Lecture 13, 14

Population Ecology

1.018J

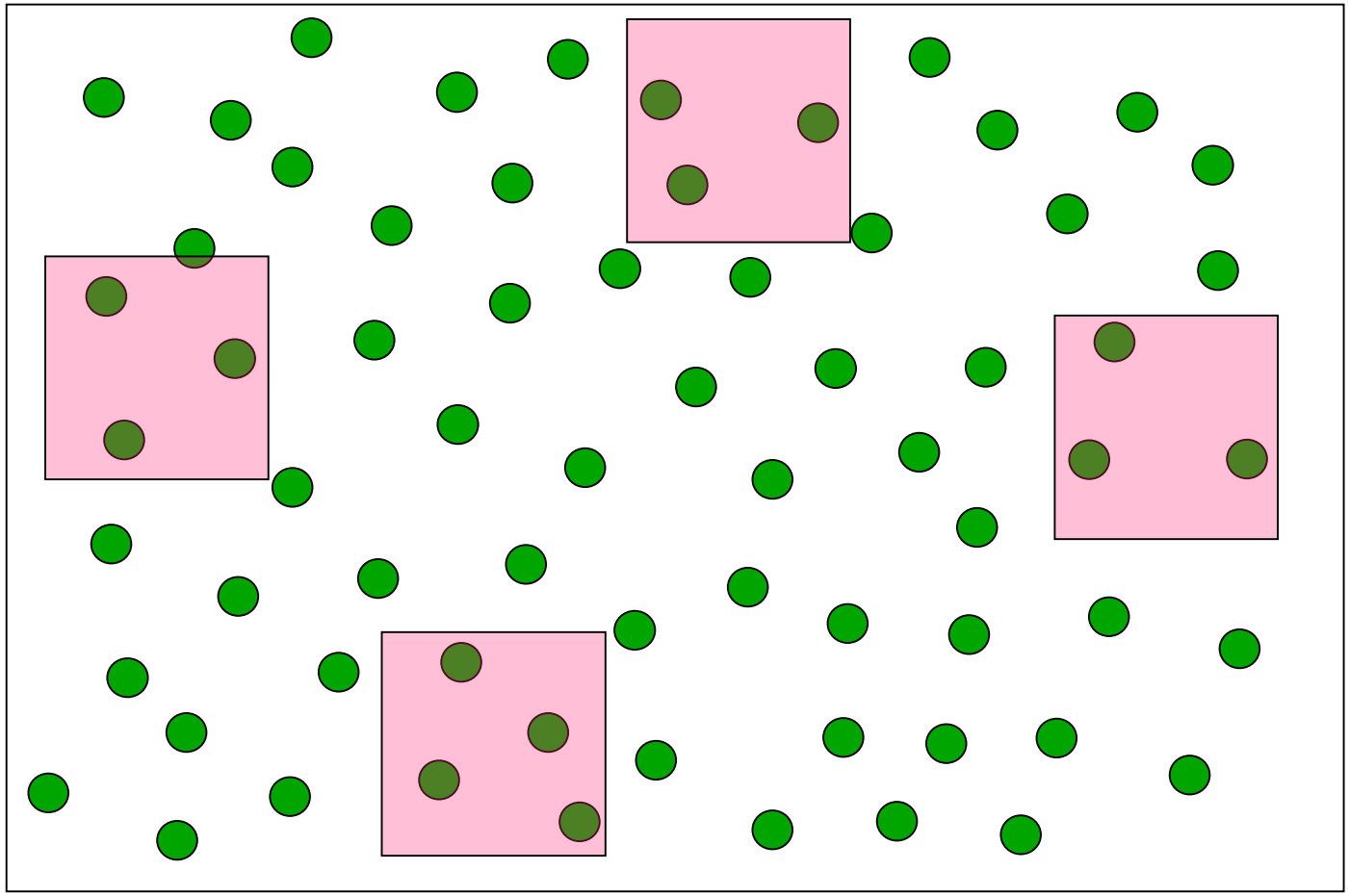
2009

The next three lectures

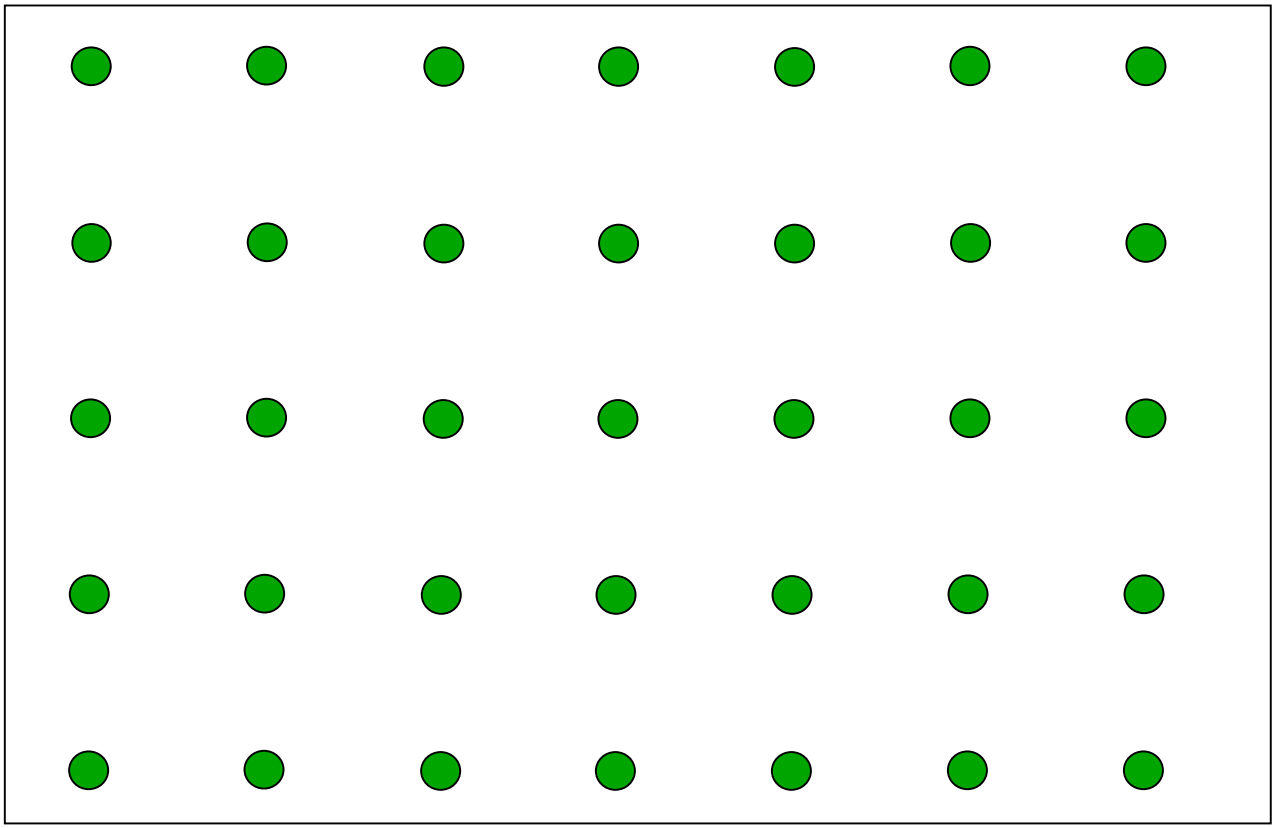
- Growth under unlimited conditions
- Resource limited growth
- Age- structured populations – “life tables”
- Human Population Growth

How do you measure the size of a population?

