

## Black Alder Afforestation on Restored Fens in the Trebel Valley

REDUCTION OF DIFFUSE  
NUTRIENT INPUTS

Water retention, climate protection, groundwater dependent ecosystems



(1) Black Alder shrubbery

*Drained fens, when used for conventional agriculture, cause significant **nutrient outflow alongside emissions of up to 24 tons of CO<sub>2</sub> per year and hectare**. However, an alternative can be the production of black alder for timber. The „ALNUS project“ researched the conditions for producing alder wood on fens, and shows the environmental and economical viability of black alder production. **Fens, water, and climate protection** are combined with an **economic benefit**. CO<sub>2</sub> avoidance costs from zero to four euros per ton of CO<sub>2</sub> were calculated. Practical results are summarized in the **ALNUS Guide**.*

### Area

Central questions in the ALNUS project on the integration of silvicultural, ecological, and economic requirements were researched on a monitoring network comprising **85 alder populations**. The selected forests in central and eastern Mecklenburg-Vorpommern cover the whole range of habitat conditions of fens in the Northeast German plain. In the autumn of 2002, ten hectares of fens near Brudersdorf in Trebeltal (administrative district Demmin) were afforested as a **pilot model**. Here, different basic elements were put to the test. The pilot area were meant to serve primarily as a teaching example. Its plots are located varying distances from the course of the Trebel river, ranging between adjacent and far away. It is meant to **include a complete moisture gradient from very wet to very dry conditions**.



River basin district and state: Warnow-Peene; Mecklenburg-Vorpommern

Name of water body: Trebel

LAWA water type: Type 23 „Backwater and brackish water influenced Baltic Sea tributaries“

Classification within the river basin and state analysis: „at risk“

Critical load factors and impacts: drainage of the fens, straightening, fixation, relocation

Protection status: FFH / SPA area

### Reason / Cause

**Fens**, which in contrast to raised bogs are fed by groundwater, take up approximately 820,000 hectares in Northern Germany, 300,000 of which are located in Mecklenburg-Vorpommern. Fens are **highly productive**, since both sufficient water and nutrients are available; they are also characterized by an enormous biodiversity. For centuries they have been used for agriculture and forestry or for the extraction of peat for fuel. These **forms of exploitation require the profound drainage** of fens. Oxidation occurs through contact with atmospheric oxygen. The consequences of **peat loss through shrinkage** are severe habitat degradation, high nutrient seepage and the **release of carbon dioxide**. 50 million tonnes of CO<sub>2</sub> are emitted in Northern Germany's fens alone.

The current political and economic conditions, which often entail the discontinuation of fen usage, open up new, environmentally friendly options. The black alder (*Alnus glutinosa*) offers an especially good possibility for the environmentally-friendly production and use of valuable **alder large dimension timber**. Alder and ash forests are the nearly natural vegetation on wet, nutrient-rich and potentially peat-forming fenland. In those areas they possess a high economical potential which has not been exploited so far. Alder wood is veneer-capable and is mainly used in the furniture industry and toy production. It is an attractive alternative to tropical timber and possesses excellent qualities for water engineering.

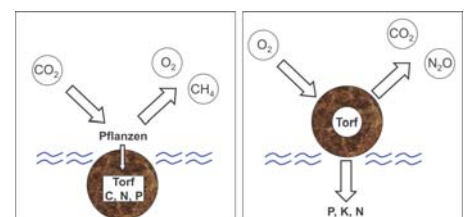
### Objective

The aim of the project was to **develop a production process for alder wood** as an alternative form of land use while **minimizing polluting effects** and resource consumption. It was investigated how wet alder sites could be used in order for a chemical release to be omitted and a chemical fixation takes place instead.

### Measures

The project began in summer 2002 and was completed in autumn 2005. The measures were divided into four stages:

- Selection and testing of representative forest stands in Mecklenburg-Vorpommern as well as the selection, **establishment and monitoring of a pilot area** to serve as a practical example.
- Characterization of ecological site types in terms of their timber yield and environmental effects.
- Economic valuation of ecological site types.
- Assessment of timber yields and environmental effects, development of implementation tools (guide, exemplary suitability maps, indicators).



(2) Environmental Processes

a) in a growing fen

b) drained fen

## Actors / Procedure

The project was carried out at the Ernst-Moritz-Arndt-University Greifswald, headed by Prof. Michael Succow from the Institute of Botany and Landscape Ecology. Project coordination was handled by the Institute for Sustainable Development of Landscapes of the Earth (DUENE). Forestry research was done by the Mecklenburg-Vorpommern Agency for Forests and Large Protected Areas. Other contributors were the Institute for Landscape Water Management and the Institute for Landscape Material Dynamics of the ZALF (Center for Agrarian Landscape Research).

## Results / Assessment

The research done by the ALNUS project has demonstrated that an environmentally sustainable alder economy can be developed on restored fens. Restoration helped to **minimize nutrient outflow**. Positive effects can also be expected for species and habitat protection.

Restoration is also important in perspective of climate protection: drained grassland fens cause **annual CO<sub>2</sub> emissions of up to 24 tons per hectare through peat loss through shrinkage**. These emissions are avoided through restoration, while the reformation of peat binds 3.7 tons of CO<sub>2</sub> per year, and the wood captures three to eight tons of CO<sub>2</sub>. **Emissions prevention** of more than 30 tonnes of CO<sub>2</sub> per year and hectare is possible through the afforestation of fens. In economic terms, this is a comparatively cheap climate protection action: At 30 tons of emissions, the **CO<sub>2</sub> avoidance costs are only zero to four euros per tonne of CO<sub>2</sub>** (compared to the hydroelectric power CO<sub>2</sub> avoidance costs of around 22 euros, and building renovation at 350 to 700 euros). With an afforestation bonus or through rewards based on ecological performance, particularly for water and climate protection, this could be an economically viable alternative.

## Conflicts

A **reward for CO<sub>2</sub>-fixing** does not (yet) exist in **Germany**. From an economic perspective however, it is recommended because it could contribute to the efficient use of scarce resources.

The implementation of an environmentally responsible alder plantation on restored fens has **little hope under the current agricultural policy framework in Germany**. Preventing this is the more attractive agricultural promotion of 320 euros per year for grassland, encouraging the conversion to pastures. Without this support, the profitability of pastureland would not be given.

## Costs / Financing

Financing was provided by the German Federal Environmental Foundation (DBU). The funding for the three-year research project was 740,000 euros.

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## Literature / Links

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Picture sources: baerens & fuss (map); W. Thiel (1), ALNUS-Leitfaden (2)

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