Updated observer catch-at-length data from the commercial fisheries at the Tristan da Cunha group of islands

Susan Johnston and Doug Butterworth

MARAM

Department of Mathematics and Applied Mathematics

University of Cape Town

Rondebosch, 7701

Updated catch-at-length (CAL) data have recently been provided for the 2012 season[1]. This document provides various comparative plots of these data compared with data from previous seasons.

Figures 1a-4a plot the male (top) and female (bottom) CAL values for the 2008-2012 seasons. For Inaccessible, Nightingale, Gough and Tristan respectively. Here the male and female portions of the catch are analysed separately, so that the total "% catch" for males sums to 100 as do the total "% females" values. Figures 1b-4b plot the average sized male and female lobster in the catch each season since 1997, as well as the percentage of the catch that was made up of female lobsters – again for each of the four islands respectively.

Note that the minimum legal carapace length was reduced from 68mm to 66mm in December 2012 at Inaccessible island.

Comments

The three outer islands show a substantial shift to the right (i.e. towards larger lobsters) in the CAL plots for the 2012 season compared with the four previous seasons. This trend is also clearly evident in the plots of average size of lobster which show large increases for the 2012 season. This trend is not so evident at Tristan island (Figure 4a), although the Tristan average male and particularly average female sizes have increased over the previous few seasons (see Figure 4b).

This shift is particularly unexpected for Inaccessible for where the minimum legal size was REDUCED from 68mm CL to 66mm CL at the start of the 2012 season. One might have expected a shift towards SMALLER lobsters in the CAL plots i.e. for the average size of lobsters in the catch to decrease.

The meaning of the observed shift in the CAL plots for the 2012 season is not immediately obvious. There are three possible interpetations of this shift:

[1] 2012 refers to the 2012/13 season

i) There has been one or more poor year classes of small lobsters which have now enetered the fishery i.e. this is a sign of fewer small lobsters or for some reason the smaller lobsters are less available;
ii) there have been one or more large year classes passing through the population, or
iii) there has been an increase in the selectivity of large lobsters (for some reason).

It is hoped that the assessment modes will be able to distinguish which of these possible causes is responsible for the observations. The reality may be a combination of these interpretations.

The implications of these alternate hypotheses will clearly be rather different. We currently assume the CPUE data are the most reliable data on the size of the resource. For Inaccessible for example, the commercial CPUE data for the 2012 season has been exceptionally good. This information suggests that there is no immediate cause for concern at Inaccessible. There may well be an unexplained reason for increased selectivity of the larger lobsters and hence this has driven the CPUE up. Further data will tell if this trend will continue.

The notable shift in the peaks of the Nightingale male CAL data towards larger lobsters between the 2010, 2011 and 2012 seasons could be explained as an exceptionally large year class that is moving through the population. The somatic growth rate required to produce this observed shift is supported by the "James Glass" model of somatic growth – the more optimistic of two growth models currently used for modelling the Nightingale population. The notable shift in the peak of the Inaccessible male CAL data between 2011 and 2012 (also towards larger lobsters) is again able to be supported by the somatic growth model used for Inaccessible. These observations would thus support interpretation ii) above.

The biomass survey CAL data for the 2012 season (see MARAM/TRISTAN/2014/FEB/04) show a similar trend in the 2012 CAL data for Nightingale and Gough i.e. a substantial shift towards larger lobsters. The Inaccessible 2012 biomass survey CAL data show no real change, and the Tristan biomass survey CAL data for 2012 show an opposite trend i.e. a shift towards the smaller lobsters. It is interesting to note the 2013 biomass survey CAL data for Nightingale show the shift to the right has not only halted but appears to have reverted to patterns seen in the 2006 and 2007 survey data. It will be very interesting to see if the commercial CAL data show a similar shift (back to the left) for the 2013 season.

