LANTMÄTERIET

2019-02-12

PRODUCT DESCRIPTION

CORINE Land Cover

DOKUMENTVERSION: 3.0

Produced with funding by the European Union

Table of contents

1 General description

1.1 Contents

In the product, which is based on interpretation of satellite data, the vegetation and land types are presented in 44 different classes. For Sweden 35 of these classes are relevant. The classification is organized in three levels with the following main classes:

- Artificial areas
- Agricultural areas
- Forest and semi-natural areas
- Wetlands
- Water bodies

For a complete list of classes, see chapter 4.

The 2018 update consists of these three separate data layers:

- CLC 2012 – A revised version of the 2012 update.
  The smallest unit to be presented is 25 hectares.
- CHA 2018 – The changes detected by comparison between satellite images from 2012 and 2018 respectively.
  The smallest unit to be presented is 5 hectares.
- CLC 2018 – A merger of the revised CLC 2012-base and the change layer CHA 2018. The surfaces are generalized to a minimum size of 25 hectares.

The 2012 update consists of these three separate data layers:

- CLC 2006 – A revised version of the 2006 update.
  The smallest unit to be presented is 25 hectares.
- CHA 2012 – The changes detected by comparison between satellite images from 2006 and 2012 respectively.
  The smallest unit to be presented is 5 hectares.
- CLC 2012 – A merger of the revised CLC 2006-base and the change layer CHA 2012. The surfaces are generalized to a minimum size of 25 hectares.

1.2 Geografic coverage

The mapping has nationwide coverage and is delimited by the territorial border in the sea and the national borders with Finland and Norway, with a corridor of 1 km into neighboring countries.

1.3 Geografic cut-out

The mapping is divided into 50 x 50 km map sheets and delivered per county. All full 50 x 50 km map sheets needed to cover the selected county are delivered along with associated metadata. The delivered geographical coverage will therefore be wider than the actual extent of the county.

1.4 Coordinate system

Plane coordinate system: SWEREF 99 TM.

Height system: the Swedish national RH 2000 height system.

2 Quality description

2.1 Data capture

2.1.1 LINEAGE

In 1985 the EU initiated the CORINE program (Coordination of Information on the Environment). One of the projects within the program is CORINE Land Cover (CLC), aimed at facilitating the planning and implementation of the EU environmental policy. The objective of the pan-European project CORINE Land Cover (CLC) is the provision of a unique and comparable land cover data set for Europe. The project is coordinated by The European Environment Agency, EEA.

The first iteration of the data series covered the reference year 1990 with subsequent releases covering the years 2000 (the first time Sweden participated), 2006, 2012 and 2018.

For CLC 2012 mainly images registered by SPOT4 and SPOT 5 from the years 2011-2012 have been used and visually compared with the images used in the production of CLC 2006, in order to identify the changes that have occurred between the reference years 2006 and 2012.

For CLC 2018 images from Sentinel 2, registered during 2017, were used and compared with the images used in the production of CLC 2012.

In addition to satellite images the following reference data have been used to support the interpretation:

- Statistics Sweden, SCB: Localities and Smaller localities, Dump sites
- The Swedish Board of Agriculture: The Meadow and Pasture Inventory, the Block database
- The European Environment Agency, EEA: CLC 2006, CLC 2012
- The Geological Survey of Sweden, SGU: Mineral extraction sites
- Swedish Civil Contingencies Agency, MSB: Fire sites
- Lantmateriet: Buildings, GeoVy with orthophotos and map series.
- Swedish Transport Administration: National Road Data Base NVDB
- Swedish Forest Agency: New forest clear cuts
- The Swedish University of Agricultural Sciences: Tree species and tree heights

2.2 Maintenance

The product presents the land cover for the reference years, as well as the changes detected between those years. The product will not be updated.

2.3 Data quality

2.3.1 POSITIONAL ACCURACY

The mapping is based on satellite images with a maximum resolution of 10 x 10 m per pixel. There are also images with a resolution of 20 x 20 m and in rare occasions images with a resolution of 25 x 25 m.

The images used for interpretation has an average RMS of maximum half a pixel.

This is valid for all image types, which means that the geometrical accuracy of the images can vary between +/- 5 metres up to +/- 12,5 metres.

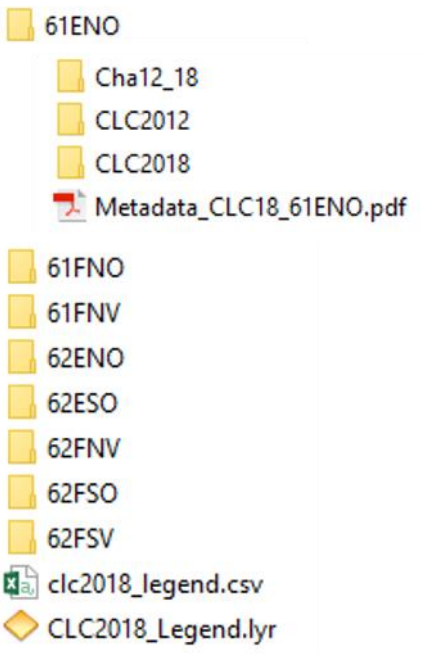
3 Delivery contents

3.1 Delivery folder structure

The product is divided into counties. For each county all intersecting map sheets are delivered. This means that the delivered area is wider than the actual size of the county. This also means that the same map sheet can be found in several counties, i.e. if you order data for two neighboring counties the same map sheet may be found in both deliveries.

Each delivery is structured as follows: In the zip-file with the name of the county lie folders containing the map sheets used to cover that county, together with legend files. Each map sheet folder contains folders with the three data layers as well as map sheet metadata. See example below for the file Blekinge.zip.

Figure 1. Folder structure in the delivery.



3.2 Delivery format and sets of files

The classification is delivered in shape format and contains the following files:

kartblad.dbf
kartblad.prj
kartblad.shp
kartblad.shx

In addition there is a metadata file available for each map sheet which is delivered in pdf-format and shows what satellite scenes and ancillary data have been used in the interpretation work.

4 Description of layers and list of codes

4.1 Table of classes

The table presents all the classes of CORINE Land Cover.

Classes marked with * do not occur in Sweden.

Table 1. Table of classes.

Code CLC	Name
111	Continuous urban fabric
112	Discontinuous urban fabric
121	Industrial or commercial units, public services and military installations
122	Road and rail networks and associated land
123	Port areas
124	Airports
131	Mineral extraction sites
132	Dump sites
133	Construction sites
141	Green urban areas
142	Sport and leisure facilities
211	Non-irrigated arable land
212	Permanently irrigated arable land *
213	Rice fields*
221	Vineyards*
222	Fruit trees and berry plantations
223	Olive groves*

Code CLC	Name
231	Pastures
241	Annual crops associated with permanent crops*
242	Complex cultivation patterns
243	Land principally occupied by agriculture, with significant areas of natural vegetation
244	Agro-forestry areas*
311	Broad-leaved forest
312	Coniferous forest
313	Mixed forest
321	Natural grassland
322	Moors and heathland
323	Sclerophyllous vegetation*
324	Transitional woodland/shrubs
331	Beaches, dunes, and sand plains
332	Bare rock
333	Sparsely vegetated areas
334	Burnt areas
335	Glaciers and perpetual snow
411	Inland marshes
412	Peat bogs/Mires
421	Salt marshes
422	Salines*

Code CLC	Name
423	Intertidal flats*
511	Watercourses
512	Water bodies
521	Coastal lagoons
522	Estuaries
523	Sea and ocean

4.2 Class definitions

In this section each class is defined and described based upon the following structure:

- *Definition*: Class definitions at the time of the production of CLC in Sweden. The class definitions are based on the definitions on European level (in English), translated and adapted to Swedish conditions.
- *Clarification*: Clarification of the Definition, where applicable, and examples of included objects.

4.2.1 ARTIFICIAL AREAS (MAIN CLASS 1)

The terms locality, smaller locality, urban fabric and built-up areas are used with the following definitions:

Locality: Outer boundary of coherent built-up areas, other artificially impervious surfaces and green urban areas defined in Statistics Sweden's locality register (densely built-up areas with at least 200 inhabitants and a maximum of 200 metres between buildings) and updated by visual interpretation of satellite data with support from Lantmateriet's databases.

Smaller locality: Outer boundary of coherent built-up areas and other artificially impervious surfaces defined in Statistics Sweden's small locality register (built-up areas with 50 - 199 inhabitants and a maximum of 150 metres between houses).

Urban fabric: Coherent built-up areas (surfaces with industrial buildings excluded) or areas with buildings according to Lantmateriet's databases.

Built-up areas: All types of buildings with associated land areas.

CONTINUOUS URBAN FABRIC (111)

Definition: Urban fabric within a locality where artificially impervious surfaces cover more than 80 % of the total surface.

