Appendix S3. Meta-analysis of the conservation assessment of the plant communities of Mecklenburg-Vorpommern and resulting consequences for nature conservation.

This appendix is a shortened English version of Abdank et al. (2004). For a synopsis of the results for all community types, see Appendix S2; for the underlying syntaxonomic classification, see Appendix S4.

Introduction

Why a Red List of plant communities?

Red Lists draw attention to the extent of decline in biodiversity and initiate actions to protect species and habitats. For decades, Red Lists of threatened species have been a common instrument in nature conservation and are available in Mecklenburg-Vorpommern now for many of the better known species groups. Our knowledge of the species' habitat preferences makes it possible to some degree to draw conclusions about particular ecosystems.

Plant communities contribute much to the structure and habitat function of biotopes. They allow finer classifications of habitats than approaches based solely on abiotic and structural parameters. Consequently, many modern habitat type lists are largely based on phytosociological units.

A Red List of plant communities should not replace Red Lists of species or habitat types, but represents a useful addition to these two conservation tools. As a Red List of habitat types does not exist in Mecklenburg-Vorpommern so far, our Red List provides important information for nature conservation assessment of biotopes. Using the classification presented here, the presence of certain species groups could be used for habitat identification and assessment.

Compared to the extant Red Lists of species in Mecklenburg-Vorpommern, the presented Red List of plant communities has the additional advantage of a separate evaluation of endangerment and conservation value. This allows defining priorities for nature conservation measures based on a transparent methodology.

Database and interpretability

This "Red List of plant communities of Mecklenburg-Vorpommern" is based on the classification of all plant communities of the country (with the exception of the single-layered cryptogamic vegetation; see Berg et al. 2001, 2004). Table 1 gives an overview of the number of distinguished syntaxa on each levels of the hierarchy. Compared to the tables volume (Berg et al. 2001), the number of associations has increased by one, as we include in the analysis below the vanished *Querco-Ulmetum* (30.3.1.2), of which no relevés were available. The statistical analyses refer – unless otherwise specified – thus always to the number of 285 associations known from the territory of the federal state of Mecklenburg-Vorpommern. The level of subtypes is given when the association was further subdivided.

Table 1. Number of syntaxa on different hierarchy levels underlying the Red List. K = class, UK = subclass, O = order, UO = suborder, V = alliance, Ass = association, AB = subtype of association.

Hierarchy	K	UK	O	UO	V	Ass.	AB
Number	34	12	70	6	125	285	72

In the following sections, the ratings of all community types with regard to endangerment and conservation value from the association chapters in Berg et al. (2004) are systematically compiled and analyzed. The analysis is based on the methodology presented in Appendix S1, while some author-specific nuances in the interpretation of the subcriteria cannot be ruled out. To minimize such cases multiple comparative validity checks have been carried out.

Endangerment

Overall balance

The overall balance of endangerment (Table 2 and Fig. 1) shows that more than one half of the associations of the state are more or less endangered. Only 42% are not redlisted, of which, however, another 10% are already placed in the category 'near threatened'.

In Table 3, a comparison of the endangemerent balance of Mecklenburg-Vorpommern with the that of the surrounding federal states of Schleswig-Holstein (Dierßen et al. 1988), Sachsen-Anhalt (Schubert et al. 2001), Thuringia (Heinrich et al. 2001) and Saxony (Böhnert et al. 2001) and the regional assessment of the German lowlands in the Red List of Germany (Rennwald 2002) is presented. Although the data, due to the different classification and evaluation methodology in the various lists, are not entirely comparable, the result of Mecklenburg-Vorpommern are overall similar to the other Red Lists.

Table 2. Frequency of Red List categories within the associations and subtypes of Mecklenburg-Vorpommern. 0 = vanished, 1 = critically endangered, 2 = endangered, 3 = vulnerable, R = naturally rare but not actually threatened, # = probably threatened, NT = near threatened, * = least concern, * < = least concern and expanding, D = data deficient.

Red List-category	0	1	2	3	R	#	NT	*	*<	D	Σ
Number of associations	2	53	49	43	9	2	28	75	18	6	285
Proportion of associations [%]	1	19	17	15	3	1	10	26	6	2	100
	1	55					42			2	
Number of subtypes	-	10	12	18	2	-	15	12	3	-	72

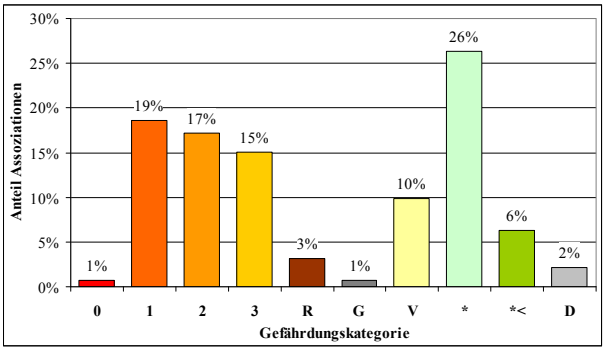

Fig. 1. Distribution of the 285 associations of Mecklenburg-Vorpommern among the Red List categories (for meaning of the categories, see Table 2).

Table 3. Proportion (in %) of vanished (Category 0), endangered (categories 1-3, R, #) and not endangered (categories *, * <, NT) plant communities of Mecklenburg-Vorpommern in comparison to surrounding states and the entire German lowlands (references see text). Ass. = associations, Ges. = informal plant communities, UE = rated subtypes, ZEH = assigned informal types.

Region	Rated syntaxa	Vanished	Endangered	Not endangered	Data deficient
Mecklenburg-Vorpommern	285 Ass.	1	55	42	2
Schleswig-Holstein	338 Ass. + Ges.	8	69	24	–
Sachsen-Anhalt	460 Ass.	1	57	42	–
Thuringia	451 Ass.	1	53	46	–
Saxonia	485 Ass., Ges. + UE	4	56	33	–
German lowlands	577 Ass., Ges. + ZEH	1	55	41	3

The following habitats and ecosystems host particularly high numbers of endangered plant communities:

0: Two previously occurring communities have **vanished** from the territory of Mecklenburg-Vorpommern. The *Isoeto lacustris-Lobelietum dortmannae* (09.1.1.1) disappeared probably in the second half of the 19th century due to the increasing eutrophication of oligotrophic glacial lakes, while it is still occurring in the neighboring Schleswig-Holstein. The hardwood floodplain forest (*Querco-Ulmetum*, 30.3.1.2), the natural vegetation type of the higher areas in the flood plains of the large central European rivers still exists in the adjacent regions, while in the small fraction of the Elbe valley belonging to Mecklenburg-Vorpommern it could not found any more.

1: The 19% of Mecklenburg-Vorpommern's associations that are **critically endangered** and the eight subtypes classified in this category belong predominantly to natural or very extensively used habitats: Baltic coast (03.1.1.2 – *Charetum horrido-balticae*, 6.1.1.1a – typical subtype of the *Salicornietum europaeae*, V14.1.2 – all associations of the *Armerion maritimae*, 15.1.3.3a – typical subtype of *Honckenyo peploidis-Crambetum maritimae*), oligo- to mesotrophic water bodies and their shores (O4.1 – *Nitelletalia flexilis*, O5.2 – *Potamogetonetalia*, O7.1 – *Nano-Cyperetalia*, V9.1.2 – *Eleocharition multicaulis*), acidic bogs and wet heathlands (K11 – *Oxycocco-Sphagnetea*), base-rich fens (UK12b – *Drepanoclado revolventis-Caricenea diandrae*), *Nardus* grasslands and dry heaths (K20 – *Calluno-Ulicetea*), dry grasslands (21.2.1.1 – *Tortulo ruraliformis-Phleetum arenarii*, 21.5.1.1 – *Sileno conicae-Cerastietum semidecandri*, 22.2.1.1 – *Potentillo arenariae-Stipetum capillatae*), (intermittendly) moist to wet grasslands (UK23b – *Molinio-Juncenea*), thermophilic forest-edge vegetation (K25 – *Trifolio-Geranietea sanguinei*), *Salix*-rich riparian forests (27.1.1.1 – *Salicetum triandro-viminalis*), forests and shrubland of oligotrophic wet habitats (O28.1 – *Vaccinio uliginosi-Pinetalia sylvestris*), shrub communities of mesotrophic base-rich fens (V29.1.1 – *Salici pentandrae-Betulion pubescentis*), dry pine forests (O32.1 – *Piceetalia excelsae*) and one acidophytic beech forest type (33.1.1.1 – *Lonicero periclymeni-Fagetum sylvaticae*). Among communities stronger bound to human activities, only two associations of the *Malvion neglectae* (V16.1.2), which rely on extensive poultry farming, and the *Cystopteridetum fragilis* (19.2.2.1), an association of old rocks, are critical endangered.

