



SPECIAL ANALYSIS

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# Modeled Species Diversity Maps

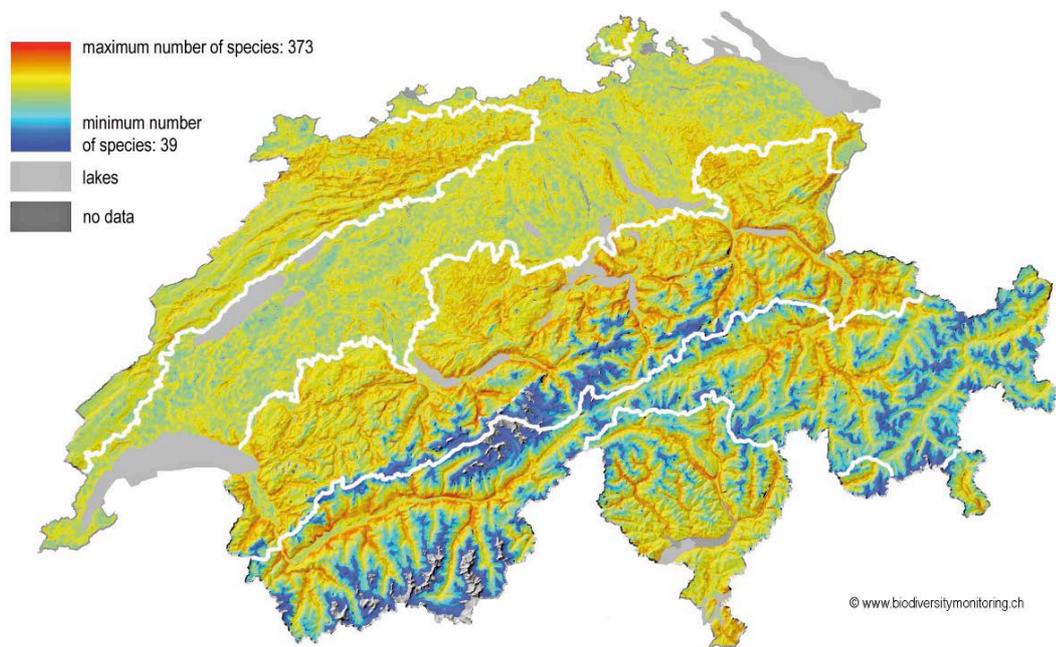
**BDM data can be used to feed mathematical models suitable for predicting nationwide species diversity distributions. Computer-assisted model predictions reveal a diversity pattern that makes allowances for the country's relief, land uses and climatic conditions.**

## Modeled species diversity maps

Figures 8 to 10 below depict predictions of nationwide species richness distributions computed using mathematical models. Models are based on species numbers logged in BDM sampling areas of 1 square kilometer each. Unlike standard regional maps, computer-assisted model predictions reveal a diversity pattern that makes allowances for the country's relief, land uses and climatic conditions. However, modeled species diversity maps are established using nationwide datasets, which prevents them from providing a comprehensive representation of small-scale conditions. For example, models fail to include information on the intensity of land use, rare habitat types, local environment enhancement projects or nature reserves. Species diversity patterns of butterflies and breeding birds are distinctly different, to the point of being almost reversed in large parts of Switzerland, with vascular plants placed in an intermediate position. Landscapes offering ideal conditions for butterflies and birds on the one hand and vascular plants on the other are limited to a few rare locations, particularly on the southern slopes of alpine valleys such as the Wallis. This canton holds true diversity hotspots for all three species groups.

**Fig. 1: Plant species diversity**

Modeled vascular plant species numbers per square kilometer



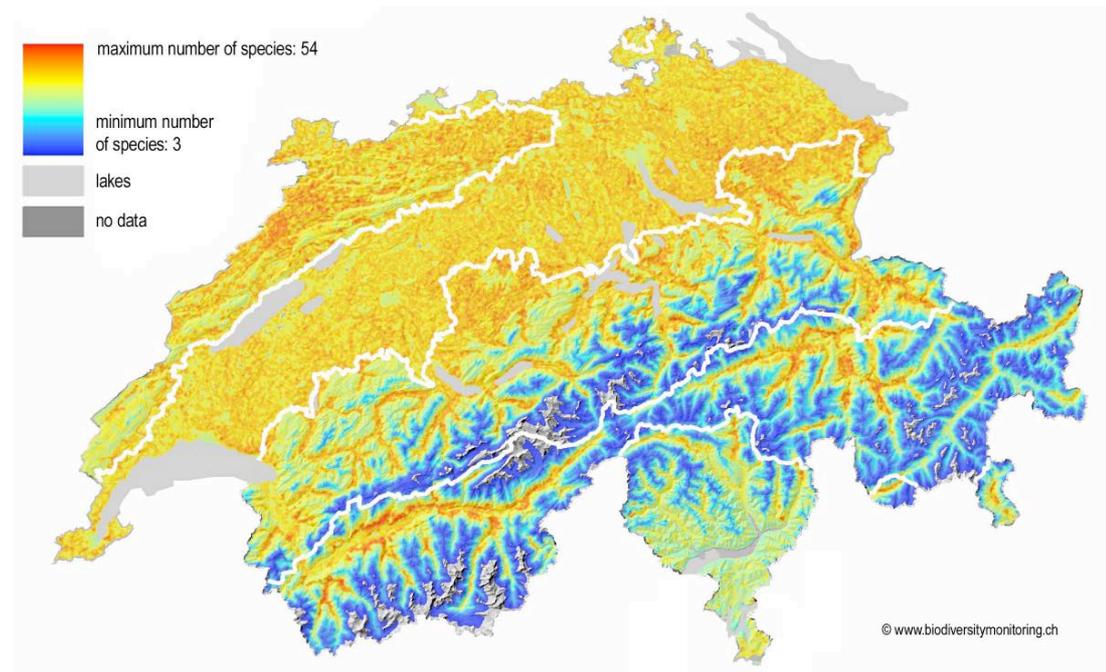
© BDM (Z7 indicator). Data source: BDM field surveys. Modeling: WSL. Status: spring of 2008