Figure 1a: Inaccessible male (top) and female (bottom) CAL plots for 2008-2012. Percentages here sum to 100 separately for each sex. The smallest and largest size categories are minus- and plus-groups respectively.

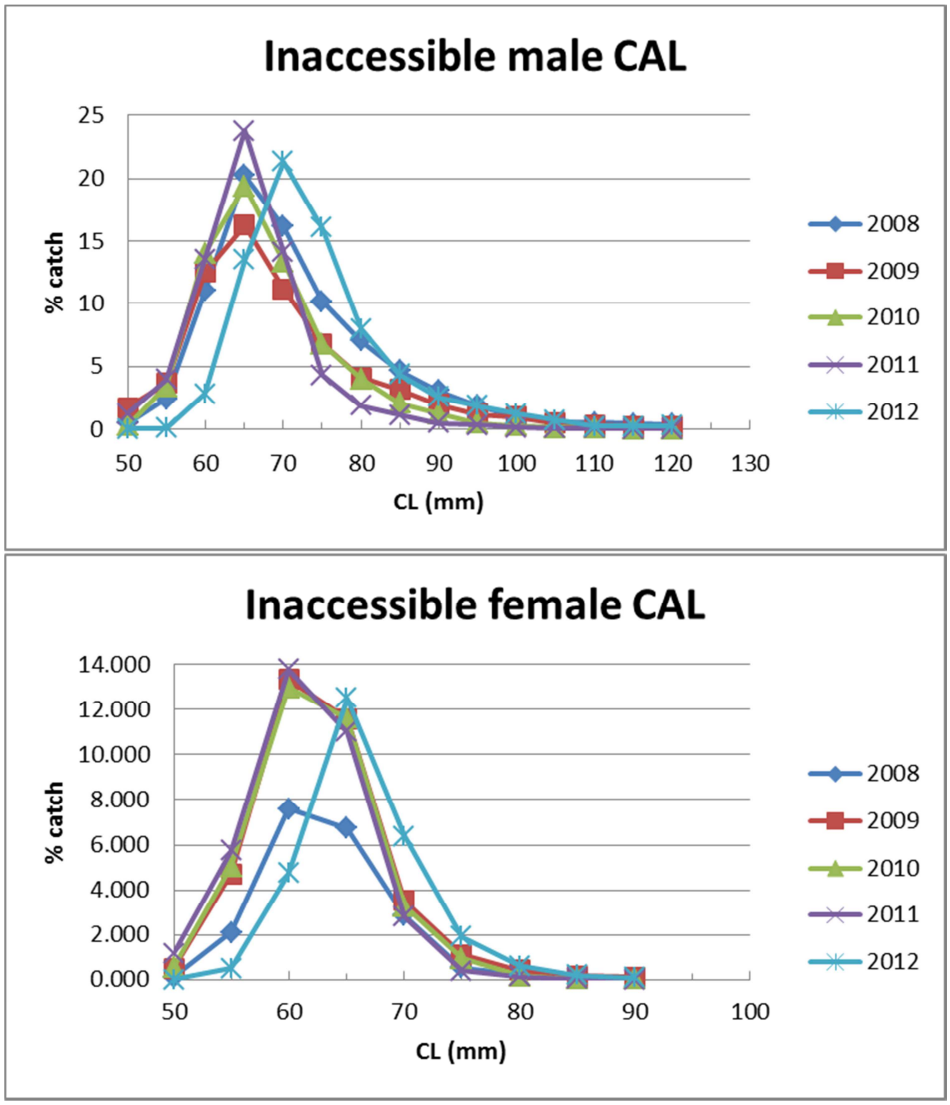

Figure 1b: Inaccessible male and female average sizes in the commercial catch and the % (by number) of females in the catch since 1997.

