



United States Department of Agriculture
US Forest Service
Natural Resource Manager (NRM)



FSVeg Common Stand Exam User Guide Region 10 Appendices

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APPENDIX A: ADMINISTRATIVE AND PROCLAIMED FOREST CODES

Table 1: Region 10 codes

Admin Number	Administrative Forest Name	Proclaimed Number	Proclaimed Forest Name
04	Chugach	04	Chugach
05	Tongass	02	Tongass – Stikine
05	Tongass	03	Tongass – Chatham
05	Tongass	05	Tongass - Ketchikan

APPENDIX B: DISTRICT CODES

Table 2: Region 10 codes

Forest	Code	District
Chugach	10	Glacier
Chugach	20	Cordova
Chugach	30	Seward
Tongass	21	Petersburg
Tongass	22	Wrangell
Tongass	31	Sitka
Tongass	32	Hoonah
Tongass	3	Juneau
Tongass	34	Admiralty NM
Tongass	35	Yukutat
Tongass	51	Craig
Tongass	52	Ketchikan/Misty Fjords
Tongass	54	Thorne Bay

APPENDIX C: STATE CODES

Table 3: Region 10 codes

Code	State
AK	Alaska

APPENDIX D: COUNTY CODES

Table 4: Alaska County codes

Code	County
13	Aleutians East
16	Aleutians West
20	Anchorage
50	Bethel
60	Bristol Bay
70	Dillingham
90	Fairbanks North Star
100	Haines
110	Juneau
122	Kenai Peninsula
130	Ketchikan Gateway
150	Kodiak Island
164	Lake and Peninsula
170	Matanuska – Susitna
180	Nome
185	North Slope
188	Northwest Arctic

Code	County
201	Prince of Wales – Oute
220	Sitka
231	Skagway – Yakutat – Ango
240	Southeast Fairbanks
261	Valdez – Cordova
270	Wade Hampton
280	Wrangell – Petersburg
290	Yukon – Koyukuk

APPENDIX E: EXISTING VEGETATION REFERENCES & CODES

Table 5: Existing Vegetation References

Code	Name	Author
1001	Region 10; Resource Information Management: Data Dictionary for the Chugach National Forest	USDA Forest Service
1003	Yakutat Existing Veg Classification, 1995	Michael Shepard, Chatham Area Ecologist

Table 6: Region 10 Chugach Codes (1001)

Code	Description	Plant Code
1001	Lutz's spruce/Sitka alder	PILU/ALVIS
1002	Lutz's spruce/Sitka alder – rusty menziesia	PILU/ALVIS-MEFE
1003	Lutz's spruce/bluejoint	PILU/CACA4
1004	Lutz's spruce/spreading woodfern	PILU/DREX2
1005	Lutz's spruce/devilsclub	PILU/OPHO
1006	Lutz's spruce/field horsetail	PILU/EQAR

Code	Description	Plant Code
1007	Lutz's spruce/western oakfern	PILU/GYDR
1008	Lutz's spruce/twinflower	PILU/LIBO3
1009	Lutz's spruce/rusty menziensia	PILU/MEFE
1010	Lutz's spruce/rust menziensia (sparse)	PILU/MEFE
1011	Lutz's spruce/lingonberry	PILU/VAVI
1012	Lutz's spruce/Sitka alder – devilsclub	PILU/ALVIS-OPHO
1013	Lutz's spruce/Sitka alder/bluejoint/field horsetail	PILU/ALVIS/CACA4/EQAR
1014	Lutz's spruce/bluejoint/field horsetail	PILU/CACA4/EQAR
1015	Lutz's spruce/bluejoint/western oakfern	PILU/CACA4/GYDR
1016	Lutz's spruce/rusty menziensia/strawberryleaf raspberry	PILU/MEFE/RUPE
1017	Lutz's spruce/rusty menziensia/strawberryleaf raspberry – bluejoint	PILU/MEFE/RUPE/-CACA4
1018	Lutz's spruce/Barclay's willow	PILU/SABA3
1019	Lutz's spruce/red elderberry/fireweed	PILU/SARA2/CHANA2
1020	Lutz's spruce/dwarf bilberry	PILU/VACA13
1021	Lutz's spruce/bog blueberry	PILU/VAUL
1101	Black spruce/Sitka alder	PIMA/ALVIS
1102	Black spruce/lingonberry	PIMA/VAVI
1103	Black spruce/Sitka alder/bluejoint/field horsetail	PIMA/ALVIS/CACA4/EQAR
1104	Black spruce/Sitka alder/shrubby cinquefoil	PIMA/ALVIS/DAFL3
1105	Black spruce/black crowberry	PIMA/EMNI
1106	Black spruce/marsh Labrador tea/cloudberry	PIMA/LEPA22/RUCH
1107	black spruce/shrubby cinquefoil/beachhead iris	PIMA/DAFL3/IRSE
1108	Black spruce/cloudberry/field horsetail	PIMA/RUCH/EQAR
1109	Black spruce/bog blueberry	PIMA/VAUL

Code	Description	Plant Code
1201	Sitka spruce/Sitka alder	PISI/ALVIS
1202	Sitka spruce/Sitka alder – devilsclub	PISI/ALVIS-OPHO
1203	Sitka spruce/devilsclub	PISI/OPHO
1204	Sitka spruce/field horsetail	PISI/EQAR
1205	Sitka spruce/splendid feather moss	PISI/HYSP70
1206	Sitka spruce/American skunkcabbage	PISI/LYAM3
1207	Sitka spruce/salmonberry-devilsclub	PISI/RUSP-OPHO
1208	Sitka spruce/Barclay's willow	PISI/SABA3
1209	Sitka spruce/oval-leaf blueberry	PISI/VAOV
1210	Sitka spruce/oval-leaf blueberry-devilsclub	PISI/VAOV-OPHO
1211	Sitka spruce/oval-leaf blueberry/spreading woodfern	PISI/VAOV/DREX2
1301	Western hemlock/splendid feather moss	TSHE/HYSP70
1302	Western hemlock/oval-leaf blueberry	TSHE/VAOV
1303	Western hemlock/oval-leaf blueberry-devilsclub	TSHE/VAOV-OPHO
1304	Western hemlock/oval-leaf blueberry/spreading woodfern	TSHE/VAOV/DREX2
1305	Western hemlock/oval-leaf blueberry/American skunkcabbage	TSHE/VAOV/LYAM3
1306	Western hemlock/oval-leaf blueberry/grass	TSHE/VAOV/2GRAM
1307	Western hemlock/oval-leaf blueberry/grass	TSHE/VAOV/2GRAM
1401	Western hemlock-Sitka spruce/devilsclub	TSHE-PISI/OPHO
1402	Western hemlock-Sitka spruce/salmonberry-devilsclub	TSHE-PISI/RUSP-OPHO
1403	Western hemlock-Sitka spruce/oval-leaf blueberry	TSHE-PISI/VAOV
1404	Western hemlock-Sitka spruce/oval-leaf blueberry-devilsclub	TSHE-PISI/VAOV-OPHO

Code	Description	Plant Code
1405	Western hemlock-Sitka spruce/oval-leaf blueberry/American skunkcabbage	TSHE-PISI/VAOV/LYAM3
1406	Western hemlock-Sitka spruce/oval-leaf blueberry/grass	TSHE-PISI/VAOV/2GRAM
1501	Mountain hemlock/Sitka alder	TSME/ALVIS
1502	Mountain hemlock/Sitka alder-rusty menziesia	TSME/ALVIS-MEFE
1503	Mountain hemlock/Alaska bellheather	TSME/HAST3
1504	Mountain hemlock/spreading woodfern	TSME/DREX2
1505	Mountain hemlock/devilsclub	TSME/OPHO
1506	Mountain hemlock/splendid feather moss	TSME/HYSP70
1507	Mountain hemlock/rusty menziesia	TSME/MEFE
1508	Mountain hemlock/rusty menziesia-lingonberry	TSME/MEFE-VAVI
1509	Mountain hemlock/rusty menziesia (sparse)	TSME/MEFE
1510	Mountain hemlock/Aleutian mountainheath	TSME/PHAL4
1511	Mountain hemlock/oval-leaf blueberry	TSME/VAOV
1512	Mountain hemlock/oval-leaf blueberry/Alaska bellheather	TSME/VAOV/HAST3
1513	Mountain hemlock/oval-leaf blueberry/copperbush	TSME/VAOV/ELPY
1514	Mountain hemlock/oval-leaf blueberry-devilsclub	TSME/VAOV-OPHO
1515	Mountain hemlock/oval-leaf blueberry-rusty menziesia	TSME/VAOV-MEFE
1516	Mountain hemlock/oval-leaf blueberry/Pacific reedgrass	TSME/VAOV/CANU
1517	Mountain hemlock/oval-leaf blueberry/deercabbage	TSME/VAOV-NECR2
1518	Mountain hemlock/bog blueberry	TSME/VAUL
1519	Mountain hemlock/lingonberry	TSME/VAVI
1520	Mountain hemlock (krumholtz)	TSME

Code	Description	Plant Code
1521	Mountain hemlock/black crowberry-blueberry (dwarf tree scrub)	TSME/EMNI-VACCI
1522	Mountain hemlock/rusty menziesia-black crowberry	TSME/MEFE-EMNI
1523	Mountain hemlock/rusty menziesia-twinflower	TSME/MEFE-LIBO3
1524	Mountain hemlock/oval-leaf blueberry/grass	TSME/VAOV/2GRAM
1525	Mountain hemlock/oval-leaf blueberry/grass (etc.)	TSME/VAOV/2GRAM
1601	Mountain hemlock-Alaska cedar/oval-leaf blueberry-Alaska bellheather	TSME-CHNO/VAOV-HAST3
1701	Mountain hemlock-Lutz's spruce/devilsclub	TSME-PILU/OPHO
1702	Mountain hemlock-Lutz's spruce/splendid feather moss	TSME-PILU/HYSP70
1703	Mountain hemlock-Lutz's spruce/rusty menziesia	TSME-PILU/MEFE
1704	Mountain hemlock-Lutz's spruce/rusty menziesia-lingonberry	TSME-PILU/MEFE-VAVI
1705	Mountain hemlock-Lutz's spruce/rusty menziesia (sparse)	TSME-PILU/MEFE
1706	Mountain hemlock-Lutz's spruce/rusty menziesia-blueberry	TSME-PILU/MEFE-VACCI
1751	Mountain hemlock-black spruce/rusty menziesia/strawberry leaf raspberry	TSME-PIMA/MEFE/RUPE
1801	Mountain hemlock-Sitka spruce/devilsclub	TSME-PISI/OPHO
1802	Mountain hemlock-Sitka spruce/oval-leaf blueberry	TSME-PISI/VAOV
1803	Mountain hemlock-Sitka spruce/oval-leaf blueberry-devilsclub	TSME-PISI/VAOV-OPHO
1804	Mountain hemlock-Sitka spruce/oval-leaf blueberry-strawberry leaf raspberry	TSME-PISI/VAOV-RUPE
1805	Mountain hemlock-Sitka spruce/oval-leaf blueberry/spreading woodfern ssp. Dilatata	TSME-PISI/VAOV/DREX2
1806	Mountain hemlock-Sitka spruce/oval-leaf blueberry/American skunkcabbage	TSME-PISI/VAOV/LYAM3

Code	Description	Plant Code
1807	Mountain hemlock-Sitka spruce/American skunkcabbage/grass	TSME-PISI/LYAM3/2GRAM
1901	Mountain hemlock-western hemlock/oval-leaf blueberry	TSME-TSHE/VAOV
1902	Mountain hemlock-western hemlock/oval-leaf blueberry-Alaska bellheather	TSME-TSHE/VAOV-HAST3
1903	Mountain hemlock-western hemlock/oval-leaf blueberry-copperbush	TSME-TSHE/VAOV-ELPY
1904	Mountain hemlock-western hemlock/oval-leaf blueberry-devilsclub	TSME-TSHE/VAOV-OPHO
1905	Mountain hemlock-western hemlock/oval-leaf blueberry-rusty menziesia	TSME-TSHE/VAOV-MEFE
1906	Mountain hemlock-western hemlock/oval-leaf blueberry/Pacific reedgrass	TSME-TSHE/VAOV/CANU
1907	Mountain hemlock-western hemlock/oval-leaf blueberry/deercabbage	TSME-TSHE/VAOV/NECR2
1909	Western hemlock-mountain hemlock/oval-leaf blueberry	TSHE-TSME/VAOV
1910	Western hemlock-mountain hemlock/oval-leaf blueberry-devilsclub	TSHE-TSME/VAOV-OPHO
1911	Western hemlock-mountain hemlock/oval-leaf blueberry/grass	TSHE-TSME/VAOV/2GRAM
1912	Western hemlock-mountain hemlock/oval-leaf blueberry/American skunkcabbage	TSHE-TSME/VAOV/LYAM3
1913	Mountain hemlock-western hemlock/oval-leaf blueberry/grass	TSME-TSHE/VAOV/2GRAM
1914	Mountain hemlock-western hemlock/oval-leaf blueberry/grass (etc.)	TSME-TSHE/VAOV/2GRAM
2001	Paper birch/Sitka alder	BEPA/ALVIS
2002	Paper birch/Pacific reedgrass	BEPA/CANU
2003	Paper birch/devilsclub	BEPA/OPHO
2004	Paper birch/twinflower	BEPA/LIBO3

Code	Description	Plant Code
2005	Paper birch/rusty menziesia	BEPA/MEFE
2006	Paper birch/rusty menziesia (sparse)	BEPA/MEFE
2007	Paper birch/lingonberry	BEPA/VAVI
2008	Paper birch/Sitka alder/bluejoint	BEPA/ALVIS/CACA4
2009	Paper birch/dwarf birch/bog blueberry	BEPA/BENA/VAUL
2010	Paper birch/willow-sweetgale/bluejoint	BEPA/SALIX-MYGA/CACA4
2011	Paper birch/willow/bog blueberry	BEPA/SALIX/VAUL
2012	Paper birch/red elderberry/spreading woodfern	BEPA/SARA2/DREX2
2051	Paper birch-balsam poplar/mountain alder/bluejoint	BEPA-POBA2/ALVIC/CACA4
2101	Black cottonwood/Sitka alder	POBAT/ALVIS
2102	Black cottonwood/devilsclub	POBAT/OPHO
2103	Black cottonwood/Sitka alder-willow	POBAT/ALVIS-SALIX
2104	Black cottonwood/Sitka alder/bluejoint	POBAT/ALVIS/CACA4
2105	Black cottonwood/Sitka alder/devilsclub	POBAT/ALVIS/OPHO
2106	Black cottonwood/devilsclub/common cowparsnip	POBAT/OPHO/HEMA80
2107	Black cottonwood/willow/lichen	POBAT/SALIX/2LICHN
2201	Quaking aspen/russet buffaloberry	POTR5/SHCA
2202	Quaking aspen/bluejoint/western oakfern	POTR5/CACA4/GYDR
2203	Quaking aspen/russet buffaloberry-squashberry	POTR5/SHCA-VIED
2204	Quaking aspen/russet buffaloberry/kinnikinnick	POTR5/SHCA/ARUV
2205	Quaking aspen/lingonberry	POTR5/VAVI
3001	Lutz's spruce-paper birch/bluejoint	PILU-BEPA/CACA4
3002	Lutz's spruce-paper birch/splendid feather moss	PILU-BEPA/HYSP70
3003	Lutz's spruce-paper birch/stiff clubmoss	PILU-BEPA/LYAN2
3004	Lutz's spruce-paper birch/rusty menziesia	PILU-BEPA/MEFE

Code	Description	Plant Code
3005	Lutz's spruce-paper birch/rusty menziesia (sparse)	PILU-BEPA/MEFE
3006	Lutz's spruce-paper birch/lingonberry	PILU-BEPA/VAVI
3007	Lutz's spruce-paper birch/Sitka alder	PILU-BEPA/ALVIS
3101	Lutz's spruce-black cottonwood/Sitka alder	PILU-POBAT/ALVIS
3102	Lutz's spruce-black cottonwood/bluejoint	PILU-POBAT/CACA4
3103	Lutz's spruce-black cottonwood/devilsclub	PILU-POBAT/OPHO
3104	Lutz's spruce-black cottonwood/field horsetail	PILU-POBAT/EQAR
3105	Lutz's spruce-black cottonwood/splendid feather moss	PILU-POBAT/HYSP70
3201	Lutz's spruce-quaking aspen/lingonberry	PILU-POTR5/VAVI
3301	Sitka spruce-black cottonwood/Sitka alder	PISI-POBAT/ALVIS
3302	Black cottonwood-Lutz's spruce/Sitka alder	POBAT-PILU/ALVIS
3303	Black cottonwood-Lutz's spruce/mountain alder/devilsclub	POBAT-PILU/ALVIC/OPHO
3304	Black cottonwood-Lutz's spruce/willow/lichen	POBAT-PILU/SALIX/2LICHN
3401	Mountain hemlock-paper birch/splendid feather moss	TSME-BEPA/HYSP70
3402	Mountain hemlock-paper birch/stiff clubmoss	TSME-BEPA/LYAN2
3403	Mountain hemlock-paper birch/rusty menziesia	TSME-BEPA/MEFE
3404	Mountain hemlock-paper birch/rusty menziesia (sparse)	TSME-BEPA/MEFE
4000	Sitka alder	ALVIS
4001	Sitka alder-devilsclub	ALVIS-OPHO
4002	Sitka alder-undergreen willow	ALVIS-SACO2
4003	Sitka alder/common ladyfern	ALVIS/ATFI
4004	Sitka alder/bluejoint	ALVIS/CACA4
4005	Sitka alder/spreading woodfern	ALVIS/DREX2

