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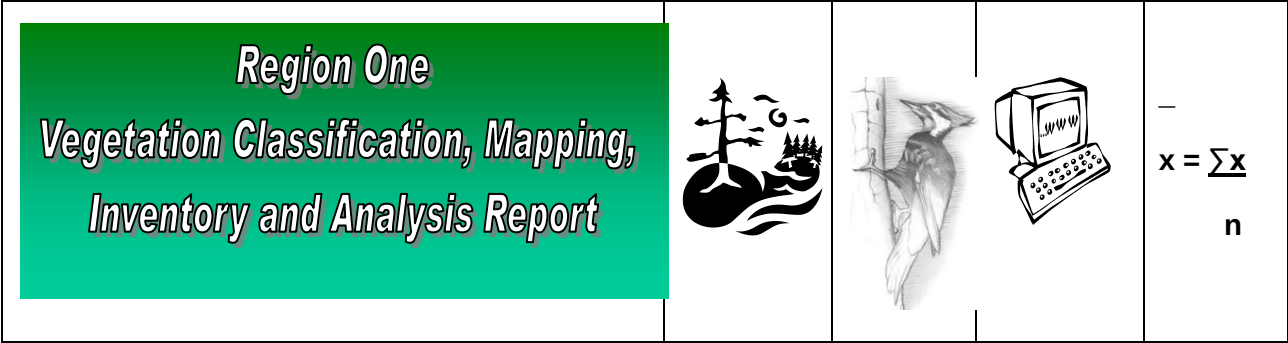


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Report 15-4 v1.0

November 13, 2015

Region 1 Existing and Potential Vegetation Groupings used for Broad-level Analysis and Monitoring

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I. Introduction

Vegetation classifications are necessary for a variety of analysis purposes. Region 1 utilizes both potential vegetation and existing vegetation classifications to describe forested and non-forested vegetation. Potential vegetation classifications are assemblages of *habitat types*; whereas existing vegetation classifications are assemblages of *dominance types*. The Region has identified potential vegetation groups (broad and mid-level groupings of habitat types) and existing vegetation groups, or cover types (Helms 1998), that are recommended for use at the broad levels to provide consistent analysis and monitoring. Multiple classifications exist, many of which are hierarchical and the applicability of their use depends on

the geographic extent and purpose of analysis. It is desirable to present a consistent depiction of the vegetation groupings used in Region 1.

Existing vegetation groups are based on the R1 Classification System (Barber and others, 2011), a consistent framework for depicting existing forested vegetation classes and conditions. The classification for non-forested existing vegetation is currently under development.

Several habitat type classifications which have been developed over the years in the Region were reviewed. New broad- and mid-level habitat type groups are presented here and compared to commonly used classifications. A clear hierarchical relationship between commonly used habitat type groupings and these Regional groups is provided to the extent possible. Finer-scale groups used for analysis may nest within these broad groups.

Vegetation groups are applied consistently to inventory data housed in FSveg and FSveg Spatial and summarized in the R1 Summary Database and Stand Exam Summary Database. The cross-walks used to assign habitat type groups and cover types based on the field collected habitat type and broad dominance type are documented in the *R1 Inventory Look-up Tables Database* (2015).

R1-VMMap (<http://www.fs.usda.gov/detailfull/r1/landmanagement/gis/?cid=stelprdb5331054&width=full>) is the Region's spatial database depicting existing vegetation. Cover types can be derived from Dominance Group 6040 classes. The Region is currently developing a potential vegetation spatial dataset. Currently, the only consistently derived and contiguous layer across the Region is the R1 PVT Layer developed by Jeff Jones for the Cohesive Strategy. For many Regional and Forest applications, this is being used until the R1 Habitat Type Groups spatial dataset is completed. Some Forests also use the Habitat Type information stored in FSveg Spatial.

The relationship between vegetation groups and Region 1 inventory and map products is shown in Table 1.

