

Research Project:

Integrating Biodiversity Conservation and Climate Change: adaptation measures and success factors for their implementation in protected areas in Germany, Sweden and the UK

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Martin Hirschnitz, GoBi Research Group, University of Greifswald, Germany



Integrating Biodiversity Conservation and Climate Change: adaptation measures and success factors for their implementation in protected areas in Germany, Sweden and in the UK

Research Project Martin Hirschnitz, Ernst Moritz Arndt University Greifswald

Supervisor: Prof. Dr. Susanne Stoll-Kleemann

1. Introduction

Climate change is affecting biodiversity around the globe. That is already apparent in a variety of species' responses to changing climatic conditions. While the range of responses has implications for biodiversity conservation, one in particular deserves attention: shifts in species' distributions in order to remain within their climatic envelopes (EEA, 2004; IPCC, 2007; Parmesan, 2006; Root, et al., 2005). Not only does successful adaption in this context depend on the physiological abilities of species to disperse, but also does especially human land use further limit dispersal by separating, reducing and blocking habitats with sometimes impermeable landscape barriers (IPCC, 2007; Pearson, 2006). This is exacerbated by the fact that protected areas (PAs) for many species constitute the last remaining patches of suitable habitat within a landscape (Baillie, et al., 2004; MA, 2005; Mu-longoy and Chape, 2004; WWF, 2006). Therefore, a dispersing species must overcome twofold barriers – firstly, there must be further suitable habitat within its dispersal range and secondly, it must be able to reach it (Kokko and Lopez-Sepulcre, 2006; Malcolm, et al., 2002; Root and Schneider, 2006).

In order to address these challenges, biodiversity conservation must develop and implement adaptation measures to help species adapt to climate change. On the one hand, those measures should encompass enhancing connectivity of the protected area network and increasing landscape permeability so that dispersal will be facilitated and current as well as future habitats be connected (Hannah, et al., 2007; Hannah, et al., 2002; IUCN, 2005; Williams, et al., 2005).¹ On the other hand, some studies recommend that the static and conserving conservation approach be questioned, because for one thing static protected areas won't be able to maintain protection for species that are

¹ Many aspects of those kinds of adaptation measure are also components of traditional conservation strategies. Therefore, their implementing will benefit biodiversity conservation beyond climate change adaptation. Killeen, T.J. and Solórzano, L.A., (2008). 'Conservation strategies to mitigate impacts from climate change in Amazonia'. *Philosophical Transactions of the Royal Society B: Biological Sciences*, published early online:8 pp.



driven out due to changing climatic conditions (Araújo, et al., 2004; Ibsch, 2005a; b). Therefore, biodiversity conservation has to face the loss of species and changing species assemblages, which conservationists might have to learn to accept (Marris, 2007; Mulongoy and Chape, 2004: 34). In response, dynamic adaptation strategies must be developed and implemented (Araújo, et al., 2004; Hannah, et al., 2002; MA, 2005; Mulongoy and Chape, 2004; Welch, 2005).

2. Research objectives and methodology

This context as outlined above constitutes the starting point for the Research project. In a mixed-method approach of expert interviews and Delphi-Surveys on EU level, national level of England, Germany and Sweden as well as on the regional/local level (case studies) data shall be collected that help to address this issue and may contribute to problem-solving. Experts in this context encompass relevant actors from European Environment Agency (EEA), Directorate General Environment of the EU-commission for EU-level, national biodiversity experts and authorities for the national level as well as protected area managers and relevant actors affecting or involved in implementation of nature conservation measures on case study level.

First, it shall be investigated whether climate change is perceived as a threat to biodiversity and hence whether adaptation measures are recommended as well as which are seen as effective. In order to be effective the measures require to be implemented. However, successful implementation of biodiversity conservation and hence also adaptation measures largely depends on a variety of actors and their interests, values and perceptions – especially on the local level (Allendorf, et al., 2006; Redford and Sanderson, 2000; Zube, 1986). If those are integrated in developing and implementing the measures, support can be enhanced and the likelihood of successful implementation increased (Hovardas and Poirazidis, 2007; Sabatier, 1988; Stoll-Kleemann, 2005; Stoll-Kleemann and O'Riordan, 2002). Therefore, particular focus will be laid on collecting data on the local level among different, relevant local actors. Here, the implementation success of the hitherto identified adaptation measures shall be analyzed and – if possible – options to act derived.

