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ARANGE Deliverable D1.2

Catalogue of harmonized environmental variables

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Abstract:

This document describes how in the ARANGE project current forest conditions in the seven Case Study Areas (CSA) are characterized and made accessible for quantitative analysis. In each CSA a set of Representative Stand Types (RST) is defined which provide a sufficient representation of forest conditions in each CSA. RSTs are defined via species composition, forest structure, management system (i.e. evenaged, unevenaged) and the site conditions. Site conditions in the CSAs are represented by a set of Site Types which include also climate data (baseline climate, climate change scenario data). Quantitative data available for each RST include: (i) water storage capacity, (ii) plant available Nitrogen, (iii) pH of the mineral soil, (iv) species specific diameter distribution for trees >10cm DBH including a representative tree height for each DBH class, (v) species specific seedling numbers in four predefined height classes. Additionally there is qualitative information provided on mixture pattern in trees and regeneration. RST numbers in CSAs range from 19 to 88, site types from 6 to 26. To allow the assessment of forest ecosystem provisioning at spatial scales beyond stand level one or more Representative Landscapes (RL) are defined in each CSA. The RLs provide a spatially explicit matrix of stand polygons and cover areas from 216 to more than 10000 hectares. Each of the stand polygons is represented by one of the RSTs (multiple assignments of RSTs to polygons is possible).

TABLE OF CONTENTS

1	Introduction	4
2	Representative Stand Types (RST)	5
2.1	Defining the RSTs	5
2.2	Variable definition	5
3	Representative Landscapes (RL)	9
3.1	Defining Representative Landscapes	9
3.2	Variable definition	10
4	Interfaces to other Work Packages and Tasks	12
5	Literature	13
	Annex – RSTs and RLs	14
	A1 CSA1 (Valsain)	14
	A2 CSA2 (Vercors)	17
	A3 CSA3 (Montafon)	18
	A4 CSA4 (Sneznik)	28
	A5 CSA5 (Vilhelmina)	32
	A6 CSA6 (Kozie chrby)	36
	A7 CSA7 (Shiroka laka)	37

1 Introduction

ARANGE is assessing forest management in seven case study areas (CSA) throughout European mountain regions. The term “forest management” is frequently used without proper definition. In the context of the ARANGE project forest management includes silvicultural measures and technical systems and approaches to actually implement silvicultural measures at various spatial scales, from individual trees to catchments and landscapes.

The smallest planning and treatment unit in silviculture is usually called “stand” (biology focused) or “compartment” (planning focused). A “stand” is defined as a forest area with (more or less) homogeneous conditions regarding to (i) site conditions, (ii) tree species composition, (iii) stand structure, (iv) tree age, (v) management objectives, and (vi) silvicultural treatments. The area size of such stands / compartments ranges from about 0.5ha to areas as large as 10-20ha, depending on attributes as listed above. Ownership characteristics play an important role as well.

In order to provide a common data base regarding site and stand conditions for all partners involved in implementing the ARANGE work plan the forest conditions in each ARANGE CSA was characterized by a set of “Representative Stand Types” (RST). To study implications of forest management at scales beyond the stand level at least one “Representative Landscape” (RL) per CSA was defined as well. RSTs and RLs, on one hand, are meant to provide the base to assess current management practices and its implications for ecosystem service provisioning, on the other hand the RSTs and RLs should also allow to explore potential alternative management regimes in the CSAs.

Details on RSTs and RLs are described in Chapters 2 and 3, links to various tasks in ARANGE Work packages in Chapter 4. In the Annex a technical description of RSTs and RLs in each CSA is given. The actual data is available to all ARANGE partners at the Internal Communication Platform (ICP).

2 Representative Stand Types (RST)

2.1 Defining the RSTs

In each case study area (CSA) the forest conditions are represented by Representative Stand Types (RST). These stand types are defined via (i) species mixture, (ii) tree age / stand development stage, (iii) site type (considering, i.a., altitude, slope & exposition, water storage capacity, nutrient supply), and (iv) whether they are even aged or uneven aged. The site type is an integral component of any RST and includes the link to a specific baseline climate record (see Deliverable D1.1).

In internal discussions 20(+) RSTs were considered as a realistic quantity per CSA. Typically, RSTs can be derived from (i) inventory data in the CSAs, or (ii) stand data available from management plans or (iii) from earlier research activities or gathered for the purpose of the ARANGE project. Whether synthetic stand types derived from measured data sets or selected “representative” stands which have been directly measured in the field are used depends on the specific situation in the CSAs.

In CSAs holding age class forests each RST should include the respective age class sequence.

The coding system for the RSTs considers the main features of a RST (e.g., species composition, structure, site; see above) as well as the stand development stages (i.e. age classes) (see Table 1).

Table 1. Coding system for RSTs.

Code position	Characterization
1.x	main RST, defining an entire chronosequence;
x.1-n	Chronosequence (stand development stages, age classes) of a main RST; should not exceed 6 categories;

2.2 Variable definition

In defining the variables to characterize each RST the role of RSTs in the ARANGE context needs to be reviewed. Main approach in ARANGE is to assess the implications of silvicultural management on ecosystem service provisioning based on empirical data as well as with ecosystem simulation approaches. The latter approach is the backbone of the ARANGE concept. Thus, data used to characterize the RSTs must be suitable to initialize the various forest simulation models available within the ARANGE consortium (e.g., Bugmann 2001, Cordonnier et al. 2008, Lexer and Hönninger 2001, Seidl et al. 2005, Schuhmacher and Bugmann 2006, Fabrika and Dursky 2005, Lamas and Erikson 2003). Based on (i) a questionnaire send to all modelling

groups within the consortium and (ii) the data availability in the CSAs as reported by the Case Study Responsibles (CSRs) a common RST data model has been defined.

Table 2. Attributes to characterize the site types in a CSA.

Attribute	Description [measurement unit]
Site-ID	ID of site type [1-n]
altitudinal range	[m a.s.l.]
Aspect	[0-360°]
Slope	[%]
Bedrock (geology)	calcareous, acidic, mixed
Soil type	FAO classification if possible
Soil depth	From topsoil mineral horizon to bedrock [cm]
Stoniness	Coarse fraction (>2mm) in mineral soil [%]
pH	Mineral layer (0-20cm)
Nutrient supply	Poor, intermediate, rich
plant available Nitrogen	Can be estimated from total N in mineral soil and a mineralisation rate (0.5-4%) [kg/ha*yr]
Water storage capacity	water column which can be stored in the mineral soil profile (soil depth); will be in the range of 50mm (sandy, shallow soil) and 250mm (high storage capacity in loamy deep soils with low stoniness) [mm]
Climate record ID	representative climate data records (baseline, climate change scenarios) are linked to the site types

Attributes to characterize each representative stand are listed in Table 3, in Figure 1 examples for the representation of tree populations via the DBH distribution and regeneration status via seedling density in height classes is shown.

Table 3. Attributes to characterize the representative stands.

Attribute	Description [measurement unit]
RST-ID	ID of RST (see Table 1)
Site-ID	ID of assigned site type
DBH distribution	each CSA should use the local minimum DBH used in forest inventories; as class width for the DBH distribution 0-10, 10-15, 15-20, 20-25cm etc. are proposed. If in a CSA diameter distributions can not be provided at this resolution in defining the diameter classes please to multiples of 5cm class width. [n/ha] per tree species
Tree height	Representative tree height per DBH class and species. Can either be provided via a height-diameter equation OR as a mean height value per diameter class and species. [m]
Mixture form	Qualitative description of the mixture form in mixed stands (e.g. random mixture, aggregation in patches); if patchy mixture please provide number of patches and mean size (patch diameter in [m]).
Regeneration	Seedling density per tree species in height classes: 10-30cm, 31-50cm, 51-80cm, 81-130cm; [n/ha]
Mixture form	a simple qualitative description of the distribution and mixture form of the regeneration in the RST. The following approach is used: (i) define whether the distribution is (a) patchy, (b) random, (c) regular. In case of patchy say how many patches/ha of which size; in case of regular say what the spacing is (in [a]m x [b]m). If there are more than one species present in the regeneration please define how these species are intermingled (intimate mixture, patchy). If there is any other distinctly different mixture form/distribution occurring in your RSTs please describe briefly in verbal form!

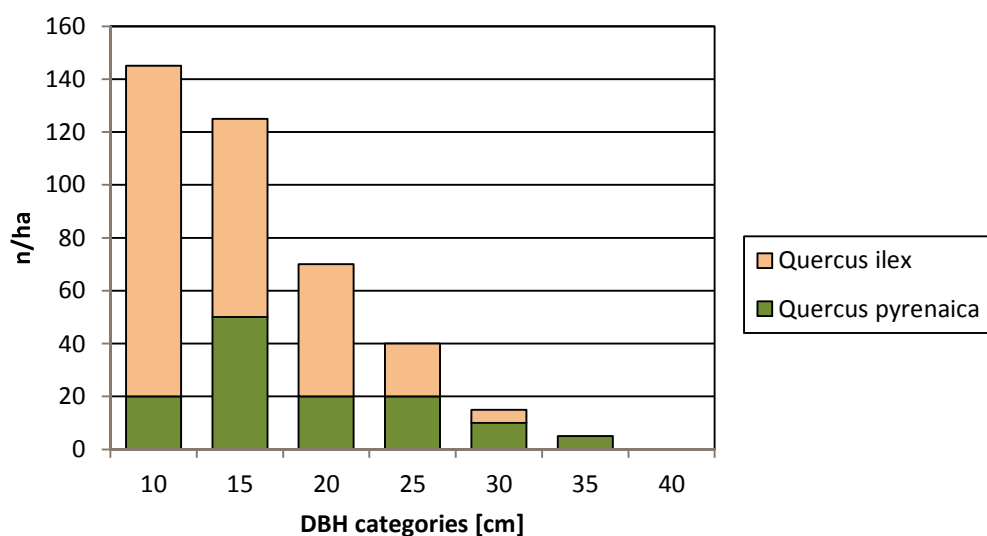


Figure 1a. Distribution of stems/ha over DBH categories per species in RST 2.1 from CSA1 (Valsain).

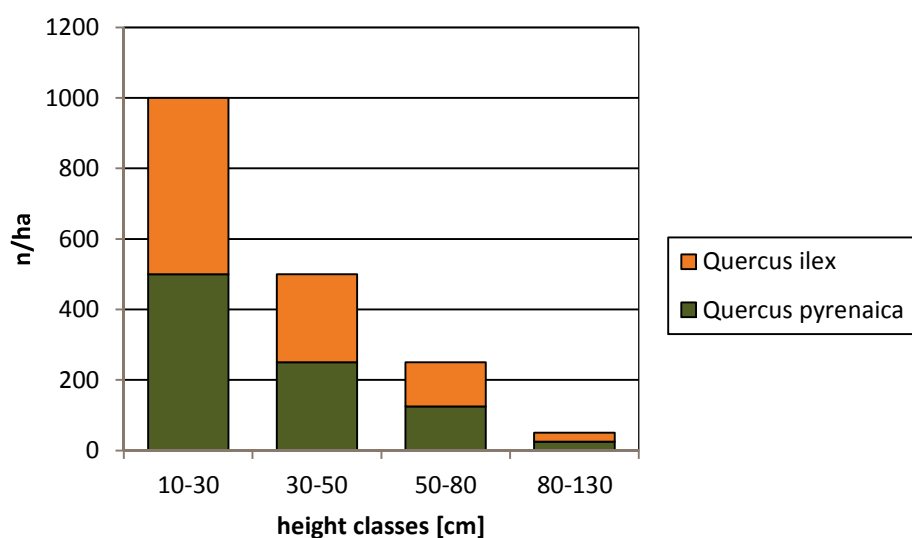


Figure 1b. Regeneration status in RST 2.1, CSA1 (Valsain). Seedling density per species in pre-defined height classes.

