26-May-24 | 2024 | CA FB | Az | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| U | 6/18/2024 | SB_2024_AZ_1_5 | SB | 26-May-24 | 2024 | CA FB | Az | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| U | 6/18/2024 | SB_2024_AZ_2_1 | SB | 26-May-24 | 2024 | CA FB | Az | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 7 | 6 | 7 | 6 | 7 | 0 |
| U | 6/18/2024 | SB_2024_AZ_2_2 | SB | 26-May-24 | 2024 | CA FB | Az | 2 | 2 | 25 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 30 | 4 | 30 | 4 | 30 | 0 |
| U | 6/18/2024 | SB_2024_AZ_2_3 | SB | 26-May-24 | 2024 | CA FB | Az | 2 | 3 | 11 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 15 | 4 | 15 | 4 | 15 | 0 |
| U | 6/18/2024 | SB_2024_AZ_2_4 | SB | 26-May-24 | 2024 | CA FB | Az | 2 | 4 | 15 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 26 | 10 | 26 | 10 | 26 | 0 |
| U | 6/18/2024 | SB_2024_AZ_2_5 | SB | 26-May-24 | 2024 | CA FB | Az | 2 | 5 | 10 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 15 | 5 | 15 | 5 | 15 | 0 |
| U/DJC | 6/25/2024 | SB_2024_UPZ_1_1 | SB | 26-May-24 | 2024 | CA VB | UP2 | 1 | 1 | 25 | 25 | 0 | 0 | 2 | 0 | 0 | 0 | 28 | 54 | 28 | 54 | 28 | 54 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_UPZ_1_2 | SB | 26-May-24 | 2024 | CA FB | UP2 | 1 | 2 | 59 | 59 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 64 | 5 | 64 | 5 | 64 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_UPZ_1_3 | SB | 26-May-24 | 2024 | CA VB | UP2 | 1 | 3 | 48 | 48 | 0 | 0 | 2 | 0 | 0 | 0 | 7 | 55 | 7 | 55 | 7 | 55 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_UPZ_1_4 | SB | 26-May-24 | 2024 | CA VB | UP2 | 1 | 4 | 53 | 53 | 0 | 0 | 3 | 0 | 0 | 0 | 12 | 67 | 3.6 | 4.3 | 4.6 | 3.4 | 4 | |
| U/DJC | 6/25/2024 | SB_2024_UPZ_1_5 | SB | 26-May-24 | 2024 | CA VB | UP2 | 1 | 5 | 62 | 62 | 0 | 0 | 1 | 0 | 0 | 0 | 8 | 71 | 8 | 71 | 8 | 71 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_UPZ_2_1 | SB | 26-May-24 | 2024 | CA FB | UP2 | 2 | 1 | 41 | 41 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 52 | 6 | 52 | 6 | 52 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_UPZ_2_2 | SB | 26-May-24 | 2024 | CA FB | UP2 | 2 | 2 | 46 | 46 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 52 | 6 | 52 | 6 | 52 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_UPZ_2_3 | SB | 26-May-24 | 2024 | CA FB | UP2 | 2 | 3 | 48 | 48 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 55 | 7 | 55 | 7 | 55 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_UPZ_2_4 | SB | 26-May-24 | 2024 | CA FB | UP2 | 2 | 4 | 53 | 53 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 58 | 5 | 58 | 5 | 58 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_UPZ_2_5 | SB | 26-May-24 | 2024 | CA FB | UP2 | 2 | 5 | 45 | 45 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 50 | 5 | 50 | 5 | 50 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_NPZ_1_1 | SB | 26-May-24 | 2024 | CA FB | NPZ | 1 | 1 | 44 | 43 | 0 | 1 | 4 | 0 | 0 | 0 | 1 | 45 | 1 | 45 | 1 | 45 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_NPZ_1_2 | SB | 26-May-24 | 2024 | CA FB | NPZ | 1 | 2 | 36 | 26 | 2 | 8 | 2 | 0 | 0 | 0 | 3 | 31 | 3 | 31 | 3 | 31 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_NPZ_1_3 | SB | 26-May-24 | 2024 | CA FB | NPZ | 1 | 3 | 35 | 29 | 4 | 2 | 0 | 0 | 0 | 0 | 1 | 30 | 1 | 30 | 1 | 30 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_NPZ_1_4 | SB | 26-May-24 | 2024 | CA FB | NPZ | 1 | 4 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | |
| U/DJC | 6/25/2024 | SB_2024_NPZ_1_5 | SB | 26-May-24 | 2024 | CA FB | NPZ | 1 | 5 | 23 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 28 | 5 | 28 | 5 | 28 | 0 | |

Figure 7: