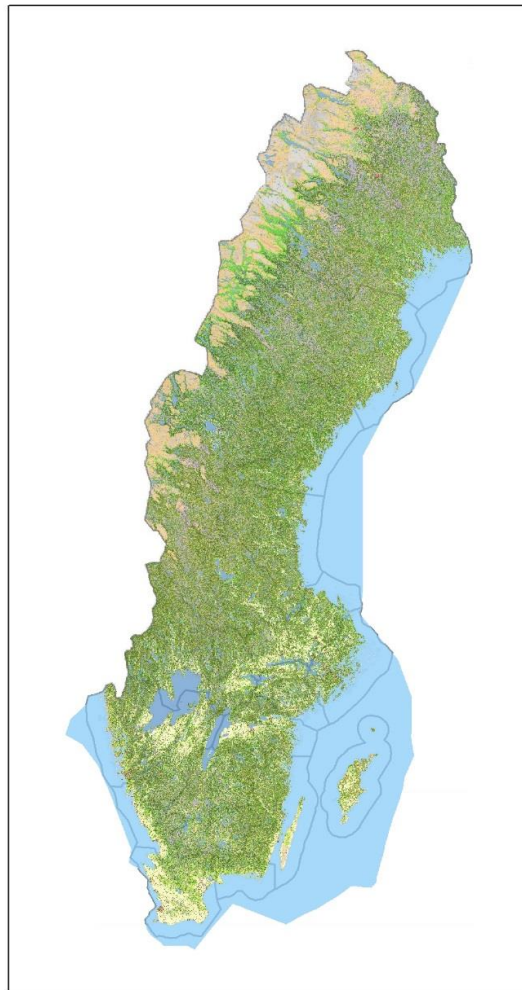


National Land Cover Database (NMD)

Product Description



SWEDISH ENVIRONMENTAL
PROTECTION AGENCY

Version

Issue	Date	Chapter changed	Details	Author(s)
1.0	2020-08-26		English version	Birgitta Olsson, Michael Ledwith (translation)

The Swedish Environmental Protection Agency
Phone: + 46 (0)10-698 10 00 Fax:+ 46 (0)10-698 16 00
E-mail: registrator@naturvardsverket.se
Address: Naturvårdsverket, SE-106 48 Stockholm, Sweden
Internet: www.naturvardsverket.se

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Abbreviations

CLC	CORINE Land Cover
DEM	Digital Elevation Model
HaV	Swedish Agency for Marine and Water Management
KNAS	Kontinuerlig Naturtypskartering Av Skyddade områden
LM	Lantmäteriet (Swedish National Land Survey)
LPIS	Land Parcel Identification System
NILS	Nationell Inventering av Landskapet i Sverige
NMD	National Land Cover Database
NV	Swedish Environmental Protection Agency
OGC	Open Geospatial Consortium
RGB	Red, Green, Blue
SCB	Statistics Sweden
SJV	Swedish Board of Agriculture
SKS	Swedish Forest Agency
SLU	Swedish University of Agricultural Sciences
SMD	Swedish Land Cover Database (from 2000)

1. Introduction

1.1 Background

The National Land Cover Database (NMD) is a land cover map over the entire country. The purpose of the database is to provide basic information about the landscape and any changes over time. The mapping production was conducted during 2017-2019 and will be updated every fifth year.

NMD is comprised of a base map with 25 thematic classes in three hierarchical levels. The map is in a raster format with 10 m resolution and a minimum mapping unit of 0,01 hectare. In addition to the base map, there are several complementary layers including:

- Object Height and Extent;
- Productivity
- Land Use
- Forests in Mountainous Regions

This document provides a synopsis of the NMD base map and complementary layers. More detailed descriptions can be found in the Swedish versions.

