

Verification reports of the Local Component products

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1. Urban Atlas

LOCAL COMPONENT VERIFICATION REPORT

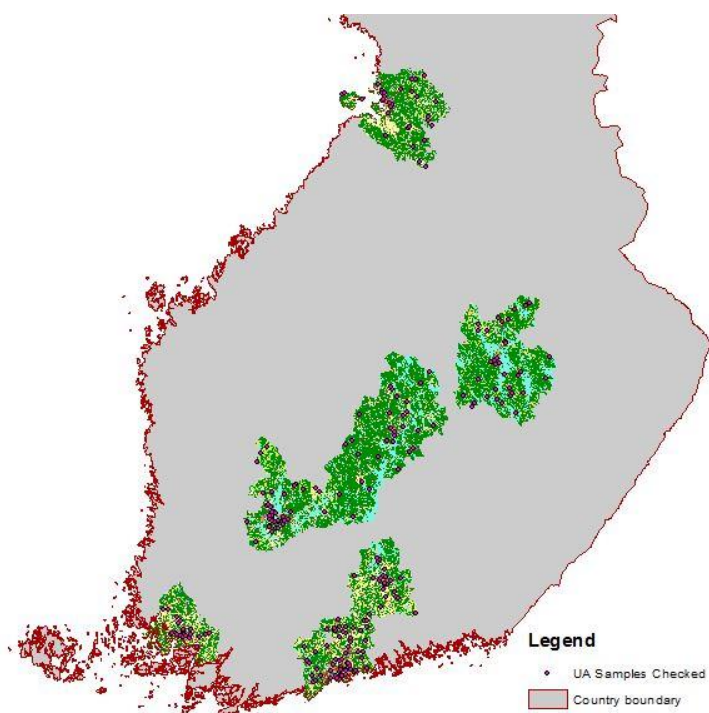
I. Metadata

DATASET	<i>Urban Atlas status layer 2012</i>
Country	<i>Finland</i>
Institution carrying out the work	<i>Finnish Environment Institute</i>
Data preparation	<i>Iida Autio, iida.autio@ymparisto.fi</i>
Visual inspection of samples	<i>Iida Autio, iida.autio@ymparisto.fi</i>
Evaluation	<i>Iida Autio, iida.autio@ymparisto.fi</i>
Reference data provided centrally	IMAGE2012 VHR satellite image mosaic
	GoogleEarth Imagery
In situ data used	National Ortho photo database/The National Land Survey Natural color/black and white ortho photos Resolution: 0.25-0.5m Reference years: 2010-2015 (partial coverages)
	The National Road and Street Database, Digiroad Vector dataset Reference year: 2017 (compared to data from 2011-2013)
	National high resolution Corine Land Cover 2012 National Corine raster dataset Resolution 20x20m
	Corine Land Cover change layers 2000-2006 and 2006-2012 National dataset Resolution 0.5ha
	The Finnish Land Parcel Information System (FLPIS) Based on farming subsidy reports Information of the dominant plant species of the field plots Vector data Reference year: 2011
	Soil Extraction Permits Database Vector data Reference year: constantly updated but data contains information on duration of the permits
	Building and Dwelling register (BDR) Population Information System Vector data Reference year 2015
	Topographic Database/The National Land Survey Compilations of object groups (fields, buildings and peatlands) Vector data Reference year: 2012
	Copernicus high resolution imperviousness layer 2012 (HRL Imperviousness) + Sample polygon data The percentage of soil sealing was calculated for each sample and used to guide the validation of the Urban Fabric (11000) classes
	ESRI/The National Land Survey basemap 1:2500

Notes	Some datasets are newer than the recommended reference year 2012. This has been taken into account while using the data in the validation process.
Software used for verification	LACO-WIKI, (+ GoogleEarth, QGIS 2.18.10), ArcMap 10.5.1, Google street view
Internal quality control done by	Pekka Härmä, pekka.harma@ymparisto.fi ; Minna Kallio, minna.kallio@ymparisto.fi
Date and place of writing the report	DD.04.2018, Helsinki

II. Overall characterization of the dataset

DATASET	UA	Urban Atlas status layer 2012
Area covered within country	10.50%	3 553 388 hectares
Number of valid classes appearing in the country	25	
Number of samples selected	250	10 samples/class
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	172	
Overall Accuracy	89,05 %	
Overall Accuracy (CI)	$\pm 0,0402$	
CORRECTNESS OF DELINEATION		
Detail of delineation	84,80 %	Correct: 212; Too coarse: 29; Too detailed: 9
Correctness of delineated area	28,00 %	Correct: 70; Unnecessary parts included: 104; Missing parts: 23; Both missing parts and unnecessary parts included: 53
Positional accuracy	59,20 %	Correct: 148; Shifted: 102
OVERVIEW FIGURE OF NATURA 2000 STATUS LAYER		



DATASET	<i>Urban Atlas status layer 2012</i>
Country	<i>Finland</i>
GENERAL REMARKS ON THE QUALITY OF THE DATASET	
The classification of LC/LU is generally accurate. Anyhow, the delineation of polygons is poor and almost half of the sample polygons are shifted beyond the positional accuracy of the data (+/- 5m). Unnecessary areas of wrong classes are often not excluded from the sample polygons. This applies to all LC/LU classes but is most evident in the large rural polygons of agricultural land and forest. Classification of the urban fabric according to the soil sealing percentage is not consistent with the reference data. There is no clear trend in the misclassifications as denser classes seem to be overestimating and sparser classes underestimating the actual soil sealing. The road network is often inaccurate and the roads are not where they're supposed to be, especially within the urban area. The roads are correctly classified but their position and shape is not correct and they contain parts that are unnecessary (e.g. small recreational path). Especially this applies to cities. In large intersections with several bridges and slip roads it is often difficult to tell the difference between bigger and smaller roads. The roads do not form a continuous network. Some misclassifications are consistent throughout the data. Clear cut forests are not recognized by the mapping process and are misclassified as e.g. permanent crops. Arable land miss-interpreted as pastures are in most cases croplands, which are laid in fallow or temporarily growing grass for forage. This is typical rotation system of croplands in Finland. In general, the delineation of the whole feature layer should be reconsidered. In many cases the FUA extends too far to the rural areas and very large polygons of agricultural land, forest and water systems are included.	

SUMMARY STATISTICS OF URBAN ATLAS STATUS LAYER

UA Class	Number of polygons	Area (ha)	%
1110	3237	4011	0,11 %
1121	8311	14661	0,41 %
1122	8619	16619	0,47 %
1123	11207	23588	0,66 %
1124	14442	21930	0,62 %
1130	64291	35323	0,99 %
1210	15696	31159	0,88 %
1221	1129	3117	0,09 %
1222	52140	36773	1,03 %
1223	2086	2584	0,07 %
1230	105	1249	0,04 %
1240	34	2821	0,08 %
1310	1968	11309	0,32 %
1330	508	1303	0,04 %
1340	1130	1005	0,03 %
1410	4476	12117	0,34 %
1420	1800	7666	0,22 %
2100	46512	473109	13,31 %
2200	17	79	0,00 %
2300	24886	117980	3,32 %
2400	0	0	0,00 %
2500	0	0	0,00 %

3100	38745	2126244	59,84 %
3200	11128	80114	2,25 %
3300	90	238	0,01 %
4000	1657	26138	0,74 %
5000	9193	494178	13,91 %
9100	154	8070	0,23 %
SUM	323561	3553388	100,00 %

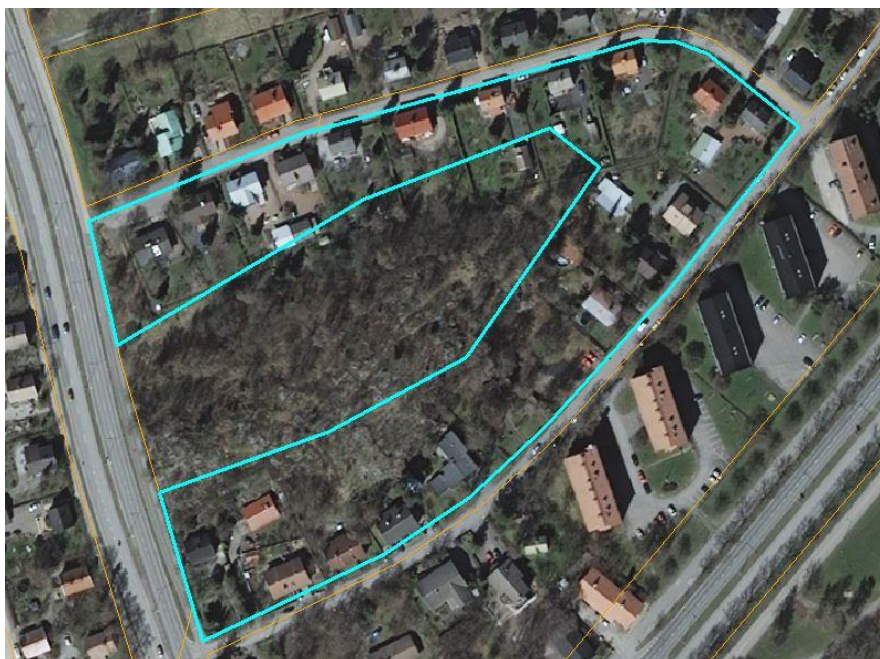
III. Characterization of the dataset by LC/LU class - UA 2012

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	11100	Continuous Urban Fabric (IMD $\geq 80\%$)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	6	
Class user's accuracy	60,00 %	
Class user's accuracy (CI)	$\pm 0,3201$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	100,00 %	Correct: 10; Too coarse: 0; Too detailed: 0
Correctness of delineated area	40,00 %	Correct: 4; Unnecessary parts included: 5; Missing parts: 0; Both missing parts and unnecessary parts included: 1
Positional accuracy	40,00 %	Correct: 4; Shifted: 6
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 11210 and 11230. Delineation is often shifted and the road network inside the polygon is not accurate.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Copernicus high resolution imperviousness layer (HRL Imperviousness)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class is residential areas near city centers in very urban contexts.	
EXAMPLE (typical mistakes / typical appearance):		



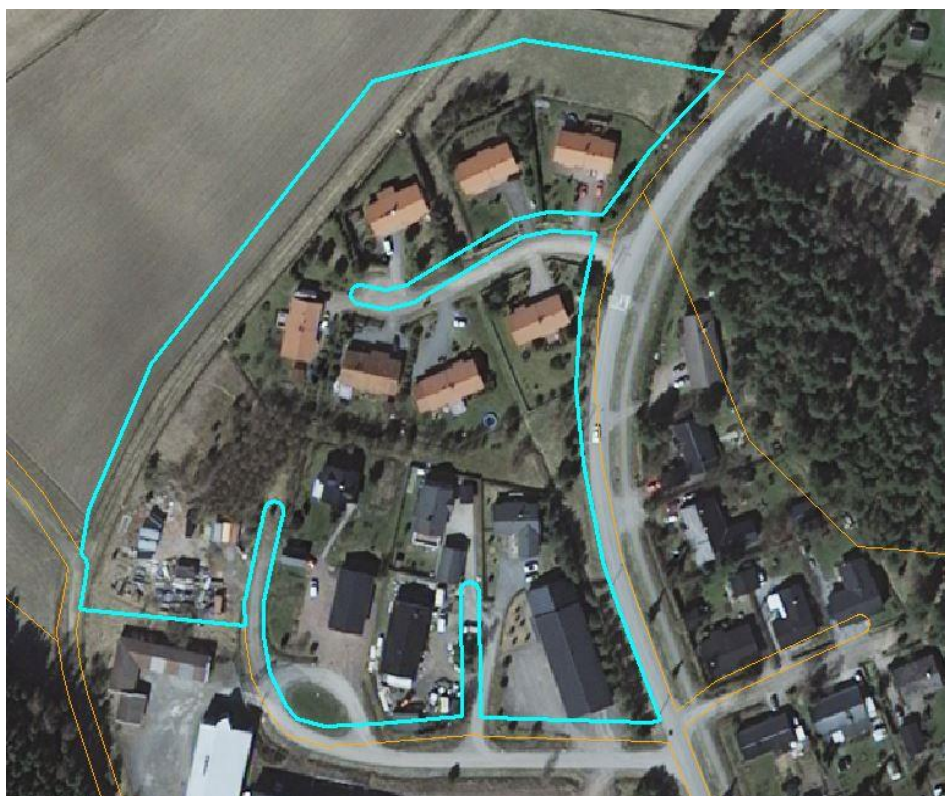
Polygon is shifted and the road network is not accurate.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	11210	Discontinuous dense urban fabric (S.L. 50% - 80%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	5	
Class user's accuracy	50,00 %	
Class user's accuracy (CI)	± 0,3267	
Class producer's accuracy	88,72 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 1; Too detailed: 0
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 6; Missing parts: 2; Both missing parts and unnecessary parts included: 1
Positional accuracy	50,00 %	Correct: 5; Shifted: 5
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 11220 and 11230. Features of 14100 are not always excluded from class area. On the other hand, parts of the class area are excluded and misclassified as e.g. 14100. Delineation is often shifted and the road network inside the polygon is not accurate.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); Copernicus high resolution imperviousness layer (HRL Imperviousness)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class is the suburban areas fairly close to city centers. Green urban areas are often bordering the class polygons.	
EXAMPLE (typical mistakes / typical appearance):		



Wrong class code (should be 11230) and parts of the associated land (yards) are excluded (14100).

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	11220	Discontinuous medium density urban fabric (S.L. 30% - 50%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	7	
Class user's accuracy	70,00 %	
Class user's accuracy (CI)	± 0,2994	
Class producer's accuracy	47,05 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 1; Too detailed: 0
Correctness of delineated area	40,00 %	Correct: 4; Unnecessary parts included: 6; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	20,00 %	Correct: 2; Shifted: 8
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 11230 and 11240. Delineation is mostly shifted and the road network inside the polygon is not accurate.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); Copernicus high resolution imperviousness layer (HRL Imperviousness)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class is the suburban areas inside cities and also in the denser inhabited areas of the rural areas.	
EXAMPLE (typical mistakes / typical appearance):		



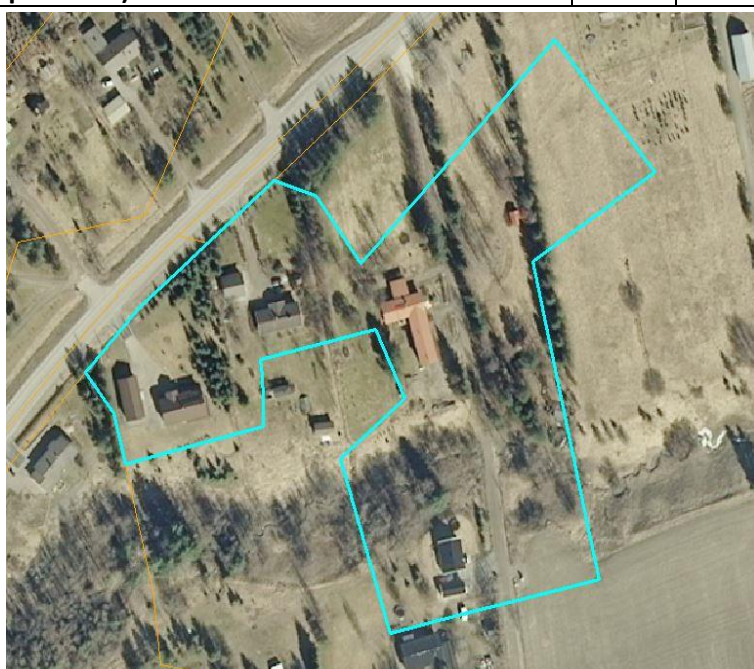
Polygon is shifted and areas of 12100 are included in the south western corner.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	11230	Discontinuous low density urban fabric (S.L. 10% - 30%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	6	
Class user's accuracy	60,00 %	
Class user's accuracy (CI)	$\pm 0,3201$	
Class producer's accuracy	46,07 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 6; Missing parts: 0; Both missing parts and unnecessary parts included: 2
Positional accuracy	70,00 %	Correct: 7; Shifted: 3
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 11220. There are several mistakes with roads: some are missing and some are unnecessary in the 11230 area. Features of 31000 are not always excluded from class area.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); Copernicus high resolution imperviousness layer (HRL Imperviousness)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class is residential areas in the suburban area of cities or residential rural areas. Often the areas are in the vicinity of forests and agricultural land.	
EXAMPLE (typical mistakes / typical appearance):		



Some forest is included in the area and the roads in the middle of the polygon should be mapped.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	11240	Discontinuous very low density urban fabric (S.L. < 10%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	6	
Class user's accuracy	60,00 %	
Class user's accuracy (CI)	± 0,3201	
Class producer's accuracy	60,12 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 2; Too detailed: 0
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 5; Missing parts: 1; Both missing parts and unnecessary parts included: 2
Positional accuracy	70,00 %	Correct: 7; Shifted: 3
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 11220 and 11230. Some of the buildings and associated area are often cut out of the polygon (misclassified with e.g. 21000). There are also unnecessary roads within the class area.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); Copernicus high resolution imperviousness layer (HRL Imperviousness); National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class is the residential rural areas. Often the areas are in the vicinity of forests and agricultural land.	
EXAMPLE (typical mistakes / typical appearance):		



Arable land is included and 12240 area is left out.

DATASET	UA	Urban Atlas status layer 2012
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LC/LU CLASS	11300	Isolated structures
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	7	
Class user's accuracy	70,00 %	
Class user's accuracy (CI)	$\pm 0,2994$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	30,00 %	Correct: 3; Too coarse: 7; Too detailed: x
Correctness of delineated area	30,00 %	Correct: 3; Unnecessary parts included: 4; Missing parts: 1; Both missing parts and unnecessary parts included: 2
Positional accuracy	80,00 %	Correct: 8; Shifted: 2
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 11240 and 21000. Features of 31000 are not always excluded from class area. Some buildings and associated land are also sometimes left out and misclassified as 31000 and 21000. The delineation is often too coarse.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class is the isolated summer cottages and farm buildings in the rural areas. Often the areas are in the vicinity of forests and agricultural land.	
EXAMPLE (typical mistakes / typical appearance):		



Some of the related buildings have been left unnoticed and are included in the surrounding forest.

DATASET	UA	Urban Atlas status layer 2012
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LC/LU CLASS	12100	Industrial, commercial, public, military and private units
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	98,48 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100,00 %	Correct: 10; Too coarse: 0; Too detailed: 0
Correctness of delineated area	60,00 %	Correct: 6; Unnecessary parts included: 2; Missing parts: 1; Both missing parts and unnecessary parts included: 1
Positional accuracy	40,00 %	Correct: 4; Shifted: 6
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Generally correctly classified but polygons are mostly shifted. The roads within the class area are often incorrect and unnecessarily divide areas into smaller polygons.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typically the class appears in all parts of the FUA. No military units are included in the sample dataset.	
EXAMPLE (typical mistakes / typical appearance):		



Road network bordering the class is not correct and cuts of part of the associated parking area.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	12210	Fast transit roads and associated land

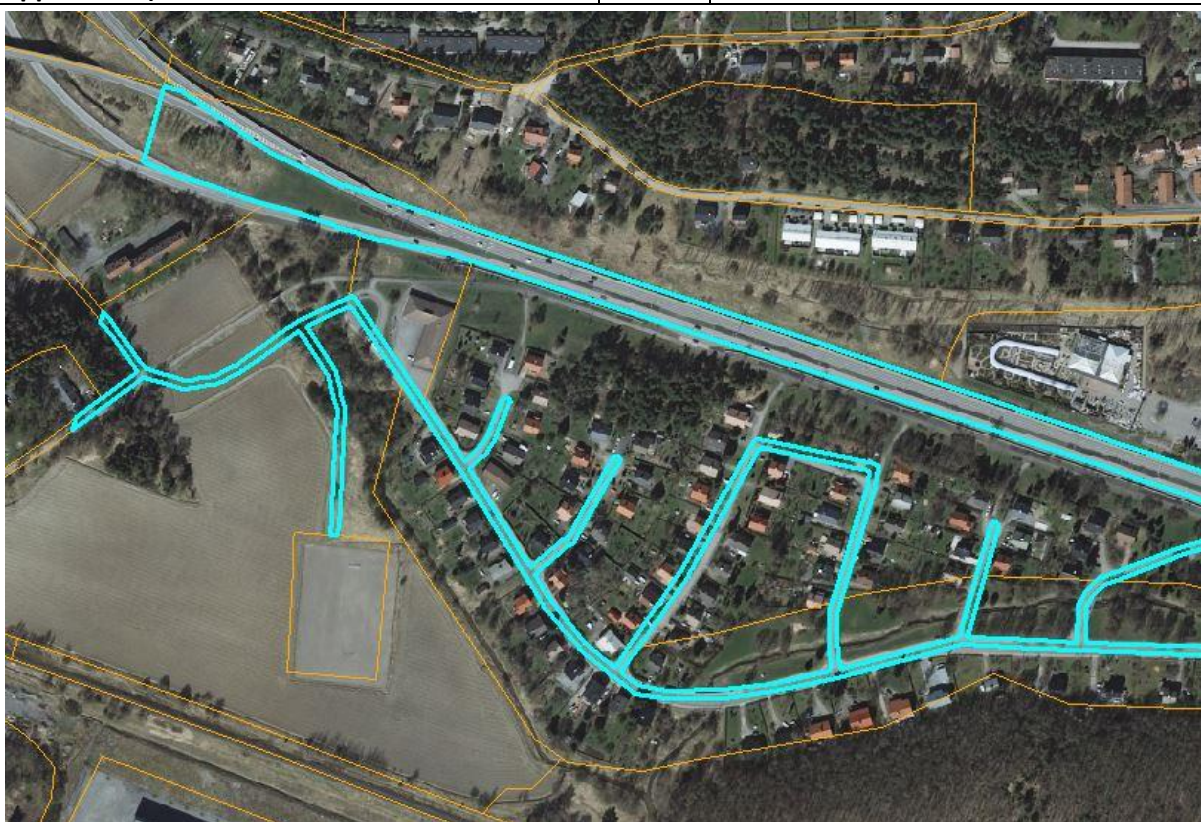
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 0; Too detailed: 2
Correctness of delineated area	80,00 %	Correct: 8; Unnecessary parts included: 0; Missing parts: 2; Both missing parts and unnecessary parts included: 0
Positional accuracy	70,00 %	Correct: 7; Shifted: 3
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The class polygon often changes shape in the middle so that it ends up being too narrow for the road. In large intersections with several bridges and slip roads it is often difficult to tell the class apart from 12220. The roads are divided into smaller polygons and do not form a continuous network.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Google street view	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class is larger, cross city highways as well as highways entering big cities.	
EXAMPLE (typical mistakes / typical appearance):		



A complex intersection with a possible shift and confusion with 12220.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	12220	Other roads and associated land
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		

Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	99,65 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100,00 %	Correct: 10; Too coarse: 0; Too detailed: 0
Correctness of delineated area	80,00 %	Correct: 8; Unnecessary parts included: 0; Missing parts: 0; Both missing parts and unnecessary parts included: 2
Positional accuracy	70,00 %	Correct: 7; Shifted: 3
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The road network is often inaccurate and the roads are not where they're supposed to be. Especially this applies to cities. This is not so visible in the 10 sample polygons but becomes more apparent where 12220 is bordering the urban classes.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	The class appears evenly throughout the FUA and consists of streets, larger roads in the city centers, country roads and smaller paved roads in the rural areas.	
EXAMPLE (typical mistakes / typical appearance):		



In the western end of the polygon, the roads are not accurate.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	12230	Railways and associated land
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		

Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100,00 %	Correct: 10; Too coarse: 0; Too detailed: 0
Correctness of delineated area	70,00 %	Correct: 7; Unnecessary parts included: 2; Missing parts: 1; Both missing parts and unnecessary parts included: 0
Positional accuracy	80,00 %	Correct: 8; Shifted: 2
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The class polygons are often unnecessarily changing shape (wide/narrow) without consistency with the reference data.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Both inner city and cross city railways.	
EXAMPLE (typical mistakes / typical appearance):		



Unnecessary change of shape in the middle of the sample polygon.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	12300	Port areas
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	8	

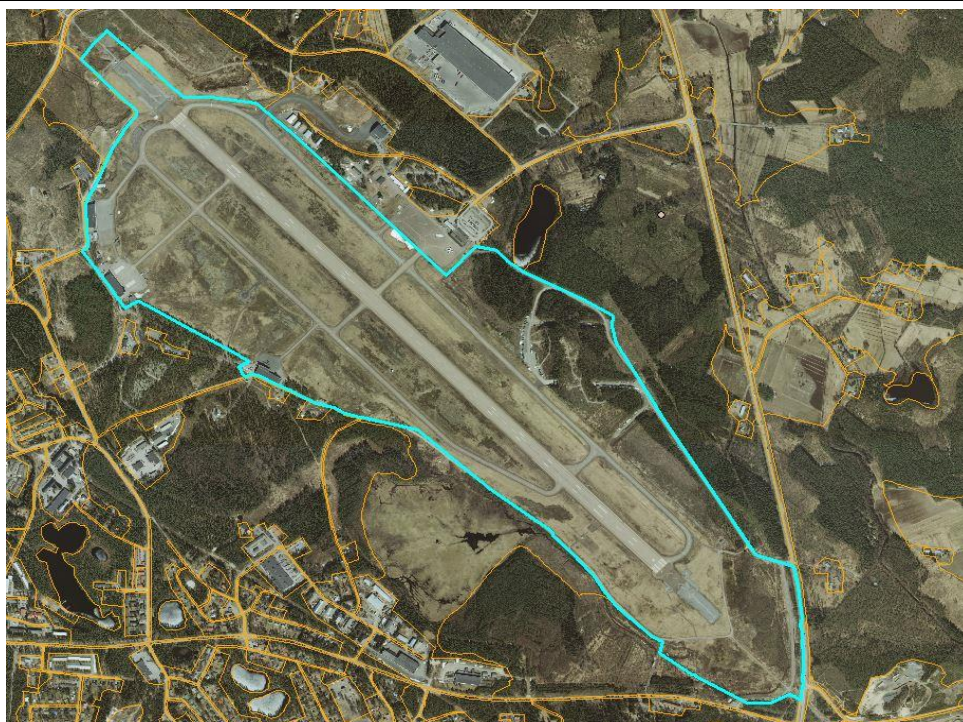
Class user's accuracy	80,00 %	
Class user's accuracy (CI)	$\pm 0,2613$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 2; Too detailed: 0
Correctness of delineated area	30,00 %	Correct: 3; Unnecessary parts included: 4; Missing parts: 0; Both missing parts and unnecessary parts included: 3
Positional accuracy	60,00 %	Correct: 6; Shifted: 4
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with class 12100. Features of e.g. 14100, 13400, 12100 and 31000 are not always excluded from class area. The road network within the port areas is often inaccurate. The overall delineation of the port areas is not very precise. Also it is difficult to interpret, where the administrative border of the area is.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typically large port areas and dockyards in proximity to the cities.	
EXAMPLE (typical mistakes / typical appearance):		