The largest proportion among the communities of Red List category 1 belongs to the base rich fens (subclass 12b – *Drepanoclado revolventis-Caricenea diandrae*, 11 of the 53 critical endangered associations.). Among the most endangered vegetation types (Table 4), even one half belongs to this subclass. In some associations only particular subtypes are critical endangered: 06.1.1.1a, 14.1.2.6a, and 15.1.3.3a in coastal vegetation, 20.2.1.2a and 20.2.1.2c in heathlands and 23.2.2.1a and 23.3.2.1a in grasslands.

Table 4: The most critically endangered associations in Mecklenburg-Vorpommern, i.e. those rated in category 1 for all three subcriteria (very rare, with very strong decline and with very strong decline in the future prognosis).

The most critically endangered associations	
05.2.1.3	Nupharetum pumilae
09.1.2.2	Samolo valerandi-Littorelletum uniflorae
11.1.1.1	Lycopodiello inundatae-Rhynchosporetum fuscae
12.2.1.1	Caricetum lasiocarpae
12.2.3.1	Scorpidio scorpioidis--Caricetum elatae
12.2.4.1	Junco subnodulosi-Schoenetum nigricantis
12.3.1.1	Sphagno teretis-Menyanthetum trifoliatae
12.3.2.1	Paludello palustri-Caricetum
20.1.1.1	Polygalo vulgaris-Nardetum strictae
22.2.1.1	Potentillo arenariae-Stipetum capillatae
29.1.1.1	Betuletum humilis

2: Endangered associations have a proportion of 17% and also predominantly inhabit natural and semi-natural sites. Particularly well represented in this category are the following habitats and groups of syntaxa: oligotrophic water bodies and their banks (V4.2.1 – *Charion fragilis*, O5.2 – *Potamogetonetalia*, O7.1 – *Nano-Cyperetalia*, V09.1.3 – *Eleocharition acicularis*), Baltic Sea coast (03.1.1.1, 06.1.1.1, O14.1, 15.1.3.3, 24.1.1.1), acidic bogs and wet heathlands (V11.1.1, V11.2.2), spring swamps and mesotrophic to eutrophic swamps and mires (10.1.1.1, V12.2.1, V12.2.2, 13.3.1.1, 27.1.1.2, 28.1.2.2, O29.1, 30.1.1.1, 30.2.2.2), dwarf shrub heaths (O20.2), dry grasslands (21.4.3.3, 22.1.2.1), moist to wet grasslands (23.3.2.2) and the juniper heaths (32.1.1.2). Among communities with stronger anthropogenic influence, the *Asplenietum trichomano-rutae-murariae* (19.2.1.1) and some the tall herb forest-edge vegetation (UK25b – *Trifolio-Geranienea sanguinei*) as well as perennial ruderal communities (26.2.2.4, 26.4.1.3) belong to category 2.

Particularly in coastal habitats, there are some of endangered subtypes (14.1.2.6b, 14.3.1.1d, 15.1.1.1d, 15.1.3.1a, 15.1.3.3b, 24.1.1.1a, 24.1.2.1a) of associations, which as a whole mainly belong to the category 'near threatened' (V). Even three associations and one further subtype of arable weed communities have so strongly decreased mainly due to fertilizer and herbicide use in Mecklenburg-Vorpommern that they are classified as endangered. These are vegetation types that formerly inhabited acidic or calcareous soils of low productivity (18.1.1.1 – *Scleranthо annui-Arnoseridetum minimae*, 18.2.2.1 – Galeopsietum speciosae, 18.3.1.1 – *Euphorbio exiguae-Melandrietum noctiflori*). Among the communities of cultivated grasslands (K23), the more nutrient-poor subtypes of the *Arrhenatheretum elatioris* (23.1.1.1a) and *Lolio perennis-Cynosuretum cristati* (23.1.2.1a) belong to the category 'endangered'.

3: Vulnerable are 15% of the associations of Mecklenburg-Vorpommern. They belong to many different classes and represent similar proportions of natural and anthropogenic communities. Mainly communities of fresh water bodies (K01, 04, 05) and their banks (K03, 08, 09, 12), syntaxa of Baltic Sea coast (K14, K15), arable fields (K18), dry grasslands (K21), moist to wet grassland (K23), perennial herbaceous communities of nutrient-poor (K25) and nutrient-rich sites (K26) as well as swamp forests (K30) and beech forests (K34) are assessed as 'vulnerable'.

#: The category **probably threatened** has been assigned only twice for xeric grasslands communities (21.3.1.3 – *Vulpietum myuri* and 21.4.1.1 – *Galio veri-Festucetum capillatae*). In both cases the past trend was not sufficiently known for an accurate classification of the Red List category.

R: As **naturally rare** but not actually threatened we considered only 3% of all associations and two subtypes: an association of inner Baltic Sea coast (03.1.2.3 – *Ranunculetum baudotii*), coast-bound shrub communities (31.1.1.3b+c – *Hippophao rhamnoidis-Sambucetum nigrae*:, two subtypes, 34.1.1.2 – *Prunus avium-Acer platanoides* community), and all three associations of alliance V34.2.3 – *Sorbo-Fagion sylvaticae*, which is restricted in Mecklenburg-Vorpommern to small spots along the Baltic Sea coast. Besides this natural coastal communities further four ruderal associations fall into category R (17.2.1.2 – *Plantagini indicae-Senecionetum viscosi*, 26.1.1.2 – *Corydalido claviculatae-Epilobietum angustifolii*, 26.2.2.3 – *Chaerophylletum bulbosi*, 26.5.1.3 *Diplotaxio tenuifoliae-Agropyretum repentis*). Their classification is explained by the fact that they reach their range edge in Mecklenburg-Vorpommern or their occurrence followed a recent introduction. All communities of the category R have very small stands in the country, while no threat in the future is foreseeable either because of the inaccessible locations (Baltic Sea cliffs) or ruderal behaviour.

NT: In the category **near threatened** we classified 10% of all associations, scattered over all vegetation classes. Most of these communities are moderately frequent with a weak negative trend in the past and/or a recognizable decline in the future. This category also includes few associations that are still common, but experienced a significant negative quantitative development in the past or are subject to negative prognosis. Finally, the *Aphano arvensis-Matricarietum chamomillae* (18.2.1.1) is the only community in the category "V", which is still very common but has already strongly decreased, and under the present form of agricultural practice continues to be highly threatened in the future.

***:** Currently not threatened (**least concern**) are about one third of all plant communities of the federal state. This mainly includes syntaxa of water bodies (K01, K05), *Bidens* communities (K08), reeds and wetland tall herb communities (K13), short-lived communities of trampled habitats (K16), short-lived weed communities (K17), mesophilous grassland (K23) and ruderal tall herb communities (K26). Within the woody vegetation, *Prunus spinosa* and *Sambucus nigra* shrublands (K31) and three widespread natural deciduous forest communities (33.1.2.1, 34.2.1.1 and 34.2.2.1) are classified as 'least concern'. Among the communities of category *, 14% is facing a weak anthropogenic threat.

***<**: The 6% associations classified as **least concern and expanding** are mainly ruderal herb and shrub communities (O13.4, V17.2.1, K26, 31.1.1.2 – *Rubo plicati-Sarothamnetum scoparii*, 31.2.1.1 – *Lamio albi-Sambucetum nigrae*) and the *Urtica dioica* subtype of the *Fraxino excelsioris-Fagetum* (34.2.1.1c). Many of these types are rich in neophytes. As a result of management

changes in grassland, also the *Artemisia vulgaris* subtype of the *Arrhenatheretum elatioris* (23.1.1.1c) and the *Ranunculo repentis-Alopecuretum geniculati* (23.2.1.1) are expanding.