Table 1: Overview of Vegetation Group Types and Data Sources in Region 1

Vegetation Group	Broad Group Names	Mid-level Groups used in Region 1	Base Attributes	Habitat Type Groups ¹ names	Spatial Depiction
Potential	R1 Broad PVT	R1 Habitat Type Groups; Western MT/ID Habitat Type Groups (USDA 2005); Old Growth Habitat Type Groups (Green et al 1992); Potential Vegetation Types, PVT (Jones 2005)	Habitat Type Reference and Habitat Type	Broad: Broad_PVT Mid: R1_Habitat_Type_Group, LCFPG05_PVT, EMT_OGG_A ¹ , WMT_OGG_A ¹ , NID_OGG_A ¹ , PVT_OG, PVT_MT_04_A ¹ , PVT_ID_04_A ¹ , MTID_PVT_1004	R1 PVT Layer (Jones) ²
Existing	R1 Cover Type	Dominance Group 6040, Dominance Group 40% Plurality, Dominance Group 60% Plurality	Dominance Group 6040 derived from inventory data	Broad: Cover_type Mid: Dom_Grp_6040_inv, Dom_Mid_40_inv, Dom_Mid_60_inv	R1-VMMap

¹ These habitat type groups are defined in 01_LUT_HT_PVT in the *R1 Inventory Look-up Tables Database* (2015) based on Habitat Type and the reference manual. Many are delivered in FSVeg Spatial and the R1 Summary Database for FIA, Intensified Grid, and stand exam data.

²Information about R1 PVT Layer (Jones's PVT) spatial depiction

http://www.fs.usda.gov/detail/r1/landmanagement/gis/?cid=fsp5_030918

II. Potential Vegetation

Potential vegetation for inventory data is based on habitat types classified in the field using the appropriate literature reference. Recently, potential vegetation grouping logic was reviewed and updated for forested and non-forested types by Regional vegetation experts, with strong consideration given to work done in 2005 for western Montana and Idaho (USDA 2005). All valid habitat types found in Region 1 and their associated references were reviewed during this process.

R1 Habitat Type Groups is a grouping of habitat types having similar biophysical characteristics, with similarities in historical disturbance regimes that have affected a similar range of tree composition, structural characteristics, productivity, and successional trends into mature forests. These groups can be effectively mapped to show spatial extent on the landscape. Landscape topography can influence the extent and size of patches across these biophysical settings. **R1 Broad PVT** is a coarse grouping of R1 Habitat Type Groups that is applicable for broad level analysis and monitoring.

Table 1 shows potential vegetation groups commonly used in Region 1 for analysis. The way that habitat types are assigned to these various potential vegetation groups is documented in *R1 Inventory Data Look-up Tables Database*, 01_LUT_HT_PVT. Tables 2 and 3 display the relationship of several common PVT groups used in R1 with the R1 Habitat Type Groups and R1 Broad PVT for forested and non-forested habitat types respectively. These PVT groups have been classified for FIA and Intensified Grid data in the R1 Summary Database (Bush, Reyes, 2014). These are found in the R1_FSVeg_PSU_Site and R1_FSVeg_Site tables. These same attributes are found in the R1_FSVeg_Setting_Site and R1_FSVeg_Site tables of the Stand Exam Summary Database for project-level analysis needs (*R1 FSVeg Reports and Utilities User's Guide*).

Mapping potential vegetation from imagery alone is impossible, modeling it with biophysical surfaces and climate data is not trivial. Currently, the only consistently derived contiguous layer of potential vegetation is the **R1 PVT layer**, also known as the "Jones" layer, which was developed for the Cohesive Strategy in 2004 utilizing multiple data sources. In some cases the classification differs for types in Montana versus Idaho. The cross walk between field recorded habitat type and the R1 PVT groups developed by Jones is documented in *R1 Inventory Data Look-up Tables Database*, and depicted in Tables 2 and 3 as well.

Table 2: R1 Forested Potential Vegetation Group Crosswalk. Labels in parenthesis are the column name in 01_LUT_HT_PVT in the *R1 Inventory Data Look-up Tables Database*.