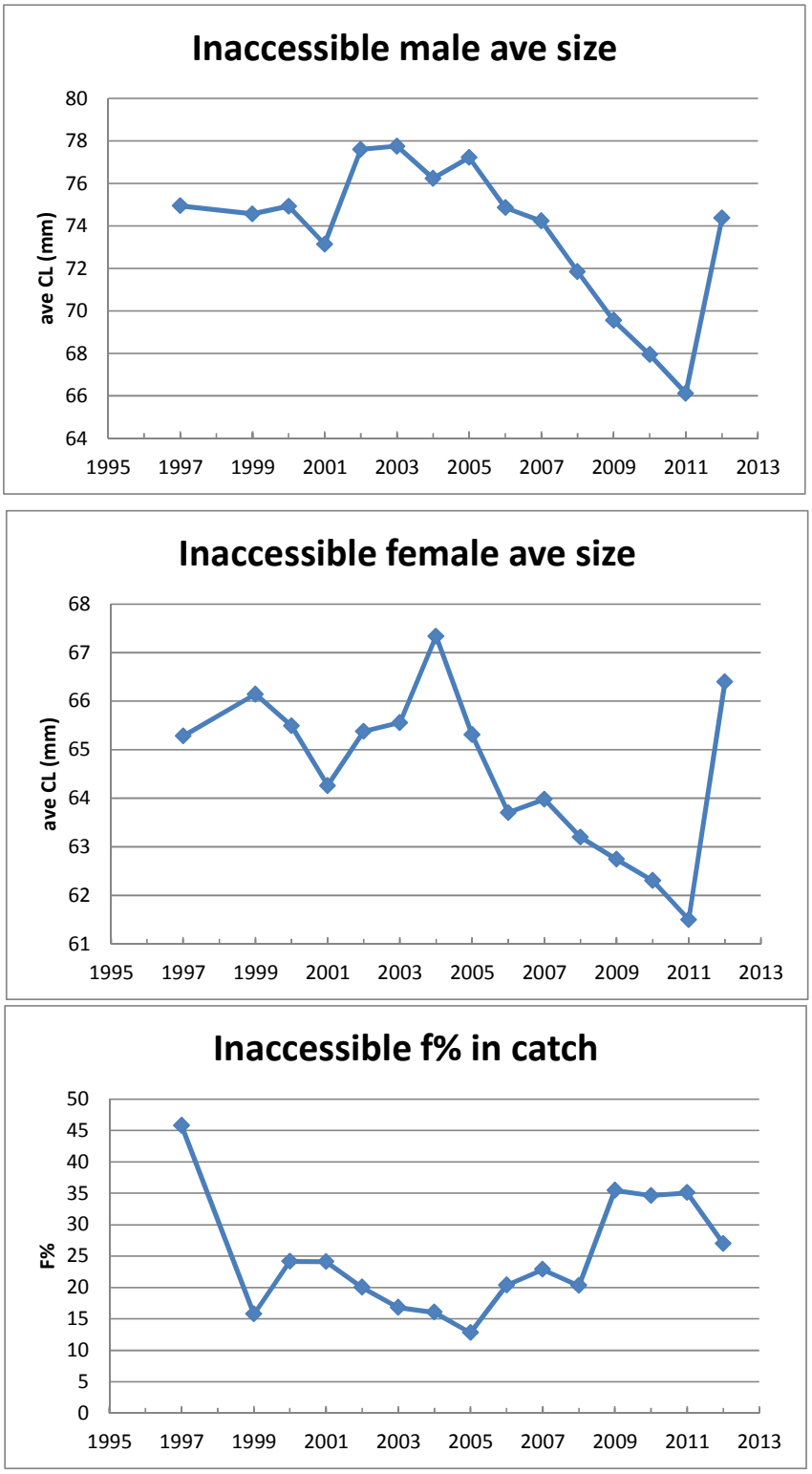

Figure 2a: Nightingale male (top) and female (bottom) CAL plots for 2008-2012. Percentages here sum to 100 separately for each sex. The smallest and largest size categories are minus- and plus-groups respectively.

