



Arlinger John

19 June 2024

Minutes StanForD

2024-06-19

Place:	Teams, 2024-06-19, 10:00-14:00 CET
Participants:	John Arlinger, Secretary Johan J. Möller, Chairman Tapio Räsänen, Metsäteho Timo Melkas, Metsäteho Aapo Koskela, LogSet Antti Korkiakoski, JohnDeere Bobby Szwajkowski, Tigercat Etienne Pilon, Logmax Canada Fredrik Tjernberg, Komatsu Henrik Persson, LogMax Ian Wilson, Forest PHD Janne Pursiainen, Ponsse Jeremy Gibson, Forest PHD Jakko Mäkinen, Technion Jean-Phillippe Gaudreau, FP Innovation Jonas Gustafsson, Sveaskog Lars-Erik Andersson, DASA Magnus Hansson, SP Mike O'Shea, Coillte Martin Whillans, Skogforsk Nicklas Nygård, LogSet

Decision summary

Decided to do the following schema updates:

- **Version 4.1.** It was decided to release version 4.1. during the fall of 2024. Probably in conjunction with the meeting in November.
It has previously been decided to clearly state at the web site that any one

today developing support for version 4 should focus on 4.1 and thus avoid 4.0. Basically the 4.0 should be viewed as deprecated.

- **Multi-Tree measuring control in harvesters.** It was decided to update both hqc and hpr.
- **Description of AccuracyCoordinate.** It was decided to update the description in order to clarify that this element describes the horizontal accuracy.
- **Invalid XML characters.** GeoJSON allows some characters that will destroy an xml-structure such as &, < and >. It was decided to recommend the use of XML escaping by updating the description of elements MultiPointGeoJSON, MultiLineGeoJSON and MultiPolygonGeoJSON
- **Old hpr versions and new bark functions.** It was decided not to do any structural updates to the bark function in hpr-files as we hopefully will not add any new bark functions in the future and therefore do not solve any problems by adding a new layer of complexity

Conclusions from discussions:

- **RelativeLimitationMatrix in pin.** It was decided to postpone the decision to the next meeting when Ponsse has carried out some practical tests.
- **Membership agreement/framework.** A draft proposal will be presented at the next meeting and finalized until the meeting in November.

Action list:

- Recommended that unclassified products are reported per SpeciesGroup.
- Recommended that the diameter vector and DBH is adjusted if a short log (butt-off) is completely excluded from the hpr.
- Recommended that by default all butt-offs from single tree processed stems should be registered independently of length.

§1 Opening of meeting and agenda

Chairman Johan J Möller opened the meeting.

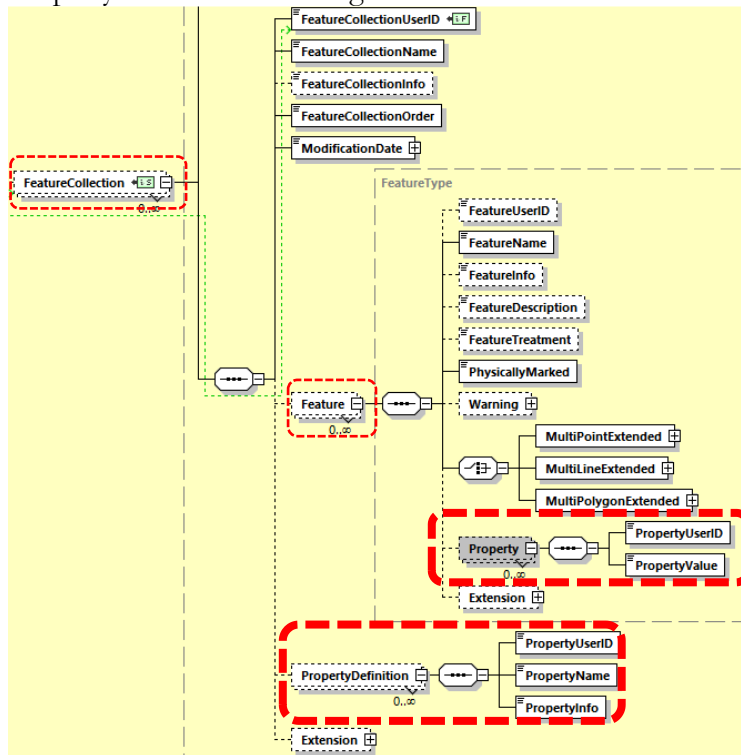
The agenda was accepted.

