



HABIT-CHANGE

Management Measures to Maintain the Conservation Status of Protected Habitat Types

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1. Introduction

In the project proposal of the HABIT-CHANGE project output 3.4.1 is described as a “report on impacts of different management practices” that includes an assessment of “different old and new management practices”. Basis for the evaluation are management practices that were reported from HABIT-CHANGE investigation areas for output 3.3.1 “Report on existing management practices in protected areas”. The strategies and measures reported for output 3.3.1 do not cover the whole spectrum of possible management strategies and measures that could be implemented in protected areas to preserve protected habitats and to obtain a favourable conservation status.

For the evaluation of existing management practices questionnaires were sent to all investigation areas that reported measures for output 3.3.1. In that questionnaire the responsible project partners were asked to assess the suitability of their management practices under climate change. They were asked to estimate if:

- The strategy or measure can be continued under changed climate;
- The strategy or measures has to be changed or adapted to still be effective under climate-change conditions; and if
- New and additional strategies and measures are (absolutely) necessary to maintain and improve the conservation status under changing climatic conditions.

For the last question, the experts were asked to make suggestions for new and additional management practices.

This output 3.4.1 C was compiled on the basis of a management guidebook for Natura 2000 areas in the German state Brandenburg. This unpublished document lists a wide choice of management options that can be implemented to obtain a favourable conservation status in protected habitats.

It has to be stated that the list does not make suggestions for all Natura 2000 habitat types. In Brandenburg only 39 of 231 Natura 2000 habitat types can be found. Therefore different management practices for coastal, alpine and Atlantic and central European habitats are not included. But the lists show also a wide choice of different strategies and respective measures that allow a transfer to other habitat types than represented in Brandenburg.

The intention of this output is to give an overview on possible management options that can be implemented in habitat management. Some of these management practices might be suitable options that we asked for in the third question of the questionnaire for output 3.4.1.

The objective of this output is to support the area management with a choice of alternative measures. Especially if measures are evaluated as not suitable to obtain or maintain a favourable conservation status under changing climate in output 3.4.1 these lists provide adequate alternatives. It may be used as a general inspiration for adaptive management plans, too.

The list was compiled by project partner 6, TUB with contributions of PP 2, UniV and provided to the investigation areas together with the questionnaire for 3.4.1.

2. Lists of response options for habitat management

2.1. Measures to develop water bodies and bogs

Table 1: List of hydrological measures

Hydrological measures
Construction or maintenance of ground sills, ramps, platforms etc.; Construction definition, e.g. height, array, overflow
Increase of the water level of the draining stream by (... measures)
Construction of an adjustable impoundment construction
Construction of a downstream dam or weir
Impoundment regulation at lakes for flood retention or for the simulation of natural fluctuations in water level
Impoundment regulation e.g. bogs, wet or fresh meadows (damming up to a defined date in the year or until the raise of the ground sill of ditches or up to a necessary extent for the agricultural use)
Abandonment of the dam or impoundment
Allow early spring floods by a gradual flattening of the flooding in April/ May by above control of water accumulation of existing weirs (retention of residual water in hollows until summer)
Sealing, filling or removal of a drainage ditch/ tailrace or run-off pipes
Termination of the pumping station
Removal or lateral shift of coastal/ riparian banks
Guarantee of the ecological minimum runoff
Implementation/ continuation of the surface water supply to the restoration of a (secondary) natural inflows/ ground water level
No impairment of quantity and quality of ground-water inflow
Establishment of small water bodies and ditches
Excavation of plane basins
Construction of plane ditches with irrigation function (channel bed depth max. 80 cm)
Reconnection of cut off meander
Restoration of backfilled in water bodies
Raise of the bed level up to the required minimum depth to maintain and develop e.g. wet meadows (definition of the bed level depth and the substrate or materials to be used, e.g. inherent occurring in the environment, tree stumps)
Temporary maintenance of ditches to allow the water flow (abandonment of ditches when the ground-water level has increased)
Closure of ponds
No straightening of streams
No clearance of alluvial deposits, sandbanks, suspended sediment, gravel, sediment deposits, eroded/instable sand and gravel banks
Control of the shallow ground-water level until a defined date in the year
Construction of a secondary or bypass channel

