User Manual for Plastron Analysis Software (Version 1.0)

Contents

1 License information

This software is released under the General Public License (GPL). A copy of the GPL can be found at gnu.org.

```
You should have received a copy of the GNU General Public
License along with this manual; if not, see
http://www.gnu.org/licenses.
```

2 About the project

The purpose of this project is given an image of a sea turtle plastron, allow the user to quantify the relative amount of softness or dekeratinization. The rationale for this analysis is to test the hypothesis that the amount of relative dekeratinization is proportional to the reproductive activity of male sea turtles. Knowing the number of adult male sea turtles that are sexually active throughout the course of the nesting season has the potential to improve models of population dynamics and subsequent conservation policies. The project home is located at:
https://bitbucket.org/ajrichards/plastron/wiki/Home.

3 PLASTron

This is the software that accompanies the PLASTron manuscript. This wiki and these documents are meant to help you install and get started with PLASTron. Feel free to use/modify this software as needed and if you use it please cite the appropriate publication:

Blanvillain G, Pease AP, Segars AL, Rostal DC, Richards AJ, and Owens DW. Comparing methods for the assessment of reproductive activity in adult male loggerhead sea turtles Caretta caretta at Cape Canaveral, Florida. Endangered Species Research, 2008, 6(1):75-85.

This software is a very simple GUI written in Tkinter and it was created for the sole purpose of calculating the relative size of dekeratinized regions. The authors have a limited capacity to test on multiple systems so there may be issues with installing or running PLASTron. Please do not hesitate contribute by making the author(s) aware of known problems (see contact below).

3.1 Binary Installation

- **Windows 7** - go to the downloads section of the home page
- **Mac OS X** - go to the downloads section of the home page
- **GNU/Linux** (install from source)

For both Windows and OSX users: (1) download the appropriate *.zip file. (2) Unzip the file and move the file to a designated location. (3) navigate into the directory 'PLASTron' and then into the director 'dist'. (3) Finally, to start the software click on 'PLASTron.exe'.

3.2 Source Installation

Most users will make use of the binary packages available. Developers or any other user interested in installing from source can do so as follows. The prerequisites are Python, PIL and NumPy.

```
$ hg clone https://bitbucket.org/ajrichards/plastron
$ cd plastron
$ sudo python setup.py install
$ python PLASTron.py
```

Assuming you can start PLASTron then you will see Figure 1. PLAStron uses a set number of pixels so it will not display exactly the same on monitors of different resolutions. Also, PLAStron is not designed work in full screen mode.