D: In the category **data deficient,** we classified 2% of the associations. A decision whether they are endangered or not is not yet possible. This concerns three dry grassland communities (21.1.1.2 – *Agrostietum vinealis*, 21.3.1.1 – *Carici arenariae-Airetum praecocis*, 21.6.1.1 – *Poo compressae-Saxifragetum tridactylitae*), two forest-edge communities (25.1.1.1 – *Lathyro linifolii-Melampyretum pratensis*; 25.2.1.6 – *Rubo caesii-Origanetum vulgaris*) and a tall herb association of intermittently wet sites (13.4.3.1 – *Veronico longifoliae-Scutellarietum hastifoliae*).

Subcriteria

As Figure 2 shows, approximately one quarter of the plant communities each were classified as very rare, rare and infrequent, respectively. The categories frequent and common share only 8% each. They are distinguished in the spatial distribution and not in the extent of the covered area (see Appendix S1).

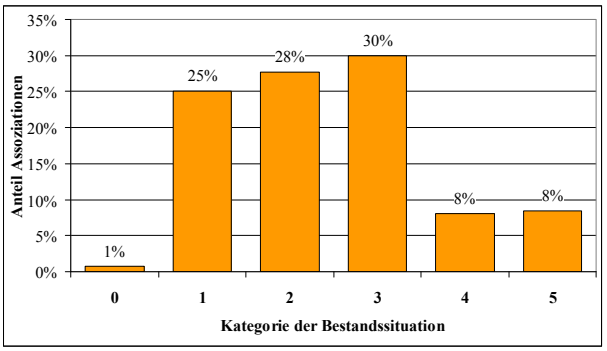

Fig. 2. Distribution of the 285 associations of Mecklenburg-Vorpommern among the categories of current status. Associations that have been assigned to two categories due to imprecise knowledge were counted proportionally in both categories; 0 = missing, 1 = very rare, 2 = rare, 3 = infrequent, 4 = frequent, 5 = common.

It should be noted, that the **current distribution** considers both the area coverage and the spatial distribution of the occurrences. As 'very rare' particularly associations of base-rich fens (K12: 10 associations), salt marshes (K14: 6 associations) and thermophilous forest-edge communities (K25: 7 associations) have been classified. Among this category are those who have always been very rare, mainly because of their restriction to certain geophysical regions such as river Elbe, Baltic Sea coast or Uckermark (SE Mecklenburg-Vorpommern), as well as those whos area have dramatically declined in recent decades.

As very common (5) according to the definition we classified communities, whose stands have a relatively large total area (but the threshold is less than 1% of the country) and are represented in (almost) all regions of the country. Such associations are found mainly in the classes of managed grasslands (K23: 5 associations) and tall-herb ruderal communities (K26: 6 associations). Among the arable weeds communities only one, the *Aphano arvensis-Matricarietum chamomillae* (18.2.1.1) is classified here. The latter, however, unlike the other very common communities but similar to the *Arrhenatheretum elatioris* (23.1.1.1) and *Lolio perennis-Cynosuretum cristati* (23.1.2.1) has already faced a remarkable decline in the past.

The **past trends** of the associations (1960 until 2004, Fig. 3) show an alarming picture: almost 60% have declined. The strongest decline (category 1) is found in associations of nutrient-poor water bodies and their shores (K04, some associations of K05, K09), nutrient-poor to mesotrophic mires and swamps (K11, K12, K29), and species-rich arable weed communities (K18). The decrease of the former diversity of arable weeds is visible by a strong downward trend and continued threat of arable weed communities – an indication of the large-scale homogenization of the habitat conditions and the suppression of all arable weeds by herbicides.

Just one third of all communities – mainly those of nutrient-rich and anthropogenic sites – had a stable distribution in the past, while less than 10% were in expansion. They colonize, with a few exceptions, nutrient-rich sites and belong to one of the following syntaxa: ruderal tall herb communities (K26), reeds and tall herb wetland vegetation (O13.4) and short lived ruderal communities (K17). Two associations of intensively managed grasslands (23.1.2.2, 23.2.1.1) are also included.

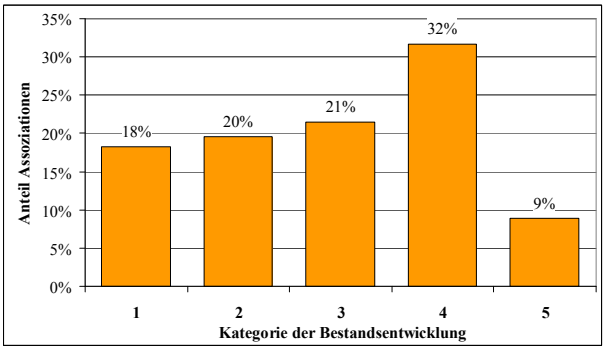

Fig. 3. Distribution of the 285 associations of Mecklenburg-Vorpommern among the categories of past trend. Associations that have been assigned to two categories due to imprecise knowledge were counted proportionally in both categories; 1 = very strong decline, 2 = strong decline, 3 = moderate decline, 4 = constant, 5 = increase.

The analysis of the predicted **prognosis** (Fig. 4) indicates that the current trend will continue in the future: 61% of the plant communities of the state are more or less threatened, while only a few (5%) likely will benefit from human activities. The development towards an increasingly uniform landscape will continue if no effective countermeasures are taken.

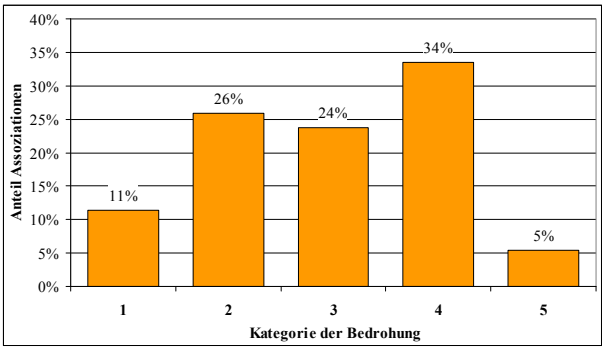

Fig. 4. Distribution of the 285 associations of Mecklenburg-Vorpommern amnong the categories of threat in the future. Associations that have been assigned to two categories due to imprecise knowledge were counted proportionally in both categories; 1 = very strong decline, 2 = strong decline, 3 = low decline, 4 = no decline, 5 = promotion.

Conservation value

Overall balance

The frequency of different conservation values among associations and subtypes in Mecklenburg-Vorpommern is shown in Table 5 and Figure 5.

Table 5: Distribution of conservation value categories among the associations and subtypes of Mecklenburg-Vorpommern, 1 = highest conservation value, 2 = high conservation value, 3 = medium conservation value, 4 = low conservation value, 5 = lowest conservation value.

Conservation value	1	2	3	4	5	∑
Number of associations	14	98	79	56	38	285
Proportion of associations [%]	5	34	28	20	13	100
	67			33		
Number of subtypes	4	25	27	14	2	72

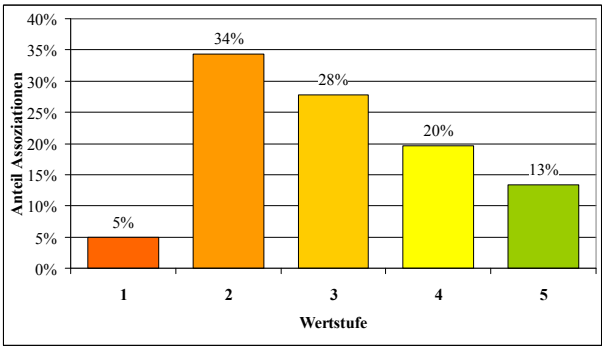

Fig. 5. Distribution of the 285 associations of Mecklenburg-Vorpommern among the five levels of conservation value. For numerical values see Table 5.

Two thirds of the associations have a medium to high conservation value. High protection value (conservation value 2) is the most frequent category, comprising more than one third of the associations. As highest worthy of protection (conservation value 1), we consider only 5% of the associations (Table 6). These are those syntaxa where at least two of the three subcriteria achieve the highest category.