Typical example of the class.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	12400	Airports
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	8	

Class user's accuracy	80,00 %	
Class user's accuracy (CI)	$\pm 0,2613$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	30,00 %	Correct: 3; Unnecessary parts included: 3; Missing parts: 3; Both missing parts and unnecessary parts included: 1
Positional accuracy	70,00 %	Correct: 7; Shifted: 3
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 14200 (aerodrome) and 21000. Often areas of the airports are cut out and misclassified to the surrounding classes such as 12100, 13100, 21000, 23000, 31000 and 32000. Roads crossing and surrounding the airport area could often be classified as its associated land as they're more like maintenance roads.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)		
EXAMPLE (typical mistakes / typical appearance):		



DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	13100	Mineral extraction and dump sites
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	

Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	99,79 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 2; Too detailed: 0
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 1; Missing parts: 2; Both missing parts and unnecessary parts included: 5
Positional accuracy	70,00 %	Correct: 7; Shifted: 3
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The class area is often confused with forest: areas of 31000 are not always excluded from class area and some 13100 area is left out of the polygon as 31000. Some of the missing 13100 areas are also misclassified as 50000, 21000, 23000 and 12100.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Soil Extraction Permits Database; National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical class appearance in samples are sand extraction areas.	
EXAMPLE (typical mistakes / typical appearance):		



DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	13300	Construction sites
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	6	
Class user's accuracy	60,00 %	
Class user's accuracy (CI)	± 0,3201	

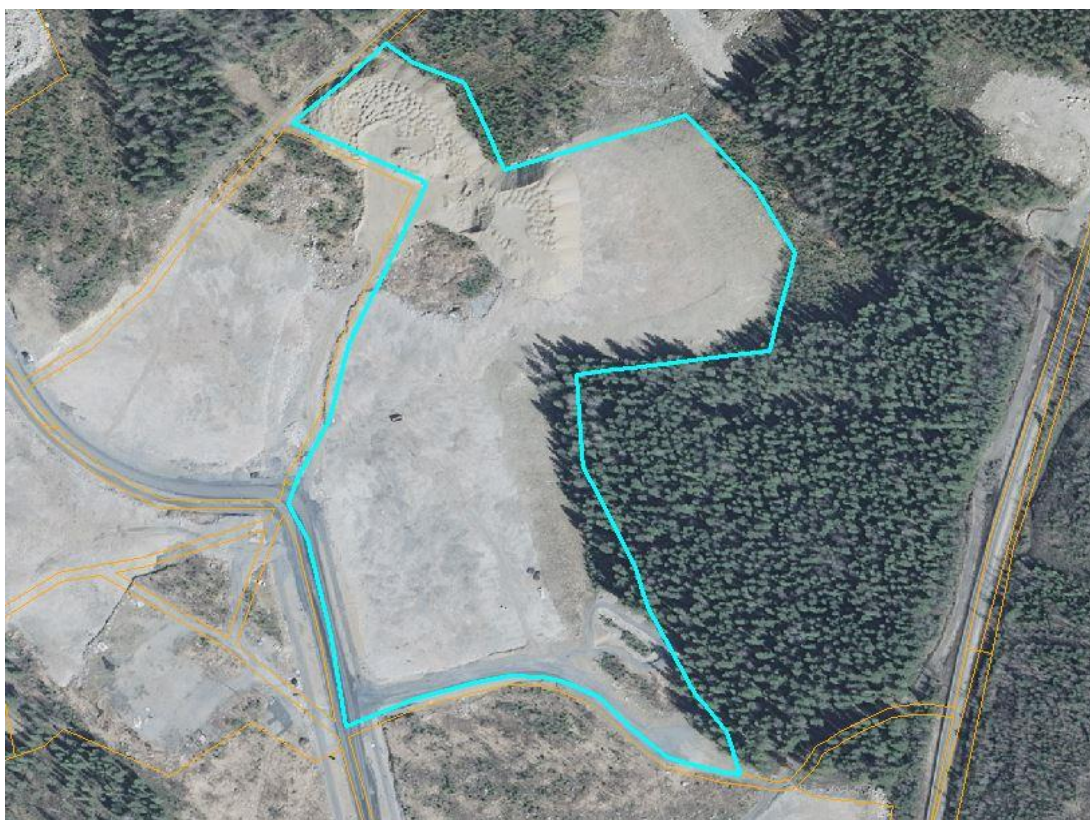
Class producer's accuracy	88,61 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100,00 %	Correct: 10; Too coarse: 0; Too detailed: 0
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 6; Missing parts: 1; Both missing parts and unnecessary parts included: 2
Positional accuracy	60,00 %	Correct: 6; Shifted: 4
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 11210, 12100, 12220 and 13400. The road network within and around the polygon area is not accurate.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical construction sites in samples are constructing roads, residential areas and industrial areas.	
EXAMPLE (typical mistakes / typical appearance):		



Wrong delineation, road network inaccurate and incorrect class code.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	13400	Land without current use
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	4	
Class user's accuracy	40,00 %	
Class user's accuracy (CI)	± 0,3201	
Class producer's accuracy	75,52 %	
Class producer's accuracy (CI)	± 0,0000	

CORRECTNESS OF DELINEATION		
Detail of delineation	70,00 %	Correct: 7; Too coarse: 1; Too detailed: 2
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 8; Missing parts: 1; Both missing parts and unnecessary parts included: 0
Positional accuracy	60,00 %	Correct: 6; Shifted: 4
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 12100, 13300, 14100, 23000 and 32000. Features of 31000 are not always excluded from class area.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); Soil Extraction Permits Database; National high resolution Corine Land Cover 2012; The Finnish Land Parcel Information System (FLPIS)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Class includes e.g. areas waiting to be built.	
EXAMPLE (typical mistakes / typical appearance):		



wrong delineation and unnecessary roads. The area will be built, but here no construction is visible.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	14100	Green urban areas
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	98,37 %	
Class producer's accuracy (CI)	± 0,0000	

CORRECTNESS OF DELINEATION		
Detail of delineation	70,00 %	Correct: 7; Too coarse: 3; Too detailed: 0
Correctness of delineated area	30,00 %	Correct: 3; Unnecessary parts included: 2; Missing parts: 1; Both missing parts and unnecessary parts included: 4
Positional accuracy	80,00 %	Correct: 8; Shifted: 2
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Features of urban fabric/artificial areas (e.g. 12100, 12200, 12230) are not always excluded from class area. Often times there are unnecessary roads dividing larger areas of 14100: these roads are only small paths that should be included in to the 14100 area as associated land.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012;	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Habitat of the green urban areas is typically forest. In Finland this class represents suburban natural areas (extending from the surroundings) rather than highly managed urban gardens or castle parks.	
EXAMPLE (typical mistakes / typical appearance):		



In the eastern end, there is a small path unnecessarily classified as road (12220) separating the two 14100 areas.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	14200	Sports and leisure facilities
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	9	
Class user's accuracy	90,00 %	
Class user's accuracy (CI)	± 0,1960	
Class producer's accuracy	95,97 %	
Class producer's accuracy (CI)	± 0,0000	

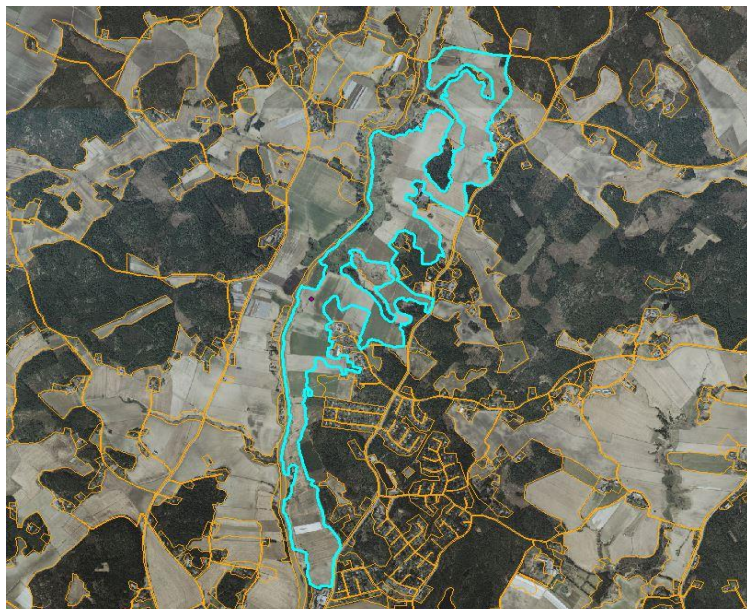
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 1; Too detailed: 0
Correctness of delineated area	30,00 %	Correct: 3; Unnecessary parts included: 2; Missing parts: 3; Both missing parts and unnecessary parts included: 2
Positional accuracy	50,00 %	Correct: 5; Shifted: 5
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with class 21000. Features of 21000 and 31000 are not always excluded from class area. Also 14200 class area is often left out of the polygon and misclassified as e.g. 21000, 31000. Often times shifted.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Marinas are overrepresented in the data. Otherwise quite varied collection of different land uses (e.g. soccer field, golf course, camping/caravan area, kart racing course).	
EXAMPLE (typical mistakes / typical appearance):		



Typical appearance of the class is a marina. Polygon is shifted.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	21000	Arable land (annual crops)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	7	
Class user's accuracy	70,00 %	
Class user's accuracy (CI)	± 0,2994	
Class producer's accuracy	78,66 %	
Class producer's accuracy (CI)	± 0,0000	

CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 1; Too detailed: 0
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 4; Missing parts: 0; Both missing parts and unnecessary parts included: 6
Positional accuracy	40,00 %	Correct: 4; Shifted: 6
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The delineation is mostly incorrect as missing and unnecessary parts occur. Features of 23000, 22000, 11300, 32000 and 31000 are not always excluded from class area. Also some 21000 are left out of the polygon and misclassified as 23000, 11300 and 31000. Not all country roads are included in the road network.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; The Finnish Land Parcel Information System (FLPIS), Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typically large field areas, with fragmented land use (e.g. Arable land, Forests, Herbaceous vegetation association, Isolated structures). Typical crop types are e.g. wheat, barley, oat, sugar beet, cultivated grass for forage and turnip rape.	
EXAMPLE (typical mistakes / typical appearance):		



A typical large, fragmented field area with confusions with neighboring classes.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	22000	Permanent crops
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	1	
Class user's accuracy	10,00 %	
Class user's accuracy (CI)	± 0,1960	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		

Detail of delineation	80,00 %	Correct: 8; Too coarse: 2; Too detailed: 0
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 10; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	30,00 %	Correct: 3; Shifted: 7
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 21000, 31000 and 14200. In cases where confusion occurs with forest, the area is often clear cut. Where correctly classified as 22000, features of 11300, 21000, 12220 and 31000 are not excluded from the class area.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; The Finnish Land Parcel Information System (FLPIS), Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class in Finland is strawberry fields.	
EXAMPLE (typical mistakes / typical appearance):		



Wrong class and misclassified as 31000 (clear cut).

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	23000	Pastures
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	7,00 %	Correct: 7; Too coarse: 3; Too detailed: 0

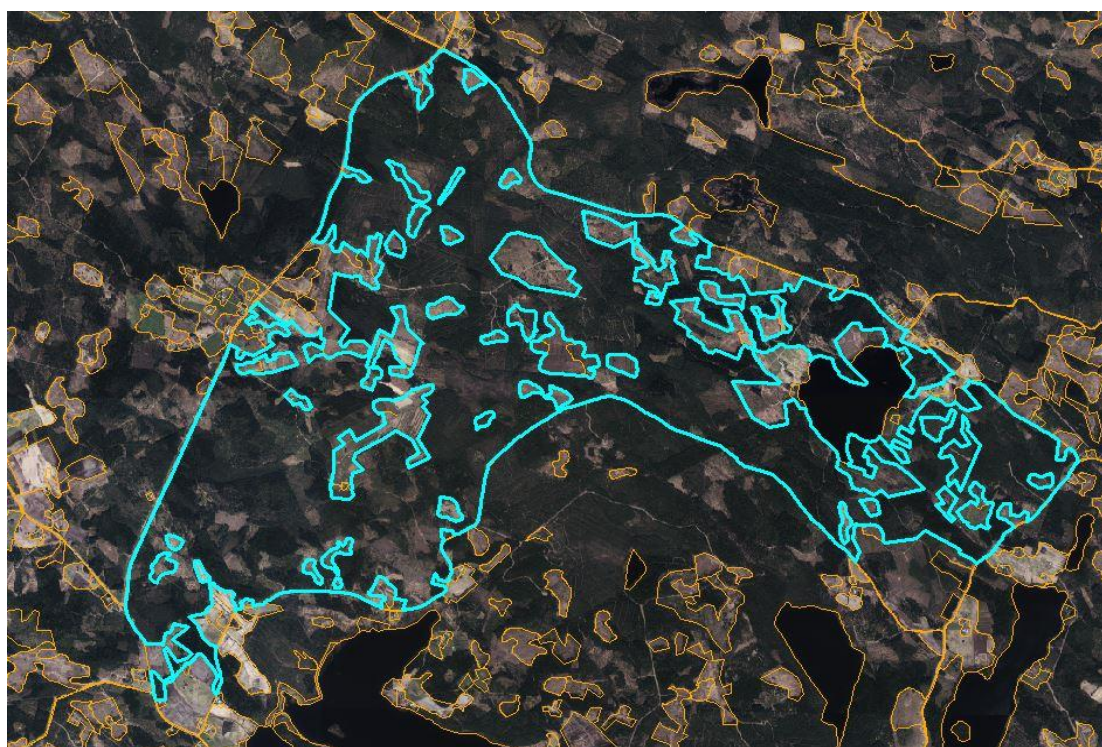
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 10; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	70,00 %	Correct: 7; Shifted: 3
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 21000, 31000 and 40000. Arable land confused as pastures is mostly field laid in fallow or temporarily growing grass for forage as part of the crop rotation system.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; The Finnish Land Parcel Information System (FLPIS), Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	No correct class was represented in the sample data.	
EXAMPLE (typical mistakes / typical appearance):		



Wrong class: this polygon is half clear cut forest and half a field that is temporarily out of use and growing grass.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	31000	Forests
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	89,95 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 1; Too detailed: 0

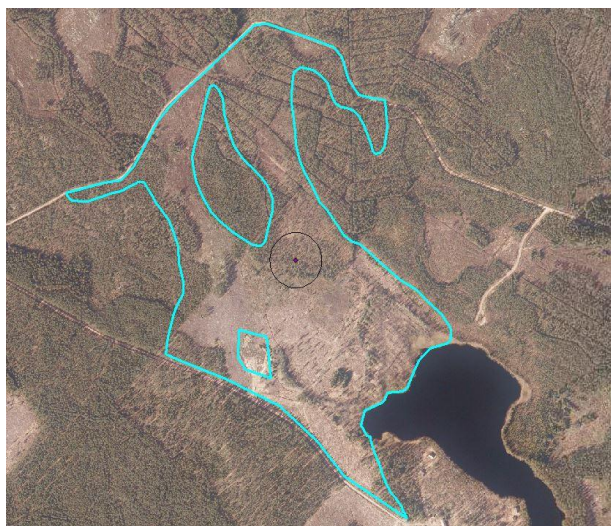
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 0; Missing parts: 0; Both missing parts and unnecessary parts included: 9
Positional accuracy	40,00 %	Correct: 4; Shifted: 6
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Features of 40000, 21000, 13100, 11300, 32000, 50000 are not always excluded from class area. Also areas of forest are left out and misclassified as 21000, 23000, 11300 and 32000. The forest areas left out of the polygon as other classes are often clear cuts.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class in the samples are very large forest areas with varying densities of forest growth, tree types and habitats. Often large areas of swamp forests are included.	
EXAMPLE (typical mistakes / typical appearance):		



A typical large forest area with misclassifications with e.g. 21000 and 23000.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	32000	Herbaceous vegetation association
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1

Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 10; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	70,00 %	Correct: 7; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 31000 and 40000. In Finland, 9/10 of the samples classified as 32000 are forest. These are mostly transitional woodland with mosaics of forest patches of different succession stages (clear cuts and recolonizations). Verification was made difficult by the similar descriptions of the UA classes 3.1. and 3.2. (3.2.: "Vegetation cover more than 50%, ground coverage of trees with height >5 m: <30%, areas with minor / without artificial or agricultural influence." could also be interpreted as transitional forests of class 3.1.) Also, there is an inconsistency with the Corine classification in which the transitional woodlands are classified as 3.2.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	No correct class was represented in the sample data. This class appeared in other class samples as abandoned agricultural land.	
EXAMPLE (typical mistakes / typical appearance):		



DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	33000	Open spaces with little or no vegetation
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	3	
Class user's accuracy	30,00 %	
Class user's accuracy (CI)	± 0,2994	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100,00 %	Correct: 10; Too coarse: 0; Too detailed: 0

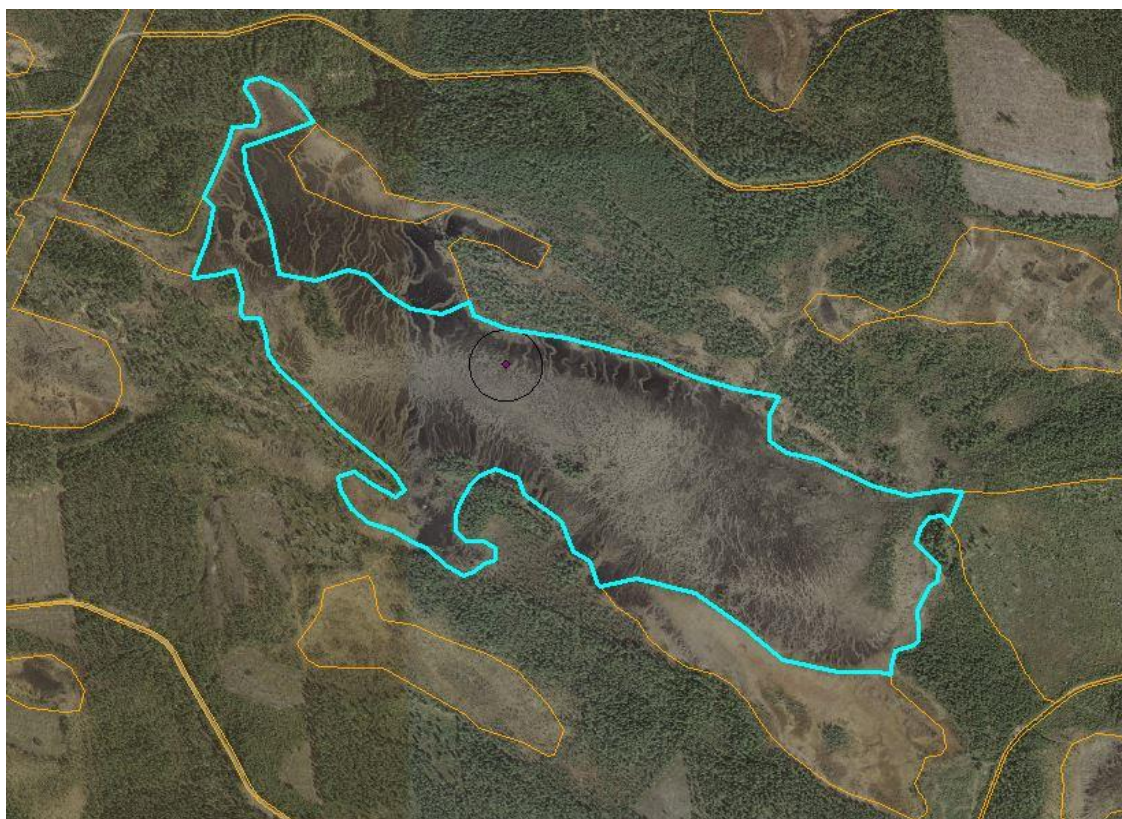
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 7; Missing parts: 0; Both missing parts and unnecessary parts included: 1
Positional accuracy	50,00 %	Correct: 5; Shifted: 5
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 31000, 50000, 40000, 32000 and 13100. Low consistency between the sample dataset and the reference data.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class is beaches.	
EXAMPLE (typical mistakes / typical appearance):		



Typical appearance: a sandy beach.

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	40000	Wetlands
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	9	
Class user's accuracy	90,00 %	
Class user's accuracy (CI)	± 0,1960	
Class producer's accuracy	54,26 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1

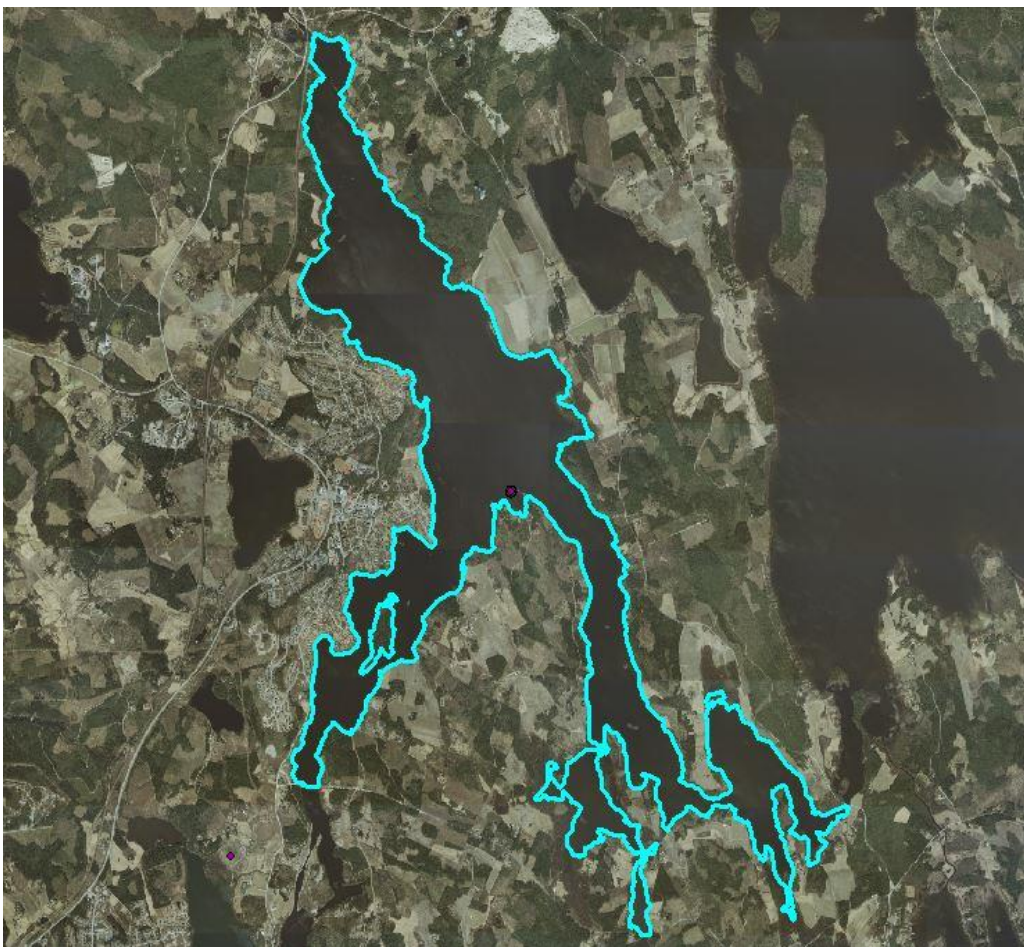
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 1; Missing parts: 5; Both missing parts and unnecessary parts included: 3
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with class 21000. Large areas of wetland are left out of the polygons and misclassified as e.g. 21000, 31000, 50000 and 23000.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class in the samples is large peat bogs and freshwater marshes/reed growths by the lakes.	
EXAMPLE (typical mistakes / typical appearance):		



A peat bog with large areas left out of the polygon (misclassified as e.g. 50000, 31000 and 23000).

DATASET	UA	Urban Atlas status layer 2012
LC/LU CLASS	50000	Water bodies
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	99,99 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	70,00 %	Correct: 7; Too coarse: 3; Too detailed: 0

Correctness of delineated area	50,00 %	Correct: 5; Unnecessary parts included: 0; Missing parts: 0; Both missing parts and unnecessary parts included: 5
Positional accuracy	40,00 %	Correct: 4; Shifted: 6
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The delineation of the coastline is not accurate. Therefore some water is left out and land is included in the polygon. Partly this can be because of the shift.	
Typical reference information used / minimum required for decision	VHR ortho imagery close to year 2012; National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc.)	Typical appearance of the class in sample are large lakes/parts of lakes.	
EXAMPLE (typical mistakes / typical appearance):		



Typical appearance: A large lake area.