3 Representative Landscape (RL)

3.1 Defining the Representative Landscape

To study the implications of management for ecosystem service (ES) provisioning a spatial entity that goes beyond the stand scale is needed. Within the ARANGE project the term “landscape” was coined for that scale. The landscapes defined within ARANGE must represent typical conditions within the specific CSAs. At least one such “representative landscape” (RL) must be defined per CSA. The landscape must be spatially explicit in texture, i.e. a stand polygon map must be provided.

The most suitable size of these representative landscapes is not easy to define. The minimum size depends on relevant ES in each CSA. For instance, to assess the rockfall protection effect the minimum required area will be the slope scale. To assess habitat suitability for a woodpecker species 100-200 ha may be required as minimum home range area. If it is further assumed that one single woodpecker home range will not be sufficient to consider landscape level management issues the aim must clearly be for several woodpecker habitats in the studied landscape (e.g. at least 500ha).

Another aspect which must be considered in defining the landscape size is the number and size of stand polygons in the landscape (i.e. the spatial structure). The number/size of stand polygons will strongly affect the flexibility of assessing ES provisioning and the optimization of forest management at larger scales. If the landscape and the related number of stands are too small no landscape level strategy of “mixing” management concepts will be possible. Thus, approximately 100 stands (i.e. polygons) may be minimum requirement to create enough flexibility for shaping landscape level management pattern.

A technical issue related to forest simulation models should also be considered in deciding about appropriate polygon sizes. If spatio-temporal heterogeneous silvicultural treatments should be implemented non-spatial models will have huge difficulties in mimicking resulting effects on stand structure (non-spatial forest models can just use “average” conditions for the entire polygon).

Another issue is the size of the stand polygons in relation to operational management considerations. If the area of a stand polygon is too large, silvicultural treatments (e.g. regeneration cuts) may take too much time for full implementation (e.g. irregular shelterwood systems with regeneration periods of up to 40-60 years). An average size of 2-5ha as stand area may be an appropriate approach.

3.2 Variable definition

Table 3 lists the main RL attributes. To define the spatial structure of the RL a shape file set up is required. A digital elevation model (DEM) is not mandatory.

Table 3. Attributes to characterize the Representative Landscape (RL) in a CSA.

Attribute	Description [measurement unit]
RL-ID	ID of RL [1-n]
Number of polygons	[n]
Landscape area	[ha]

The stand polygons in the landscape are then represented by the RSTs (see Chapter 2). This means that to each stand polygon in the landscape one of the RSTs (or age class stages of a RST) is assigned (Figure 2). It is no requirement to have each individual stand polygon in the landscape being represented by a unique RST.

The focus of ARANGE will be on forest ecosystem services. So, at landscape scale parts of the landscape may be non-forest land and this will affect the landscape structure. However, there will be no focus on ES provided by other landcover types than forests.

Table 4 lists details on RSTs and RLs in the CSAs.

Table 4. Key attributes of all Case Study Areas in ARANGE.

Case Study Area	Location	RST definition	Site types	Landscape	comments
CSA1	Valsain, Spain	33 RSTs (14 main RSTs)	7	2616 ha (incl. 681 ha non-forest area), (89 MU-polygons, 265 stands [no spatial polygons inside MUs])	a MU-polygon contains more than 1 stand, usually also more than 1 RST (incl. non-forest area)
CSA2	Vercors, France	19 RSTs	12	<i>Not provided yet</i>	No regeneration data available!
CSA3	Montafon, Austria	Reilstal: 53 RST Silbertal: 18 RST	Reilstal: 14 Silbertal: 12	Reilstal: 210ha (53 polygons) Silbertal: 368ha (18 polygons)	
CSA4	Sneznik, Slovenia	47 RSTs (23 main RSTs)	8	5015.54 ha (1438 polygons)	regeneration data is provided at the level of main RSTs. This information is representative for juvenile/thicket stages (x.1) and for rejuvenation stages (x.4) of age class RSTs and for unevenaged RSTs.
CSA5	Vilhelmina, Sweden	88 RSTs (15 main RSTs)	8	10668 ha (889 polygons) 3 owners	
CSA6	Kozie chrby, Slovakia	45 RST (25 main RST)	6	5130 ha (1172 polygons)	
CSA7	Shiroka laka, Bulgaria	25 RSTs	10	735 ha (290 polygons) 1000 ha (312 polygons)	

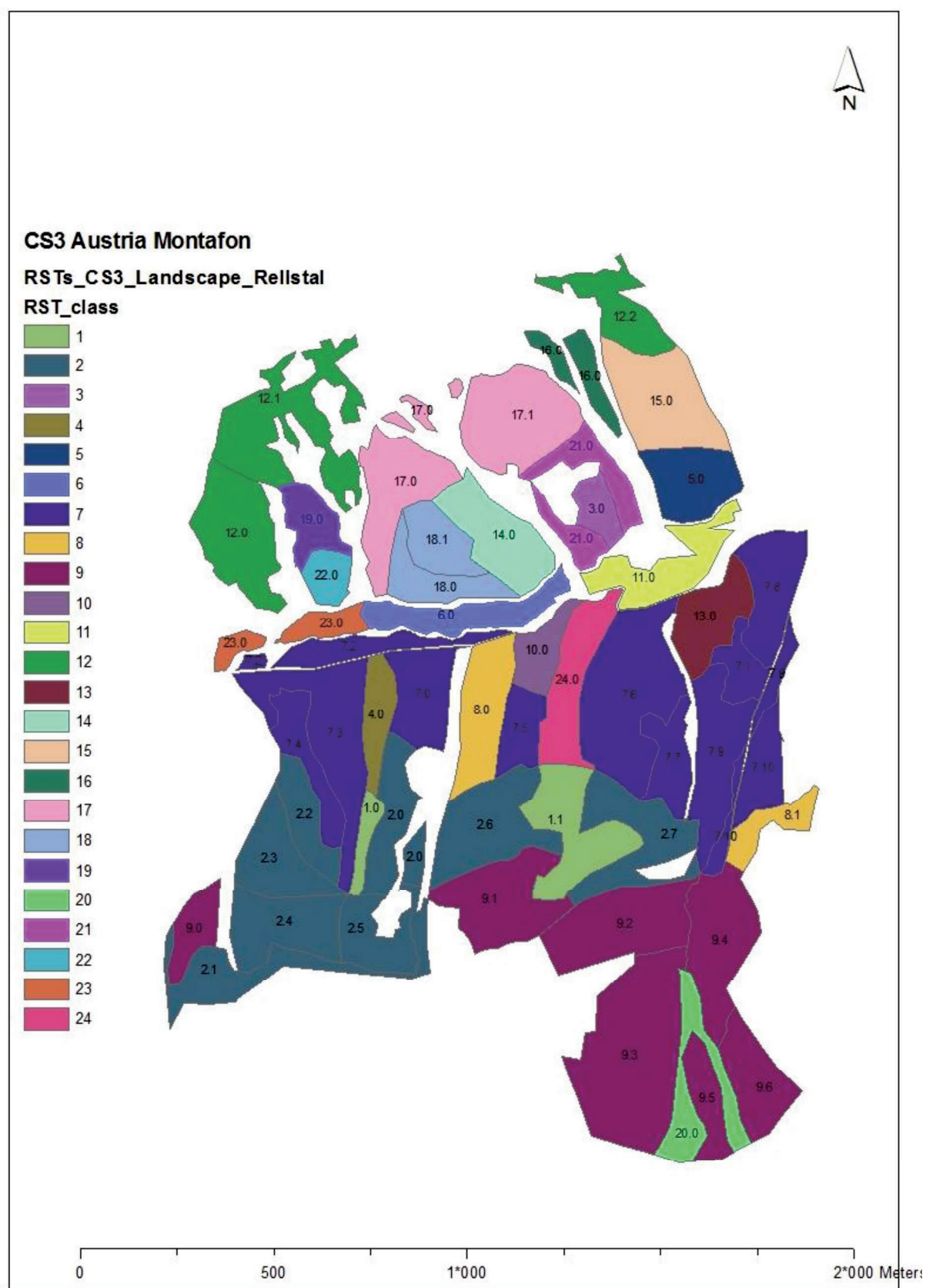


Figure 2. Representative Landscape (RL) “Rellstal” in the CSA3 (Montafon) in Austria. Colours denote main Representative Stand Types (RST), numbers in the polygons the stand development stages within a main RST (i.e. the chronosequence).

4 Interlink to other ARANGE Tasks

The RSTs are a core element in analysing current and potential alternative forest management regimes and their impact on forest structure and composition and related ecosystem service provisioning. Thus, manifold interlinkages to other Tasks and within Tasks have to be considered when defining the RSTs and when using them in the analysis.

4.1 Defining BAU and alternative management

The representative stands must be conceptually linked to the definition of BAU and potential alternative management (AM) as defined in Task 1.3. The explanation for this requirement is twofold:

- (1) For any RST which may be defined for a study landscape some management must be defined in order to simulate effects of management on ecosystem service provisioning. Thus, with the exception of unmanaged forests, there should be no RST without BAU management.
- (2) From the perspective of Task 1.3 (identifying current management practices in the case study areas) any practiced “baseline” management in a CSA must be linked to a “stand type” (i.e. forest type) in order to analyse its impacts on ecosystem service provisioning.

4.2 Analysing harvesting systems

A particular important aim in ARANGE is that emphasis will be put on realistic management practices that can be implemented given specific constraints in forest engineering and harvesting technology. In assessing the current status of employed harvesting systems the RSTs in combination with the silvicultural prescriptions (see Chapter 3.1) provide the frame regarding timber species, timber dimensions and harvest volumes. Road networks require the scale of landscapes, skyline logging systems the slope scale for meaningful analysis (Task 1.3).

4.3 Forest management planning and optimization

Work Package 4 sets focus on planning and optimization. Task 4.2 attempts to develop optimized management plans for larger parcels of forest (i.e. landscapes, forest management units) for a portfolio of ecosystem services. Landscape structure (i.e. forest types and their arrangement in the landscape) may affect the provisioning of ecosystem services and the type of management strategy being suitable to provide specific ecosystem services. Here it is important that realistic landscapes are available that contain an appropriate level of diversity in stand conditions and provide sufficient flexibility for management regarding the size of the landscape

and number of basic management units (i.e. stands). Similar requirements arise from Task 4.3 where multi-criteria methods will be used to analyse from multi-stakeholder perspectives alternative forest management plans.