Higher proportions of conservation values 1 or 2 can be found in nutrient-poor fens (both the open K12 and the woodland class K29), in oligotrophic-acidic bogs and wet heaths (K11), in *Litorella* communities (K09) and in salt marshes (K14).

Table 6. The associations and some subtypes with the 'highest protection value' (category 1).

Plant communities primarily worthy of protection	
03.1.1.2	Charetum horrido-balticae
09.1.1.1	Isoeto lacustris-Lobelietum dortmannae
09.1.3.1	Myriophyllo alterniflori-Littorelletum uniflorae
12.1.1.1	Sphagno recurvi-Caricetum rostratae
12.2.1.1	Caricetum lasiocarpae
12.2.1.2	Caricetum diandrae
12.2.3.1	Scorpidio scorpioidis--Caricetum elatae
12.3.1.1	Sphagno teretis-Menyanthetum trifoliatae
12.3.2.1	Paludello palustri-Caricetum
15.1.3.3	Honckenyo peploidis-Crambetum maritimae
29.1.1.1	Betuletum humilis
29.1.1.3	Junco subnodulosi-Betuletum pubescentis
34.2.3.1	Carici-Fagetum sylvaticae
34.2.3.2	Orchido purpureae-Cornetum sanguinei
31.1.1.3b	Hippophao rhamnoidis-Sambucetum nigrae: *Vincetoxicum hirundinaria* subtype
31.1.1.3c	Hippophao rhamnoidis-Sambucetum nigrae: *Festuca arundinacea* subtype

Subcriteria

The **relevance for species conservation** has been scaled in such a way that one fifth of the associations falls in each of the five categories (see Appendix S1). A numeric value of 1,000 means that in an average vegetation plot of that community type 10 species of Red List category 3, five of category 2, or 2.5 of the category 1 occur, respectively. When comparing the relevance for species conservation of different communities, it has to be taken into account that these are referring to different plot sizes areas (see table header data in the table volume, Berg et al. 2001) and constancy values increase with plot size (Dengler et al. 2009).

Table 7 demonstrates that the highest weighted number of endangered plant species occur in the nutrient-poor open (K12) and wooded fens (K29). By contrast, the ruderal vegetation types of short lived (K16, K17) and the tall herb ruderal communities (K26) are generally inhabited by only few red-listed species.

Table 7: The associations with the highest relevance for species conservation, sorted by the decreasing numeric value. The category 1 starts at a numeric value of 671. A value of 1,000 means that there is on average 10 species of Red List category 3 per relevé.

Values over 4000	
12.3.2.2	Schoenetum ferruginei
Values over 3000	
29.1.1.1	Betuletum humilis
12.3.2.1	Paludello palustri-Caricetum
Values over 2000	
12.3.2.3	Juncetum subnodulosi
12.3.1.1	Sphagno teretis-Menyanthetum trifoliatae
12.2.4.1	Junco subnodulosi-Schoenetum nigricantis
12.2.4.2	Eleocharitetum pauciflorae
29.1.1.3	Junco subnodulosi-Betuletum pubescentis
Values over 1000	
12.3.1.2	Parnassio palustris-Caricetum
23.3.1.1	Selino carvifoliae-Molinietum caeruleae
07.1.1.2	Polygono-Eleocharietum ovatae
12.2.3.1	Scorpidio scorpioidis-Caricetum elatae
29.1.1.2	Cladium mariscus-Salix pentandra-Gesellschaft
22.2.1.1	Potentillo arenariae-Stipetum capillatae
11.1.1.1	Lycopodiello inundatae-Rhynchosporetum fuscae
12.2.1.2	Caricetum diandrae
20.1.1.2	Juncetum squarrosi
09.1.2.2	Samolo valerandi-Littorelletum uniflorae
20.1.1.1	Polygalo vulgaris-Nardetum strictae
22.1.2.1	Adonido vernalis-Brachypodietum pinnati
09.1.1.1	Isoeto lacustris-Lobelietum dortmannae
12.2.1.1	Caricetum lasiocarpae
07.1.2.2	Hypno lindbergii-Cicendietum filiformis
25.3.2.3	Thalictro mini-Geranietum sanguinei
34.2.3.1	Carici-Fagetum sylvaticae
14.1.1.2	Sagino maritimae-Cochlearietum danicae
14.1.2.2	Blysmetum rufi
11.1.1.2	Ericetum tetralicis
12.2.2.1	Junco-Caricetum nigrae
12.2.2.2	Caricetum serotinae
14.1.2.5	Junco ancipis-Caricetum extensae

The degrees of **naturalness** of the various associations are shown in Figure 6. Just one half of all associations have been assigned to a single category only, most of them to category 1 (natural). By contrast, many associations can live at sites of different naturalness; the most common case being '1–2'. This means communities that are found equally in natural as in semi-natural habitats. Remarkable are the three associations that cover the whole range of values, i.e. '1–5'. They all belong to the subclass 26c of semi-ruderal grasslands. Their natural habitat is located in highly dynamic sites of the Baltic Sea coast and the banks of the Elbe River. They have the ability to colonize natural as well as strongly anthropogenicly altered pioneer sites.

By summarizing the communities with only a single value in the degree of naturalness and those with a value range (e.g. 1–2), it is evident that the greatest variety of associations can be found under semi-natural conditions (Fig. 6). Under such condition one half of all communities in the state occur. The number of associations decreases both to more natural and to more anthropogenic sites.

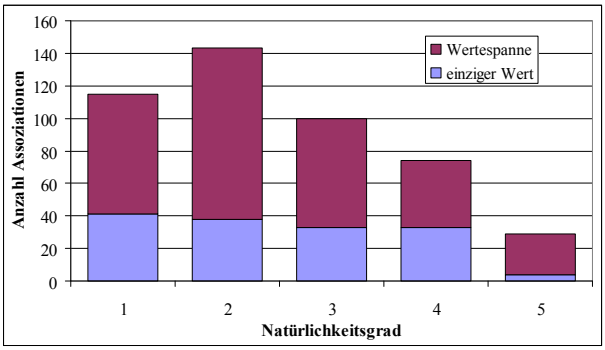

Fig. 6: Occurrence of the 285 associations of Mecklenburg-Vorpommern in sites of different degrees of naturalness. The lower part of the columns (blue) refers to communities that are limited to a single category, the upper part (red) to those that occur at sites of varying naturalness; 1 = natural, 2 = semi-natural, 3 = pre-industrial anthropogenic, 4 = industrial anthropogenic, 5 = artificial.

The world distribution ranges of the plant communities show a similar picture as in plant taxa. Not a single association is endemic to Mecklenburg-Vorpommern. Figure 7 shows that the federal state has no special responsibility for the majority of its plant communities because they have wide overall ranges. In global relevance, our highest category 1, in which a community is classified when 50% or more of its total range is inside the study area, was hard to reach for such a small reference area as Mecklenburg-Vorpommern. The low values also indicate that Mecklenburg-Vorpommern is a 'young' (in terms of post-glacial recolonization) and geographically not isolated territory.

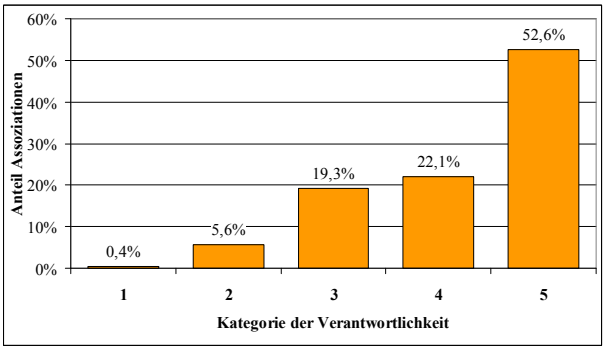

Fig. 7. Distribution of the 285 associations of Mecklenburg-Vorpommern among the categories of global relevance. 1 = highest global relevance, 2 = high global relevance, 3 = moderate global relevance, 4 = low global relevance, 5 = least global relevance.