Code	Description	Plant Code
4006	Sitka alder/field horsetail	ALVIS/EQAR
4007	Sitka alder-salmonberry	ALVIS-RUSP
4008	Sitka alder-salmonberry/common ladyfern	ALVIS-RUSP/ATFI
4009	Sitka alder/feltleaf willow	ALVIS/SAAL
4010	Sitka alder-feltleaf willow/bluejoint	ALVIS-SAAL/CACA4
4011	Sitka alder-Barclay's willow	ALVIS-SABA3
4012	Sitka alder-Sitka willow	ALVIS-SASI2
4013	Sitka alder-Sitka willow/bluejoint	ALVIS-SASI2/CACA4
4014	Feltleaf willow	SAAL
4015	Barclay's willow/bluejoint	SABA3/CACA4
4016	Barclay's willow/Sitka sedge	SABA3/CAAQD
4017	Barclay's willow/forb	SABA3/2FORB
4018	Undergreen willow	SACO2
4019	Dune willow	SABO
4020	Sitka willow	SASI2
4021	Sitka alder-willow	ALVIS-SALIX
4022	Sitka alder-willow/bluejoint	ALVIS-SALIX/CACA4
4023	Sitka alder-willow/black cottonwood	ALVIS-SALIX/POBAT
4024	Sitka alder/black cottonwood	ALVIS/POBAT
4025	Willow	SALIX
4026	Willow/bluejoint	SALIX/CACA4
4027	Willow/horsetail	SALIX/EQUIS
4028	Sitka willow/purple marshlocks/bluejoint	SASI2/POPA28/CACA4
4101	Dwarf birch	BENA
4102	Copperbush	ELPY

Code	Description	Plant Code
4103	Sweetgale-Barclay's willow	MYGA-SABA3
4104	Sweetgale-undergreen willow	MYGA-SASI2
4105	Sweetgale-dune willow	MYGA-SAHO
4106	Sweetgale/bluejoint	MYGA/CACA4
4107	Sweetgale/Lyngbye's sedge	MYGA/CALY3
4108	Sweetgale/Sitka sedge	MYGA/CAAQD
4109	Sweetgale/tall cottongrass	MYGA/ERAN6
4110	Salmonberry	RUSP
4111	Salmonberry/common ladyfern	RUSP/ATFI
4112	Salmonberry/bluejoint	RUSP/CACA4
4113	Dwarf birch/sedge	BENA/CAREX
4114	Heath (bog, open low scrub)	ERICA
4115	Sweetgale	MYGA
4116	Willow-sweetgale	SALIX-MYGA
4117	Willow-sweetgale/bluejoint	SALIX-MYGA/CACA4
4118	Willow-sweetgale/sedge	SALIX-MYGA/CAREX
4119	Willow-sweetgale/horsetail	SALIX-MYGA/EQUIS
4201	Alaska bellheather-partridgefoot	HAST3-LUPE
4202	Alaska bellheather-partridgefoot/deercabbage	HAST3-LUPE/NECR2
4203	Eightpetal mountain-avens/alpine sweetgrass	DROC/HIAL3
4204	Black crowberry	EMNI
4205	Black crowberry-alpine kinnikinnick	EMNI-ARAL2
4206	Black crowberry-bog blueberry	EMNI-VAUL
4207	Black crowberry-bog blueberry-manyflower sedge	EMNI-VAUL-CAPL6
4208	Black crowberry-bog blueberry/deercabbage	EMNI-VAUL/NECR2

Code	Description	Plant Code
4209	Black crowberry-bog blueberry/tufted bulrush	EMNI-VAUL/TRAC30
4210	Aleutian mountainheath-Alaska bellheather	PHAL4-HAST3
4211	Aleutian mountainheath/deercabbage	PHAL4/NECR2
4212	Arctic willow-black crowberry	SAAR27-EMNI
4213	Arctic willow/Lyngbye's sedge	SAAR27/CALY3
4214	Nettleaf willow/Altai fescue	SARE2/FEAL
4215	Least willow/smallawned sedge	SARO2/CAMI4
5001	Pendantgrass	ARFU2
5002	Bluejoint	CACA4
5003	Bluejoint/willow	CACA4/SALIX
5004	Water sedge	CAAQ
5005	Lyngbye's sedge	CALY3
5006	Lyngbye's sedge/marsh pea	CALY3/LAPA4
5007	Lyngbye's sedge/alkali buttercup	CALY3/RACY
5008	Lyngbye's sedge/forbs	CALY3/2FORB
5009	Longawn sedge	CAMA11
5010	Smallawned sedge	CAMI4
5011	Fewflower sedge	CAPA19
5012	Manyflower sedge	CAPL6
5013	Beaked sedge	CARO6
5014	Sitka sedge	CAAQD
5015	Tufted hairgrass	DECA18
5016	Common spikerush	ELPA3
5017	Sand ryegrass	LEAR11
5018	Sand ryegrass/boreal yarrow	LEAR11/ACMIB

Code	Description	Plant Code
5019	Tall cottongrass-fewflower sedge	ERAN6-CAPA19
5020	Tall cottongrass-manyflower sedge	ERAN6-CAPL6
5021	Tall cottongrass-tufted bulrush	REAN6-TRCA30
5022	Altai fescue	FEAL
5023	Altai fescue/woolly geranium	FEAL/GEER2
5024	Wahlenberg's woodrush	LUWA
5025	Dwarf alkaligrass	PUPU3
5026	Tufted bulrush	TRCA30
5027	Sedge	CAREX
5028	Sedge-tufted bulrush	CAREX-TRCA30
5029	Sedge/water horsetail	CAREX/EQFL
5030	Sedge/shrub	CAREX/2SHRUB
5031	Tufted hairgrass	DECA18
5032	Tall cottongrass	ERAN6
5101	Common ladyfern	ATFI
5102	Fireweed	CHANA2
5103	Field horsetail	EQAR
5104	Water horsetail	EQFL
5105	Variegated scouringrush	EQVA
5106	Deercabbage	NECR2
5107	Deercabbage/tufted bulrush	NECR/TRCA30
5108	Beach strawberry	FRCH
5109	Beach pea	LAJAM
5110	Nootka lupine	LUNO
5111	Buckbean	METR3

Code	Description	Plant Code
5112	Pacific silverweed	AREGE
5113	Purple marshlocks	COPA28
5114	Sitka valerian	VASI
5115	Green false hellebore	VEVI
5116	Fireweed/bluejoint	CHANA2/CACA4
5117	Fireweed/bluejoint/field horsetail/western oakfern	CHANA2/CACA4/EQAR/ GYDR
5118	Horsetail	EQUIS
5119	Horsetail-purple marshlocks	EQUIS-COPA28
5120	Buckbean-horsetail	METR3-EQUIS
5121	Buckbean-purple marshlocks	METR3-COPA28
5201	Northern water-starwort	CAHE2
5202	Common mare's-tail	HIVU2
5203	Shortspike watermilfoil	MYSI
5204	Fineleaf pondweed	STFIF
5205	Claspingleaf pondweed	POPE7
5206	Threadleaf pondweed	RATR
5207	Bur-reed	SPARG
5208	Waterawtwort	SUAQ
5209	Common bladderwort	UTMA
6000	Water	2W
7000	Barren	2BARE

Table 7: Region 10 Yakutat Codes (1003)

Code	Description	Plant Code
125005	Picea sitchensis-Populus balsamifera ssp. Trichocarpa/Alnus crispa ssp. Sinuate	PISI-POBAT/ALCRS