§2 Presentation of participants

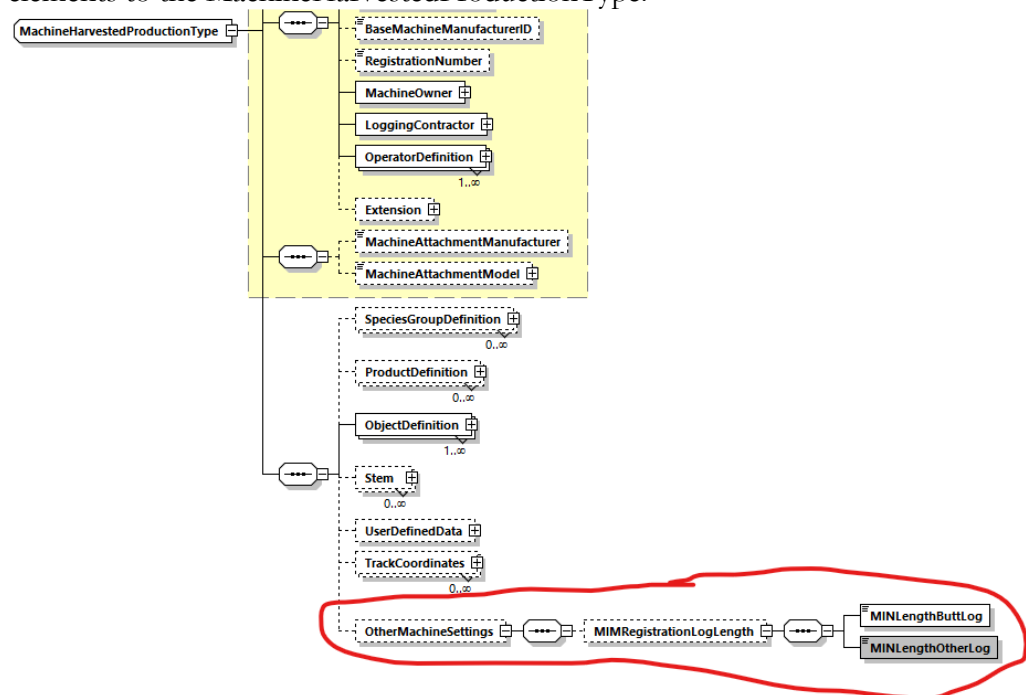
Presentation of meeting participants.

§3 Information about decisions and discussions at previous meeting

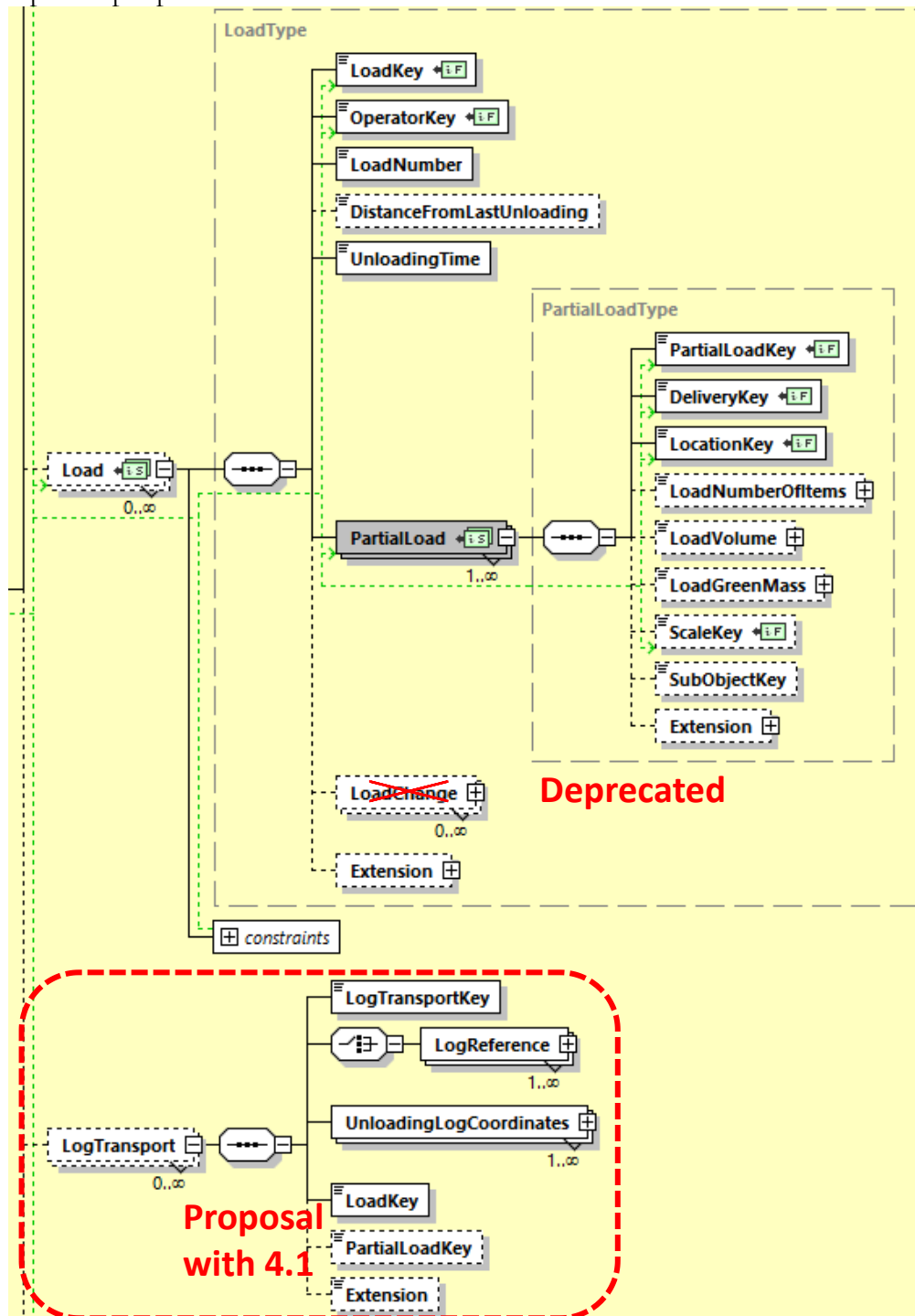
- **Property in ogi.** It was decided to add new elements Property and PropertyDefinition to the ogi 4.1.



