sDiv working group meeting summary

"Linking Landscape Structure to Ecosystem Services (sLandServ)"

Workshop Summary

This was the second workshop for the sLandServ working group and took place in July 2018. The first workshop (in December 2017) focused on generating new conceptual advances about how the structure of landscapes influence the provision of ecosystem services. In that workshop we took a social-ecological network approach and developed a new framework for thinking about the effects of landscape structure on ecosystem services. The aim of this second workshop was to extend on those ideas and explicitly test hypotheses about the effect of landscape structure using simulations and empirical data. In addition, we aimed to develop a conceptual framework for integrating governance/policy in the the networks approach; an important aspect for applying the outcomes of this working group. The group consisted of largely the same diverse group as for the first workshop, but with the addition of three new participants, who particularly brought expertise in environmental governance. Overall the group spent approximately 10% of its time on presentations, 60% working on outputs, and 30% brainstorming and sharing information.

The start of the first day consisted of four presentations that recapped the progress on refining the conceptual framework and simulation results since the first workshop, outlined the empirical data sets that had been compiled, and brought new ideas for the governance topic. Jonathan Rhodes and Laura Graham initially presented progress since the first workshop on the simulation modelling in which we simulate artificial landscapes of different structures to assess effects on ecosystem service provision. A key insight from this presentation was that further work was required during this workshop to operationalise the predictions from the simulations to develop key hypotheses that could be tested with empirical data. Jonathan Rhodes then presented details of ecosystem service data that had been compiled from the Montérégie region of Quebec, Canada and Camila Hohlenwerger remotely presented compiled ecosystem service data in agricultural landscapes from Brazil. Both these data sets had the potential to allow the testing of hypotheses generated from the simulation study. In the final presentation, Barbara Schröter presented a range of ideas about how we might consider governance in our framework. In addition, Barbara presented an idea to use our multidisciplinary group to explore the usefulness of boundary objects (concepts that are used by different disciplines and facilitates communication) in generating multidisciplinary outputs. The rest of the day was spent discussing the best way forward and the plan for the rest of the workshop.

Over days 2-4 the group worked on two primary goals: (1) operationalising the simulations, preparing data for testing hypotheses, refining the conceptual framework, and drafting the manuscript describing this work (the "framework" paper), and (2) brainstorming ideas on the incorporation of governance into our

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framework and drafting an associated manuscript (the "governance" paper). Although we worked in sub-groups to address these tasks, the group met as a whole to share ideas and update on progress and least one or twice per day. This aimed to ensure good communication and cooperation across the group.

Significant progress was made on operationalising the simulations (including the development of an R package) and initial results suggested a strong effect of landscape structure on ecosystem service provision, but often in unexpected ways. A range of "experiments" aimed at generating specific hypotheses that could be tested with empirical data were then set up. Progress was also made in analysing deer hunting and maple syrup ecosystem service empirical data from the Montérégie region. We were able to generate social-ecological networks from spatial data for these ecosystem services that will allow for the testing of the hypotheses generated from the simulations. Extensive discussion was also had about refining and clarifying aspects of our framework, especially in terms of representing the demand side of ecosystem service benefit generation. These discussions were incorporated into the draft of the framework paper.

The discussions for the governance paper focussed on conceptualising how alternative governance interventions might influence landscape structure and then the social-ecological network of ecosystem services supply, demand and flow, and hence the provision of ecosystem services. A draft manuscript outline was developed and ideas for using the simulation model to test some of these ideas were explored.

On the final day outlines of the framework and governance paper drafts were shared and discussed. In addition, four other potential papers that emerge from our new framework were identified (as well as a manuscript on boundary objects). For each paper a lead author was identified and we agreed to aim to submit the framework paper to PNAS and the governance paper to Nature Sustainability or People & Nature by the end of 2018. The other papers will likely take longer to emerge, and new opportunities will be identified to bring the group together in the future to complete these.

Conclusions and Feedback

This was a quite different workshop compared to the first workshop. The first workshop focussed almost entirely on the generation of new ideas, while this workshop was centred much more around implementation of those ideas. This made it more challenging to develop cohesive group interactions give that semi-independent bits of work that needed completing by small groups, but the regular coming together of the entire group helped a lot in this respect. Nonetheless, having the follow-up workshop to implement the ideas from the first workshop was critical. As always, the support from iDiv was fantastic and facilities provided were outstanding, which allowed us to be highly productive in the short time we had together.