All the more, attention should be paid to protect the few associations that have a large proportion of their worldwide range in the territory of Mecklenburg-Vorpommern (Table 8). This is particularly true for the only association classified with the highest global relevance category, the *Charetum horrido-balticae* (03.1.1.2). Further, these are those plant communities in which Mecklenburg-Vorpommern accounts for 1/5 and more of their world range (category 2; Table 8). Among them are mostly communities of the Baltic Sea coast (a brackish water community, three salt marsh communities, two dune communities, two shrub and herbaceous communities of the cliffs), but also three types of dry grasslands.

Table 8. Associations for whose conservation the state of Mecklenburg-Vorpommern carries a particular global relevance in the global framework (categories 1 and 2 of global relevance).

1 – Highest global relevance	
03.1.1.2	Charetum horrido-balticae
2 – High global relevance	
03.1.1.1	Charetum canescentis
04.1.1.1	Nitelletum capillaris
05.1.1.3	Ranunculo trichophylli-Callitrichetum
12.2.4.1	Junco subnodulosi-Schoenetum nigricantis
14.1.1.1	Centaurio vulgaris-Saginetum moniliformis
14.1.1.2	Sagino maritimae-Cochlearietum danicae
14.1.2.5	Junco ancipis-Caricetum extensae
18.3.1.1	Euphorbio exiguae-Melandrietum noctiflori
21.4.3.3	Allio schoenoprasi-Caricetum praecocis
21.5.2.2	Festucetum polesicae
22.1.1.1	Solidagini virgaureae-Helictotrichetum pratensis
23.3.1.1	Selino carvifoliae-Molinietum caeruleae
24.1.2.2	Festucetum arenariae
25.3.1.2	Sileno nutantis-Libanotidetum montanae
31.1.1.3	Hippophao rhamnoidis-Sambucetum nigrae
33.1.1.1	Lonicero periclymeni-Fagetum sylvaticae

Combination of endangerment and conservation value: the need for action

We treat endangerment and conservation value as two independent, complementary criteria (see Appendix S1). Nevertheless, there are some correlations between the two criteria (Fig. 8): communities tend to be more valuable, the more endangered they are and vice versa. So most of the associations of the two highest conservation value levels are endangered (category 2), the majority of the remaining value levels not.

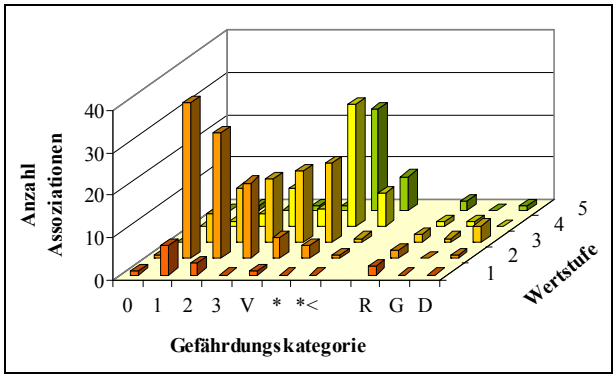

Fig. 8. Frequency of occurrence of different combinations of Red List category and conservation value among the 285 associations of Mecklenburg-Vorpommern. The Red List categories R, # and D, which do not be fit into the ordinal sequence, are displayed separately at the right-hand end.

Of particular interest are the exceptions of this dominant scheme. Their significant proportion confirms our approach to determine conservation value and Red List category independently.

On the one hand, there are associations with high endangerment but low conservation value. Foremost among these are two communities of the *Malvion neglectae* (V16.1.2). Although they are critically endangered in Mecklenburg-Vorpommern their (relatively) low content of endangered species and their wide world ranges lead to only low to moderate conservation value.

The opposite case is represented by vegetation types that have a high conservation value but are not endangered in the country so far. Highly worthy are five associations that are in Mecklenburg-Vorpommern not endangered or even spreading, including a water plant community (05.1.1.3), two associations of the Baltic Sea coast (24.1.2.2, 31.1.1.3) and two of the Elbe valley (08.1.2.2, 13.4.3.2). 'Classical' Red Lists that are based solely on the endangerment would not draw the attention to these units for which the state of Mecklenburg-Vorpommern has a high global relevance in the international context.

In the **need for action** we finally combined endangerment and conservation value in an overall priorization tool for nature conservation. The need for action is targeted at all actors involved in nature conservation, to give them a meaningful prioritization when implementing conservation, development and restoration measures. The conservation measures listed in Berg et al. (2004) for each plant community provide appropriate information. However, in addition to defining priorities one has to judge their cost-effect ratio and their chances of success.

Table 9. Frequency of categories of need for action among the associations and subtypes of Mecklenburg-Vorpommern. !!! = primary need for action, !! = high need for action, ! = moderate need for action, [x] = [!!!], [!!] or [!] means restoration demand, (x) = (!!!), (!!) or (!), or stands for potential need for action, – = no need for action. ? = require research.

Need for action	**!!!**	**!!**	**!**	**[x]**	**(x)**	**–**	**?**	**∑**
Number of associations	47	69	54	2	9	98	6	285
Proportion of associations [%]	16	24	19	1	3	34	2	100
	60			4				
Number of subtypes	21	22	8	-	2	19	-	72

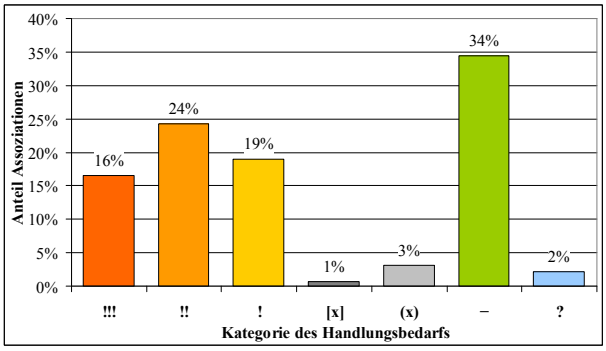

Fig. 9. Distributin of the 285 associations of Mecklenburg-Vorpommern among the categories of need for action. For the meaning of the catetories, see Table 9.

Table 9 and Fig. 9 show the proportion of the need for action. In 60% of the vegetation types in the country no current action is needed to protect it. There are another 11 associations with potential need for action or with the need of restoration.

!!! – **Primary need for action** for immediate and effective protection is documented for 47 associations. They are

characterized by a combination of high endangerment and high conservation value and belong to the following habitats and syntaxa:

- Bogs and fens (K11 – *Oxycocco-Sphagnetea*, UK12b – *Drepanoclado revolventis-Caricenea diandrae* with 12 associations)
- Lakes and shores (O04.1 – *Nitelletalia flexilis*, O05.2 – *Potamogetonetalia*, K07 – *Isoeto-Nano-Juncetea*, K09 – *Littorelletea*)
- Baltic Sea coast (V03.1.1 – *Charion canescentis*, V14.1.2 – *Armerion maritimae*, 15.1.3.3 – *Honckenyo peploidis-Crambetum maritimae*, 21.2.1.1 – *Tortulo ruraliformis-Phleetum arenarii*)
- Grasslands and thermophilous forest-edge vegetation (V20.1.1 – *Violion caninae*, 22.2.1.1 – *Potentillo arenariae-Stipetum capillatae*, UK23b – *Molinio-Juncenea*, 25.3.2.3 – *Thalictro mini-Geranietum sanguinei*)
- Woody vegetation (27.1.1.1 – *Salicetum triandro-viminalis*, K28 – *Vaccinio uliginosi-Pinetea*, V29.1.1 – *Salici pentandrae-Betulion pubescentis*, K32 – *Vaccinio-Piceetea*, 33.1.1.1 – *Lonicero periclymeni-Fagetum sylvaticae*).

[!!!] – **Restoration demand** of highest level is assigned to highly valued associations that have not been observed in Mecklenburg-Vorpommern for at least 10 yr (vanished, Red List category 0). This category was asigned only twice, but could increase in the future with continuous monitoring of vegetation change. For the affected associations, potential habitats should be restored with high priority. In case of the *Querco-Ulmetum* (30.3.1.2) recovery measures have already successfully been performed in neighboring federal states, while in the case of the vanished *Isoeto lacustris-Lobelietum dortmannae* (09.1.1.1) a restoration seem to be currently not very realistic. If communities of the category [!!!] are rediscovered, they will turn into the category !!!.