- **MINRegistrationLogLength.** It was decided to add MINRegistrationLogLengthButt and MINRegistrationLogLengthOther elements to the MachineHarvestedProductionType.



- **LogTransport in fpr.** It was decided to add a new LogTransport structure to the fpr-file where log identities and pile coordinates can be reported per partial load.

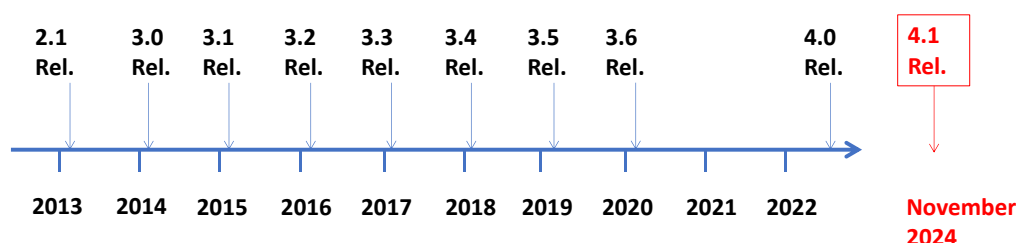


- **UserID description.** Decided to update the description of UserIDs according to the following text: *Identity per product defined by user of data, normally logging organisation Do not use a single space or null value. Do not begin or end with a space. Do not include any of the following characters: Double space, Linefeed, carriage return, %, ?, lt, gt, :, " (double quote), /, \, |, *, +.*

- **Version 4.1.** It was decided to release version 4.1. during the fall of 2024
 - It was decided to clearly state at the web site that any one today developing support for version 4 should focus on 4.1 and thus avoid 4.0. Basically the 4.0 should be viewed as depreciated.
- **Presentation Order.** It was decided to update rules 3.3 and 3.8. This means that re-sorting of Products and Deliverys in the machine does not trigger a new Key.

§4 Future frequency of StanForD updates

The figure below illustrates the timeline for publishing all versions since 2.1.



The goal is to release version 4.1. during the fall of 2024 as we now have several significant updates proposed such as coding of features in the ogi and the new log positions and IDs in the fpr-file. We will therefore have an additional meeting in September and a final decision to publish version 4.1 in November

It was decided at the previous meeting to clearly state at the web site that any one today developing support for version 4 should focus on 4.1 and thus avoid 4.0. Basically the 4.0 should be viewed as depreciated.

§5 Reporting of issues related to version 4.0

No new errors or bugs to report on.

§6 New proposals

MULTI-TREE MEASURING CONTROL IN HARVESTERS

Introduction

There is a need for controlling and correcting the estimated volumes registered for felled and multi-tree-processed stems as the present estimation methods often give systematical errors depending on the DBH distribution of the forest and the method used by the individual operator. This is an important issue in cases where a significant proportion of stems are multi-tree processed as is often the case in first thinnings. This is especially true when harvester data is used for paying the forest owner.

Skogforsk, coordinated by Martin Whillans, has therefore developed and tested a method for control and possible correction of these volumes. A consequence of this work is a proposal for updating hqc-files as described below in order to report control data where a multi-tree-felled bunch is control measured by processing the individual stems. The proposal also makes it possible to report a corrected volume for multi-tree-processed logs.

Method

The method for collecting control data can be described with the following steps:

1. Random selection of MTP-bunch
 - a. Random frequency settable in controller. Frequency indicates the number of stem bunches between the controls.
 - b. Possible to turn on or off in controller
2. Stems released from harvester head
3. Stems in felled bunch processed individually
4. MTF and STP data registered in hqc-file
 - a. Correction factor (CF) calculated (MTF volume/STP volume)
5. STP data reported in hpr-file.
Observe that no MTF nor MTP volumes are registered in the hpr-file.
6. All MTP-volumes registered in hpr are corrected based on average CF for last 30 control bunches.
 - a. A corrected volume is only corrected once, meaning that the corrected volume of a stem or log is never changed in the harvester.
7. Corrected MTP volumes stored using enumeration "m3subEstimated" in hpr-files with new elements "EstimatedVolumeCorrected" (value true) and "CorrectionFactor" in order to indicate that the volume has been corrected based on control data.

The method could, from an operator perspective, also be described using the following steps:

1. Operator has a MultiTreeProcessing bunch in the harvester head.
2. The head is tilted down
3. Operator is notified by the controller that the bunch is to be control measured (“it is a control bunch”).
4. The bunch is released and the real number of stems is confirmed by the operator.
 - a. Or the operator verify that the last control stem has been processed in step 5 below.
5. Each stem in the bunch is processed separately.
 - a. The stems are registered as SingleTreeProcessed stems in the hpr.
 - b. The sems are registered as both MultiTree and SingleTree stems in the hqc-file.