Clarification: The class mainly corresponds to areas in the centre of localities, where continuous built-up precinct areas exist. The class corresponds to large extent to "Blocks of built-up area" in Lantmateriet's databases.

DISCONTINUOUS URBAN FABRIC (112)

Definition: Urban fabric where between 30 % and 80 % of the total surface consists of artificially impervious surfaces. Remaining parts mainly consist of vegetation not defined as green urban areas.

Clarification: The class includes urban fabric, from private housing estates with a relatively large amount of greenery to denser block of flats with less greenery. Apart from resident houses there are also office buildings, cemeteries and leisure homes, depending on the percentage of artificially impervious surfaces.

INDUSTRY OR COMMERCIAL UNITS, PUBLIC SERVICES AND MILITARY INSTALLATIONS (121)

Definition: Built-up areas consisting of industrial and commercial units, public services and other public buildings as well as military installations. More than 30 % of the surface consists of artificially impervious surfaces (areas with asphalt etc. for different purposes as well as buildings).

Clarification: The class includes industrial areas, shopping centres, hospitals, convalescent homes, schools, military barracks, prisons, libraries, museums, hotels, exhibition halls, larger transformer station areas, power plants, waterworks, treatment plants, buildings or areas for keeping farm animals and other farm buildings.

ROAD AND RAIL NETWORKS AND ASSOCIATED LAND (122)

Definition: All motorways, roads and railways wider than 100 metres are included in CLC. For roads and railways are also associated land included, such as traffic junctions, service stations, areas within roundabouts, verges, embankments and lay-bys at the side of roads, railway stations and railyards. Those areas are included if their surface is > 25 ha.

PORT AREAS (123)

Definition: Port areas including quays, dockyards and marinas.

Clarification: Quay, jetty, pier etc. are included if they are more than 100 metres wide. If they are narrower and/or if the total surfaces of these structures are less than the minimum mapping unit the water surface surrounded by for example two jetties are included.

AIRPORTS (124)

Definition: Airports with take-off and landing runways surfaced with concrete or asphalt with associated buildings, facilities and other adjacent surfaces such as grass areas.

Clarification: Military airports visible in satellite images but not presented in Lantmateriet's data base are mapped.

MINERAL EXTRACTION SITES (131)

Definition: Open-pit extraction sites where mining and extraction of minerals, rocks sand and gravel take place. Associated buildings, industries, rock crushers, roads etc. are included.

Clarification: The class includes areas where extraction of ore, gravel, sand, rock, limestone, shale etc. takes place. Rock crushers at site are also included. Industries and dump sites are included in the class if their surfaces are smaller than the minimum mapping unit. If the extraction site is covered by vegetation it is not included in the class. Water filled mineral extraction sites belong to the class Water bodies.

DUMP SITES (132)

Definition: Dump sites (municipal, industrial or mining waste dump sites) including associated buildings, industries, roads etc.

Clarification: Vehicle scrapping plants are included. Sludge dams/pools around cellulose- and mining industries or treatment plants are included. If the dump site is covered by vegetation it is not included in this class. Water filled dump sites belong to the class Water bodies.

CONSTRUCTION SITES (133)

Definition: Construction sites for roads, bridges, tunnels, buildings etc.

GREEN URBAN AREAS (141)

Definition: Green areas within localities where more than 70 % of the surface consists of vegetation and the remaining surfaces can consist of buildings and other artificially impervious surfaces.

Clarification: The class includes vegetated areas within localities, such as parks, grass fields, cemeteries, zoos, botanical gardens, amusement parks and forest areas. Green areas may contain single buildings and artificially impervious surfaces. The class does not include open wetlands or arable land.

SPORT AND LEISURE FACILITIES (142)

Definition: Sports grounds, unsurfaced airfields (grass) and golf courses are included, together with associated buildings and facilities. Urban parks, camping sites and leisure homes outside localities/smaller localities are not included.

Clarification: Sports grounds also include shooting ranges, motor racing circuits, race and trotting courses as well as dog racing tracks.

4.2.2 AGRICULTURAL AREAS (MAIN CLASS 2)

NON-IRRIGATED ARABLE LAND (211)

Definition: Ploughed arable land with cereals, oil seeds, root crops and potherbs, fruit and berries excluded. Pastures and hayfields under rotation, old

abandoned arable land, coppice, greenhouses and areas with greenhouses are also included in this class.