5 Literature

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Appendix

A1 CSA1 (Valsain)

Table A-1.1. Site types in CSA1 (Valsain). SD = soil depth [cm], CF = coarse fraction >2mm of mineral soil [%], paN = plant available Nitrogen [kg/ha*yr], WSC = water storage capacity [mm], alt = altitudinal range [m].

Site-ID	Alt	Climate record	geology	soil type	SD	CF	PH	paN	WSC
1	1125-1375	1250 (flat)	acidic	Cambisol	60	58	4,1	94,2	61,0
2	1125-1375	1250 (0°)	Acidic	Cambisol	60	58	4,1	94,2	61,0
3	1125-1375	1250 (315°)	acidic	Cambisol	60	58	4,1	94,2	61,0
4	1125-1375	1250 (180°)	acidic	Cambisol	100	52	4,1	48,9	120,0
5	1375-1625	1500 (315°)	acidic	Ranker, cambisol	60	60	4,7	134,4	76,0
6	1625-1875	1750 (315°)	acidic	Ranker, Cambisol	100	45	3,8	100,0	195,0
7	>1875	2000 (270°)	acidic	Ranker	100	52	5,6	60,0	73,0

Table A-1.2. Representative Stand Types (RST) in CSA1 (Valsain).

RST-ID	species mixture [in % basal area]	age (or stand development stage)	site type
1,1	Q. ilex 100%	overmature (>120 years)	1
2,1	Q. pyrenaica 30%, Q. ilex 70%	Coppice	2
3,1	Q. pyrenaica 100% dense	Coppice	2
4,1	Q. pyrenaica 100% low dense	Coppice	2
5,1	Q. pyrenaica 70%, P. sylvestris 30%	Q.pyr: coppice, P.sylv: (80 years)	3
6,1	P. sylvestris 70%, Q. pyrenaica 30%	Q.pyr: coppice, P.sylv: (20 years)	3
6,2	P. sylvestris 70%, Q. pyrenaica 30%	Q.pyr: coppice, P.sylv: (50 years)	3
6,3	P. sylvestris 70%, Q. pyrenaica 30%	Q.pyr: coppice, P.sylv: (80 years)	3
6,4	P. sylvestris 70%, Q. pyrenaica 30%	Q.pyr: coppice, P.sylv: irregular	3
7,1	Q. pyrenaica 100% dense	Coppice	3
8,1	Q. pyrenaica 100% low dense	Coppice	3
9,1	Q. pyrenaica 100% dense	Coppice	4
10,1	Q. pyrenaica 100% low dense	Coppice	4
11,1	P. sylvestris 100%	thicket (20 years)	5
11,2	P. sylvestris 100%	pole (50 years)	5
11,3	P. sylvestris 100%	mature (80 years)	5
11,4	P. sylvestris 100%	over mature (>120 years)	5
12,1	P. sylvestris 70%, Q. pyrenaica 30%	Q.pyr: coppice, P.sylv: (80 years)	5
12,1	P. sylvestris 70%, Q. pyrenaica 30%	Q.pyr: coppice, P.sylv: (80 years)	5
13,1	P. sylvestris 100%	thicket (20 years)	6
13,2	P. sylvestris 100%	pole (50 years)	6
13,3	P. sylvestris 100%	mature (80 years)	6
13,4	P. sylvestris 100%	over mature (>120 years)	6
14,1	P. sylvestris 100%	thicket (20 years)	7
14,2	P. sylvestris 100%	pole (50 years)	7
14,3	P. sylvestris 100%	mature (80 years)	7
14,4	P. sylvestris 100%	over mature (>120 years)	7

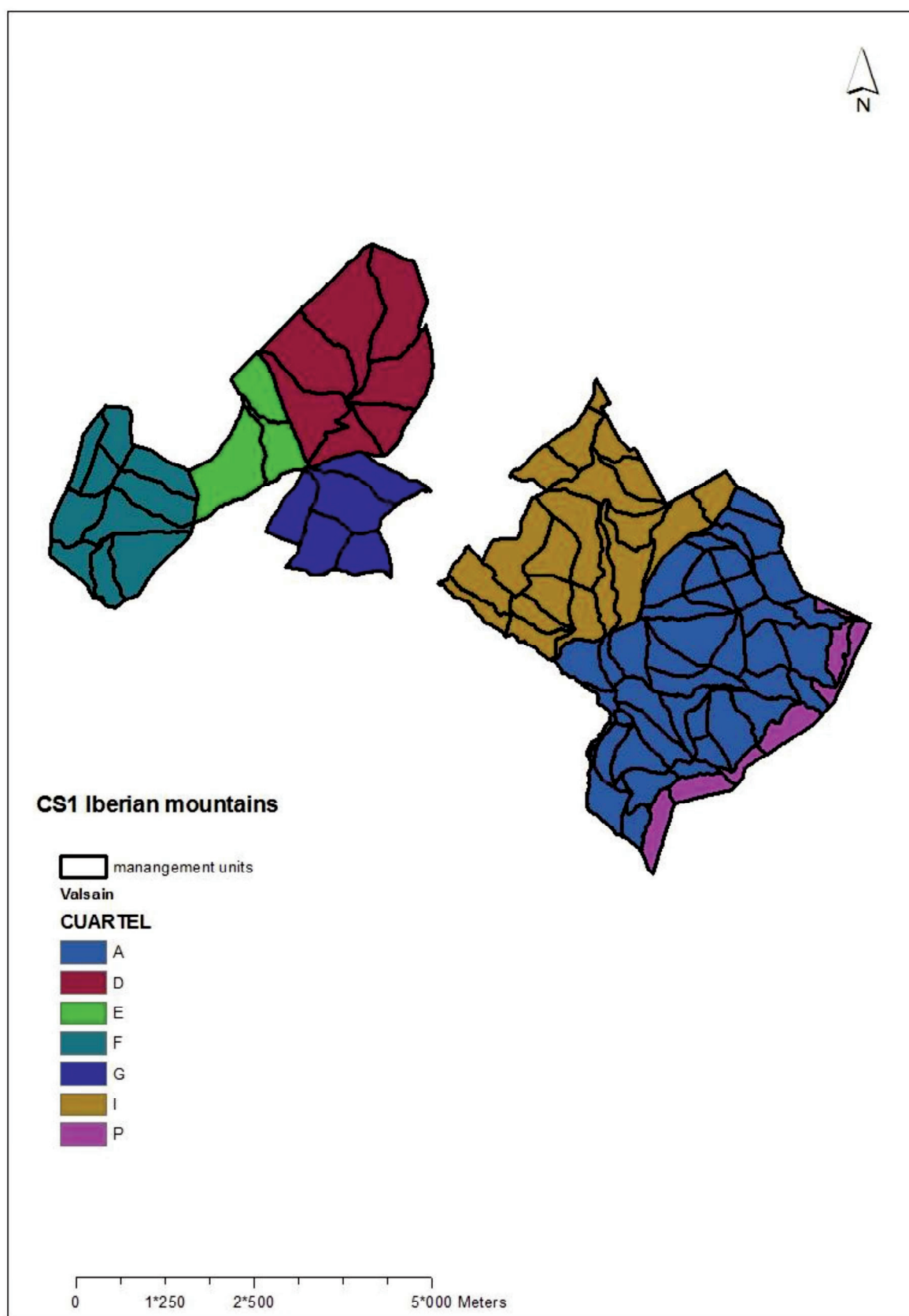


Figure A-1.1. Representative Landscape (RL) in CSA1 (Valsain).

A2 CSA2 (Vercors)

Table A-2.1. Site types in CSA2 (Vercors). paN = plant available Nitrogen [kg/ha*yr], WSC = water storage capacity [mm], alt = altitudinal range [m].

site_ID	inclination	Aspect	bedrock	soiltype	pH	paN	WSC
1	>30°	45°-225°	calcareous	Leptosol/Umbrisol	5-5.5	34,0	30-60
2	10-30°	225°-45°	calcareous	Cambisol/Umbrisol	5-5.5	34,0	60-90
3	10-30°	225°-45°	calcareous	Leptosol/Cambisol	5.5-6	34,0	60-90
4	10-30°	315-135°	calcareous	Cambisol/Umbrisol	5.5-6	34,0	60-90
5	10-30°	225°-45°	calcareous	Leptosol/Umbrisol	5.5-6	34,0	30-60
6	10-30°	225°-45°	calcareous	Leptosol/Umbrisol	5.5-6	34,0	30-60
7	10-30°	45°-225°	calcareous	Leptosol/Umbrisol	5.5-6	34,0	30-60
8	10-30°	45°-225°	calcareous	Leptosol/Umbrisol	5.5-6	34,0	30-60
9	10-30°	225°-45°	calcareous	Leptosol	5.5-6	34,0	30-60
10	10-30°	45°-225°	calcareous	Leptosol	5.5-6	34,0	30-60
11	10-30°	225°-45°	calcareous	Leptosol	5.5-6	34,0	<30

Table A-2.2. Representative Stand Types (RST) in CSA2 (Vercors).

RST-ID	species mixture [in % basal area]	age (or stand development stage)	site type
1,0	75% beech, 10% spruce, 10% other deciduous species	Coppice	1
2,0	75% spruce, 25% fir	uneven-aged	2
3,0	90% spruce, 10% fir	uneven-aged	3
4,0	60% spruce, 40% fir	even-aged (mature/overmature)	4
5,0	70% fir, 15% spruce, 15% deciduous species (beech dominant)	uneven-aged	5
6,0	60% fir, 20% spruce, 20% deciduous species (beech dominant)	uneven-aged	7
7,0	45% fir, 45% spruce, 10% deciduous species (beech dominant)	uneven-aged	6
8,0	50% fir, 20% spruce, 30% deciduous species (maple dominant)	uneven-aged	8
9,0	50% fir, 20% spruce, 30% deciduous species (maple dominant)	uneven-aged	9
10,0	40% spruce, 40% fir, 20% deciduous species (beech dominant)	even-aged (mature/overmature)	7
11,0	50% fir, 20% spruce, 30% deciduous species (beech dominant)	even-aged (mature/overmature)	6
12,0	70% fir, 20% spruce, 10% deciduous species (beech dominant)	even-aged (mature/overmature)	8
13,0	75% spruce, 25% secondary species and fir	even-aged (mature/overmature)	9
14,0	40% spruce, 40% fir, 20% secondary species and mountain pine	uneven-aged	11
15,0	70% spruce, 20% mountain pine, 10% fir	even-aged (mature/overmature)	12

16,0	40% beech, 40%fir, 10%spruce, 10% other deciduous species	Mixed coppice high forests	7
17,0	40% beech, 30%fir, 20%spruce, 10% other deciduous species	uneven-aged	8
18,0	50% spruce, 25%fir, 25% deciduous species	uneven-aged	10
19,0	50% spruce, 25%fir, 25% deciduous species	even-aged (mature/overmature)	10

A3 CSA3 (Montafon)

Table A-3.1. Site types in CSA3 (Montafon), Landscape Rellstal. SD = soil depth [cm], CF = coarse fraction >2mm of mineral soil [%], paN = plant available Nitrogen [kg/ha*yr], WSC = water storage capacity [mm], alt = altitudinal range [m].