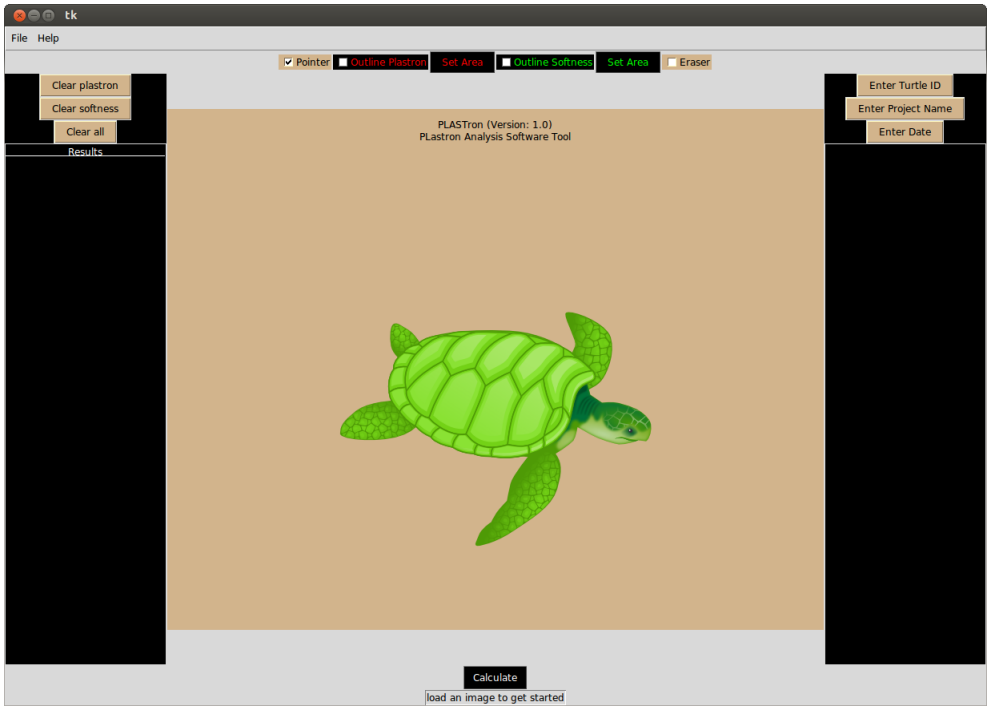

Figure 1: The opening PLASTron interface.

4 Analysis summary

We first summarize the procedure for calculating plastron softness in five basic steps. Then we go into each of these steps with the detail necessary to complete the analysis.

1. **Load file**
2. **Enter metadata**
3. **Outline and set area of plastron**
4. **Outline and set softness area**
5. **Calculate relative softness**

Figure 2 shows in detail where on in the PLASTron interface to look for each of these steps.

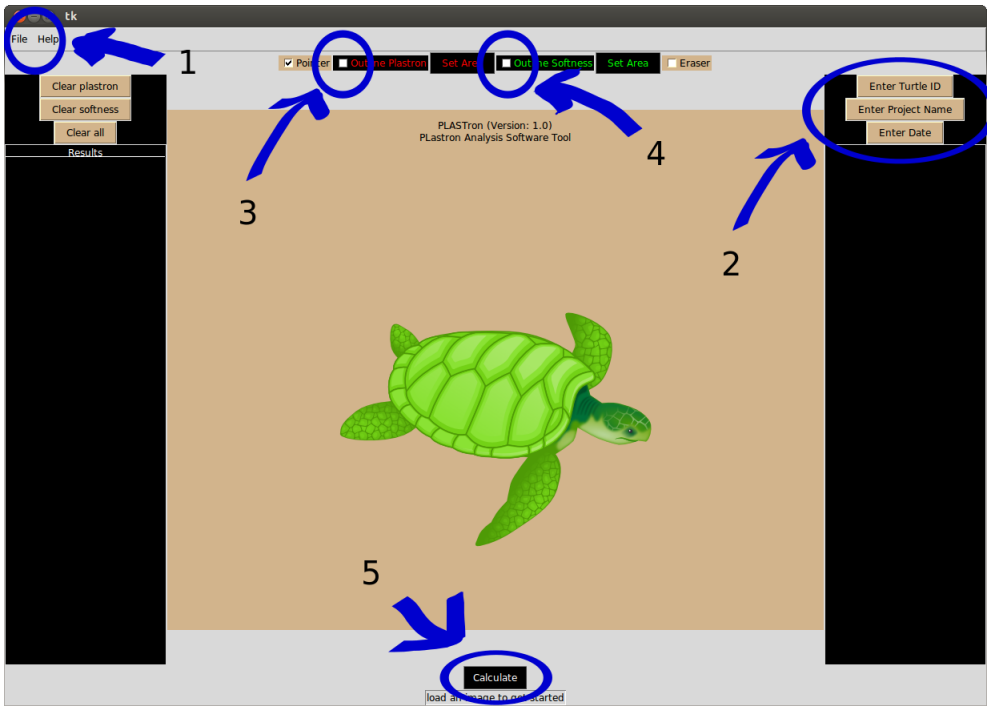

Figure 2: The five basic steps to carry out an analysis using PLASTron. (1) Load a file from the file menu. (2) Enter all the metadata (date, project, turtle ID), (3) Outline and set the plastron area, (4) outline and set the softness area (4) and (5) calculate the relative softness.

5 Procedure details

5.1 Load image file

Load an image file from the file menu.

5.2 Enter metadata

Enter the analysis specific data: date, project ID, and turtle ID. PLASTron will not allow your to save your work until these fields have been filled in.

5.3 Outline and set area of plastron

In an effort to standardize the procedure we only outline the plastron and not any of the skin or overlying carapace. The most important thing however is to be consistent between all images analyzed. This area should almost alway be a complete polygon.