2. Riparian Zones

LOCAL COMPONENT VERIFICATION REPORT

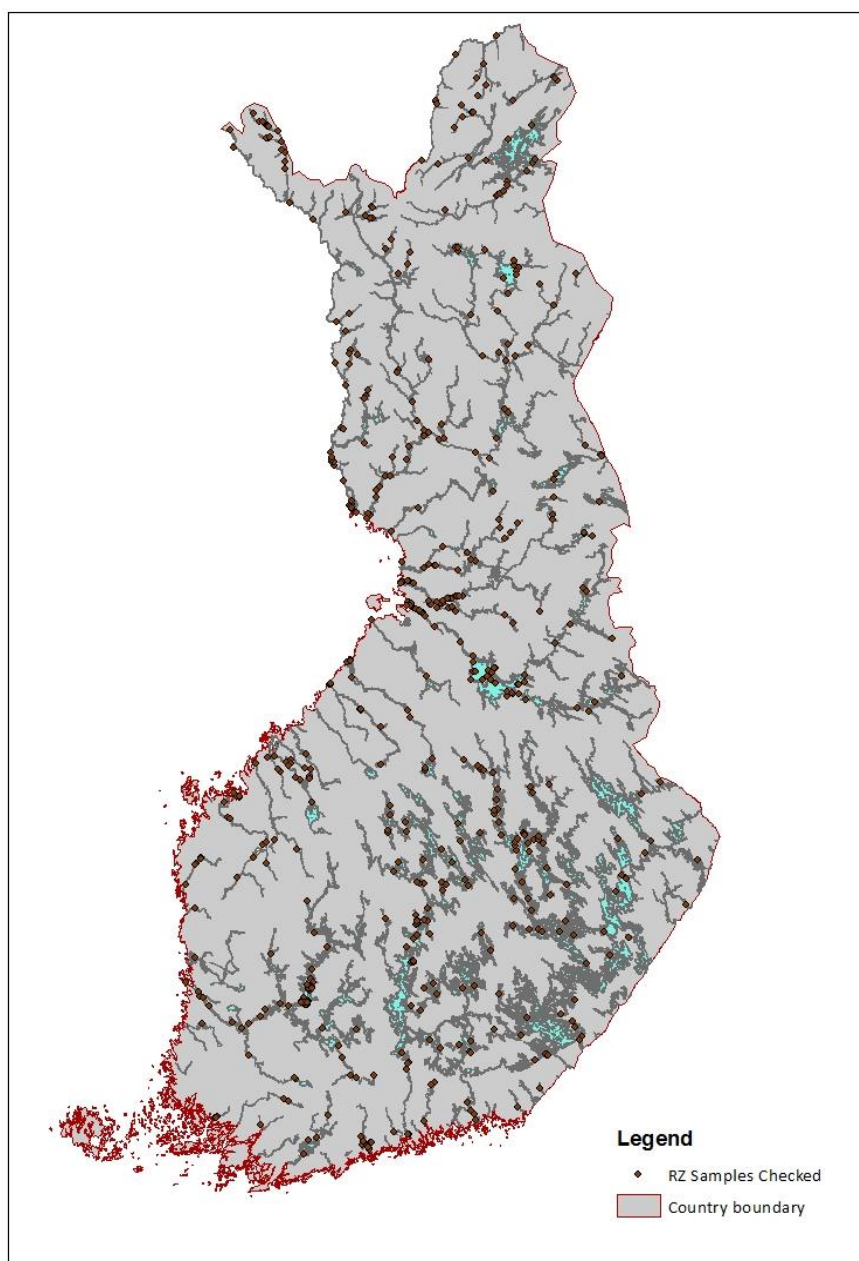
I. Metadata

DATASET	<i>Riparian Zones status layer 2012</i>
Country	<i>Finland</i>
Institution carrying out the work	<i>Finnish Environment Institute</i>
Data preparation	<i>Iida Autio, iida.autio@ymparisto.fi,</i>
Visual inspection of samples	<i>Iida Autio, iida.autio@ymparisto.fi, Minna Kallio, minna.kallio@ymparisto.fi</i>
Evaluation	<i>Iida Autio, iida.autio@ymparisto.fi, Minna Kallio, minna.kallio@ymparisto.fi</i>
Reference data provided centrally	IMAGE2012 VHR satellite image mosaic
	GoogleEarth Imagery
In situ data used	National Orthophoto database/The National Land Survey Natural color/black and white ortophotos Resolution: 0.25-0.5m Reference years: 2010-2015 (partial coverages)
	The National Road and Street Database, Digiroad Vector dataset Reference year: 2017 (compared to data from 2011-2013)
	National high resolution Corine Land Cover 2012 National Corine raster dataset Resolution 20x20m Reference year: 2012
	National Corine Land Cover change layers 2000-2006 and 2006-2012 Resolution 0.5ha
	The Finnish Land Parcel Information System (FLPIS) Based on farming subsidy reports Information of the dominant plant species of the field plots Vector data Reference year: 2011
	Soil Extraction Permits Database Vector data Reference year: constantly updated but data contains information on duration of the permits
	Building and Dwelling register (BDR) Population Information System Vector data Reference year 2015
	Topographic Database/The National Land Survey Compilations of object groups Vector data Reference year: 2012
	Topographic map series/The National Land Survey Raster data Reference year: 2017

	Copernicus high resolution imperviousness layer 2012 (HRL Imperviousness) + Sample polygon data The percentage of soil sealing was calculated for each sample and used to guide the validation of the Urban Fabric classes
	ESRI/The National Land Survey basemap 1:2500
	Digital Elevation Model/ The National Land Survey & SYKE Resolution 10x10m Raster data Reference year: 2015
	Laser Scanned Tree Cover Density Resolution 2x2m Raster Data Reference year: 2018
	Shoreline 10 and River network Based on the Topographic database/National Land Survey of Finland Vector data Reference year: 2016
Notes	Some datasets are newer than the recommended reference year 2012. This has been taken into account while using the data in the validation process.
Software used for verification	LACO-WIKI, (+ GoogleEarth, QGIS 2.18.10), ArcMap 10.5.1, Google street view
Internal quality control done by	Pekka Härmä, pekka.harma@ymparisto.fi ; Minna Kallio, minna.kallio@ymparisto.fi
Date and place of writing the report	DD.04.2018, Helsinki

II. Overall characterization of the dataset

DATASET	RZ	Riparian Zones status layer 2012
Area covered within country	13.00%	4 400 457 hectares
Number of valid classes appearing in the country	65	
Number of samples selected	573	max. 10 samples/class
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	293	
Overall Accuracy	52,71 %	
Overall Accuracy (CI)	$\pm 0,0323$	
CORRECTNESS OF DELINEATION		
Detail of delineation	74,69 %	Correct: 428; Too coarse: 52; Too detailed: 93
Correctness of delineated area	15,18 %	Correct: 87; Unnecessary parts included: 368; Missing parts: 36; Both missing parts and unnecessary parts included: 82
Positional accuracy	94,59 %	Correct: 542; Shifted: 31
OVERVIEW FIGURE OF NATURA 2000 STATUS LAYER		



DATASET	RZ	Riparian Zones status layer 2012
GENERAL REMARKS ON THE RIPARIAN ZONES STATUS LAYER		
Overall feedback on the quality of the dataset: The urban classes (1000) are fairly well identified in the Riparian Zone status layer. Especially this applies to the truly urban land use classes such as urban fabric, industrial areas, road and rail network and transport infrastructure. The “green” land use classes (green urban area and sports and leisure facilities) also correspond to the reference data but the tree cover density (T.C.D.) is misinterpreted in many cases. While general classification is mostly correct, the delineation of the polygons is poor. Unnecessary areas are included in majority of the sample polygons. Roads and railways are an exception as their delineation is quite exact. Arable land and the more general agricultural LC/LU class 2331 are well identified in the dataset but their delineation is not very accurate as unnecessary parts are included (forests and low density urban areas). Delineation of the forest polygons (3000) does not follow patterns of forest type and therefore most of them should be redelineated and reclassified. This applies to both tree species and soil moisture factors. The Potential Riparian Zone (PRZ) is ignored in the validation as national reference data doesn’t support the delineation of PRZ. Only forests that are located in the moist low areas along the water systems and clearly affected by the adjacent water are classified as riparian and fluvial forests. There is a strong correlation between the forest polygons of the RZ status layer and the wetland polygons of the Topographic Database of the National Land Survey so this has clearly been used in the production of the dataset. It should be documented in METADATA that features of national data is included (superimposed) into output as such. This is visible in output in many cases. Grassland classes (4000) are not well identified in the data and often the class is confused with forest or arable land. The national reference data is not sufficient to support the validation of the class. Especially difficult it is to distinguish between mesic grassland and freshwater marsh as well as mesic and managed grasslands. Transitional woodland and wooded grassland both occur in abandoned arable land and are often confused. Validation of heathland and scrub classes (5000) and sparsely vegetated areas (6000) is problematic as distinguishing these classes (e.g. 5111, 6111, 6221, also 7212) from each other is often challenging from satellite images or even more precise national reference data. The high class user’s accuracy isn’t always an indication of a successful mapping but uncertainties in validation. Sparsely vegetated LC/LU classes 6211, 6213, 6221 at the waterfront are also difficult to validate since there are differences in water levels between satellite images and national reference data. In many cases national reference data indicates that the area should be water even though satellite image shows land area. Freshwater marshes (7000) are misclassified with e.g. forest classes but their validation is also difficult without sufficient reference data. Both natural and artificial water bodies (9000 & 10000) are quite well identified in the feature layer with a few exceptions. Overall feedback on the RZ classification and nomenclature guidelines: There are several issues in the RZ classification and the nomenclature guidelines that should be considered to improve the quality and usability of the dataset. There are big differences in the dataset in terms of coherence with the Urban Atlas status layer. Especially this applies to the urban classes. It is mentioned in the RZ nomenclature, that inside the Urban Atlas Core		

Regions, Urban Atlas is integrated to the RZ and elsewhere used as reference. This approach is problematic since it causes big differences in precision: in some areas the RZ layer is very generalized and polygons include several LC/LU classes of >MMU while in other areas they are very detailed. Also UA Core regions are not clearly described in the RZ nomenclature guidelines and no information is available on them in other sources.

Forest classes have attributes describing the four levels T.C.D. This could be considered as a 5th level of classification and is possibly too detailed. These were not taken into account when validating the correctness of the LC/LU classes

Validation of the grassland and wetland classes is complicated by the fact that the descriptions of these classes are somewhat confusing in the RZ nomenclature guideline. First of all, the RZ nomenclature guideline is not clear on the description (e.g. type and amount of vegetation and its management status) of classes 7111 and 7112 as they're described together under the headline of "7.1.1.1 Inland freshwater marshes". Also there are several exceptions and elaborations for classes 7111, 7112 as well as 4222 in the Nordic countries and Scandinavia and these are somewhat contradictory. It could be argued that the classification of marsh areas and grasslands in the RZ dataset is too ambitious. Their distinctive properties (management status, the height of grassy vegetation and humidity of soil) are both hard to describe and impossible to detect on satellite images or even on aerial images or other more precise national reference data.

The nomenclature specifies that in Nordic countries areas close to water are classified as freshwater marshes since they're not likely to be peat producing. This is not an accurate assumption since there are many large peat bogs next to lakes in Finland. This presumably causes a systematical error in classification of the freshwater marsh and peat bog classes.

Both classes "Heathland and moorlands" (5111) and "Sparsely vegetated areas" (6111) are mentioned to form mosaics of different land use classes with at least 70% coverage of the respective class. In Nordic conditions this applies also to peat bogs. This makes it difficult to determine the right delineation of a polygon, as in many cases an area could be either divided into smaller homogenous LC/LU classes or treated as a mosaic. The acceptance of mosaics is also an indication that the classification is too ambitious. If the LC/LU cannot be classified to the most detailed level, more general classification should be considered.

The existence of class 8111 (Salt marshes without reeds) in Finland is questionable. RZ nomenclature guideline specifies that "the Baltic Sea has only brackish coastal waters, which qualify for inland freshwater marshes" but still class 8111 is present in the dataset. There are coastal meadows in the Baltic Sea coastal areas that have salt tolerant plants, but according to the nomenclature also these should be considered freshwater marshes (or alternatively mesic grasslands).

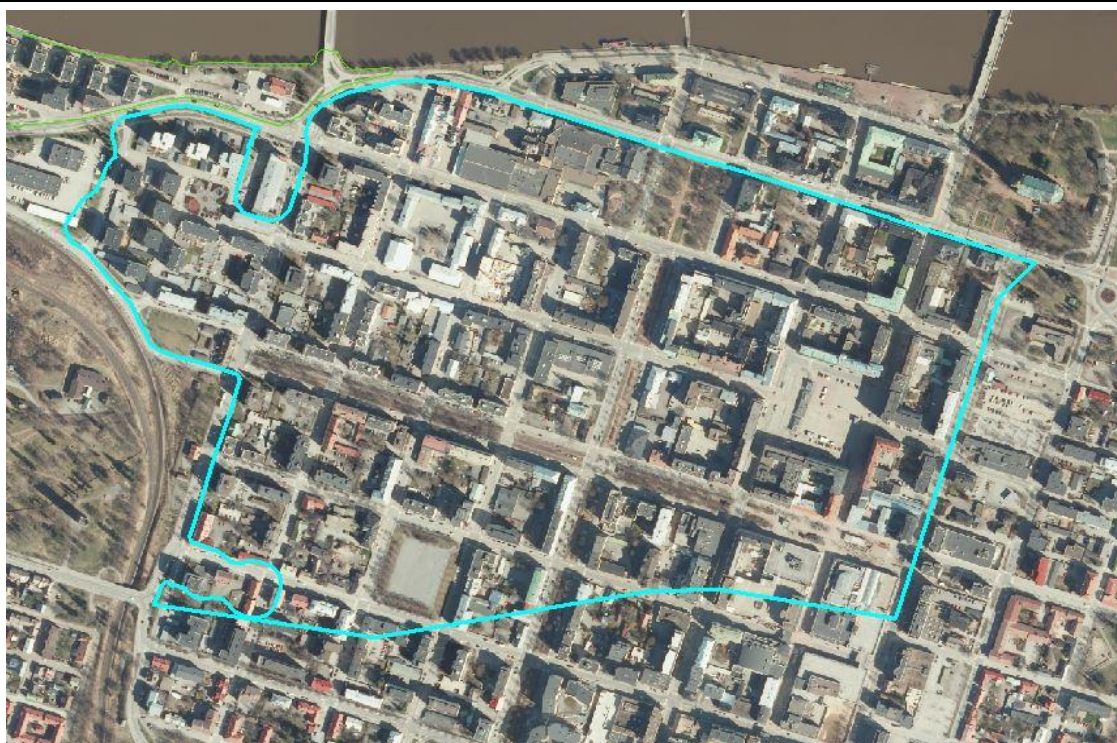
SUMMARY STATISTICS OF RIPARIAN ZONES STATUS LAYER

RZ Class	Number of polygons	Area (ha)	%
1111	262	428	0,01 %
1112	792	3283	0,07 %
1113	4613	15127	0,34 %
1120	102	2973	0,07 %
1121	40854	107349	2,44 %
1210	1	90	0,00 %
1211	3791	7532	0,17 %
1212	440	996	0,02 %
1213	27	141	0,00 %
1214	12	236	0,01 %
1311	571	1512	0,03 %
1321	19	9	0,00 %
1410	3	14	0,00 %
1411	71	203	0,00 %
1412	451	1164	0,03 %
1420	4	103	0,00 %
1421	178	870	0,02 %
1422	417	1244	0,03 %
2111	33224	290451	6,60 %
2121	18	49	0,00 %
2221	1	1	0,00 %
2222	4	8	0,00 %
2331	261	6119	0,14 %
3000	655	5250	0,12 %
3111	27480	84154	1,91 %
3121	7570	17707	0,40 %
3131	9992	35365	0,80 %
3151	1	2	0,00 %
3211	89731	343494	7,81 %
3221	29601	92976	2,11 %
3231	51324	235360	5,35 %
3232	1	9	0,00 %
3311	74909	241168	5,48 %
3321	22118	68522	1,56 %
3331	33805	133926	3,04 %
3411	60736	203551	4,63 %
3412	30	71	0,00 %
3431	2	23	0,00 %
4111	1636	4020	0,09 %
4112	5939	11160	0,25 %
4122	1	2	0,00 %
4211	5	12	0,00 %
4212	237	919	0,02 %
4222	634	2672	0,06 %
4223	2	2	0,00 %
5111	424	7433	0,17 %
5112	105	413	0,01 %
6111	658	2326	0,05 %

6112	1	1	0,00 %
6211	160	395	0,01 %
6213	272	701	0,02 %
6221	1169	2934	0,07 %
7111	12033	44445	1,01 %
7112	16	45	0,00 %
7121	17	126	0,00 %
7210	58	885	0,02 %
7211	337	6597	0,15 %
7212	12595	143107	3,25 %
7221	1	1	0,00 %
8111	44	151	0,00 %
9000	115	13379	0,30 %
9111	3811	88680	2,02 %
9112	1	2	0,00 %
9113	4	22	0,00 %
9121	26	35	0,00 %
9211	6316	2168178	49,27 %
9212	20	23	0,00 %
9213	7	65	0,00 %
9214	1	4	0,00 %
9215	11	100	0,00 %
9221	2	40	0,00 %
10111	95	104	0,00 %
SUM	540824	4400457	100,00 %

III. Characterization of the dataset by LC/LU class - RZ 2012

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	1111	Continuous Urban Fabric (IMD ≥80-100%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	7	
Class user's accuracy	70,00 %	
Class user's accuracy (CI)	± 0,2994	
Class producer's accuracy	87,50 %	
Class producer's accuracy (CI)	± 0,2194	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 0; Too detailed: 2
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 7; Missing parts: 0; Both missing parts and unnecessary parts included: 1
Positional accuracy	70,00 %	Correct: 7; Shifted: 3
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 1112, 1113 and 3311. Larger than MMU features of 1113 and roads >MMW are not always excluded. Polygons are often shifted.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Copernicus high resolution imperviousness layer (HRL Imperviousness), Building and Dwelling register (BDR)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class is residential areas near and in city centers. Public/commercial/industrial component not clearly distinguishable from residential buildings is often included.	
EXAMPLE (typical mistakes / typical appearance):		



Residential areas together with industrial/public/commercial buildings.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	1112	Discontinuous dense urban fabric (S.L. 50% - 80%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	5	
Class user's accuracy	50,00 %	
Class user's accuracy (CI)	$\pm 0,3267$	
Class producer's accuracy	62,50 %	
Class producer's accuracy (CI)	$\pm 0,2652$	
CORRECTNESS OF DELINEATION		
Detail of delineation	50,00 %	Correct: 5; Too coarse: 0; Too detailed: 5
Correctness of delineated area	30,00 %	Correct: 3; Unnecessary parts included: 6; Missing parts: 0; Both missing parts and unnecessary parts included: 1
Positional accuracy	80,00 %	Correct: 8; Shifted: 2
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 1111, 1121 and 1120. Roads >MMW are not always excluded from the class area. Polygons are often too detailed as they have small twists that have no consistency with reference data. There is an inconsistency in the class name: in the RZ dataset the class name includes "+ industrial, commercial, public, military and private units", but this is not the case in the RZ nomenclature guideline.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); Copernicus high resolution imperviousness layer (HRL Imperviousness)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class is the suburban areas fairly close to city centers.	
EXAMPLE (typical mistakes / typical appearance):		



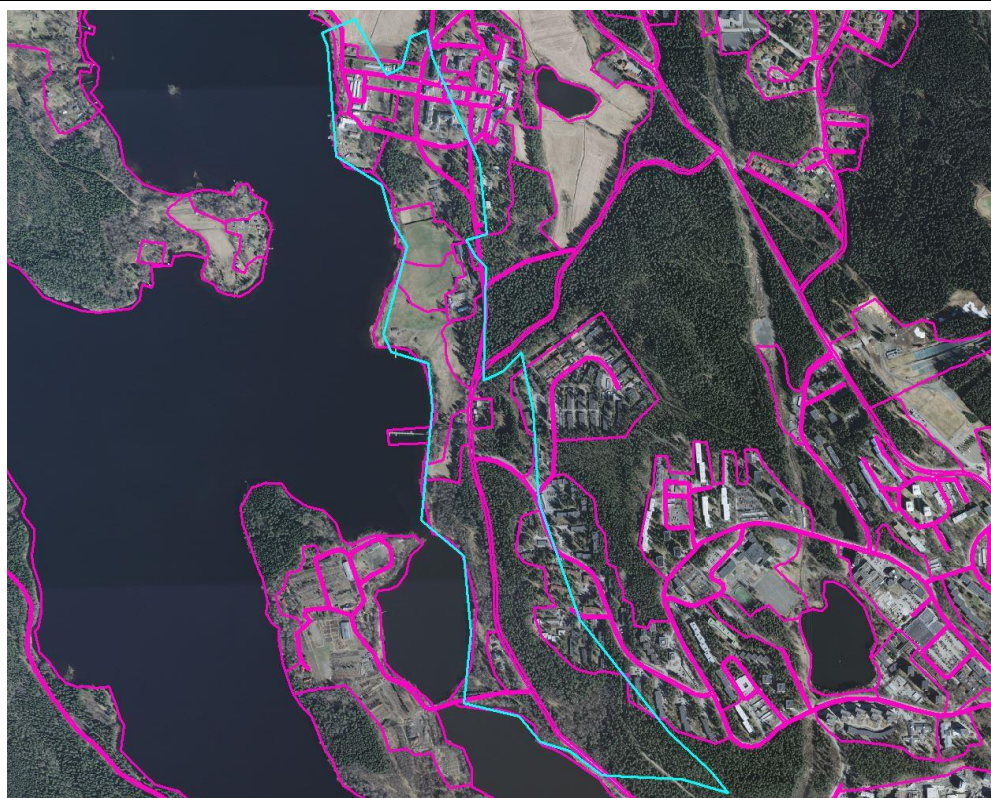
Delineation is too detailed: polygon has unnecessary twists The road should be excluded.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	1113	Industrial or commercial units
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	7	
Class user's accuracy	70,00 %	
Class user's accuracy (CI)	$\pm 0,2994$	
Class producer's accuracy	35,00 %	
Class producer's accuracy (CI)	$\pm 0,1439$	
CORRECTNESS OF DELINEATION		
Detail of delineation	40,00 %	Correct: 4; Too coarse: 2; Too detailed: 4
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 6; Missing parts: 2; Both missing parts and unnecessary parts included: 1
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 1121 and 1120. Features >MMU of 1121 as well as roads are not always excluded from the class area. There are small twists in the delineation which don't have correspondence in reference data.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); Copernicus high resolution imperviousness layer (HRL Imperviousness)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class is different sized industrial facilities both in cities and in the rural areas.	
EXAMPLE (typical mistakes / typical appearance):		



Typical appearance: an industrial area. Delineation is peculiar with unnecessary detailed twists.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	1120	Discontinuous low density urban fabric (S.L. 10% - 30%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	8	
Class user's accuracy	80,00 %	
Class user's accuracy (CI)	0,261333	
Class producer's accuracy	57,14 %	
Class producer's accuracy (CI)	± 0,2048	
CORRECTNESS OF DELINEATION		
Detail of delineation	10,00 %	Correct: 1; Too coarse: 9; Too detailed: 0
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 7; Missing parts: 0; Both missing parts and unnecessary parts included: 3
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The delineation of the class is very crude. Large areas of e.g. 1112, 1113, 3000, 4110, 9211 and roads (1211) are not excluded from the polygon. Delineation doesn't follow Urban Atlas.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); Copernicus high resolution imperviousness layer (HRL Imperviousness)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class is residential areas in the suburban area of cities or residential rural areas.	
EXAMPLE (typical mistakes / typical appearance):		



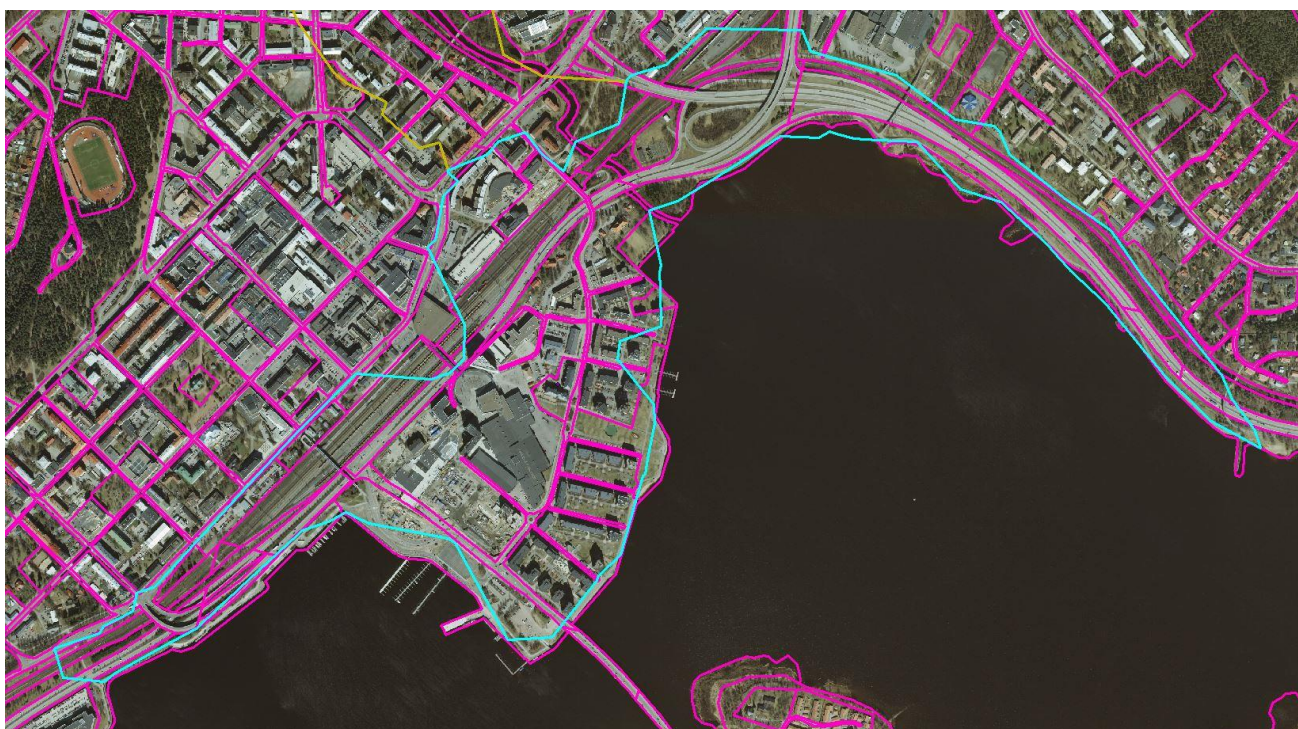
Large areas of other classes are included. UA (pink lines) is not followed in delineation.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	1121	Low density urban fabric (IM.D. 0-30%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	8	
Class user's accuracy	80,00 %	
Class user's accuracy (CI)	± 0,2613	
Class producer's accuracy	40,00 %	
Class producer's accuracy (CI)	± 0,1407	
CORRECTNESS OF DELINEATION		
Detail of delineation	60,00 %	Correct: 6; Too coarse: 0; Too detailed: 4
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 7; Missing parts: 1; Both missing parts and unnecessary parts included: 1
Positional accuracy	90,00 %	Correct: 9; Shifted: 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 3231 and 2111. There are features >MMU of e.g. 3000, 2111 and roads (1211) not excluded from the class area. Often houses that are in the woods are not mapped.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); Copernicus high resolution imperviousness layer (HRL Imperviousness); National high resolution Corine Land Cover 2012; The Finnish Land Parcel Information System (FLPIS)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class is the residential rural areas. Often the areas are in the vicinity of forests and agricultural land.	
EXAMPLE (typical mistakes / typical appearance):		



Arable land and is included.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	1210	Transport infrastructure
Number of samples selected for the class	1	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	0,00 %	Correct: 0; Too coarse: 1; Too detailed: 0
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 1; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 1; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The only sample of the class is misclassification with 1112. The area includes transport infrastructure such as roads, railways and railway stations but the sampling point lands on 1112. The delineation is not in line with Urban Atlas.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Large polygon with unnecessary parts. Nod delineated with UA.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	1211	Road networks and associated land
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	$\pm 0,0000$	
Class producer's accuracy	90,91 %	
Class producer's accuracy (CI)	$\pm 0,1620$	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 0; Too detailed: 2
Correctness of delineated area	60,00 %	Correct: 6; Unnecessary parts included: 2; Missing parts: 2; Both missing parts and unnecessary parts included: 0
Positional accuracy	80,00 %	Correct: 8; Shifted: 2
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The class is well identified in the dataset. The delineation of the road network is not always accurate especially in the urban areas.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Class includes all kinds of roads both in urban and rural areas.	
EXAMPLE (typical mistakes / typical appearance):		



A part of a large urban road polygon showing inaccuracies in the road network.