Table 2: List of measures to maintain or develop original water quality

Measures to maintain or develop original water quality
Termination of untreated waste water discharge e.g. from local communities, agriculture, fish farms, industry or other sources
Review of technical measures for lake re-naturation
Desludging
No desludging
No influx of water of all kinds
No discharge of uncleansed or eutrophic water
No liming measures
No artificial substrates
No increase of water temperature
No air turbulences of sediments
No increase of salinity
No anti-fouling substances in boat paint coatings

Table 3: List of measures to maintain/ develop semi-natural structures of water bodies and bogs

Measures to maintain/ develop semi-natural structures of water bodies and bogs
Opening of obstructed or tapped springs
Removal of piping and tight flow holes
Removal of transverse structures
Replacement of the bottom slide by bottom sill
Creation of riparian zones on flowing and standing waters
Construction of margin stripes, mowing every 3-5 years
Clearing or total removal of embankment trees and shrubs at water bodies
No mowing of reed
Mowing of reed
Restoration of reed
Initial planting of defined species
Removal of the bank reinforcement, river pavement etc.
Integration of disturbing elements, groynes, ground sills into flowing waters
Introduction of inherent substrate
Reconnection of sidearms /cut-off meanders and the old creek bed
Planting of trees and shrubs on flowing waters (definition of the planting method, e.g. in sections, alternating at the riparian zones, in a row or group)
Installation of a fish ladder
Termination or restriction of measures for the maintenance of waters
Keeping of fallen trees/ woody debris
Mowing of the excavation site considering aspects of the protection of species
No maintenance of water bodies, removal of weeds or ground clearance or only under consideration of aspects of the protection of species
Definition of the requirements of the maintenance of waters (e.g. ground clearance or sectional mowing, perennial recurrence frequency, not more than the max required extent for agricultural or fresh grassland use, not before a defined date in the year (e.g. 15.9.), no storage of the cuttings close to the water body)

Measures to maintain/ develop semi-natural structures of water bodies and bogs
Renaturation of small water bodies
Flattening of the edges of water bodies: Installation of a shallow water zone, defined by a downward slope of e.g. 30°, 45°
Guarantee of a minimum duration of drying beds for ponds (for the development of Littorelletea communities, resp. dwarf sedge)
Removal of non-native plant species out of water bodies
Approval of drinking places
Fencing of water bodies
Removal of fences along water bodies
No further maintenance of groynes with decay as goal

Table 4: List of measures for the maintenance and development of the natural balance of fish species – fishing measures

Measures for the maintenance and development of the natural balance of fish species – fishing measures
Removal of fish species which impair the stock of FFH-habitat types and - species
Mass removal of non-predatory fish and replenishment of the predatory fish stock
Restoration of the natural fish-species composition of the respective habitat type
Maintenance of the natural balance of fish species by fishery management
Abandonment of intensive fishery management
Abandonment of any fishery use
Concretely defined angling (e.g. spatial, temporal)
No fishing with fyke nets
Abandonment of fishery use except of the use of trawl nets for the removal of non-predatory fish species
Year round protection of certain (endangered) fish species
No stocking of fish
No stocking of genetically modified fish or risky species with respect to contagion hygiene
No fish stocking except for concretely defined species
Restriction of stocking fish species which can impair the good state of preservation of biotype types and species of appendix I or II (FFH-directive); to be area-specified
No baiting
Reduction of the fish stock
No use of biocides or biological pest-control methods

Table 5: Other measures

Other measures
No swimming or diving
No use of any watercraft, including rowing boats, canoes, surfboards or air mattresses
No use of combustion-engine watercraft
No reconstruction or construction of hydro-power plants

