

Pine Snake Population Dynamics

Assumptions:

Life time of pine snake = 15 years

Pine snakes reach sexual maturity at age 2-3 and live for 15 years...so ratio is 12/15 years they can give birth.

Sex ratio is determined by the temperature

Pine snake lay 3-24 (on average say 14) eggs so let's assume some eggs don't hatch randomly so let's say there is equal probability to lay eggs from 1-14 randomly. They lay egg from June to august..so every year basically
So eggs = pick randomly(1-14)/1

So birth rate is not certain..

Simple model of growth

$$N(t) = N_0 e^{(kt)}$$

birth rate = $\text{number_women} / (\text{population}) * (\text{sexual_maturity years ratio}) * (\text{egg rate per female per year})$

K is net birth per female snake per year

So let's say mortality rate be 1/15 since age 15 will definitely die..

$K = \text{birth rate} - \text{death rate}$

Let's introduce factors of death:

Say if female < male like way less say 20% of total population then we want to increase death factor because of lack of copulation and stuff like that, say =
 $\text{death} = \text{death factor} * \text{population}$ and choose death factor randomly from 0-0.2...

The model looks like:

$$N(t) = N_0 e^{(kt)} - \lambda N(t-1) \text{ where } \lambda \text{ is chosen randomly if sex ratio is way less}$$