Observe that the correction factor is suggested to be independent of species, meaning that the same factor is used for all bunches. Including species as a

determining factor would increase the complexity significantly but with unknown benefits.

Randomization and rejection

Based on the experiences from implementing and using control measurements of STP stems it is suggested that we keep the randomization as simple as possible in this first proposal-

In order to not make the volume correction of multi tree handling too complex it is suggested that that rejected control bunches are simply registered as MTP or MTF bunches. The reason for rejection is thus not registered at all.

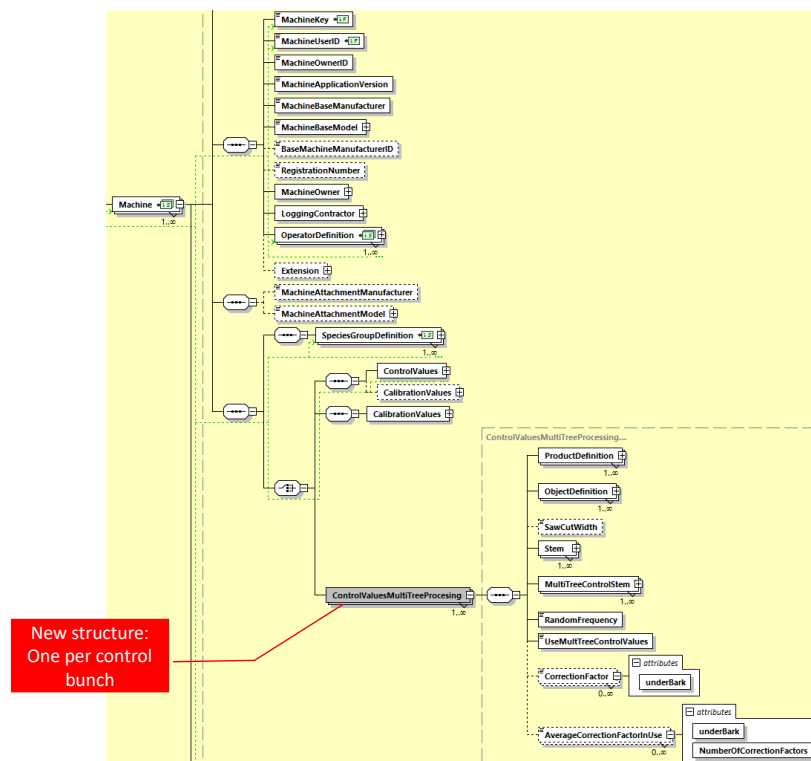
The randomization of control bunches could be done so that the interval between different bunches is constant, for example every 100 stem bunch is selected for control.

This fairly simple solution could be modified in the future depending on the experiences from practical implementations.

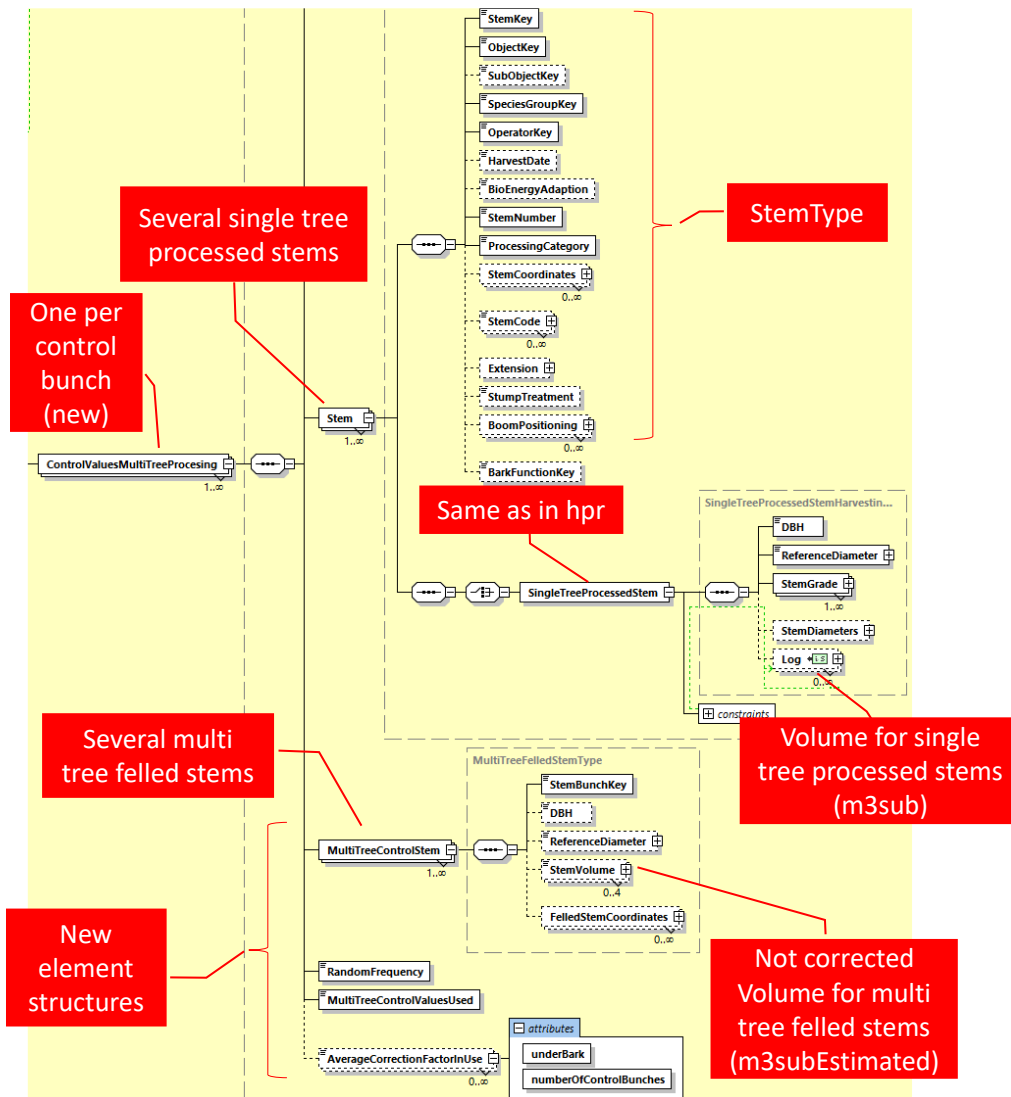
No SingleTreeProcessed stem is to be randomly selected for a “normal” measuring control stem when processing a control bunch. This means that the randomization is “turn off” during processing of control bunches.