Select the 'Outline Plastron' check box. This activates the painter and you may outline the desired region. Use the eraser to help with this process. After the plastron outline is drawn then set the area, which saves the number of pixels that compromise the plastron. An example is see in Figure 4.

5.4 Outline and set area of softness

This is done in the same way as the plastron outline. However, the outline of the soft area of the plastron may not be a complete polygon so use multiple polygons. Use the eraser to correct any lines connecting

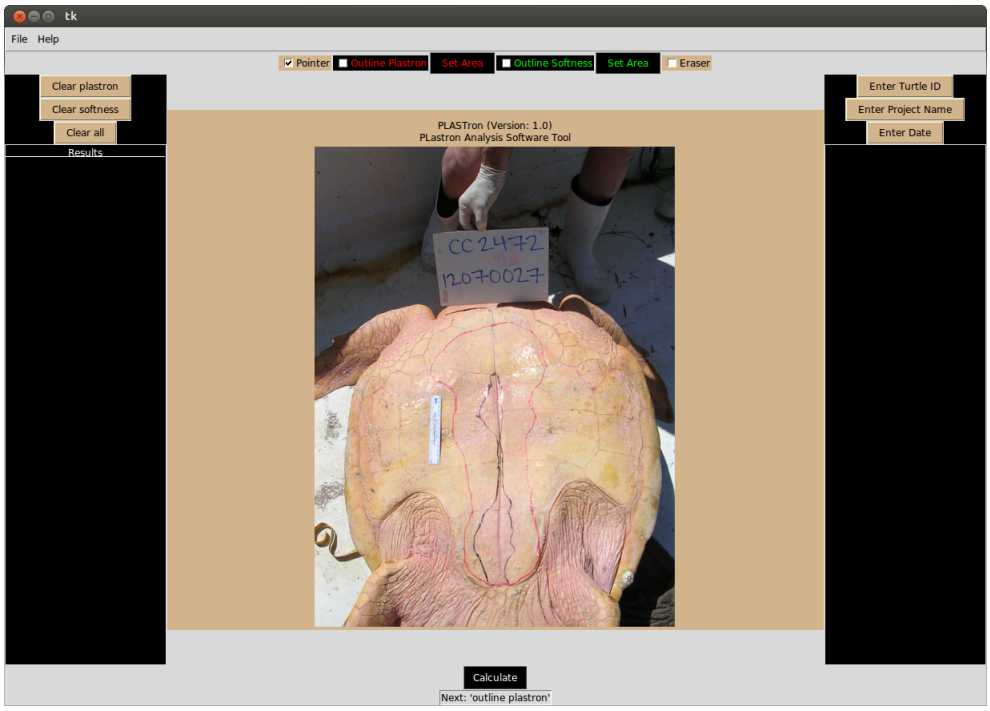

Figure 3: Example of a loaded image of a plastron

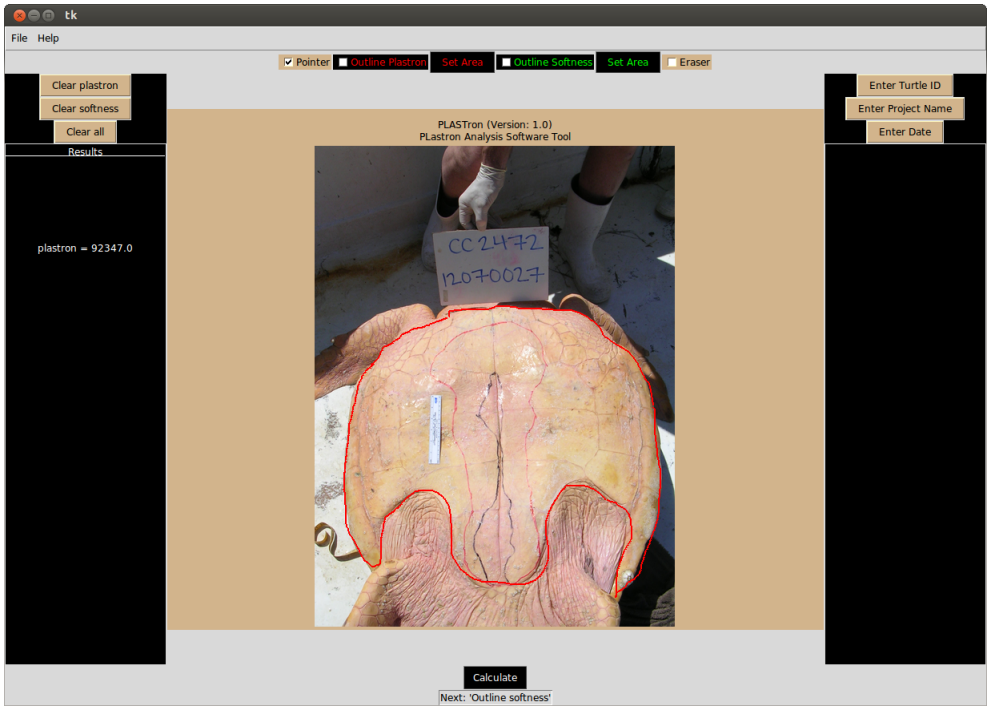

Figure 4: Example plastron region delineated.

polygons. When you set the area it will will show up as a shaded green color. The may be small lines missing from the region, due to the way the pixels are calculated. This can be minimized by careful drawing.