2.2. Measures in forests and timberland

Table 6: List of silvicultural measures of the young to middle-aged stands

Silvicultural measures of the young to middle-aged stands
Keeping short-living pioneer and secondary tree species
Early regulation by mixing for the benefit of native tree species
Early site regulation in tree-rich stands
Selective, long-term exemption of solitary admixed native tree species in the site or natural landscape foreign (pure) stands
Selective, non-schematic maintenance in pure stands
Selective young tree management method or
Separation of stump sprouts
Withdrawal of very dense soft deciduous nurse crop canopies
Repression of alien species for the benefit of site or natural landscape native tree and shrub species through extracting or early underplanting (semi) shady tree species to darken the site
Underplantation of native tree species to favour the bottom or intermediate phase of deciduous trees of site-native tree species to contain expansive non-native tree species
Temporary maintenance of a nurse-crop canopy for stand renewal

Table 7: List of silvicultural measures of the older stands

Silvicultural measures of the older stands
Adoption of existing nature regeneration of site-native tree species
Nature regeneration of site-native tree species by keeping stand gaps and holes
Pre-, post- and additional planting of site-native tree species
Natural pre-regeneration of site-native tree species
Adoption of the bottom or intermediate phase of the next stand generation
Extraction of wildlings
Introduction of large plants into grassy stocks
Tree top care (exemption) for future seed trees of site-native tree species
Horst usage and regeneration (selection, group-selection management)
Preservation of old trees
Re-forestation through initial planting of site-native tree and shrub species
Re-forestation by various methods of stand establishment

Table 8: List of cross-age measures

Cross-age measures
Removal non-native tree species
Creational removal of non-native tree species
Selective thinning (groups, structure, light growth)
Promotion of the bottom and intermediate phase
Temporary hack break
Implementation of a stand-internal accessibility system
The use of timber harvesting is permitted only on marked tracks
No extensive, drastic injuries of the mineral soil layer
No extensive use of machines soil endangered to harden.
No pesticides of any kind

Table 9: List of measures to maintain or promote the ecologically valuable forest typical structure

Maintenance or promotion of ecologically valuable forest typical structure
Maintenance of mature forest stands (minimum rate x%)
Maintenance or promotion of old trees
Maintenance or promotion of distinctive or aesthetic isolated trees/ tree and shrub groups
Maintenance or promotion of rare tree and shrub species
Maintenance of aerie and hollow trees
Maintenance and, if necessary, increase of standing and lying dead wood up to at least 5,10 or 20% of the standing or lying stand
Leaving the forest residues in the area
No blocking with forest residues acc. to appendix I or habitat types acc. to appendix II of the FFH-directive
Keeping of root plates
No extraction of stubs
Preservation of special structure and micro-habitats

Table 10: List of measures to maintain or promote structure and species- rich forest edges

Maintenance or promotion of structure and species-rich forest edges
Maintenance or promotion of the structure and species richness of forests outer and inner edge by opening up the main stand
Shift of the forest edge
Maintenance or promotion of added site-native (light) tree species at eaves-like forest edges by reduction of competition
Promotion (site extension) of selected single trees to stabilize the stand edges
Promotion by natural seeding of site-native trees and shrubs by thinning of the forest canopy
Planting (sowing) of site-native trees and shrubs under canopy
Planting (sowing) of a forest edge of xy-meters of width that is in front of the forest and consists of site-native tree and shrub species
Allowance of the natural development of forest edges of xy-meters of width that is in front of the forest
Protection of forest edges