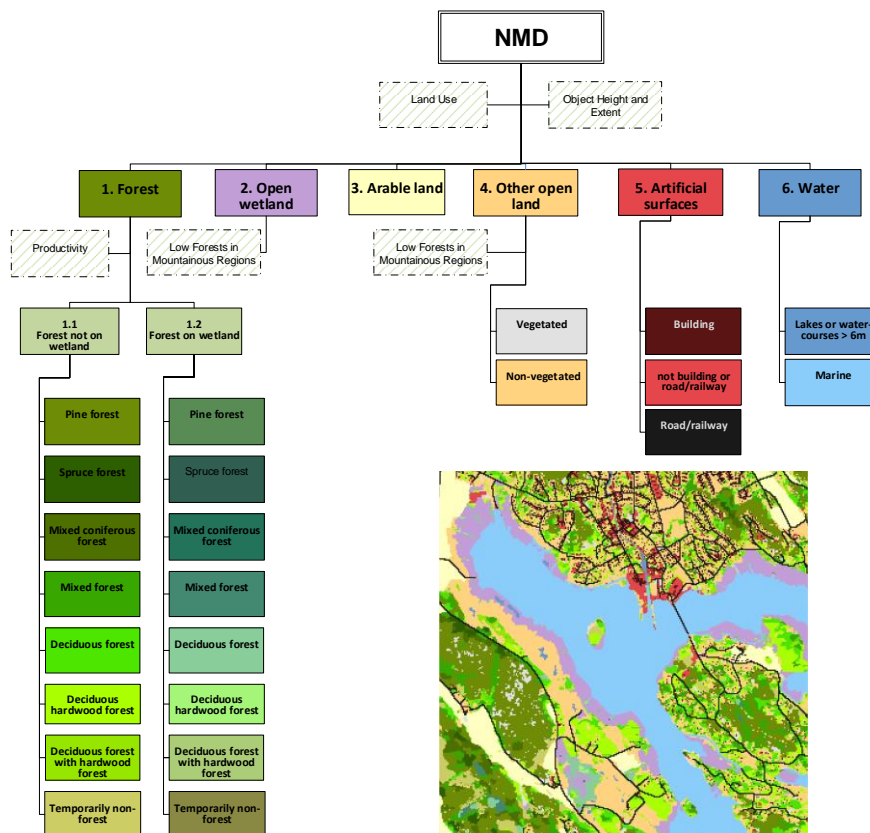


Figure 1. Hierarchical visualization of the NMD base map and complementary layers. The colors are the same as the equivalent class in the map legend.

1.2 References

Documents that are referred to in this text, as well as other documents that can of interest, are listed below. These documents are in Swedish.

- a) Home page
<http://www.swedishepa.se/State-of-the-environment/Maps-and-map-services/National-Land-Cover-Database/>
- b) Technical specifications (available via the Home page above)
Description of the production chain, including input, processes and output.
- c) Nilsson, M., Ahlkrona, E., Jönsson, C., Allard, A., 2020: *Regionala jämförelser mellan Nationella Marktäckedata och fältdata från Riksskogstaxeringen och NILS*.
A comparison of NMD version 1.0 with field data.
Available via the Home page above.

1.3 Terms of Use

Data that has been produced within the National Land Cover Database project is made available via the CC0 license and it therefore free to use, distribute and aggregate. *NMD, Naturvårdsverket* can be given as the source.

1.4 Timeliness

In the description below, there are links that are active in July 2020. Via the Environmental Protection Agency's metadata portal <http://www.miljodataportalen.naturvardsverket.se> information (metadata) and links to download the data can be found.

1.5 Comments and Feedback

Feedback on the products and their usefulness are appreciated. Comments can be sent to: data@naturvardsverket.se.