Hqc proposal

It was decided to add a new structure “ControlValuesMultiTreeProcessing” to the hqc according to the figure below. This means that a new type of hqc is implemented on top of existing “control value hqc” and “calibration value hqc”.



Detailed illustration of the new hqc structure below:



Correction factor = $0.076 / 0.042 = 1.81$

Hpr proposal

StemCode

Extension

StumpTreatment

BoomPositioning

BarkFunctionKey

SingleTreeProcessedStem

MultiTreeProcessedStemType

StemBunchKey

ReferenceDiameter

StemGrade

LogHarvestedProductionType

LogKey

ProductKey

LogVolume

CuttingCategory

DiameterSectionProduction

TopCoring

FuelBeltFunction

LogCoordinates

DisruptedMeasuring

Extension

LogMeasurement

EstimatedVolumeCorrected

VolumeCorrectionMultiTreeProc

AverageCorrectionFactor

Attributes: underBark, numberOfControlBranches

Legend:

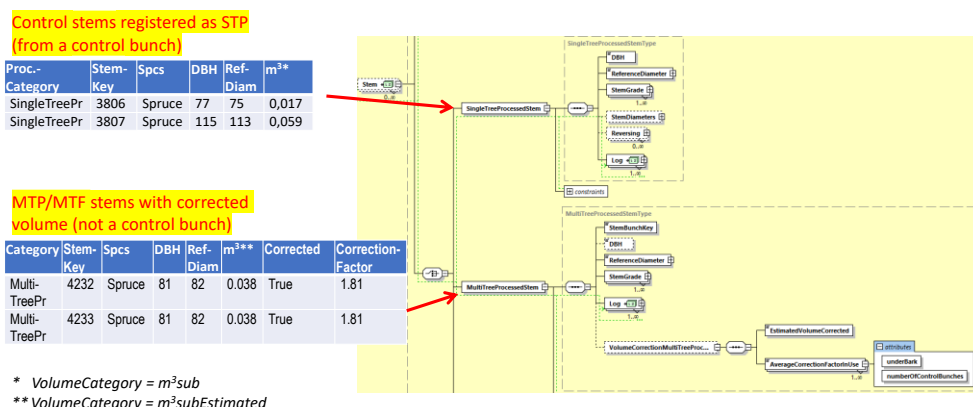
- m3 (price)
- m3sob
- m3sub
- m3 (price) Estimated
- m3sobEstimated
- m3subEstimated

Boolean element "EstimatedVolumeCorrected"

Decimal element "CorrectionFactor"

10

below includes a “normal” MTP bunch which has a corrected volume with the correction factor 1.81.



New elements and attributes in hqc and hpr

It was decided to add the following new elements to hqc:

Name	Data type	Unit	Description
ControlValues-MultiTreeProcessing			Structure for reporting MultiTreeProcessing control data. No manual measurements from caliper included.
MultiTreeControlStem	MultiTreeFelled-StemType		Structure for storing control data as MultiTreeFelled stems
RandomFrequency	nonNegativeInteger	no	Sampling interval for random selection of control bunches. The frequency should mean the average number of stems, between random sampled control bunches. The unit should be no of stem bunches
MultiTreeControlValues-Used	Boolean	True/False	Indicating if control bunch is used in calculation of average CorrectionFactor.
AverageCorrection-FactorInUse	PositiveDecimal		Average correction factor for last control bunches of stems. Number of stems used for calculating the floating average is registered in attribute numberOfControlBunches. Suggested default value is 30.
underBark	Boolean	True/False	CorrectionFactor for volume under or over bark.
numberOfControlBunches	positiveInteger	no	Number of stem bunches used for calculating the floating average. Suggested default value is 30.