Clarification: Strawberry plantations are included in this class. Seed orchards are not included. Nurseries surrounded by arable land are included in this class. If the nursery is surrounded by forest the surface is classified as clear-felled area. If the surrounding consists of mixed areas the class of the nursery is determined by the predominant land type.

FRUIT TREES AND BERRY PLANTATIONS (222)

Definition: Land used for fruit- or berry plantations (strawberries excluded) in commercial scale.

PASTURES (231)

Definition: Grass land used for (or have been used for) grazing or haymaking, not under rotation. Trees and shrubs cover less than 30 % of the surface.

Clarification: The grass lands are claimed and can be fertilized, affected by seeded hay, chemical control or drainage. Pastures with trees and shrubs covering more than 30 % of the surface are mapped as woodland/shrub (3.2).

Grass land not used for grazing (reindeer grazing excluded) together with climatic or other natural impact preventing or obstructing the growth of trees or shrubs are classed as natural grassland (321).

COMPLEX CULTIVATION PATTERNS (242)

Definition: A mixture of small areas of arable land and pastures, where none of the categories cover more than 75% or less than 25% of the total surface.

Clarification: The class includes pastures and arable land smaller than the minimum mapping unit. The class also include pastures smaller than the minimum mapping unit, within a larger area of arable land bigger than the minimum mapping unit. Allotments are included in the class. Urban fabric or single buildings can be included if the artificial areas cover less than 30 % of the surface.

LAND PRINCIPALLY OCCUPIED BY AGRICULTURE, WITH SIGNIFICANT AREAS OF NATURAL VEGETATION (243)

Definition: A mixture of small areas consisting of agricultural areas and areas of natural or semi-natural origin, where none of the categories cover more than 75% or less than 25% of the total surface.

Clarification: The class includes classes within agricultural areas and natural/semi-natural areas smaller than the minimum mapping unit. Agricultural areas consist of arable land, fruit and berry plantations, pastures or allotments. Natural/semi-natural areas consist of forest, transitional woodland/shrub, natural grassland, moors and wetlands but also classes such as water bodies and bare rock. Urban fabric or single buildings can be included if the artificial areas cover less than 30 % of the surface.

4.2.3 FOREST AND SEMI-NATURAL AREAS (MAIN CLASS 3)

The forest mask corresponds to the layers Coniferous and mixed forest, Broad-leaved forest and Mountain birch forest in Lantmateriet's Topographic Map, Road Map and GGD.

BROAD-LEAVED FOREST (311)

Definition: Tree covered areas with a total crown cover of more than 30% of the surface, where more than 75% of the crown cover consist of broad-leaved forest. Tree height is more than 5 metres with the exception of natural low growing forest where lower tree height is allowed.

CONIFEROUS FOREST (312)

Definition: Areas consisting of trees with a total crown cover of more than 30% of the surface, where more than 75% of the crown cover consist of coniferous forest. Tree height is more than 5 metres with the exception of natural low growing forest where lower tree height is allowed.

MIXED FOREST (313)

Definition: Areas consisting of trees with a total crown cover of more than 30% of the surface, where neither broad-leaved forest or coniferous forest constitute more than 75% of the crown cover. Tree height is more than 5 metres with the exception of natural low growing forest where lower tree height is allowed.

NATURAL GRASSLAND (321)

Definition: Grassland characterized by climatic or other natural impact that prevents or obstructs the growth of trees. The vegetation must cover more than 50% of the surface. Grass and herbaceous vegetation dominate (>75%) the part of the surface covered by vegetation. The land should not be grazed, reindeer grazing in the bare mountain regions above the tree line is however allowed. The land must not be fertilized, affected by seeded hay or chemical control.

Clarification: The class consists of grassland that is open due to natural conditions caused by climate, type of soil/bedrock or water. The class includes open natural grassland such as grass heaths and meadows with low and tall herbs. Natural beach meadows and heaths rich on grass (for instance sand grass heaths) are included. Significantly sparse grassland (< 50% vegetation), for instance alvar, is classified as sparsely vegetated areas. Included in the class are also herbaceous military training areas that are not grazed. Natural grassland where trees or shrubs cover more than 30 % of the surface are mapped as woodland/shrub.

MOORS AND HEATHLAND (322)

Definition: Vegetation with low and closed cover dominated by bushes, shrubs and herbaceous plants.

