productive\_for

ISSUE: Review implementation of PRODUCTIVE\_FOR in existing translation tables

**New notes:**

* productive, potentially productive, un(non)productive
* forested, non-forested, potentially productive?
* P = productive forest, install of null
* OM should only occur in NonForVeg
* only when LYR record occurs
* Only use when it exists, otherwise undefined
* Create new attribute which is a rollup

**Introduction**

This attribute was formerly called **unproductive\_for** in the original CASFRI specifications (see Appendix 1 below). The acceptable values for this attribute have also changed (Compare older Table A1 with newer Table 1). This attribute is a derived attribute and not one that is measured directly. Consequently, there seems to be a certain amount of arbitrariness in it’s application across inventories.

* According to the CAS\_04 database, the current version of this attribute includes 7 possible values (Table 1) but only 2 of those were recorded for AB, BC, and NB (“PF” and “PP”).
* The notes below from 2014 (see Appendix 2 below) are not completely clear (nor is the Perl code) but indicates that **productive\_for** is derived from the source FRI attributes. An alternative might be to derive it using the CAS standardized attributes? We would then have one algorithm for deriving the attribute that would apply to all inventories. It would be easy to replicate and modify if a user wanted a slightly different version i.e., we wouldn’t be locked in to the source inventories which would not be available.
* Along those lines, BC has an interesting attribute / algorithm that might serve as a model (see “BC Forest Management Land Base Indicator” below). We applied it to calculate **productive\_for** for the BC08 inventory. Should we consider using this as a model for other inventories?

**Table 1**. Acceptable values for productive\_for based on CAS\_04 code and notes.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Value** | **Description** | **CAS\_04\*** | **AB06, 16** | **BC** | **NB** |
| NP | Non-productive forest - poor forest types on rocky or wet sites | 8,849 |  |  |  |
| PF | Productive forest - any other forest | 18,551,934 | 165,908 | 82,565 | 933,169 |
| PP | Productive potential??? | 4,425,539 | 15,263 | 3,898,969 | 4 |
| SC | Scrub Coniferous - scrub coniferous trees on poor sites | 157,818 |  |  |  |
| SD | Scrub Deciduous - scrub deciduous trees on poor sites | 32,472 |  |  |  |
| TM | Treed musked - treed wetland sites | 208,767 |  |  |  |
| TR | Treed??? | 47,230 |  |  |  |

\* Counts extracted from the CAS\_04 PostgreSQL database=foundry04, schema=cas\_04, table=lyr

**Algorithms**

General...

**British Columbia**

The more recent inventories, starting with BC08, include an attribute called **for\_mgmt\_land\_base\_ind** that could be used as a proxy for productive and non-productive forest. It is described in this [document](https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/forest-analysis-inventory/data-management/standards/forest_management_land_base_definition.pdf) and summarized in the Appendix 2 below.

|  |
| --- |
| **productive\_for = “PF” if:**   * + **for\_mgmt\_land\_base\_ind = “Y”**   **productive\_for = “PP” if:**   * + **for\_mgmt\_land\_base\_ind = “N”** |

**Alberta**

|  |
| --- |
| **Productive\_for = “PP” if:**   * + **mod1 != "CC" & species\_1 "EMPTY\_STRING" & (crown\_closure\_upper!=-9998 | height\_upper!=-9999) [ab06]**   + **modcon1!="CC" & species\_1=="EMPTY\_STRING" & (crown\_closure\_upper!=-9998 | height\_upper!=-9999) [ab16]**   **Productive\_for = “PF” if:**   * + **productive\_for != “PP”** |

**New Brunswick**

|  |
| --- |
| **productive\_for= “PP” if:**   * + **(crown\_closure\_lower %in% c(-8888,-9998) | height\_lower==c(-8888,-9999)) | (fst==0 & (!str\_trim(l1trt)=="" | !l1trt=="CC"))**   + **(crown\_closure\_lower %in% c(-8888,-9998) | height\_lower==c(-8888,-9999)) | (fst==0 & (!str\_trim(l2trt)=="" | !l2trt=="CC"))**   **productive\_for = “PF” if:**   * + **productive\_for != “PP”** |

**Appendix 1. Original specification (Cosco 2011)**

**Unproductive Forest**. Unproductive forest is forest land not capable of producing trees for forest operations. They are usually wetlands, very dry sites, exposed sites, rocky sites, higher elevation sites, or those sites with shallow or poor soils. The detailed table, CAS codes, and conversion rule sets are presented in Appendix 12.

**Table A1**. Original classes and values for unproductive\_forest attribute.

|  |  |
| --- | --- |
| **UNPRODUCTIVE\_FOREST** | **Attribute Value** |
| Treed Muskeg - treed wetland sites | TM |
| Open Muskeg - open (<10% trees) wetland sites | OM |
| Alpine forest - high elevation forest usually above 1800 m | AL |
| Scrub Deciduous - scrub deciduous trees on poor sites | SD |
| Scrub Coniferous - scrub coniferous trees on poor sites | SC |
| Non Productive Forest - poor forest types on rocky or wet sites | NP |
| Productive Forest - any other forest | P |
| Blank - no value | NA |

**Appendix 2. BC Forest Management Land Base Indicator**

Forest Management Land Base Indicator (FMLB) is an attribute field to indicate whether the polygon is forested or has been forested and is capable of producing a stand of trees. This allows the user to filter out polygons that are traditionally considered non-productive such as lakes, rock and alpine. Polygons that have harvest history are included in the FMLB as well as any polygon with a site index greater than or equal to 5. The polygon is considered FMLB = Y where:

* the polygon has history indicating it has been harvested and has a site index value greater than or equal to 5 **OR**
* the polygon has an inventory standard indication FIP based inventory and is NOT non-productive and has a site index value greater than or equal to 5 **OR**
* the polygon is inventory Standard “V” or “I” and is not classified in the BC Land Classification Scheme Level 1 Unknown (U) **AND**
* is not classified in the BC Land Classification Scheme Level 3 Alpine (A) And has a site index value greater than or equal to 5

This blurb was taken from the VRI data dictionary: “The criteria is if site index >5, opening\_ind (opening) equal to "Y" (yes), or inventory\_standard\_cd equal V or I but bclcs\_level\_1 not equal "N", or bclcs\_level\_3 not equal "A".

