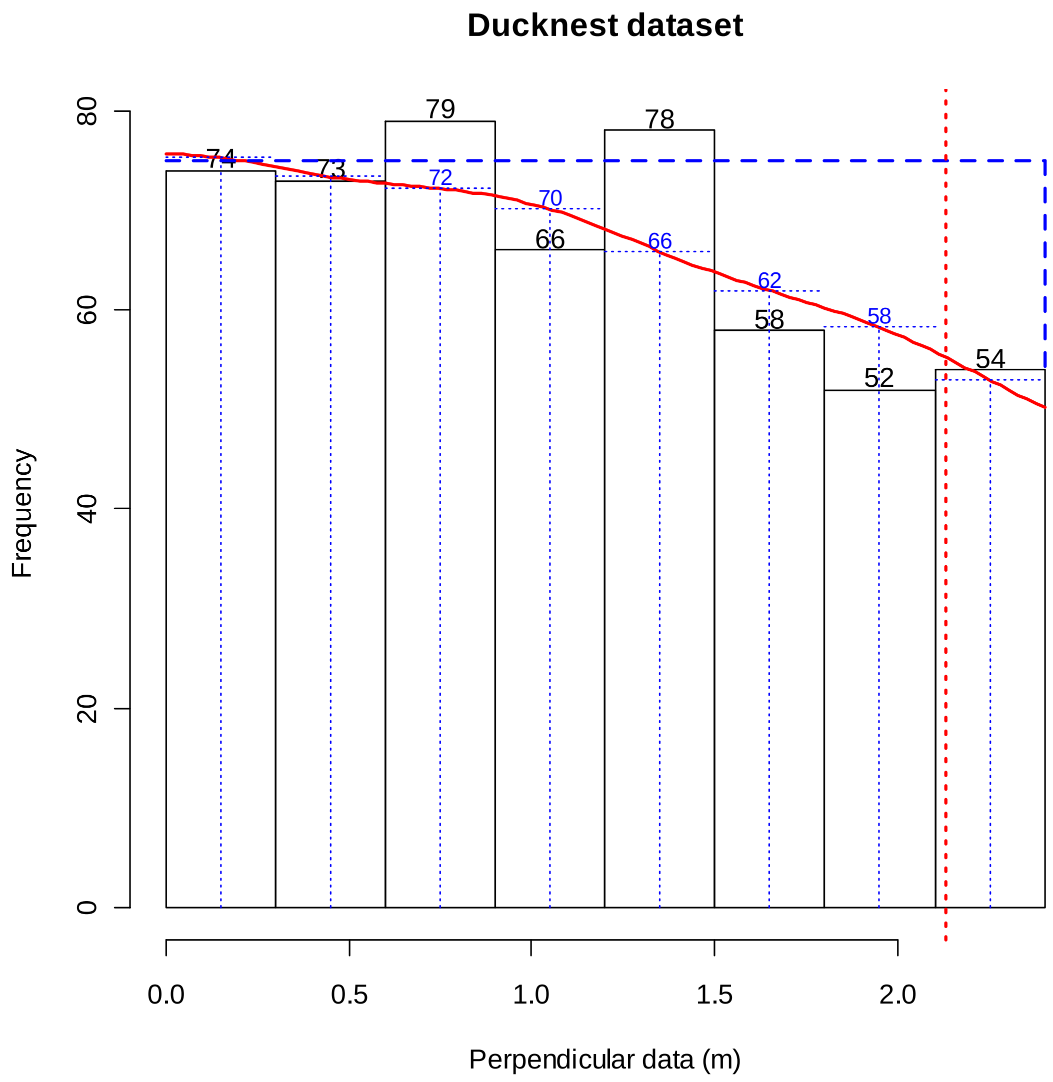
Introduction to Distance Sampling

Line transect Solutions



2) The red vertical dashed line shows my estimated effective strip half-width of 2.13m; I estimate that the area below my curve to the right of 2.13 is the same as the area above the curve to the left of 2.13. In this case, the effective area surveyed is estimated as $2\mu L$ = 2×(2.13/1000) ×2575 = 10.97 km^2, and estimated density is 534/10.97 = 48.7 nests / km^2.

3) For my curve to represent the pdf *f*(*x*), I need to rescale such that the area under the curve is 1.0. Since I estimated the area under my curve is 159, I can rescale by dividing all the numbers on the *y*-axis by 159. The intercept, *f*(0) is therefore 75/159 = 0.472. Substituting this into the formula:

$$\hat{D} = \frac{n\hat{f}(0)}{2L}$$

gives a density estimate of 534×(0.472×1000)/2×2575 = 48.0 nests per km^2 (Note, I had to multiply *f*(0) by 1000 to convert from m^{-1} to km^{-1}.)

Another way to estimate *f*(0) is *f*(0)=1/μ – in which case I'd get the same estimate as in part (b).

Distance works by fitting a pdf $f(x)$ to the observed data, and using the estimated $f(0)$ to estimate density. The output also gives μ and P_a, but these are worked out from the estimate of $f(0)$, so Distance would get the same answer whichever formula you used.