

A national method for landscape identification required as a common basis for landscape analysis at national, regional and local levels.

In Norway, we have identified and analysed landscape based on multiple needs and by using various approaches for decades. To support this it has been made guidelines for various assignments such as landscape management and assessment in municipal planning and for the establishment of wind farms.

There is an increasing need for detailed information about landscapes and the impact of a measure on a particular landscape for use in both local and regional management and planning.

This need for knowledge and for identifying and analysing the landscape is related to the increased amount of conflicts associated with different landscape changes happening in growing speed.

Landscape values currently have little impact on decision-making, although the Planning and building act in Norway states that the effect for the landscape should be emphasized. We need more systematic knowledge of the diversity we have in the Norwegian landscape to know what is

- Rare/unique
- Common/representative

Despite that it throughout years are used considerable resources on landscape identification in Norway, is it still not possible to say how rare or common, typical or representative different kind of landscape are. The cause for this is that there is no explicit classification in landscape types as a basis for the landscape identification.

By ratifying the Landscape convention, Norway has committed itself “*to identify its own landscapes throughout its territory*”, and “*to analyse their characteristics and the forces and pressures transforming them*”

It is a point that the Landscape convention Article 6c distinguishes between identification and analysis, and both elements are essential to achieve good planning and management of the territories. I will – because the time is limited - concentrate my presentation on the work to be done to further develop the methodology for landscape identification in Norway and to establish a common database for landscape.

It is important to point out that in Norway the landscape identification are carried out in a number of phases

- **Identification of the various landscape types** constitutes the 1st phase, where there is carried out a survey with the aim of a systematic description of the variations in landscape.
- **The landscape analysis and assessment** constitutes the next two stages, where there is carried out an analysis of selected characteristics of the landscape assessed in relation to a clearly defined purpose / intended use.

With the identification of landscape types do we mean "identification with the aim of systematic description of regional variation in the landscape" It is assumed that landscape type identification will serve as a knowledge base and a benchmark for the management, planning and monitoring of landscape and land use. The identification will make visible regional characteristics of the different main types of landscape and it is assumed that the identification will form the basis for a national database of knowledge about landscape.

In Norway, public knowledge databases have been a milestone regarding to safeguard interests relating to cultural heritage, biodiversity, and a variety of other important environmental values in community planning. A database for landscape is therefore likely to be of great practical importance for spatial planning, regional and local planning and will be of great use in the assessment of single measures, whether for the protection, other management or development.

Some basic conditions must be in place to build such a database. There need to be developed a common methodological platform for landscape identification. The procedure has to be systematic enough that it can be done comparing assessments of landscape values within major regions. The method must furthermore be flexible enough that the identification may be applied to many different purposes.

Landscape identification to use in a database is therefore something else than landscape analysis, where the objective is to assess selected characteristics of the landscape in relation to a clearly defined purpose / intended use. The landscape identification should act as a neutral and verifiable knowledge base for the more specific landscape analysis adapted to many different purposes. The landscape analysis shall be decision relevant for one or more defined issues.

Norway is characterised by considerable local variation in topography, geology and climate. The environmental conditions change rapidly over short distances. Because of this the Norwegian land area is a mosaic of different landscapes. To meet the need of a landscape typology, it is determined that the landscape section in the division of Norwegian nature types (NiN) will be developed into a typology that is suitable for identification at a scale 1 to 50.000, the scale most commonly used for landscape identification in Norway.

A project was initiated in 2011 in Nordland under the auspices of The Norwegian Biodiversity Information Centre and Nordland County. It aims to systematize the knowledge on landscape variation. This systematized knowledge is then used as a basis for drawing up a section of landscape types, first for Nordland and then for all of Norway.

The Identification methodology for the various landscape types is largely a development of the "National Reference System for Landscape" which was developed by The Norwegian Forest and Landscape Institute in the 1990s, but with some important differences. The main thing is that the new computer technologies have made it possible to describe the landscape at this level of detail. The national reference system from the 1990's was based on the use of qualitative assessments and extensive use of professional judgment. The system has been used to describe the landscape variations in a large scale. Landscape identification at the most detailed level, which is a necessary requirement for it to be a relevant knowledge base in planning, however, has shown very time- and resource-intensive.

In the selection of which landscapes to identify we looked at the landscape definition in the convention, which states that "*Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*"

This we had to give an interpretation as the foundation for a new landscape typology for Norway.

- '*as perceived by people*' We search for characteristics that are observable at a relevant scale.
- '*as perceived by people*' – we search for general aspects in the variation in the landscapes characteristics.
- '*natural and/or human factors*' that are observable, will together form the basis for the landscape type classification

The interpretation excludes cultural references and intangible properties - this have to be captured by the identification of landscape character and value.

In accordance to tradition for Norwegian landscape analysis should subareas initially be 4 km² large or particularly eye-catching.

