

## Communities

- a) i) Explain the theory behind this assumption.  
*If the moose eat more of the leaves, the tree will not be able to produce as much biomass since the leaves account for the bulk of the primary productivity of a tree (photosynthesis happens there). With less productivity, the tree makes less wood, so the rings will be smaller.*
- ii) What is another possible relationship between moose and fir trees?  
*The amount of moose growth reflects the amount of fir trees available for food.*
- b) Most of the paper deals with a predator-prey oscillation in this system. For example, the moose and wolves appear to be in a classic predator-prey oscillation. That is, the populations of both organisms rise and fall regularly.
- i) Explain what causes the oscillation in the moose/wolf system and why the two population graphs show opposite oscillations.  
*When moose are high, the wolves eat well and reproduce more. As this happens, the wolf population increases. The increase in wolves leads to more predation on moose, so the moose population drops. With fewer moose, the wolves die of starvation. With fewer wolves, the moose population recovers and the cycle repeats.*
- ii) What specific times or time-periods from the graph show the behavior you described in part i)?  
*From 1965 to 1970 the moose population was high. This caused increased wolf reproduction from 1970 to 1975, which, in turn, reduced the moose population in the 1980s.*
- c) i) For example, in a low-producing year, we can deposit cut down furs on the island. If this leads to a change in the pattern, we can conclude that the bottom-up model is at work.  
*There are many more possible experiments here.*
- d) The bottom graph shows “AET” in mm. Their figure legend says “The AET is the amount of water available to the plants during the growing season as a function of both rainfall and temperature and has a close relation to primary productivity (PP).” What do each of the models predict about the relationship between AET and the other graphs? Based on the AET graph, which model is correct?  
*In model 1, the tree ring oscillation is caused by the moose oscillation, not by the climate. Therefore, you would not expect AET to be correlated with the other cycles. This is what the data shows. In model 2, the tree ring oscillation is driven by the climate, so you would expect that the tree ring width would follow the AET as it varies. This is not what was seen. Therefore, model 1 is more likely to be correct.*