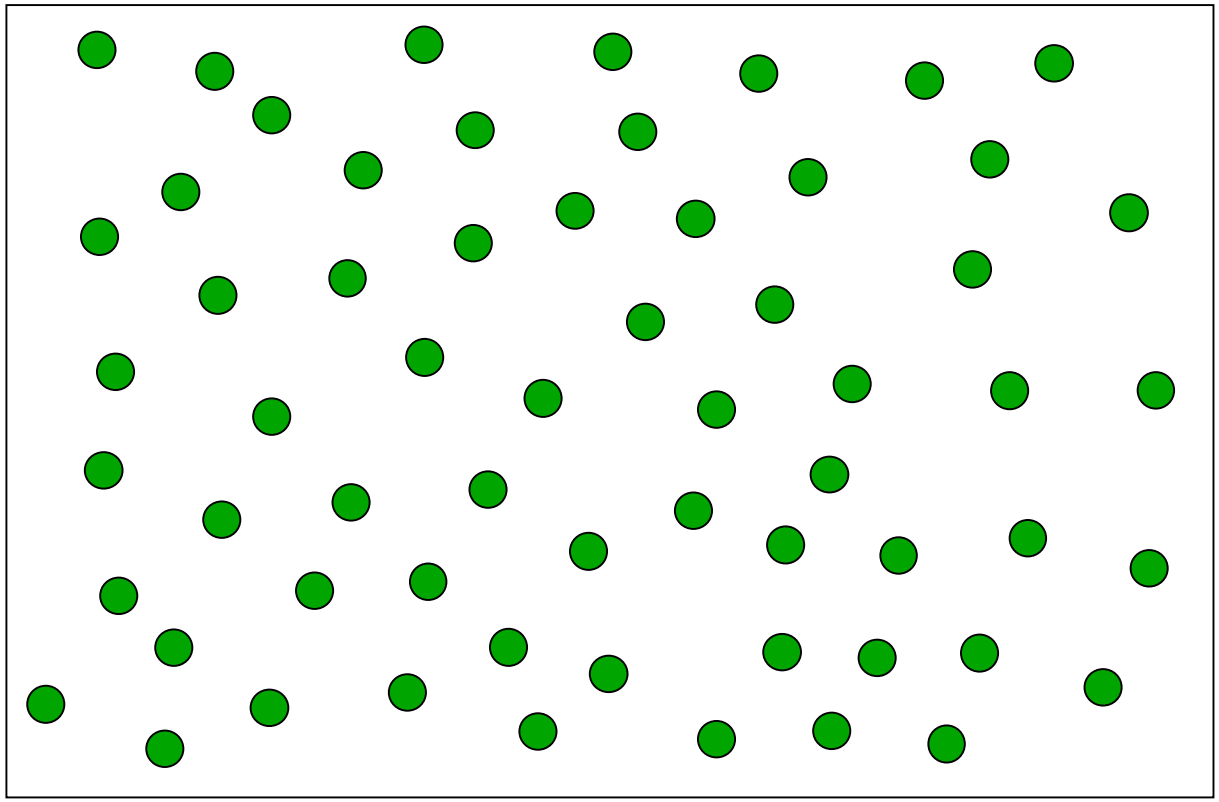
QUADRATS



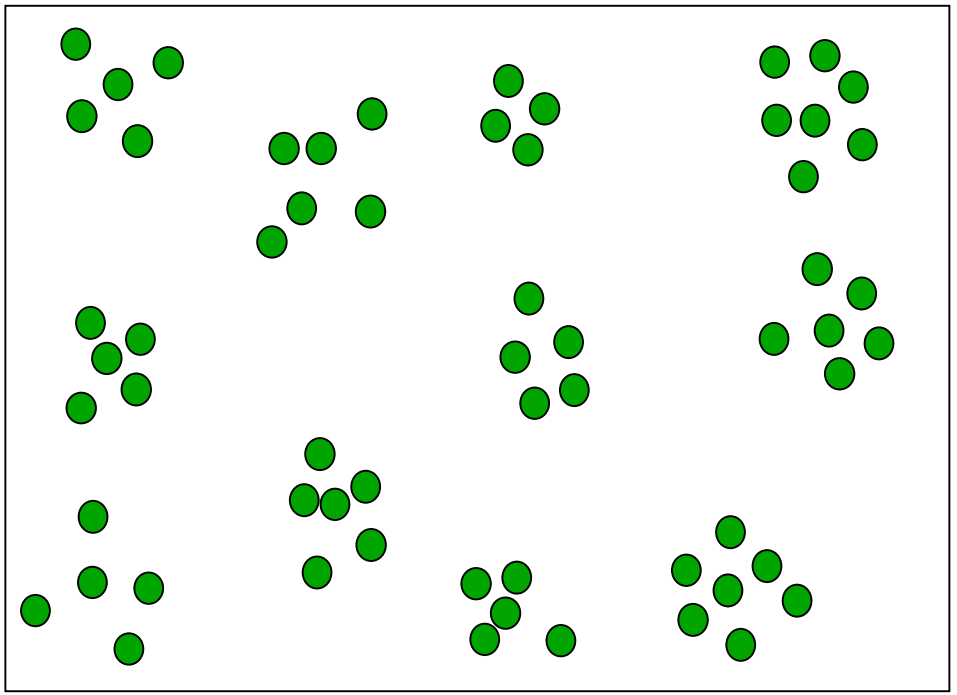
UNIFORM DISTRIBUTION



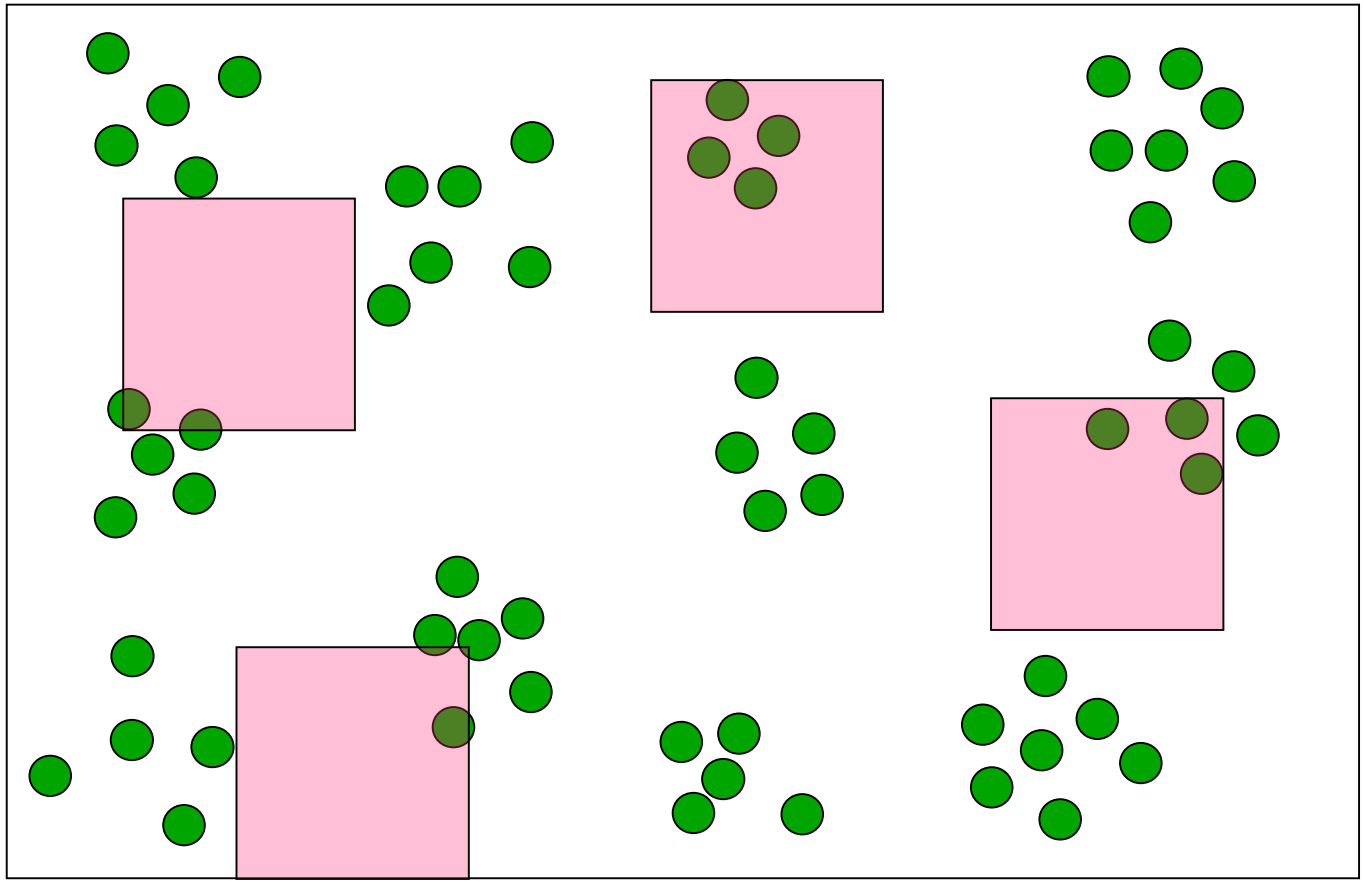
RANDOM DISTRIBUTION



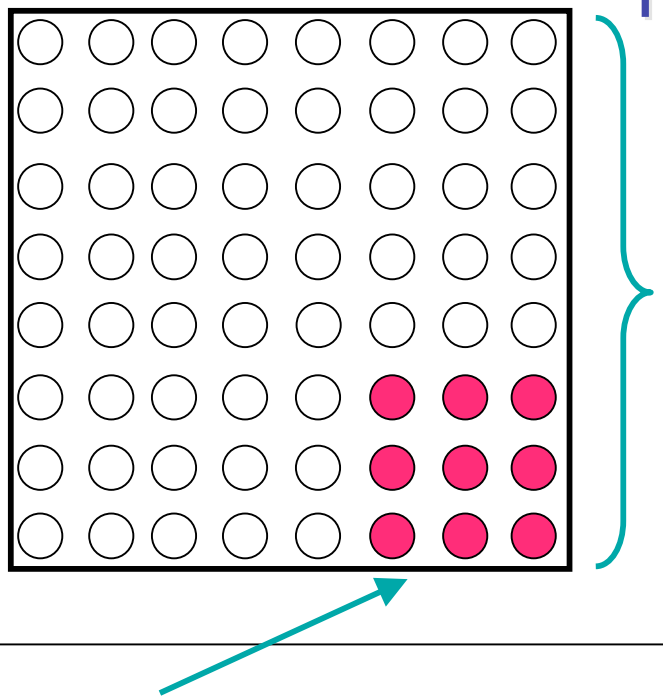
CLUMPS



quadrat size has to be very large for clumped distrubutions

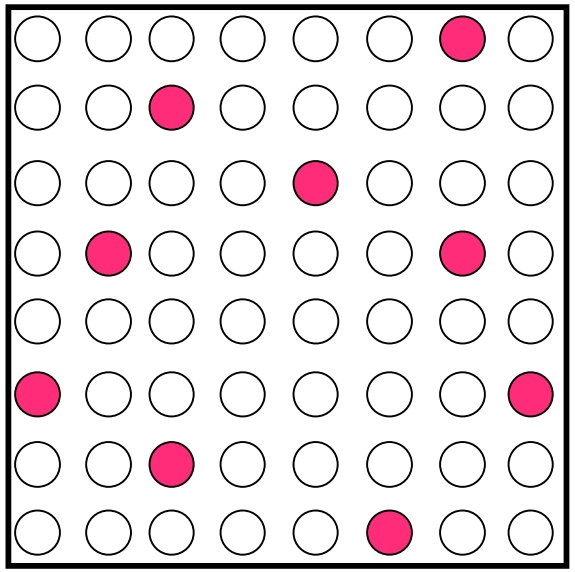