Code	Description	Plant Code
125010	Picea sitchensis-Populus blasamifera ssp. Trichocarpa/Echinopanax horridum	PISI-POBAT/ECHO2
125015	Picea sitchensis-Populus balsamifera ssp. Trichocarpa/seral	PISI-POBAT/SERAL
140015	Alnus crispa ssp. sinuata-Malus fusca	ALCRS-MAFU
140020	Alnus crispa ssp. sinuata-Rubus spectabilis	ALCRS-RUSP
140030	Alnus crispa ssp. sinuata/Athyrium-femina	ALCRS/ATFI
140035	Alnus crispa ssp. sinuata/Calamagrostis Canadensis	ALCRS/CACA4
145030	Alnus crispa ssp. sinuata-Salix sitchensis	ALCRS-SASI2
147005	Alnus crispa ssp. sinuata/graminoid	ALCRS/2GRAM
150030	Salix barclayi/Carex pluriflora	SABA3/ACPL6
150045	Salix barclayi/Fragaria chiloensis	SABA3/FRCH
150050	Picea sitchensis/Alnus crispa ssp. sinuata	PISI/ALCRS
150055	Salix barclayi/mixed herb	SABA3/mixed herb
150065	Salix hookeriana	SAHO
150070	Salix sitchensis	SAS12
15030	Picea sitchensis/Echinopanax horridum	PISI/ECHO2
15060	Picea sitchensis/Hylocomium splendens	PISI/HYSP70
15070	Picea sitchensis/Rubus spectabilis-Echinopanax horridum	PISI/RUSP-ECHO2
15080	Picea sitchensis/Vaccinium ovalifolium	PISI/VAOV
15085	Picea sitchensis/Vaccinium ovalifolium-Echinopanax horridum	PISI/VAOV-ECHO2
15095	Picea sitchensis/Vaccinium ovalifolium/Dryopteris dilatata	PISI/VAOV/DRDI2
15105	Picea sitchensis/seral	PISI/seral
15110	Picea sitchensis/Sphagnum spp.	PISI/SPAG2

Code	Description	Plant Code
165015	Myrica gala/Carex sitchensis	MYGA/CASI3
170015	Myrica gala/Carex livida	MYGA/CALI
170020	Myrica gala/Carex pluriflora	MYGA/CAPL6
170025	Myrica gala/Epilobium angustifolium	MYGA/EPAN2
170030	Myrica gala/Equisetum Varigatum	MYGA/EQVA
190005	Andromeda/polifolia/Carex pluriflora	ANPO/CAPL6
190020	Empetrum nigrum-Vaccinium uliginosum	EMNI-VAUL
190040	Empetrum nigrum/Carex pluriflora	EMNI/CAPL6
20010	Pinus contorta/empetrum nigrum	PICO/EMNI
20005	Elymus arenarius	ELARM
24005	Clamagrostis Canadensis	CACA4
250010	Calamagrostis Canadensis/Potentilla egedii	CACA4/POEG
25010	Tsuga heterophylla/Echinopanax horridum-Rubus spectabilis	TSHE/ECHO2-RUSP
25035	Tsuga heterophylla/Vaccinium ovalifolium	TSHE/VAOV
25040	Tsuga heterophylla/Vaccinium ovalifolium-Echinopanax horridum	TSHE/VAOV-ECHO2
25050	Tsuga heterophylla/Vaccinium ovalifolium/Dryopteris dilate	TSHE/VAOV/CRDI2
275025	Trichophorum caespitosum	TRAC30
285015	Carex livida-Trichophorum caespitosum	CALI-TRCA30
285025	Carex saxatilis	CASA10
285035	Carex sitchensis/Equisetum fluviatile	CASI3/EQFL
287005	Puccinellia pumila	PUPU
290010	Carex lyngbyei	CALY3
290015	Carex lyngbyei-Carex pluriflora	CALY3-CAPL6
290035	Eleocharis palustris	ELPA3

Code	Description	Plant Code
295020	Carex sitchensis/Oxycoccus palustris	CASI3/OXPA4
300015	Fragaria chiloensis	FRCH
300020	Fragaria chilioensis-Achillea borealis	FRCH-ACBO
305030	Lupinus nootkatensis/Salix setchelliana	LUNO/SASE4
315005	Athyrium filix-femina	ATFI
320005	Equisetum fluviatile	AQFL
325015	Menyanthes trifoliata-Equisetum variegatum	METR3-EQVA
327010	Menyanthes trifoliata	METR3
327020	Menyanthes trifoliata-Potentilla palustris	METR3-POPA14
335005	Nuphar polysepalum	NUPO2
355005	Myriophyllum sibiricum	MYSI
45075	Tsuga mertensiana/Vaccinium ovalifolium	TSME/VAOV
70010	Tsuga mertensiana-T. heterophylla/Vaccinium ovalifolium	TSME-TSHE/VAOV
70030	Tsuga mertensiana-T. heterophylla/Vaccinium ovalifolium/Lysichiton americanus	TSME-TSHE/VAOV/LYAM3
75030	Mixed conifer/Vaccinium ovalifolium	MIXED CONIFER/VAOV
75050	Mixed conifer/Vaccinium ovalifolium/Lysichiton americanus	MIXED CONIFER/VAOV/LYAM3
90035	Populus balsamifera ssp. trichocarpa/Echinopanax horridum	POBAT/ECHO2
90055	Populus balsamifera ssp. trichocarpa/Rubus spectabilis	POBAT/RUSP
90065	Populus balsamifera ssp. trichocarpa/Salix ssp.	POBAT/SALIX

APPENDIX F: POTENTIAL VEGETATION REFERENCES

Table 8: Potential Vegetation References

Code	Name	Author
1002	A combination of R10-MB-210 (Ketchikan Area); R10-TP-57 (Chatham Area); R-10-TP-72 (Stikine Area); and R10-TP-56 (Yakutat Foreland).	USDA Forest Service

APPENDIX G: POTENTIAL VEGETATION CODES

Table 9: Reference Code 1002

PV_CODE	COMMON_NAME	SCIENTIFIC_NAME
AOC	Maple/sweetroot-cohosh	ACER/OSMOR-CAULO
100	Western hemlock series	TSHE Series
110	Western hemlock/blueberry	TSHE/VACCI
115	Western hemlock/blueberry-rusty menziesia	TSHE/VACCI-MEFE
120	Western hemlock/blueberry/mountain woodfern	TSHE/VACCI/DRCA3
130	Western hemlock/blueberry/American skunkcabbage	TSHE/VACCI/LYAM3
140	Western hemlock/blueberry-devilsclub	TSHE/VACCI-OPHO
150	Western hemlock/devilsclub-salmonberry	TSHE/OPHO-RUSP
160	Western hemlock/devilsclub	TSHE/OPHO
165	Western hemlock/devilsclub (low production)	TSHE/OPHO
170	Western hemlock/devilsclub/American skunkcabbage	TSHE/OPHO/LYAM3
175	Western hemlock/salmonberry	TSHE/RUSP

200	Western hemlock-Alaska cedar series	TSHE-CHNO
210	Western hemlock-Alaska cedar/blueberry	TSHE-CHNO/VACCI
220	Western hemlock-Alaska cedar/blueberry/American skunkcabbage	TSHE-CHNO/VACCI/LYAM3
230	Western hemlock-Alaska cedar/blueberry-rusty menziesia	TSHE-CHNO/VACCI-MEFE
250	Western hemlock-Alaska cedar/blueberry-devilsclub	TSHE-CHNO/VACCI-OPHO
300	Sitka spruce Series	PISI
310	Sitka spruce/blueberry	PISI/VACCI
320	Sitka spruce/blueberry-devilsclub	PISI/VACCI-OPHO
330	Sitka spruce/devilsclub	PISI/OPHO
333	Sitka spruce/devilsclub/small enchanter's nightshade	PISI/OPHO/CIAL
335	Sitka spruce/devilsclub-salmonberry	PISI/OPHO-RUSP
340	Sitka spruce/devilsclub/American skunkcabbage	PISI/OPHO/LYAM3
345	Sitka spruce/devilsclub (upland)	PISI/OPHO
350	Sitka spruce/red alder	PISI/ALRU2
352	Sitka spruce-red alder/salmonberry	PISI-ALRU2/RUSP
353	Sitka spruce/simil onion	PISI/ALSI
360	Sitka spruce/Pacific reedgrass	PISI/CANU
370	Sitka spruce/blueberry/American skunkcabbage	PISI/VACCI/LYAM3
380	Sitka spruce/salmonberry	PISI/RUSP

