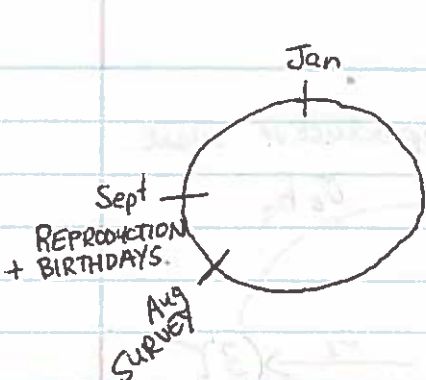
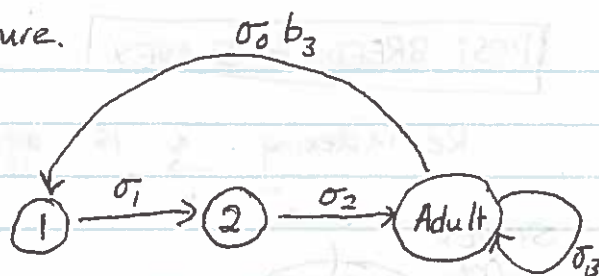


PRE-BREEDING SURVEY

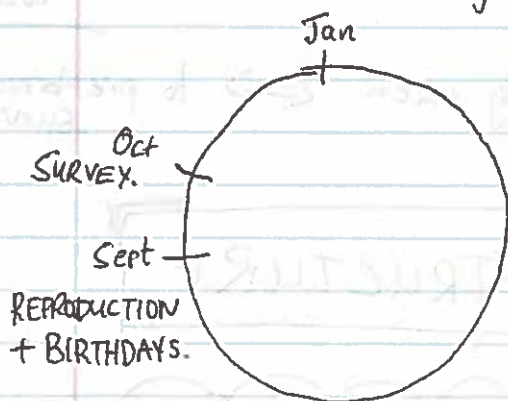


Age-structure.

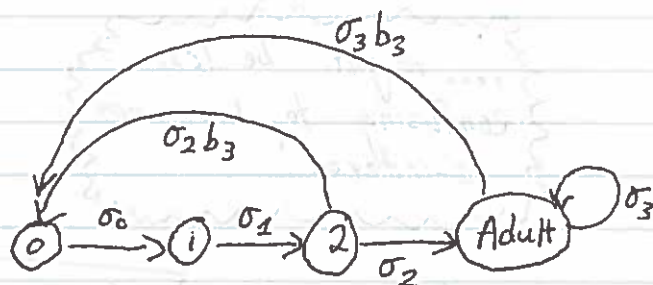


where b_i is the fecundity of ~~age~~ ^{age} i .
and σ_i is the survivorship of age i .

POST-BREEDING SURVEY



Age-structure.



• σ_3 appears on fecundity arrow since adults must survive to reproduce due to the timing of the census.

• Note, individuals that are age 2 at the survey, will be age 3 when the next reproductive event occurs.

IF THIS SEEMS TOO WEIRD AN OPTION IS TO REDEFINE THE INDEX.

.... Let i be the age of individuals when the next reproductive event occurs.

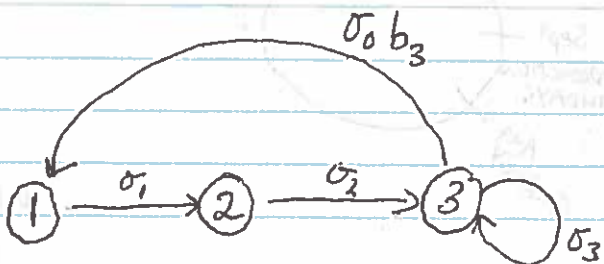
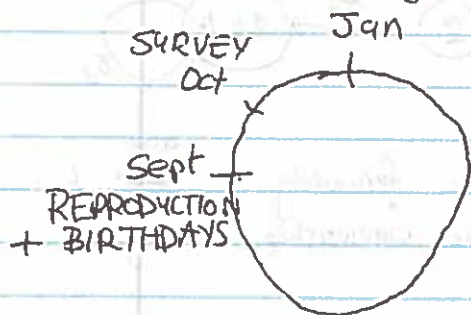
$\Rightarrow b_3$ fecundity of ind. that will be 3 when the next reproductive event occurs but some of these individuals are 2 at the census.

②

POST-BREEDING SURVEY

Age-structure.

Re-indexing: i is age at next reproductive event.



σ_1 is prob. of surviving from age 0 to age 1 at census

\Leftrightarrow age 1 to age 2 at next reproductive event.

.... might be less confusing to have not re-indexed!

(~~is~~ pretty much \Leftrightarrow to pre-breeding survey)

STAGE STRUCTURE

Let,

$P_J = \sigma_J (1 - \gamma_J)$ prob of remaining a juvenile.

$G_J = \sigma_J \gamma_J$ prob a juvenile matures to an adult.

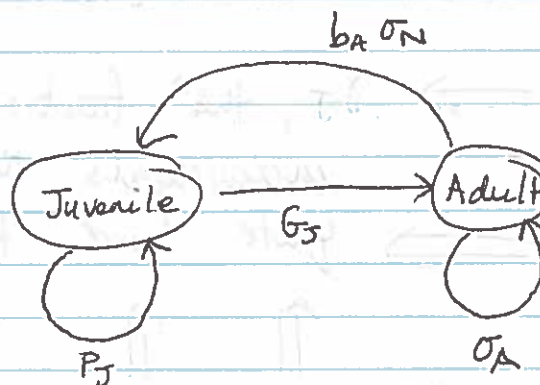
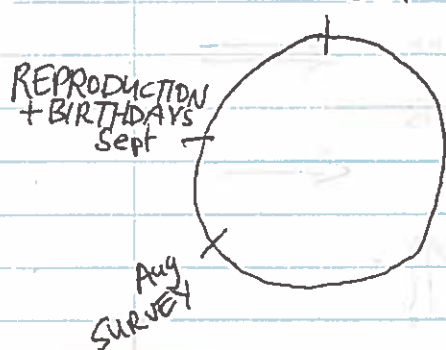
where γ_J fraction of surviving juveniles that mature.

