Line transect notation

Known constants and data:

k = number of lines

l_j = length of j^{th} line, j=1,...,k

$L = \Sigma l_j$ = total line length

n = number of animals or clusters detected

x_i = distance of i^{th} detected animal or cluster from the line, i=1,...,n

w = truncation distance for x

A = size of region of interest

a = area of "covered" region = $2wL$

s_i = size of i^{th} detected cluster, i=1,...,n

Functions:

$g(x)$ = detection function

$f(x)$ = probability density function (pdf) of observed distances

$f(0) = f(x)$ evaluated at 0 distance

Parameters:

N = population size / abundance of animals

N_s = abundance of clusters

D = density = animals per unit area = N/A

D_s = density of clusters

μ = effective strip (half-)width

P_a = probability of detecting an animal or cluster given it is in the covered area a

$E(s)$ = mean size of clusters in the population

Point transect notation

Known constants and data:

k = number of points

n = no. of animals or clusters detected

r_i = distance of i^{th} detected animal or cluster from the point, i = 1, ..., n

w = truncation distance for r

A= size of region of interest

a = size of covered region = $k\pi w^2$

s_i = size of i^{th} detected cluster, i = 1, ..., n

Functions:

$g(r)$ = detection function

$f(r)$ = probability density function (pdf) of detection distances

$h(r) = f'(r)$ = slope of pdf $f(r)$

$h(0)$ = slope of pdf evaluated at $r=0$

Parameters:

D = density = animals per unit area

D_s = density of clusters

N = population size = $D \cdot A$

ρ = effective radius = $\sqrt{2/h(0)}$

v = effective area (per point) = $2\pi/h(0)$

P_a = prob. of detection of animal or cluster in the covered area a