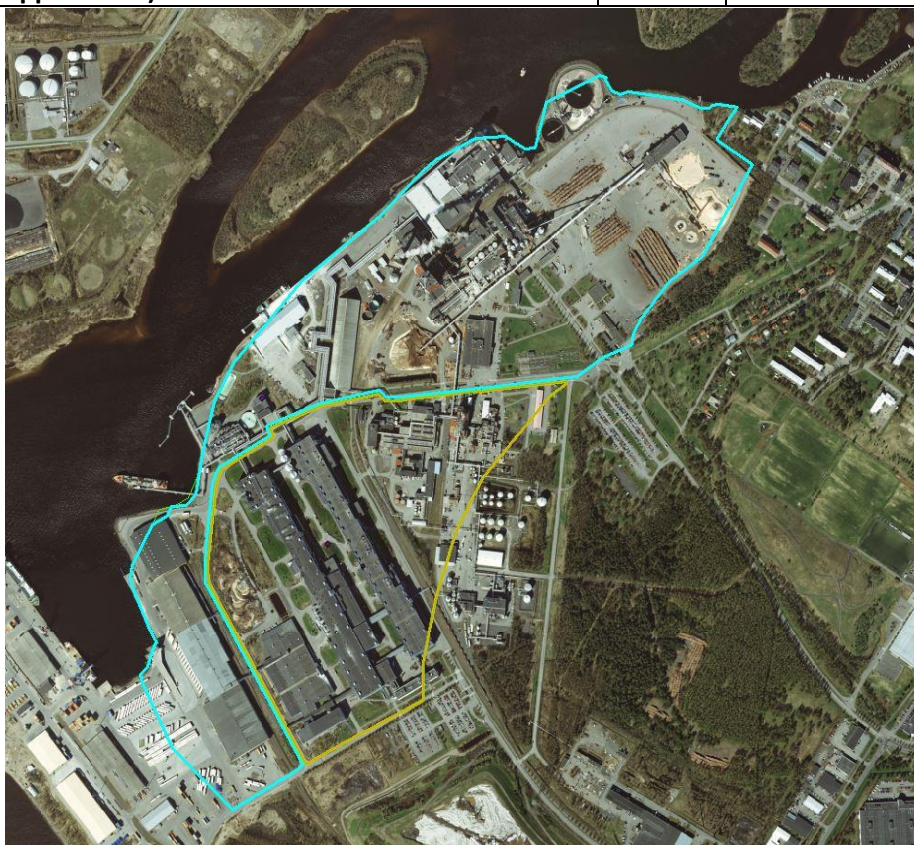
DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	1212	Railways and associated land
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	1000,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	20,00 %	Correct: 2; Too coarse: 0; Too detailed: 8
Correctness of delineated area	80,00 %	Correct: 8; Unnecessary parts included: 2; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The class is well identified in the dataset. The polygons include unnecessary extensions and twists.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Both inner city and cross city railways.	
EXAMPLE (typical mistakes / typical appearance):		



Example of a railway polygon with too much detail in delineation (twists).

DATASET	RZ	Riparian Zones status layer 2012
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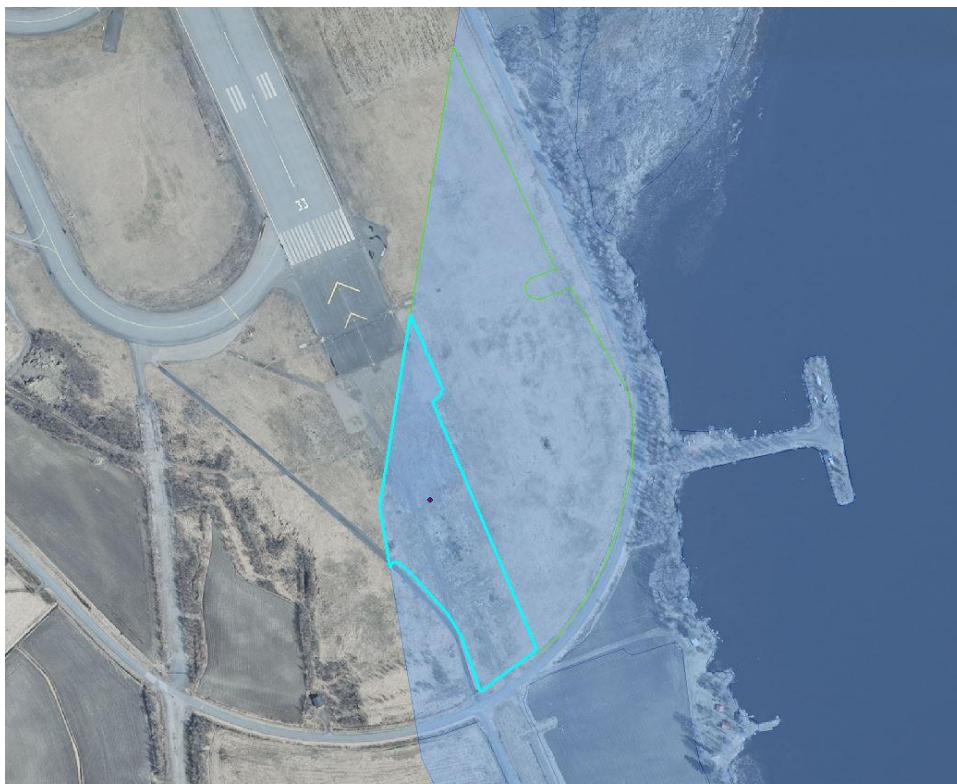
LC/LU CLASS	1213	Port areas
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	90,91 %	
Class producer's accuracy (CI)	± 0,1620	
CORRECTNESS OF DELINEATION		
Detail of delineation	70,00 %	Correct: 7; Too coarse: 2; Too detailed: 1
Correctness of delineated area	30,00 %	Correct: 3; Unnecessary parts included: 4; Missing parts: 2; Both missing parts and unnecessary parts included: 1
Positional accuracy	100,00 %	Correct: 10; Shifted: 3
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The class is well identified in the dataset. Features >MMU of e.g. 1113 and 1211 are often not excluded from the class area as port and industrial activities are connected.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



A typical sample polygon in an area where port and industrial activities are combined.

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	1214	Airports
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	9	
Class user's accuracy	90,00 %	
Class user's accuracy (CI)	$\pm 0,1960$	
Class producer's accuracy	90,00 %	
Class producer's accuracy (CI)	$\pm 0,1775$	
CORRECTNESS OF DELINEATION		
Detail of delineation	70,00 %	Correct: 7; Too coarse: 0; Too detailed: 3
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 2; Missing parts: 7; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Features >MMU of e.g. 3000 and 4000 are often not excluded from the class area. According to the nomenclature, grasslands in the airport area should be interpreted as associated land.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Areas of associated land are excluded (Riparian Zone in light blue).

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	1311	Mineral extraction, dump and construction sites
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	6	
Class user's accuracy	60,00 %	
Class user's accuracy (CI)	$\pm 0,3201$	
Class producer's accuracy	75,00 %	
Class producer's accuracy (CI)	$\pm 0,2646$	
CORRECTNESS OF DELINEATION		
Detail of delineation	60,00 %	Correct: 6; Too coarse: 0; Too detailed: 4
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 6; Missing parts: 2; Both missing parts and unnecessary parts included: 1
Positional accuracy	90,00 %	Correct: 9; Shifted: 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 1321, 9213, 3211 & 1311. Inaccuracies in delineation with bordering forest areas.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Soil Extraction Permits Database; National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical class appearance in samples are sand extraction areas.	
EXAMPLE (typical mistakes / typical appearance):		



A sand extraction area. Forest areas are included in the sample polygon.

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	1321	Land without current use
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	1	
Class user's accuracy	10,00 %	
Class user's accuracy (CI)	± 0,1960	
Class producer's accuracy	50,00 %	
Class producer's accuracy (CI)	± 0,6930	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 1; Too detailed: 0
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 9; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	60,00 %	Correct: 6; Shifted: 4
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 1112, 1120, 1411, 1412 and 1410. The class is mostly confused with green urban areas.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; Building and Dwelling Register (BDR); Soil Extraction Permits Database; National high resolution Corine Land Cover 2012; The Finnish Land Parcel Information System (FLPIS)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	The correctly classified sample polygon is a small leftover land in urban context (green fields).	
EXAMPLE (typical mistakes / typical appearance):		



Wrong class code (1410).

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	1410	Green urban areas
Number of samples selected for the class	3	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	2	
Class user's accuracy	66,67 %	
Class user's accuracy (CI)	$\pm 0,6533$	
Class producer's accuracy	50,00 %	
Class producer's accuracy (CI)	$\pm 0,4244$	
CORRECTNESS OF DELINEATION		
Detail of delineation	0,00 %	Correct: 0; Too coarse: 3; Too detailed: 0
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 1; Missing parts: 0; Both missing parts and unnecessary parts included: 2
Positional accuracy	66,66 %	Correct: 2; Shifted: 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with class 3411.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; Tree Cover Density	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Too coarse delineation.

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	1411	Green urban areas T.C.D. = 30%
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	5	
Class user's accuracy	50,00 %	
Class user's accuracy (CI)	$\pm 0,3267$	
Class producer's accuracy	45,45 %	
Class producer's accuracy (CI)	$\pm 0,2445$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 7; Missing parts: 0; Both missing parts and unnecessary parts included: 2
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 4111, 1422, 1120 and 1412. Delineation with neighboring urban areas (1120) is often not accurate.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; Tree Cover Density	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Habitat of the green urban areas is typically forest. In Finland this class represents more suburban natural areas (extending from the surroundings) rather than highly managed urban gardens or castle parks.	
EXAMPLE (typical mistakes / typical appearance):		



Principally covered by forest habitat. Inaccuracies in delineation with neighboring urban fabric (1121).

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	1412	Green urban areas T.C.D. < 30%
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	6	
Class user's accuracy	60,00 %	
Class user's accuracy (CI)	$\pm 0,3201$	
Class producer's accuracy	60,00 %	
Class producer's accuracy (CI)	$\pm 0,2500$	
CORRECTNESS OF DELINEATION		
Detail of delineation	70,00 %	Correct: 7; Too coarse: 2; Too detailed: 1
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 4; Missing parts: 1; Both missing parts and unnecessary parts included: 3
Positional accuracy	90,00 %	Correct: 9; Shifted: 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 1411 and 2111. Inaccuracies in delineation with neighboring classes (e.g 3111, 1121, 1113).	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; Tree Cover Density	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Compared to 1411 this class is typically more heavily maintained and is located in more urban areas.	
EXAMPLE (typical mistakes / typical appearance):		



A highly managed park with some missing and unnecessary parts.

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	14200	Sports and leisure facilities
Number of samples selected for the class	4	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	4	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	0,00 %	Correct: 0; Too coarse: 4; Too detailed: 0
Correctness of delineated area	25,00 %	Correct: 1; Unnecessary parts included: 0; Missing parts: 0; Both missing parts and unnecessary parts included: 3
Positional accuracy	100,00 %	Correct: 4; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Delineation of the class is too coarse and thus it is quite inaccurate.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typically golf courses and trotting-tracks.	
EXAMPLE (typical mistakes / typical appearance):		



A trotting-track. Eastern part is unnecessary and parts of the associated land are missing.

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	1421	Sports and leisure facilities T.C.D. = 30%
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	3	
Class user's accuracy	30,00 %	
Class user's accuracy (CI)	$\pm 0,2994$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	60,00 %	Correct: 6; Too coarse: 0; Too detailed: 4
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 7; Missing parts: 2; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 1421 and 1113. Tree cover density is often underestimated.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; Tree Cover Density	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Golf courses are overpresented in the data.	
EXAMPLE (typical mistakes / typical appearance):		



A wrong class code. A golf course where T.C.D is underestimated.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	1422	Sports and leisure facilities T.C.D. < 30%
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	8	
Class user's accuracy	80,00 %	
Class user's accuracy (CI)	± 0,2613	
Class producer's accuracy	50,00 %	
Class producer's accuracy (CI)	± 0,1659	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 1; Too detailed: 0
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 2; Missing parts: 5; Both missing parts and unnecessary parts included: 2
Positional accuracy	80,00 %	Correct: 8; Shifted: 2
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 1211 and 1410. Areas of 1422 are often left out (misclassified as e.g. 2111 and 1121).	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; The National Road and Street Database, Digiroad; Topographic Database/The National Land Survey; National high resolution Corine Land Cover 2012; Tree Cover Density	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Data is quite varied (golf courses, sports fields, allotment gardens, marinas, amusement parks).	
EXAMPLE (typical mistakes / typical appearance):		



An allotment where a large area is left out in the southern side.

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	2111	Non-irrigated arable land
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	8	
Class user's accuracy	80,00 %	
Class user's accuracy (CI)	$\pm 0,2613$	
Class producer's accuracy	47,06 %	
Class producer's accuracy (CI)	$\pm 0,1765$	
CORRECTNESS OF DELINEATION		
Detail of delineation	70 %	Correct 7 - Too coarse 0 - Too detailed 3
Correctness of delineated area	0 %	Correct 0 - Missing and unnecessary parts 3 - Missing parts 0 - Unnecessary parts included 7
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Wrong delineation often includes forests, grassland or built-up areas.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Class consists typically of cultivations of different crops, improved grasslands in rotation (<5 year cycle) or fields laid in fallow.	
EXAMPLE (typical mistake):		



Typical appearance: correct class but wrong delineation (forest included).

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	2121	Greenhouses
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	4	
Class user's accuracy	40,00 %	
Class user's accuracy (CI)	$\pm 0,3201$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	50 %	Correct 5 - Too coarse 0 - Too detailed 5
Correctness of delineated area	20 %	Correct 2 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 8
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Missclassifications with fur farms (1113). Features > MMU of 2111 are not always excluded.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical error):		



Fur farm (1113).

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	2221	High stem fruit trees (extensively managed)
Number of samples selected for the class	1	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 1 - Too coarse 0 - Too detailed 0
Correctness of delineated area	0 %	Correct 0 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 1
Positional accuracy	100 %	Correct 1 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Only 1 sample	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical appearance):		



Trees are in rows because they grow in ditches (abandoned grasslands).

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	2222	Low stem fruit trees and berry plantations
Number of samples selected for the class	4	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	$\pm 0,0000$	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 4 - Too coarse 0 - Too detailed 0
Correctness of delineated area	0 %	Correct 0 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 4
Positional accuracy	100 %	Correct 4 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Only 4 samples. Misclassifications with 3411 and 1121.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical appearance):		



Typical mistake: wrong class (3411).

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	2331	Land principally occupied by agriculture with significant areas of natural vegetation
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	7	
Class user's accuracy	70,00 %	
Class user's accuracy (CI)	$\pm 0,2994$	
Class producer's accuracy	87,50 %	
Class producer's accuracy (CI)	$\pm 0,2194$	
CORRECTNESS OF DELINEATION		
Detail of delineation	0 %	Correct 0 - Too coarse 10 - Too detailed 0
Correctness of delineated area	0 %	Correct 0 - Missing and unnecessary parts 1 - Missing parts 0 - Unnecessary parts included 9
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with forest (e.g. 3331, 3131, 3411). Too coarse delineation and unnecessary forest and 1121 are included.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Too coarse delineation. Areas of e.g. 3000 could be mapped separately.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3000	Woodland and forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 10 - Too coarse 0 - Too detailed 0
Correctness of delineated area	10 %	Correct 1 - Missing and unnecessary parts 2 - Missing parts 0 - Unnecessary parts included 7
Positional accuracy	50 %	Correct 5 - Shifted 5
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The Potential Riparian Zone is ignored in data and validation. Some shifting and unnecessary parts from neighboring polygons are included (e.g. 2111, 1121). Houses that are admist the trees are not noticed as 1121.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Forest mosaic of various types of forests.	
EXAMPLE (typical mistake):		



Polygon includes >MMU areas of 1121 and strips of 1113 and 2111 from bordering polygons. Also road delineation is questionable.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3111	Riparian and fluvial Broadleaved forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 10 - Too coarse 0 - Too detailed 0
Correctness of delineated area	0 %	Correct 0 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 10
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	All sample polygons are at least partly in the Potential Riparian Zone but this is ignored in the validation as national reference data doesn't support the delineation of PRZ. Delineation of the polygons does not follow forest patterns.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Forest mosaic according to soil moisture and tree species.	
EXAMPLE (typical error):		

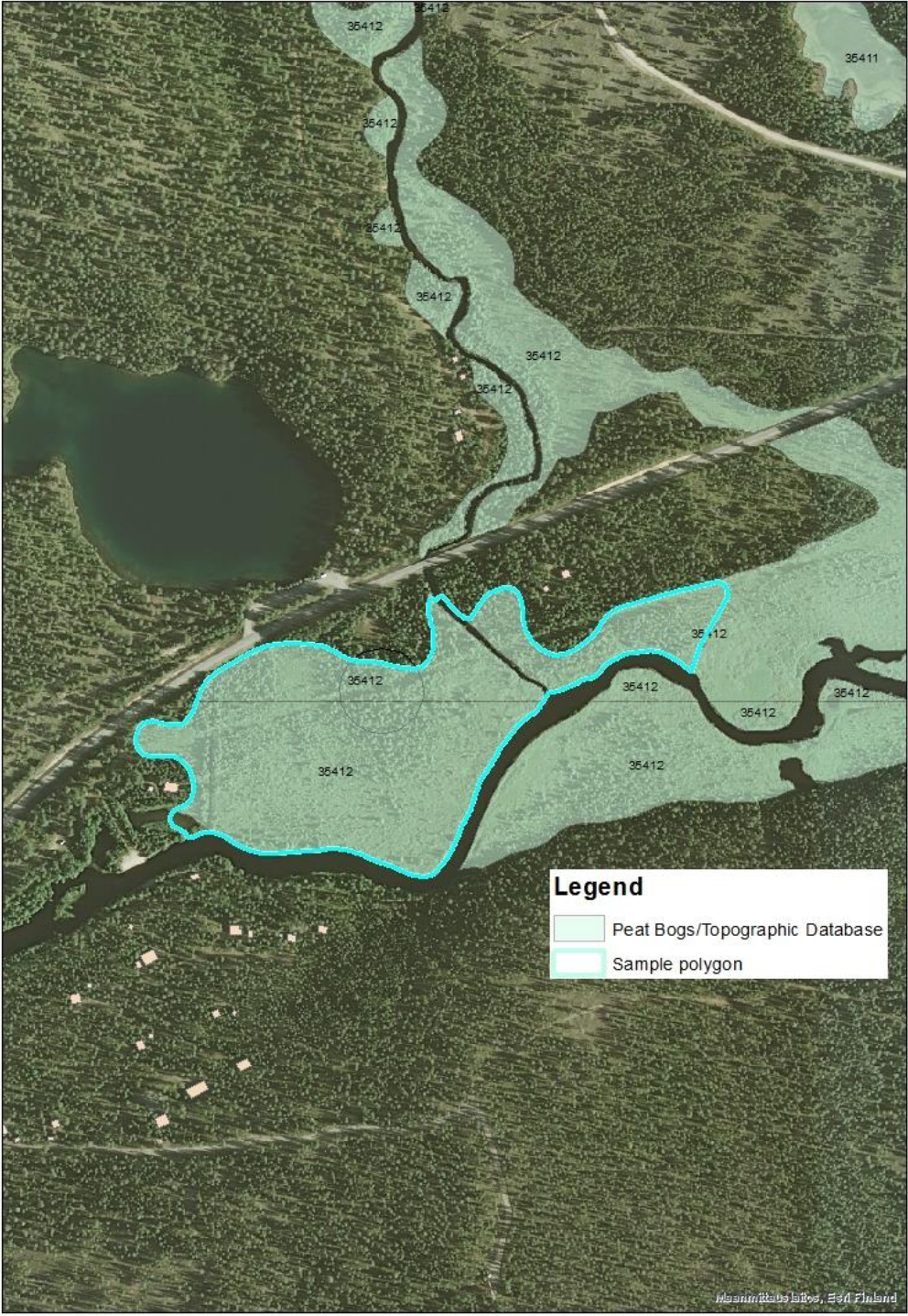


Forest delineation does not follow forest patterns.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3121	Broadleaved swamp forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	3	
Class user's accuracy	30,00 %	
Class user's accuracy (CI)	$\pm 0,2994$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	80 %	Correct 8 - Too coarse 0 - Too detailed 2
Correctness of delineated area	0 %	Correct 0 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 10
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	National reference data doesn't support the delineation of PRZ and it seems to be ignored also in the Riparian Zones status layer. Delineation of the polygons does not follow forest patterns. Formation of polygons can include unnecessary twists.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Forest mosaic according to soil moisture and tree species. It is apparent that the peat bog layer in Topographic Database of the National Land Survey has been used in the production of RZ dataset.	
EXAMPLE (typical appearance):		



There are often unnecessary twists in the delineation boundary.



Peat bog layer of the Topographic Database used as a reference data for delineation of RZ.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3131	Other natural & semi natural broadleaved forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	3	
Class user's accuracy	30,00 %	
Class user's accuracy (CI)	$\pm 0,2994$	
Class producer's accuracy	21,43 %	
Class producer's accuracy (CI)	$\pm 0,1932$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90 %	Correct 9 - Too coarse 0 - Too detailed 1
Correctness of delineated area	0 %	Correct 0 - Missing and unnecessary parts 1 - Missing parts 1 - Unnecessary parts included 8
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	National reference data doesn't support the delineation of PRZ and it seems to be ignored also in the Riparian Zones status layer. Delineation of the polygons does not follow forest patterns.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Forest mosaic according to soil moisture and tree species.	
EXAMPLE (typical appearance):		



DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3211	Riparian and fluvial coniferous forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	80 %	Correct 8 - Too coarse 0 - Too detailed 2
Correctness of delineated area	0 %	Correct 0 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 10
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Potential Riparian Zone is ignored in the validation as national reference data doesn't support the delineation of PRZ. Delineation of the polygons does not follow forest patterns.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Forest mosaic according to soil moisture and tree species combination.	
EXAMPLE (typical error):		



No difference to neighbor polygons.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3221	Coniferous swamp forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	5	
Class user's accuracy	50,00 %	
Class user's accuracy (CI)	$\pm 0,3267$	
Class producer's accuracy	27,78 %	
Class producer's accuracy (CI)	$\pm 0,1651$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90 %	Correct 9 - Too coarse 0 - Too detailed 1
Correctness of delineated area	10 %	Correct 1 - Missing and unnecessary parts 1 - Missing parts 2 - Unnecessary parts included 6
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	National reference data doesn't support the delineation of PRZ and it seems to be ignored also in the Riparian Zones status layer. Delineation of the polygons does not follow forest patterns.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Forest mosaic according to soil moisture and tree species combination.	
EXAMPLE (typical appearance):		



DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3231	Other natural & semi natural coniferous forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	9	
Class user's accuracy	90,00 %	
Class user's accuracy (CI)	$\pm 0,1960$	
Class producer's accuracy	26,47 %	
Class producer's accuracy (CI)	$\pm 0,0738$	
CORRECTNESS OF DELINEATION		
Detail of delineation	60 %	Correct 6 - Too coarse 0 - Too detailed 4
Correctness of delineated area	20 %	Correct 2 - Missing and unnecessary parts 1 - Missing parts 2 - Unnecessary parts included 5
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	National reference data doesn't support the delineation of PRZ and it seems to be ignored also in the Riparian Zones status layer. Delineation of the polygons does not follow forest patterns.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Forest mosaic according to soil moisture and tree species combination.	
EXAMPLE (typical appearance):		



DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3311	Riparian and fluvial mixed forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	1	
Class user's accuracy	10,00 %	
Class user's accuracy (CI)	$\pm 0,1960$	
Class producer's accuracy	11,11 %	
Class producer's accuracy (CI)	$\pm 0,2047$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90 %	Correct 9 - Too coarse 0 - Too detailed 1
Correctness of delineated area	0 %	Correct 0 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 10
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Potential Riparian Zone is ignored in the validation as national reference data doesn't support the delineation of PRZ. Delineation of the polygons does not follow forest patterns.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Forest mosaic according to soil moisture and tree species combination.	
EXAMPLE (typical error):		



Delineation contains many types of forest.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3321	Mixed swamp forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	5	
Class user's accuracy	50,00 %	
Class user's accuracy (CI)	$\pm 0,3267$	
Class producer's accuracy	45,45 %	
Class producer's accuracy (CI)	$\pm 0,2445$	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 10 - Too coarse 0 - Too detailed 0
Correctness of delineated area	10 %	Correct 1 - Missing and unnecessary parts 1 - Missing parts 0 - Unnecessary parts included 8
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	National reference data doesn't support the delineation of PRZ and it seems to be ignored also in the Riparian Zones status layer. Delineation of the polygons does not follow forest patterns.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Forest mosaic according to soil moisture and tree species combination.	
EXAMPLE (typical appearance):		



DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3331	Other natural & semi natural mixed forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	4	
Class user's accuracy	40,00 %	
Class user's accuracy (CI)	$\pm 0,3201$	
Class producer's accuracy	12,50 %	
Class producer's accuracy (CI)	$\pm 0,0938$	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 10 - Too coarse 0 - Too detailed 0
Correctness of delineated area	10 %	Correct 1 - Missing and unnecessary parts 0 - Missing parts 1 - Unnecessary parts included 8
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	National reference data doesn't support the delineation of PRZ and it seems to be ignored also in the Riparian Zones status layer. Delineation of the polygons does not follow forest patterns. Misclassifications also with 1211.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Forest mosaic according to soil moisture and tree species combination.	
EXAMPLE (typical appearance):		



Delineation is not in line with actual forest types in the area.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3411	Transitional woodland and scrub
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	6	
Class user's accuracy	60,00 %	
Class user's accuracy (CI)	$\pm 0,3201$	
Class producer's accuracy	17,65 %	
Class producer's accuracy (CI)	$\pm 0,0918$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90 %	Correct 9 - Too coarse 1 - Too detailed 0
Correctness of delineated area	10 %	Correct 1 - Missing and unnecessary parts 5 - Missing parts 0 - Unnecessary parts included 4
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Delineation of the polygons does not follow forest/woodland patterns.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Forest regrowth or abandoned areas	
EXAMPLE (typical appearance):		



DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	3412	Lines of trees and scrub
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	6	
Class user's accuracy	60,00 %	
Class user's accuracy (CI)	$\pm 0,3201$	
Class producer's accuracy	75,00 %	
Class producer's accuracy (CI)	$\pm 0,2784$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90 %	Correct 9 - Too coarse 0 - Too detailed 1
Correctness of delineated area	30 %	Correct 3 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 7
Positional accuracy	90 %	Correct 9 - Shifted 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Delineation of the polygons does not follow forest/woodland patterns. Sample polygons also include areas that otherwise follow the class description of 3412 but are located along rivers with Strahler Level ≥ 3 -5.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Narrow islands	
EXAMPLE (typical error):		



River is a Strahler level >3 .