390	Sitka spruce-mountain hemlock/blueberry	PISI-TSME/VACCI
391	Sitka spruce-mountain hemlock/blueberry/Howell's marsh marigold	PISI-TSME/VACCI/CALEH2
395	Sitka spruce-mountain hemlock/blueberry-devilsclub	PISI-TSME/VACCI-OPHO
400	Mixed conifer series	2TE
410	Mixed conifer/blueberry	2TE/VACCI
420	Mixed conifer/blueberry/American skunkcabbage	2TE/VACCI/LYAM3
430	Mixed conifer/blueberry/deercabbage	2TE/VACCI/NECR2
440	Mixed conifer/American skunkcabbage-common ladyfern	2TE/LYAM3-ATFI
460	Mixed conifer/blueberry-salal	2TE/VACCI-GASH
465	Mixed conifer/blueberry-salal/deercabbage	2TE/VACCI-GASH/NECR2
470	Mixed conifer/salal/American skunkcabbage	2TE/GASH/LYAM3
480	Mixed conifer/salal	2TE/GASH
490	Mixed conifer/copperbush/deercabbage	2TE/ELPY/NECR2
491	Mixed conifer/copperbush	2TE/ELPY
500	Mountain hemlock Series	TSME
510	Mountain hemlock/blueberry	TSME/VACCI
520	Mountain hemlock/copperbush	TSME/ELPY
525	Mountain hemlock/copperbush-cassia	TSME/ELPY-CASSI
530	Mountain hemlock/cassia	TSME/CASSI
535	Mountain hemlock/cassia/deercabbage	TSME/CASSI/NECR2

540	Mountain hemlock/blueberry/deercabbage	TSME/VACCI/NECR2
570	Mountain hemlock/blueberry/Howells marsh marigold	TSME/VACCI/CALEH2
580	Western hemlock/blueberry/American skunkcabbage	TSME/VACCI/LYAM3
600	Lodgepole pine series	PICO
610	Lodgepole pine/black crowberry	PICO/EMNI
620	Lodgepole pine/blueberry	PICO/VACCI
630	Lodgepole pine/Sitka sedge	PICO/CAAQD
640	Lodgepole pine/tufted bulrush	PICO/TRCA30
650	Lodgepole pine/salal	PICO/GASH
700	Western hemlock-western red cedar series	TSHE-THPL
710	Western hemlock-western red cedar/blueberry	TSHE-THPL/VACCI
720	Western hemlock-western red cedar/western swordfern	TSHE-THPL/POMU
730	Western hemlock-western red cedar/blueberry/American skunkcabbage	TSHE-THPL/VACCI/LYAM3
750	Western hemlock-western red cedar/blueberry (well-drained variant)	TSHE-THPL/VACCI
760	Western hemlock-western red cedar/blueberry-salal	TSHE-THPL/VACCI-GASH
765	Western hemlock-western red cedar/blueberry-salal/American skunkcabbage	TSHE-THPL/VACCI-GASH/LYAM3
780	Western hemlock-western red cedar/salal	TSHE-THPL/GASH
800	Sitka spruce-black cottonwood series	PISI-POBAT

830	Sitka spruce-black cottonwood/devilsclub	PISI-POBAT/OPHO
833	Sitka spruce-black cottonwood/devilsclub/enchanter's nightshade	PISI-POBAT/OPHO/CIAL
865	Sitka spruce-black cottonwood/Sitka alder-salmonberry	PISI-POBAT/ALSI-RUSP
885	Sitka-spruce-black cottonwood/Sitka alder-devilsclub	PISI-POBAT/ALSI-OPHO

APPENDIX H: FUEL PHOTO REFERENCES & CODES

Table 10: Fuel Photo References

Code	Reference
8	Maxwell, Wayne G. and Ward, Franklin R. 1980. Photo Series for Quantifying Natural Forest Residues in Common Vegetation Types of the Pacific Northwest . USDA Forest Service, Gen. Tech. Rep. PNW-105. Pacific Northwest Forest and Range Exp. Stn., Portland, OR. 229 p.
9	Ottmar, Roger D. and Hardy, Colin C. 1989. Stereo Photo Series for Quantifying Forest Residues in Coastal Oregon Forests: Second Growth Douglas-fir—Western Hemlock Type, Western Hemlock—Sitka Spruce Type, and Red Alder Type . USDA Forest Service, Gen. Tech. Rep. PNW-231. Pacific Northwest Range Exp. Stn., Portland, OR 67 p.
13	Wayne G. Maxwell, Franklin R. Ward. 1976. Photo Series for Quantifying Forest Residues in the Coastal Douglas-fir-Hemlock type, Coastal Douglas-fir-Hardwood Type. USDA Forest Service, Gen. Tech. Rep. PNW-51. Northwest Forest and Range Experiment Station, Portland, OR.
16	Ottmar, Roger D., R.E. Vihnanek, and S.C. Wright. 1998. Stereo Photo Series for Quantifying Natural Fuels in Black Spruce and White Spruce Types in Alaska (includes Volume IIa: Hardwoods with Spruce in Alaska).

FUEL PHOTO CODES

Table 11: Fuel Photo Codes for Reference 8

Code
1BR
1DF2
1DF3
1DF4
1DFHD3
1DFHD4
1GR
1HD2
1JU2
1LP1
1LP2
1LP3
1MC2
1MC3
1MC4
1PP&ASSOC3
1PP&ASSOC4
1PP1
1PP2
1PP3
1PP4
1SA1
1SA2

Code
1SA3
1SA4
2BR
2DF2
2DF3
2DF4
2DFHD3
2DFHD4
2GR
2HD2
2JU2
2LP1
2LP2
2LP3
2MC2
2MC3
2MC4
2PP&ASSOC3
2PP&ASSOC4
2PP1
2PP2
2PP3
2PP4
2SA1
2SA2

Code
2SA3
2SA4
3DFHD3
3DFHD4
3LP1
3LP2
3LP3
3MC2
3MC3
3PP&ASSOC3
3PP&ASSOC4
3PP1
3PP2
3PP3
3PP4
3SA1
3SA3
4DF4
4DFHD4
4LP2
4PP&ASSOC3
4PP2
4PP3
4PP4
4DF4

Code
5DFHD4
5PP&ASSOC3
5PP3
5PP4
6DF4
6PP3
6PP4
7DF4
7PP3
7PP4
8PP3
8PP4

Table 12: Fuel Photo Codes for Reference 9

Code
1DFWHPRE01
1DFWHPRE02
1DFWHPRE03
1DFWHPRE04
1DFWHPRE05
1DFWHPRE06
1DFWHPRE07
1DFWHPRE08
1DFWHPRE09
2WHSSPRE01
3RAPRE01

Code
3RAPRE02
3RAPRE03
3RAPRE05
3RAPRE06
RAPRE07
4DFWHPOST01
4DFWHPOST02
4DFWHPOST03
4DFWHPOST04
5RAPOST01
5RAPOST02
5RAPOST03
5RAPOST04
5RAPOST05

Table 13: Fuel Photo Codes for Reference 13

Code
10DF4CC
1DF1TH
1DF3PC
1DF4CC
1DF4PC
1DFHD4CC
1DFHD4PC
2DF1TH
2DF3PC

Code
2DF4CC
2DF4PC
2DFHD4CC
2DFHD4PC
3DF1TH
3DF3PC
3DF4CC
3DF4PC
3DFHD4CC
3DFHD4PC
4DF1TH
4DF3PC
4DF4CC
4DF4PC
4DFHD4CC
4DFHD4PC
5DF3PC
5DF4CC
5DF4PC
5DFHD4CC
5DFHD4PC
6DF3PC
6DF4CC
6DF4PC
6DFHD4CC

Code
6DFHD4PC
7DF4CC
7DF4PC
7DFHD4CC
8DF4CC
8DF4PC
9DF4CC
9DF4PC

Table 14: Fuel Photo Codes for Reference 16

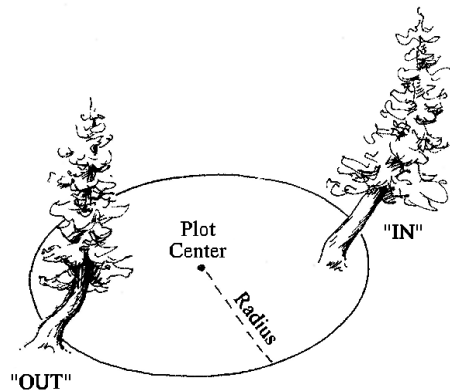
Code
AH01
AH02
AH03
AH04
AH05
AH06
AH07
AH08
AH09
AH10
AH11
AH12
AH13
AH14
AH15

Code
BS01
BS02
BS03
BS04
BS05
BS06
BS07
BS08
BS09
BS10
BS11
BS12
BS13
BS14
WS01
WS02
WS03
WS04
WS05
WS06
WS07
WS08
WS09
WS10
WS11

APPENDIX I: FIXED RADIUS PLOT

A fixed radius plot is used to sample trees that are less than the specified breakpoint diameter. These sample trees are determined to be “in” or “out” at ground line. If the measured distance from plot center to the central axis of the tree at ground line is equal to or less than the fixed plot radius the tree is tallied as a sample tree. If this distance is greater than the fixed plot radius, the tree is not tallied.

