

This is Forestand

Forestand is a standard for data on forest and forest management. The standard will help all parties in the forestry sector speak the same language and facilitate communication.

Standard for data on forest and forest management

Data standards are needed to ensure efficient digital exchange of information. Swedish forestry is no exception. For many years, standards have been applied in areas such as timber measurement information and for communication with computers in forest machines.

The latest addition to sector-specific standards is the SIS standard *Geographic information - Data on forest and forest management* (SS-637009), abbreviated to Forestand.

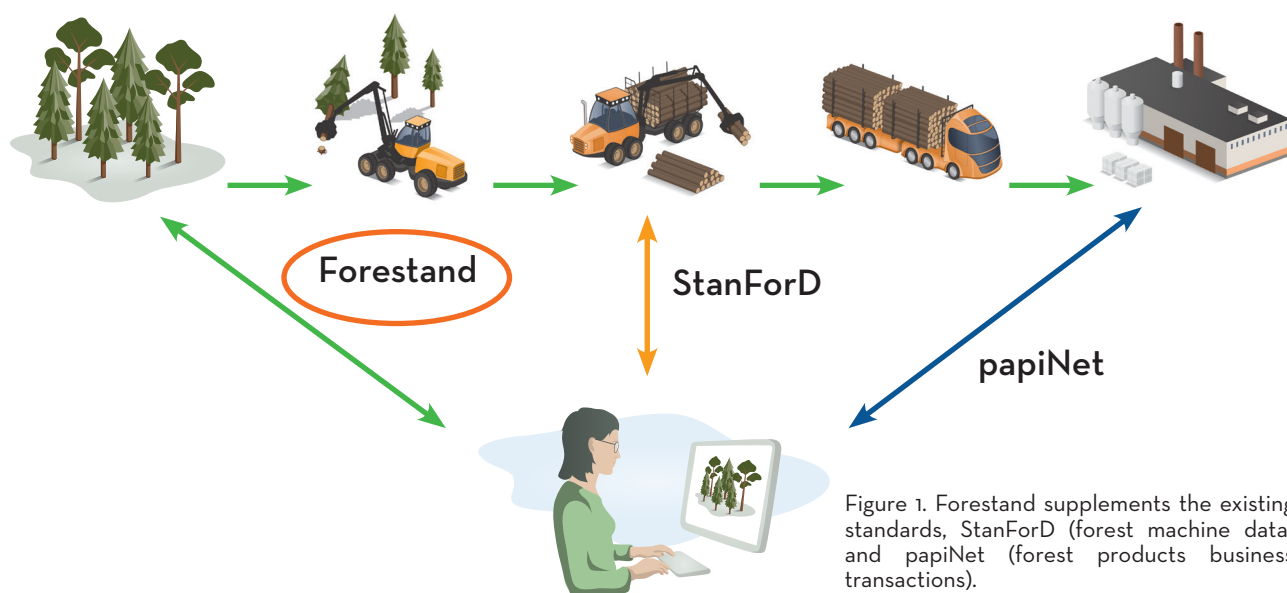


Figure 1. Forestand supplements the existing standards, StanForD (forest machine data) and papiNet (forest products business transactions).

Describes standing forest

Forestand performs the function of organising information of the type found in forest management plans, stand registers, and similar. Typical concepts included are stands, sites, nature consideration, forest management activities, and even individual

trees. One clear difference in comparison with other standards is that Forestand completely lacks concepts for describing the harvested timber. In popular terms, it can be said that Forestand concerns descriptions of the standing forest, not the felled forest.

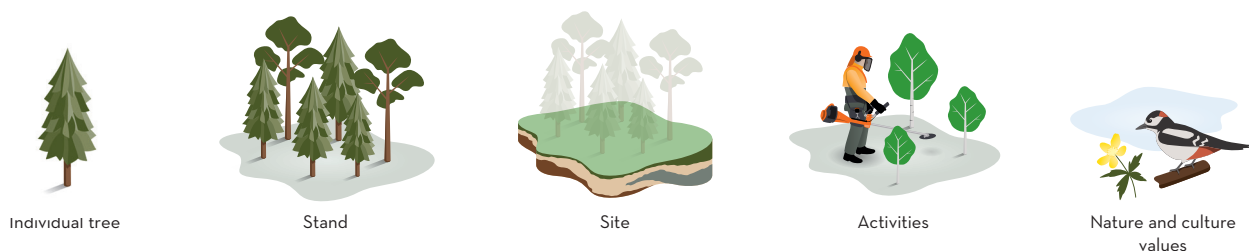


Figure 2. The overall phenomena that can be described with Forestand .