(!!!) – **Potential need for action** of highest level has been assigned to four forest communities of the Baltic Sea coast, the *Prunus avium-Acer platanoides* community (34.1.1.2) and three rare beach forest communities on limestone and marl cliffs (34.2.3.1, 34.2.3.2, 34.2.3.3). Most of their stands are currently secured in protected areas. However, their total areas covered are so small that immediate measures are needed if in the future any threat should arise.

Endangerment, conservation value and need for action according to vegetation classes

The synoptic overview (Table 10) presents the proportion of the associations in each of the 34 vegetation classes that fall into certain categories of endangerment, conservation valuable and need for action.

Regarding **endangerment**, the following four classes include the largest number of threatened associations (in descending order): K12 – *Parvo-Caricetea*, K25 – *Trifolio-Geranietea sanguinei*, K14 – *Juncetea maritimi* and K26 – *Artemisietea vulgaris*. In the last class, the large number results mainly from the fact that this is the class with the highest number of associations, while the percentage with 24% is far below average. Looking at the proportion of **vulnerable** associations, there is a different picture: All communities (100%) of K06 – *Thero-Salicornietea strictae*, only one association in the state!), K09 – *Littorelletea*, K10 – *Montio-Cardaminetea*, K19 – *Asplenietea trichomanis*, K22 – *Festuco-Brometea*, K27 – *Salicetea purpureae* and K28 – *Vaccinio uliginosi-Pinetea*, are threatened to some degree. With more than 50% critically endangered associations the situation is extreme in the classes K07 – *Isoeto-Nano-Juncetea*, K12 – *Parvo-Caricetea* and K32 – *Vaccinio-Piceetea*alarming. By contrast, so far little or not endangered (≤ 10% vulnerable associations) are the classes K02 – *Zosteretea*, K13 – *Phragmito-Magno-Caricetea*, K17 – *Sisymbrietea* and K31 – *Rhamno-Prunetea*.

The proportion of the associations with high **conservation value** generally shows a similar picture as that of the endangerment. Contrasting patterns, i.e. a high proportion of valuable communities with a lower proportion of threatened ones, occur in the following classes: K05 – *Potamogetonetea*, K13 – *Phragmito-Magno-Caricetea* and K33 – *Quercetea robori-petraeae*. Low conservation values but high proportions of endangerment show the associations of K18 – *Stellarietea mediae* and K19 – *Asplenietea trichomanis*.

In almost half of all classes all associations have a **need for action**. Only in seven of the 34 classes less than a half of the communities need conservation measures. However, considering the different urgency to act in the form of the median (not shown), the highest need for action appears forn K09 – *Littorelletea*, K12 – *Parvo-Caricetea* as well as K28 – *Vaccinio uliginosi-Pinetea*, followed by the tree-free, nutrient-poor acidic bogs and wet heaths K11 – *Oxycocco-Sphagnetea* and the willow alluvial woodlands of K27 – *Salicetea purpureae*.

Table 10. Proportion of threatened and valuable associations, and those with high need for action within the 34 vegetation classes (in % except for *n* = number of associations), End. = proportion of threatened associations (category 0-3, R and G); Value = proportion of valuable associations (category 1-3), H = proportion of associations with need for action (including potential need and restoration requirement); shares from 75% fat, high values of the individual categories shaded (without R, G, D), numbers in italics = classes with *n* <4.

Class		*n*	Endangerment											Conservation value						H
			End.	0	1	2	3	V	*	*<	R	G	D	Value	1	2	3	4	5	!-!!!, (x), [x]
01	**Lemnetea**	6	50				50		50					50			50	33	17	50
02	**Zosteretea**	1	*0*					*100*						***100***		*100*				***100***
03	**Ruppietea maritimae**	5	80		20	20	20	20				20		**100**	20	20	60			**100**
04	**Charetea**	8	**88**		25	50	13	13						**100**		100				**100**
05	**Potamogetonetea**	13	46		23	15	8	8	46					**85**		38	46	15		54
06	**Thero-Salicornietea strictae**	1	***100***			*100*								***100***			*100*			***100***
07	**Isoeto-Nano-Juncetea**	7	**86**		57	29			14					**86**		43	43	14		**86**
08	**Bidentetea**	8	25				25		75					50		25	25	13	38	25
09	**Littorelletea**	6	**100**	17	33	33	17							**100**	33	50	17			**100**
10	**Montio-Cardaminetea**	2	***100***			*50*	*50*							***100***			*100*			***100***
11	**Oxycocco-Sphagnetea**	8	**88**		50	38		13						**100**		88	13			**100**
12	**Parvo-Caricetea**	17	**88**		65	12	12	12						**100**	35	65				**100**
13	**Phragmito-Magno-Caricetea**	17	6			6		12	53	24			6	71		24	47	29		18
14	**Juncetea maritimi**	12	**83**		17	50	17	17						**100**		75	25			**100**
15	**Cakiletea maritimae**	5	60			20	40	20	20					**100**	20	20	60			80
16	**Polygono-Poetea annuae**	8	38		25		13		63					0				13	88	38
17	**Sisymbrietea**	10	10						60	30		10		0				20	80	10
18	**Stellarietea mediae**	7	**86**			43	43	14						29		14	14	71		**86**
19	**Asplenietea trichomanis**	3	***100***		*33*	*33*	*33*							*33*			*33*	*67*		***100***
20	**Calluno-Ulicetea**	6	**83**		33	50		17						**100**		50	50			**100**
21	**Koelerio-Corynephoretea**	16	56		13	6	25	19	6		13		19	**88**		25	63	6	6	75
22	**Festuco-Brometea**	3	***100***		*33*	*33*	*33*							***100***		*100*				***100***
23	**Molinio-Arrhenatheretea**	11	36		18	9	9	18	36	9				64		45	18	27	9	55
24	**Ammophiletea**	3	*33*			*33*		*33*	*33*					*67*		*33*	*33*	*33*		*33*
25	**Trifolio-Geranietea sanguinei**	18	61		22	17	22	11	17				11	**89**		39	50	11		72
26	**Artemisietea vulgaris**	41	24			5	12	2	54	20		7		7			7	54	39	24
27	**Salicetea purpureae**	2	***100***		*50*	*50*								***100***		*100*				***100***
28	**Vaccinio uliginosi-Pinetea**	3	***100***		*67*	*33*								***100***		*67*	*33*			***100***
29	**Molinio-Betuletea pubescentis**	8	**88**		38	25	25	13						**100**	25	63	13			**100**
30	**Alnetea glutinosae**	9	67	11		22	33	22	11					**100**		67	33			**89**
31	**Rhamno-Prunetea**	5	0						60	40				40		20	20	40	20	0
32	**Vaccinio-Piceetea**	5	**80**		60	20		20						80		40	40	20		**80**
33	**Quercetea robori-petraeae**	3	*33*		*33*			*33*	*33*					*67*		*33*	*33*	*33*		*33*
34	**Carpino-Fagetea**	8	**75**				25		25			50		**75**	25	38	13	25		**75**

Threat causes

Within the project, threat causes for plant communities as a separate category, but they were integrated into the sections *Gefährdung* (Endangerment) and *Erhaltungsmöglichkeiten* (Conservation measures) of the association treatments in Berg et al. (2004). A systematization of the threat causes is difficult due to the manifold interconnections (such as drainage and eutrophication of wetlands), and existing approaches are unsatisfactory. We nevertheless compiled by survey questionnaire among the authors of the class treatments in Berg et al. (2004) to elucidate the relative importance of a wide array of factors

The threat causes distinguished have been grouped on the basis of an internal list of the German Federal Agency for Nature Conservation into 12 complexes, which mainly reflect the origin of threat (Table 11). Figure 10 shows the same data in aggregate form. It is important to note that the causal complexes listed here, just mean the summation of all individual causes assigned to the respective complex. For example, the causal complex ‘agriculture’ does not mean that agriculture *per se* is a threat for plant communities, but certain forms of management or some measures according to the details of Table 11.