Figure 1: Trees “in” and “out” of fixed radius plot



On level ground, the fixed plot radius is determined by holding the measuring tape or pole in a horizontal position from plot center to the central axis of the sample tree. On slopes greater than 9 percent, if a measuring tape or pole cannot be horizontally from plot center to the central axis of the sample tree, the fixed plot radius is corrected for the slope percent by using one of the following methods.

METHOD 1

Correct the fixed plot radius for slope percent using the “Circular Plot Radii Corrected for Slope” table and then measuring distances parallel to the ground line. This method always results in a circular plot on the slope. Example – 1/300 acre fixed plot on 50 percent slope. Corrected fixed plot radius is 7.2 feet.

Figure 2: Correcting the fixed plot radius for slope percent

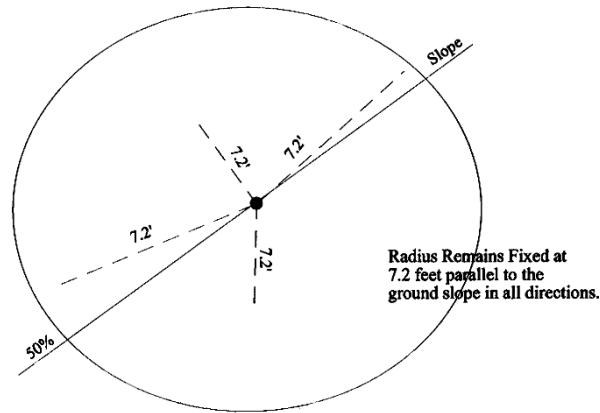


Table 15: Circular Plot Radii Corrected for Slope; plot size in acres

Slope %	1 / 300	1 / 100	1 / 50	1 / 20	1 / 10	1 / 5
0-9	6.8	11.8	16.7	26.3	37.2	52.7
10-17	6.8	11.8	16.7	26.5	37.4	52.9
18-22	6.9	11.9	16.8	26.6	37.6	53.2
23-26	6.9	12.0	16.9	26.7	37.8	53.4
27-30	6.9	12.0	17.0	26.9	38.0	53.7
31-33	7.0	12.1	17.1	27.0	38.2	54.0
34-36	7.0	12.1	17.1	27.1	38.3	54.2
37-39	7.0	12.2	17.2	27.2	38.5	54.5
40-42	7.1	12.2	17.3	27.4	38.7	54.7
43-44	7.1	12.3	17.4	27.5	38.9	55.0
45-47	7.1	12.3	17.5	27.6	39.1	55.2
48-49	7.2	12.4	17.5	27.7	39.2	55.5
50-51	7.2	12.5	17.6	27.9	39.4	55.7
52-53	7.2	12.5	17.7	28.0	39.6	56.0
54-55	7.3	12.6	17.8	28.1	39.8	56.2
56-57	7.3	12.6	17.9	28.2	39.9	56.5

Slope %	1 / 300	1 / 100	1 / 50	1 / 20	1 / 10	1 / 5
58-59	7.3	12.7	17.9	28.4	40.1	56.7
60-61	7.4	12.7	18.0	28.5	40.3	57.0
62-63	7.4	12.8	18.1	28.6	40.4	57.2
64-65	7.4	12.8	18.2	28.7	40.6	57.4
66-67	7.4	12.9	18.2	28.8	40.8	57.7
68-69	7.5	13.0	18.3	29.0	41.0	57.9
70	7.5	13.0	18.4	29.1	41.1	58.2
71-72	7.5	13.1	18.5	29.2	41.3	58.4
73-74	7.6	13.1	18.5	29.3	41.5	58.6
75	7.6	13.2	18.6	29.4	41.6	58.7
76-77	7.6	13.2	18.7	29.6	41.8	59.1
78-79	7.7	13.3	18.8	29.7	42.0	59.3
80	7.7	13.3	18.8	29.8	42.1	59.6
81-82	7.7	13.4	18.9	29.9	42.3	59.8
83	7.8	13.4	19.0	30.0	42.5	60.0
84-85	7.8	13.5	19.1	30.1	42.6	60.3
86	7.8	13.5	19.1	30.3	42.8	60.5
87-88	7.8	13.6	19.2	30.4	42.9	60.7
89	7.9	13.6	19.3	30.5	43.1	61.0
90-91	7.9	13.7	19.3	30.6	43.3	61.2
92	7.9	13.7	19.4	30.7	43.4	61.4
93-94	8.0	13.8	19.5	30.8	43.6	61.6
95	8.0	13.8	19.6	30.9	43.7	61.9
96-97	8.0	13.9	19.6	31.0	43.9	62.1
98	8.0	13.9	19.7	31.2	44.1	62.3

Slope %	1 / 300	1 / 100	1 / 50	1 / 20	1 / 10	1 / 5
99-100	8.1	14.0	19.8	31.3	44.2	62.5
101	8.1	14.0	19.8	31.4	44.4	62.8
102	8.1	14.1	19.9	31.5	44.5	63.0
103-104	8.2	14.1	20.0	31.6	44.7	63.2
105	8.2	14.2	20.1	31.7	44.8	63.4
106-107	8.2	14.2	20.1	31.8	45.0	63.6
108	8.2	14.3	20.2	31.9	45.1	63.8
109	8.3	14.3	20.3	32.0	45.3	64.1
110-111	8.3	14.4	20.3	32.1	45.5	64.3
112	8.3	14.4	20.4	32.2	45.6	64.5
113	8.4	14.5	20.5	32.4	45.8	64.7
114-115	8.4	14.5	20.5	32.5	45.9	64.9
116	8.4	14.6	20.6	32.6	46.1	65.1
117	8.4	14.6	20.7	32.7	46.2	65.3
118-119	8.5	14.7	20.7	32.8	46.4	65.6
120	8.5	14.7	20.8	32.9	46.5	65.8
121	8.5	14.8	20.9	33.0	46.7	66.0
122	8.5	14.8	20.9	33.1	46.8	66.2
123-124	8.6	14.8	21.0	33.2	47.0	66.4
125	8.6	14.9	21.1	33.3	47.1	66.6
130	8.7	15.1	21.3	33.7	47.7	67.4
135	8.8	15.3	21.6	34.1	48.3	68.3
140	8.9	15.4	21.8	34.5	48.8	69.1
145	9.0	15.6	22.1	34.9	49.4	69.9
150	9.1	15.8	22.3	35.3	50.0	70.0

METHOD 2

Determine the slope limiting distance to borderline trees by using the “Slope Correction Table” (the slope being corrected is the slope from plot center to the tree, not the overall plot slope). Measure the distance parallel to the ground line to the borderline tree. This method always results in an oval on the slope. Following is a list of fixed plot sizes and the specific radius for each.

Table 16: Method 2 plot size/radius slope

Plot Size	Plot Radius
1/1000	3.7 feet
1/500	5.3 feet
1/400	5.9 feet
1/300	6.8 feet
1/250	7.4 feet
1/200	8.3 feet
1/150	9.6 feet
1/100	11.8 feet
1/50	16.7 feet
1/20	26.3 feet
1/10	37.2 feet
1/5	52.7 feet
1/4	58.9 feet
1/3	68.0 feet
1/2	83.3 feet
1	117.8 feet

To determine the slope limiting distance, multiply the plot radius for the appropriate plot size by the appropriate slope correction factor.

Example 1

1/300 acre fixed plot with a borderline tree on a 45 percent slope. A 1/300-acre plot equals a 6.8-foot radius and the slope correction factor for a 45 percent slope is 1.10. $6.8 \times 1.10 = 7.48$; thus, a tree on a 1/300 acre fixed plot at a 45 percent slope can be 7.5 feet from plot center.

Example 2

The same plot has another borderline tree on a 25 percent slope. The slope correction factor for a 25 percent slope is 1.03. $6.8 \times 1.03 = 7.0$; thus, a tree on a 1/300 acre fixed plot at a 25 percent slope can be 7.0 feet from plot center.

