

VDYP7 Information Note # 5

This new release of VDYP7 has added new structures to deal with the Mountain Pine Beetle (MPB) damaged stands, added Improvements and fixed a few minor errors, and provided an improvisation for processing multi-layer stands with more than one growing layers.

The new version that will be released in 2016 includes the following modifications and improvements;

1. Adaptation to multi-layer processing. The epidemic attack of the MPB of vast areas in the BC interior region created new stands structures that did not exist on such a large scale in the province. Similar pest attacks had occurred before, but the extent was limited to a few areas in the Caribou/Williams Lake area. The 2003/2010 attack covered close to 30% of the area of the province. The MPB damage has rendered the assumption of natural even aged stands invalid and irrelevant. Instead, the following possible scenarios have been created:
 - a) Stands with residual trees (R) with crown closure greater than 10% and a component of dead trees (D).
 - b) Stands where a veteran layer existed prior to MPB attack and now have potentially three live layers, the veteran layer (V), the residual layer (R), the regeneration layer (Y) that will follow mortality, and a component of dead trees (D)
 - c) Stands with residual trees (R) and an associated understory (Y)
 - d) Stands that have only the residual layer (R) and a dead layer, but over time will have a regeneration layer (Y).
2. Business rules for processing layer data.

A new VDYP7 input format was created to handle complex stands created by MPB damage. The new format is constituted as follows:

- Polygon table with the following attributes in order: FEATURE_ID, MAP_ID, POLYGON_NUMBER, ORG_UNIT, TSA, TFL INVENTORY_STANDARD_CODE, TSA_NUMBER, SHRUB_HEIGHT, SHRUB_CROWN_CLOSURE, SHRUB_COVER_PATTERN, HERB_COVER_TYPE_CODE, HERB_COVER_PCT, HERB_COVER_PATTERN_CODE, BRYOID_COVER_PCT, BEC_ZONE_CODE, STOCKABILITY, YIELD_FACTOR, NON_PRODUCTIVE_DESCRIPTOR_CODE, BCLCS_LEVEL1_CODE, BCLCS_LEVEL2_CODE, BCLCS_LEVEL3_CODE, BCLCS_LEVEL4_CODE, BCLCS_LEVEL5_CODE, OLD_REF, REF_YEAR_YOD, PCT_DEAD, NON_VEG_COVER_TYPE_1,

NON_VEG_COVER_PCT_1, NON_VEG_COVER_PATTERN_1,
 NON_VEG_COVER_TYPE_2, NON_VEG_COVER_PCT_2,
 NON_VEG_COVER_PATTERN_2, NON_VEG_COVER_TYPE_3,
 NON_VEG_COVER_PCT_3, NON_VEG_COVER_PATTERN_3,
 LAND_COVER_CLASS_CD_1, LAND_COVER_PCT_1,
 LAND_COVER_CLASS_CD_2, LAND_COVER_PCT_2,
 LAND_COVER_CLASS_CD_3, LAND_COVER_PCT_3;

- Layer table with the following attributes in order: FEATURE_ID, TREE_COVER_LAYER_ESTIMATED_ID, MAPSHEET_ID, POLYGON_NUMBER, LAYER_LEVEL_CODE, VDYP7_LAYER_CD, LAYER_STOCK_PERC, FOREST_COVER_RANK_CODE, NON_FOREST_DESCRIPTOR_CODE, EST_SITE_INDEX_SPECIES_CD, ESTIMATED_SITE_INDEX, CROWN_CLOSURE_PCT, BASAL_AREA_75, STEMS_PER_HA_75, SPECIES_CD_1, SPECIES_PCT_1, SPECIES_CD_2, SPECIES_PCT_2, SPECIES_CD_3, SPECIES_PCT_3, SPECIES_CD_4, SPECIES_PCT_4, SPECIES_CD_5, SPECIES_PCT_5, SPECIES_CD_6, SPECIES_PCT_6, EST_AGE_SPP1, EST_HEIGHT_SPP1, EST_AGE_SPP2, EST_HEIGHT_SPP2, ADJ_IND, LOREY_HEIGHT_75, BASAL_AREA_125, WS_VOL_PER_HA_75, WS_VOL_PER_HA_125, CU_VOL_PER_HA_125, D_VOL_PER_HA_125, DW_VOL_PER_HA_125;

3. Lorey height capping. We have noticed that the computation of Lorey height produces unrealistic values in some cases. For instance we have had lorey heights as high as 100 metres. In addition, the defective values were much larger than dominant stand height.

