Phil* 2000, Reflection 9

To be submitted by Dropbox

Before 3:00 pm, Wednesday march 29

In the documentary that we watched last week, ecologist Daniel Botkin explained that he once believed that ecological communities were in a sort of natural balance (see roughly the 35 minute mark). On this view, strict laws of nature govern the diversity and abundance of species in a given community. So when the system is perturbed each species returns to equilibrium levels. In reality, Botkin claims, communities are governed not by stabilizing laws but instead by contingent events. The numbers of moose at Isle Royal do not cycle in phase with the populations of wolves. Rather, they go up and down unpredictably in response to storms, droughts or other unpredictable occurrences. This view of ecosystems as highly contingent systems has become the new dogma in ecology.

This week, I want to consider implications of this view for the science of ecology and its usefulness for making policy decisions. Just to give some idea, ecology is sometimes called upon when deciding how to sustainably manage a resource, such as a fishery or a lumber industry. It is also called upon to make predictions about human impacts on the environment. For example, ecologists are expected to be able to predict the effects of CO2 emissions or on invasive species.

Some ecologists argue that, since there are (presumably) no laws at the level of ecological communities, the prospects for community management are dismal. Ecologist John Lawton (1999) is often associated with this position. He argued that since there are no laws at the level of ecological communities (that is, at the level of multi-species assemblages), there is no point in proceeding with community ecology as a science. Other ecologists, like Daniel Simberloff, argue that community ecology can continue to inform policy, even if there are no laws at this level. In the reading for this week (Simberloff, 2004) presents a vision of community ecology as a "science of case studies." I would like to try and become clear on what this might mean.

1. On page 788, Simberloff presents an argument for why community ecology is still useful as a management tool. I have copied his argument on the following page. In your reflection, please first provide a reconstruction of his argument. Then, in a short paragraph, raise an objection to any one of the premises that you have identified.
2. Most of the remainder of Simberloff's article cites examples from the field of invasive and threatened species management. These examples are meant to show how specific communities have been successfully managed by those who monitor them. In a sense, I don't see this as an objection to Lawton. He would concede that intensive study of a particular system allows one to manage it reasonably well. The issue, I gather, is whether ecological science can allow us to manage systems that have not been so intensively studied. Can we "export" our knowledge from known case studies to novel systems? In a few sentences, explain whether Simberloff gives us any reason to think that case studies have this kind of generality.

Here is the paragraph containing an argument for you to reconstruct.

> According to Pickett et al. (1994, p. 26), "understanding is the overarching goal of any science" (cf. Ruse 1988). Any science that achieves such understanding has epistemic value. For most sciences, "understanding" means understanding how nature works, that is, being able to answer questions about a natural phenomenon by referring to certain patterns, relationships among entities and processes, and causes of the patterns and their differences (Pickett et al. 1994). Generalization is not the only tool for achieving basic scientific understanding. In community ecology, general laws might even mask understanding of mechanisms (Chave et al. 2002). Other important tools for achieving understanding are causal explanation and testing. Although the concept of cause has several layers of meaning (Kuhn 1977), a causal explanation is the determination of the conditions, processes, and mechanisms that yield a pattern or phenomenon (Pickett et al. 1994). Community ecology is rife with examples of causal explanation, and the fact that almost all are quite local does not mean they are not major scientific achievements. The typical contingency noted above dictates that most causal explanations in ecology will entail substantial understanding of conditions, so perforce will be local. Testing, that is, examination of a pattern or causal explanation to assess its validity and domain, is not only a normal feature of good community ecology but also, because of the overarching contingency, will automatically reject most proposed generalizations. Again, the nature of communities ensures this result; it does not mean that the community level is unworthy of study or that the understanding community ecology achieves is weak or deficient. (Simberloff 2004 p. 788)