R1 Broad PVT (R1_Broad_PVT)	R1 Habitat Type Groups (R1_Habitat_type_group)	West MT/ID habitat type groups 2005 (LCFPG05_PVT and LCFPG_Desc)	R1 MT PVT ² (PVT_MT04_A)	R1 ID PVT ² (PVT_ID04_A)	ADP ¹ Habitat Type Code
Warm Dry	Hot Dry	1 Warm & Dry	pifl	Pifl	000, 040, 050, 051, 052, 070, 090 ⁶ , 091 ⁶ , 092 ⁶ , 093 ⁶ , 094 ⁶ , 095 ⁶
	Warm Dry	1 Warm & Dry	pipo	pipo	100, 110, 130, 140, 141, 142, 160, 161, 162
				none	103 ⁷ , 104 ⁷ , 100032 ⁸ , 100033 ⁸ , 100034 ⁸ , 100035 ⁸ , 100037 ⁸ , 105 ⁷ , 106 ⁷ , 150
			psme1	psme1	200, 210, 220, 230
				none	205 ⁷ , 390 ⁷
			psme2	psme2	311, 380
			psme3	psme3	321
		2 Mod warm & Dry	pipo	pipo	180, 181, 182
	Mod Warm Dry	2 Mod warm & Dry	pipo	pipo	170, 171, 172, 190
			picea	picea	430
			abgr1	abgr1	505, 506, 507, 508
			none		
			psme2	psme2	240 ⁷ , 250, 260, 261, 262, 263, 280, 281, 282, 283, 292, 310, 312, 313
			psme3	psme3	360, 320, 322, 323, 324, 330, 350, 370, 340
	Mod Warm Mod Dry	3 moderately warm & moderately dry	abgr2	abgr2	510, 511, 512, 515, 590, 591, 592
			abgr3	abgr3	523
			psme2	psme2	290, 291, 293
Warm Moist	Mod Warm Moist	4 moderately warm & Moist	abgr3	abgr3	500, 516, 517, 518, 519, 520, 521, 522, 524, 525, 526, 529
	Mod Cool Moist to Wet	5 Moderately Cool & Moist	thpl1	thpl1	555
			thpl2	thpl2	501, 530, 531, 532, 533, 534, 535, 545, 546, 547, 548
			tshe	tshe	502, 565, 570, 571, 572, 573, 574, 575, 576, 577, 578
		6 Moderately Cool & Wet	thpl1	thpl1	540, 541, 542, 550, 560
	7 Cool & Moist	tshe	tshe	579	
Cool Moist	Cool Moist	7 Cool & Moist	abla2	abla2	600, 620, 621, 622, 623, 624, 625, 660, 661, 662670, 671, 673, 740
			tsme1	tsme1	685, 686, 687
				tsme2	tsme2
			tsme3	tsme3	680
				picea	picea
	Cool Wet	8 Cool & Wet	abla1	abla1	610, 630, 635, 636, 637, 650, 651, 652, 653, 654, 655
				none	631, 632
			tsme1	tsme1	675, 677
			picea	picea	410, 440, 480
			Cool Mod Dry	9 Cool &	abla2

R1 Broad PVT (R1_Broad_PVT)	R1 Habitat Type Groups (R1_Habitat_type_group)	West MT/ID habitat type groups 2005 (LCFPG05_PVT and LCFPG_Desc)	R1 MT PVT ² (PVT_MT04_A)	R1 ID PVT ² (PVT_ID04_A)	ADP ¹ Habitat Type Code
	to Moist	Moderately Dry	abla3	abla3	640, 691, 693, 700, 720, 750, 770, 780, 790, 791, 792
				abla4	690
				none	607, 745
			picea	picea	450
			pico	pico	900, 910, 920, 930, 950
				none	960 ⁷
Cold (capable of WBP)	Cold	10 Cold & Moderately Dry	tsme2	tsme2	710, 712
			abla3	abla4	672, 692, 694, 731, 732, 733,
			abla4	abla4	674, 730, 800, 810, 820, 830, 831, 832
			tsme1	tsme1	676
			tsme2	tsme3	681, 711, 840, 841, 842
			tsme3	tsme3	713
	Timberline	11 Cold	pico	pico	925, 940
			laly	laly	860
			pial	pial	850, 870, 890

¹ Automatic Data Processing Code (habitat type publications) - includes all codes from valid references in Region 1 for use with NRM FSVeg. Unless otherwise specified, codes are from 101 (Forest Habitat Types of Montana, Pfister and others 1977) or 110 (Forest Habitat Types of Northern Idaho: a Second Approximation, Cooper and others, 1991)

² R1 PVT's based on "Jones" metadata logic and labels.

