Aaron Nelson homework week 5 - Population Ecology

6.1: If we accept the assumptions that species abundances have effects on other species abundances through interactions, and that for both species to coexist in nature then their interaction must be stable, it follows that it can be useful to quantify the interactions in some way. However, while interactions surely play an important role in determining population abundances, they are probably never the sole factor. Therefore, stability analysis that look only at the relationships between species abundances will be oversimplified. Models should also seek to simultaneously include effects of environmental effects on population, such as climate, weather, or disturbance. Also, in smaller populations and/or in heterogenous environments, stochastic effects on population abundances may results in fluctuations that outsize effects of interactions.

   Also, it seems unlikely to me that there are many two-species interaction models that will accurately predict population abundances. Ecosystems are made up of a web of interactions of between organisms and all organisms probably have some minuscule effect on other sympatric species, even if indirectly. Considering this it seems almost futile to attempt to model ecosystems except in the cases of rare simplicity.

6.3:

   Predator-prey:

   Prey: As predator population increases the per capita growth of the prey will be negative

   Predator: As prey population increases; percapital growth is + for predator

   Competition: For both species, as population of the other speceis increases the per capita growth will decrease and have a negative sign

   Mutualist: As the population of either species grows the per capita growth of each will have a positive sign.

2. In chapter 6, the α_{ij} = the change in total growth rate of species j on species i.
In chapter 7, α_{ij} = the change in relative growth rate of species j on species i compared to the effect that species i has on its own growth rate. To reduce confusion, perhaps the i and j should be capitalized (α_{IJ}) in the chapter six case. This would be similar to how *f* symbolizes per capita growth rates and *F* symbolizes total growth rates.

3. As the value for *p* (proportion of new yorkers that move to California) increases, the population of New york decreases to a steady state value determined in balance by the number of Californians that move to New York (*q*).