Site ID	Slope	Geology	soiltype	SD	CF	pH	paN	WSC	Alt	climate_ID
1	30-45	Mixed	cambisol	50	18	5	65	170	1125-1475	1300_north_35
2	30-45	Mixed	cambisol	50	18	5	65	170	1125-1475	1300_south_35
3	30-45	Mixed	cambisol	50	18	5	65	170	1475-1825	1650_north_35
4	30-45	Mixed	ranker	30	55	4,5	50	130	1125-1475	1300_north_35
5	30-45	Mixed	ranker	30	55	4,5	50	130	1125-1475	1300_south_35
6	30-45	Mixed	ranker	30	55	4,5	50	130	1475-1825	1650_north_35
7	30-45	Mixed	ranker	30	55	4,5	50	130	1475-1825	1650_south_35
8	30-45	Mixed	ranker	40	33	4,5	55	150	1125-1475	1300_north_35
9	30-45	Mixed	ranker	40	33	4,5	55	150	1475-1825	1650_south_35
10	30-45	Acidic	rich cambisol	60	19	5,5	75	250	1125-1475	1300_north_35
11	30-45	Acidic	rich cambisol	60	19	5,5	75	250	1125-1475	1300_south_35
12	30-45	Acidic	rich cambisol	60	19	5,5	75	250	1475-1825	1650_south_35
13	30-40	Acidic	Semipodsol	45	18	4,3	69	236	1125-1475	1300_north_35
14	30-40	Acidic	Anmoor	35	60	5	60	130	1125-1475	1300_north_35
15	25-35	Acidic	Cambisol	45	60	5	55	170	1475-1825	1650_north_35

Table A-3.2. Representative Stand Types (RST) in CSA3 (Montafon), Landscape Rellstal. Volume in m³/ha; Reg: 1 = regeneration covers >12,5% of stand area, 0 = regeneration covers <12.5% of stand area.

RST-ID	species mixture [% basal area]	age	site type	Volume (dbh 10-30)	Volume (dbh 30-50)	Volume (dbh >50)	Reg
1,0	Picea abies > 80% AND all other species <10%	12	5	50	40	20	1
2,0	Picea abies > 80% AND all other species <10%	15	6	20	10	30	1
3,0	Picea abies > 80% AND all other species <10%	17	6	30	0	0	0
4,0	Picea abies > 80% AND all other species <10%	167	13	0	0	50	0
5,0	Picea abies > 80% AND all other species <10%	UA	1	20	120	560	1
6,0	Picea abies > 80% AND all other species <10%	UA	1	30	110	320	1
7,0	Picea abies > 80% AND all other species <10%	UA	3	10	80	330	1
8,0	Picea abies > 80% AND all other species <10%	UA	3	10	110	220	1
9,0	Picea abies > 80% AND all other species <10%	UA	3	50	110	400	1
10,0	Picea abies > 80% AND all other species <10%	UA	3	20	150	380	1
11,0	Picea abies > 80% AND all other species <10%	UA	3	50	50	150	1
12,0	Picea abies > 80% AND all other species <10%	UA	3	30	80	210	1
13,0	Picea abies > 80% AND all other species <10%	UA	3	10	130	680	1
14,0	Picea abies > 80% AND all other species <10%	UA	4	20	50	70	1
15,0	Picea abies > 80% AND all other species <10%	UA	4	30	30	20	1
16,0	Picea abies > 80% AND all other species	UA	4	80	120	90	1

	<10%						
17,0	Picea abies > 80% AND all other species <10%	UA	4	10	100	230	1
18,0	Picea abies > 80% AND all other species <10%	UA	4	0	40	400	1
19,0	Picea abies > 80% AND all other species <10%	UA	4	10	20	60	1
20,0	Picea abies > 80% AND all other species <10%	UA	4	0	100	360	1
21,0	Picea abies > 80% AND all other species <10%	UA	4	0	130	560	0
22,0	Picea abies > 80% AND all other species <10%	UA	4	20	180	350	1
23,0	Picea abies > 80% AND all other species <10%	UA	4	50	280	390	1
24,0	Picea abies > 80% AND all other species <10%	UA	4	40	150	280	1
25,0	Picea abies > 80% AND all other species <10%	UA	6	10	60	420	1
26,0	Picea abies > 80% AND all other species <10%	UA	6	0	30	230	0
27,0	Picea abies > 80% AND all other species <10%	UA	6	20	160	260	1
28,0	Picea abies > 80% AND all other species <10%	UA	6	0	80	260	1
29,0	Picea abies > 80% AND all other species <10%	UA	6	0	50	390	1
30,0	Picea abies > 80% AND all other species <10%	UA	6	10	100	230	1
31,0	Picea abies > 80% AND all other species <10%	UA	6	10	40	220	1
32,0	Picea abies > 80% AND all other species <10%	UA	6	10	110	210	1
33,0	Picea abies > 80% AND all other species <10%	UA	8	40	90	350	1
34,0	Picea abies > 80%	UA	11	110	60	0	1

	AND all other species <10%						
35,0	Picea abies > 80% AND all other species <10%	UA	12	0	140	820	1
36,0	Picea abies > 80% AND all other species <10%	UA	12	20	40	620	1
37,0	Picea abies > 80% AND all other species <10%	UA	12	100	210	460	1
38,0	Picea abies > 80% AND all other species <10%	UA	14	20	170	100	1
39,0	Picea abies > 50% AND Fagus sylvatica > 10% AND all other species <10%	UA	10	10	60	100	1
40,0	Picea abies > 50% AND Fagus sylvatica > 10% AND Abies alba > 10% AND all other species <10%	UA	5	20	150	360	1
41,0	Picea abies > 50% AND Fagus sylvatica > 10% AND Abies alba > 10% AND all other species <10%	UA	11	40	40	200	1
42,0	Picea abies > 50% AND Acer pseudoplatanus > 10% AND all other species <10%	UA	11	60	20	0	1
43,0	Picea abies > 50% AND Abies alba > 10% AND all other species <10%	UA	2	10	80	500	1
44,0	Picea abies > 50% AND Abies alba > 10% AND all other species <10%	UA	5	20	160	370	1
45,0	Picea abies > 50% AND Abies alba > 10% AND all other species <10%	UA	7	0	100	510	0
46,0	Picea abies > 50% AND Abies alba > 10% AND all other species <10%	UA	9	30	190	640	1
47,0	Picea abies > 50% AND Abies alba > 10% AND all other species <10%	UA	9	10	200	720	0

48,0	Picea abies > 50% AND Abies alba > 10% AND all other species <10%	UA	11	110	30	240	1
49,0	Picea abies > 50% AND Abies alba > 10% AND all other species <10%	UA	11	10	30	210	1
50,0	Picea abies > 50% AND Abies alba > 10% AND all other species <10%	UA	12	0	130	920	0
51,0	Picea abies > 50% AND Abies alba > 10% AND all other species <10%	UA	15	10	110	410	1
52,0	Fagus sylvatica > 40% AND Abies alba > 10% AND Picea abies > 10% AND all other species <10%	UA	5	40	90	70	1
53,0	Abies alba > 40% AND Fagus sylvatica > 10% AND Picea abies > 10% AND all other species <10%	UA	11	0	110	530	1

Table A-3.3. Site types in CSA3 (Montafon), Landscape Silbertal. SD = soil depth [cm], CF = coarse fraction >2mm of mineral soil [%], paN = plant available Nitrogen [kg/ha*yr], WSC = water storage capacity [mm], alt = altitudinal range [m].

ID	Slope	bedrock	Soiltype	SD	CF	pH	paN	WSC	alt	climate_ID
21	25-42	acidic	Cambisol	50	18	5	65	170	1475-1825	1650_north_35
22	19-45	acidic	Ranker	30	55	4,5	50	130	1475-1825	1650_north_35
23	19-45	acidic	Ranker	30	55	4,5	50	130	1475-1825	1650_south_35
24	21-49	acidic	Ranker	40	33	4,5	55	150	1125-1475	1300_south_35
25	21-49	acidic	Ranker	40	33	4,5	55	150	1475-1825	1650_north_35
26	2-32	acidic	rich cambisol	60	19	5,5	75	250	1125-1475	1300_flat
27	8-40	acidic	rich cambisol	60	19	5,5	75	250	1125-1475	1300_south_35
28	8-40	acidic	Semipodsol	45	18	4,3	69	236	1125-1475	1300_north_35
29	8-40	acidic	Semipodsol	45	18	4,3	69	236	1125-1475	1300_south_35
30	8-40	acidic	Semipodsol	45	18	4,3	69	236	1475-1825	1650_north_35
31	24-41	acidic	Podsol	45	60	4,3	55	170	1125-1475	1300_north_35
32	24-41	acidic	Podsol	45	60	4,3	55	170	1475-1825	1650_north_35

Table A-3.4. Representative Stand Types (RST) in CSA3 (Montafon), Landscape Silbertal. Volume in m³/ha; Reg: 1 = regeneration covers >12,5% of stand area, 0 = regeneration covers <12.5% of stand area.

RST-ID	species mixture [% basal area]	Age	site type	Volume (dbh 5- 30)	Volume (dbh 30- 50)	Volume (dbh >50)	Reg
60,0	Picea abies > 95% AND all other species <5%	UA	21	10	120	170	1
61,0	Picea abies > 95% AND all other species <5%	UA	22	40	40	110	1
62,0	Picea abies > 95% AND all other species <5%	UA	22	10	120	170	1
63,0	Picea abies > 95% AND all other species <5%	UA	23	20	70	40	1
64,0	Picea abies > 95% AND all other species <5%	UA	23	40	140	70	0
65,0	Picea abies > 95% AND all other species <5%	UA	24	20	70	40	1
66,0	Picea abies > 95% AND all other species <5%	UA	25	20	70	40	1
67,0	Picea abies > 95% AND all other species <5%	UA	25	40	40	110	1
68,0	Picea abies > 95% AND all other species <5%	UA	26	40	40	110	1
69,0	Picea abies > 95% AND all other species <5%	UA	27	20	70	40	1
70,0	Picea abies > 95% AND all other species <5%	UA	28	20	70	40	1
71,0	Picea abies > 95% AND all other species <5%	UA	29	20	70	40	1
72,0	Picea abies > 95% AND all other species <5%	UA	29	40	140	70	1
73,0	Picea abies > 95% AND all other species <5%	UA	30	40	40	110	0
74,0	Picea abies > 95% AND all other species <5%	UA	30	10	120	170	1
75,0	Picea abies > 95%	UA	31	20	70	40	1

	AND all other species <5%						
76,0	Picea abies > 95% AND all other species <5%	UA	32	40	140	70	0
77,0	Picea abies > 95% AND all other species <5%	UA	32	40	40	110	1