Table 11: List of measures to protect biotopes and habitats

Protection of biotopes and habitats
Promotion of rare and endangered species and biotopes by light position
Restoration of valuable open land habitats by deforestation
Preservation of non-stocked areas
No initial forestation
Inhibition of plant succession in ecological valuable accompanying biotopes (special biotopes)
No levelling measures for random or disturbance induced (small) areas and structures
No soil measures on old historic forest sites
No use of fertilizers, limning and biocides
No refuse of the barking machine on areas with habitat types acc. to appendix I and II of the FFH-directive
Promotion of natural tree and shrub boundary ridge at flowing and standing waters by the removal of foreign trees and shrubs
Seasonal or regional restrictions or abandonment of use
No reforestation and/or thinning of forest stands
Clear felling only up to 0,5 ha
Special recognition of accompanying biotopes with a small area
No driving on hydromorphous soil with a considerable share of fine-grained substrate except for frost and dry periods
No forest measures on moors
Removal of tree species that are foreign to habitat types (e.g. christmas trees)
Abandonment of grazing

Table 12: List of measures concerning hunting

Measures concerning hunting
Long-term elimination of populations of non-native game species
Fencing-in
Individual protection against browsing
Protection against bark stripping damage
Transformation of wild arables into extensive used wild grassland
Keeping wild arables and wild grasslands open
No agrestal pastures or meadows on an area with habitat types acc. to appendix I or in habitats acc. appendix II of the Habitats-Directive
Landscape compatible integration of hunting facilities
Dismantling/ demolition of hunting facilities
Restriction of hunting (e.g. standing water: restriction on water birds etc.)

Table 13: List of measures for the revival or continuation of historic forms of utilization

Revival or continuation of historic forms of utilization
Revival or continuation of coppice management
Revival or continuation of middle forest management
Revival or continuation of the use of herding forests/ cattle track
Revival or continuation of other historic ways of utilization
forest pasture

2.3. Measures for arable land and grassland

Table 14: List of regulations and measures for the cultivation of arable land

Regulations and measures for the cultivation of arable land
Extensive agriculture
Resource-conserving agriculture
Erosion reducing management
Establishment of a long-term fallow
Establishment of small fallow arable land in areas threatened by erosion
Establishment of rotating fallows
Establishment of perennial fallow arable land with aimed greening
Establishment of perennial fallow arable land with natural vegetation
Establishment of perennial fallow arable land with natural vegetation
Transformation of arable land into grassland
Transformation of arable land into grassland through sowing
Transformation of arable land into grassland through natural processes
Transformation of arable land into grassland through sowing with self-gathered seeds
Decrease of field size
Cultivation of historic and region-typical crops and cultivars
Installation of extensive managed arable areas and zones
Establishment of field-flora reserves

Regulations and measures for the cultivation of arable land
Late change of stubble/cereal waste
Establishment of a border of field (min. 5 m)
Temporal and spatial limited management measures for arable land
No filling of hollows and temporary small water bodies

Table 15: List of regulations and measures for the cultivation of grassland

Regulations and measures for the cultivation of grassland
Resource-conserving grassland cultivation
Mosaic mowing
Mulching (mowing without removal)
Mowing with a clearly defined recurrence frequency (e.g. 1 x year)
Mowing within clearly defined period (e.g. after the seed maturation habitat type typical plants or without interference of grassland birds)
No grazing
Grazing with a clearly defined number of cattle/ha/a
Grazing within a clearly defined period or a clearly defined recurrence frequency
Exclusion of certain animal species (e.g. goats, horses, fallow deer)
Definition of preferred animal species, grazing methods or combinations of grazing and mowing (e.g. forest grazing with sheep, rotational grazing system, mowing without follow on grazing)
Exclusion of grazing on certain areas (e.g. very sloped areas)
Fencing, boundary (e.g. of wetland habitats, border zones)
Cultivation (mowing and/or grazing) of the riparian zones not until a determined date
Mowing as a first measure
No plowing of grassland
Dynamic grassland management
Dynamic grassland management with high proportion of late use
Clearly defined requirements for mowing (e.g. no roller or leveller, max. speed by 5 km/h, easy mowing techniques)

Table 16: List of regulations and measures regarding fertilization

Regulations and measures regarding fertilization (to be defined spatially)
No fertilization
No fertilization except phosphate-potash- maintenance fertilizer
No (mineral) nitrogen fertilization or quantity limitations (e.g. 60kg/ha)
No use of slightly water-soluble nitrogen fertilizer - in periods of low vegetation cover
No application of liquid manure
No deposition of sewage sludge
No monocultural cultivation of leguminous plants
Fertilization after the first use (grassland)