Table 11. Threat causes and number of endangered associations that are affected (n = 173) based on author assessment; multiple answers were possible, only threat causes with at least 4 entries are listed; bold type indicates causes affecting at least 40 associations.

Threat causes	# of assoc.
Agriculture:	
Eutrophication and pollution	**83**
Loss of landscape structures	**45**
Drainage of wetlands etc.	**43**
Fallow / abandonment	31
Lost of old forms of land use	22
Intensive agriculture (mineral fertilizers, herbicides, impoverished, short rotation, etc.)	14
Industrial grassland management	12
Changes in land use (eg turns grassland to arable fields)	9
Mechanical loads (sealing, deposition)	8
Damage by machining techniques (soil compaction, deep plowing, etc.)	5
Contamination:	
Diffuse nutrient inputs from the atmosphere and air pollution	**62**
Water pollution (surface and ground waters)	**40**
Direct contamination, such as waste dumping	12
Forestry:	
Drainage	**47**
Structural losses	18
Mechanical and material loads	18
Intensive forestry	15
Reforestation	11
Hydraulic engineering:	
Regulation / suppression of natural river dynamics	**42**
Structural losses, such as river straightening	10
Changes through structural measures	8
Industrial water body management	4
Habitat management:	
Inappropriate or lacking management	26
Lack of public awareness	4
Fishery:	
Water pollution, such as biocides, fertilizing, liming, feeding	23
Intensive fishing	9
Landscape changes:	
Fragmentation and isolation of habitats	17
Changes of urban settlement structures	8
Loss of village structures, urbanization	6
Coastal protection:	
Dike construction, shore protection, formation of dunes	21
Transport and energy:	
Release of contaminants	14
Intensive road and rail maintenance	6
Sealing by roads etc.	5
Leisure and tourism:	
Destruction / trampling / pollution	15
Space consumption	5
Construction and mining	
Closing small area excavation	8
Material loads	5
Military:	
Abandonment	8
Mechanical and material loads	4

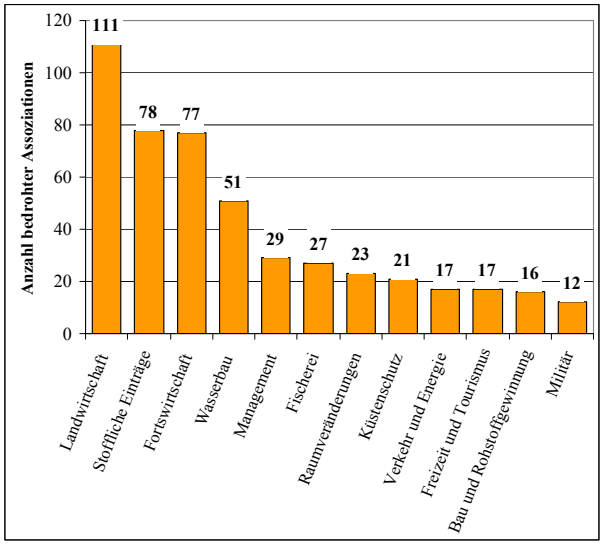

Fig. 10. Number of threatened associations (n = 173) affected by different causal complexes in Mecklenburg-Vorpommern, multiple assignments were allowed. The sequence of causal complexes is the same as in Table 11.

Table 11 shows that most plant communities – 64% of all threatened associations – are threatened by factors attributable to the (intensive) agriculture. The main damaging factors within the agricultural practice are eutrophication and herbicide application, changes in landscape structure and drainage of wetlands, followed by contaminations (mainly diffuse nutrient inputs from the atmosphere and water pollution), forestry (especially drainage) and hydraulic engineering (especially water body regulation).

Overall of medium importance as threats factors are the complexes habitat management, fisheries, landscape changes and coastal protection. Least important as a threat to for the majority of plant communities are those factors related to transport and energy supply, leisure and tourism, urban development, mining and military. It should be noted, however, that this assessment refers to plant communities as abstract types and all these factors may cause a substantial threat for individual concrete vegetation stands.

This spectrum of dominant threat causes is closely connected to the geological and economic structure of Mecklenburg-Vorpommern as agricultural land with low degree of industrialization, but a high percentage of arable land and semi-aquatic habitats. The main threat factors eutrophication and drainage could decrease in the next decades when a more sustainable agriculture would be established. The opportunities existing in the agricultural sector (e.g. subsidies for conservation-oriented grassland management)

and in hydraulic engineering (e.g. restoration of water bodies and swamps) should be exploited.

Legal protection

Protection of habitats according to § 20 of the Nature Conservation Law of Mecklenburg-Vorpommern (LNatG)

Targets of § 20 of the Law for the Protection of Nature and Landscape in Mecklenburg-Vorpommern (Land Conservation Act – LNatG MV) of 22 October 2002, last amended on 17 December 2003, are the endangered habitats. As 'identifiable habitats of plant and animal communities' they usually characterized among others by typical vegetation. The assignment of all associations to a habitat type as defined as **legally protected biotopes** (Annex 1 to § 20 LNatG MV) provides a good measure of check their status of protection. In particular, the 125 associations and the subtypes of nine other associations with high or very high need for action require special attention. Fortunately, almost 80% of these associations are generally protected by law. Among them, with one exception, all associations with currently very high need for action.

However, there are also 11 (9%) of these highly action requiring associations and one subtype that are presently not protected by law (Table 12). These are ruderal and arable weed communities, wall vegetation, forest-edge tall herb communities and some mesophilous forest types.

Table 12. Plant communities with high or very high need for action, but not protected by § 20 LNatG MV. H = need for action; § 20 = protected by § 20 LNatG MV, § 30 = protected by § 30 BNatSchG =, FFH = protected by the EU Habitats Directive, * = priority habitat types.

Association or subtype		H	§ 20	§ 30	FFH
16.1.2.3	Poo annuae-Coronopetum squamati	!!	–	–	–
18.1.1.1	Sclerantho annui-Arnoseridetum minimae	!!	–	–	–
18.3.1.1	Euphorbio exiguae-Melandrietum noctiflori	!!	–	–	–
19.2.2.1	Cystopteridetum fragilis	!!	–	–	–
25.1.3.2	Potentillo sterilis-Conopodietum majoris	!!	–	–	–
26.1.1.2	Corydalido claviculatae-Epilobietum angustifolii	(!!)	–	–	–
26.2.2.3	Chaerophylletum bulbosi	(!!)	–	–	–
26.2.2.4	Urtico dioicae-Parietarietum officinalis	!!	–	–	–
33.1.1.1	Lonicero periclymeni-Fagetum sylvaticae	!!!	–	–	yes
33.1.1.2b	Vaccinio myrtilli-Fagetum sylvaticae, *Leucobryum glaucum* subtype	!!	–	–	yes
34.1.1.1	Adoxo moschatellinae-Aceretum pseudoplatani	!!	–	yes	yes*
34.1.1.2	*Prunus avium-Acer platanoides* community	(!!!)	–	yes	yes*

Another 17 (14%) associations and two subtypes with a high to very high need for action fall under legal habitat protection only under certain conditions (for example, certain structural features of the biotopes). They belong to the following habitats:

- Water bodies, shores and swamps (07.1.1.4, 07.1.2.1, 07.1.2.3, 09.1.2.2)
- Lagoons and sea shore drift line (03.1.2.3, 15.1.3.3) and coastal shrubs (31.1.1.3c)
- Wet grassland (23.2.2.1, 23.2.2.1a)
- Thermophilous forest-edge and tall herb vegetation (25.1.2.1, 25.2.1.1, 25.2.1.3, 25.3.1.1 and 25.3.1.2, 25.3.2.1, 25.3.2.3, 25.3.2.4, 25.3.2.5)
- Lichen-rich pine forest (32.1.1.4)

Some communities are part of protected habitats according to Annex I of the EU Habitats Directive (Directive 92/43/EEC, see Table 13 and Appendix S2). Since all states of the European Union are obliged to establish and maintain a network of protected areas (Natura 2000), the lack of legal protection of biotopes on the state-level could be compensated.