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	4111	Managed grasslands with trees and scrubs (T.C:D. $\geq 30\%$)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	3	
Class user's accuracy	30,00 %	
Class user's accuracy (CI)	$\pm 0,2994$	
Class producer's accuracy	37,50 %	
Class producer's accuracy (CI)	$\pm 0,2943$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 9; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 1214, 1411, 3411, 3331 and 3412. Many of the mistakes in delineation occur with forest classes. Also, national reference data is not always sufficient to support the validation. E.g. it is difficult to distinguish between transitional woodland and a wooded grassland that both occur in abandoned arable land.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS); Tree Cover Density	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class is abandoned arable land with trees and bushes as well as pastures.	
EXAMPLE (typical mistakes / typical appearance):		



Wrong class (3331).

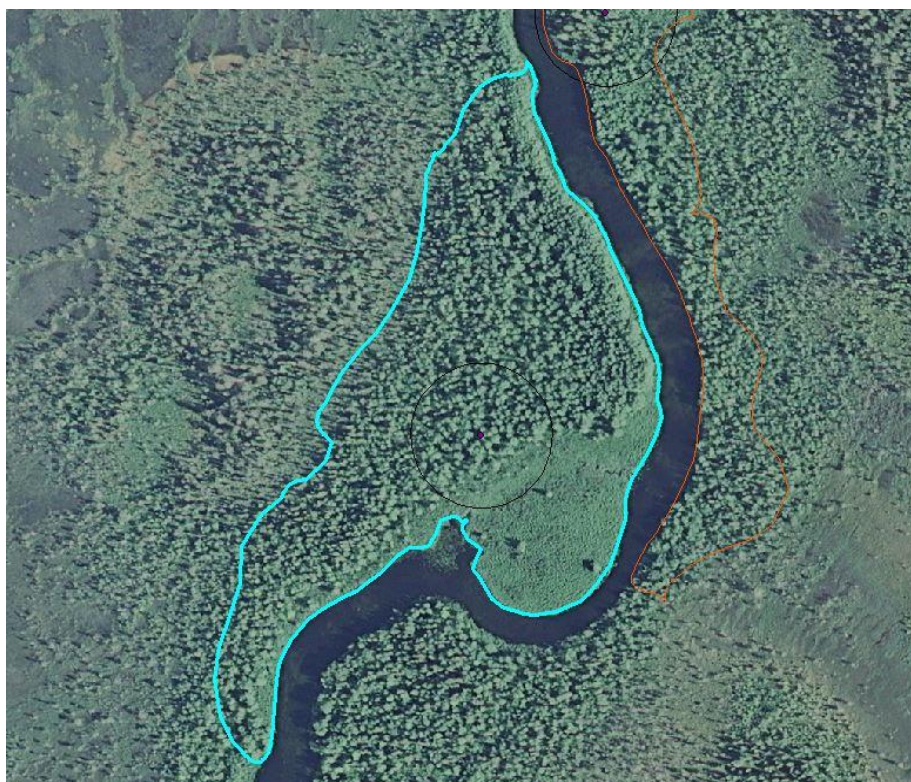
DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	4112	Managed grasslands without trees and scrubs (T.C.D. < 30%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	4	
Class user's accuracy	40,00 %	
Class user's accuracy (CI)	± 0,3201	
Class producer's accuracy	44,44 %	
Class producer's accuracy (CI)	± 0,2895	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 8; Missing parts: 1; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 2111, 3131, 3311, 3411. National reference data is not always sufficient to support the validation.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS); Tree Cover Density	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class is abandoned arable land.	
EXAMPLE (typical mistakes / typical appearance):		



Typical class appearance on abandoned arable land. Unnecessary and missing parts.

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	4211	Dry grassland with trees (T.C.D. ≥0%)
Number of samples selected for the class	5	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	10,00 %	Correct: 5; Too coarse:0; Too detailed: 0
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 5; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 5; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 3221, 3311, 3411. None of the samples seem to be correctly classified but also the national reference data is not sufficient to identify this habitat.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS); Tree Cover Density	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Wrong class (riparian and fluvial forest).

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	4212	Mesic grasslands with trees (T.C.D. = 30%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	2	
Class user's accuracy	20,00 %	
Class user's accuracy (CI)	± 0,2613	
Class producer's accuracy	66,67 %	
Class producer's accuracy (CI)	± 0,5235	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 0; Too detailed: 2
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 10; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 2111, 3311, 3333, 3412, 7112. There is not enough national reference data to support the validation and confidently confirm the presence of the class.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS); Tree Cover Density	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	In Finland the class could typically be moist sedge and grass growing meadows and marshes in vicinity of fresh and brackish water. These are not distinguishable from national reference data.	
EXAMPLE (typical mistakes / typical appearance):		



Potential but not confirmed appearance of the class (also unnecessary areas included such as forest).

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	4222	Mesic grasslands without trees and scrubs (T.C.D. < 30%)

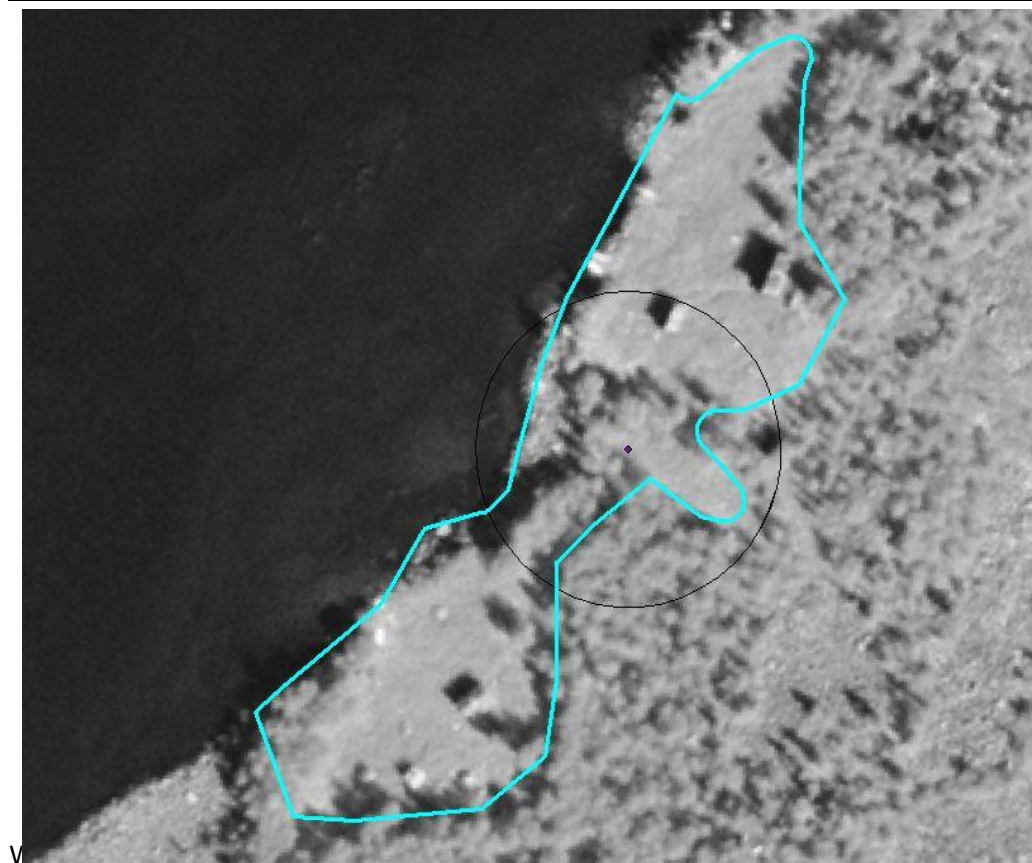
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	3	
Class user's accuracy	30,00 %	
Class user's accuracy (CI)	0,299395	
Class producer's accuracy	60,00 %	
Class producer's accuracy (CI)	± 0,3946	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 7; Missing parts: 0; Both missing parts and unnecessary parts included: 1
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 3221, 3411, 4112, 7112. There is not enough national reference data to support the validation and confidently confirm the presence of the class.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS); Tree Cover Density	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	In Finland the class could typically be moist sedge and grass growing meadows and marshes in vicinity of fresh and brackish water. These are not distinguishable from national reference data.	
EXAMPLE (typical mistakes / typical appearance):		



Potential but not confirmed appearance of the class

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	4223	Alpine and subalpine grasslands without trees (T.C.D. < 30%)

Number of samples selected for the class	2	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100,00 %	Correct: 2; Too coarse: 0; Too detailed: 0
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 2; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 2; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Only 2 samples. Missclassifications with class 1121. The class is not present in the sample dataset.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database& Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS)	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	5111	Heathlands and Moorlands
Number of samples selected for the class	10	

CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	9	
Class user's accuracy	90,00 %	
Class user's accuracy (CI)	$\pm 0,1960$	
Class producer's accuracy	64,29 %	
Class producer's accuracy (CI)	$\pm 0,1939$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 1; Missing parts: 0; Both missing parts and unnecessary parts included: 9
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Polygons are mostly large and include several different LC/LU classes. Their delineation is not possible to determine with the reference data available. Also mosaics are included in the class description which complicates the validation even further. The high class user's accuracy in this case isn't an indication of a successful mapping but of uncertainties in validation.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of class is large heath and moorland areas in northern Finland (Lapland area).	
EXAMPLE (typical mistakes / typical appearance):		



A large polygon with heath and moorland together with other LC/LU classes. It is not possible to delineate them correctly using available reference data.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	5112	Other scrub land
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		

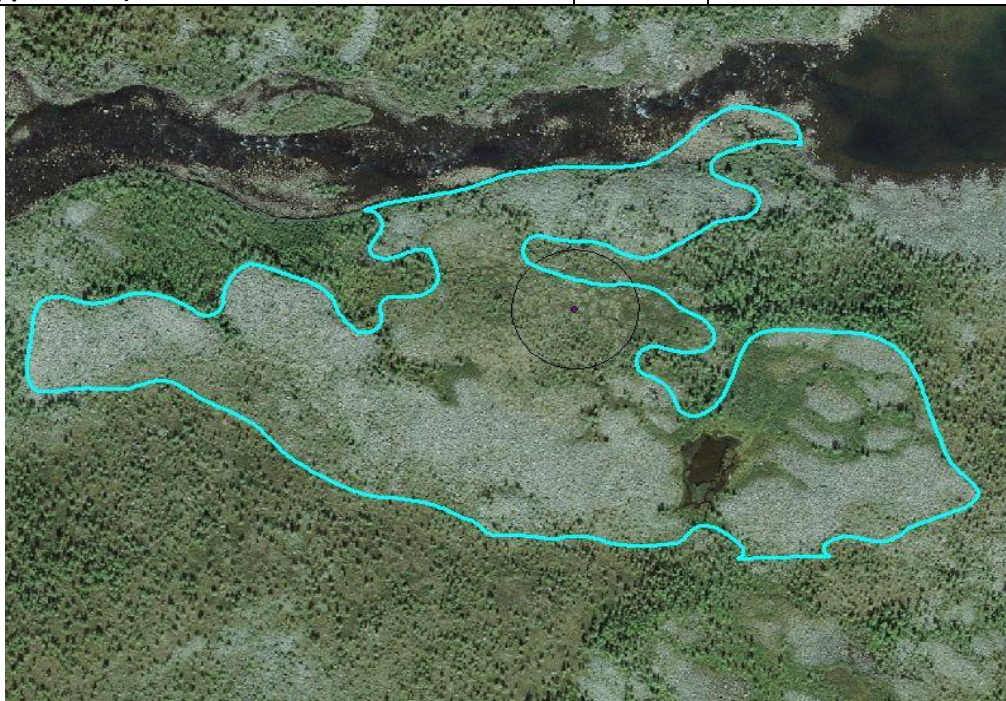
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 8; Missing parts: 1; Both missing parts and unnecessary parts included: 0
Positional accuracy	1000,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	National reference data is not sufficient to identify this class and support the validation.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Probably wrong class (7212).

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	6111	Sparsely vegetated areas
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	9	

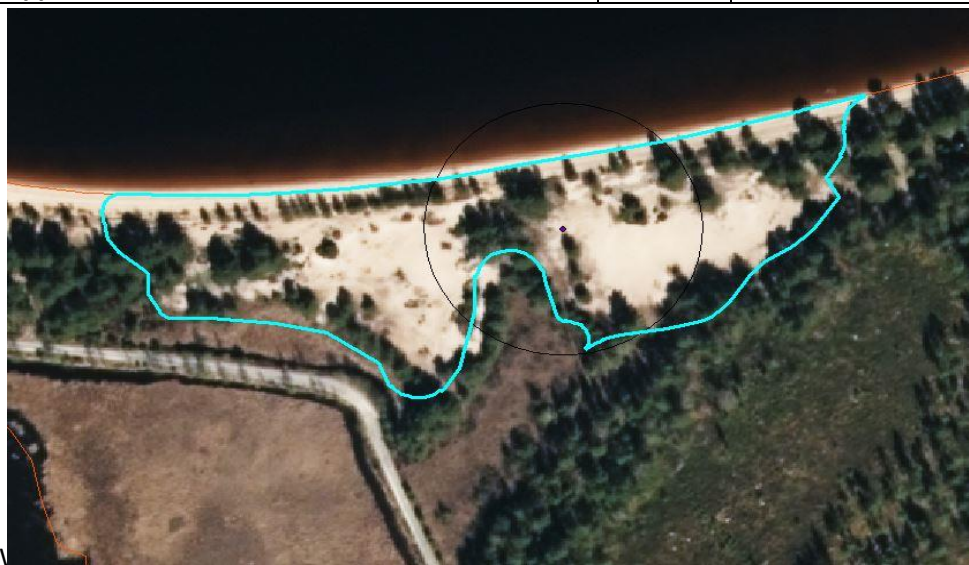
Class user's accuracy	90,00 %	
Class user's accuracy (CI)	$\pm 0,1960$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 0; Missing parts: 0; Both missing parts and unnecessary parts included: 10
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Polygons are mostly large and include several different LC/LU classes whose delineation is not possible to determine with the reference data available. Also mosaics are included in the class description which complicates the validation even further. The high class user's accuracy in this case isn't an indication of a successful mapping but of uncertainties in validation.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



A mosaic of different land use types

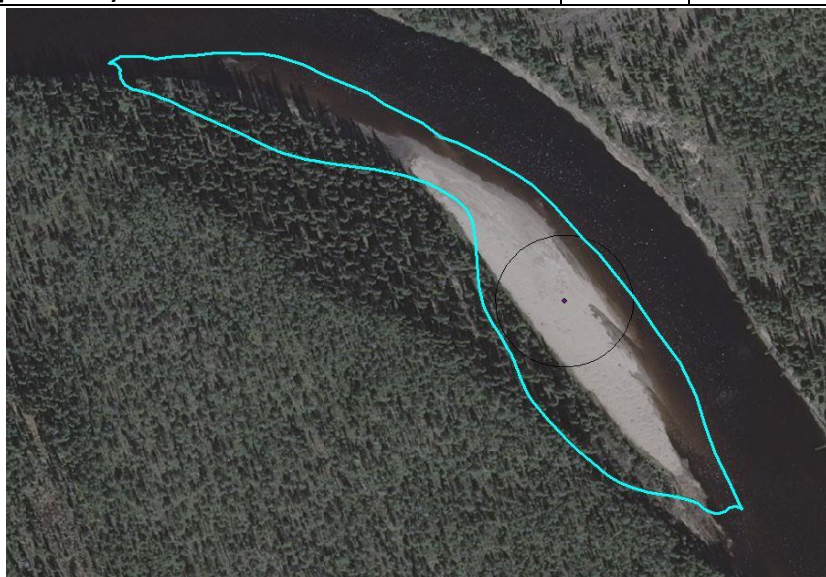
DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	6211	Beaches
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	1	
Class user's accuracy	10,00 %	

Class user's accuracy (CI)	± 0,1960	
Class producer's accuracy	33,33 %	
Class producer's accuracy (CI)	± 0,5235	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 9; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	90,00 %	Correct: 9; Shifted: 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The mapping process hasn't been able to correctly identify 6211 in the sample dataset. Misclassifications with class 3411 occur, as often times there is too much vegetation in the sample area, or the soil type is not appropriate. Also misclassified with 4222/7112 but there is not enough national reference data to support the validation and confidently confirm the presence of these classes. In some cases national reference data indicates that the area should be water even though satellite image shows land area (possibly due to water level differences) which makes it difficult to identify the correct LC/LU class.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Digital Elevation Model 2x2m; Shoreline 10 and River network	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class could be sandy beaches along brackish and fresh water coasts.	
EXAMPLE (typical mistakes / typical appearance):		

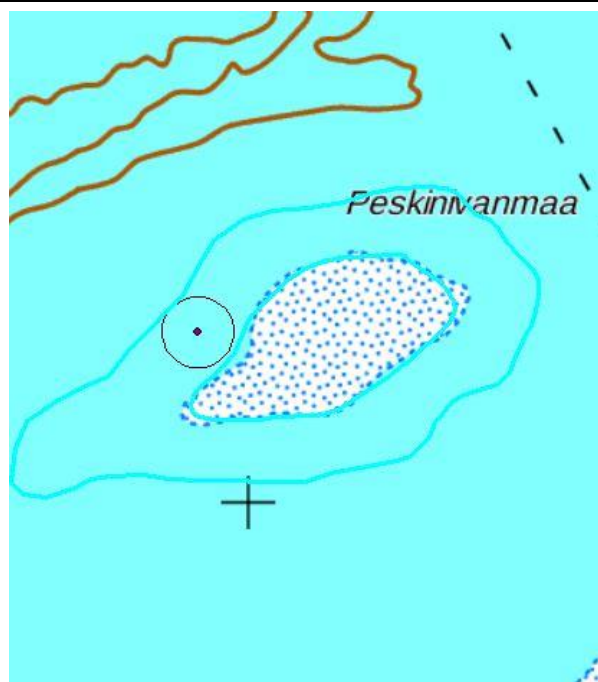


DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	6213	River banks
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	5	
Class user's accuracy	50,00 %	

Class user's accuracy (CI)	$\pm 0,3201$	
Class producer's accuracy	50,00 %	
Class producer's accuracy (CI)	$\pm 0,3267$	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse:0; Too detailed: 2
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 9; Missing parts: 0; Both missing parts and unnecessary parts included: 1
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 3411, 4111 and 6221. Delineation with bordering forest and water areas is not accurate and therefore features of these classes are not always excluded from the sample area. In some cases national reference data indicates that the area should be water even though satellite image shows land area (possibly due to water level differences) which makes it difficult to identify the correct LC/LU class.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Digital Elevation Model 2x2m; Shoreline 10 and River network	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class is sandy or gravelly open areas in rivers in the northern Finland and Lapland area.	
EXAMPLE (typical mistakes / typical appearance):		



DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	6221	Bare rocks and rock debris
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	7	
Class user's accuracy	70,00 %	
Class user's accuracy (CI)	$\pm 0,2994$	
Class producer's accuracy	77,78 %	
Class producer's accuracy (CI)	$\pm 0,2507$	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	30,00 %	Correct: 3; Unnecessary parts included: 6; Missing parts: 0; Both missing parts and unnecessary parts included: 1
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 3231, 3331 and 5111. In some cases national reference data indicates that the area should be water even though satellite image shows land area (possibly due to water level differences) which makes it difficult to identify the correct LC/LU class.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Digital Elevation Model 2x2m; Shoreline 10 and River network	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Satellite image (left) and national reference data (topographic map, left) are contradictory and LCLU-class is hard to confirm.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	7111	Inland freshwater marshes without reeds
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	2	
Class user's accuracy	20,00 %	
Class user's accuracy (CI)	± 0,2613	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	70,00 %	Correct: 7; Too coarse: 1; Too detailed: 2
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 9; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	There is not enough national reference data to support the validation and confidently confirm the presence of the class. Data exists for reed beds that are clearly located in water areas but not for coastal low lands without forest cover and these are corrected to 7112. The description of this class is also not clear in the RZ nomenclature guideline, as 7111 and 7112 are described together. Several specifications are made for the Nordic countries that are partly contradictory. Also the nomenclature specifies that in Nordic countries areas close to water are classified as freshwater marshes since they're not likely to be peat producing. This is not an accurate assumption since there are many large peat bogs next to lakes in Finland. Samples also include polygons in large artificial lake areas in northern Finland where water levels fluctuate heavily. They could be closer to a mudflat but should not be mapped using same principles as natural water areas.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS); Tree Cover Density; Shoreline 10 and River network	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Wrong class: area is adjacent to a large lake but is still a peat bog (7212).

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	7112	Inland freshwater marshes with reeds
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	5	
Class user's accuracy	50,00 %	
Class user's accuracy (CI)	± 0,3267	
Class producer's accuracy	13,51 %	
Class producer's accuracy (CI)	± 0,0818	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 0; Too detailed: 2
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 8; Missing parts: 1; Both missing parts and unnecessary parts included: 1
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 3221 and 3331. Even where the classification is validated to be correct, it should be treated with precaution. There is not enough national reference data to support the validation and confidently confirm the presence of the class. Especially this applies to distinguishing fresh water mars with reeds from mesic grassland as it is very difficult to identify the management status, the height of grassy vegetation and humidity of soil from satellite or even aerial images. Data exists for reed beds that are clearly located in water areas but not for coastal low lands without forest cover. Also the description of this class is confusing in the RZ nomenclature guidelines (cf. 7111).	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS); Tree Cover Density; Shoreline 10 and River network	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Class could be correct but this cannot be confidently determined from the data available.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	7121	Inland saline marshes without reeds
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	50,00 %	Correct: 5; Too coarse:4; Too detailed: 1
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 10; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 5; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	This class doesn't exist in Finland. It is mapped to appear in the narrow coastal strip between forest and other wetland classes but this is incorrect. The classification of most samples has been corrected to 7112 but the same uncertainties apply as in actual class 7112.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS); Tree Cover Density; Shoreline 10 and River network	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Typical appearance of the class in the data: a narrow strip of land between higher vegetation and other freshwater marsh classes. It is incorrect. Also delineation is very coarse.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	7210	Peat Bogs
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	7	
Class user's accuracy	70,00 %	
Class user's accuracy (CI)	$\pm 0,2994$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 2; Too detailed: 0
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 9; Missing parts: 0; Both missing parts and unnecessary parts included: 1
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with forest classes 3221, 3231 and 3411. Also features >MMU are not excluded from the class area.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Tree Cover Density; Shoreline 10 and River network	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Being a lower level (3) class it includes several types of bogs from unexploited to ditched and exploited areas with different sizes.	
EXAMPLE (typical mistakes / typical appearance):		



21).

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	7211	Exploited peat bog
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	0	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	10,00 %	Correct: 1; Unnecessary parts included: 9; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The mapping process hasn't been able to correctly identify 7211 in the sample dataset even though it is quite common in Finland. Misclassification with classes 3221, 3411, 4112 and 7212. In many cases the area might have previously been peat extraction site as the ditches are visible in aerial images, but it's already growing forest and thus should be classified as 3411 or 3221.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Wrong class code transformation from Unexploited peat bog.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	7212	Unexploited peat bog

Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	9	
Class user's accuracy	90,00 %	
Class user's accuracy (CI)	$\pm 0,1960$	
Class producer's accuracy	45,00 %	
Class producer's accuracy (CI)	$\pm 0,1382$	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 0; Too detailed: 2
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 4; Missing parts: 1; Both missing parts and unnecessary parts included: 3
Positional accuracy	100,00 %	Correct: 2; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassification with 3221. There are inaccuracies in delineation with neighboring forest classes.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class in samples is quite large peat bogs in northern Finland.	
EXAMPLE (typical mistakes / typical appearance):		



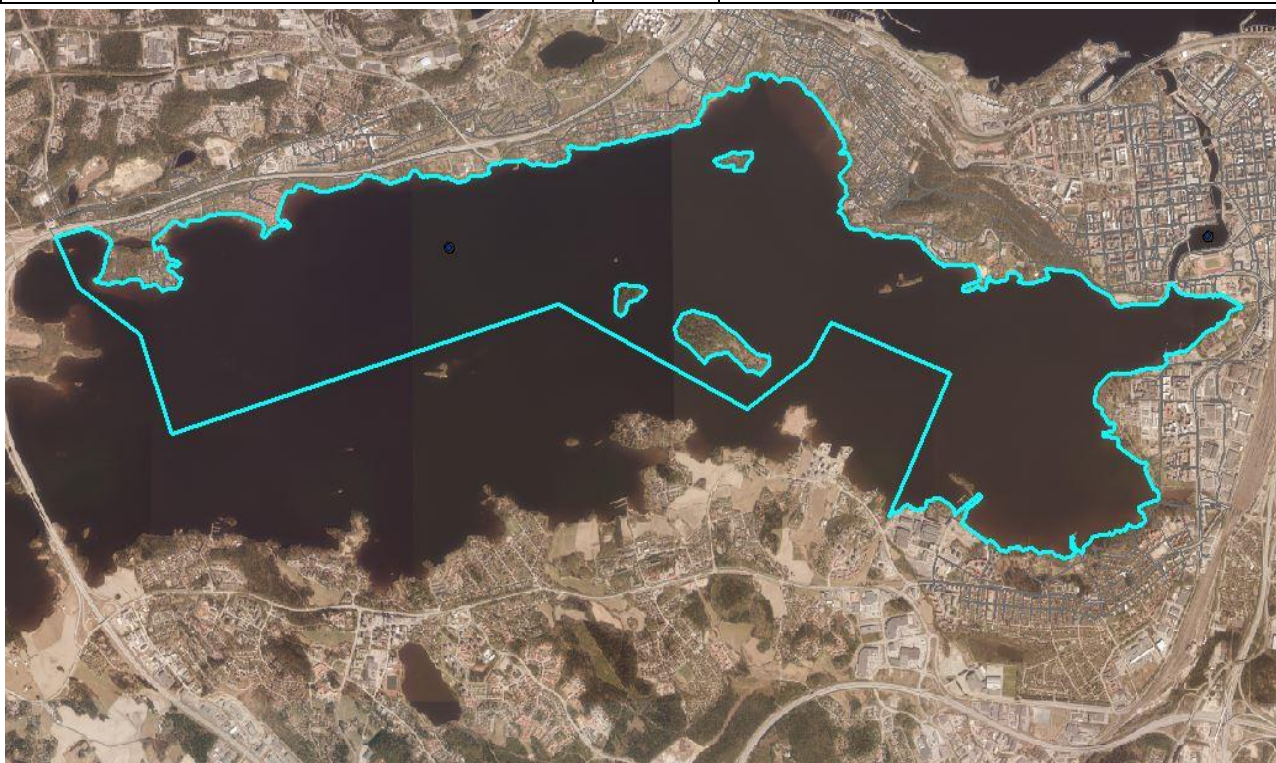
A large peat bog in Lapland area.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	8111	Salt marshes without reeds
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 0; Too detailed: 2
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 8; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 2; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	The existence of this class in Finland is questionable. RZ nomenclature guideline indicates that "the Baltic Sea has only brackish coastal waters, which qualify for inland freshwater marshes". There are coastal meadows in the Baltic sea coastal areas, that have salt tolerant plants but according to the nomenclature also these should be considered freshwater marshes or mesic grasslands. The classification of most samples has been corrected to 7112 but the same uncertainties apply as in actual class 7112.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; The Finnish Land Parcel Information System (FLPIS); Tree Cover Density; Shoreline 10 and River network	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Wrong class: a coastal marsh or grassland in brackish water. Correct class cannot be confidently determined from the data available.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	9000	Rivers and lakes
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	9	
Class user's accuracy	90,00 %	
Class user's accuracy (CI)	$\pm 0,1960$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	60,00 %	Correct: 6; Too coarse: 4; Too detailed: 0
Correctness of delineated area	50,00 %	Correct: 5; Unnecessary parts included: 4; Missing parts: 0; Both missing parts and unnecessary parts included: 1
Positional accuracy	70,00 %	Correct: 7; Shifted: 3
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassification with class 1213. This is a level 1 class and therefore it includes a varied set of different water systems. The delineation is partly inaccurate, too coarse and shifted.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Shoreline 10 and River network; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Different sized lakes and rivers.	
EXAMPLE (typical mistakes / typical appearance):		



A large lake polygon.

