Classification, management and evaluation of grasslands in Natura 2000 sites

Joachim Mulser

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Department for nature, landscape and spatial development
• Current situation
• Objectives
• Methods
• Implementation and next steps
Current situation
Land cover 2015

Legend
- non-agricultural used area
- arable
- fruit cultivation and viticulture
- intensively managed meadow
- extensively managed meadow and pasture

source: Land cover „Realnutzungskarte“ 2015 (satellite images, 2013)
Percentage of agricultural used areas referring to the total area of South Tyrol

- non-agricultural used areas: 529,208 ha (71%)
- arable: 6,542 ha (1%)
- fruit cultivation and viticulture: 26,768 ha (4%)
- intensively managed meadow: 68,206 ha (9%)
- extensively managed meadow and pasture: 109,225 ha (15%)
- arable: 6,542 ha (1%)

Source: Land cover „Realnutzungskarte“, 2015
**Overview of species-rich meadows in South Tyrol**

- **Funded extensively managed meadows** (source: Nature conservation payments, 2011)
- **Other intensively managed grasslands** (source: GeoLafis, 2011)

**Natura 2000 habitats**

- **6150** Siliceous alpine and boreal grasslands
- **6170** Alpine and subalpine calcareous grasslands
- **6210** Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*)
- **6230** Species-rich *Nardus* grasslands on siliceous substrates in mountain areas
- **6410** *Molinia* meadows on calcareous, peaty or clayey-siltladen soils (*Molinion caeruleae*)
- **6510** Lowland hay meadows
- **6520** Mountain hay meadows
- **6520, 6230, 6510** Species-rich hay meadows
- **6230, 6520, 6170, 6510** Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*
- **6240** Formations erbose steppiche subpannoniche
- **6410, 7210, 7230** Other intensively managed grasslands

**Habitat Natura 2000**

- **6230, 6170, 6150, 7230, 6210** Nutrient-poor meadow
- **6520, 6230, 6510** Species-rich hay meadows
- **6230, 6520, 6170, 6510** Meadows with larch
- **6410, 7210, 7230** Litter meadows

- **56.806 ha** 93.3 %
- **4.094 ha** 7.6 %
Classification, management and evaluation of meadows

Joachim Mulser

Alpine grassland management workshop

Laufen, Germany, 9-11 December 2015
Extensively managed species-rich meadows:
- Nutrient-poor meadow
- Species-rich hay meadows
- Meadows with larch
- Litter meadows
Classification, management and evaluation of meadows

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Alpine grassland management workshop
Laufen, Germany, 9-11 December 2015

Distribution of species-rich meadows
Distribution of species-rich meadows
Main threats

**Abandonment** of meadows due to:

- difficult accessibility
- difficult management
- small-sized distributions of property
Main threats

Increase in agricultural production

• increase of livestock per site
• purchase of fodder

• increased distribution of liquid manure
• increased frequency of cutting
Main threats

Increase in agricultural production

• levelling and melioration
• utilization of standard seed mixtures
• drainage in wet meadows
Objectives
## Development of a standardized mapping system

### Inventory of ecologically valuable grassland habitats:
- informative overview of the developments and trends
- basis for decision making in the case of impact on the landscape

### Fulfilment of the requirements concerning the Natura 2000 Assessments:
- defining favourable conservation status
- establishment of the Monitoring system

### Admission requirements for the nature conservation payments for:
- nutrient-poor meadow
- species-rich hay meadows

### Guidelines for locally adapted management of:
- Nature 2000 habitats
- other ecologically valuable grassland habitats
Methods
Classification scheme for grasslands according to the intensity of management

A. very intensively managed and/or hypertrophic meadows

B. intensively managed, eutrophic and profitable meadows

C. eutrophic meadows with a management of medium intensity

D. species-rich, mesotrophic and less intensively managed meadows

E. extensively managed semi-natural nutrient-poor grasslands (incl. mown bogs and other hydrophilous grasslands)
### Quick - classification through stand forming species

<table>
<thead>
<tr>
<th>Intensity of management</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

#### A
- *Poa trivialis*
- *Poa annua*
- *Agropyron repens*

#### B
- *Lolium perenne*
- *Lolium multiflorum*

#### C
- *Dactylis glomerata*
- *Trisetum flavescens*
- *Arrhenaterum elatior*

#### D
- *Arrhenaterum elatior*
- *Trisetum flavescens*
- *Festuca rubra*
- *Festuca rupicola*

#### E
- *Bromus erectus*
- *Festuca rubra*
- *Agrostis tenuis*
- *Nardus stricta*
- *Sesleria caerulea*
- *Festuca valesiaca*