³ 579 is in Group 7, Cool & Moist, in R1 HTG (2005) but is included in the Warm/Moist Broad PVT to maintain a connection with the other tshe types.

⁶ Reference 199 = FSH 2409.21h R-1 Timber Management Data Handbook. Used in R1 until 2001.

⁷ Reference 102 = Key to Montana Forest/Woodland Habitat Types East of the Continental Divide. FIA use only.

⁸ Reference 114 = The Vegetation of the Grand River/Cedar River, Sioux, and Ashland Districts of the Custer NF: A Habitat Type Classification, Hansen and Hoffman.

⁹ Reference 112 = Classification and Management of Montana's Riparian and Wetland sites. Hansen, Boggs, Cook and others, 2005.

Table 3: Non-forested Potential Vegetation Group Crosswalk

R1 Broad PVT (Broad_PVT)	R1 Habitat Type Groups (R1_Habitat_ type_group)	R1 MT PVT ² (PVT_MT0 4_A)	R1 ID PVT ² (PVT_ID04 _A)	Habitat Type ²
Xeric Grassland	Bluebunch Wheatgrass	drygrass	drygrass	Ref 199: 015, 016, 017, 020, 065 Ref 115: 200, 500, 800 Ref 103: 47130, 47131, 47132, 47140, 47141, 47142, 47143, 47144, 47145, 47146 Ref 114: 100005, 100006, 10010, 100021, 100054, 100055,
	Western Wheatgrass	agrsmi	agrsmi	Ref 114: 100001 Ref 115: 100
Mesic Grassland	Fescue	fesida	fesida	Ref 199: 18, 39 Ref 615: GB5917, GB5922 Ref 103: 47003, 47004, 47120, 47121, 47122, 47123, 47124, 47125, 47126, 47127 Ref 114: 100023
		fessca	fessca	Ref 199: 19 Ref 103: 47110, 47111, 47112, 47113, 47114, 47115

R1 Broad PVT (Broad_PVT)	R1 Habitat Type Groups (R1_Habitat_ type_group)	R1 MT PVT ² (PVT_MT0 4_A)	R1 ID PVT ² (PVT_ID04 _A)	Habitat Type ²
Mesic Shrubland	Mesic Shrubland	potfru	potfru	Ref 199: 34 Ref 103: 46620, 46621, 46622, 46623
		mesic shrub	mesic shrub	Ref 199: 030 Ref 110: 030, 031 Ref 112: 156, 157, 158, 159, 160, 161 Ref 115: 2000, 2100, Ref 114: 100052, 100056 Ref 615: SM19
Xeric Shrubland/ Woodland	Low Shrubland	sage1	sage1	Ref 199: 031 Ref 103: 46600, 46601, 46602, 46603
	Mountain Shrubland	sage4	sage4	Ref 199: 033 Ref 103: 46611, 46612, 46613
	Xeric Sagebrush	sage3	sage3	Ref 199: 032
		sage2	sage2	Ref 115: 1100, 1200 Ref 103: 46610, 46614, Ref 114: 100014, 100015
	Xeric Shrubland	dry shrub	dry shrub	Ref 103: 46201, 46301, 46630, 46632, 46633 Ref 114: 100028 Ref 115: 1400 Ref 199: 035 Ref 615: SD49
		rhus	rhus	Ref 199: 036, 037 Ref 103: 46640, 46641, 46642, Ref 114: 100046, 100047, 10048
		sage 5	sage 5	Ref 114: 100013 Ref 115: 1000
	Salt Desert Shrub	saltshrub	saltshrub	Ref 199: 038 Ref 115: 1300, Ref 103: 46650, 46651, 46652 Ref 114: 100049, 100050
	Juniper Woodland	juniper	juniper	Ref 102: 151, 152 Ref 114: 100029, 100030 Ref 199: 50
Riparian/ Wetland	Aspen Woodland	poptre	poptre	Ref 102: 351, 356 Ref 112: 117, 118, 119, 120, 121 Ref 114: 100040 Ref 199: 078
	Riparian Shrub ³	ripshrub	ripshrub	Ref 112: 030, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 150, 151, 152, 153, 154, 155, SW1117, SW5112, SW5113 Ref 199: 071, 072, 073, 074
	Wetland Graminoid	ripgrass	ripgrass	Ref 615: MW19 Ref 199: 021, 061, 070, Ref 112: 200, 201, 202, 203, 204, 205, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, MD3111, MM1912, MM2912, MM2914, MM2915, MM2917, MM2920, MS31111, MW3912, MW4911, MW4912 Ref 103: 47100, 47101
	Riparian Deciduous Tree	ripdecid	ripdecid	Ref 102: 301 Ref 110: 20 Ref 112: 103, 104, 105, 106, 110, 111, 112, 113, 114, 115, 116, 122, 123, 124, 125, 130