Below is a first attempt to implement it using R:

library(tidyverse)

# Replicate forest management land base indicator (FMLB; see PDF)

xx = mutate(x,

logging=if\_else(substr(line\_7b\_disturbance\_history,1,1)=="L",1,0),

logging=if\_else(is.na(logging),0,logging),

fmlb = if\_else(

(substr(line\_7b\_disturbance\_history,1,1)=="L" & site\_index>=5) |

(inventory\_standard\_cd=="F" & is.na(non\_productive\_descriptor\_cd) & site\_index>=5) |

(inventory\_standard\_cd %in% c("V","I","L") & !bclcs\_level\_1=="U") &

(!bclcs\_level\_3=="A" & site\_index>=5), 1, 0))

table(x$fmlb, x$logging)

**Appendix 3. Selected notes from 2014**

The following notes are taken from the document “DocToUpdate LYR for v5.docx” (2014-11-24). Additional notes relevant to each province can also be found in the document.

* The default value is PF (productive forest). It should not be MISSING or UNDEF.
  + PRODUCTIVE\_FOR type other than PF should be use only when indicated in the inventory.
  + If there is no species code, no mention of unproductivity, but there is a height, crown closure or density, the PRODUCTIVE\_FOR should be PP.
  + If there is no species code, no mention of unproductivity and no height, crown closure or density, the polygon should not be LYR.
* To enforce consistency, we will assume that when PRODUCTIVE\_FOR != PF, height, crown closure and density attributes should be coded as MISSING where they are not present, not UNDEF. We will do this EVEN THOUGH, strictly speaking, they are undef in some inventories.
* Any record with in .dst with a CO field record (indicating harvesting) will be considered Productive Forest no matter other attributes are present or missing (e.g. species)
* Types OM, OT, UF should not occur (PV: note also that AL is no longer included).

**British Columbia**

* UNPRODUCTIVE\_FOR = PP, fix species code
* If species are NULL and NON\_FOREST has any non-null entry (check manual)=> CAS species = UNDEF and PRODUCTIVE\_FOR = PP. The old version of your script was putting the species code as MISSING.
* UNPRODUCTIVE\_FOR = SD, fix type and species
* If species are NULL and NON\_PRODUCTIVE = NPBU =>CAS species = UNDEF and PRODUCTIVE\_FOR = NP. They should have a dst entry filled because we know it is a burn. It should not be CAS species MISSING with UNPRODUCTIVE\_FOR = SD
* UNPRODUCTIVE\_FOR = OT, fix everything. OT type needs to be deleted.
* If species is defined, INVENTORY\_STANDARD = V or I and LAND\_COVER\_CLASS\_CODE = TM, TB or TC => PRODUCTIVE\_FOR = PF
* The manual do not recognized the code NP for the attributes NON\_FOREST:
* If species are known and have height, crown closure or density => PRODUCTIVE\_FOR = PP.
* If species is NULL, INVENTORY\_STANDARD = V or I and LAND\_COVER\_CLASS\_CODE = ST or SL, the polygon should be NFL, not LYR
* If species is NULL, INVENTORY\_STANDARD = V or I and and LAND\_COVER\_CLASS\_CODE = ST or SL => PRODUCTIVE\_FOR = PP.
* OT: When SPECIES is NULL , INVENTORY\_STANDARD = “V” OT “I” and LAND\_COVER\_CLASS = TM (treed mixed), TB (treed broadleaf), ST (shrub tall), SL (shrub low), TC ( treed coniferous).
* Make sure generic species Xc, Xh, Zc and Zh are well translated. Those entries should have PRODUCTIVE\_FOR = NP if non productive descriptor is given OR PP if non productive descriptor is unknown.

**Alberta**

* UNPRODUCTIVE\_FOR= -8888 and SPECIES CODE = -9999, fix entries in the right table.
* If LAYER\_RANK = 2, SPECIES\_1 = SC (shrub closed) or SO (shrub open) => translate those entries in NFL table as layer\_2 and NON\_FORESTED\_VEGETATED.

**New Brunswick**

* UNPRODUCTIVE\_FOR = UF, drop UF type
* There are 7 occurrences of UF in the entire database. The UF type only occurs when a polygon has 2 layer in NB. UF is related to the 2nd layer. The first layer is always well describe. For those cases, the 2nd layer should be ignored and logged as a possible error to report to the data contributor. \*\*\*Note that NonForest code , despite its name, describes various kinds of Potentially Productive forest.
* UNPRODUCTIVE is MISSING and SPECIES is MISSING, fix type
* If FST=!0 (forested polygons) and L1TRT(layer 1 treatment) = CC (clear cut):
* If there is height, density or crown closure => PRODUCTIVE\_FOR = PF
* If there is no information on height, density or crown closure => the polygon should not be recorded in LYR, but only in DST.