2 Description of the Products

2.1 Available Products

The following products are currently available:

- NMD base map: Comprised of 25 thematic classes in three hierarchical levels, as shown in Figure 1.
- NMD – Forests in Mountainous Regions. These forests are defined as tree-covered areas within the montane regions with a tree height of between 2 – 5 meters and a crown cover of at least 10%
- NMD - Productivity. This raster differentiates between productive and non-productive forested areas within the classes that have been mapped as *forest* in the NMD base map. The forested areas, productive forests and non-productive forests that have been mapped in NMD are in accordance with customary forestry laws (and the UN Food and Agricultural Organization). A notable exception is that forested areas within agricultural land and in built-up areas are also classed as forested areas. Non-productive forested area is defined as forested areas with less than 1 m³ per ha and year during a period of 100 years.
- NMD – Object Height and Extent. This complementary layer is comprised of four deliverables that correspond to object heights 0,5 – 5 m, object heights 5 – 45 m, crown cover of objects with heights 0,5 – 5 m and crown cover of objects with heights 5 – 45 m. Objects with heights of 0,5 – 5 m are assumed to be bushes and object over 5 m in height are assumed to be trees. It is possible that other objects, such as buildings, masts and reeds, are present in this layer.
- NMD – Land Use. This layer is comprised of three files that contain pastures (from LPIS - SJV), power lines (from property maps - LM) and landscaped areas (from infrastructure objects – SCB).

2.2 Geographical Coverage

All products cover the entire country, including the coastal economic zone.

2.3 Geographical Reference System

All products are provided in the Sweref 99 TM (EPSG; 3006) coordinate system.

2.4 Data Format

All products are provided as raster files. The files have a GeoTiff format (PackBits compression) with 8-bit data depth and 10 m pixel resolution.

NMD Metadata is available as a geodatabase with vector format. This is only available in Swedish. The following formats are available:

- ESRI file geodatabase (gdb)
- OGC GeoPackage (gpkg)

2.5 Attribute and List of Codes

Table 1. The table below details the products and attributes, along with a short description

Product and delivery file	Attribute	Description
<i>NMD Base Map</i> NMD2018bas_ogeneraliserad_v1_1.tif	Value Count Class	Value/ code according to Table 2. Number 10 x 10 m pixels Name of class according to Table 2.
<i>NMD Forests in Mountainous Regions</i> NMD_lag_fjallskog_v1_1.tif	Value Count Class	0, 1 or 255 Number 10 x 10 m pixels 0: Not mountain forest 1: Mountain forest 255: No Data
<i>NMD Productivity</i> NMDproduktivitet_ogeneraliserad_v1_1.tif	Value Count Class	0, 1 or 2 Number 10 x 10 m pixels 0: Not forested 1: Productive forest 2: Non-productive forest
<i>NMD Object Height and Extent</i> <ul style="list-style-type: none"> • Objekt_hojd_intervall_0_5_till_5_v1_3.img • Objekt_tackning_hojdintervall_0_5_till_5_v1_3.img • Objekt_hojd_intervall_5_till_45_v1_3.img • Objekt_tackning_hojdintervall_5_till_45_v1_3.img 	Value Count Class	Value Number 10 x 10 m pixels Name of class according to Table 3
<i>NMD Land Use</i> <ul style="list-style-type: none"> • NMD_markanv_bete_v1.tif • NMD_markanv_kraftledning_v1.tif • NMD_markanv_anlagda_omr_v1.tif 	Value Count Class	Class according to Table 4 Number 10 x 10 m pixels Name of class according to Table 4

Table 2. Value, Name of class and definition for NMD Base Map.