#### Species
- *Rumex obtusifolius*
- *Rumex alpinus*
- *Poa pratensis*
- *Alopecurus pratensis*
- *Lolium perenne*
- *Poa pratensis*
- *Alpecurus pratensis*
- *Bromus erectus*
- *Nardus stricta*
- *Poa alpina*
- *Molinia caerulea*
- *Carex sempervirens*
- *Carex ferruginea*
- *Carex nigra*
- *Carex davalliana*
- *Carex flava*
A Very intensively managed and/or hypertrophic meadows

Species-poor (< 20 species), species are indicators for very intensive fertilisation, high tolerance toward nitrogen and salt. High to low stands, high harvest frequency and suboptimal production (low biomass).
A Very intensively managed and/or hypertrophic meadows

Species-poor (< 20 species), species are indicators for very intensive fertilisation, high tolerance toward nitrogen and salt. High to low stands, high harvest frequency and suboptimal production (low biomass).
Intensively managed, eutrophic and profitable meadows

Species-poor (ca. 20 - 25 species), most of them nitrophilous. These plant stands are stabil and have a mostly dense sod, are profitable, consist of good forage plants and have a good balance of grasses, legumes and herbs.
B Intensively managed, eutrophic and profitable meadows

Species-poor (ca. 20 - 25 species), most of them nitrophilous. These plant stands are stabil and have a mostly dense sod, are profitable, consist of good forage plants and have a good balance of grasses, legumes and herbs.
C  Eutrophic meadows with a management of medium intensity

Average number of species (ca. 30 species). Consist of qualitative and profitable forage plants and have a good balance of grasses, legumes and herbs. This grasslands can appear very colorful depending on the presence and development of herbs.
Nutrient-rich type:
• >3% of the dry matter: Poa trivialis, Holcus lanatus, Bromus mollis, Capsella bursa-pastoris, Stellaria media, Lamium album, Achillea millefolium, Carum carvi, and others
or
• >10% of the dry matter: Anthriscus sylvestris, Heracleum sphondylium, Taraxacum officinale, Rumex sp., Ranunculus acris, R. repens, Agropyron repens, Geranium sylvaticum, and others
Typical type:
- productive grasslands dominated by Arrhenatherum elatior or Trisetum flavescens with meadow-flowers
- transitional grasslands with presence of Arrhenaterum elatior, Trisetum flavescens, Dactylis glomerata and/or Festuca pratensis, Festuca rubra, Agrostis tenuis
Typical type:
- productive grasslands dominated by Arrhenatherum elatior or Trisetum flavescens with meadow-flowers
- transitional grasslands with presence of Arrhenatherum elatior, Trisetum flavescens, Dactylis glomerata and/or Festuca pratensis, Festuca rubra, Agrostis tenuis
Species-rich, mesotrophic and less intensively managed meadows

High species number (> 35 species), no or few nitrophilous plants (< 3% of the dry matter), good balance of grasses, legums and herbs. The herbs consist mostly of wild flowers (mostly biennials or perennials) and thus indicate a late first cut.
Species-rich, mesotrophic and less intensively managed meadows

High species number (> 35 species), no or few nitrophilous plants (< 3% of the dry matter), good balance of grasses, legums and herbs. The herbs consist mostly of wild flowers (mostly biennials or perennials) and thus indicate a late first cut.
Extensively managed semi-natural nutrient-poor grasslands (incl. mown bogs and other hydrophilous grasslands)

High species number (mostly >40 species, except hydrophilous meadows, which can be less species-rich). Species of collin to subalpine dry or nutrient-poor grasslands and bogs
Extensively managed semi-natural nutrient-poor grasslands (incl. mown bogs and other hydrophilous grasslands)

High species number (mostly >40 species, except hydrophilous meadows, which can be less species-rich). Species of collin to subalpine dry or nutrient-poor grasslands and bogs.
## Accordance between grassland classes and Natura 2000 habitats

<table>
<thead>
<tr>
<th>CLASSES OF MANAGEMENT INTENSITY</th>
<th>HABITAT NATURA 2000 WITH CONSERVATION STATUS*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6150</td>
</tr>
<tr>
<td>A</td>
<td>A</td>
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<td>B</td>
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<td><strong>C</strong></td>
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<td>C(B)</td>
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<td>C</td>
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<td>C(D)</td>
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<td><strong>D</strong></td>
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<td>D(C)</td>
<td>c</td>
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<td>D</td>
<td>b</td>
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<tr>
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<tr>
<td>E(D)</td>
<td>a(b)</td>
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<tr>
<td>E</td>
<td>a</td>
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</tbody>
</table>