R1 Broad PVT (Broad_PVT)	R1 Habitat Type Groups (R1_Habitat_ type_group)	R1 MT PVT ² (PVT_MT0 4_A)	R1 ID PVT ² (PVT_ID04 _A)	Habitat Type ²
				Ref 114: 100024 Ref 199: 60, 71, 72, 73, 74, 79
Alpine	Alpine Herbaceous	alpine	alpine	Ref 113: 001,002, 003,004,005, 006, 009, 010, 012, 013, 015, 016, 018, 019, 022, 023, 024, 025, 026, 027, 028, 029 Ref 199: 080, 081, 084
	Alpine Shrub	alpine	alpine	Ref 113: 007, 008, 011, 014, 017, 020, 021 Ref 199: 087
Sparse	Sparse	Sparse	sparse	Ref 101: 010

¹ Manning, 2009

² Mueggler & Stewart 1980; Hansen & Hoffman 1985; Cooper et al 1987

³ Not currently in mapped PVT products

As shown in Tables 2, there is not a 1-to-1 crosswalk with forested “Jones” PVTs and other potential vegetation groups. Since Jones is currently the only spatial depiction available, assumptions are needed to use Jones PVTs as a spatial representation for R1 Habitat Type Groups. The Jones PVT labels listed in Table 4 indicate the type selected to represent a 1-to-1 relationship with R1 Habitat Type Group and R1 Broad PVT based on the *most common or abundant types*, with other rationale as noted in the footnotes. However, some Forests utilize FSveg Spatial to map habitat type based on stand exams or other information. In this case, the habitat type can be directly translated into R1 Habitat Type Groups or R1 Broad PVT and used for mapping instead of using the Jones PVT layer. Therefore, the mapping of R1 Habitat Type Group or R1 Broad PVT could vary for some forested habitat types depending on whether the source map is Jones PVT or FSveg Spatial. The non-forested types (Table 3) have a 1-1 match with Jones PVT groups. Also shown in Table 4 is the SIMPPLLE modeling habitat type group (HTG) used for the HLC Forest Plan Revision; this is one example, and modeling groups may be different for other Forests.

Table 4: Mapped PVT Crosswalk for Forest-Specific Analysis, HLC Revision

R1 Broad PVT	R1 Habitat Type Group	R1_MT_ID_PVT	SIMPPLLE HTG ²
Warm Dry	Hot Dry	pifl	A1
	Warm Dry	pipo	A2
		psme1	
	Mod Warm Dry	abgr1 ¹	NA
		psme2	B2
		psme3	B1
	Mod Warm Mod Dry	abgr2 ¹	NA
Warm Moist	Mod Warm Moist	abgr3 ¹	NA
	Mod Cool Moist	thpl2 ¹	NA
		tshe ¹	
		thpl1 ¹	
Cool Moist	Cool Moist	abla2	D3
		picea	D2
	Cool Wet	abla1	E2
		tsme1 ¹	
	Cool Mod Dry to Moist	pico ³	F1
		abla3	F2
Cold	Cold	abla4	G1
		tsme2 ⁴	
		tsme3 ⁴	NA