Value	Class	Definition
111	Pine forest not on wetland	Tree-covered areas outside of wetlands with a total crown cover of >10% where >70% of the crown cover consists of pine. Trees are higher than 5 meters
112	Spruce forest not on wetland	Tree-covered areas outside of wetlands with a total crown cover of >10% where >70% of the crown cover consists of spruce. Trees are higher than 5 meters
113	Mixed coniferous not on wetland	Tree-covered areas outside of wetlands with a total crown cover of >10% where >70% of consists of pine or spruce, but none of these species are >70%. Trees are higher than 5 meters.
114	Mixed forest not on wetland	Tree-covered areas outside of wetlands with a total crown cover of >10% where neither coniferous nor deciduous crown cover reaches >70%. Trees are higher than 5 meters.
115	Deciduous forest not on wetland	Tree-covered areas outside of wetlands with a total crown cover of >10% where >70% of the crown cover consists of deciduous trees (primarily birch, alder and/or aspen). Trees are higher than 5 meters.
116	Deciduous hardwood forest not on wetland	Tree-covered areas outside of wetlands with a total crown cover of >10% where >70% of the crown cover consists of deciduous trees, of which >50% is broad-leaved deciduous forest (mainly oak, beech, ash, elm, linden, maple, cherry and hornbeam). Trees are higher than 5 meters.
117	Deciduous forest with deciduous hardwood forest not on wetland	Tree-covered areas outside of wetlands with a total crown cover of >10% where >70% of the crown cover consists of deciduous trees, of which 20 - 50% is broad-leaved deciduous forest (mainly oak, beech, ash, elm, linden, maple, cherry and hornbeam). Trees are higher than 5 meters.
118	Temporarily non-forest not on wetland	Open and re-growing clear-felled, storm-felled or burnt areas outside of wetlands. Trees are less than 5 meters.
121	Pine forest on wetland	Tree-covered areas on wetlands with a total crown cover of >10% where >70% of the crown cover consists of pine. Trees are higher than 5 meters
122	Spruce forest on wetland	Tree-covered areas on wetlands with a total crown cover of >10% where >70% of the crown cover consists of spruce. Trees are higher than 5 meters

Value	Class	Definition
123	Mixed coniferous on wetland	Tree-covered areas on wetlands with a total crown cover of >10% where >70% of consists of pine or spruce, but none of these species are >70%. Trees are higher than 5 meters.
124	Mixed forest on wetland	Tree-covered areas on wetlands with a total crown cover of >10% where neither coniferous nor deciduous crown cover reaches >70%. Trees are higher than 5 meters.
125	Deciduous forest on wetland	Tree-covered areas on wetlands with a total crown cover of >10% where >70% of the crown cover consists of deciduous trees (primarily birch, alder and/or aspen). Trees are higher than 5 meters.
126	Deciduous hardwood forest on wetland	Tree-covered areas on wetlands with a total crown cover of >10 where >70% of the crown cover consists of deciduous trees, of which >50% is broad-leaved deciduous forest (mainly oak, beech, ash, elm, linden, maple, cherry and hornbeam). Trees are higher than 5 meters.
127	Deciduous forest with deciduous hardwood forest on wetland	Tree-covered areas on wetlands with a total crown cover of >10 where >70% of the crown cover consists of deciduous trees, of which 20 - 50% is broad-leaved deciduous forest (mainly oak, beech, ash, elm, linden, maple, cherry and hornbeam). Trees are higher than 5 meters.
128	Temporarily non-forest on wetland	Open and re-growing clear-felled, storm-felled or burnt areas on wetlands. Trees are less than 5 meters.
2	Open wetland	Open land where the water for a large part of the year is close by, in or just above the ground surface.
3	Arable land	Agricultural land used for plant cultivation or kept in such a condition that it can be used for plant cultivation. The land should be able to be used without any special preparatory action other than the use of conventional farming methods and agricultural machinery. The soil can be used for plant cultivation every year. Exceptions can be made for an individual year if special circumstances exist.
41	Non-vegetated other open land	Other open land that is not wetland, arable land or exploited vegetation-free surfaces and has less than 10% vegetation coverage during the current vegetation period. The ground can be covered by moss and lichen.
42	Vegetated other open land	Other open land that is not wetland, arable land or exploited vegetation-free surfaces and has more than 10% vegetation coverage during the current vegetation period.