Table 17: List of regulations and measures for the use of chemical plant protection products

Regulations and measures for the use of chemical plant protection products
Greatest possible avoidance of the use of chemical plant protection products
No use of chemical plant protection products (limitation to herbicides or insecticides)

Table 18: List of regulations and measures for the establishment and maintenance of border zones, margins and other buffer zones

Regulations and measures for the establishment and maintenance of border zones, margins and other buffer zones
Establishment and maintenance of edge zones
Establishment and maintenance of margins
Maintenance of riparian zones of grasslands (definition of width)
Establishment of succession zones in the open landscape
Keeping existing shrub edges and structures of trees and shrubs
Creation of a bank-protection strip (definition of width e.g. 10m)

Table 19: List of regulations and measures for the management of dry lawn

Regulation and measures for the management of dry lawn
Grazing of dry lawn (definition of the grazing manner, e.g. forest grazing, paddock husbandry)
Mowing of dry lawn (definition: including removal of cuttings or mulching)
Removal of shrubs of dry lawns
Establishment of heather underneath power lines
Maintenance and creation of open sands

Table 20: List of regulations and measures to maintain heather

Regulations and measures to maintain heather
Grazing of heather
Mowing of heather
Removal of the topsoil
Integration of humus material into the soil
Controlled burning of heather
Removal of encroaching woodland with spade or machine saw

Table 21: List of measures at landscape elements in the agricultural landscape

Measures at landscape elements in the agricultural landscape
Establishment and addition of avenues, lines of trees and single trees
Planting of avenues
Addition of the existing gappy avenue
Replanting in existing avenues
Planting of a tree line
Addition of a gappy tree line
Planting of a solitary tree
Planting of several solitary trees

Measures at landscape elements in the agricultural landscape
Planting of single pollard willows
Planting of a group of pollard willows
Planting of a line of pollard willows
Addition of the existing gappy pollard willow stand
Planting of isolated tree and shrub clusters, using site-native species in irregular distances (200m), alternating
Establishment and addition of hedges
Structuring of large arables through hedges
Planting of a hedge
Establishment of a Benjes-hedge
Addition of a gappy hedge
Enhancement of a hedge with native trees and shrubs
Enhancement of a hedge with briars
Enlargement or enhancement of a hedge of trees with a row of shrubs
Enlargement or enhancement of an existing hedge up to min. 4 rows of shrub in front of both sides
Establishment and addition of extensive tree and shrub stand
Establishment of field trees and shrubs
Establishment of a litter orchard
Addition of the existing gappy litter orchard
Establishment of several field trees and shrubs
Removal of trees and shrubs
Partial removal of the tree and shrub stand
Removal of the tree and shrub stand
Removal of particular trees and shrubs
Removal of the christmas tree stock
Cultivation and other measures
Fencing of trees and shrubs
Cut back to the cane of the hedge
Trimming of pollarded trees
Maintenance of litter orchards (package of measures)
Removal of non-native or not site-appropriate species
Extensification of fruit orchards (e.g. through extensive permanent ground greening)
Explicit protection of existing trees and shrubs (field trees and shrubs, isolated trees, hedges)
Long-term transformation to site-native and natural landscape typical tree and shrub species
Establishment of barriers of plants and greening
Establishment of barriers of plants
Greening of disturbing buildings