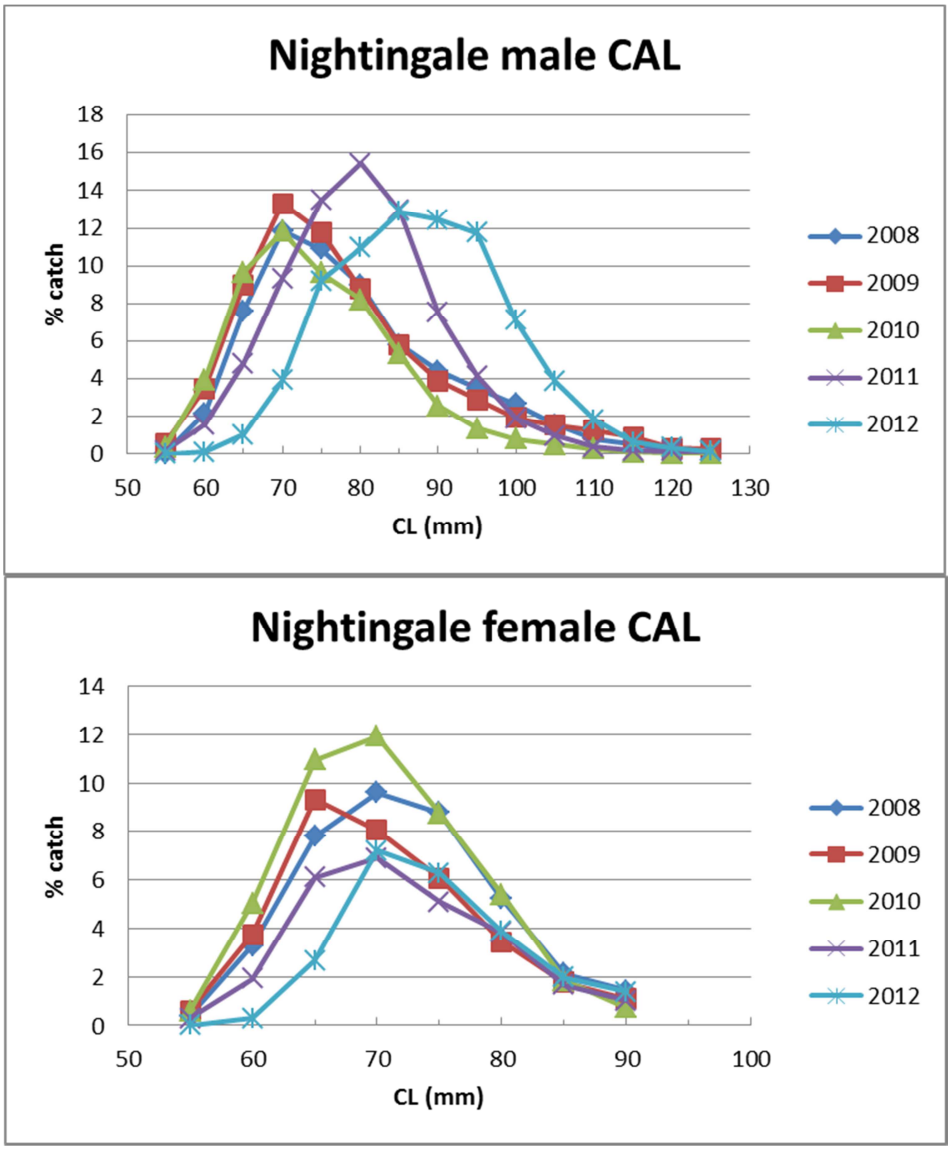

Figure 2b: Nightingale male and female average sizes in the commercial catch and the % (by number) of females in the catch since 1997.

