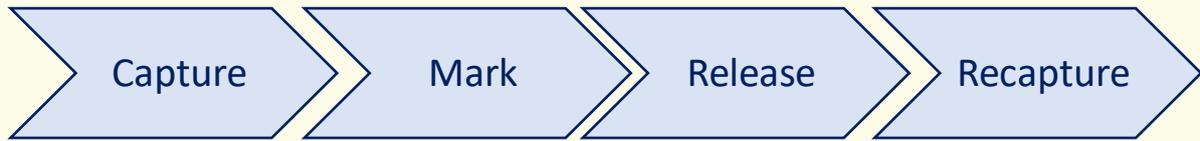


# Petersen Capture Recapture

A method to estimate the size of a population where it's impossible to capture the whole population.



$$N = \frac{Mn}{m}$$

$N$  = number in the population estimate  
 $M$  = size of first sample  
 $n$  = size of second sample  
 $m$  = number marked in second sample

#### Assumptions:

- population does not change between release or recapture
- probability of being caught is same for all members of population
- marks or tags are not lost and always recognisable
- sample size large enough to represent population

Researchers used the Petersen capture recapture method to estimate the number of humpback whales off the coasts of California, Oregon and Washington.

They used aerial photographs to identify the whales, recording the whales' unique markings in the first sampling rather than tagging the whales.

In 1995 they recorded the markings of 331 individual whales.

In 1996 they identified 264 individual whales of which 104 had been identified in the previous year. (Source: [digitalcommons.unl.edu](https://digitalcommons.unl.edu))

(a) Calculate an estimate for the number of humpback whales off the coasts of California, Oregon and Washington in 1996 (2 marks)

Question 10 from GCSE Statistics (Edexcel) Paper 1 Higher, June 2024