This problem occurred in stands which had two equally leading species with very different total ages (e.g. 45 and 7 years of age). Where the problem occurred, the leading species was determined to be either of the species during initial processing (FIPSTART or VRISTART) and then switched during projection (VDYP7). If the leading species was initially the older of the two species, an initial Lorey Height was calculated based on that. Once the younger species became the leading species, the Lorey Height was not recalculated. At that point, the Lorey Height curves are not designed to cope with tall heights against young trees and produce a wildly growing stand.

The internal logic for determining leading species was difficult enough and far reaching enough that it was decided to trap for the wild Lorey Height problem, prevent projected volumes from being generated, and produce an error message.

4. Minor fixes. The new release includes other minor fixes, such as:
 71. Added support for the Interleaved Input data format.

- 75. Incorporated the SINDEXT 1.47 library.
- 102. Add support for Dead, Residual, and Regeneration layers.
- 118. Fixed issues with biologically impossible projections (Lorey Height problem)
- 119. Indicate from which layer type (Primary, Vet, Dead, etc.) a yield table was generated.

- 5. Each component of the VDYP7 has a version number and can be viewed/confirmed at the top of the Error output file:

```

VDYP7 Console Version:           7.14b
VDYP7 Extended Core DLL Version: 7.25b
VDYP7CORE DLL Version:          7.19d
Supporting Calc Library Version: 7.1g 2016-Jan-27
VRIADJST Calc DLL Version:       7.5b
VDYPBACK Calc DLL Version:       7.5b
FIPSTART Calc DLL Version:       7.5b
VDYP7 Calc DLL Version:          7.5b
VRISTART Calc DLL Version:       7.5b
Calc DLL I/O Support Version:    7.5b
VDYP7 Low Level I/O DLL Version: 7.23c
VDYP SI Wrapper Version:        7.9c

```

In addition, the VDYP7Batch and WinVDYP7 applications will report version: 7.30a

- 6. There are a number command line parameters for VDYP7Console. All command line parameters are case-insensitive (meaning '-back' is the same as '-Back' and '-BACK'). The most commonly used command line parameters are grouped into the following categories:

a) Configuration

- `-ini <VDYP7.INI Initialization File>`
This is a mandatory parameter and should be one of the first command line parameters supplied to identify where to get basic initialization data.
- `-p <Command Line Parameter File>`
This parameter can be used to point to a text file containing any number of command line parameters, one command line parameter per line. This is a convenient means for supplying a large number of parameters in a single file.

Any and all command line parameters may be stored in a Command Line Parameter File. Refer to Appendix B for an example parameter file.

- `-c <VDYP7 Configuration Data File Folder>`
Points to the folder containing all configuration data and underlying VDYP7 model initialization data. This folder is typically named VDYP_CFG and is found in the VDYP7 installation folder.

b) File Input/Output

- `-ifmt <CSV | HCSV | DCSV>`
Indicates the data format of the input data. All input formats are CSV files structured in different ways for different purposes.
 - CSV: A collection of 8 input CSV files holding different components of a stand description.
 - HCSV: A CSV input data format consisting of two files, one containing polygon level data and the other containing layer specific descriptions.
 - DCSV: A flat data structure holding all polygon, layer, and stand information on a single CSV input record.
- `-i <Input directory or file>`
Specifies the the input file or directory or file depending on the ‘-ifmt’ chosen. For CSV input, this is the directory holding the 8 CSV inut files. For DCSV, this points to the CSV file containing the data to be processed.
- `-ip <Input polygon file>`
`-il <Input layer file>`
For HCSV file input formats, these two parameters point to the files containing the polygon level data and the layer/species data respectively.
- `-ofmt <YieldTable | CSVYieldTable | DCSV>`
Indicates the type of data VDYP7Console will produce.
 - YieldTable: a formatted text file containing yield tables.
 - CSVYieldTable: yield tables in CSV format.
 - DCSV: Projected values (not yield tables) in a CSV output format (requires DCSV as the input source).
- `-o <Output File Name>`
Specifies the file name to store the generated data out to. The format of the data

is identified with the `-ofmt` command line parameter.