Observe that the Stem-element under ControlValuesMultiTreeProcessing is based on existing StemType and SingleTreeProcessedStemType.

It was decided to add the following new elements to hpr:

Name	Data type	Unit	Description
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VolumeCorrection-MultiTreeProcessing			Structure for reporting whether and how volumes from MultiTreeProcessed stems have been corrected.
EstimatedVolumeCorrected	Boolean	True/False	Stem volume corrected with correction factor
AverageCorrection-FactorInUse	PositiveDecimal		Average correction factor for last stems. Number of stems used for calculating the floating average is registered in attribute numberOfControlBunches. Suggested default value is 30.
underBark	Boolean	True/False	CorrectionFactor for volume under or on bark.
numberOfControlBunches	positiveInteger	no	Number of stem bunches used for calculating the floating average. Suggested default value is 30.

DESCRIPTION OF ACCURACYCOORDINATE

Description of attribute accuracyCoordinate is:

Accuracy value of position, in unit meter. Observe that the exact calculation method for this attribute is not defined at present.

It has been noted by the secretary that both vertical and horizontal accuracy can be calculated. It is assumed that the basic idea was to use this attribute for the horizontal accuracy.

It was therefore decided update the description according to the following text:

***Horizontal** accuracy value of position, in unit meter. Observe that the exact calculation method for this attribute is not defined at present.*

CDATA IN GEOJSON (NON VALID CHARACTERS)

Originally proposal based on discussion with Fredrik Tjernberg, Komatsu.

GeoJSON allows some characters that will destroy an xml-structure such as &, < and >. This means that we run the risk that the recently added elements MultiPointGeoJSON, MultiPolygonGeoJSON and MultiLineGeoJSON might cause problems. The following example would make the whole ogi-fil in-valid since it includes the "&" character:

```
<MultiPointGeoJSON> {
  "type": "Feature",
  "geometry": {
    "type": "Point",
    "coordinates": [-90.071532, 29.951065]
  },
  "properties": {
    "name": "Problems & solutions"
  }
}
</MultiPointGeoJSON>
```

One important reason for considering this issue is that the GeoJSON string is often generated by an external unknown application.

A common solution for this problem is to enclose a string within a so called CDATA section. This means that the following example is valid:

```
<MultiPointGeoJSON><![CDATA[{
  "type": "Feature",
  "geometry": {
    "type": "Point",
    "coordinates": [-90.071532, 29.951065]
  },
  "properties": {
    "name": "Problems & solutions"
  }
}]]>
</MultiPointGeoJSON>
```

All characters enclosed by a CDATA section are interpreted as characters, not markup or entity references. Every character is taken literally, the only exception being the]]> sequence of characters.

It was therefore suggested that we updated the description for elements where GeoJSON strings are enclosed as illustrated below:

Name	Description
MultiPointGeoJSON	Multi point string according to GeoJSON. <u>This string is to be enclosed within a CDATA section in order to avoid problems with invalid characters.</u> This example includes the required tags: <pre><![CDATA[{ "type": "MultiPoint", "coordinates": [[10, 40], [40, 30], [20, 20], [30, 10]] }]]</pre>
MultiLineGeoJSON	Multi line string according to GeoJSON. <u>This string is to be enclosed within a CDATA section in order to avoid problems with invalid characters.</u> This example includes the required tags: <pre><![CDATA[{ "type": "MultiLineString", "coordinates": [[[10.0, 10.0], [20.0, 20.0], [10.0, 40.0]], [[40.0, 40.0], [30.0, 30.0], [40.0, 20.0], [30.0, 10.0]]] }]]</pre>
MultiPolygonGeoJSON	Multi polygon string according to GeoJSON. <u>This string is to be enclosed within a CDATA section in order to avoid problems with invalid characters.</u> This example includes the required tags: <pre><![CDATA[{ "type": "MultiPolygon", "coordinates": [[[[40.0, 40.0], [20.0, 45.0], [45.0, 30.0], [40.0, 40.0]]], [[[20.0, 35.0], [10.0, 30.0], [10.0, 10.0], [30.0, 5.0], [45.0, 20.0], [20.0, 35.0]], [[30.0, 20.0], [20.0, 15.0], [20.0, 25.0], [30.0, 20.0]]]] }]]</pre>

	]]]]
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The elements in the table above are located in MultiPointType, MultiLineType and MultiPolygonType.

A second alternative is to use XML escaping where the characters are “converted” as illustrated below:

- & to &
- < to <
- > to >
- " to "
- ' to '

This means that the following text is valid:

```
<MultiPointGeoJSON>{
  "type": "Feature",
  "geometry": {
    "type": "Point",
    "coordinates": [-90.071532, 29.951065]
  },
  "properties": {
    "name": "Problems &amp; solutions"
  }
}
</MultiPointGeoJSON>
```

XML escaping is already in use in the StanForD envelope according to rule R7.2.

Both CDATA and XML-escaping can be enclosed in an envelope inside and XML-escaping. However, a CDATA cannot be nested inside a CDATA.

The previous meeting discussed the advantages and disadvantages with the different methods. The conclusion was that we should decide on one of the methods as recommended and that all members should consider this issue until the next meeting. It was thus decided to postpone this issue until the next meeting.