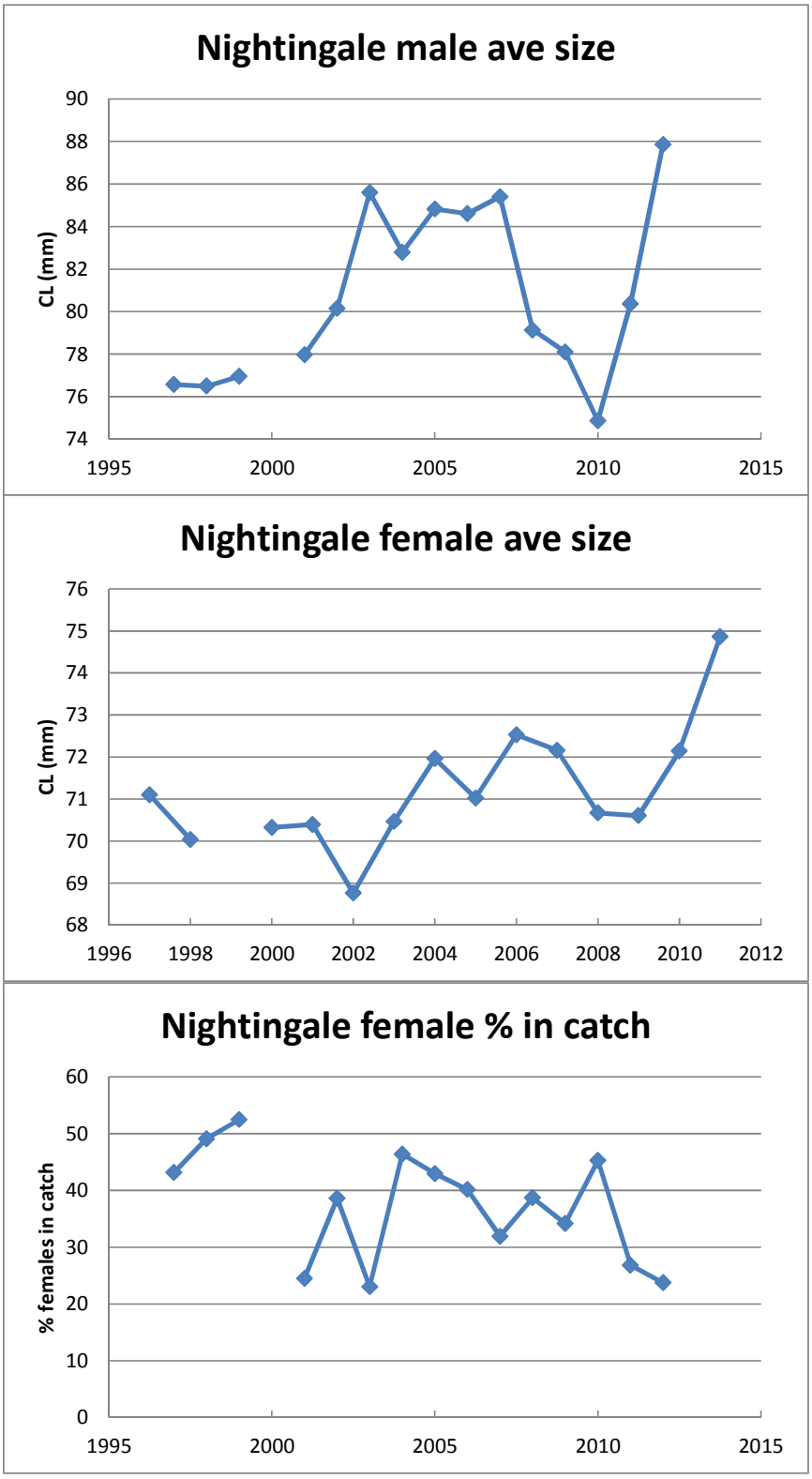

Figure 3a: Gough male (top) and female (bottom) CAL plots for 2008-2012. Percentages here sum to 100 separately for each sex. The smallest and largest size categories are minus- and plus-groups respectively.