- `-e <Error File Name>`
Specifies the text file name to record error, warning and informational messages generated by VDYP7Console as processing continues.
- `-l <Log File Name>`
Identifies the file to receive the text output that normally goes to the screen. This causes VDYP7Console to run “invisibly” – that is with no visible sign of progress which is important in certain batch environments.
- `-progressFrequency <Never | Polygon | Mapsheet | Number>`
Indicates how often to produce a progress message to the log file or screen:
 - Never – Never indicate any progress.
 - Polygon – Indicate progress for each polygon encountered in the input file.
 - Mapsheet – Indicate progress for each change in encountered mapsheet.
 - Number – Produce a ‘.’ for each ‘number’ of polygons processed.

c) Model Configuration

- `-util <SP=<4.0 | 7.5 | 12.5 | 17.5 | 22.5>>`
For each of the 16 SP0 species codes (‘AT’, ‘C’, ‘D’, etc.), set the utilization level you would like reported volumes and other per hectare attributes projected at.

This parameter would be repeated up to 16 times for each of the SP0 codes.

- `-allowBATPHSub <Yes | No>`
If, during processing, it becomes apparent that a valid computed Basal Area/TPH can not be computed (perhaps the stand is young), allow the system to use input values for those parameters if they are supplied.
- `-back <Yes | No>`
`-forward <Yes | No>`
Allow or disallow the underlying model to “project backwards” from Reference Year (using the VDYP7BACK module), and to allow or disallow the underlying model to project forwards from Reference Year (using VDYP7 module).

d) Generated Yield Table Control

- `-agestart <starting total age>`
`-ageend <ending total age>`

Specifies the starting and ending age range for the resulting yield table.

- `-yearstart <starting calendar year>`
`-yearend <ending calendar year>`
 Specifies a yield table that ranges over calendar years rather than a stand age range.
- `-inc <year count>`
 The increment in years between each row of the generated yield table across the specified range.
- `-forceRefYear <Yes | No>`
`-forceCrntYear <Yes | No>`
`-forceYear <Calendar Year>`
 These optional parameters insist on, in addition to the normal range of the yield table, to also include the identified years implied by these parameters.
- `-yldTblColumnHdrs <Yes | No>`
 Indicates whether to include (or not) the Yield Table Headers in the output yield tables.
- `-includeProjMode <Yes | No>`
 For yield table output, indicates how the projected values were projected (i.e. using VDYP7BACK or VDYP7) and whether the year is “special” (such as the Reference Year, Current Year or the Forced Year).
- `-yieldtableincpolyid <Yes | No>`
 Include the polygon identifier as part of the generated yield table header.
- `-projectedByLayer <Yes | No>`
`-projectedBySpecies <Yes | No>`
 For certain output formats, produce a summary layer level projected per hectare values and/or produce species specific projected per hectare values.
- `-projectedVolumes <Yes | No>`
`-projectedBiomass <Yes | No>`
 When producing projected per hectare values in a yield table, include (or exclude) Volumes and/or Biomass calculations.

Contents of a sample parameter file—see Appendix

APPENDIX – Contents of a sample VDYP7Console Parameter file.

This parameter file contains the contents of a sample VDYP7Console. A typical run of VDYP7Console might have the following command line:

```
VDYP7Console -p ParamFile.txt
```

Where the contents of the 'ParamFile.txt' file might look like:

```
-ini C:\VDYP7\VDYP.ini  
-ifmt hcsv  
-ofmt csvyieldtable  
-ip E:\VDYP7_newVerDlayer\POLY_MPB_test.csv  
-il E:\VDYP7_newVerDlayer\LAYER_MPB_test.csv  
-o E:\VDYP7_newVerDlayer\HCSV-YldTbl_test.csv  
-e E:\VDYP7_newVerDlayer\HCSV-Err_test.txt  
-l E:\VDYP7_newVerDlayer\HCSV-Log_test.txt  
-v7log E:\VDYP7_newVerDlayer\HCSV-V7Log.txt  
-C C:\VDYP7\VDYP_CFG\  
-d E:\VDYP7_newVerDlayer\Debug  
-dbg No  
-v7save No  
-back Yes  
-forward Yes  
-includeprojmode Yes  
-util AC = 12.5  
-util AT = 12.5  
-util B = 12.5  
-util C = 12.5  
-util D = 12.5
```

```
-util E = 12.5
-util F = 12.5
-util H = 12.5
-util L = 12.5
-util MB = 12.5
-util PA = 12.5
-util PL = 12.5
-util PW = 12.5
-util PY = 12.5
-util S = 12.5
-util Y = 12.5
-forceyear 2015
#-yearstart 2005
#-yearend 2016
#-agestart 10
#-Ageend 160
#-inc 10
-includeagerows Yes
-allowbatphsub Y
-yieldtableincpolyid Yes
```