The secretary did some tests after the meeting and noticed that his two different xml parsers and XML Spy automatically applies the XML escaping. The secretary therefore prefers XML-escaping. It was also tested by the secretary to enclose an xml-escaped ogi-file inside an envelope. This caused no problems when extracting the files from the envelope.

It was therefore decided that to update the element descriptions according to the following table:

Name	Description
MultiPointGeoJSON	Multi point string according to GeoJSON. <u>XML escaping is to be used for invalid characters in the GeoJSON string.</u> This example includes the required tags:

Name	Description
MultiLineGeoJSON	Multi line string according to GeoJSON. <u>XML escaping is to be used for invalid characters in the GeoJSON string.</u> This example includes the required tags:
MultiPolygonGeoJSON	Multi polygon string according to GeoJSON. <u>XML escaping is to be used for invalid characters in the GeoJSON string.</u> This example includes the required tags:

OLD HPR VERSION AND NEW BARK FUNCTIONS

It has been suggested to recommend that the enumeration value “None” is registered in attribute “barkFunctionCategory” in cases when converting bark parameters from version 4 to version 2 and 3.

However, several participants noted that this might indicate that no bark function has been used at all and that m3sob and m3sub thus would be equal. The previous meeting decided to let the secretary analyse this issue further.

The evolution of bark functions within StanForD is described below.

StanForD Classic (apt-file) had the following bark functions:

- *Zacco*, linear function based on diameter ob (var113_t1), included 1988.
- *German* table, bark deduction based on diameter ob (var113_t2 and var113_t3), added to standard 1995
- *Skogforsk 2004, Scots pine*, added to standard 2004.
- *Skogforsk 2004, Norway spruce*, added to standard 2004.

The *GermanDistanceBased* function was added with StanForD2010, version 3.0.

The *LogisticTypeBarkFunction* (Lithuanian) bark function was added with StanForD2010, version 3.4.

Two new functions were also added with 4.0 in the form of a “*2nd degree polynomial*” and a “*Logarithmic*” function. Both of these are included in the Consolidated function. The ConsolidatedFunction also includes the old linear *Swedish Zacco* function and the *Skogforsk 2004, Norway spruce function*.

It can thus be noted that this issue has existed for a fairly long period, e.g. if generating a 2.0 hpr based on a spi according to 3.4 (both *GermanDistanceBased* and *LogisticTypeBarkFunction* missing from 2.0).

The StanForD2010 versions up to 3.6 all require attribute BarkFunctionCategory and element BarkFunction. One of the enumerations in BarkFunctionCategory is “None” which is used on markets where volumes and diameters under bark is not in use at all (e.g. Finland).

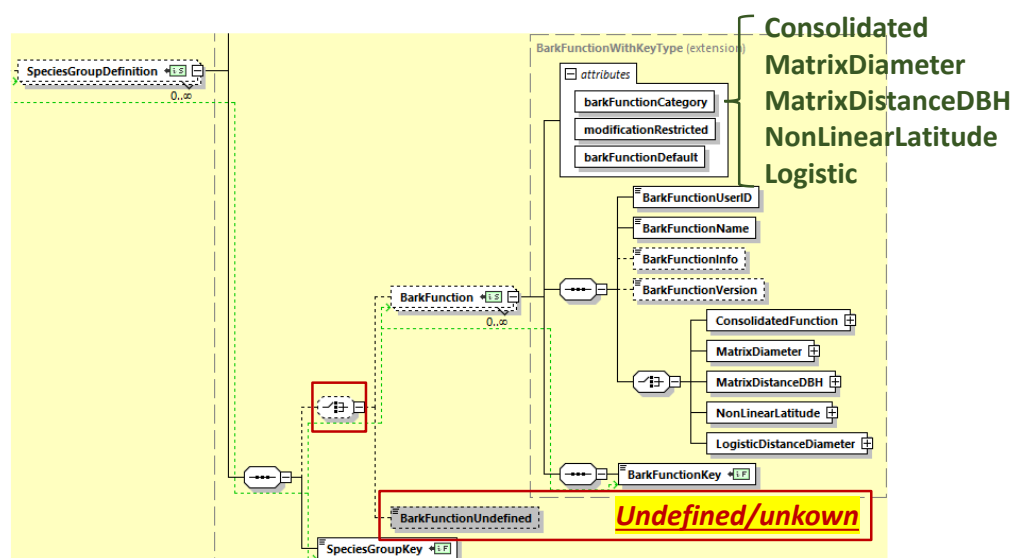
A solution could be to either use enumeration value “None” or to use a specific function such as the linear *Zacco* function with parameter values set to 0. The second alternative would indicate that a bark function has been used but is not supported.

The previous meeting decided to not include any recommendations for these special cases. However, it was decided to let the secretary analyse the possibility of adding a new “Unknown” enumeration to the BarkFunctionCategory which means that future problems of this kind could be handled in a good way.

Discussion undefined bark function

Finding a solution that only affects hpr and hqc sent from machine, and not the spi instruction, was more complex than expected.