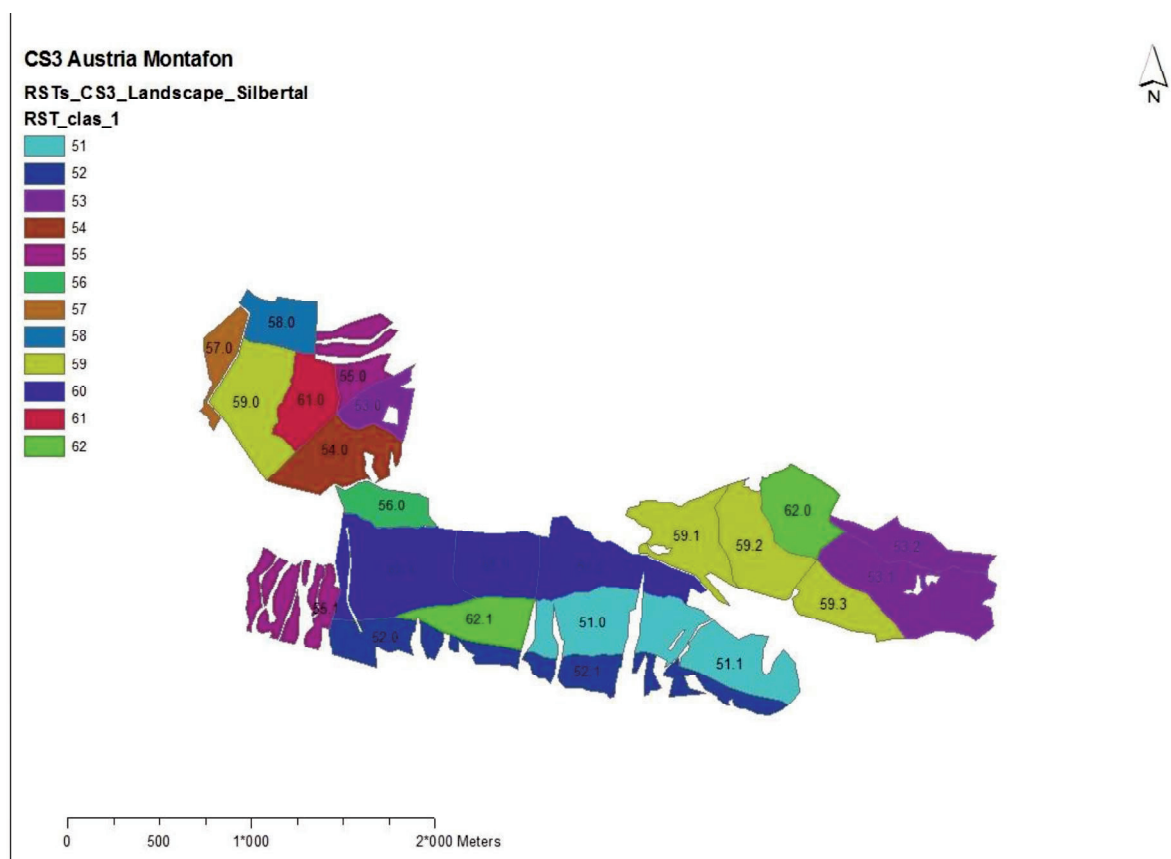


Figure A-3.2. Representative Landscape (RL) in CSA3 (Montafon), Landscape Silbertal.

A4 CSA4 (Sneznik)

Table A-4.1. Site types in CSA4 (Sneznik). SD = soil depth [cm], CF = coarse fraction >2mm of mineral soil [%], paN = plant available Nitrogen [kg/ha*yr], WSC = water storage capacity [mm], alt = altitudinal range [m].

I D	altitude	baseline climate record	bedrock	soil type	SD	CF	ph	paN	WSC
1	600-900	600 m (flat)	limestone	chromic cambisols (80%) + rendzic leptosol (20%)	30	25	6,5	68	98
2	700-1100	900 m (flat)	limestone	chromic cambisols (80%) + rendzic leptosol (20%)	30	25	6,5	68	98
3	740-1140	900 m (25°N)	limestone	chromic cambisols (80%) + rendzic leptosol (20%)	30	25	6,5	68	98
4	760-1090	900 m (25°S)	limestone	chromic cambisols (80%) + rendzic leptosol (20%)	30	25	6,5	68	98
5	780-1220	900 m (25°N)	limestone	chromic cambisols (60%) + rendzic leptosol (40%)	25	30	6,5	66	85
6	1050- 1400	1200 m (25°N)	limestone	chromic cambisols (60%) + rendzic leptosol (40%)	25	30	6,5	66	85
7	1350- 1797	1500 m (25°N)	limestone	rendzic leptosols (100%)	15	10	6,5	59	58
8	1350- 1797	1500 m (25°S)	limestone	rendzic leptosols (100%)	15	10	6,5	59	58

Table A-3.4. Representative Stand Types (RST) in CSA4 (Sneznik).

RST-ID	species mixture	age (or stand development stage)	site type
1,1	66% <i>Fagus sylvatica</i> , 21% <i>Abies alba</i> , 7% <i>Picea abies</i> , 3% <i>Acer pseudoplatanus</i> , 1% other conifers, 2% other broadleaves	regeneration/thicket	2
1,2	66% <i>Fagus sylvatica</i> , 21% <i>Abies alba</i> , 7% <i>Picea abies</i> , 3% <i>Acer pseudoplatanus</i> , 1% other conifers, 2% other broadleaves	Pole	2
1,3	66% <i>Fagus sylvatica</i> , 21% <i>Abies alba</i> , 7% <i>Picea abies</i> , 3% <i>Acer pseudoplatanus</i> , 1% other conifers, 2% other broadleaves	Mature	2
1,4	66% <i>Fagus sylvatica</i> , 21% <i>Abies alba</i> , 7% <i>Picea abies</i> , 3% <i>Acer pseudoplatanus</i> , 1% other conifers, 2% other broadleaves	rejuvenation	2
2,1	86% <i>Fagus sylvatica</i> , 4% <i>Abies alba</i> , 6% <i>Picea abies</i> , 4% <i>Acer pseudoplatanus</i>	regeneration/thicket	6
2,2	86% <i>Fagus sylvatica</i> , 4% <i>Abies alba</i> , 6% <i>Picea abies</i> , 4% <i>Acer pseudoplatanus</i>	Pole	6
2,3	86% <i>Fagus sylvatica</i> , 4% <i>Abies alba</i> , 6% <i>Picea abies</i> , 4% <i>Acer pseudoplatanus</i>	Mature	6
2,4	86% <i>Fagus sylvatica</i> , 4% <i>Abies alba</i> , 6% <i>Picea abies</i> , 4% <i>Acer pseudoplatanus</i>	rejuvenation	6
3,1	93% <i>Fagus sylvatica</i> , 2% <i>Abies alba</i> , 5% <i>Picea abies</i>	regeneration/thicket	7
3,2	93% <i>Fagus sylvatica</i> , 2% <i>Abies alba</i> , 5% <i>Picea abies</i>	Pole	7
3,3	93% <i>Fagus sylvatica</i> , 2% <i>Abies alba</i> , 5% <i>Picea abies</i>	Mature	7
3,4	93% <i>Fagus sylvatica</i> , 2% <i>Abies alba</i> , 5% <i>Picea abies</i>	rejuvenation	7
4,3	17% <i>Fagus sylvatica</i> , 72% <i>Abies alba</i> , 9% <i>Picea abies</i> , 2% other broadleaves	Mature	1
4,4	17% <i>Fagus sylvatica</i> , 72% <i>Abies alba</i> , 9% <i>Picea abies</i> , 2% other broadleaves	rejuvenation	1
5,3	36% <i>Fagus sylvatica</i> , 57% <i>Abies alba</i> , 4% <i>Picea abies</i> , 3% <i>Acer pseudoplatanus</i>	Mature	2
5,4	36% <i>Fagus sylvatica</i> , 57% <i>Abies alba</i> , 4% <i>Picea abies</i> , 3% <i>Acer pseudoplatanus</i>	rejuvenation	2
6,2	19% <i>Fagus sylvatica</i> , 69% <i>Abies alba</i> , 8% <i>Picea abies</i> , 3% <i>Acer pseudoplatanus</i> , 1% other broadleaves	Pole	2
6,3	19% <i>Fagus sylvatica</i> , 69% <i>Abies alba</i> , 8% <i>Picea abies</i> , 3% <i>Acer pseudoplatanus</i> , 1% other broadleaves	Mature	2
6,4	19% <i>Fagus sylvatica</i> , 69% <i>Abies alba</i> , 8% <i>Picea abies</i> , 3% <i>Acer pseudoplatanus</i> , 1% other broadleaves	rejuvenation	2
7,3	13% <i>Fagus sylvatica</i> , 59% <i>Abies alba</i> , 26% <i>Picea abies</i> , 2% <i>Acer pseudoplatanus</i>	Mature	3
7,4	13% <i>Fagus sylvatica</i> , 59% <i>Abies alba</i> , 26% <i>Picea abies</i> , 2% <i>Acer pseudoplatanus</i>	rejuvenation	3

	Picea abies, 2% Acer pseudoplatanus		
8,3	17% Fagus sylvatica, 67% Abies alba, 10% Picea abies, 5% Acer pseudoplatanus, 1% other broadleaves	Mature	4
8,4	17% Fagus sylvatica, 67% Abies alba, 10% Picea abies, 5% Acer pseudoplatanus, 1% other broadleaves	rejuvenation	4
9,1	17% Fagus sylvatica, 9% Abies alba, 72% Picea abies, 1% Acer pseudoplatanus, 1% other broadleaves	regeneration/thicket	1
9,2	17% Fagus sylvatica, 9% Abies alba, 72% Picea abies, 1% Acer pseudoplatanus, 1% other broadleaves	Pole	1
9,3	17% Fagus sylvatica, 9% Abies alba, 72% Picea abies, 1% Acer pseudoplatanus, 1% other broadleaves	Mature	1
9,4	17% Fagus sylvatica, 9% Abies alba, 72% Picea abies, 1% Acer pseudoplatanus, 1% other broadleaves	rejuvenation	1
10,1	9% Fagus sylvatica, 4% Abies alba, 83% Picea abies, 2% Acer pseudoplatanus, 1% other conifers, 1% other broadleaves	regeneration/thicket	2
10,2	9% Fagus sylvatica, 4% Abies alba, 83% Picea abies, 2% Acer pseudoplatanus, 1% other conifers, 1% other broadleaves	Pole	2
10,3	9% Fagus sylvatica, 4% Abies alba, 83% Picea abies, 2% Acer pseudoplatanus, 1% other conifers, 1% other broadleaves	Mature	2
10,4	9% Fagus sylvatica, 4% Abies alba, 83% Picea abies, 2% Acer pseudoplatanus, 1% other conifers, 1% other broadleaves	rejuvenation	2
11,1	34% Fagus sylvatica, 37% Abies alba, 19% Picea abies, 8% Acer pseudoplatanus, 2% other broadleaves	regeneration/thicket	2
11,2	34% Fagus sylvatica, 37% Abies alba, 19% Picea abies, 8% Acer pseudoplatanus, 2% other broadleaves	Pole	2
11,3	34% Fagus sylvatica, 37% Abies alba, 19% Picea abies, 8% Acer pseudoplatanus, 2% other broadleaves	Mature	2
11,4	34% Fagus sylvatica, 37% Abies alba, 19% Picea abies, 8% Acer pseudoplatanus, 2% other broadleaves	rejuvenation	2
12,0	62% Fagus sylvatica, 22% Abies alba, 13% Picea abies, 2% Acer pseudoplatanus, 1% other conifers	uneven-aged	6
13,0	50% Fagus sylvatica, 10% Abies alba, 40% Picea abies	uneven-aged	8
14,0	9% Fagus sylvatica, 84% Abies alba, 5% Picea abies, 1% Acer pseudoplatanus, 1% other broadleaves	uneven-aged	2
15,0	35% Fagus sylvatica, 56% Abies alba, 7% Picea abies, 1% Acer pseudoplatanus, 1%	uneven-aged	2