### Comments regarding the plant species diversity map

- The Alps and the Jura are particularly rich in plant species. High species numbers are primarily found in the Northern Alps, the Jura and on the slopes of big valleys in the Wallis, the Tessin and Graubünden.
- Unlike butterflies, vascular plants quite frequently create species-rich sampling areas at lower altitudes.
- High-alpine habitats are markedly poorer in species than lowland areas. Many species occurring at these altitudes are high-mountain specialists, while a lot of species that are widespread at lower altitudes are unable to survive under such harsh conditions.

**Fig. 2: Bird species diversity**

Modeled breeding bird species numbers per square kilometer



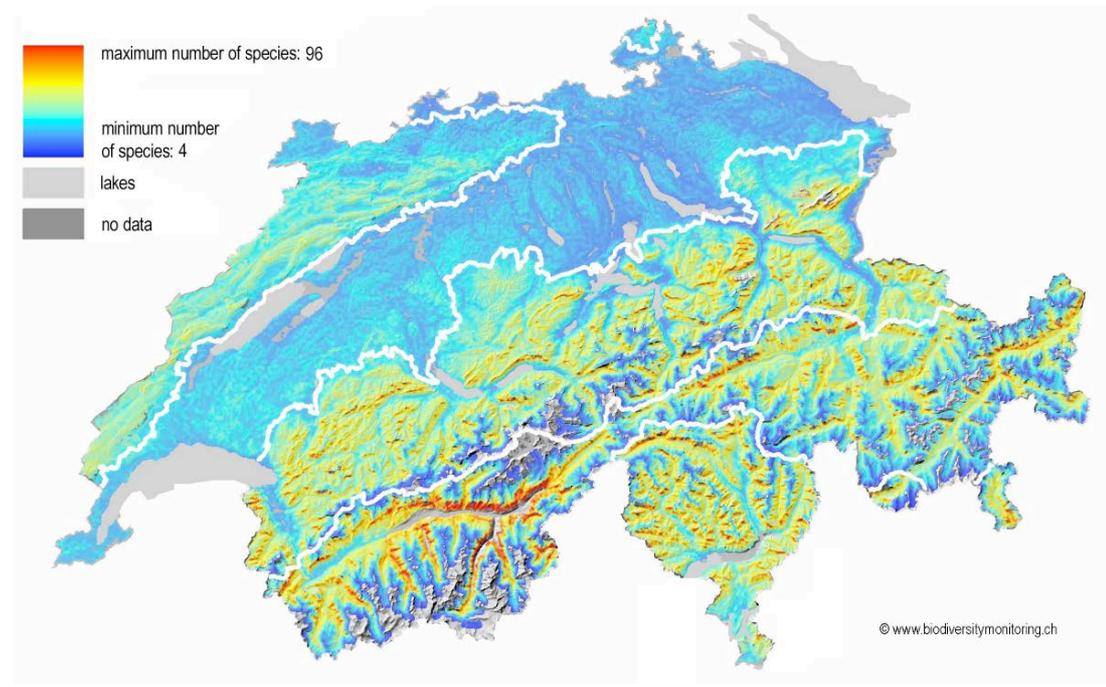
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### Comments regarding the bird species diversity map

- Breeding bird species diversity is high in alpine valleys, on the Central Plateau and in the Jura. However, models predict low species numbers for high-alpine areas.
- Species diversity of breeding birds is especially high in the Wallis between Sion and Brig, in the Prättigau and in the Domleschg, in the Jura east of La Chaux-de-Fonds, in the Napf region, in the Zurich Oberland region, and in the canton of Appenzell Ausserrhoden.

**Fig. 3: Butterfly species diversity**

Modeled butterfly species numbers per square kilometer



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**Comments regarding the butterfly species diversity map**

- In general, butterfly species numbers are higher than elsewhere in landscapes characterized by a marked relief, i.e. great differences in altitude, such as the Alps, the Jura and the Napf region.
- Areas facing South are invariably rich in butterfly species.
- Butterfly species diversity hotspots are to be found on steep southern slopes of big alpine valleys, above all in the Wallis and Graubünden, with the largest hotspots located in the valleys of the rivers Rhone and Visper. Additional species-rich areas are situated in the remaining southern valleys of the Wallis, in the Goms, the Bedretto valley, the Anterior Rhine valley, and the Lower Engadine valley.
- The Northern Alps also feature small-scale hotspots in areas facing South, for example near Grindelwald. These hotspots contribute to the Northern Alps being almost as species-rich overall as the Central Alps and the Southern Alps.
- This model also permits to establish rough estimates of the effects of global warming. Assuming a temperature increase of 2°C until 2050, it is quite easy to foresee how strongly butterflies might respond to the change in climate. Whereas a distinct increase in species diversity may be anticipated in the Alps, above all at high altitudes, the lowlands could very well be faced with a decline in species numbers. For more information on this topic please refer to another special analysis of BDM data at:  
> <http://www.biodiversitymonitoring.ch/pdfs/downloads/Altermatt%20et%20al.%202009%20Poster%20Biology09.pdf>