Figure 3: Plot size radius slope

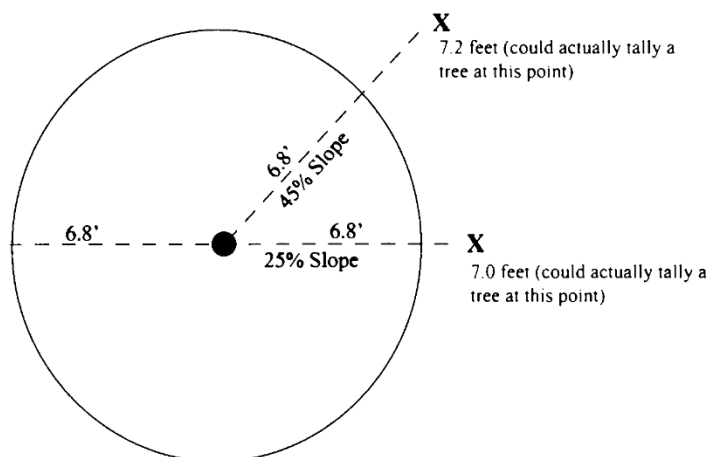


Table 17: Slope Correction Table

Percent of Slope	Degree of Slope	Correction Factor
0 to 9	0-6	1.00
10 to 17	7-10	1.01
18 to 22	11-12	1.02
23 to 26	13-14	1.03
27 to 30	15-17	1.04
31 to 33	18	1.05
34 to 36	19-20	1.06
37 to 39	21	1.07
40 to 42	22	1.08
43 to 44	23	1.09
45 to 47	24	1.10
48 to 49	25-26	1.11

Percent of Slope	Degree of Slope	Correction Factor
50 to 51	27	1.12
52 to 53	28	1.13
54 to 55	29	1.14
56 to 57	29	1.15
58 to 59	30	1.16
60 to 61	31	1.17
62 to 63	32	1.18
64 to 65	33	1.19
66 to 67	34	1.20
68 to 69	34	1.21
70	35	1.22
71 to 72	36	1.23
73 to 74	37	1.24
75	37	1.25
76 to 77	38	1.26
78 to 79	38	1.27
80	39	1.28
81 to 82	39	1.29
83	40	1.30
84 to 85	40	1.31
86	41	1.32
87 to 88	41	1.33
89	42	1.34
90 to 91	42	1.35
92	43	1.36

Percent of Slope	Degree of Slope	Correction Factor
93 to 94	43	1.37
95	44	1.38
96 to 97	44	1.39
98	44	1.40
99 to 100	45	1.41
101	45	1.42
102	46	1.43
103 to 104	46	1.44
105	46	1.45
106 to 107	47	1.46
108	47	1.47
109	47	1.48
110 to 111	48	1.49
112	48	1.50
113	48	1.51
114 to 115	49	1.52
116	49	1.53
117	49	1.54
118 to 119	50	1.55
120	50	1.56
121	50	1.57
122	51	1.58
123 to 124	51	1.59
125	51	1.60
126	52	1.61

Percent of Slope	Degree of Slope	Correction Factor
127 to 128	52	1.62
129	52	1.63
130	52	1.64
131	53	1.65
132 to 133	53	1.66
134	53	1.67
135	53	1.68
136	54	1.69
137 to 138	54	1.70
139	54	1.71
140	54	1.72
141	55	1.73
142 to 143	55	1.74
144	55	1.75
145	55	1.76
146	56	1.77
147	56	1.78
148 to 149	56	1.79
150	56	1.80

APPENDIX J: VARIABLE RADIUS PLOT

INTRODUCTION

In or our determination is made at the DBH or DRC of each tree. For information on the theory and mathematics of variable plot cruising, and formulas for determining the plot radius factor for any given BAF, the reader is referred to **Log Scaling and Timber Cruising**, 1973, J.R. Dilworth. OSU Book Stores, Inc., Corvallis, Oregon.

The experienced field person using a wedge prism, angle gauge, or relaskop can quickly tell in which case trees are “in” or “out” on the variable plot. However, there are certain trees that are questionable (borderline) for tally because they are located at the outer limits of the variable plot radius. This narrative deals with the procedures needed to ascertain if these borderline trees should be tallied: the mechanics of using plot radius tables in the field, the associated measurements, and corrections of variable plot radii for slope.

MEASUREMENT OF BORDERLINE TREES TO DETERMINE “IN OR OUT” STATUS

In variable plot sampling, the plot radius varies according to the DBH or DRC of each tree. To determine whether a tree is to be sampled requires measurement of its DBH or DRC and its distance from plot center. [Table 18](#), [Table 19](#), [Table 20](#), [Table 21](#), [Table 22](#), [Table 23](#), and [Table 24](#) display limiting distances (the maximum horizontal distance from plot center to the face of the tree at breast height for a tree to be considered “in”) for various tree diameters and commonly used basal area factors (BAF).

Once the DBH or DRC of the borderline tree is taken, the limiting distance is found by entering the table appropriate for the specified BAF. This limiting distance is then compared to the horizontal distance between plot center and the nearest **face of the tree** at breast height. If the measured horizontal distance from plot center is *less than or equal to* the limiting distance from the table, the tree in question is “in” and is tallied as a sample tree. However, if measured horizontal distance from plot center is greater than the limiting distance, then the tree in question is “out” and is not tallied.

1. Measure the diameter to the nearest tenth of an inch
2. Measure the percent slope from the face of the tree at DBH or DRC to plot center

If the slope is less than ten percent look up limiting distance in Tables 1 through 5 or use the BAF correction factors listed in Table 24 below.

Table 18: BAF correction factors

Type	Correction Factors								
BAF	10	15	20	25	30	35	40	50	60
Plot Radius Factor*	27.08	2.203	1.902	1.697	1.546	1.428	1.333	1.188	1.081

** This is a corrected plot radius factor, corrected for determining the limiting distance to the face of the tree. A standard plot radius factor was used to determine limiting distance to the center of a tree, and is computed by $8.696/\text{SQR}(\text{BAF})$. A corrected PRF subtracts $1/24$ (0.041666) from the standard plot radius factor.*

Example:

BAF = 40; DBH = 20.9 inches; Slope = 5%

Limiting Distance = Plot Radius Factor * DBH, $1.333 * 20.9 = 27.9$ feet

3. **If the slope is greater than ten percent**, first determine the slope correction factor. The slope correction factor and the slope corrected plot radius factor can be obtained by using the formula below or by referring to [Table 23](#). Then, multiply the slope correction factor by the plot radius factor identified in step #3 above to obtain

the slope corrected plot radius factor. Finally, multiply the slope corrected plot radius factor by the diameter to obtain the limiting distance.

Example:

BAF = 40; DBH = 20.9 inches; Slope = 20%

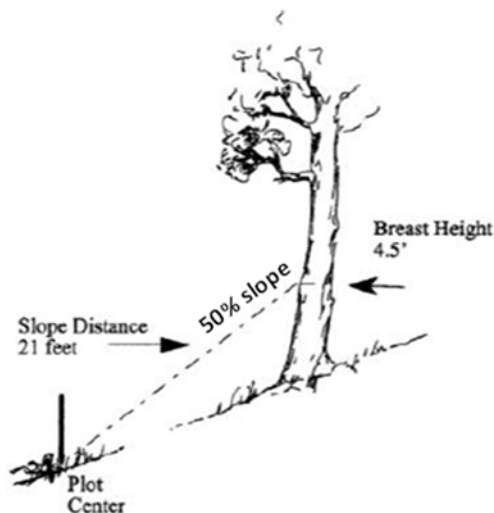
Slope Correction Factor = $\text{SQR}(1 + (\text{slope}/100)^2) = \text{SQR}(1 + (20/100)^2) = 1.0198$

Slope Corrected Plot Radius Factor = Slope Correction Factor * Plot Radius Factor = $1.0198 * 1.333 = 1.359$

Limiting Distance = Slope Corrected Plot Radius Factor * DBH = $1.359 * 20.9 = 28.4$ feet

4. Measure the distance from plot center to the face of the tree, nearest plot center, at DBH or DRC. Both the slope measurement and distance measurement must be taken at plot center. If the measured distance is less than the limiting distance, the tree is "in."

Figure 4: Determining limiting distance on a slope



Example:

BAF = 40; DBH = 15.0; Slope = 50%; Slope Distance = 21.0 feet

Referring to [Table 23](#), the Combined Factor for a slope of 50% with a 4- BAF is 1.490.

Limiting Distance = DBH * Combined Factor = $15.0 * 1.490 = 22.35$

Since 21.0 is less than or equal to the limiting distance of 22.35 feet, the tree is "in" and is tallied as a sample tree.

Measuring “In” or “Out” Down Trees

Down trees are “in” or “out” of the variable plot radius based on where the DBH or DRC now lies, not on where the tree once stood. The distance measurement is taken from plot center to the nearest face of the tree at breast height.

