Figure S1: Study site. Study site and most relevant ocean currents surrounding South Australia.
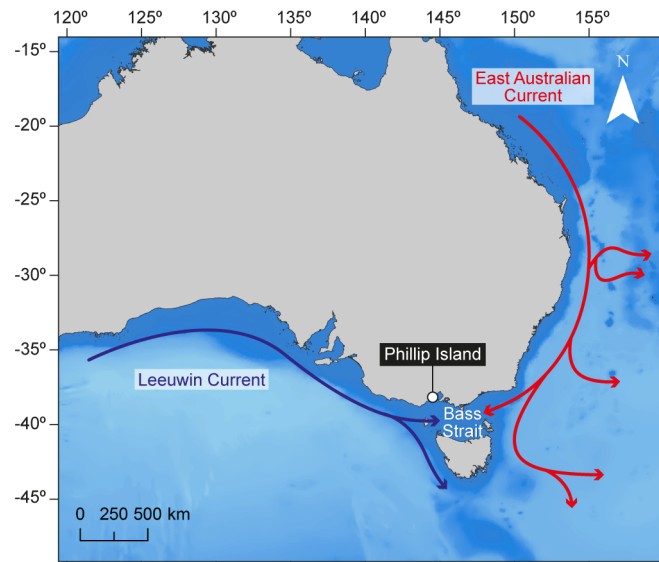
Figure S2: Resistance function assume a quadratic function, ranging from 0 to 1, resulting in a downward parabola. Parameters have been estimated from all range of x values [0-2π radians]. The function is isotropic and slope-dependent for x values (absolute difference angles between current mean azimuths and direction of each pixel to the source, Bass Strait), estimating lower values for the directions pointing to the source, and greater values for the opposite directions.
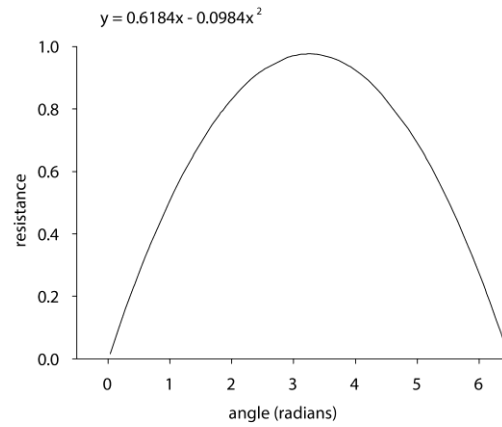

$$y = 0.6184x - 0.0984x^2$$

Figure S3: Steps and outputs of the process to derive monthly areas of influence, using two contrasting months as example: February 2000 on the left side and September 2000 on the right side). Ocean current data (A, B). Water speed is graded in colour. Cost raster derived from ocean currents (C, D). Areas of influence (E, F): connectivity maps should be interpreted as a probability of ways to arrive to the sink. Upper quartile was used to delineate final areas. Arrows show water speed from original current models. The higher the arrow, the higher the water speed. Colour scheme on the bottom of the figure.
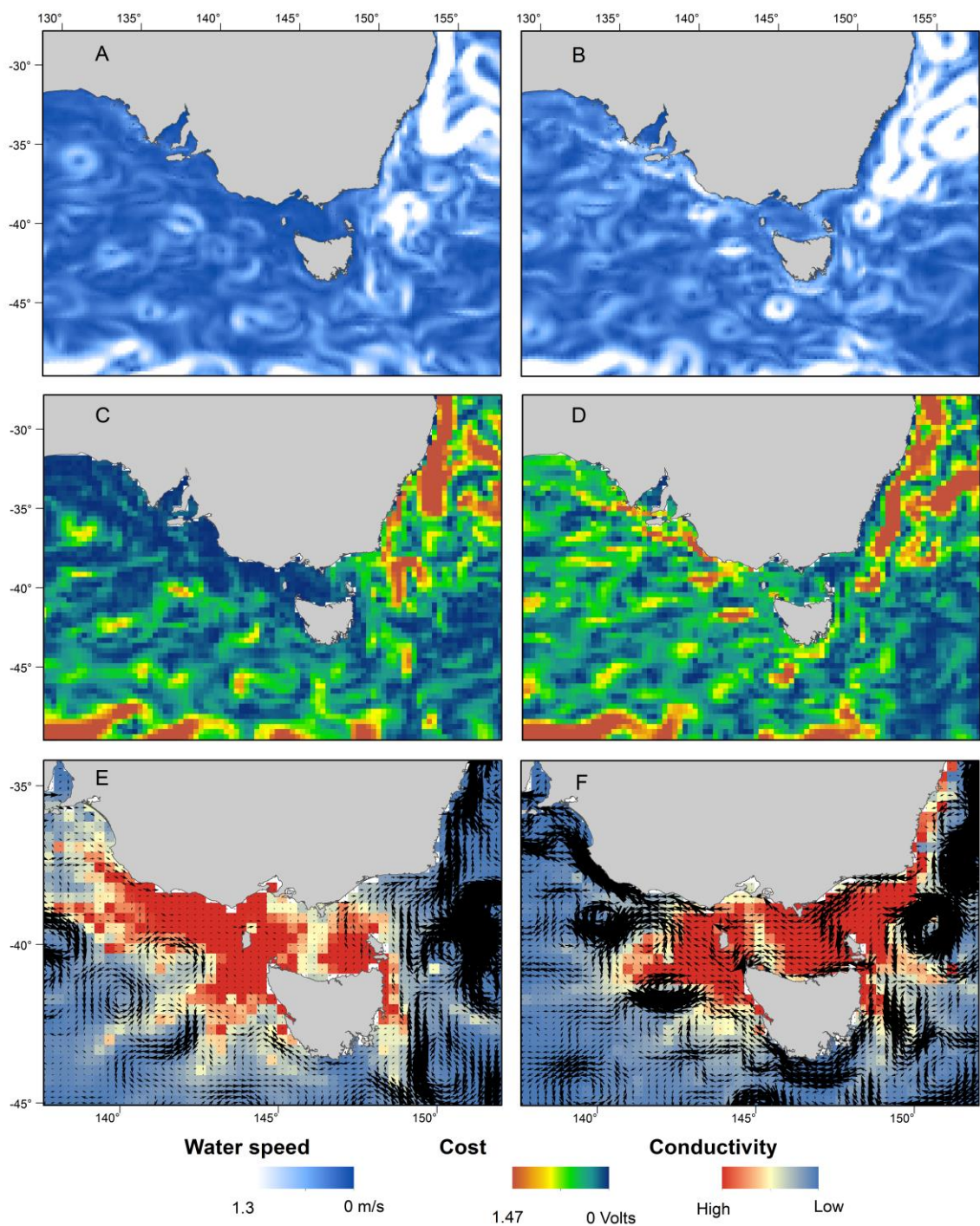
Figure S4: Monthly maps showing the mean of the areas of influence for the 1998-2009 time period. Influence areas show a breakpoint between eastern and western side of Bass Strait. Eastward influence areas show greater surface during autumn and winter, diminishing during summer, when areas of influence grow westward.