2.4. Measures for management of recreational use including regulations for passing and access

Table 22: List of administrative measures to regulate passing and access

Administrative measures to regulate passing and access
Prohibition of access
Prohibition of access outside of marked trails
Closure for public motor traffic
Closure for public motor traffic on weekends
Removal of traffic designation from roads (no longer any obligation of traffic safety: to cut branches, cut down trees, etc.)
Prohibition of conversion or expansion of roads
Blocking for water sports (all-season)
Blocking for watercraft
Blocking for surf boards
Prohibition of mooring for watercraft of all kinds
Limitation of the number of boats
Blocking of motorboat traffic
Prohibition of combustion engines for boats
Speed restriction for motor boats
Bathing ban (bank protection, reduction of nitrogen in take e.g. for oligotrophic water bodies)
No extension of recreational use (bank protection)
No disposal of organic waste (garden compost, dung etc.) in areas with direct contact to bordering wetland habitats
Contact with adjoining wetlands
No disposal of organic waste (garden compost, dung etc.) in bordering biotopes
Prohibition to ride a horse outside of public roads and paths or marked riding trails

Table 23: List of measures for nature observation and environmental education

Measures for nature observation and environmental education
Establishment of an information centre
Establishment of a nature observation station
Construction of an observation tower
Construction of observation huts
Construction of other observation possibilities
Construction of a nature trail
Establishment of information boards
Offer of guided hikes
Access only in the context of guided hikes

Table 24: List of measures to regulate and designate hiking trails, cycle tracks and bridle ways

Measures to regulate and designate hiking trails, cycle tracks and bridle ways
Designation of hiking trails
Designation of cycle tracks
Designation of bridle ways
Designation of water tours
Marking of trails
Removal of markings
Signposting in the arrival area
Installation of a jetty or a corduray bridge
Construction or restoration of a bridge

Table 25: List of measures to block sensitive areas

Measures to block sensitive areas
Blocking by a barrier
Blocking by obstacles
Blocking by a ditch
Blocking by a soil mound (visual enclosure)
Enclosure of the path section with wooden benches
Reduction of attractiveness of a path section
Blocking by buoys, beams for bathing and swimming
Demarcation of bathing areas and boat moorings
Blocking of bank areas for fishing/ removal of jetties

Table 26: List of measures for construction and transformation of touristic facilities

Measures for construction and transformation of touristic facilities
Installation of a parking lot (to avoid illegal use of other areas)
Installation of a rest area
Installation of an overnight accommodation for water tours
Installation of a camp site
Concentration of leisure housing areas by a small-scale, space-saving design
Installation of an ecologically friendly water supply and water disposal
Installation of an ecologically friendly waster disposal
Installation of a sport boat harbour
Installation of a landing stage for sport boats
Installation of a landing stage for passenger craft
Installation of a launch for boats
Installation of a launch for canoes
Preservation/ creation of a public access to a bathing area
Transformation of the bathing area
Installation of a public bathing area
Installation of a bathing and fishing jetty or another bathing platform

2.5. Special measures for the protection of species and biotopes

Table 27: List of special measures for the protection of species and biotopes

Ban on cutting, picking, tearing or digging out, damaging or destroying wild plants or their parts or development forms
Ban on catching, hurting or killing wild animals or removing certain of their natural development forms, and damaging or destroying them
Ban on removing hatching and resting places of wild animals, and on damaging or destroying them
Transformation of migratory barriers for animals
Ban on abandoning animals or colonizing plants

2.6. Redeeming-measures for interfering buildings and restoration of damages to the landscape and landscape fragmentation

Table 28: List of redeeming-measures for interfering buildings and restoration of damages to the landscape and landscape fragmentation

Demolition of facilities (e.g. buildings, fences, trails, roads, parking areas, landing stages, bathing areas, camping sites)
Modification of the power line
Installation of a cable system of the power line
Reduction of the expansion of trails and roads
Removal of earth deposits, mounds
Restoration of earth deposits, mounds
No further sealing
No installation of placards, advertising structures

2.7. Administrative measures

Table 29: List of administrative measures

Nature reserve – protected zone I or II (habitat protection by the designation of national protected areas)
Wetland of international relevance

3. Literature

Handbuch zur Managementplanung Natura 2000 im Land Brandenburg. Leitfaden zur Erstellung von Managementplänen für die Natura 2000-Gebiete in Brandenburg. Version 1; 2009; Landesumweltamt Brandenburg. Unpublished.