5.5 Calculate relative softness

Use the calculate button at the bottom of the screen to calculate the percent of plastron softness in the current image. An example of a completed analysis is show in Figure 5

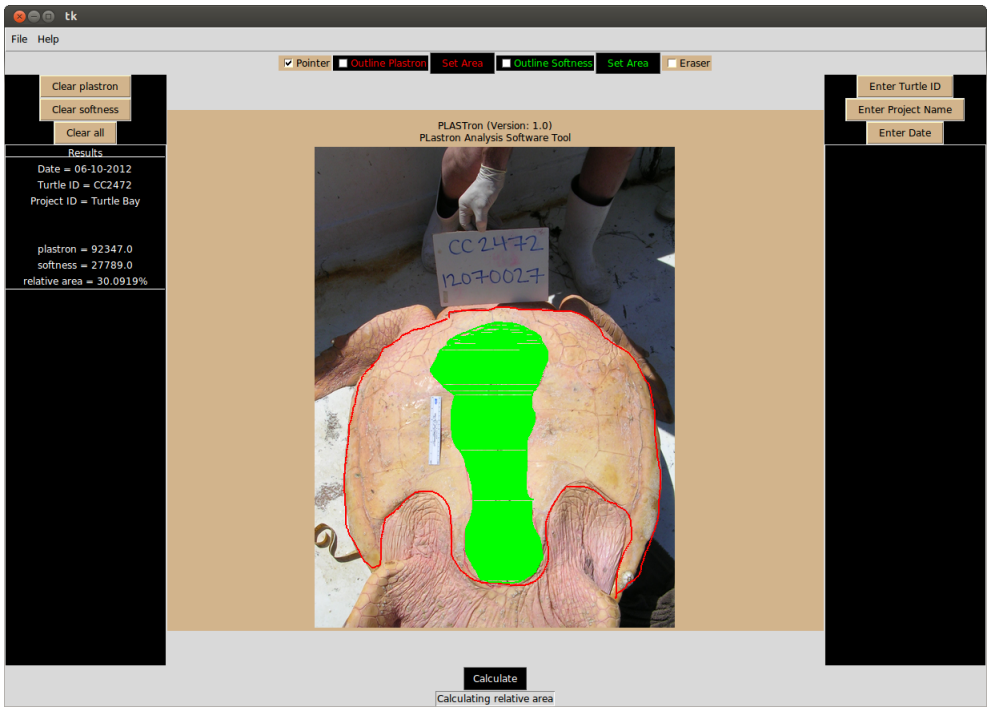

Figure 5: Example of an analyzed plastron.

5.6 Saving

The work can then be saved as a *.csv file by clicking on 'Save project as' from the file menu. Another image may then be loaded and the process repeated. Once you go on to save additional image results they will be appended to the existing file as long as you use the 'Save project' button. In addition, images complete with the outlined regions may also be saved from the file menu.

6 Contact information

Please refer questions, comments and suggestions to,
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This document was last updated on May 9, 2012.