	other broadleaves		
16,0	18% Fagus sylvatica, 69% Abies alba, 10% Picea abies, 2% Acer pseudoplatanus, 1% other broadleaves	uneven-aged	2
17,0	33% Fagus sylvatica, 58% Abies alba, 7% Picea abies, 1% Acer pseudoplatanus, 1% other broadleaves	uneven-aged	3
18,0	19% Fagus sylvatica, 65% Abies alba, 13% Picea abies, 2% Acer pseudoplatanus, 1% other broadleaves	uneven-aged	3
19,0	21% Fagus sylvatica, 65% Abies alba, 11% Picea abies, 2% Acer pseudoplatanus, 1% other broadleaves	uneven-aged	4
20,0	20% Fagus sylvatica, 58% Abies alba, 19% Picea abies, 2% Acer pseudoplatanus, 1% other broadleaves	uneven-aged	5
21,0	33% Fagus sylvatica, 45% Abies alba, 19% Picea abies, 3% Acer pseudoplatanus	uneven-aged	3
22,0	34% Fagus sylvatica, 44% Abies alba, 17% Picea abies, 4% Acer pseudoplatanus, 1% other broadleaves	uneven-aged	5
23,0	31% Fagus sylvatica, 37% Abies alba, 28% Picea abies, 3% Acer pseudoplatanus, 1% other broadleaves	uneven-aged	6

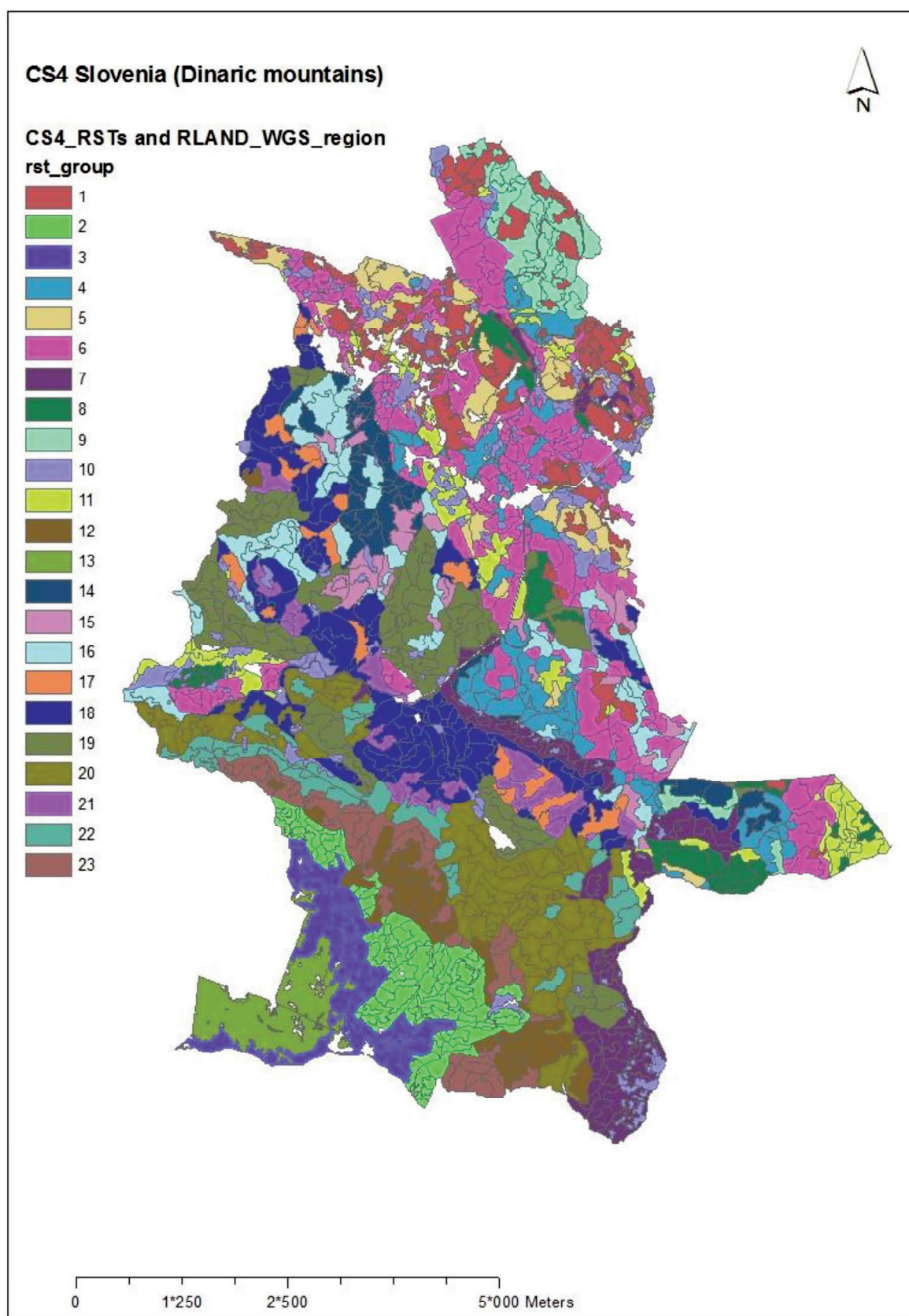


Figure A-4.1. Representative Landscape (RL) in CSA4 (Sneznik).

A5 CSA5 (Vilhelmina)

Table A-5.1. Site types in CSA5 (Vilhelmina). SD = soil depth [cm], CF = coarse fraction >2mm of mineral soil [%], paN = plant available Nitrogen [kg/ha*yr], WSC = water storage capacity [mm], alt = altitudinal range [m].

I D	bed- rock	soil type	SD	CF	ph	paN	WSC	Soiltype	Alt	baseline climate
1	acidic	Podzol	40 0	45	5,1	5	300	Sandy loam (Till)	300- 400	350_flat
2	acidic	Podzol	20 0	50	5,2	16	325	Sandy loam (Till)	300- 400	350_north_20
3	acidic	Podzol	30 0	60	5,1	12	275	Sandy loam (Till)	300- 400	350_south_20
4	acidic	Arenosol	10 00	3	4,9	10	50	Sand (Sediment)	300- 400	350_flat
5	acidic	Umbrisol	25 0	35	5,3	30	350	Silt loam (Till)	400- 500	500_north_20
6	acidic	Podzol	25 0	50	5,2	10	325	Sandy loam (Till)	400- 500	500_flat
7	acidic	Podzol	25 0	50	5,2	12	325	Loam (Till)	500- 600	500_flat
8	acidic	Podzol	17 5	65	5,1	6	275	Sandy loam (Till)	500- 600	500_flat

Table A-3.4. Representative Stand Types (RST) in CSA5 (Vilhelmina).

RST- ID	Site	development stage	Volume [m ³ /ha]	Species compisition				Age
				Pinus sylvestris	Picea abies	Betula pubescens	Pinus contorta	
1,01	1	1	0	0,0	30,0	70,0	0,0	1
1,02	1	2	11	0,0	57,1	42,9	0,0	11
1,03	1	3	20	0,0	50,0	50,0	0,0	30
1,04	1	4	50	5,0	5,0	90,0	0,0	50
1,05	1	5	75	11,0	42,0	47,0	0,0	70
1,06	1	6	79	1,7	49,7	48,7	0,0	90
1,07	1	7	110	10,0	45,0	45,0	0,0	110
1,08	1	8	110	0,0	10,0	90,0	0,0	130
1,09	1	9	64	0,0	62,0	38,0	0,0	150
2,01	5	1	0	0,0	25,0	75,0	0,0	1
2,02	5	2	4	10,0	40,0	50,0	0,0	11
2,03	5	3	20	5,0	30,0	65,0	0,0	30
2,04	5	4	57	1,5	51,5	47,1	0,0	50
2,05	5	5	126	0,0	50,0	50,0	0,0	70
2,06	5	6	122	0,0	20,0	80,0	0,0	90
2,07	5	7	134	0,0	53,0	47,0	0,0	110
2,08	5	8	160	0,0	40,0	60,0	0,0	130
3,01	8	1	0	32,6	2,2	65,2	0,0	1
3,02	8	2	2	10,0	30,0	60,0	0,0	11
3,06	8	6	80	30,0	20,0	50,0	0,0	90
3,07	8	7	90	10,0	50,0	40,0	0,0	110

3,09	8	9	120	15,0	49,0	36,0	0,0	150
4,01	5	1	1	0,0	25,0	75,0	0,0	1
4,02	5	2	1	0,0	87,5	12,5	0,0	11
4,03	5	3	20	0,0	85,0	15,0	0,0	30
4,04	5	4	70	0,0	70,0	30,0	0,0	50
4,05	5	5	73	0,2	78,0	21,8	0,0	70
4,06	5	6	106	0,0	70,0	30,0	0,0	90
4,07	5	7	121	0,0	71,7	28,3	0,0	110
4,08	5	8	158	0,0	79,1	20,8	0,0	130
4,09	5	9	213	0,1	87,8	12,2	0,0	150
4,10	5	10	242	4,7	88,8	6,6	0,0	170
5,01	7	1	0	0,0	30,0	70,0	0,0	1
5,02	7	2	1	1,8	72,3	25,9	0,0	11
5,03	7	3	25	0,0	71,2	28,8	0,0	30
5,04	7	4	37	2,6	71,3	26,0	0,0	50
5,05	7	5	60	10,0	80,0	10,0	0,0	70
5,06	7	6	79	1,5	72,6	25,9	0,0	90
5,07	7	7	91	0,0	72,7	27,3	0,0	110
5,08	7	8	119	1,9	77,4	20,7	0,0	130
5,09	7	9	153	2,4	88,0	9,6	0,0	50
5,10	7	10	183	0,0	92,4	7,6	0,0	170
6,01	8	1	0	0,0	32,0	68,0	0,0	1
6,02	8	2	0	33,3	66,7	0,0	0,0	11
6,03	8	3	20	0,0	70,0	30,0	0,0	30
6,05	8	5	50	0,0	70,0	30,0	0,0	70
6,06	8	6	60	0,0	70,0	30,0	0,0	90
6,07	8	7	68	0,0	72,7	27,3	0,0	110
6,08	8	8	65	1,2	79,2	19,6	0,0	130
6,09	8	9	114	1,1	93,0	5,9	0,0	150
6,10	8	10	97	5,0	87,4	7,6	0,0	170
7,01	5	1	0	0,0	1,4	69,4	29,2	1
7,03	5	3	10	0,0	2,4	11,3	86,3	30
8,01	6	1	0	0,0	1,7	66,7	31,7	1
8,02	6	2	2	0,0	0,0	5,3	94,7	11
8,03	6	3	4	5,0	5,0	11,0	79,0	30
9,01	8	1	0	0,0	2,1	62,5	35,4	1
9,02	8	2	2	0,0	5,0	15,0	80,0	11
9,03	8	3	8	0,0	10,6	24,2	65,2	30
10,01	3	1	0	31,7	1,7	66,7	0,0	1
10,02	3	2	3	70,0	0,0	30,0	0,0	11
10,03	3	3	57	69,2	17,7	13,1	0,0	30
10,04	3	4	70	65,0	25,0	10,0	0,0	50
10,05	3	5	128	78,0	12,0	10,0	0,0	70
10,08	3	8	120	70,0	30,0	0,0	0,0	130
10,10	3	10	150	75,0	20,0	5,0	0,0	170
11,01	4	1	0	35,4	2,1	62,5	0,0	1
11,06	4	6	36	81,7	18,3	0,0	0,0	70
11,07	4	7	50	95,0	5,0	0,0	0,0	90
11,10	4	10	52	85,0	10,0	5,0	0,0	170
12,01	5	1	0	29,2	1,4	69,4	0,0	1
12,02	5	2	4	66,0	0,0	34,0	0,0	11
12,03	5	3	20	80,0	15,0	5,0	0,0	30