Mark and recapture method



Question: what is the population size, **N**?

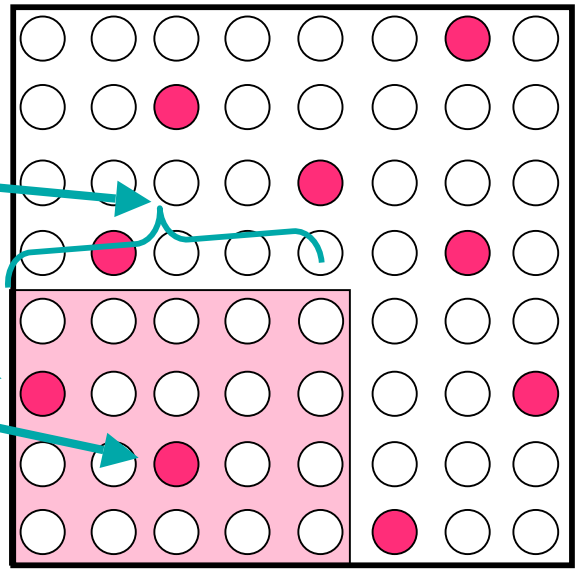
Step 1: Capture and mark **M** individuals



Step 2: Release and wait

Step 3:

Capture **S** individuals in second sampling
and
count # that are marked (**R**)



So….

N (number in population) = S x M/R

i.e.

$$N = \text{number in second sampling} \times \frac{\text{originally marked}}{\text{recovered marked}}$$

So how do we model population growth?

Growth Rate Examples

Organism	r (day^{-1})	Doubling Time
Bacteria	58.7	17 min
Beetle	0.101	6.9 days
Rat	0.0148	46.8 days
Cow	0.001	1.9 years
Birch Tree	0.00075	25 years

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