Value	Class	Definition
51	Artificial surfaces, building	A durable construction consisting of roofs or roofs and walls and which is permanently placed on the ground or partly or wholly below ground or is permanently placed in a certain place in water and is intended to be designed so that people can stay in it.
52	Artificial surfaces, not building or road/railway	Artificial open and vegetation-free surfaces that are not building or road/railway.
53	Artificial surfaces, road/railway	Road or railway.
61	Inland water	Lakes or water-courses.
62	Marine water	Sea, ocean, estuaries or coastal lagoons.
0	Outside mapping area	Outside the borders of Sweden and the Exclusive Economic (EEZ) Zone

Table 3. File name, value and class for the complementary layer Object Height and Extent.

<i>File name</i>	<i>Value (code)</i>	<i>Class (height, meter)</i>
Objekt_hojd_intervall_0_5_till_5_v1_3.img	1	0,5 – 1
	3	1 – 3
	5	3 - 5
	255	No Data
Objekt_hojd_intervall_5_till_45.img_v1_3.img	10	5-10
	15	10-15
	20	15-20
	25	20-25
	30	25-30
	45	>30
255	No Data	
<i>File name</i>	<i>Value (code)</i>	<i>Class (density, %)</i>
Objekt_tackning_hojdintervall_0_5_till_5_v1_3.img	5	0 - 5
	10	5 – 10
	20	10 -20
	30	20 – 30
	40	30 – 40
	50	40 – 50
	60	50 – 60
	70	60 – 70
	80	70 – 80
	90	80 – 90
	100	90 – 100
	255	No Ddata

Objekt_tackning_hojdintervall_5_till_45_v1_3.img.	5	0 - 5
	10	5 - 10
	20	10 - 20
	30	20 - 30
	40	30 - 40
	50	40 - 50
	60	50 - 60
	70	60 - 70
	80	70 - 80
	90	80 - 90
	100	90 - 100
	255	No Data

Table 4. Value, Name of class and file name, in which the class is present in the NMD complementary layer Land Use.

Value	Class	Class is present in:
0	No Data	All files
1	Airports, airfields	nmd_markanv_anlagda_omr_v1.tif
2	Cemeteries, graveyards, burial grounds	nmd_markanv_anlagda_omr_v1.tif
3	Gravel-, rock-, mineral coverage	nmd_markanv_anlagda_omr_v1.tif
4	Peat	nmd_markanv_anlagda_omr_v1.tif
5	Quarries, mines	nmd_markanv_anlagda_omr_v1.tif
6	Pastures	nmd_markanv_bete_v1.tif
7	Power lines	nmd_markanv_kraftledning_v1.tif
8	Gardens, allotments	nmd_markanv_anlagda_omr_v1.tif
9	Camping grounds	nmd_markanv_anlagda_omr_v1.tif
10	Golf courses	nmd_markanv_anlagda_omr_v1.tif
11	Ski resorts	nmd_markanv_anlagda_omr_v1.tif
12	Speedways	nmd_markanv_anlagda_omr_v1.tif
13	Other sport facilities	nmd_markanv_anlagda_omr_v1.tif
14	Dumps and recycling depots	nmd_markanv_anlagda_omr_v1.tif

3 Availability

3.1 Via Download

The products can be downloaded per county or as a complete coverage of the entire country. In addition to the desired raster data, documentation, legends and metadata are also included – although the text is in Swedish.

Links to the available downloads are possible via the metadata and NV's Home page, see <http://www.swedishepa.se/State-of-the-environment/Maps-and-map-services/National-Land-Cover-Database/Download-the-National-Land-Cover-Database/>

3.2 Webb Mapping Service

The Land Cover Database is available via a WMS. This includes layers for the Base Map, Forests in Mountainous Regions and Productivity. The database connection to this service is:

http://gis-services.metria.se/arcgis/rest/services/nv/InspireNV_NMD/MapServer/exprts/InspireView/service?