12,04	5	4	141	89,5	4,3	6,2	0,0	50
12,05	5	5	201	88,0	7,7	4,3	0,0	70
12,06	5	6	130	75,0	23,0	2,0	0,0	90
12,08	5	8	160	80,0	19,0	1,0	0,0	130
12,09	5	9	180	80,0	19,0	1,0	0,0	150
13,01	2	1	0	5,1	27,1	67,8	0,0	1
13,02	2	2	3	40,0	40,0	20,0	0,0	11
13,03	2	3	6	48,0	33,0	19,0	0,0	30
13,04	2	4	46	29,7	51,6	18,7	0,0	50
13,07	2	7	110	40,0	55,0	5,0	0,0	110
13,08	2	8	54	63,0	23,0	14,0	0,0	130
13,09	2	9	134	25,0	57,0	18,0	0,0	150
14,01	5	1	0	4,2	25,4	70,4	0,0	1
14,02	5	2	5	50,0	50,0	0,0	0,0	11
14,03	5	3	10	0,0	31,7	18,0	50,3	30
14,04	5	4	120	20,0	60,0	20,0	0,0	50
14,08	5	8	105	38,9	33,3	27,8	0,0	130
14,09	5	9	190	27,0	62,0	11,0	0,0	150
15,01	8	1	0	6,4	29,8	63,8	0,0	1
15,03	8	3	30	40,0	30,0	30,0	0,0	30
15,04	8	4	11	30,0	50,0	20,0	0,0	50
15,06	8	6	80	40,0	50,0	10,0	0,0	90
15,07	8	7	90	20,0	60,0	20,0	0,0	110
15,08	8	8	85	60,0	40,0	0,0	0,0	130
15,09	8	9	120	45,0	50,0	5,0	0,0	150
15,10	8	10	100	40,0	50,0	10,0	0,0	170

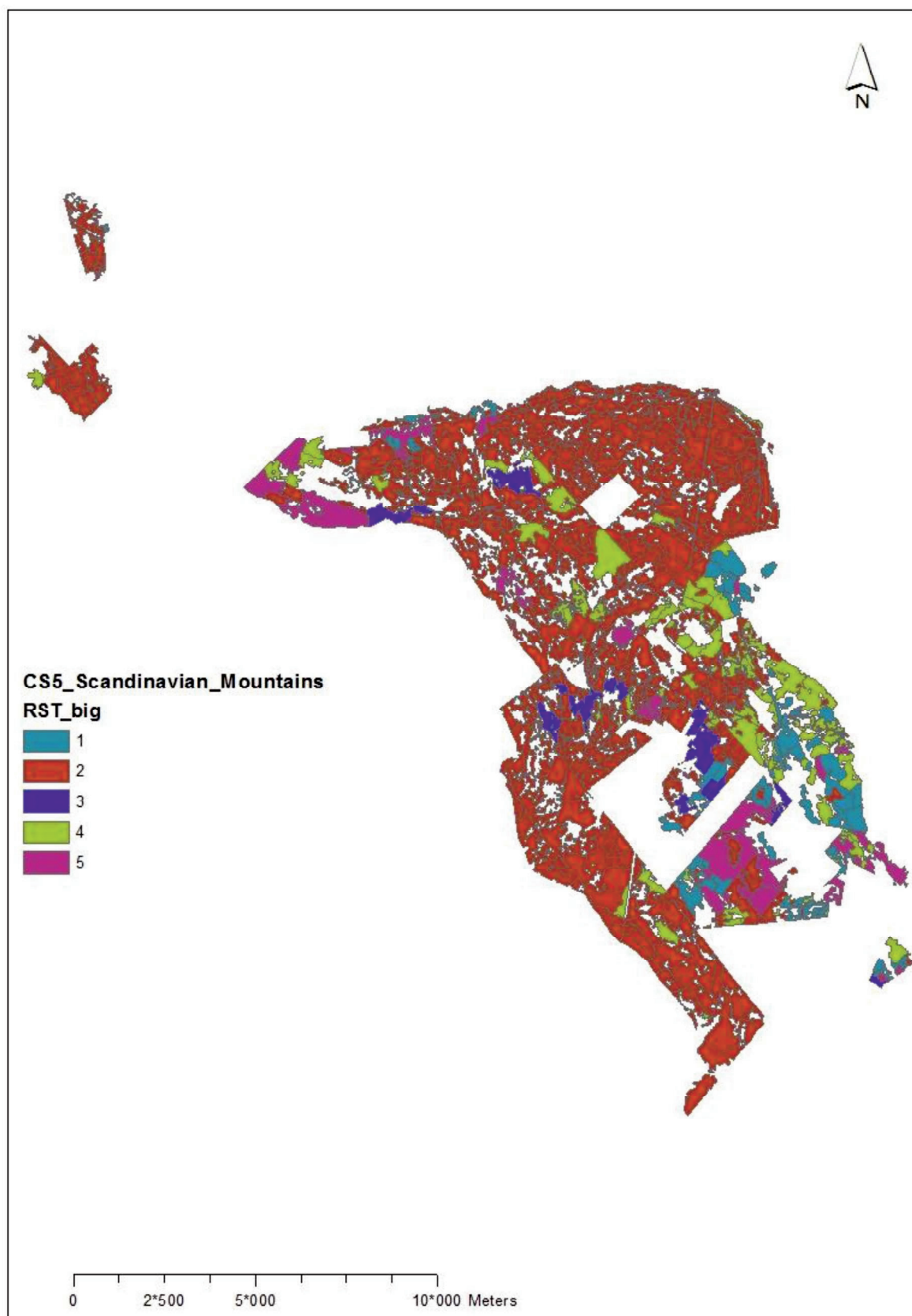


Figure A-5.1. Representative Landscape (RL) in CSA5 (Vilhelmina).

A6 CSA6 (Kozie chrby)

Table A-6.1. Site types in CSA6 (Kozie chrby). SD = soil depth [cm], CF = coarse fraction >2mm of mineral soil [%], paN = plant available Nitrogen [kg/ha*yr], WSC = water storage capacity [mm], alt = altitudinal range [m].

site_ID	slope	bedrock	Soiltype	SD	CF	pH	paN	WSC	Climate-ID
1	0-25	acidic	Cambisol	55	35	4,8	70	150	650m (flat)
2	0-25	acidic	Cambisol	50	40	4,4	60	150	950m (flat)
3	0-20	acidic	Podzol	55	35	3,8	45,0	170,0	950m (flat)
4	0-25	acidic	Cambisol	55	35	4,4	65,0	170,0	1250m (flat)
5	0-20	acidic	Podzol	50	45	3,8	45	150	1250m (flat)
6	20-45	calcareous	Rendzina	35	50	6,5	50	100	1250m (flat)

Table A-6.1. Representative Stand Types (RST) in CSA6 (Kozie chrby). Aa = Abies alba, as = acer sp., cs = castanea sativa, ld = larix decidua, pa = picea abies, pp = picea pungens, ps = pinus sylvestris.

RST-ID	Site-ID	Species composition							Age
		aa	as	cs	ld	Pa	Pp	ps	
1.0	1	0	0	0	0	100	0	0	85
2.1	2	0	0	0	0	100	0	0	25
2.2	2	0	0	0	0	100	0	0	60
2.3	2	0	0	0	0	100	0	0	105
3.1	3	0	0	0	0	100	0	0	60
3.2	3	0	0	0	0	100	0	0	105
4.1	4	0	0	0	0	100	0	0	25
4.2	4	0	0	0	0	100	0	0	60
4.3	4	0	0	0	0	100	0	0	105
5.1	5	0	0	0	0	100	0	0	25
5.2	5	0	0	0	0	100	0	0	60
5.3	5	0	0	0	0	100	0	0	105
6.1	6	0	0	0	0	100	0	0	60
6.2	6	0	0	0	0	100	0	0	105
7.1	1	0	0	0	6	94	0	0	45
7.2	1	0	0	0	6	94	0	0	100
8.1	2	0	0	0	11	89	0	0	45
8.2	2	0	0	0	11	89	0	0	75
8.3	2	0	0	0	11	89	0	0	95
9.1	3	0	0	0	7	93	0	0	45
9.2	3	0	0	0	7	93	0	0	95
10.1	4	0	0	0	10	90	0	0	45
10.2	4	0	0	0	10	90	0	0	75
10.3	4	0	0	0	10	90	0	0	90
11.1	5	0	0	0	10	90	0	0	45
11.2	5	0	0	0	10	90	0	0	75
11.3	5	0	0	0	10	90	0	0	90
12.1	6	0	0	0	8	92	0	0	45
12.2	6	0	0	0	8	92	0	0	75
12.3	6	0	0	0	8	92	0	0	95

13.1	1	0	0	0	32	41	0	27	80
13.2	1	0	0	0	32	41	0	27	105
14.1	2	0	0	0	32	41	0	27	80
14.2	2	0	0	0	32	41	0	27	105
15.0	3	0	0	3	15	76	0	6	90
16.0	1	0	0	5	30	65	0	0	30
17.0	2	0	0	5	30	65	0	0	30
18.0	3	0	0	5	30	65	0	0	30
19.0	4	0	0	5	30	65	0	0	30
20.0	6	0	10	25	15	45	5	0	15
21.0	1	20	0	10	30	40	0	0	20
22.0	2	20	0	10	30	40	0	0	20
23.0	4	20	0	10	30	40	0	0	20
24.0	5	20	0	10	30	40	0	0	20
25.0	6	20	0	10	30	40	0	0	20