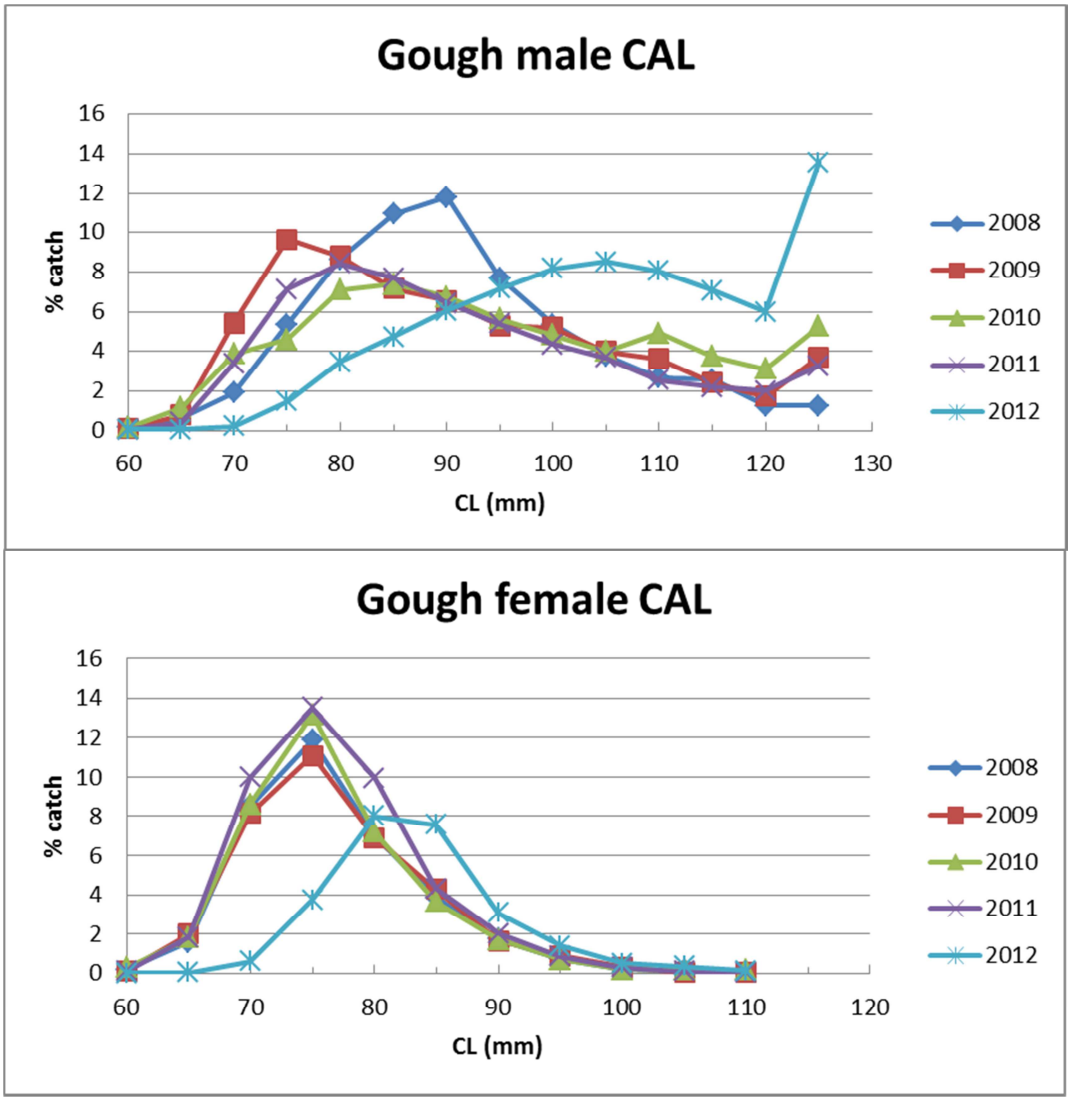

Figure 3b: Nightingale male and female average sizes in the commercial catch and the % (by number) of females in the catch since 1997.

