TB1 Story Line: Bending the curve of biodiversity loss under climate change *(short abstract)*

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Starting point: The expected climate change of ~2° above preindustrial level (even more for terrestrial ecosystems) will fundamentally transform current ecosystems. Intensive land use is and will continue to increase the pressure on ecosystems further. Providing tailored information for decision-makers, for societies on how we manage our future landscapes and their ecosystems we are faced with three challenges:

(1) There is high complexity in ecological systems. To acquire a predictive understanding of how ecosystems will function in the future we must identify the most important drivers and moderators and strategically fill knowledge gaps to produce predictive models for decision-making.
(2) It is necessary to have near-time monitoring and observational data and to harmonize and aggregate this data that comes from different sources to have information available in a time frame that is relevant for most environmental decisions.
(3) It is necessary to foster close partnerships with decision- and policymakers, to co-develop actionable knowledge, and to generate scientific products that meet their needs.

The complexity challenge: How will ecosystems of the future function under a variety of possible climate change trajectories, in conjunction with increasing demand for land resources for food, water and energy supply? Many environmental scientists will tell you that ecosystems are too complex for predictive modeling to be accurate and useful. We also recognize that everything is connected in an ecosystem and appreciate the complexities of the systems we study. However, all drivers and moderators are not equally important, and we aim to reduce the complexity to the factors that are most important for robust predictions for decision making. We strategically fill knowledge gaps that are critical to understanding the future provisioning of essential ecosystem services in a range of ecosystem types, ranging from agroecosystems, forests, managed grasslands, and more.

The near-time data delivery challenge: Ecological systems are dynamic and can change rapidly due to various factors, including climate change creating conditions that are novel to the ecosystem, changing human behavior, etc. Near-time data delivery ensures that scientists and decision-makers have access to the most up-to-date information, allowing rapid model updates and rapid responses to new threats or new opportunities for conservation and management.

The Interface Challenge. To ensure that our results can be directly used in decision-making, we foster close partnerships with decision makers locally, nationally, and globally.

Outlook: By addressing all these challenges we establish the knowledge based for process oriented predictive ecosystem modelling. We work towards a future in which all management decisions and policies that affect ecosystems are based on the best available science using the process of *adaptive ecosystem management* (see Figure 1).

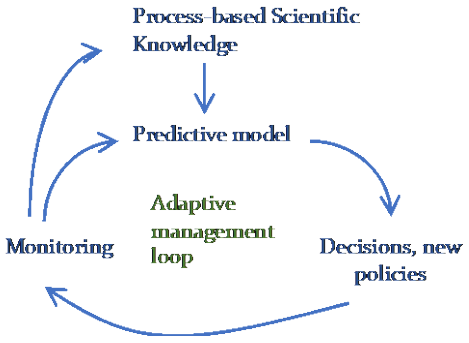

Figure 1. Adaptive ecosystem management is an iterative process in which predictive models are created for environmental decision making, decisions are made, interventions are implemented, their effects are monitored and evaluated, and the next intervention incorporates the knowledge gained. In this process, decisions are made based on the best available science, and changes in management and policy provide opportunities to test and improve our process-based understanding of ecosystems.