**Ecological theory and its applications**

Objectives –

1. Understand basic ecological theories
2. Understand how modeling is used to further ecological theory
3. Apply ecological theory to conservation, resource management, and restoration
4. Synthesize ecological theory to understand the role of ecology in climate research
5. Develop an independent research project in an urban ecosystem
6. Gain proficiency in using R for exploration of ecological theory

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| **Week** | **Topic** | **General notes on execution** |
| 1 | How humans interact – Niche theory and competition | Introduction of simple competition and niche models, case studies on how competition niche theory have been applied to humans |
| 2 | Facilitation - conservation policy in drylands | Introduction of facilitation into the simple competition and niche models (a la Bruno et al. 2003) – apply to conservation of desert/aridland systems, look at direct policy links |
| 3 | Soil feedbacks – water management in the NL | Add possibility of soil feedbacks into models (PSFs but also other positive feedback mechanisms) – **link to Mariet on peatlands? Link to local ecosystem processes, use water management in the NL as example, link to George on microbial feedbacks** |
| 4 | Populations to metapopulations – Rewilding in Yellowstone (?) | Embed simple population dynamic model (probably from week 1) in a metapopulation – use rewilding examples from Yellowstone (or Dutch example that Mariet discussed) |
| 5 | Communities to metacommunities – Restoration and the role of big data | Imbed simple community model (variation on week 3) in a metacommunity – apply metacommunity theory to restoration efforts **– Link to Merel in BioLand, landscape scale** |
| 6 | Scaling up to the globe and dynamic vegetation models - Climate policy | Look at assumptions of global climate models, talk about how they differ from the models we’ve been working with. Think about the impact of those differences on climate policy and predictions. Discussion - how can we bridge the gap? **Link to Marijke on REDD+, global conservation efforts, tropical forest examples** |
| 7 | Developing projects/collecting data | Applying ecological theory across socioeconomic gradients in Utrecht, socio-ecological systems, backyard ecology |
| 8 | Collecting/analyzing data |  |
| 9 | Presenting/discussing results |  |
| 10 | Exam week ☺ |  |

Weekly structure –

Day 1 – Lecture/exploration

Day 2 – Practice materials

Day 3 (.5 day) – Synthesis materials