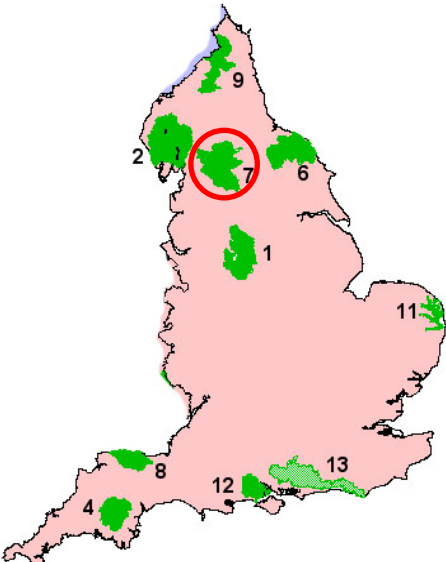

2.1 Data gathering

2.1.1. Case study selection

In each country, two national parks and/or biosphere reserves shall be selected as case studies, where data will be collected on the regional/local level. The selection procedure should encompass protected areas, which are climate sensitive, where climate change adaptation projects are undertaken and where a variety of different actors is affecting the implementation of nature conservation strategies (Urwin and Jordan, 2008). Another important criterion for selecting case studies is that the data collection must be feasible, i.e. that inter alia the regions are accessible in the framework of a certain financial and time budget.

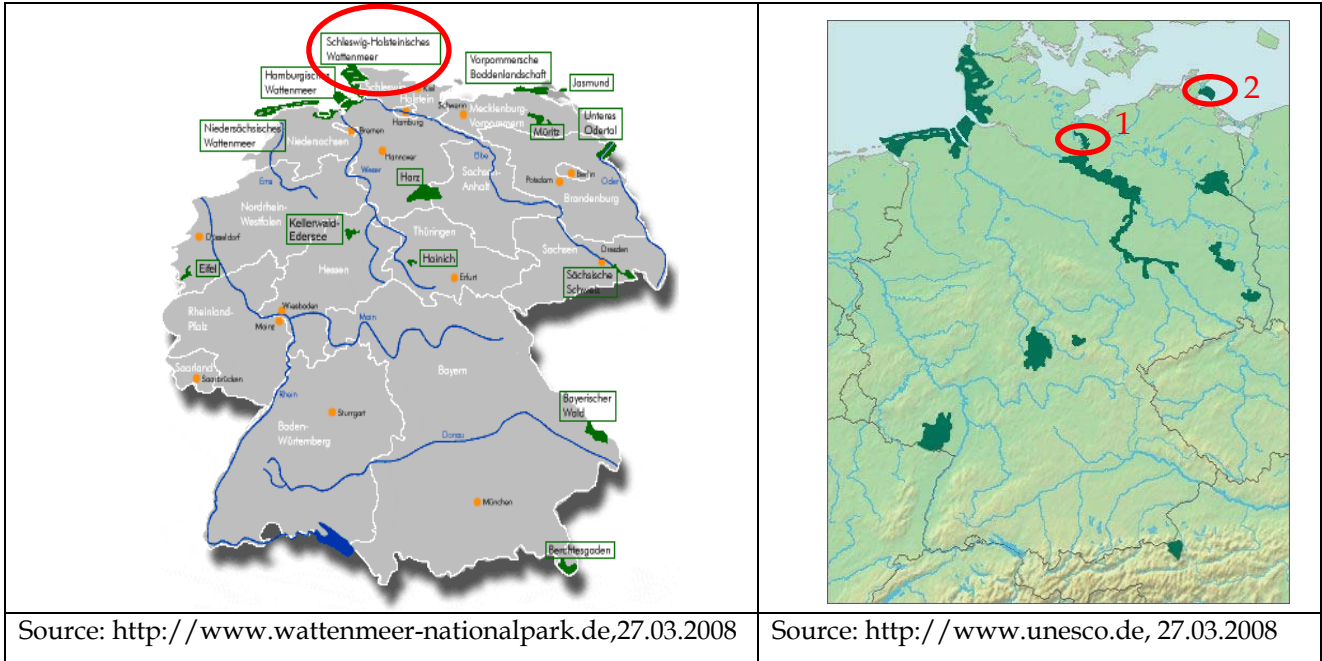
In England, the following case studies will be selected (see Urwin and Jordan, 2008):