R1 Broad PVT	R1 Habitat Type Group	R1_MT_ID_PVT	SIMPPLLE HTG ²
	Cold Timberline	laly	G2
		pial	
Xeric Grassland	Bluebunch Wheatgrass	drygrass	NF1A
Mesic Grassland	Western Wheatgrass	agrsmi	NF1C
	Fescue	fesida	NF1B
		fessca	
Mesic Shrubland	Mesic Shrubland	potfru	NF2A
		mesic shrub	
Xeric Shrubland/ Woodland	Low Shrubland	sage1	NF2D
	Mountain Shrubland	sage4	NF2B
	Xeric Sagebrush	sage3	NF2C
		sage2	
	Xeric Shrubland	dryshrub	NF3A
		rhus	
		sage 5	
	Salt Desert Shrub	saltshrub	NF6
Riparian/ Wetland	Juniper Woodland	juniper	NF3B & NF3C
	Aspen Woodland	poptre	NF3D
	Riparian Shrub ³	ripshrub	NF4A & NF4B
	Wetland Graminoid	ripgrass	NF4D
	Riparian Deciduous Tree	ripdecid	NF4E
Alpine	Alpine Herbaceous & Shrub	alpine	NF5A & NF5B
Sparse	Sparse	Sparse	XX4

¹These types do not occur on the HLC.

² HTG's for modeling vary by Forest and SIMPPLLE analysis done in R1. Groups shown here are for the HLC.

³The pico Jones group occurs in both the Cold and Cool Moist broad PVT groups; it was crosswalked to Cool Moist for mapping because it should not have whitebark pine component, which is the key feature of the Cold group.

⁴The tsme2 Jones group also occurs in both the Cold and Cool Moist Broad PVT's. This is crosswalked to the Cold broad PVT because it has the potential to contain a whitebark pine component.

III. Existing Vegetation

R1 also has classifications for existing vegetation, such as dominance types, which represent broad species groups of dominant vegetation and meet Forest Service technical guide standards (Barber and others, 2011). Unlike potential vegetation, which is generally assumed to be static, existing vegetation changes over time. **R1 Cover Types** are broad groups of existing vegetation based on dominance types. Douglas-fir (PSME) dominance types grow across a wide range of biophysical settings. Therefore, R1 Habitat Type Groups are used to determine the appropriate R1 Cover Types for the PSME dominance types. Forested R1 Cover Types can be mapped by integrating R1 VMap with Jones PVT layer. However, the classification for non-forested types is still under development therefore the non-forested R1 Cover Types will be available for inventory data and in spatial layers once finalized. In the interim, Table 5 shows non-forested cover types currently depicted in R1-VMap.

Table 5: Cover Type Crosswalk to Dominance Types (Existing Vegetation)