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	9111	Permanent interconnected running water courses
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,1960	
Class producer's accuracy	71,43 %	
Class producer's accuracy (CI)	± 0,1915	
CORRECTNESS OF DELINEATION		
Detail of delineation	100,00 %	Correct: 10; Too coarse: 0; Too detailed: 0
Correctness of delineated area	60,00 %	Correct: 6; Unnecessary parts included: 2; Missing parts: 0; Both missing parts and unnecessary parts included: 2
Positional accuracy	90,00 %	Correct: 9; Shifted: 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	This class is well identified in the RZ status layer. In some polygons the delineation is not precise.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Shoreline 10 and River network; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class is large river polygons	
EXAMPLE (typical mistakes / typical appearance):		



DATASET	RZ	Riparian Zones status layer 2012
---------	----	----------------------------------

LC/LU CLASS	9112	Intermittently running water courses
Number of samples selected for the class	1	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100,00 %	Correct: 1; Too coarse: 0; Too detailed: 0
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 1; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 1; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Only 1 sample.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Shoreline 10 and River network; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		



Wrong class code (7112).

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	9113	Highly modified natural water courses and canals
Number of samples selected for the class	4	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	2	
Class user's accuracy	50,00 %	
Class user's accuracy (CI)	$\pm 0,5658$	
Class producer's accuracy	66,67 %	
Class producer's accuracy (CI)	$\pm 0,5029$	
CORRECTNESS OF DELINEATION		
Detail of delineation	25,00 %	Correct: 1; Too coarse:0; Too detailed: 3
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 3; Missing parts: 1; Both missing parts and unnecessary parts included: 0
Positional accuracy	75,00 %	Correct: 3; Shifted: 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassification with 9211 and 9213. Delineation of polygons is often too detailed as small twists are included that do not correspond to reality.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Shoreline 10 and River network; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of class in samples is canals.	
EXAMPLE (typical mistakes / typical appearance):		



Typical appearance of class: a canal. Also small twists are visible at the borders of the polygon.

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	9121	Permanent separated water bodies belonging to the river system
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	7	
Class user's accuracy	70,00 %	
Class user's accuracy (CI)	$\pm 0,2994$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	70,00 %	Correct: 7; Too coarse: 2; Too detailed: 1
Correctness of delineated area	60,00 %	Correct: 6; Unnecessary parts included: 4; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with classes 7112 and 9211.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Shoreline 10 and River network; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	The origin of the water bodies in the class samples is not known but assessed by the shape and location of the samples, they seem to be oxbow lakes cut off from the river system. Mostly located in northern Finland.	
EXAMPLE (typical mistakes / typical appearance):		



Typical appearance: an oxbow lake in northern finland.

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	9211	Permanent natural water bodies
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	0	
Class producer's accuracy	76,92 %	
Class producer's accuracy (CI)	± 0,1933	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 1; Too detailed: 0
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 4; Missing parts: 1; Both missing parts and unnecessary parts included: 3
Positional accuracy	100,00 %	Correct: 10; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	This class is well identified in the dataset. Delineation is often inaccurate and especially in the shallow inlets freshwater marshes are included in the polygons.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Shoreline 10 and River network; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class is large natural lakes.	
EXAMPLE (typical mistakes / typical appearance):		



A typical appearance of the class: a large lake area (left) with unnecessary marshes included in the small inlets (right)

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	9212	Temporary natural water bodies
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	90,00 %	Correct: 9; Too coarse: 0; Too detailed: 1
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 10; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	90,00 %	Correct: 9; Shifted: 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	This class has not been identified in the dataset. Most sample polygons are located at the coastal areas of lakes. The classification of most samples has been corrected to 7112 but the same uncertainties apply as in actual class 7112. Misclassifications also with classes 3211, 3411 and 6221. The class description in the RZ nomenclature guidelines is not very clear but it could be argued that the class doesn't appear in Finland.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Shoreline 10 and River network; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	The class description in the RZ nomenclature guidelines is not very clear but it could be argued that the class doesn't appear in Finland.	
EXAMPLE (typical mistakes / typical appearance):		



A sample polygon located in the lakeside, possibly a freshwater marsh (7112).

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	9213	Ponds and lakes with completely man-made structure
Number of samples selected for the class	7	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	3	
Class user's accuracy	42,86 %	
Class user's accuracy (CI)	$\pm 0,3960$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	57,00 %	Correct: 4; Too coarse: 0; Too detailed: 3
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 6; Missing parts: 1; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 7; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassification with classes 9111, 9113 and 9215. Features of e.g. forest and field are not excluded from the class area. None of the class samples are completely man made (no concrete structures) but rather dug ponds located next to a water area and thus filled with natural water.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Shoreline 10 and River network; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Artificial ponds that have been dug and are filled naturally from surrounding water courses (e.g. retention pools to improve water quality in adjacent water systems).	
EXAMPLE (typical mistakes / typical appearance):		



Typical appearance of class: man made water body (not completely artificial)

DATASET	RZ	Riparian Zones status layer 2012
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LC/LU CLASS	9214	Intensively managed fish ponds
Number of samples selected for the class	1	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	0	
Class user's accuracy	0,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	0,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	0,00 %	Correct: 0; Too coarse: 0; Too detailed: 1
Correctness of delineated area	0,00 %	Correct: 0; Unnecessary parts included: 1; Missing parts: 0; Both missing parts and unnecessary parts included: 0
Positional accuracy	100,00 %	Correct: 1; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	There is only one sample of this class and it has been incorrectly classified (should be 1113).	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Shoreline 10 and River network; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Class appears in Finland but hasn't been identified in the dataset.	
EXAMPLE (typical mistakes / typical appearance):		



Wrong class: 1113 (a waste water treatment plant)

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	9215	Standing water bodies of extractive industrial sites
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	7	
Class user's accuracy	70,00 %	
Class user's accuracy (CI)	$\pm 0,2994$	
Class producer's accuracy	87,50 %	
Class producer's accuracy (CI)	$\pm 0,2194$	
CORRECTNESS OF DELINEATION		
Detail of delineation	50,00 %	Correct: 5; Too coarse: 2; Too detailed: 3
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 6; Missing parts: 1; Both missing parts and unnecessary parts included: 1
Positional accuracy	90,00 %	Correct: 9; Shifted: 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassification with classes 1113 and 1311. Delineation of class samples is not accurate.	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Shoreline 10 and River network; Digital Elevation Model 2x2m; Soil Extraction Permits Database	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of class is water bodies close to active extraction sites.	
EXAMPLE (typical mistakes / typical appearance):		



A water body in an extraction site

DATASET	RZ	Riparian Zones status layer 2012
LC/LU CLASS	10111	Marine (other)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	8	
Class user's accuracy	80,00 %	
Class user's accuracy (CI)	$\pm 0,2613$	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	80,00 %	Correct: 8; Too coarse: 0; Too detailed: 2
Correctness of delineated area	20,00 %	Correct: 2; Unnecessary parts included: 4; Missing parts: 1; Both missing parts and unnecessary parts included: 3
Positional accuracy	100,00 %	Correct: 2; Shifted: 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassification with 1113 and 7112. Delineation is not always precise. This class is quite well identified in the RZ feature layer. Often the delineation between fresh and marine water is contradictory with national reference data (in places where rivers are running into the Baltic sea).	
Typical reference information used / minimum required for decision	Orthophotos close to year 2012; Topographic Database & Topographic map series/The National Land Survey; National high resolution Corine Land Cover 2012; Corine Land Cover change layers 2000-2006 and 2006-2012; Shoreline 10 and River network; Digital Elevation Model 2x2m	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Typical appearance of the class in samples is narrow strips of water at the Baltic sea coast.	
EXAMPLE (typical mistakes / typical appearance):		



A narrow strip in the coastal area.

3. N2K

LOCAL COMPONENT VERIFICATION REPORT

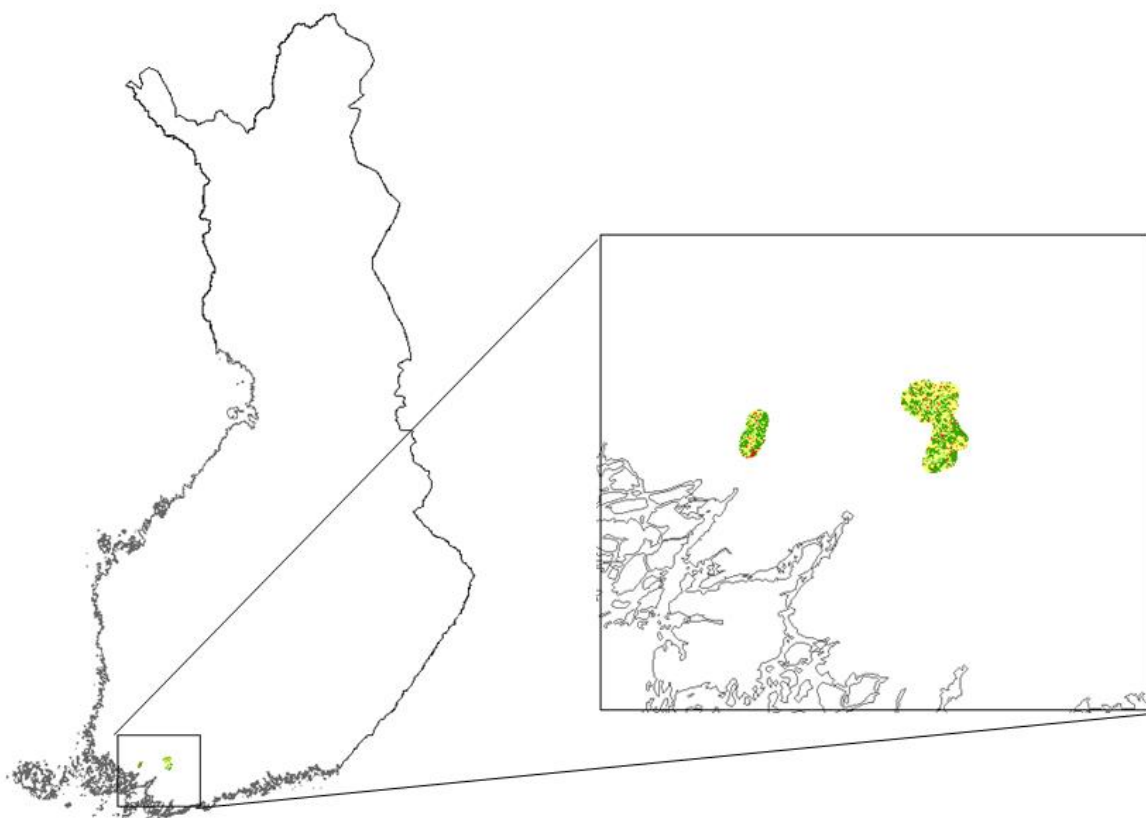
I. Metadata

DATASET	<i>Natura 2000 land cover (2012)</i>
Country	<i>Finland</i>
Institution carrying out the work	<i>Finnish Environment Institute SYKE</i>
Data preparation	<i>Iida Autio, iida.autio@ymparisto.fi</i>
Visual inspection of samples	<i>Minna Kallio, minna.kallio@ymparisto.fi</i>
Evaluation	<i>Minna Kallio, minna.kallio@ymparisto.fi</i>
Reference data provided centrally	IMAGE2012 VHR satellite image mosaic
	GoogleEarth Imagery, Bing imagery
In situ data used	National Orthophoto database/The National Land Survey Natural color/black and white orthophotos Resolution: 0.25-0.5m Reference years: 2010-2015 (partial coverages)
	The National Road and Street Database, Digiroad Vector dataset Reference year: 2017 (compared to data from 2011-2013)
	National high resolution Corine Land Cover 2012 National Corine raster dataset Resolution 20x20m Reference year: 2012
	Corine Land Cover change layers (National) 2000-2006 and 2006-2012 Resolution 0.5ha
	The Finnish Land Parcel Information System (FLPIS) Based on farming subsidy reports Information of the dominant plant species of the field plots Vector data Reference year: 2011
	Soil Extraction Permits Database Vector data Reference year: constantly updated but data contains information on duration of the permits
	Topographic Database/The National Land Survey Compilations of object groups Vector data Reference year: 1960*- 2012 (*no exact metadata of the production year)
	Topographic map series/The National Land Survey Raster data Reference year: 2017
	Topographic map series/The National Land Survey Raster data Reference years: 2011-2013 (partial coverages)
	Copernicus high resolution imperviousness layer (HRL Imperviousness) Reference year: 2012
	Digital Elevation Model/ The National Land Survey & SYKE Resolution 10x10m Raster data

	Reference year: 2015
	Laser Scanned Tree Cover Density Resolution 2x2m Raster Data Reference year: 2018
	Tree Species Data from satellite images Raster Data Reference year: 2015
	Shoreline 10 and River network Based on the Topographic database/National Land Survey of Finland Vector data Reference year: 2016
	Laser scanned elevation Resolution 2x2m Raster Data National Land Survey of Finland Reference years 2008-2016
	Laser scanned vegetation height Resolution 2x2m Raster Data National Land Survey of Finland & SYKE Reference years 2008-2016
Software used for verification	LACO-WIKI, (+ GoogleMaps, ArcMap 10.5)
Internal quality control done by	<i>Minna Kallio, minna.kallio@ymparisto.fi</i>
Date and place of writing the report	<i>01.03.2018. Helsinki</i>

II. Overall characterization of the dataset

DATASET	N2K	Natura 2000 status layer 2012
Area covered within country	0.06 %	20 837 hectares
Number of valid classes appearing in the country	20	
Number of samples selected	154	Remark: 10 samples / class was aimed to be selected, but some classes included less than 10 polygons
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	125	
Overall Accuracy	94,6%	
Overall Accuracy (CI)	±1,90%	
CORRECTNESS OF DELINEATION		
Detail of delineation	90.9%	Correct: 140; Too coarse: 12; Too detailed: 2
Correctness of delineated area	61,03 %	Correct: 94; Unnecessary parts included: 44; Missing parts: 21; Both missing parts and unnecessary parts included: 35
Positional accuracy	96.75%	Correct: 149; Shifted: 5
OVERVIEW FIGURE OF NATURA 2000 STATUS LAYER - FINLAND		



DATASET	N2K	Natura 2000 status layer 2012
GENERAL REMARKS ON THE QUALITY OF THE DATASET		
The data consists of N2K grassland-rich sites, including a 2km buffer. The test area covers very small part of agricultural areas and just two Natura 2000 sites in Finland. Only 20 out of 60 classes of the N2K nomenclature (Level 4) is present in this data. The delineation detail is sufficient and shifts in the data are rare. Sometimes it seems that Finnish national datasets are used to produce the classes like Topographic database peatlands or fields. Most polygons belong to class Non-irrigated arable land (2111). Their accuracy is usually high. The polygons are delineated with class road network (1211), but there are some problems with the roads used to cut the big agricultural areas into separate polygons. Only some roads are included in the road network, and when they are used to produce the class 2111 polygons, it sometimes leads to erroneous delineation of these polygons. The road polygon ends when the width of the road is less than 10 m. It causes odd or coincidental patterns to the polygons formed by these road polygons. The problem of outlining field polygons with roads does not show in the result of the verification, because the delineation follows the rules defined in the Nomenclature Guidelines document (Copernicus Initial Operations 2011-2013 - Land Monitoring Service Local Component: Natura 2000 Mapping. European Environment Agency. D1.8 NOMENCLATURE GUIDELINE Issue 1.1 Date Issued: 13/08/2015). The most interesting classes in N2K data are the Semi-natural grasslands (4211-4212). Class definitions need reconsideration in terms of TCD: Trees groups are often scattered in otherwise open grassland areas and it makes the delineation of the polygons according to tree cover density difficult with this particular MMU. The frequency and area of Other natural & semi-natural coniferous forest (3231) is high. The problematic classes among forests are the swamp forests, which seem to be derived from the objects in national data in N2K data. The palustrine soils mapped in the Topographic database are not accurate and is quite old. The most interesting classes in N2K data are the Semi-natural grasslands (4211-4212). Class definitions need reconsideration in terms of TCD: Trees groups are often scattered in otherwise open grassland areas and it makes the delineation of the polygons according to tree cover density difficult with this particular MMU. More attention should be paid to semi-natural habitat patterns, especially tree patterns in semi-natural grasslands, wooded pastures and set-asides. Areas besides water elements should be reconsidered (not combining land areas with water).		

SUMMARY STATISTICS OF NATURA 2000 STATUS LAYER – FINLAND			
N2K Class	Number of polygons	Area (ha)	%
1111	605	917,74	4 %
1113	31	71,45	0 %
1211	5	55,76	0 %
1311	5	12,54	0 %
1411	1	0,74	0 %
2111	174	10411,9	50 %
2121	1	1,05	0 %
3121	4	9,98	0 %
3131	87	340,73	2 %
3221	117	483,1	2 %
3231	378	5436,82	26 %
3321	5	14,4	0 %
3331	74	549,21	3 %
3411	345	1490	7 %
4111	109	426,97	2 %
4211	34	285,68	1 %
4212	50	216,43	1 %
7212	4	32,71	0 %
9111	10	72,38	0 %
9211	9	8,05	0 %
SUM		20837,64	100 %

1.1.1.1 Urban fabric (predominantly public and private units)

III. Characterization of the dataset by LC/LU class -

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	1111	Urban fabric (predominantly public and private units)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	7	
Class user's accuracy	70,00 %	
Class user's accuracy (CI)	± 0,2994	
Class producer's accuracy	97,82 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	70 %	Correct 7 - Too coarse 2 - Too detailed 1
Correctness of delineated area	40 %	Correct 4 - Missing and unnecessary parts 1 - Missing parts 1 - Unnecessary parts included 4
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications between farming industry and residential areas. The buffer zone around buildings is wide and includes field.	
Typical reference information used / minimum required for decision	National CLC12 raster	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Residential buildings in rural areas, only some farm buildings.	
EXAMPLE (typical mistake):		

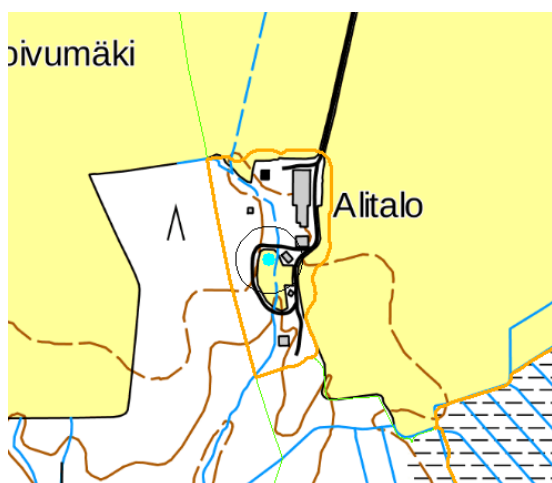


Wrong code (sample point and polygon turquoise color, others green): Farming industries dominate the polygon 1111->1113. The grey buildings are industrial and black buildings residential.

1.1.1.3 Industrial, commercial and military units

III. Characterization of the dataset by LC/LU class -

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	1113	Industrial, commercial and military units
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	8	
Class user's accuracy	80,00 %	
Class user's accuracy (CI)	$\pm$ 0,2613	
Class producer's accuracy	23,75 %	
Class producer's accuracy (CI)	$\pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	80 %	Correct 8 - Too coarse 2 - Too detailed 0
Correctness of delineated area	60 %	Correct 6 - Missing and unnecessary parts 1 - Missing parts 2 - Unnecessary parts included 1
Positional accuracy	80 %	Correct 8 - Shifted 2
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications between farming industry and residential areas. The buffer zone around buildings is wide and includes a lot of field.	
Typical reference information used / minimum required for decision	National CLC12 raster	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Buildings belonging to the farming industry.	
EXAMPLE (typical appearance):		

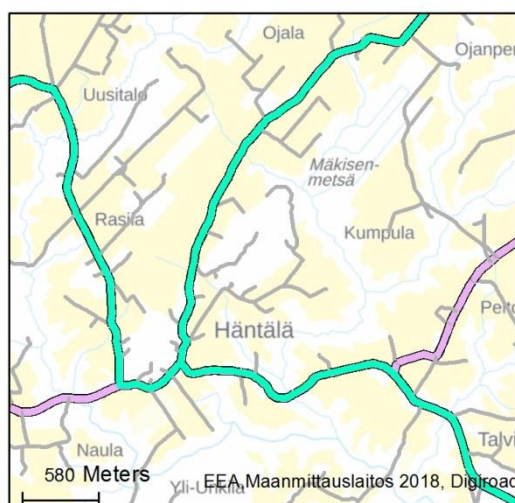


There is a wide buffer around the 1113 area, that includes a lot of field and forest.

III. Characterization of the dataset by LC/LU class -

1.2.1.1 Road networks and associated land

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	1211	Road networks and associated land
Number of samples selected for the class	5	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	5	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	$\pm$ 0,0000	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 5 - Too coarse 0 - Too detailed 0
Correctness of delineated area	40 %	Correct 2 - Missing and unnecessary parts 1 - Missing parts 2 - Unnecessary parts included 0
Positional accuracy	100 %	Correct 5 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail		
Typical reference information used / minimum required for decision	Digiroad, airphoto	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	There is no explanation how roads are cut to individual polygons.	
EXAMPLE (typical appearance):		



Only some roads (here green) are in the dataset.

1.3.1.1 Mineral extraction, dump and construction sites

III. Characterization of the dataset by LC/LU class -

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	1311	Mineral extraction, dump and construction sites
Number of samples selected for the class	5	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	4	
Class user's accuracy	80,00 %	
Class user's accuracy (CI)	$\pm$ 0,3920	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 5 - Too coarse 0 - Too detailed 0
Correctness of delineated area	40 %	Correct 2 - Missing and unnecessary parts 0 - Missing parts 2 - Unnecessary parts included 1
Positional accuracy	100 %	Correct 5 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail		
Typical reference information used / minimum required for decision	National CLC12 raster	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Sand extraction sites.	
EXAMPLE (typical mistakes / typical appearance):		



Parts missing in the north (selected sample in turquoise, other samples in green).

III. Characterization of the dataset by LC/LU class -

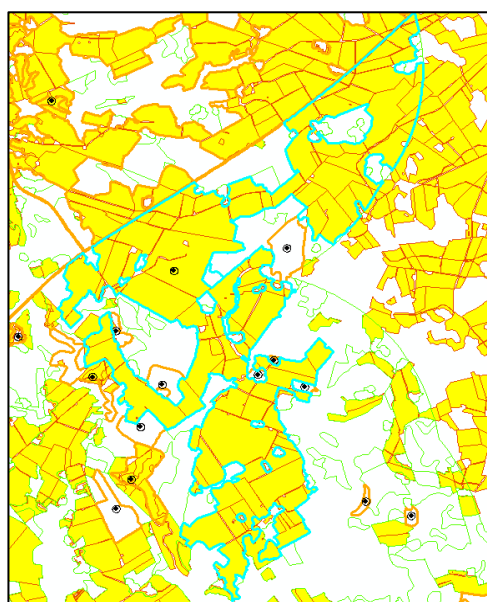
1.4.1.1 Green urban areas and
leisure facilities

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	1411	Green urban areas and leisure facilities
Number of samples selected for the class	1	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	1	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	$\pm$ 0,0000	
Class producer's accuracy	22,82 %	
Class producer's accuracy (CI)	$\pm \pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 1 - Too coarse 0 - Too detailed 0
Correctness of delineated area	100 %	Correct 1 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 0
Positional accuracy	100 %	Correct 1 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Only one sample.	
Typical reference information used / minimum required for decision	Airphoto	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Leisure facility boundaries are seldom easy to interpret in rural landscapes.	

2.1.1.1 Non-irrigated arable land

III. Characterization of the dataset by LC/LU class -

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	2111	Non-irrigated arable land
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	$\pm 0,0000$	
Class producer's accuracy	99,92 %	
Class producer's accuracy (CI)	$\pm 0,0000$	0
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 10 - Too coarse 0 - Too detailed 0
Correctness of delineated area	90 %	Correct 9 - Missing and unnecessary parts 0 - Missing parts 1 - Unnecessary parts included 0
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Well classified and found.	
Typical reference information used / minimum required for decision	LPIS and Topographic database	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	N2K Grassland data is in arable regions with a lot of fields.	
EXAMPLE (typical mistakes / typical appearance):		



The field polygons are often large and complicated. Road network has high impact on polygon delineation (National road network=red, selected sample polygon=turquoise, fields of topographic database= yellow, other N2K polygons=green) .