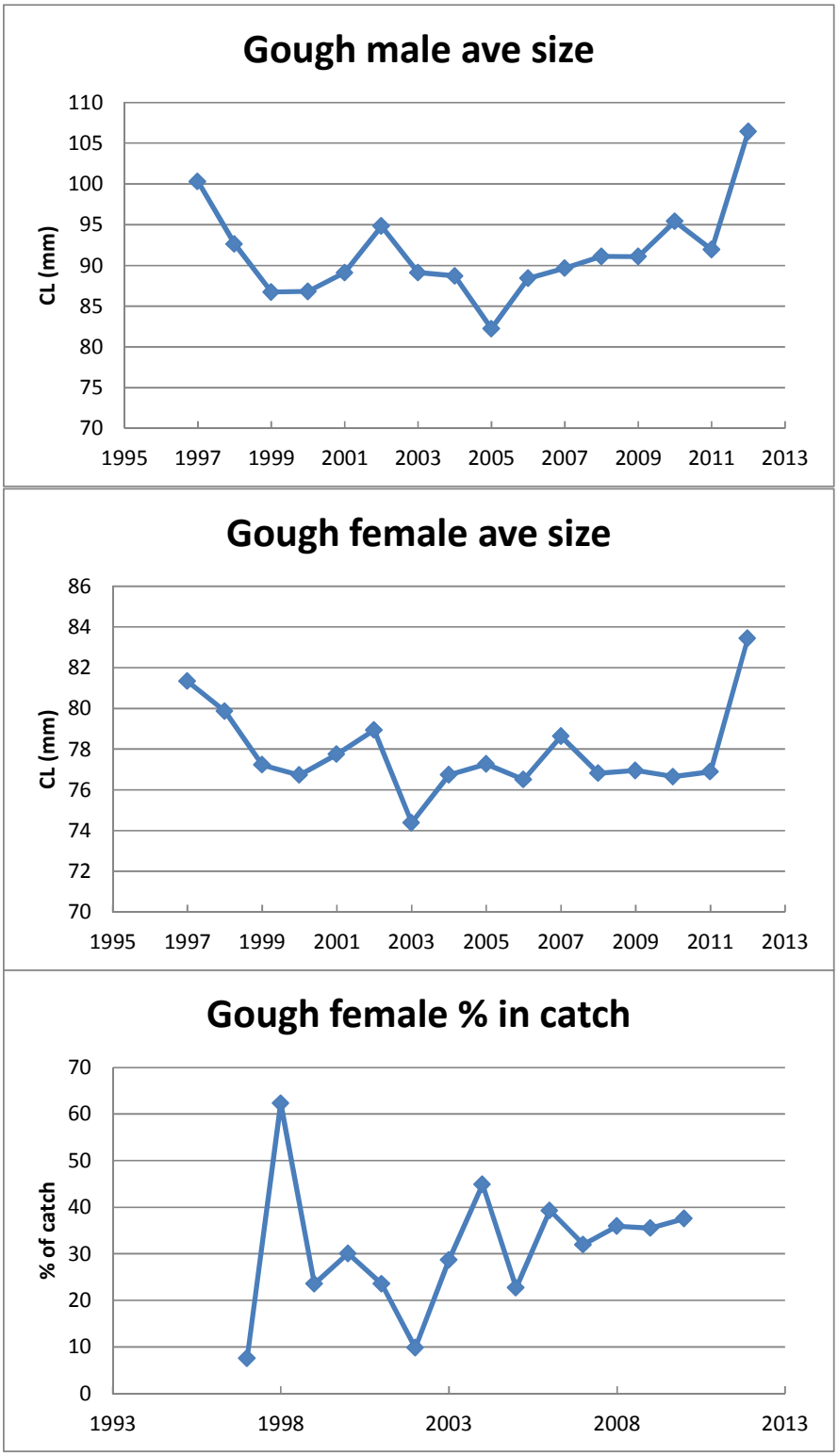

Figure 4a: Tristan male (top) and female (bottom) CAL plots for 2008-2012. Percentages here sum to 100 separately for each sex. The smallest and largest size categories are minus- and plus-groups respectively.