R1 Cover Type	Species included	DomMid40	Dom Group 6040
Ponderosa Pine ponderosapine	Ponderosa pine with components Douglas-fir, limber, juniper.	MX-PIFL2, MX-PIPO, or MX-JUNIP ¹	PIFL2, PIFL2-Imix, PIFL2-Tmix, PIFL2-Hmix, PIPO, PIPO-Imix, PIPO-Tmix, PIPO-Hmix, JUNIP-Hmix, JUNIP-Tmix, or JUNIP-Imix ¹
Dry Douglas-fir² (dryDouglasfir)	Dry Douglas-fir (potential components of ponderosa pine, limber, and juniper).	(IMIX or MX-PSME) AND (Jones PVT = pifl, pipo, psme1, or psme) or (R1 Habitat type Group = Hot Dry or Warm Dry)	(PSME, PSME-Imix, PSME-Hmix or IMIX) AND (PVT = pifl, pipo, psme1, or psme3) or (R1 Habitat type Group = Hot Dry or Warm Dry)
Mixed Mesic Conifer² (mixedmesiccon)	Moist Douglas-fir, cedar, white pine, grand fir, western hemlock (potential components of lodgepole pine, spruce, subalpine fir).	MX-ABGR, MX-PIMO3, MX-THPL, MX-TSHE, MX-TSME, TMIX or [(MX-PSME or IMIX) AND (PVT NOT pifl, pipo, psme1, or psme3) or (R1 Habitat Type Group is NOT Hot Dry or Warm Dry)	ABGR, ABGR-Imix, ABGR-Tmix, ABGR-Hmix, PIMO3, PIMO3-Imix, PIMO3-Tmix, PIMO3-Hmix, PSME-Tmix, THPL, THPL-Imix, THPL-Tmix, THPL-Hmix, TSHE, TSHE-Imix, TSHE-Tmix, TSHE-Hmix, TSME, TSME-Imix, TSME-Tmix, TSME-Hmix, TMix, or [(PSME, PSME-Imix, PSME-Hmix, or IMIX) (PVT NOT pifl, pipo, psme1, or psme3) or (R1 Habitat Type Group NOT Hot Dry or Warm Dry)
Western larch Mixed Conifer (wlarchmixedcon)	Western larch, Douglas-fir (minor components lodgepole pine, spruce)	MX-LAOC	LAOC, LAOC-Imix, LAOC-Tmix, LAOC-Hmix
Lodgepole Pine (lodgepolepine)	Lodgepole pine (other minor components)	MX-PICO	PICO, PICO-Imix, PICO-Tmix, PICO-Hmix
Aspen/Hardwood³ (aspen/hardwood)	Aspen, cottonwood, birch (other minor conifer components)	MX-BEPA, HMIX, MX-FRPE, MX-POPUL, or MX-POTR5	BEPA, BEPA-Imix, BEPA-Tmix, BEPA-Hmix, Hmix, FRPE, FRPE-Imix, FRPE-Tmix, FRPE-Hmix, POPUL, POPUL-Imix, POPUL-Tmix, POPUL-Hmix, POTR5, POTR5-Imix, POTR5-Tmix, POTR5-Hmix
Spruce/fir (sprucefir)	Subalpine fir, Engelmann spruce (minor lodgepole component)	MX-ABLA, MX-PIEN, or MX-TABR2	ABLA, ABLA-Imix, ABLA-Tmix, ABLA-Hmix, PIEN, PIEN-Imix, PIEN-Tmix, PIEN-Hmix, TABR2, TABR2-Imix, TABR2-Tmix, TABR2-Hmix
Whitebark pine/Alpine larch (whitebarksubalplarch)	Whitebark pine	MX-LALY or MX-PIAL	LALY, LALY-Imix, LALY-Tmix, LALY-Hmix, PIAL, PIAL-Imix, PIAL-Tmix, PIAL-Hmix
Grass	Forb mixes; Rough fescue; Idaho fescue; Western wheatgrass; Bluebunch wheatgrass, Needle-and-thread grass; Tufted hairgrass; Little bluestem; Prairie sandreed; Green needle grass; Needlegrass; Timothy; Crested wheatgrass; Blue grama; Kentucky bluegrass Cool season short grass mix; Cool season mid grass mix; Warm season mid grass mix; Warm season short grass mix; Mixed grass	Grass-Dry; Grass-Bunch; Grass-Singlestem	Grass-Dry; Grass-Bunch; Grass-Singlestem

R1 Cover Type	Species included	DomMid40	Dom Group 6040
Dry Shrub (dryshrub)	Sagebrush; Antelope Bitterbrush; Shrubby cinquefoil; Skunkbush sumac; Curl-leaf mountain mahogany; Greasewood; Rabbitbrush; Saltbush, Spinless horsebrush; Soapweed yucca	Shrub-Xeric; MX-CELE3	CELE3, CELE3-Imix, CELE3-Tmix, CELE3-Hmix
	Juniper shrub ¹	MX-JUNIP, JUNIP	JUNIP
Riparian Grass/shrub	Willow, Alder, Deciduous shrub mix; Mountain brome; Smooth brome; Dry sedge; Wet sedge/spikerush/juncus; Annual brome	Grass-Wet	Grass-Wet
Mesic Shrub	chokecherry, plum; rose; snowberry; huckleberry; mallow ninebark; white spirea; buffaloberry; evergreen shrub	Shrub-Mesic	Shrub-Mesic
Non-Vegetated	N/A	Sparse; Urban; Water	Sparse; Urban; Water

¹The JUNIP dominance 6040 type is included in the dry shrub cover type given its common association with grass/shrub. However, juniper dominance types that include a mix of other tree species (JUNIP-Imix, JUNIP-Hmix, JUNIP-Tmix) include components of ponderosa pine, limber pine, and/or Douglas-fir, and are therefore included in the Ponderosa Pine cover type.

²PVT information must be used to split the PSME dominance groups to distinguish between the dry Douglas-fir and the Mixed Mesic Conifer cover types.

³Aspen is also depicted in potential vegetation associated with riparian types. It is included as a forested cover type to account for upland aspen that is mapped outside of riparian areas.