The methodology has landscape types on two levels. That is;

- Main types - landscape based on landform. Made to facilitate identification at a scale 1 to 500.000
- Basic types - landscape based on landform and the landscape content of elements and attributes. Made to facilitate identification at a scale 1 to 50.000

While landform and formation way are the main criteria for the classification of landscape types at coarse scale (Main types - Landscape), there are a variety of other characteristics of the landscape that will have an impact when landscape variation on a finer scale are to be described (Basic types - Landscape).

Landscape type classification of NiN version 2.0 should therefore contain a basic typology based on variation in vegetation, lakes and watercourses, buildings and land use (occurrence and area coverage of various natural systems and landscape parts), which together describe cultural character and spatial relationships and have great impact on the landscape character

First phase in the efforts to develop a more detailed landscape typology was a systematic investigation of the factors that create variation in the landscape at different scale levels. The first part in this phase was a survey in Nordland County in 2011-2013, which included all landscape in the county, from central cityscape to peripheral coastal and mountain landscape. It processed all observable characteristics within natural geography, ecology and cultural subjects and looked also at how these properties affect the spatial-visual characteristics (how the landscape is perceived).

The main focus was to identify patterns of variation, and to understand the processes that cause these patterns. In order to identify such patterns and relationships are multivariate statistical methods used. These methods have been used in vegetation ecology for more than fifty years, as the basis for the division of vegetation types and habitat types (and which is also used in many other disciplines). But while vegetation ecology focus is how the variation in vegetation (composition of species and quantity allocation between species) correlates with the variation of environmental factors, are there other relationships and patterns we want to identify in terms of landscape.

The work of division into landscape types were based on three steps:

1. Systematic collecting knowledge about the variation in landscapes in Nordland on the basis of
 - 258 observation units up to 5×5 km in size
 - 279 landscape variables recorded for each observation unit
 - Cartographic data, interpretation of aerial images, field work
2. Statistical processing of the data material with the aim of finding patterns and relationships in how the landscape contents and characteristics vary together and separately
3. Draw up, on the basis of the analyzes in the preceding steps, a landscape typology that as completely as possible describes the landscape variety and that is suitable for landscape identification at a scale 1 to 50 000

Localization of the observation units has taken place by specific criteria. Simplified we can say that they are drawn out randomly within each main type of landscape, but with additional requirements that ensure that the variation in some clearly important landscape characteristics in Nordland are captured. This is for instance variation from city to countryside, from coastal to inland and in the degree of utilization for agricultural purposes. Only the part of each square which belongs to the dominant landscape main type in the square, are included in the same observation unit. The observation units will therefore vary in size.

In each observation unit, all the characteristics of the landscape that may conceivably have an impact on the landscape character are registered in a standardized way. Data for the natural geographical, ecological, cultural historical and spatial-visual variables that are to be registered will be collected from three different sources:

- existing area statistics / digital map data
- interpretation of aerial images and / or non-digital maps
- registrations in the field

There was created and filled out a registration form for each of the 258 observation units. Then they gathered the registrations from all observation units in one large table. Based on this data material

became a first draft for a landscape typology for Nordland prepared, and a map of the county in scale 1 to 50 000 showing 3056 areas divided on 50 landscape types is made.

Further development of the landscape type's classification to include all of Norway's territory requires that it is complemented with data from the rest of the country and new analyzes. Efforts are being made to get this funded.

The national landscape typology / classification of landscape types makes it possible to start using the concept of landscape diversity, and provides the opportunity to identify (and documenting) rare / unique landscape, representative landscapes and whether a landscape is a strong or weak version. Furthermore, it will be a tool to monitor and describe the condition of landscapes, monitor landscape changes and form a knowledge base for landscape analysis.

A national identification of landscape types will be the knowledge base for:

- Identification of the landscape character
- Value assessments
- Vulnerability assessments
- Impact assessments
- Suitability Ratings
- Indication of important biodiversity
- Cultural historical analysis
- Evaluation of intervention status (Wilderness)
- Mapping of outdoor interests
- Municipal land use planning
- Strategic land use planning / major infrastructure projects
- Monitoring the condition and landscape changes

Efforts are being made to establish a database for knowledge about the landscape based on the results of the methodological development and the work on a landscape typology / classification of landscape types for Norway. Here it will be requirements to both the methodology used for the landscape identification and the format of the information delivered. The database will contribute to fulfilling key objectives of the European Landscape Convention, namely

- Article 5c Participation
- Article 6a Awareness-raising
- Article 6b Training and education
- Article 6 c Identification and assessment

We aim to finance landscape identification with classification and delimitation of landscape types and landscape areas for Norway to be used for the following purposes:

- Identification of important landscape values
- Identification of important natural assets (landscape types will be an important indicator for Others biodiversity)
- Monitoring land use and landscape changes
- Knowledge base for conservation targets and management of national parks and larger protected areas
- Assessment of the individual landscape types vulnerability to various landscape changes and measures
- Knowledge base in impact studies for landscape
- Knowledge base for assessing the suitability for localization of various land use functions
- Knowledge base in natural geographic analyzes and cultural historical analyzes
- Suitable units for assessment of intervention status
- Suitable units for surveying outdoor activities
- Knowledge base in strategic spatial planning and regional planning