Ensures consistency in concepts and definitions

It would be easy to assume that the most important function of the standard is the technical representation of data, i.e. how the systems will write and read data to enable communication. However, the cornerstone of the standard does not lie there, but rather in the definitions of concepts that the standard expresses or refers to, and how the standard stipulates that they will relate to one another.



Figure 3. The standard is based on a collection of concepts and their definitions .

The importance of definitions is clear to anyone who has worked with conversion of data between different registers. For example, what does ‘other broadleaves’ actually mean? Does it include birch? Does the definition refer to the arithmetic mean height or basal area weighted height? Do ‘area reductions’ only concern nature consideration, or do they also include roads? Must stands and sites have the same geometry? What does ‘planning year’ mean? These types of questions have undoubtedly arisen in many of the conversion projects that have taken place over the years. The question that is really being asked is: what did the person who created the information mean? Consequently, it does not help if our systems can communicate in purely technical terms if we as humans are not in consensus about the terms and definitions expressed in the language used by the computers.

Structure

Place

Forestand is a geographical standard. This means in practical terms that all information has some form of geographical placement. This is why the key concept in the standard is the term ‘place’.

Place has a number of variations, the most common being points, polylines and polygons. But there are also places observed on the basis of where they are situated in relation to another place (for example, ‘somewhere within’). One particular type of place is ‘compartment’. The term is normally used for an overall division of a parcel, and must therefore always have a land use class.

Observations

Data that describes stands or sites is primarily processed through ‘observations’. Typical observations for stands are volume, basal area or mean diameter and, for sites, slope, soil moisture and vegetation type. Some observations are numerical, while others have a unit. Others can divide a characteristic on the basis of a number of classes in a ‘code list’. In more complex cases, the observation is both divided into classes and is numerical (such as site index). Observations may also include free-text descriptions.



Individual tree	Tree population	Site object
Tree species	Dominant tree species	Ground vegetation type
Height	Dominant height	Soil type
Diameter	Diameter distribution	Target class
Tree damage	Stand damage	Slope

Figure 4. Some examples of observations.

The term 'observation' implies that the same characteristic can be measured or estimated using several different methods or on different occasions, with different results possible. Observations can be used together with the concept of 'inventory'; see below.

Observation object

Data relating to a stand can apply to all trees, but can also apply to a selection of the trees. For example, it is common to state the volume for a certain tree species or number of stems for a certain layer. The standard has a solution for describing such a sample, which is called an 'observation object'. All observations always concern a specific observation object.

Observation objects were designed for use with stand data but, for consistency, the concept of observation object is also used for sites and for individual trees.

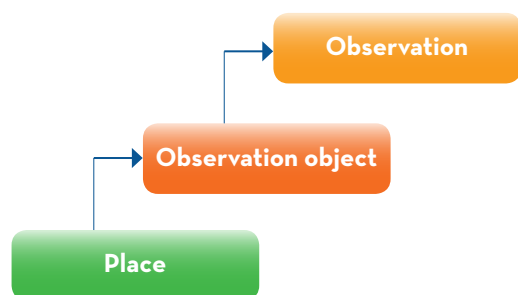


Figure 5. Observations concern an observation object that concerns a place .

Activities and forestry occasions

Forestand applies a traditional basic division of activities. There is a set of main types, such as felling, thinning or regeneration activities. These are then divided into another level, enabling more specific information about the type of activity involved. The standard also contains code lists to enable further categorisation.

Each type of activity has a series of attributes that contain a certain type of information. For example, for felling activities, harvesting can be specified, while for fertilisation, amount applied per hectare can be stated. Some attributes are common to all activity types, such as date of activity and activity status.