In connection with the last amendment (25.11.2003) of the Federal Nature Conservation Act – BNatSchG), parts of the remaining protection deficit were eliminated. Previously, in Mecklenburg-Vorpommern only natural swamp forests and forests of dry and warm locations were protected by law. Due to the amendment of § 30 BNatSchG now also ravine and slope forests are included in the habitat protection of the German federal states. Specifically the legal protection of marine and coastal habitats and inland water bodies and their plant communities have been extended in this act (see Riecken 2002). Now the whole area of all water bodies (lakes, ponds, backwaters, abandoned mining waters, etc.) with their complete vegetation fall under legal habitat protection.

Assignment of the associations with FFH habitats

The assignment to habitat types of Annex I of the EU Habitats Directive, based on the treatment for the whole of Germany by Ssymank et al. (1998), is given in Table 13. This result enables to differentiate, describe and assess the Annex I habitats in phytosociological terms.

Table 13. Overview of the assignment of the associations of Mecklenburg-Vorpommern to Annex I habitats of the EU Habitats Directive. Habitats type = habitat type in Annex I of the EU Habitats Directive; * = priority habitat; (*) = only orchid rich stands belong to that priority habitat type.

Habitat typ	No. of assoc.	Associations	
		Habitats	Habitats p.p.
Marine and coastal habitats (incl. inland dunes)			
Open sea and tidal areas			
1110	p.p 1		02.1.1.1
1130	p.p 7		03.1.1.1, 03.1.1.2 03.1.2.1, 03.1.2.2 03.1.2.3, 04.2.1.5 05.2.2.1
***1150**	p.p 8		all 1110 and 1130
1160	p.p 5		02.1.1.1, 03.1.1.1 03.1.1.2, 03.1.2.1, 03.1.2.2

Habitat typ	No. of assoc.	Associations	
		Habitats	Habitats p.p.
Sea cliffs and shingle or stony beaches			
1210	2	15.1.1.1, 15.1.3.1	
1220	1, p.p 3	15.1.3.2	15.1.2.1, 15.1.3.3 26.4.1.2
1230	p.p 10		17.2.1.1, 17.2.1.3 21.4.3.2, 25.3.1.1 25.3.1.2, 26.4.1.1 26.4.1.2, 26.4.1.3 26.5.1.1, 26.5.2.2
Atlantic and continental salt marshes and salt meadows			
1310	2	06.1.1.1, 14.1.1.2	
1330	10, p.p 1	14.1.1.1, 14.1.2.1 14.1.2.2, 14.1.2.3 14.1.2.4, 14.1.2.5 14.1.2.6, 14.1.2.7 14.2.1.1, 14.2.2.1	14.1.1.2
***1340**	p.p 5		06.1.1.1, 14.1.2.3, 14.2.1.1, 14.2.2.1, 14.3.1.1
Sea dunes of the Atlantic, North Sea and Baltic coast			
2110	1, p.p 3	24.1.1.1	15.1.3.2, 15.1.3.3 24.1.2.1
2120	2, p.p 3	24.1.2.2, 24.1.2.1	15.1.3.3, 17.2.1.3 26.4.1.3
***2131**	1, p.p 7	21.2.1.1	21.1.1.1, 21.1.1.3 21.4.1.1, 21.4.2.1 21.4.3.1, 21.5.2.1, 21.5.2.2
***2137**	1		21.3.1.1
***2140**	1	20.2.2.2	
2150	1	20.2.2.1	
2160	p.p 1		31.1.1.3
2180	1	32.1.1.3	32.1.1.1, 32.1.1.4 32.1.2.1
2192	p.p 2		07.1.2.2, 14.1.1.1
2193	p.p 2		11.1.1.2, 11.1.1.3
Inland dunes			
2310	p.p 1		20.2.1.2
2330	p.p 9		21.1.1.1, 21.1.1.2 21.1.1.3, 21.3.1.1, 21.3.1.2, 21.4.2.1, 21.4.3.1, 21.4.3.2, 21.4.3.3
Freshwater habitats			
Standing water			
3110	1	09.1.1.1	
3130	1, p.p 1	04.1.1.1	04.1.2.1
3131	4, p.p 2	09.1.2.1, 09.1.2.2 09.1.3.1, 09.1.3.2	09.1.1.1 09.1.3.3
3132	3, p.p 4	07.1.1.2, 07.1.1.3 07.1.1.4	07.1.1.1, 07.1.2.1 07.1.2.2, 07.1.2.3
3140	4, p.p 4	04.2.1.1, 04.2.1.2 04.2.1.3, 04.2.1.4	04.1.2.1, 04.2.1.5 04.2.2.1, 05.2.3.2
3150	p.p 13		01.1.1.1, 01.1.1.2 01.1.2.1, 01.1.3.1 01.1.3.3, 05.2.1.1, 05.2.1.2, 05.2.1.4, 05.2.2.1, 05.2.2.2, 05.2.2.3, 05.2.3.1, 05.2.3.2
3160	p.p 4		01.1.1.1, 01.1.1.2 05.1.1.3, 05.2.1.3
Running water			
3260	1, p.p 2	05.2.2.4	05.2.2.1 05.2.2.2
3270	3, p.p 2	08.1.1.2, 08.1.2.2, 08.1.2.3	08.1.1.1, 08.1.2.1

Habitat typ	No. of assoc.	Associations	
		Habitats	Habitats p.p.
Temperate heath and scrub			
European wet and dry heaths			
4010	p.p 3		11.1.1.1, 11.1.1.2 11.1.1.3
4030	2	20.2.1.1, 20.2.1.2	
Sub-Mediterranean and temperate scrub			
5130	1	32.1.1.2	
Natural and semi-natural grassland formations			
Natural grassland			
6120	2, p.p 1	21.5.1.1, 21.5.2.2	21.5.2.1
Semi-natural dry grasslands and scrubland facies			
(*)6212	1	22.1.1.1	
(*)6214	1	21.4.3.2	
***6230**	2	20.1.1.1, 20.1.1.2	
***6240**	2	22.1.2.1, 22.2.1.1	
Semi-natural tall-herb humid meadows			
6410	2	23.3.1.1, 23.2.2.2	
6431	p.p 7		13.4.1.1, 13.4.1.2 13.4.2.1, 13.4.2.2 13.4.3.1, 13.4.3.2 13.4.3.3
6440	p.p 1		23.2.2.1
Mesophile Grassland			
6510	p.p 1		23.1.1.1
Raised bogs and mires and fens			
Sphagnum acid bogs			
***7110**	1, p.p 1	11.2.1.2	11.2.1.1
7120	p.p 1		11.3.1.1
7140	6, p.p 8	11.2.1.1, 11.3.1.1 12.1.1.1, 12.1.1.2 12.2.1.1, 12.2.1.2	11.2.1.2, 11.2.2.1 11.2.2.2, 12.2.1.3 12.2.2.1, 12.3.1.1 12.3.1.2, 13.1.2.1
7150	2, p.p 2	11.2.2.1, 11.2.2.2	11.1.1.1, 12.2.2.2
Calcareous fens			
***7210**	2, p.p 2	12.2.3.1, 29.1.1.2	12.2.1.3, 12.2.3.2
***7220**	2	10.1.1.1, 30.1.1.1	
7230	7, p.p 4	12.2.4.1, 12.2.4.2 12.2.4.3, 12.3.2.1 12.3.2.2, 12.3.2.3 29.1.1.1	12.2.3.1, 12.2.3.2 12.3.1.1, 12.3.1.2
Forests			
9110	1, p.p 1	33.1.1.1	33.1.1.2
9130	3	34.2.1.1, 34.2.1.2 34.2.2.1	
9150	1	34.2.3.1	
9160	p.p 1		34.2.1.1
***9180**	2	34.1.1.1, 34.1.1.2	
9190	p.p 1		33.1.2.1
***91D0**	1	30.2.1.2	
***91D1**	2	29.2.1.1, 29.2.2.1	
***91D2**	3	28.1.1.1, 28.1.2.1, 28.1.2.2	
91E0	5	27.1.1.1, 27.1.1.2 30.1.2.1, 30.2.2.1 30.2.2.2	
91F0	1	30.3.1.2	
91T0	1	32.1.1.4	
91U0	1	32.1.2.1	

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