- Yorkshire Dales National Park (7)
- Braunton Burrows Biosphere Reserve

	
<p>Source: http://en.wikipedia.org, 27.03.2008</p>	<p>Source: http://www.unesco.de 27.03.2008</p>

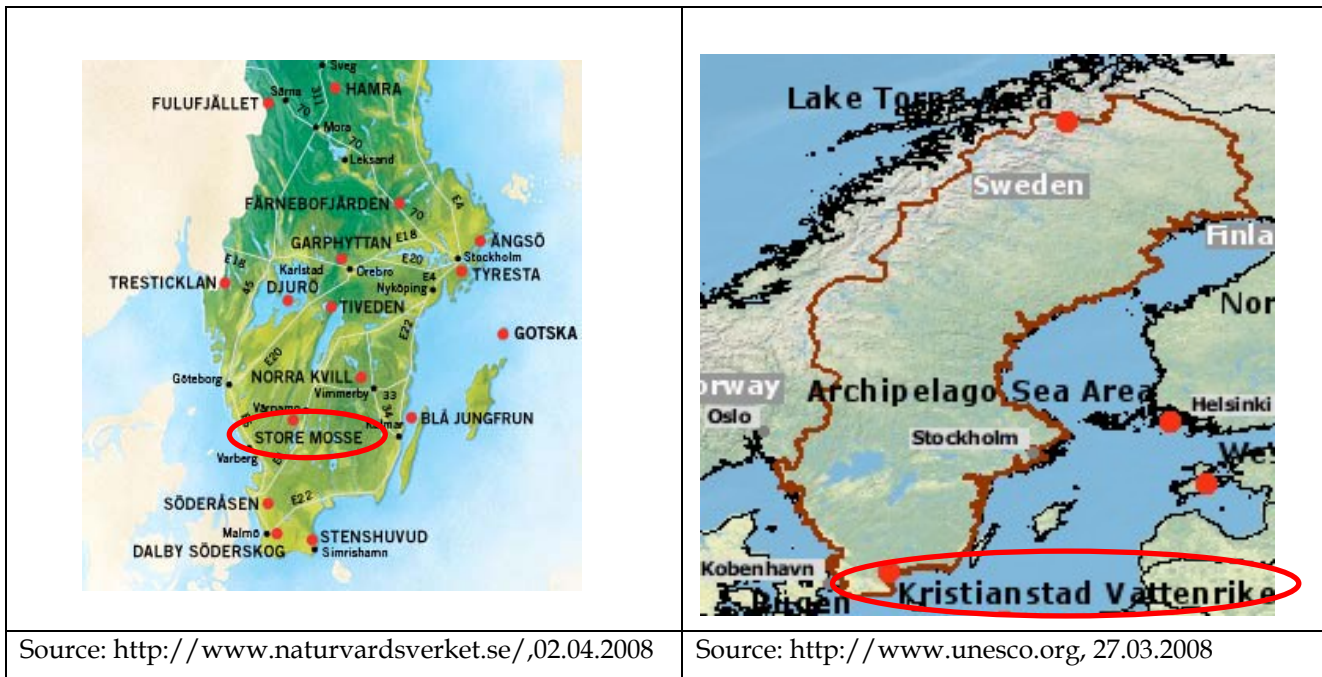
In Germany, the preliminary selection encompasses the following case studies:

- National Park Schleswig-Holsteinisches Wattenmeer
- Biosphere Reserves Schaalsee (1) and Südostrügen (2)



In Sweden, the preliminary selection encompasses the following case studies:

- Söderåsen National Park
- Kristianstad Vattenrikke Biosphere Reserve





2.1.2. Actors

Selection of local actors for data collection will follow a procedure analogous to that of the case studies. Also, in particular those actors shall be selected that are responsible for managing the respective protected area, that are affiliated with climate sensitive sectors (Zebisch, Grothmann et al. 2005; Urwin and Jordan 2008), that are engaged in existing projects of climate change adaptation and that are of local and regional significance for implementing biodiversity conservation.

