

Germany – Black Forest case study

Case study forest area: 1,400 ha

Ownership: Community 60%, State 24%, Private 16%

Forest goods and services:

Timber production, tourism, recreation, biodiversity.

Special local conditions:

The promotion of Norway spruce at the expense of European beech and other deciduous tree species in the past resulted in large areas stocked with Norway spruce outside its potential natural distribution.

Stakeholders

Local state forest administration (County of Rastatt), Community forest administration (town of Baden Baden), State Forest – Baden-Wuerttemberg (ForstBW), Nature park agency, Nature protection organisations, Tourism, Private forest owners, Timber processing industry, Conservation NGOs.

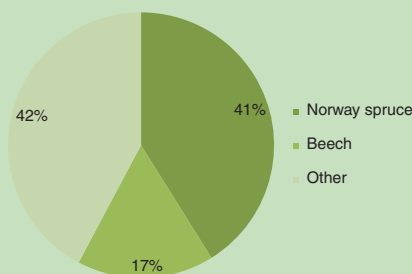
Management and governance issues

The city of Baden-Baden with a community forest area of 8,578 ha and a 61% share of the total forest area is the largest communal forest owner in Germany. The urban district of Baden-Baden therefore has a forest administration of its own.

The State Forest is run by ForstBW, the official State Forest Company of Baden-Wuerttemberg that manages around 350,000 ha of forest.

Private forests in the county of Rastatt cover an area of 6700 ha, from which 5450 ha are managed as a cooperative forest called “Murgschifferschaft”. This old German cooperative accrued from a forest owner cooperative dating back to the 15th century. The goal of the cooperative is to achieve the maximum sustainable yield of valuable timber and benefit. The financial surplus of the cooperative is distributed among the shareholders on a yearly basis.

Proportion of species of Baden Baden

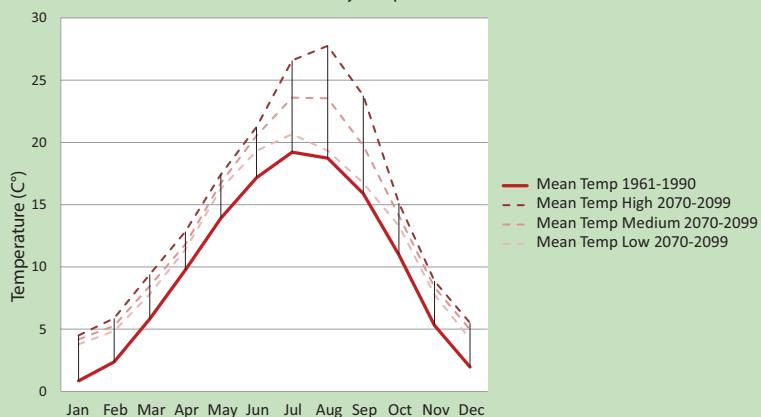




Climate change challenge

Norway spruce stands are susceptible to increasing occurrence of drought and disturbances such as bark beetle attacks.

Mean Monthly Temperature



Mean Monthly Precipitation

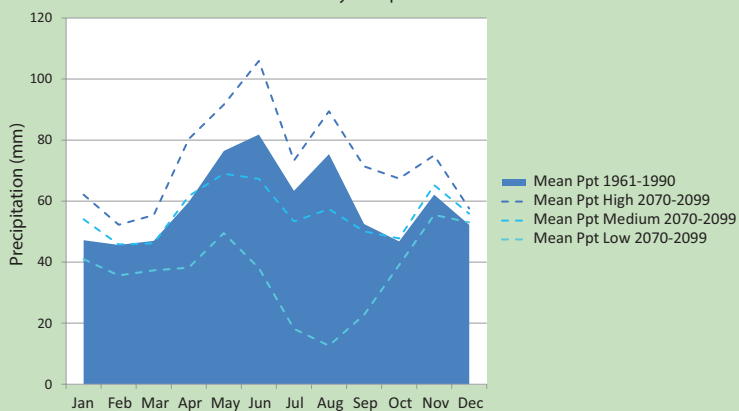




Photo: Thomas Nissen.

In the region climate change induced droughts threaten the forests directly and indirectly via insect calamities, especially Norway spruce plantations outside their natural distribution.



Photo: Thomas Nissen.