III. Characterization of the dataset by LC/LU class -

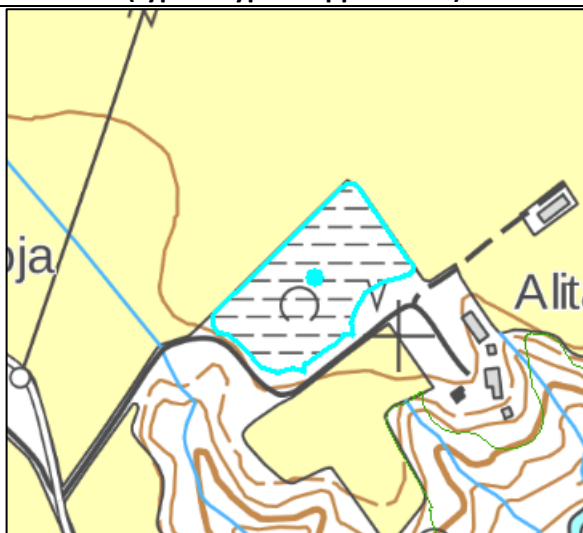
2.1.2.1 Greenhouses

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	2121	Greenhouses
Number of samples selected for the class	1	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	1	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 1 - Too coarse 0 - Too detailed 0
Correctness of delineated area	100 %	Correct 1 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 0
Positional accuracy	100 %	Correct 0 - Shifted 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Only one sample	
Typical reference information used / minimum required for decision	airphoto	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical mistakes / typical appearance):		

III. Characterization of the dataset by LC/LU class -

3.1.2.1 Broadleaved swamp forest

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	3121	Broadleaved swamp forest
Number of samples selected for the class	4	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	4	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	$\pm$ 0,0000	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	75 %	Correct 3 - Too coarse 0 - Too detailed 1
Correctness of delineated area	75 %	Correct 3 - Missing and unnecessary parts 0 - Missing parts 1 - Unnecessary parts included 0
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail		
Typical reference information used / minimum required for decision		Corine land cover raster 20x20 m, airphotos, topographic database
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		Only 4 samples.
EXAMPLE (typical typical appearance):		



Selected sample = turquoise, Topographic database palustrine layer = black dash line

III. Characterization of the dataset by LC/LU class -

3.1.3.1 Other natural & semi natural broadleaved forest

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	3131	Other natural & semi natural broadleaved forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	3	
Class user's accuracy	30,00 %	
Class user's accuracy (CI)	$\pm$ 0,2994	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	70 %	Correct 7 - Too coarse 3 - Too detailed 0
Correctness of delineated area	60 %	Correct 6 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 4
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail		Forests are typically very mosaicked and broadleaved often close to mixed forests.
Typical reference information used / minimum required for decision		Corine land cover raster 20x20 m, airphotos, topographic database
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		Pure broadleaves forests are usually small patches in the forest mosaic.
EXAMPLE (typical mistakes):		



Selected sample = turquoise. Wrong class.

III. Characterization of the dataset by LC/LU class -

3.2.2.1 Coniferous swamp forest

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	3221	Coniferous swamp forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	8	
Class user's accuracy	80,00 %	
Class user's accuracy (CI)	$\pm$ 0,2613	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	70 %	Correct 10 - Too coarse 0 - Too detailed 0
Correctness of delineated area	40 %	Correct 7 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 3
Positional accuracy	100 %	Correct 9 - Shifted 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail		Quite well interpreted class. Also a thin peat layer is considered as swamp forest in N2K data.
Typical reference information used / minimum required for decision		Corine land cover raster 20x20 m, airphotos, topographic database
Typical appearance of the class in samples (habitats, cultivation type, land use etc)		
EXAMPLE (typical appearance):		

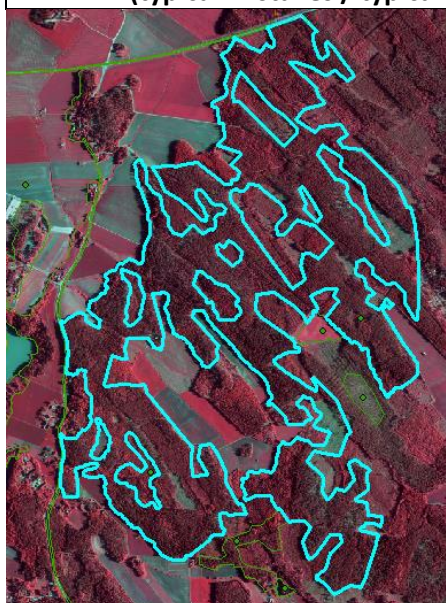


Selected sample = turquoise

3.2.3.1 Other natural & semi natural coniferous forest

III. Characterization of the dataset by LC/LU class -

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	3231	Other natural & semi natural coniferous forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	95,54 %	
Class producer's accuracy (CI)	± 0,0000	0
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 10 - Too coarse 0 - Too detailed 0
Correctness of delineated area	40 %	Correct 4 - Missing and unnecessary parts 0 - Missing parts 1 - Unnecessary parts included 5
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Unnecessary parts are easily included in large polygons.	
Typical reference information used / minimum required for decision	Corine land cover raster 20x20 m, airphotos, topographic database	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	This is a typical class in Finnish forests covering large areas.	
EXAMPLE (typical mistakes / typical appearance):		

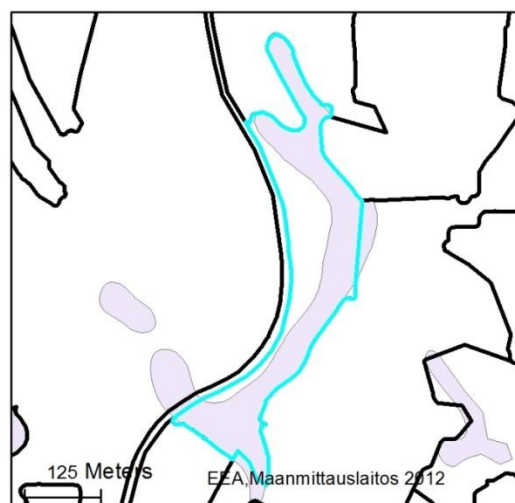
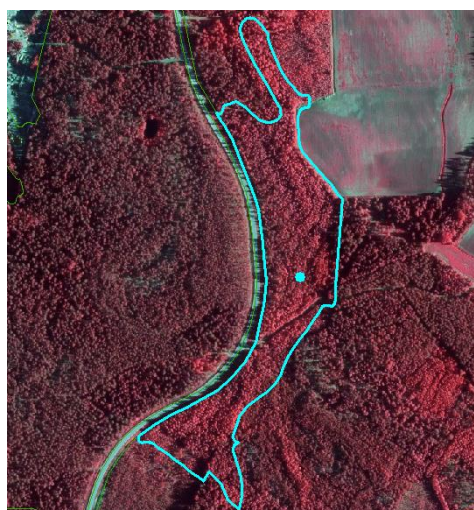


Unnecessary parts included. Selected sample = turquoise, other , samples = green

III. Characterization of the dataset by LC/LU class -

3.3.2.1 Mixed swamp forest

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	3321	Mixed swamp forest
Number of samples selected for the class	5	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	4	
Class user's accuracy	80,00 %	
	±	
Class user's accuracy (CI)	0,3920	
Class producer's accuracy	19,26 %	
	±	
Class producer's accuracy (CI)	0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 10 - Too coarse 0 - Too detailed 0
		Correct 2 - Missing and unnecessary parts 0 - Missing parts 1 - Unnecessary parts included 2
Correctness of delineated area	40 %	
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Delineation often includes unnecessary parts. Also a thin peat layer is classified as swamp forest in N2K data.	
Typical reference information used / minimum required for decision	Corine land cover raster 20x20 m, airphotos, topographic database	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	6 samples.	
EXAMPLE (typical mistakes / typical appearance):		



Wrong delineation, unnecessary parts included. Selected sample = turquoise. National Topographic database peatland = lilac, the layer is obviously partly used in producing the class.

III. Characterization of the dataset by LC/LU class -

3.3.3.1 Other natural & semi natural

mixed forest

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	3331	Other natural & semi natural mixed forest
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	6	
Class user's accuracy	60,00 %	
Class user's accuracy (CI)	$\pm 0,3201$	
Class producer's accuracy	59,10 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	80 %	Correct 8 - Too coarse 2 - Too detailed 0
Correctness of delineated area	50 %	Correct 5 - Missing and unnecessary parts 1 - Missing parts 1 - Unnecessary parts included 3
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Misclassifications with class 3231. Finnish forest mosaic is not easy to turn into patterns from satellite images.	
Typical reference information used / minimum required for decision	Corine land cover raster 20x20 m, airphotos, topographic database	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Very typical Finnish forest.	
EXAMPLE (typical mistakes / typical appearance):		



Wrong code. Selected sample = turquoise.

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	3411	Transitional woodland and scrub
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	± 0,0000	
Class producer's accuracy	88,57 %	
Class producer's accuracy (CI)	± 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 10 - Too coarse 0 - Too detailed 0
Correctness of delineated area	40 %	Correct 4 - Missing and unnecessary parts 0 - Missing parts 1 - Unnecessary parts included 5
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail		
Typical reference information used / minimum required for decision	Corine land cover raster 20x20 m, airphotos, topographic database	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	The class contains forest cuttings but also old agricultural areas turning back to forests. An important class measuring pressures to important grassy habitats.	
EXAMPLE (typical appearance):		



Good interpretation. Selected sample = turquoise.

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	4111	Managed grassland
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	5	
Class user's accuracy	50,00 %	
Class user's accuracy (CI)	$\pm$ 0,3267	
Class producer's accuracy	90,80 %	
Class producer's accuracy (CI)	$\pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	80 %	Correct 8 - Too coarse 2 - Too detailed 0
Correctness of delineated area	50 %	Correct 5 - Missing and unnecessary parts 0 - Missing parts 1 - Unnecessary parts included 4
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	This is a difficult class to interpretate because the degree of management is not properly defined in datasets. Easily confused with 4212 and 4211.	
Typical reference information used / minimum required for decision	Airphoto, LPIS, Topographic database.	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	A typical class in arable regions.	
EXAMPLE (typical appearance):		



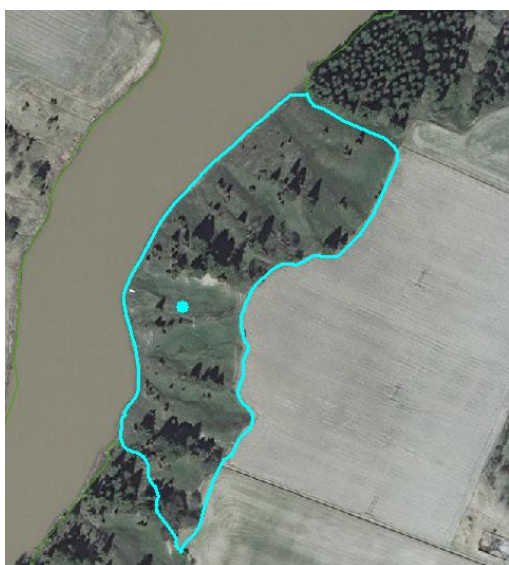
Good interpretation Selected sample = turquoise

III. Characterization of the dataset by LC/LU class -

4.2.1.1 Semi-natural grassland with trees

(T.C.D. $\geq$ 30%)

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	4211	Semi-natural grassland with trees (T.C.D. $\geq$ 30%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	10	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	$\pm 0,0000$	
Class producer's accuracy	87,00 %	
Class producer's accuracy (CI)	$\pm 0,0000$	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 10 - Too coarse 0 - Too detailed 0
Correctness of delineated area	90 %	Correct 9 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 1
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	It is not easy to differentiate between 4212 and 4211 in neighbour polygons. Not too much open grassland should be included.	
Typical reference information used / minimum required for decision	Airphoto.	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Very important type for Natura 2000 grasslands and also nationally valuable seminatural traditionally managed habitats.	
EXAMPLE (typical appearance):		



Good interpretation Selected sample =
turquoise

4.2.1.2 Semi-natural grassland without trees (T.C.D. < 30%)

III. Characterization of the dataset by LC/LU class -

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	4212	Semi-natural grassland without trees (T.C.D. < 30%)
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	8	
Class user's accuracy	80,00 %	
Class user's accuracy (CI)	$\pm$ 0,2613	
Class producer's accuracy	57,74 %	
Class producer's accuracy (CI)	$\pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 10 - Too coarse 0 - Too detailed 0
Correctness of delineated area	40 %	Correct 4 - Missing and unnecessary parts 0 - Missing parts 2 - Unnecessary parts included 4
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	It is not easy to differentiate between 4212 and 4211 in neighbour polygons. Not too much TCD should be included.	
Typical reference information used / minimum required for decision	Airphoto.	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Very important type for Natura 2000 grasslands and also nationally valuable traditionally managed seminatural habitats.	
EXAMPLE (typical mistakes):		



Woody parts in the south (unnecessary parts). Selected sample = turquoise

III. Characterization of the dataset by LC/LU class -

7.2.1.2 Unexploited peat bog

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	7212	Unexploited peat bog
Number of samples selected for the class	4	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	3	
Class user's accuracy	75,00 %	
Class user's accuracy (CI)	$\pm$ 0,4900	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 4 - Too coarse 0 - Too detailed 0
Correctness of delineated area	100 %	Correct 4 - Missing and unnecessary parts 0 - Missing parts 0 - Unnecessary parts included 0
Positional accuracy	100 %	Correct 4 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail		
Typical reference information used / minimum required for decision	Topographic database, airphoto.	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Only 4 samples. A stable class (if not exploited as arable land or peat extraction).	
EXAMPLE (typical appearance):		

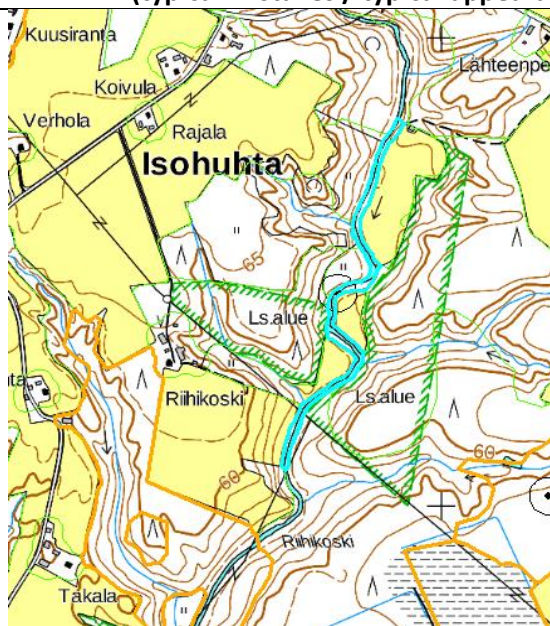


Selected sample = turquoise

III. Characterization of the dataset by LC/LU class -

9.1.1.1 Interconnected running water courses

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	9111	Interconnected running water courses
Number of samples selected for the class	10	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	9	
Class user's accuracy	90,00 %	
Class user's accuracy (CI)	$\pm$ 0,1960	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	90 %	Correct 9 - Too coarse 1 - Too detailed 0
Correctness of delineated area	70 %	Correct 7 - Missing and unnecessary parts 0 - Missing parts 3 - Unnecessary parts included 0
Positional accuracy	100 %	Correct 10 - Shifted 0
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Usually interpreted according to the class definition. Still, there is a question about the width: usually there is no change in habitats although the 9111 polygon ends.	
Typical reference information used / minimum required for decision	Topographic database, airphoto.	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	The banks of narrow rivers are very important seminatural habitats if managed traditionally.	
EXAMPLE (typical mistakes / typical appearance):		



Wrong delineation, parts missing. Selected sample = turquoise, Other samples=orange, Protected area=green.

III. Characterization of the dataset by LC/LU class -

9.2.1.1 Natural water bodies

DATASET	N2K	Natura 2000 status layer 2012
LC/LU CLASS	9211	Natural water bodies
Number of samples selected for the class	9	
CORRECTNESS OF LC/LU CODE		
Number of correctly interpreted samples	9	
Class user's accuracy	100,00 %	
Class user's accuracy (CI)	$\pm$ 0,0000	
Class producer's accuracy	100,00 %	
Class producer's accuracy (CI)	$\pm$ 0,0000	
CORRECTNESS OF DELINEATION		
Detail of delineation	100 %	Correct 9 - Too coarse 0 - Too detailed 0
Correctness of delineated area	40 %	Correct 4 - Missing and unnecessary parts 0 - Missing parts 1 - Unnecessary parts included 5
Positional accuracy	90 %	Correct 9 - Shifted 1
CHARACTERIZATION OF THE CLASS		
Typical mistakes (misclassification, wrong delineation, etc.) describe in detail	Usually quite well delineated, sometimes near forest borders can be missing parts.	
Typical reference information used / minimum required for decision	Topographic database.	
Typical appearance of the class in samples (habitats, cultivation type, land use etc)	Small lakes are typical to southern agricultural areas.	
EXAMPLE (typical mistakes / typical appearance):		



Missing stripe of water in the south-east Selected sample = turquoise, other samples = green.

4. The usability and potential use of the Copernicus Land Local Component Products in Finland

Executive Summary

The user survey is part of the verification and enrichment of Copernicus local component products. It describes the results of the usability and the potential use of local component data sets in Finland. The users were experts and researchers using corresponding data in their work and responsible for reporting obligations. Urban atlas was evaluated also by planners.

This user survey was advertised in regular meetings and seminars where environmental experts and researchers participated. These potential users were also encouraged to participate to the survey. However, it was difficult to motivate them to answer the query after they found out that the data to be evaluated couldn't be used directly in their own work. Also the preliminary expectations of the usability of data were low, since experts are used to work with national data sets based on field observations together with false colour Orto-photos. The number of respondents was very low in spite of efforts to activate the users to respond. Thus following results may not be based on representative sample of national users.

Urban Atlas data is evaluated to be sufficient in land use monitoring, but it could cover more cities geographically both in Finland and in Nordic countries. Time series of different years is important to have. The users hoped to have more classes on the green areas.

The data content and quality of Riparian Zones LCLU data was found unacceptable. However the need for land cover information on riparian zones was recognized. Following factors hamper the usability of data: It is based on elevation model with low accuracy, unclear descriptions of data production methods and too ambitious classification systems. More simple data that covers also smaller streams would serve the users better. Riparian zone data have potential and it should be further developed.

Natura 2000 data covers only two Natura 2000 sites in Finland. Grassland data is welcomed in the monitoring of the habitat pressures and the users hope to get more habitats to be mapped in the future. The habitats themselves cannot be recognized in the data, but the general trends in the area can be monitored using time series. Additionally the data are usable in evaluating the status and change in the surroundings of grassland habitats.

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1. About the survey

The user survey is part of the verification of Copernicus local component products. This report describes the usability and the potential use of local component data sets in Finland. The products assessed were the following:

- Urban Atlas (UA) 2012 status layer and Street Tree Layer (STL)
- Riparian Zones LCLU 2012 status layer (RZ) and Green Linear Elements 2012 status layer (GLE)
- Natura 2000 - Grassland LCLU 2012 status layer (N2K)

The user survey was conducted by presenting the datasets widely to the public and stakeholders, using online questionnaire, in depth interviews and meetings.

The questionnaire consisted of three parts: (1) General knowledge and opinion about the Copernicus local component products (2) Technical aspects and (3) Final remarks /follow-up comments. The respondents were mainly experts using land cover-land use / habitat data products in their work. Also general comments given in the process of verification were added to the final remarks.

Responses to the questions set by EEA were collected using an online survey tool (WebRopol). In the query there were short instructions in Finnish, but the questions were in English. The different scientific and professional backgrounds of the users caused that all the questions were set optional, to ensure that the form was not too difficult to fill.

Since the Street Tree Layer covered only city of Lahti in Urban Atlas and the quality of Riparian Green Linear Element was not satisfactory, these data were not included in the query. However the usability of linear features was discussed in the meetings and interviews and also reported in connection with responding themes.

2. Stakeholder analysis

The national user forum of Copernicus services, which SYKE is coordinating together with Finnish Meteorological Institute, consists of the most of potential users for this survey. National, high resolution land use/land cover data is used widely in the environmental administration and thus we have also lot of in-house users. Additional users include partners responsible for land monitoring in Finland and visitors of SYKE OpenData portal .

The experts responsible for reporting obligations set by various EU initiatives are especially important users of Land cover/land use data. The users evaluated also the usability of the local components for national purposes .

In spite of the significant efforts put into the dissemination (described below), it was very difficult to get answers to the survey.

3. Presenting the datasets

3.1.Web pages

SYKE open data service (www.syke.fi/openinformation) is widely used and thus offers a good forum to reach people interested in Land monitoring data and activities. In order to promote Local components and the verification task dedicated [web pages](#) (in Finnish) were published. The Local component products and potential use cases set by Copernicus programme were presented.

The focus of the web pages was to gather feedback on the usability of the products. Relevant reference documents were set available and the web page contained links to the questionnaires, the web map application and EEA's web pages of local components.

3.2. Map applications

A [web-based application](#) for viewing the data with relevant background data was developed in-house. The web map application presented all the local component map layers together with HRLs, protected areas and background data. The information section of the application included a brief introduction on the map layers and the purpose of the application. The application utilized directly the local component web map services of EEA.

For internal users at SYKE the local component layers were set available via three separate ArcGis projects. These projects included UA, RZ and N2K data. Several layers of national GIS data were available in the application, and there is a possibility to select more GIS layers using SYKE's own applications.

3.3. Seminar on national land monitoring

Information on the local component of Copernicus Land were presented to 25 participants in a national seminar in September. The programme of the seminar concentrated different EU based land monitoring data and their usability. The Eurostat LUCAS survey and EEA Copernicus Land products including local components were presented. The local components www-pages, the Webropol survey and the web map application were demonstrated. The participants were encouraged to answer the survey.

The seminar raised awareness of the Copernicus Land program and products in general. Important contacts were made with the national statistical organization and ministries.

3.4. Announcements and user contact

The launch of the national verification and usability assessment of the local components was promoted in various media including links to end user survey and Web map applications. The survey and verification process was announced in the SYKE's open data service in the 14 of September and the 17 of October. Intranet news were repeated several times along the project progress. Notifications in social media were published in Twitter, Facebook and Yammer accounts.

Corresponding information were e-mailed to selected user groups, individual experts and participants of the seminar. GIS professionals and experts were recognized through the stakeholder analysis. Personal contact was the most effective way to get the users really to answer to the survey.

User meetings and individual interviews were held in order to present the project and the local component products. The users often wanted to examine locations in the data sets that they had been using in their own studies to understand the nature of the data. The questionnaire was browsed together with the users and the questions of the survey were discussed further. Also the metadata was examined together.

In the end of the survey a user meeting was arranged, where the general context of the products was presented with for example the VHR mosaics. Also those users, who had not yet filled in questionnaire, had the possibility to deliver it. All users who had participated in the evaluation were sent the draft of the report for comments.

4. Results

4.1. The respondents

The contact information of the user were included according to the guidelines of EEA including name, email, organization and the role (research, reporting, expert, planning, etc.)

The fitness of purpose was evaluated by selected experts in the fields of the different research and development themes relevant to local component services. The total number of responses for all surveys was 14. Although the number is low, the persons who did respond to the query are important experts

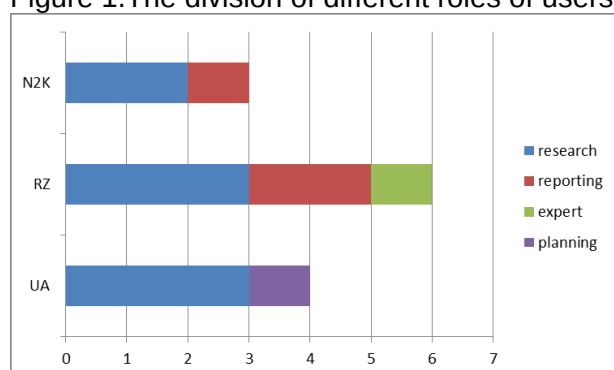
especially in reporting of the Habitats Directive and evaluating the data in terms of ecosystem services and biodiversity values.

It was learned in this study, that filling the questionnaire and express an opinion of the usability of the data would have required more time than the experts were willing to put into the task. This was partly due to the low preliminary expectations on the data accuracy and content. Also some of the users gave their feedback in email or interview, and the questionnaire was filled based on that.

Despite of the low number of responses to the survey this exercise improved the awareness of the Copernicus services - especially the very high resolution images rouse interest.

Remarks collected during statistical verification were also used and added into the usability analysis. Experts, who completed the statistical verification, have presently the best experience on the characteristics of the local component products in relation to detailed national data sources.

Figure 1. The division of different roles of users in data products:



4.2. Urban Atlas (UA) 2012 status layer and Street Tree Layer (STL)

Most of the users had already used or were planning to use the data. These products were found important and also the spatial resolution was satisfactory. These products are important since similar national data is not available, and possibility for international comparison gives important additional value for data. Urban land use and structure, accessibility to services and health research were mentioned as topics of the studies using UA data. Time series and high update frequency were found important.

The users gave also several proposals for improvements e.g.

- Need for more specific classification of green urban areas
- The concentrations of services would have been interesting
- More urban areas should be mapped especially in all Nordic countries
-

Finnish UA included large areas of agricultural land, forest and water, these areas may not be considered as urban area.

Part 1: General knowledge and opinion about the Copernicus Local Component products

1. Do you use the Local Component product:

Use of Urban Atlas	N	Percent
a. Yes, I have used it	2	40%
b. Yes, I am planning to use it.	2	40%
c. No (specify why)	1	20%
It does not cover my research areas		

2. Describe the (potential) uses of the local component products in your workflows

Land use change in Helsinki Metropolitan Area 2006-2012. Latest use was calculation of land taken for build-up areas (especially green areas).
Accessibility from kindergartens to forest and urban green areas 2012.
I define sometimes quite small catchments (e.g. Piece of street).
Use on research as international comparisons of urban land use (e.g. Density of urban structure)
Use on research as national studies on urban green infrastructure, urban development (time series), quality of residential areas etc.
These data can possibly be used in epidemiological health research defining exposures of the living environments

3. What kind of support do you expect from the local component products (which you do not find yet) to fulfil your reporting/monitoring obligations? Select one or more of the below options

Expected support	N	Percent
a. High update frequency allows gap filling of national products	2	50%
b. Classification system supports national MAES obligation	1	25%
c. Comparability between national N2K sites/Urban areas/Riparian Zones	0	0%
d. Others (specify) -More accurate locations of streets, roads and parks.	1	25%

4. What is its added value when compared to rather national, local data? Select one or more of the below options

Added value	N
a. Higher spatial resolution	3
b. Higher temporal resolution	0
c. Better thematic classification	2
d. Others (specify) It exists. In here we do not necessarily have land use data for every city. Actually, only for a few.	1

5. What are the limitations experienced by the user? Select one or more of the below options

Limitations	N
a. Spatial resolution	0
b. Temporal resolution (please, specify) There is not yet repeated data to examine changes in the variables	1
c. Nomenclature (please, specify)	0
d. Thematic content (please, specify) More specific classification of green areas (e.g. forest types) would be very useful. Like in Corine Land Cover data. Classification of forests doesn't exist	2
e. Delineation (please, specify) Reykjavik/Iceland is missing	1
f. Others (please, specify) The areas for different land use are located a bit of from their original location.	1

Part 2: Technical aspects

6. What are your comments (for improvement in further updates) regarding: nomenclatures? (e.g. class descriptions, missing classes

It's fine by me

technical documentations? (e.g. information about thematic content, geographical coverage,

It would be good to verify the locations of the borders of different land uses. The data is accurate enough, but its targeting is a bit off.

Geographical coverage is not sufficient. Only seven urban areas in Finland which is unfortunate.

interpretation methods)?

-

thematic/semantic content of classes?

It's fine by me.

Forests could be classified (e.g. like in Corine)

More specific classification of green areas (e.g. forest types) would be very useful. Like in Corine Land Cover data.

A variable defining concentrations of services/businesses would be an interesting addition to the data that could be used in the research of human behaviors.

delineation?

Include Reykjavik/Iceland for comparisons of Nordic countries.