IV. References

Barber, Jim, D. Berglund, R. Bush. 2011. The Region 1 Existing Vegetation Classification System and its Relationship to Inventory Data and the Region 1 Existing Vegetation Map Products. Region 1 Vegetation Classification, Mapping, Inventory, and Analysis Report # 11-10.

http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5332073.pdf

Bush, Renate R., B. Reyes. 2014. Overview of FIA and Intensified Grid Data. Region 1 Vegetation Classification, Mapping, Inventory, and Analysis Report #14-13 v2.0.

http://fsweb.r1.fs.fed.us/forest/inv/r1_tools/Overview_FIA_Int_Grid.pdf

Bush, Renate, B. Reyes. 2014. R1 Summary Database Reports and Utilities. Region 1 Vegetation, Classification, Mapping, Inventory, and Analysis Report #14-15.

http://fsweb.r1.fs.fed.us/forest/inv/r1_tools/R1_SDB_Rep_Util.pdf

Chew, Moeller, and Stalling 2012. SIMPPLLE, Version 2.5 User's Guide. USDA Forest Service, Rocky Mountain Research Station RMRS-GTR-268WWW. (Appendix A).

Cooper, S.V., K.E. Neiman, and D.W. Roberts 1991. Forest Habitat Types of Northern Idaho: A Second Approximation. USDA Forest Service, Intermountain Research Station. GTR-INT-236.

FSH 2409.21h R-1 Timber Management Data Handbook.

http://fsweb.r1.fs.fed.us/forest/inv/cse_exams/legacy.shtml

Green, P.; J. Joy; D. Sirucek; W. Hann; A. Zack; and B. Nauman. 1992. Old-growth forest types of the Northern Region. Unpublished report, Missoula, MT: U.S. Department of Agriculture, Forest Service,

Northern Region. Errata corrected 2005. Green et.al. Error Correction Notes. Art Zack, Renee Lundberg, Barry Bollenbacher. Missoula, MT: USDA Forest Service, Region 1.

Hansen, Paul L.; Boggs, Keith L.; Cook, Bradley J.; and others. 1995. Classification and Management of Montana's Riparian and Wetland sites. Misc. Pub. #54. Missoula, MT: Montana Riparian Association.

Hansen, Paul, L.; Hoffman, George R. The Vegetation of the Grand River/Cedar River, Sioux, and Ashland Districts of the Custer NF: A habitat Type Classification. Gen. Tech. Rep. RM-157. T, Collins, CO: USDA FS RMFR Ex ST. 68p.

Helms, John A. 1998. The Dictionary of Forestry. The Society of American Foresters. 5400 Grosvenor Lane, Bethesda, MD 20814-2198.

Jones, Jeff 2005. A description of Methods; & R1 GIS Metadata for Jones PVT Layer

Key to Montana Forest/Woodland Habitat Types East of the Continental Divide. Developed for RMRS FIA (FIA ONLY)

Manning, Mary 1999. Non-forested Vegetation Habitat Type Groups.

Mueggler, W.F and W.L Stewart 1980. Grassland and shrubland habitat types of Western Montana. General Technical Report INT-66. Intermountain Forest and Range Experiment Station, Ogden, UT.

Pfister, R. D., B. L. Kovalchik, S. F. Arno, and R. C. Presby. 1977. Forest Habitat Types of Montana. GTR-INT-34. USDA Forest Service, Intermountain Forest & Range Experiment Station.

R1 Inventory Look-up Tables Database. Region 1 Vegetation Classification, Mapping, Inventory, and Analysis Report #15-07, 2015. <http://fsweb.r1.fs.fed.us/forest/inv/classify/index.shtml>

R1 FSVeg Reports and Utilities User's Guide, R1 Supplement to National FSVeg/CSE User's Guide Chapters 7 and 8. Region 1 Vegetation Classification, Mapping, Inventory, and Analysis Report #15-6 , V 9.0. http://fsweb.r1.fs.fed.us/forest/inv/fsveg/r1_fsveg_reports_and_utilities.pdf

USDA 2005. Biophysical Classification – Habitat Type Groups and Descriptions of Northern Idaho and Northwestern Montana, Lower Clark Fork and Adjacent Areas. Region One Vegetation Classification Mapping, Inventory, and Analysis Report. #09-08.
http://fsweb.r1.fs.fed.us/forest/inv/classify/hab_type_groups_revisd_final_12_05_r1.pdf