Clarification: The class consists of extremely dry-dry dwarf shrub heath, dry dwarf shrub heath, mesic-wet dwarf shrub heath and moist-wet dwarf

shrub heath. Dwarf birch and low shrubs may occur. Grassy heaths, for instance sand grass heaths, are included in natural grassland. The land may be grazed if the vegetation still has heathland character. Sparsely vegetated heathland, such as alvar heaths, are included in sparsely vegetated areas (333). Heathland with trees or shrubs covering more than 30% of the surface is mapped as woodland/shrub.

TRANSITIONAL WOODLAND/SHRUB (324)

Definition: Thickets, clear-felled areas and young broad–leaved and coniferous forest.

Clarification: The class may occur both within and outside wetlands.

BEACHES, DUNES, AND SAND PLAINS (331)

Definition: Beaches, dunes, and plains consisting of sand or gravel with none or sparse vegetation. Beaches with pebbles are included in the class.

Clarification: Accumulation of sand and gravel along watercourses are included. Alpine watercourses with accumulated sand and gravel in the lower sections are also included.

BARE ROCK (332)

Definition: Bare rock and rock outcrop areas where the surface has none or sparse vegetation, but can be covered with moss or lichen.

Clarification: Bare rock includes scree, boulder valleys, rubble beaches. If forest covers > 30 % of the surface it is classified as forest.

SPARSELY VEGETATED AREAS (333)

Definition: Sparsely vegetated areas with little or sparsely developed ground vegetation layer. The vegetation field layer has a coverage of between 10 % and 50 % of the surface. In the bare mountain region above the tree line the class mainly consists of snow beds and gradients to these. Below the bare mountain regions above the tree line sparsely vegetated heaths and alvar are included.

BURNT AREAS (334)

Definition: Burnt areas within forest and semi-natural areas.

Clarification: Only burnt areas visible in satellite data at the time of registration are included.

GLACIERS AND PERPETUAL SNOW (335)

Definition: Perpetual snow and ice in high mountain regions.

4.2.4 WETLANDS (MAIN CLASS 4)

INLAND MARSHES (411)

Definition: Open wetlands largely affected by water from lakes and watercourses. Marl lakes and limestone bogs are included.

Clarification: Open is defined as less than 30 % surface coverage by trees or shrub. Included are periodically flooded fens, certain types of alluvial fens and marsh liable to flooding in Lantmateriet's databases. Here is also rooted water vegetation such as reeds, sedges, rushes, bulrush and unbranched bur-reed included.

PEAT BOGS/MIRES (412)

Definition: Open peat producing wetlands not largely affected by sea or lake water or water from watercourses.

Clarification: Open is defined as less than 30 % surface coverage by trees or shrub. Included are hummock mires, lawn and carpet mires, mud bottom mires, certain types of alluvial fens (marsh in Lantmateriet's database) and peat extraction sites.

SALT MARSHES (421)

Definition: Open wetlands to a great extent affected by sea water.

Clarification: Includes rooted water vegetation such as reeds and rushes. Includes marsh lands where sediments are deposited from the sea at high tide. The Baltic Sea, the Bothnian Sea and the Gulf of Bothnia are all defined as sea.

4.2.5 WATER BODIES (MAIN CLASS 5)

WATERCOURSES (511)

Definition: Watercourses, including canals, with a width of minimum 100 metres.

WATER BODIES (512)

Definition: Lakes and weirs with open surfaces and surfaces covered with vegetation.

Clarification: Included in the class are floating vegetation such as waterlilies, pondweed and duckweed. Included are also water vegetation such as reeds, sedges, rushes, bulrush and unbranched bur-reed.

COASTAL LAGOONS (521)

Definition: Water entirely or partly separated from the sea by a narrow strip of land.

Clarification: Included in lagoons in the Baltic Sea are flads and smaller waters in low lying areas which due to the land elevation have been entirely or partially cut off from the sea.

ESTUARIES (522)

Definition: The part of the river mouth where the impact of the sea is clearly noticeable by variations of water level and intermix of salt water.

Clarification: Water vegetation such as reeds, sedges, pondweed and watermilfoil can be included in estuaries if those areas are not classified as a

mask according to Lantmateriet's databases. The Baltic Sea, the Bothnian Sea and the Gulf of Bothnia are all defined as sea.

SEA AND OCEAN (523)

Definition: Open or vegetation covered waters beyond the coast line.

Clarification: The Baltic Sea, the Bothnian Sea and the Gulf of Bothnia are all defined as sea. The class includes floating vegetation, but also other water vegetation such as reeds.