In this context, actors within the sectors biodiversity conservation, agriculture and forestry, tourism and water management are considered worth selecting (see e.g. Urwin and Jordan 2008). Biodiversity conservation actors, for instance, are responsible for protected area management, in some place are already engaged in climate change adaptation projects, play a significant role in implementing strategies in the nature conservation sector, which, as outlined above, is certainly climate sensitive (Zebisch, Grothmann et al. 2005; IPCC 2007). Therefore, biodiversity conservation actors to be selected for data collection should encompass local authorities, protected area management and local biodiversity conservation NGOs.

Agriculture and forestry are also sensitive to climate change and thus also face the need to adapt to climate change, because changing climatic conditions will alter crop farming and tree selection for forestry (Zebisch, Grothmann et al. 2005; IPCC 2007). Furthermore, actors within this sector are also influencing implementation of biodiversity conservation – be it through partnerships in existing projects or fostering resistance against other projects (Sauer 2007). Therefore, actors to be selected from this sector should encompass local/regional authorities and associations.

Tourism and water management on the one hand are sensitive to climate change, not least because the tourism potential and hydrological regime of a landscape will change due to climate change impacts (Zebisch, Grothmann et al. 2005; IPCC 2007). On the other hand, those actors also partner in biodiversity conservation projects and influence implementation. Therefore, actors to be selected from this sector should encompass local/regional authorities, enterprises and associations.

Data will be collected in a two-step process. First, relevant experts on EU, national and case study (local) level shall be interviewed concerning climate change risk perception, possible adaptation measures for biodiversity conservation and their implementation potential. Table 1 on the following page provides an overview of the first step of data collection.



Table 1: Overview of the first step of data collection

Research subject & questions	method	Actors
Subject: climate change perception		
question 1: How are climate change impacts on flora and fauna of Yorkshire Dales NP perceived by its management and land users?	Expert interviews	EU-level (e.g. EEA) national level (e.g. BfN) case study/local level
question 2: Do those actors perceive adaptation measures as necessary?	Expert interviews	(e.g. protected area management, land user)
Subject: climate change adaptation measures		
question 1: Which adaptation measures can be identified according to data and literature on NP level and in particular according to the expertise of the different actors?	Expert interviews	EU-level (e.g. EEA) national level (e.g. BfN) case study/local level
question 2: Which adaptation measures from other sectors such as agriculture, forestry, water management or tourism could be integrated with biodiversity adaptation?	Expert interviews	(e.g. protected area management, land user)
Subject: implementation of climate change adaptation measures		
question 1: Which (other) actors do the experts interviewed consider relevant for implementation?	Expert interviews	EU-level (e.g. EEA) national level (e.g. BfN) case study/local level (e.g. protected area management, land user)
question 2: How will implementation potential and implementation success of the measures identified be judged by the different actors?	Expert interviews	
question 3: Which factors do the different actors consider as fostering / impeding for implementation of the measures identified?	Expert interviews	
question 4: How can implementation success of the measures identified be increased?	Expert interviews	

The second step of data collection will be a Delphi-survey on case study level. This technique applies a formalised questionnaire and collects data in several repetitive waves among the same actors. The data will be analysed after every round and – made anonymous - sent back to the same actors as the subsequent wave of data collection using the identical questionnaire.



A Delphi-survey therefore contributes to document learning processes and changes due to confronting the participants with group opinions and results. Thus, it may yield consensus-oriented outcomes and results that represent realistic constellations as close as possible.

The formalised questionnaire will be developed based on analysing data from the expert interviews. Therefore, the questions and components of the questionnaire already represent expert knowledge, so that particular issues and questions can be dealt with in more detail. Potential participants shall encompass those local actors that were already interviewed personally, whose willingness to participate could be inquired during the expert interviews, and further recommended actors. In order to respond to the time restrictions and budgets of the participants, the Delphi-survey can either be administered per mail, email or as an online-survey. Altogether, depending on the respective options to participate, three repetitive waves are strived for with two weeks intervals between two waves.

2.2 Data analysis

Analysis of the quantitative data will be done using the statistical programm SPSS and R. Qualitative data will be analysed by means of structuring content analysis using the program Atlas.Ti. Furthermore, both kinds of data will be used as input into Bayesian Belief Networks using the program Nettica or Hugin.

Altogether, options to act and possible recommendations should be drawn from data collection and analysis, which address implementation of adaptation measures, in particular on the regional and local level.



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