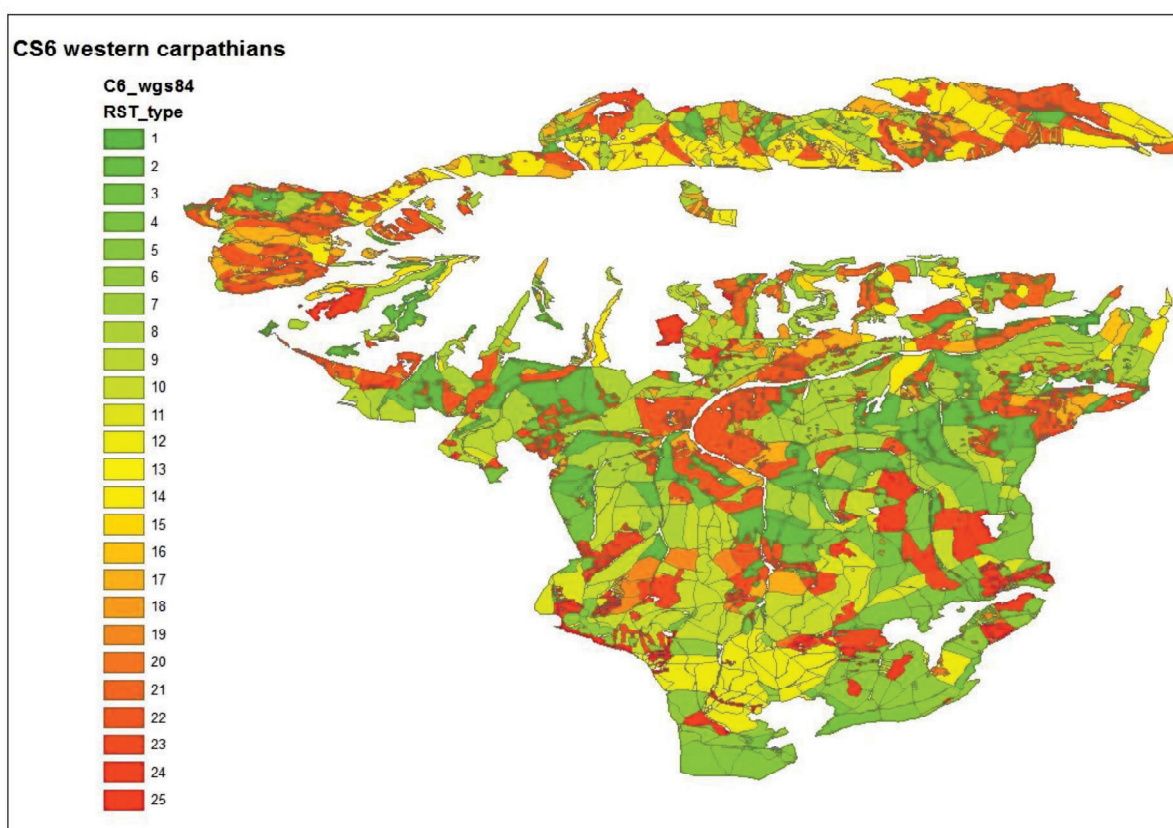


Figure A-6.1. Representative Landscape (RL) in CSA6 (Kozie chrby).

A7 CSA7 (Shiroka laka)

Table A-7.1. Site types in CSA7 (Shiroka laka). SD = soil depth [cm], CF = coarse fraction >2mm of mineral soil [%], paN = plant available Nitrogen [kg/ha*yr], WSC = water storage capacity [mm], alt = altitudinal range [m].

ID	slope	bedrock	soiltype	SD	CF	pH	paN	WSC	alt	baseline climate record
1	25-35	mixed	cambisol	45	40	6,0	50	170	1000-1150	1000m (25° north)
2	35	limestone	Rendzina	20	65	8,0	30	80	1200-1450	1250m (25° north)
3	25-35	limestone	Rendzina	35	55	7,5	40	120	1200-1450	1250m (25° north)
4	25-35	mixed	cambisol	55	35	6,5	60	180	1200-1400	1250m (25° north)
5	20-25	acidic	cambisol	40	50	5,5	40	130	1100-1300	1250m (25° north)
6	30	acidic	cambisol	60	30	5,5	65	200	1200-1350	1250m (25° north)
7	25-35	acidic	cambisol	80	20	5,5	75	220	1550-1850	1750m (25° north)
8	30-40	acidic	cambisol	45	40	5,5	55	170	1550-1850	1750m (25° north)
9	25-35	acidic	cambisol	45	40	4,5	50	170	1900-2050	2000m (25° north)
10	5-15	acidic	cambisol	60	30	5,0	70	220	1900-2100	2000m (flat)

Table A-7.1. Representative Stand Types (RST) in CSA7 (Shiroka laka).

RST-ID	species mixture	age (or stand development stage)	site type	Landscape
1,1	100% <i>Fagus sylvatica</i>	pole (60 years)	1	Landscape 1
1,2	100% <i>Fagus sylvatica</i>	mature (100 years)	1	Landscape 1
2,1	90% <i>Pinus nigra</i> , 10% <i>Picea abies</i> and <i>Fagus sylvatica</i>	pole (60 years)	2	Landscape 1
3,1	75% <i>Pinus nigra</i> , 15% <i>Picea abies</i> , 10% <i>Fagus sylvatica</i>	thicket (20 years)	3	Landscape 1
3,2	75% <i>Pinus nigra</i> , 15% <i>Picea abies</i> , 10% <i>Fagus sylvatica</i>	pole (60 years)	3	Landscape 1
3,3	75% <i>Pinus nigra</i> , 15% <i>Picea abies</i> , 10% <i>Fagus sylvatica</i>	mature (100 years)	3	Landscape 1
4,1	45% <i>Pinus nigra</i> , 45% <i>Picea abies</i> , 10% <i>Fagus sylvatica</i>	pole (60 years)	4	Landscape 1
4,2	45% <i>Pinus nigra</i> , 45% <i>Picea abies</i> , 10% <i>Fagus sylvatica</i>	mature (100 years)	4	Landscape 1
5,1	60% <i>Pinus sylvestris</i> , 20% <i>Pinus nigra</i> , 20% <i>Picea abies</i> and <i>Fagus sylvatica</i>	pole (60 years)	5	Landscape 1
5,2	60% <i>Pinus sylvestris</i> , 20% <i>Pinus nigra</i> , 20% <i>Picea abies</i> and <i>Fagus sylvatica</i>	mature (100 years)	5	Landscape 1
6,1	60% <i>Picea abies</i> , 40% <i>Abies alba</i>	thicket (20 years)	6	Landscape 1
6,2	60% <i>Picea abies</i> , 40% <i>Abies alba</i>	pole (60 years)	6	Landscape 1
6,3	60% <i>Picea abies</i> , 40% <i>Abies alba</i>	mature (100 years)	6	Landscape 1
7,1	100 % <i>Picea abies</i>	thicket (20 years)	7	Landscape 2
7,2	100 % <i>Picea abies</i>	pole (60 years)	7	Landscape 2
7,3	100 % <i>Picea abies</i>	mature (100 years)	7	Landscape 2
7,4	100 % <i>Picea abies</i>	over mature (140 years)	7	Landscape 2
8,1	100 % <i>Picea abies</i>	thicket (20 years)	8	Landscape 2
8,2	100 % <i>Picea abies</i>	pole (60 years)	8	Landscape 2
8,3	100 % <i>Picea abies</i>	mature (100 years)	8	Landscape 2
8,4	100 % <i>Picea abies</i>	over mature (140 years)	8	Landscape 2
9,1	100 % <i>Picea abies</i>	mature (100 years)	9	Landscape 2
9,2	100 % <i>Picea abies</i>	over mature (140 years)	9	Landscape 2
10,1	100 % <i>Picea abies</i>	thicket (15 years)	10	Landscape 2
10,2	100 % <i>Picea abies</i>	pole (50 years)	10	Landscape 2

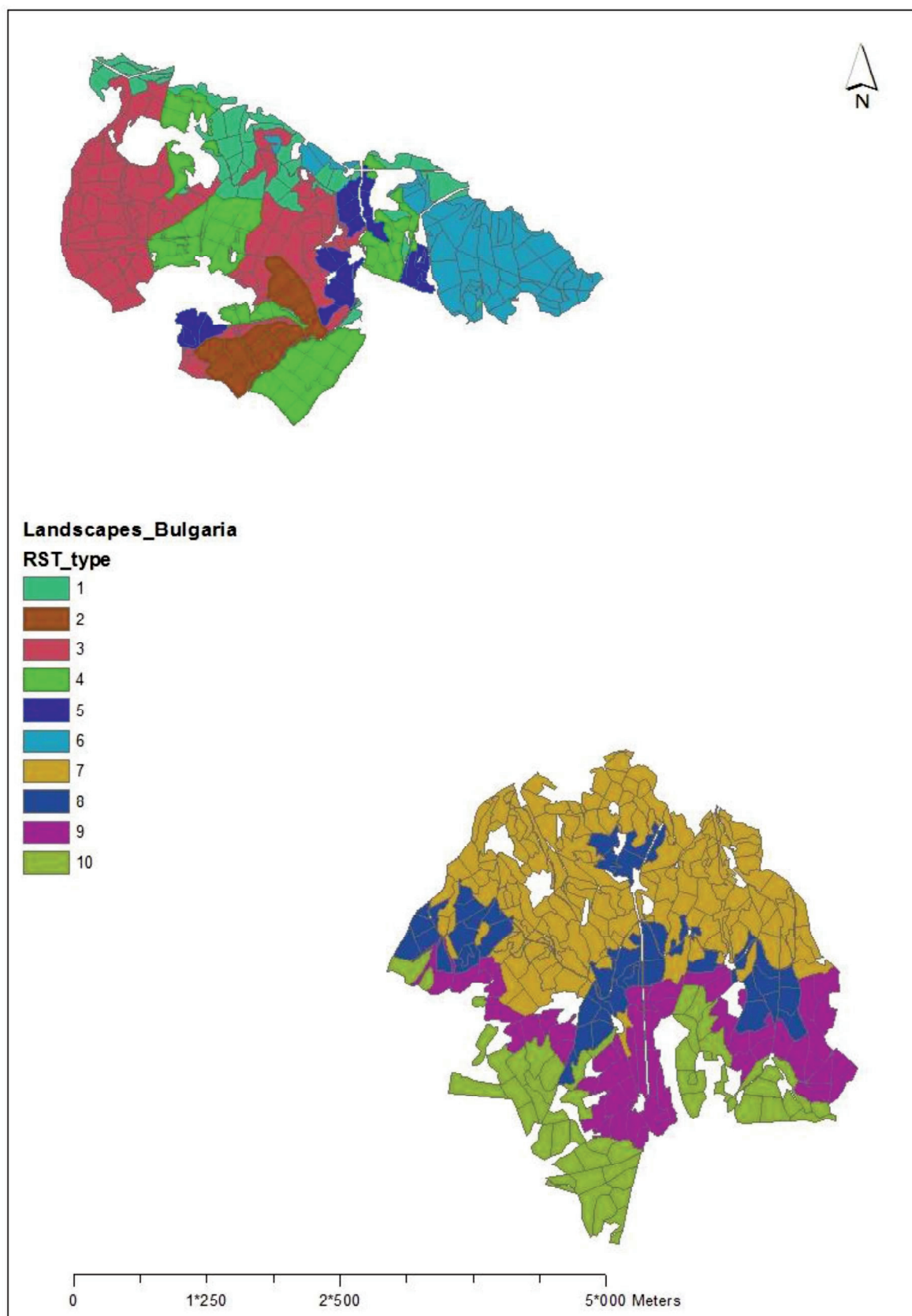


Figure A-7.1. Representative Landscape (RL) in CSA7 (Shiroka laka).