Activities are grouped using the concept 'forestry occasion'. This makes it possible to describe the period in which the activities will take place and in what order.

Factors

In the standard, different types of conditions affecting forestry are called 'factors'. Such factors include nature, culture, water and social values. While these are mainly used to describe different types of values, and consideration taken to these values, the concept 'other factors' is useful for describing all possible features, such as roads, boundaries and landings. There is also a special factor intended to describe conditions relating to reindeer herding.

In the same way as for observation object, factors always concern a place.

Inventory

The concept 'inventory' is used for storing information about how the data has been collected. This can be information about who has carried out the inventory, when it was done, and the method used. The connection between collected data and inventory information is determined either indirectly, by noting where the inventory is placed in the data structure, or directly from each place, observation object or observation.

A typical application of the inventory concept is to state the inventory year and projection date for a forest management plan.

Possibilities for adaptation

Forestand is a more flexible standard than StanForD. This means that a message can be adapted to a particular application. The standard stipulates that all such adaptations must be made according to a special agreement. An agreement is intended to regulate matters that are not considered in the standard, and can be drawn up between two or more parties..

In certain cases, it may be practical to draw up temporary agreements, or agreements that only certain parties are aware of. This could apply, for example, to major migration projects implemented on individual occasions. However, in most cases, it is beneficial if agreements can be made general, thereby enabling use by many parties without special adaptations.



Figure 6. General agreements are available on forestand.org. Skogforsk is responsible for these agreements and for all other content on the page.

Skogforsk has taken on the role of drawing up and managing general agreements where necessary. A typical example is a general agreement for stand registers, used for sending information in forest management plans. Some examples of rules that are included in general agreements:

- How area reductions from polylines are to be expressed
- Which places must be present
- Which types of places can have observation objects

Individual code list

Code lists are the lists of alternative values that a certain attribute can have. Examples of code lists can be different soil moisture classes, tree species or land use classes. Some code lists are fixed in the standard, while others can be changed, expanded or replaced with individual code lists, providing this is shown in the agreement. One reason for using individual code lists can be that, in certain cases, a different resolution may be needed in the description. Another can be that the standard quite simply lacks a code list for certain attributes.

Forestand shows an approach for using individual code lists, with reference to other standards intended for this purpose. In the same way as for agreements, Skogforsk has assumed responsibility to manage certain code lists included in the general agreements and/or that are deemed usable within the framework for other agreements.

Mikael Lang, Project Manager, pcSKOG

“A standardised way of handling information is positive. Not least for our clients, who can easily collect data and share it with other companies. Previously, we’ve built up our own procedures for this, but we no longer need to do this work, which is practical and saves time.”

Magnus Bäck, Production Manager, Foran

“Creating a common standard for forestry is obviously very positive. Since we got the conversion between the shape-format and Forestand in place, it’s made our work considerably easier. It means there are fewer steps between receiving files from the client, through processing, to delivery.”

Magnus Lewenhaupt, Project Manager Orsa Besparingsskog

“Forestand has made it much easier to share information. It makes things easier in every stage if we all speak the same language. We also save money, because avoiding all the conversions and special adaptations means less work.”

Technology

The computer language used is XML, which is also a standard. Another standard used is GML, which in simple terms is based on expressing geographical information within the framework for XML. A third key technology is the XML schema. The XML schema can be used to create rules to ensure that files can be checked by a computer system.

Together, these standards form a framework that can be used to efficiently reformulate the definitions and concepts presented in Forestand into digitised information.

Management of Forestand

Forestand is managed by SIS (Swedish Institute for Standards). Changes in the standard require a formal decision to be taken in a special SIS technical committee. From 2018, the Forestand technical committee comprises representatives from Skogforsk and a project manager from SIS.

In practice, continual development of the standard is brought about by users expressing needs. Skogforsk ensures awareness of needs by:

- offering a continual support function
- arranging workshops
- disseminating information

XML schema, code lists and general agreements are managed by Skogforsk and are available on www.forestand.org