The following figure illustrates a proposed new structure added to SpeciesGroupDefinitionWithDetailsAndBarkFunctionAndKeyType:

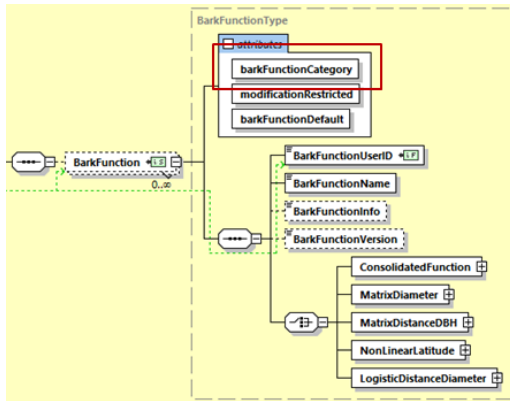


Name	Data type	Unit	Description
BarkFunction-Undefined	Boolean	True/false	Indicates if a bark function category has been used that is not available in present standard version generated by the harvester. Might e.g. occur in cases when using an spi based on a later version than the hpr or hqc.

The meeting decided not to do any structural updates to the bark function in hpr-files as we hopefully will not add any new functions in the future and therefore do not solve any problems by adding a new layer of complexity.

Proposal description barkFunctionCategory

It was also noted that the description of attribute barkFunctionCategory is incorrect as the old enumeration value “None” was excluded with version 4.0.



It was therefore decided that we update the description according to the following text:

Allowed values: "None", "Consolidated", "MatrixDiameter", "MatrixDistanceDBH", "NonLinearLatitude" and "Logistic". If this attribute is "None" the BarkFunction element is empty.

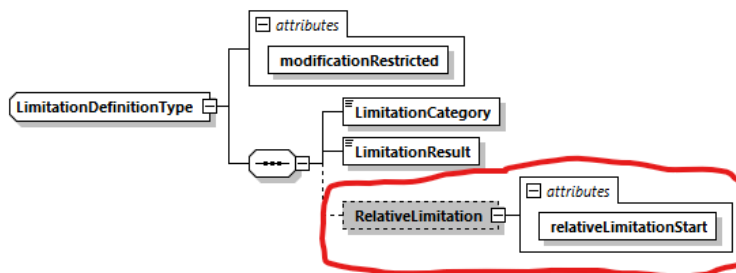
§7 Items for discussion

RELATIVELIMITATIONMATRIX

The basic idea, as described in a number of previous meetings, is to introduce a new type of limitation matrix where the limit is relative rather than absolute. The idea is also to include an attribute “relativeLimitationStart” that indicates when this type of limitation will affect the bucking optimization.

The proposal is to add the following new element and attribute to the LimitationDefinition:

`<RelativeLimitation RelativeLimitationStart="5">true</RelativeLimitation>`



Name	Data type	Unit	Description
RelativeLimitation	Boolean		LimitationCategory and PriceMatrix.Limitation interpreted as a relative values if value is TRUE. All other cases interpreted as an absolute limitation.
relativeLimitationStart	nonnegative-Integer	Pcs/m3	Minimum total number/volume of harvested log per product before the relative limitation matrix is applied. Relative limitation not in use when total volume is below this value. Logs harvested before this limit is reached is taken in account in the limitation calculation.

A first practical test has been carried out by Ponsse earlier this spring. However, some bugs were found that means that a new test will be run in August. This issue will be discussed at the next meeting in September.

MECHANIZED FOREST REGENERATION SCHEMA

The pre-release forest regeneration production schema (rpr) has been published at the web site (www.skogforsk.se/stanford).

Draft for reporting forest regeneration data

A draft version of schemas as well as a specification for reporting soil preparation and planting can be downloaded below:

[Extending StaForD2010 Mechanized forest regeneration 2024-01-16](#)

Final decision postponed until some manufacturer has done a test implementation.

§8 StanForD2010 projects / implementations

WOOD VALUE TEST

Suggested time frame is November 2025.

§9 Other issues

NEW STANFORD AGREEMENT/Framework

Skogforsk plans to create an updated StanForD “agreement/framework” with the objective of keeping a long term stability for the work within the StanForD group. We have not had any general meeting discussing these issues since 2006 (before that in 1998 and 2002). A draft framework will be presented at the September meeting and then discussed at the meeting on the 20th of November

The framework should describe:

- Responsibilities of Skogforsk
- Organization
- Budget and membership fee
- Annual reporting

Skogforsk will suggest a move from SEK to EURO (SEK has caused some administrative confusion) and an upward adjustment of membership fee to 4500 Euro/year. The fee has not changed since year 2006 (4000 Euro/year). The fee today covers the work of secretary (support/admin/preparing proposals/information). The work of Johan Möller/Anders Rowell/Tapio Räsänen/Juha-Antti Sorsa is covered by Skogforsk and Metsäteho

§10 Next meetings

StanForD meeting 2024-09-12, Teams (10:00-14:00 CET)

StanForD meeting 2024-11-20--21, Uppsala/Teams (12:00-14:00 CET)

By default, all financially contributing members will receive an Outlook invitation to all meetings in advance.

§11 End of meeting

The chairman Johan J Möller thanked everyone for attending the meeting.