

# Measuring data for the polygons

## Instruction guide

### Scanning

Scan in the clear plastic transfer illustration of polygons.

#### Helpful hints:

Try to ensure images contain no smudges or lines which may not be formed properly. Leave the lines thick but not too thick, otherwise when you save to monochrome later the lines will become even thicker.

### Paint program

1. Open Paint.
2. Choose 'file' > 'open' > then go to the folder with the item you have just scanned.
3. Choose the eraser item if needed to remove any mess, or break up any lines which are connected together but shouldn't be. (This step only applies to fat marker pen markings. If there are no markings go to next step.)
4. Save the item as a monochrome bitmap (\*.bmp)—click on 'file' > 'save as'. Then left click once on the 'save as type' option and go down to choose this item. Then click in where the file name is, remove anything there, type in the photo code, then click 'save'. Example: R37
5. Once it has been saved you may close Paint and open up ImageJ.

### ImageJ program

Download the ImageJ analysis software package available from <https://imagej.nih.gov/ij/download.html>

6. Open 'ImageJ'.
7. Go to 'file' then 'open' and open the image to be measured.
8. Under 'image' choose 'type' then '8-bit' (may already be selected).
9. Select the 'line' symbol on the tool bar.
10. Using the mouse, draw a line on the scale in the image from the far left hand of the rectangle to the right hand side.
11. Under 'analyse' choose 'set scale'. Enter '16.7' in the 'known distance' box and leave 'cm' as the 'unit of measurement'. Tick 'global' and then hit OK.

#### *Optional steps for thick lined images:*

- Under 'process' choose 'binary' then 'skeletonise'.
  - Under 'process' choose 'binary' then 'dilate'.
  - If necessary, export into Paint and edit unnecessary lines, export from Paint then re-import into ImageJ (as per step 3 above, under Paint Program instructions).
12. Under 'image' choose 'adjust' and 'threshold'. A dialogue box will appear showing a black bordered rectangle containing a grey histogram covered by a red square outline. The histogram represents the number of pixels at each grey tone in the image. The red box represents the range of tones converted to red in the image. The two sliders below are used to adjust the upper and lower ends of the red range. Converting certain pixels to red is important for measuring area.