* CONSERVATION STATUS

- **a**: excellent
- **a(b)**: excellente (good)
- **b(a)**: good (excellent)
- **b**: good
- **b(c)**: good (average)
- **c(b)**: average
- **c**: reduced
### Indicator species

<table>
<thead>
<tr>
<th></th>
<th>species</th>
<th>grasses</th>
<th>legumes</th>
<th>herbs</th>
<th>lichens/mosses</th>
<th>forage production (%) dry matter</th>
<th>disturbance indicator (%) dry matter</th>
<th>gap-filler (%) dry matter</th>
<th>species which indicate Natura 2000 habitats</th>
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<tbody>
<tr>
<td>1</td>
<td>Achillea sp.</td>
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<tr>
<td>2</td>
<td>Acinos alpinus</td>
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<td>Aconitum sp.</td>
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<td>Agrimonia eupatoria</td>
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<td>5</td>
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<td>7</td>
<td>Ajuga sp.</td>
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<td>8</td>
<td>Alchemilla sp.</td>
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<td>9</td>
<td>Allium sp.</td>
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<td>Alopecurus pratensis</td>
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<td>12</td>
<td>Anthericum sp.</td>
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<td>Anthriscus sylvestris</td>
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<td>14</td>
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<td>Arnica montana</td>
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<td>18</td>
<td>Artemisia campestris</td>
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<td>Avenula flexuosa</td>
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<td>23</td>
<td>Bartsia alpina</td>
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<tr>
<td>24</td>
<td>Biscutella laevigata</td>
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<td>25</td>
<td>Biscutella laevigata</td>
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<td>X</td>
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<tr>
<td>26</td>
<td>Vicia cracca, V. sepium</td>
<td>X</td>
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<tr>
<td>27</td>
<td>Vicia hirsuta</td>
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<td>28</td>
<td>Viola arvensis, Arveni</td>
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<td>29</td>
<td>Viola tricolor</td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
<td>0.25</td>
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<tr>
<td>30</td>
<td>Willemetia stipitata</td>
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</tbody>
</table>
Guidelines for locally adapted management

In presence of a Natura-2000-habitat with reduced conservation status, adequate corrective measures in accordance with the Department for Nature, landscape and spatial development have to be undertaken:

<table>
<thead>
<tr>
<th>Management class</th>
<th>Description</th>
<th>Dominant grass species</th>
<th>Habitat</th>
<th>Altitude (m a.s.l.)</th>
<th>Cut frequency (yr)</th>
<th>Yield (t/ha)</th>
<th>N-max (kg/ha/yr)</th>
<th>Management measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Very intensively managed and/or hypertrophic meadows</td>
<td>...</td>
<td>...</td>
<td>&lt; 1,250</td>
<td>4</td>
<td>10</td>
<td>150</td>
<td>3, 8, 120</td>
</tr>
<tr>
<td>B</td>
<td>Intensively managed, eutrophic and profitable meadows</td>
<td>...</td>
<td>...</td>
<td>&lt; 1,250</td>
<td>4</td>
<td>10</td>
<td>150</td>
<td>3, 8, 120</td>
</tr>
<tr>
<td>C</td>
<td>Eutrophic meadows with a management of medium intensity</td>
<td>...</td>
<td>...</td>
<td>&lt; 1,250</td>
<td>3</td>
<td>7,5</td>
<td>113</td>
<td>2, 5, 75</td>
</tr>
<tr>
<td>D</td>
<td>Species-rich mesotrophic and less intensively managed meadows</td>
<td>...</td>
<td>...</td>
<td>&lt; 1,250</td>
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<tr>
<td>E</td>
<td>Extensively managed semi-natural but poor grasslands (not known bogs and other hydophilous grasslands)</td>
<td>...</td>
<td>...</td>
<td>&lt; 1,250</td>
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</table>
Implementations and next steps
<table>
<thead>
<tr>
<th>Implementations and next steps</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inventory of grassland habitats:</strong></td>
</tr>
<tr>
<td>• Current Grassland releves for different purposes are performed applying this system</td>
</tr>
<tr>
<td>• Accessibility to the public through the provincial browser for geodata</td>
</tr>
</tbody>
</table>
Fulfilment of requirements concerning the Natura 2000 Assessments:

- Definition of reference areas (local FRV)
- Establishment of the favourable conservation status through a field validation
- Development of clear criteria for cartographical delimitation
Implementations and next steps

Admission requirements for nature conservation payments:
• Implementation in the Rural Development Plan 2014-2020
• Performance of the relevés and controls 2015 according to this system
Implementations and next steps

Guidelines for locally adapted fertilization management of grasslands:
• Lack of willingness for the application of the proposed management measures
• More awareness-raising; further analysis at farm level; necessity of regimentation in order to establish minimum standard measures