Part 3: Final remarks /follow-up comments

7. Please, add here any other comments

It seems that the Land use change data is more exact comparing to Local Corine (at least in Helsinki Metropolitan Area). However, classification is not so specific where e.g. forest types are not included.

If it is possible to develop the classification by adding sub-classes such as in Corine (e.g. coniferous forest, broad leaf forest..), it would be very useful in the environmental research field.

Urban Atlas, like other EEA's GIS datasets, are very important especially for the international research and comparability, but also for national studies. Awareness of these datasets and their use is still quite weak. Their potential is much bigger.

Information of EEA's data and its availability could be developed and promoted more. These datasets should be provided in open interfaces and in national GIS services (like Paikkatietoikkuna in Finland).

Remarks from the verification: Classification of the urban fabric according to the soil sealing percentage is not consistent with the reference data. There is no clear trend in the misclassifications as denser classes seem to be overestimating and sparser classes underestimating the actual soil sealing.

The road network is often inaccurate and the roads are not where they're supposed to be, especially within the urban area. The roads are correctly classified but their position and shape is not correct and they contain parts that are unnecessary (e.g. small recreational path). Especially this applies to cities. Fast transit roads often end up being too narrow for the same class. In large intersections with several bridges and slip roads it is often difficult to tell the difference between bigger and smaller

roads. The roads do not form a continuous network.

Some misclassifications are consistent throughout the data. Clear cut forests are not recognized by the mapping process and are misclassified as e.g. permanent crops. Arable land miss-interpreted as pastures are in most cases croplands, which are laid in fallow or temporarily growing grass for forage. This is typical rotation system of croplands in Finland.

In general, the delineation of the whole feature layer should be reconsidered. In many cases the FUA extends too far to the rural areas and very large polygons of agricultural land, forest and water systems are included.

Usability of the STL: The data covered only Lahti and is not usable because of limited geographical coverage and the characteristics and quality of the data.

4.3. Riparian Zones LCLU 2012 status layer (RZ) and Green Linear Elements 2012 status layer (GLE)

Only 2 of the 7 respondents were planning to use the RZ data. Data of the riparian areas was thought to be valuable, but the data product did not seem to meet the expectations of such data. Finland's river network system is scattered and complicated, and contains small rivers, which are not included to the RZ data. The method for data production was difficult to understand and clear errors found in familiar places did not inspire confidence to the data. Also the function of the GLE data was unclear.

Nevertheless there are a number of potential use cases for riparian data like mapping ecosystem types, assessing the state of the RZ, creating indicators for biodiversity monitoring and the assessment of state and change of Habitat Directive habitats. It was estimated that the RZ data may not be directly used in reporting the habitats, instead VHR images could be more usable, especially if the habitats are rare.

It is possible to produce corresponding national data from national datasets. These local component products were still found important in terms of update frequency, MAES classification and comparability. There is added value in higher spatial and temporal resolution. Doubts were raised about the classification and data production methods. The elevation data used in production of RZ was found inadequate.

There were many requests for individual classes defining habitats like alluvial forest. It was also noted, that some classes can not be produced from only one image, but would require a series of images – like habitats under water only part of the time. The Potential Riparian Zone (PRZ) in producing the classes did not find any support of the national data. Many notifications also to the classification were added in the verification process.

Part 1: General knowledge and opinion about the Copernicus Local Component products

1. Do you use the Local Component product:

Use of Riparian Zones LCLU	N	Percent
a. Yes, I have used it	0	0%
b. Yes, I am planning to use it.	2	29%
c. No (specify why)		
– If it will include Finnish riparian zones in much more detail in the future...		
– I have not used it so far but I could consider using it. I heard before a rumor that it might not be very accurate which is I didn't take a look at it sooner.		
– I have looked at it but have not found any concrete use for it yet.		
– Classification and delineation do not support the use	5	71%

2. Describe the (potential) uses of the local component products in your workflows

In Finland we don't seem to have land cover/use data specifically on riparian zones so this kind of information would be valuable in general. However the current data doesn't cover all the riparian areas in Finland and therefore at the moment the data is not applicable. The comprehensive data would help to specify/assess the amount of certain habitat/ecosystem types in Finland.
If there was long-term temporal continuity related to the riparian zones data it could also be used in the assessment of the state/status of the riparian ecosystems in the future.
I do ecosystem service mapping and I expect that this data would be good material to be applied in this context.
I would use them for national biodiversity monitoring -- as a basis of indicators. Riparian zones are an interesting topic with no existing biodiversity indicators in use in Finland.
I would be interested in land use changes in the riparian zone as well as the development of some special riparian habitat types such as flooded forests next to streams and rivers. I would also potentially use them for studies that link species observations with landscape characteristics and ecosystem services.
Just to view the data is OK for someone, who does not do spatial data analyzes (like me). If analyzed material is needed for specific use, an expert can compile the current material and then be totally aware what has been done. I do not see this would be of particular benefit to reporting the Habitats Directive, as the types of directives on inland waters are few.
The material may be useful in the general overview of blue and green infrastructures and networks and ecosystem services, but I can't estimate this more closely. When there is no exact information on how the material is made, making interpretations seems a bit risky.
The material could be valid in assessing ecosystem services and the use of land-use planning projects. I would hope for someone who works with those subjects would also assess the product. However, my own work is in the monitoring habitats and I use more traditional methods, and do not currently see the use of material in these projects.
Corresponding material is already available by making it from the national CORINE2012 itself. Using it there is also a possibility to define the shoreline area to better meet the needs of use. This kind of material is needed for national habitat assessment and The Habitats Directive projects, and that's what I have done for our own needs in Biodiversity Centre, and I would like to develop it further in cooperation with SYKE Data and Information Centre.
The assessment of state and change of Habitat Directive habitats. The data can not be directly used in reporting the habitat data. VHR images could be more usable, especially in cases the habitats are rare. But the data production would need a national input to be reliable.
I would like to calculate the change of the area of certain habitat inside a Natura 2000 area. Even only separating treeless areas from wooded would be beneficial. My interest of detecting change would be related to soil moisture and hydrology. In the Finnish scale climate change causes changes in the times of flooding in inland waterways. On the coast, floods are becoming more common. In the longer term, flood protection and hydraulic engineering may have impact on coastal habitat types.

3. What kind of support do you expect from the local component products (which you do not find yet) to fulfil your reporting/monitoring obligations? Select one or more of the below options

Expected support	N
a. High update frequency allows gap filling of national products	3
b. Classification system supports national MAES obligation	2
c. Comparability between national N2K sites/Urban areas/Riparian Zones	3
d. Others (specify) -Better international comparability, greater geographical coverage	1

4. What is its added value when compared to rather national, local data? Select one or more of the below options

Added value	N
a. Higher spatial resolution	2
b. Higher temporal resolution	2
c. Better thematic classification	1
d. Others (specify)	
It would hopefully give additional information/further insight to the habitat type/ecosystem assessments	1

5. What are the limitations experienced by the user? Select one or more of the below options

Limitations	N
a. Spatial resolution (please, specify) The metadata gives a very small MMU. The large number of classes and the small pattern size give cause to doubt that the material is not accurate. Many segments can be provided by a model and there is no evidence, what their actual nature is.	3
b. Temporal resolution	0
c. Nomenclature (please, specify) There could a separate class for low-lying broadleaved forest that are right next to flowing water -- forest that are most likely affected by flooding and, in the north, by ice-scouring	1
d. Thematic content (please, specify) The data should separate the habitats consistently	1
e. Delineation (please, specify) For MAES work this might be applicable for European level but I think for more local analyses, vector data is more useful	2
f. Others (please, specify) -	1

Part 2: Technical aspects

6. What are your comments (for improvement in further updates) regarding:

nomenclatures? (e.g. class descriptions, missing classes)

I think that it is good that it follows MAES classification. However, potentially there might be mismatch with national classifications (another expert to check?).
Many of Habitat Directive classes cannot be defined, e.g. alluvial forests. The classification of the coastal habitats could be more useful, if the definitions of the missing classes were good: sandy beaches, heaths, rocky areas, meadows... On the coastal areas the coverage of the directive habitats is much wider. Classification is not accurate enough to help with the national assessments of most types of habitats. For example, we would like to distinguish sandy, rocky and bushy beaches of inland waters and calculate their area and distribution.
The classification is quite detailed, and many of the categories are very interesting. When examining the material, it seems to be very specific. For example, in the classification, several classes on level 4 separate TCD over 80%, 50-80%, 30-80% and 10-30%. Complexity can be an advantage but also a disadvantage in using the material.
The data is missing classes, that are under water part of the time.

technical documentations? (e.g. information about thematic content, geographical coverage,

There should be data on all permanent water bodies not just the largest ones as it seem to be the case at the moment. There should also be concise descriptions of the land cover classes and the methods for the delineation of the riparian zones attached to the data. Without these documents it is impossible to say whether the data is useful.

interpretation methods)?

-

thematic/semantic content of classes?

Alluvial forests are problematic. Now it seems there are open and wooded areas in the same class in the data at the moment. Usually a site with high floods can not be recognized on a snap shot image, a time series is needed. It was good to notice on the example area, that a mire with ditches was classified as an exploited peat bog. That feature would be important to separate everywhere.

delineation?

In northern Finland the total riparian zone is sometimes too wide and includes areas that are not affected by the river/flooding. See, for example, around the town of Ylikiminki.

Many times small streams flowing into a river have valuable riparian habitats at their downstream parts. These should potentially be included in the delineation. Often big river have been dredged and/or build for hydropower and have lost a great deal of their riparian habitats. It is the small tributaries that still have high biodiversity riparian habitats left. Fields prone to flooding should somehow be specified and systematically included in the delineation. In general, there could more specific classes for fields in the riparian zone that would reflect their value for biodiversity.

The definition of the riparian area can not be directly used for e.g. national habitat assessment and Habitat Directive projects. The zone is quite wide. However, the width does not seem to be based on altitude, as there are more than 10 meters high woody hillocks in the riparian area.

I wonder whether DEM has been used to delineate the riparian zones?

Part 3: Final remarks /follow-up comments

7. Please, add here any other comments

Remarks from the verification:

Overall feedback on the quality of the dataset:

The urban classes (1000) are fairly well identified in the Riparian Zone status layer. Especially this applies to the truly urban land use classes such as urban fabric, industrial areas, road and rail network and transport infrastructure. The "green" land use classes (green urban area and sports and leisure facilities) also correspond to the reference data but the tree cover density (T.C.D.) is misinterpreted in many cases. While general classification is mostly correct, the delineation of the polygons is poor. Unnecessary areas are included in majority of the sample polygons. Roads and railways are an exception as their delineation is quite exact.

Arable land and the more general agricultural LC/LU class 2331 are well identified in the dataset but their delineation is not very accurate as unnecessary parts are included (forests and low density urban areas).

Delineation of the forest polygons (3000) does not follow patterns of forest type and therefore most of them should be relinedated and reclassified. This applies to both tree species and soil moisture factors.

The Potential Riparian Zone (PRZ) is ignored in the validation as national reference data doesn't support the delineation of PRZ. Only forests that are located in the moist low areas along the water systems and clearly affected by the adjacent water are classified as riparian and fluvial forests. There is a strong correlation between the forest polygons of the RZ status layer and the wetland polygons of the Topographic Database of the National Land Survey so this has clearly been used in the production of the dataset. It should be documented in METADATA that features of national data is included (superimposed) into output as such. This is visible in output in many cases.

Grassland classes (4000) are not well identified in the data and often the class is confused with forest or arable land. The national reference data is not sufficient to support the validation of the class. Especially difficult it is to distinguish between mesic grassland and freshwater marsh as well as mesic and managed grasslands. Transitional woodland and wooded grassland both occur in abandoned arable land and are often confused.

Validation of heathland and scrub classes (5000) and sparsely vegetated areas (6000) is problematic as distinguishing these classes (e.g. 5111, 6111, 6221, also 7212) from each other is often challenging from satellite images or even more precise national reference data. The high class user's accuracy isn't always an indication of a successful mapping but uncertainties in validation.

Sparsely vegetated LC/LU classes 6211, 6213, 6221 at the waterfront are also difficult to validate since there are differences in water levels between satellite images and national reference data. In many cases national reference data indicates that the area should be water even though satellite image shows land area.

Freshwater marshes (7000) are misclassified with e.g. forest classes but their validation is also difficult without sufficient reference data.

Both natural and artificial water bodies (9000 & 10000) are quite well identified in the feature layer with a few exceptions.

Overall feedback on the RZ classification and nomenclature guidelines:

There are several issues in the RZ classification and the nomenclature guidelines that should be considered to improve the quality and usability of the dataset.

There are big differences in the dataset in terms of coherence with the Urban Atlas status layer. Especially this applies to the urban classes. It is mentioned in the RZ nomenclature, that inside the Urban Atlas Core Regions, Urban Atlas is integrated to the RZ and elsewhere used as reference. This approach is problematic since it causes big differences in precision: in some areas the RZ layer is very generalized and polygons include several LC/LU classes of >MMU while in other areas they are very detailed. Also UA Core regions are not clearly described in the RZ nomenclature guidelines and no information is available on them in other sources.

Forest classes have attributes describing the four levels T.C.D. This could be considered as a 5th level of classification and is possibly too detailed. These were not taken into account when validating the correctness of the LC/LU classes

Validation of the grassland and wetland classes is complicated by the fact that the descriptions of these classes are somewhat confusing in the RZ nomenclature guideline. First of all, the RZ nomenclature guideline is not clear on the description (e.g. type and amount of vegetation and its management status) of classes 7111 and 7112 as they're described together under the headline of "7.1.1.1 Inland freshwater marshes". Also there are several exceptions and elaborations for classes 7111, 7112 as well as 4222 in the Nordic countries and Scandinavia and these are somewhat contradictory. It could be argued that the classification of marsh areas and grasslands in the RZ dataset is too ambitious. Their distinctive properties (management status, the height of grassy vegetation and humidity of soil) are both hard to describe and impossible to detect on satellite images or even on aerial images or other more precise national reference data.

The nomenclature specifies that in Nordic countries areas close to water are classified as freshwater marshes since they're not likely to be peat producing. This is not an correct assumption since there are

many large peat bogs next to lakes in Finland. This presumably causes a systematic error in classification of the freshwater marsh and peat bog classes.

Both classes "Heathland and moorlands" (5111) and "Sparsely vegetated areas" (6111) are mentioned to form mosaics with different classes with at least 70% coverage of the respective class. In Nordic conditions this applies also to peat bogs. This makes it difficult to determine the right delineation of a polygon, as in many cases an area could be either divided into smaller homogenous LC/LU classes or treated as a mosaic. The acceptance of mosaics is also an indication that the classification is too ambitious. If the LC/LU cannot be classified to the most detailed level, more general classification should be considered.

The existence of class 8111 (Salt marshes without reeds) in Finland is questionable. RZ nomenclature guideline specifies that "the Baltic Sea has only brackish coastal waters, which qualify for inland freshwater marshes" but still class 8111 is present in the dataset. There are coastal meadows in the Baltic Sea coastal areas that have salt tolerant plants, but according to the nomenclature also these should be considered freshwater marshes (or alternatively mesic grasslands).

The usability of the GLE is poor because the quality of the data. In addition, the intended use is not sufficiently documented in the metadata. The GLE consists of very heterogeneous patches and lines in various landscapes and it is unclear how it could be used outside areas dominated by agriculture.

4.4.Natura 2000 - Grassland LCLU 2012 status layer (N2K)

The N2K products cover only two Natura sites in Finland. Thus the product has not been found very interesting and only three experts answered the questionnaire. The users were not planning to use the data because of they did not see the need for it at the moment. Potentially it could be used to link species observations with landscape characteristics and ecosystem services, creating indicators and reporting EU directives and MAES work. Comparability, update frequency and classification were mentioned as supportive to their work, and higher spatial resolution and comparability added the value of the product compared to national data.

The present grassland classes and the coarseness of the data prevent finding the most valuable (biodiversity rich etc.) grassland patches. The data has potential in describing the state and pressures to the habitats. Also other habitats could be tested. The verification included detailed comments to the classes.

Part 1: General knowledge and opinion about the Copernicus Local Component products

1. Do you use the Local Component product:

Use of Natura 2000 - Grassland LCLU	N	Percent
a. Yes, I have used it	0	0%
b. Yes, I am planning to use it.	0	0%
c. No (specify why)		
– Currently I use little land use data in my research. Not working with any national reporting/monitoring obligations to EU.	3	100%
– Poor coverage in Finland?		
– No use for it so far		

2. Describe the (potential) uses of the local component products in your workflows

Could possibly use these products in analysing biodiversity patterns vs. land use.

This would potentially assist in reporting to EU (directives)
Perhaps MAES work as well

Ideally I would use them for biodiversity monitoring on a national scale (as an information basis of indicators). Grasslands are an important topic with no existing indicators on their extent and development in Finland. Any reliable and updatable (collected at different time points with consistent methods) would be greatly appreciated.

Potentially I would also use them for studies that link species observations with landscape characteristics and ecosystem services.

3. What kind of support do you expect from the local component products (which you do not find yet) to fulfil your reporting/monitoring obligations? Select one or more of the below options

Results

Expected support	N
a. High update frequency allows gap filling of national products	2
b. Classification system supports national MAES obligation	2
c. Comparability between national N2K sites/Urban areas/Riparian Zones	2
d. Others (specify)	0

4. What is its added value when compared to rather national, local data? Select one or more of the below options

Results

Added value	N
a. Higher spatial resolution	2
b. Higher temporal resolution	0
c. Better thematic classification	0
d. Others (specify)	3
– Better comparability with land use data from other Member states.	
– Better international comparability, potentially larger geographical coverage.	

5. What are the limitations experienced by the user? Select one or more of the below options

Results

Limitations	N
a. Spatial resolution	2
Rather coarse for analysing fine-scale biodiversity patterns (my main area of interest).	
b. Temporal resolution (please, specify)	0
c. Nomenclature (please, specify)	0
d. Thematic content (please, specify)	0
e. Delineation (please, specify)	1
Some obvious grassland patches were not included	
f. Others (please, specify)	0

Part 2: Technical aspects

6. What are your comments (for improvement in further updates) regarding: nomenclatures? (e.g. class descriptions, missing classes)

The habitat classes used seem rather coarse, which is of course understandable considering the large spatial scale of the data.

There can be a conflict with national classifications

Not sure if the present grassland classes help finding the most valuable (biodiversity rich etc.) grassland

patches.

technical documentations? (e.g. information about thematic content, geographical coverage,

-

interpretation methods)?

-

thematic/semantic content of classes?

-

delineation?

Delineation could be more accurate in some cases

Part 3: Final remarks /follow-up comments

7. Please, add here any other comments

Remarks from the verification:

The data consists of N2K grassland-rich sites, including a 2km buffer. The test area covers very small part of agricultural areas and just two Natura 2000 sites in Finland. Only 20 out of 60 classes of the N2K nomenclature (Level 4) is present in this data. The delineation detail is sufficient and shifts in the data are rare. Sometimes it seems that Finnish national datasets are used to produce the classes like Topographic database peatlands or fields. The data has potential in describing the state and pressures to the habitats.

Most polygons belong to class Non-irrigated arable land (2111). Their accuracy is usually high. The exception is when polygons are delineated with class road network (1211), in which case the problem is that roads are used to cut the big agricultural areas into separate polygons. The roads are not accurate in the data and they are used to produce the class 2111 polygons which leads to erroneous delineation of these polygons. The road polygon ends when the width of the road is less than 10 m. It causes odd or coincidental patterns to the polygons formed by these road polygons. Also only some roads are included in the road network.

The problem of outlining field polygons with roads does not show in the result of the verification, because the delineation follows the rules defined in the Nomenclature Guidelines document (Copernicus Initial Operations 2011-2013 - Land Monitoring Service Local Component: Natura 2000 Mapping. European Environment Agency. D1.8 NOMENCLATURE GUIDELINE Issue 1.1 Date Issued: 13/08/2015).

The most interesting classes in N2K data are the Semi-natural grasslands (4211-4212). Class definitions need reconsideration in terms of TCD: Trees groups are often scattered in otherwise open grassland areas and it makes the delineation of the polygons according to tree cover density difficult with this particular MMU.

The frequency and area of Other natural & semi-natural coniferous forest (3231) is high. The problematic classes among forests are the swamp forests, which seem to be derived from the objects in national data in N2K data. The palustrine soils mapped in the Topographic database are not accurate and is quite old.

More attention should be paid to semi-natural habitat patterns, especially tree patterns in semi-natural grasslands, wooded pastures and set-asides. Areas besides water elements should be reconsidered (not combining land areas with water).

4.5.Examples of quality of local component products

Example cases of principal problems were noticed by the experts. They were viewed together and discussed in more detail in the interviews. The source of the data on the maps are EEA and the National Land Survey of Finland for topographic maps, elevation and orthophotos.



Figure 2. The arable areas (topographic map fields =yellow) do not belong to the riparian LCLU. There are many sites where traditional agriculture has been and is very dependent on the river ecosystem, and often includes important riparian habitats.



Figure 3. RZ is including forest areas that have no riparian features and that include hills and hummocks (Ylikiiminki). The use of the elevation is not accurate enough.

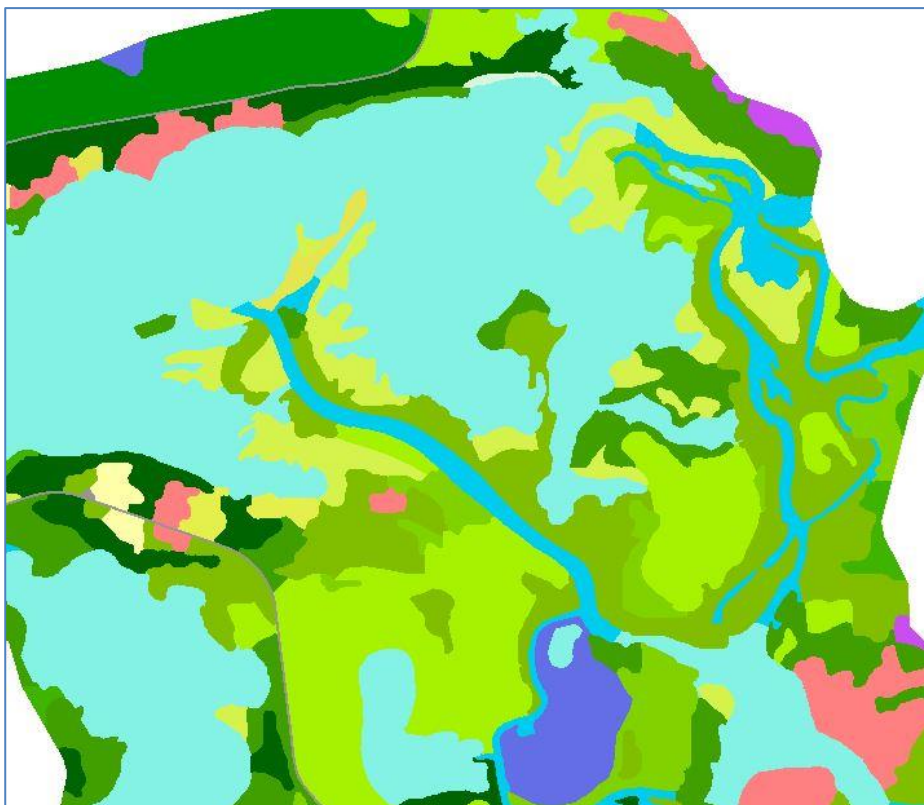


Figure 4. RZ is outlining flood meadows well in some parts of low areas near the river (different shades of green) . However, some parts are under water in the data (light blue).It would be better to use several points in time to produce classes seasonally under water.

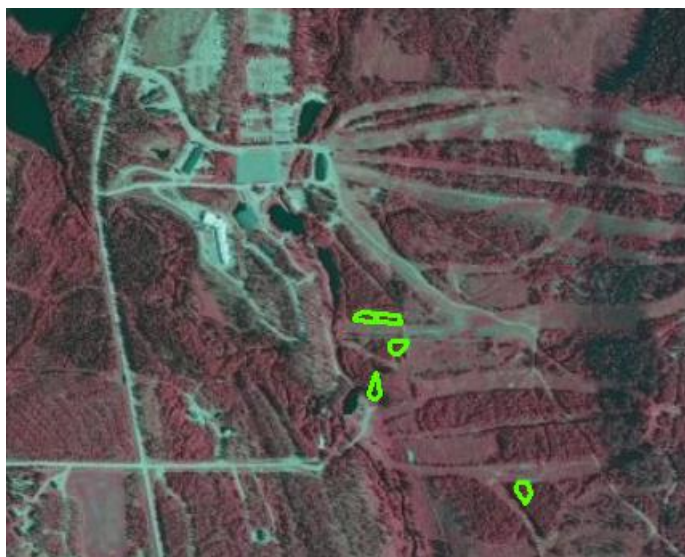


Figure 5a-b. Usability of the RZ GLE was found low because of and unclear function in many places.



Figure 6. N2K does not find all important grasslands by the river. The arrow points to important grassland habitat that is missing from the neighbouring N2K polygon.



Figure 7. N2K (in purple colour) compared to sample data of monitoring the state of the environment in agricultural areas MYTVAS 3 (in black colour). The semi-natural grasslands (4211-4212) are especially difficult to classify according to tree cover density in of the N2K data.

4.6. Annex 1

The Questionnaire

Part 1: General knowledge and opinion about the Copernicus Local Component products

1. Do you use the Local Component product (Urban Atlas):
 - a. Yes, I have used it
 - b. Yes, I am planning to use it.
 - c. No (specify why) [Free text]
2. Describe the (potential) uses of the local component products in your workflows [Free text]
3. What kind of support do you expect from the local component products (which you do not find yet) to fulfil your reporting/monitoring obligations? Select one or more of the below options
 - a. High update frequency allows gap filling of national products
 - b. Classification system supports national MAES obligation
 - c. Comparability between national N2K sites/Urban areas/Riparian Zones
 - d. Others (specify) [Free text]
4. What is its added value when compared to rather national, local data? Select one or more of the below options
 - a. Higher spatial resolution
 - b. Higher temporal resolution
 - c. Better thematic classification
 - d. Others (specify) [Free text]
5. What are the limitations experienced by the user? Select one or more of the below options
 - a. Spatial resolution (please, specify)
 - b. Temporal resolution (please, specify)
 - c. Nomenclature (please, specify)
 - d. Thematic content (please, specify)
 - e. Delineation (please, specify)
 - f. Others (please, specify)

Part 2: Technical aspects

6. What are your comments (for improvement in further updates) regarding:
 - nomenclatures? (e.g. class descriptions, missing classes) [Free text]
 - technical documentations? (e.g. information about thematic content, geographical coverage, interpretation methods)? [Free text]
 - thematic/semantic content of classes? [Free text]
 - delineation? [Free text]

Part 3: Final remarks /follow-up comments

7. Please, add here any other comments [Free text]