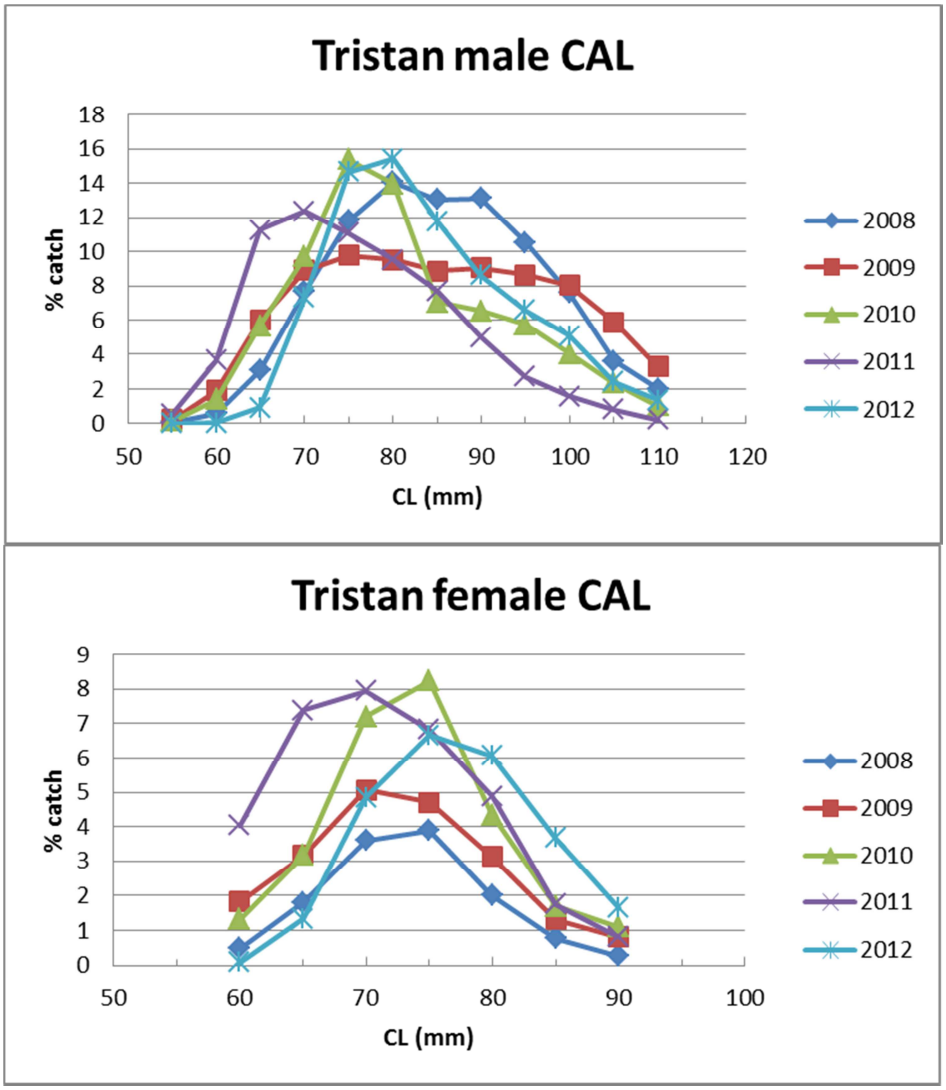

Figure 4b: Nightingale male and female average sizes in the commercial catch and the % (by number) of females in the catch since 1997.