ATA Accounting.

see next page

3

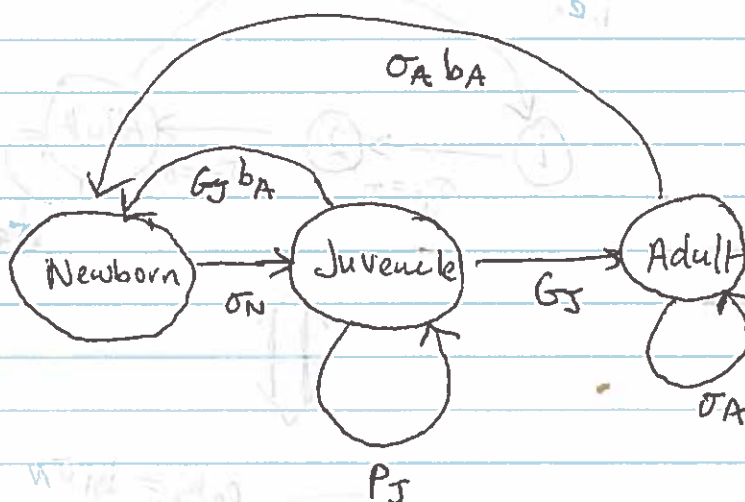
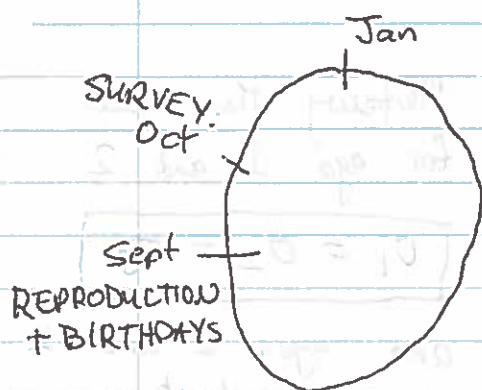
Pre-breeding survey



where σ_N is survival of newborn to ~~the~~ survey.

P_J and G_J were defined on page (2) at the bottom.

Post-breeding survey

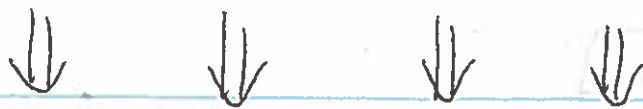


.... SO STAGE-STRUCTURE is similar to AGE-STRUCTURE, but we should note the definitions of P_J and G_J at the bottom of page 2

WAIT!!!

there is one more important thing!

(4)



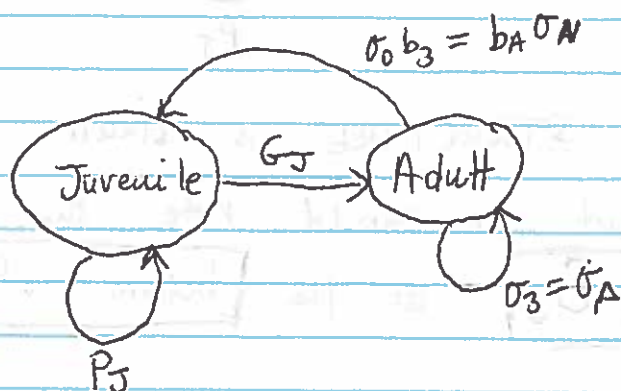
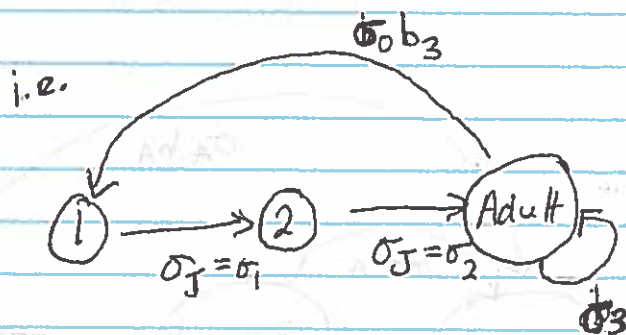
$\Rightarrow \gamma_J$, the fraction of surviving individuals that mature is
 \Rightarrow quite hard to estimate



GOAL

Same intrinsic growth rate, λ , for an age-structure MPM and an equivalent stage-structured MPM.

??? What should γ_J be to achieve this ???



Mortality the same for age 1 and 2

$$\sigma_1 = \sigma_2 = \sigma_J$$

and ages 1 and 2 can't reproduce so collapse into "juvenile" stage.

with $P_J = \sigma_J (1 - \gamma_J)$

$$G_J = \sigma_J \gamma_J$$

What should γ_J the probability of Juv. \Rightarrow Adult transition be?

6

For complete details, references,
and a more precise explanation.

SEE

Kendall, B. E. et al. PERSISTENT PROBLEMS

— IN THE CONSTRUCTION OF 2019

— MATRIX POPULATION MODELS.

Ecological Modelling

~~406~~

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