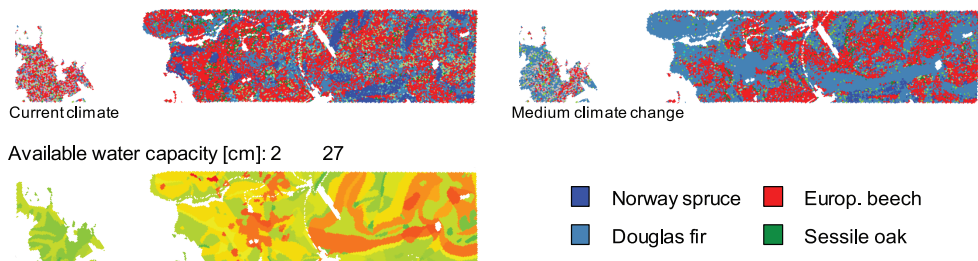


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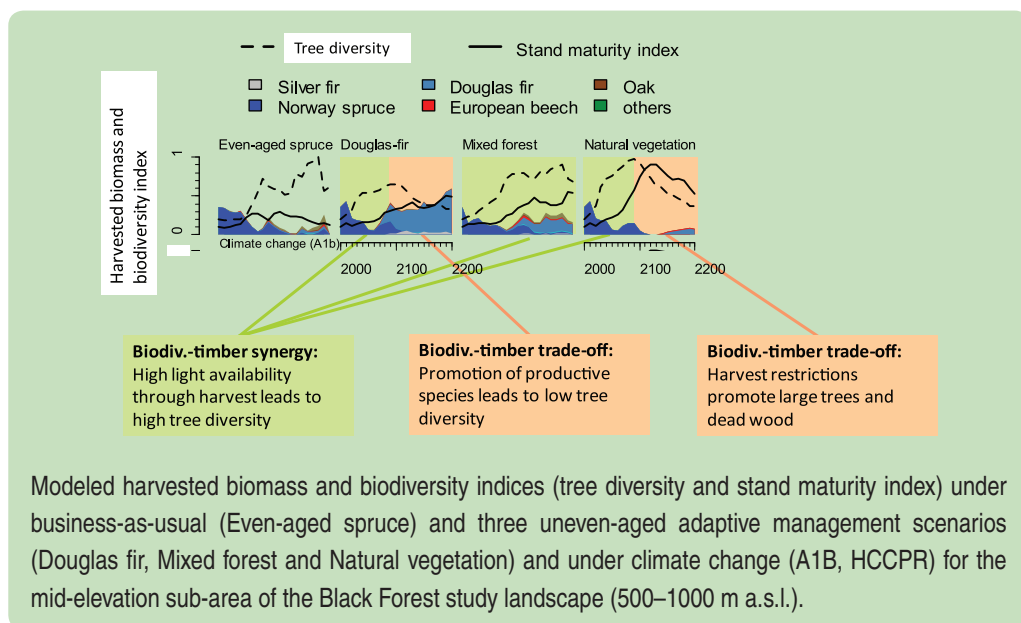
In addition to droughts and insect calamities, large-scale storm events like the hurricane “Lothar” in 1999 or local thunderstorms are the major disturbance regime in the region.

Simulation results confirm the long-term landscape trends of increasing Norway spruce mortality and dominance of more drought-adapted species (e.g. Douglas fir and beech). This underpins the need to convert low-elevation spruce forests to more drought-resilient forest types.

Species dominance after conversion to *Natural vegetation* (year 2100):



Under climate change, timber production in even-aged spruce forests cannot be maintained. Adaptive management needs to consider trade-offs. However, in the long term a joint promotion of forest diversity and timber production can be achieved by mixed forest management.



Modeled harvested biomass and biodiversity indices (tree diversity and stand maturity index) under business-as-usual (Even-aged spruce) and three uneven-aged adaptive management scenarios (Douglas fir, Mixed forest and Natural vegetation) and under climate change (A1B, HCCPR) for the mid-elevation sub-area of the Black Forest study landscape (500–1000 m a.s.l.).

Conclusion

Adaptive management is inevitable in order to maintain the provision of ecosystem goods and services under climate change. The species mixture has to be adapted to dry environmental conditions. Adaptive management does not necessarily impose a trade-off between resource use and conservation objectives. In contrast, 'win-win' situations accrue along some of the conversion pathways.