Table 19: BAF 10 Plot Radii in Feet and Tenths of Feet from Plot Center to Face of Tree at DBH for 0% Slope

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	13.5	13.8	14.1	14.4	14.6	14.9	15.2	15.4	15.7	16.0
6	16.2	16.5	16.8	17.1	17.3	17.6	17.9	18.1	18.4	18.7
7	19.0	19.2	19.5	19.8	20.0	20.3	20.6	20.9	21.1	21.4
8	21.7	21.9	22.2	22.5	22.7	23.0	23.3	23.6	23.8	24.1
9	24.4	24.6	24.9	25.2	25.5	25.7	26.0	26.3	26.5	26.8
10	27.1	27.4	27.6	27.9	28.2	28.4	28.7	29.0	29.2	29.5
11	29.8	30.1	30.3	30.6	30.9	31.1	31.4	31.7	32.0	32.2
12	32.5	32.8	38.5	38.7	39.0	39.3	39.5	39.8	40.1	40.3
13	35.2	35.5	35.7	36.0	36.3	36.6	36.8	37.1	37.4	37.6
14	37.9	38.2	38.5	38.7	39.0	39.3	39.5	39.8	40.1	40.3
15	40.6	40.9	41.2	41.4	41.7	42.0	42.2	42.5	42.8	43.1
16	43.3	43.6	43.9	44.1	44.4	44.7	45.0	45.2	45.5	45.8
17	46.0	46.3	46.6	46.8	47.1	47.4	47.7	47.9	48.2	48.5
18	48.7	49.0	49.3	49.6	49.8	50.1	50.4	50.6	50.9	51.2
19	51.5	51.7	52.0	52.3	52.5	52.8	53.1	53.3	53.6	53.9
20	54.2	54.4	54.7	55.0	55.2	55.5	55.8	56.1	56.3	56.6
21	56.9	57.1	57.4	57.7	58.0	58.2	58.5	58.8	59.0	59.3
22	59.6	57.1	57.4	57.7	58.0	58.2	58.5	58.8	59.0	59.3
23	62.3	62.6	62.8	63.1	63.4	63.6	63.9	64.2	64.5	64.7
24	65.0	65.3	65.5	65.8	66.1	66.3	66.6	66.9	67.2	67.4
25	67.7	68.0	68.2	63.1	63.4	63.6	63.9	64.2	64.5	64.7

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
26	70.4	70.7	70.9	71.2	71.5	71.8	72.0	72.3	72.6	72.8
27	73.1	73.4	73.7	73.9	74.2	74.5	74.7	75.0	75.3	75.6
28	75.8	76.1	76.4	76.6	76.9	77.2	77.4	77.7	78.00	78.3
29	78.5	78.8	79.1	79.3	79.6	79.9	80.2	80.4	80.7	81.0
30	81.2	81.5	81.8	82.1	82.3	82.6	82.9	83.1	83.4	83.7
31	83.9	84.2	84.5	84.8	85.0	85.3	85.6	85.8	86.1	86.4
32	86.7	86.9	87.2	87.5	87.7	88.0	88.3	88.6	88.8	89.1
33	89.4	89.6	89.9	90.2	90.4	90.7	91.0	91.3	91.5	91.8
34	92.1	92.3	92.6	92.9	93.2	93.4	93.7	94.0	94.2	94.5
35	94.8	95.1	95.3	95.6	95.9	96.1	96.4	96.7	96.9	97.2
36	97.5	97.8	98.0	98.3	98.6	98.8	99.1	99.4	99.7	99.9
37	100.2	100.5	100.7	101.0	101.3	101.6	101.8	102.1	102.4	102.6
38	102.9	103.2	103.4	103.7	104.0	104.3	104.5	104.8	105.1	105.3
39	105.6	105.9	106.2	106.4	106.7	107.0	107.2	107.5	107.8	108.0
40	108.3	108.6	108.9	109.1	109.4	109.7	109.9	110.2	110.5	110.8
41	111.0	111.3	111.6	111.8	112.1	112.4	112.7	112.9	113.2	113.5
42	113.7	114.0	114.3	114.5	114.8	115.1	115.4	115.6	115.9	116.2
43	116.4	116.7	117.0	117.3	117.5	117.8	118.1	118.3	118.6	118.9
44	119.2	119.4	119.7	120.0	120.2	120.5	120.8	121.0	121.3	121.6
45	121.9	122.1	122.4	122.7	122.9	120.2	123.5	123.8	124.0	124.3
46	124.6	124.8	125.1	125.4	125.7	125.9	126.2	126.5	126.7	127.0
47	127.3	127.5	127.8	128.1	128.4	128.6	128.9	129.2	129.4	129.7
48	130.0	130.3	130.5	130.8	131.1	131.3	131.6	131.9	132.2	132.4
49	132.7	133.0	133.2	133.5	133.8	134.0	134.3	134.6	134.9	135.1
50	135.4	135.7	135.9	136.2	136.5	136.8	137.0	137.3	137.6	137.8

Prepared by multiplying the BAF 10 Plot Radius Factor 2.708 * DBH. For example, if DBH = 14.3 inches, then 14.3 * 2.708 = 38.

Table 20: BAF 20 Plot Radii in Feet and Tenths of Feet from Plot Center to Face of Tree at DBH for 0% Slope

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	9.5	9.7	9.9	10.1	10.3	10.5	10.7	10.8	11.0	11.2
6	11.4	11.6	11.8	12.0	12.2	12.4	12.6	12.8	12.9	13.1
7	13.3	13.5	13.7	13.9	14.1	14.3	14.5	14.7	14.8	15.0
8	15.2	15.4	15.6	15.8	16.0	16.2	16.4	16.6	16.8	16.9
9	17.1	17.3	17.5	17.7	17.9	18.1	18.3	18.5	18.6	18.8
10	19.0	19.2	19.4	19.6	19.8	20.0	20.2	20.4	20.6	20.7
11	20.9	21.1	21.3	21.5	21.7	21.9	22.1	22.3	22.5	22.6
12	22.8	23.0	23.2	23.4	23.6	23.8	24.0	24.2	24.4	24.5
13	24.7	24.9	25.1	25.3	25.5	25.7	25.9	26.1	26.3	26.5
14	26.6	26.8	27.0	27.2	27.4	27.6	27.8	28.0	28.2	28.4
15	28.5	28.7	28.9	29.1	29.3	29.5	29.7	29.9	30.1	30.3
16	30.4	30.6	30.8	31.0	31.2	31.4	31.6	31.8	32.0	32.2
17	32.4	32.5	32.7	32.9	33.1	33.3	33.5	33.7	33.9	34.1
18	34.3	34.4	34.6	34.8	35.0	35.2	35.4	35.6	35.8	36.0
19	36.2	36.3	36.5	36.7	36.9	37.1	37.3	37.5	37.7	37.9
20	38.1	38.3	38.4	38.6	38.8	39.0	39.2	39.4	39.6	39.8
21	40.0	40.2	40.3	40.5	40.7	40.9	41.1	41.3	41.5	41.7
22	41.9	42.1	42.2	42.4	42.6	42.8	43.0	43.2	43.4	43.6
23	43.8	44.0	44.1	44.3	44.5	44.7	44.9	45.1	45.3	45.5
24	45.7	45.9	46.1	46.2	46.4	46.6	46.8	47.0	47.2	47.4
25	47.6	47.8	48.0	48.1	48.3	48.5	48.7	48.9	49.1	49.3
26	49.5	49.7	49.9	50.0	50.2	50.4	50.6	50.8	51.0	51.2

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
27	51.4	51.6	51.8	52.0	52.1	52.3	52.5	52.7	52.9	53.1
28	53.3	53.5	53.7	53.9	54.0	54.2	54.4	54.6	54.8	55.0
29	55.2	55.4	55.6	55.8	55.9	56.1	56.3	56.5	56.7	56.9
30	57.1	57.3	57.5	57.7	57.9	58.0	58.2	58.4	58.6	58.8
31	59.0	59.2	59.4	59.6	59.8	59.9	60.1	60.3	60.5	60.7
32	60.9	61.1	61.3	61.5	61.7	61.8	62.0	62.2	62.4	62.6
33	62.8	63.0	63.2	63.4	63.6	63.8	63.9	64.1	64.3	64.5
34	64.7	64.9	65.1	65.3	65.5	65.7	65.8	6.0	66.2	66.4
35	66.6	66.8	67.0	67.2	67.4	67.6	67.7	67.9	68.1	68.3
36	68.5	68.7	68.9	69.1	69.3	69.5	69.6	69.8	70.0	70.2
37	70.4	70.6	70.8	71.0	71.2	71.4	71.6	71.7	71.9	72.1
38	72.3	72.5	72.7	72.9	73.1	73.3	73.5	73.6	73.8	74.0
39	74.2	74.4	74.6	74.8	75.0	75.2	75.4	75.5	75.7	75.9
40	76.1	76.3	76.5	76.7	76.9	77.1	77.3	77.5	77.6	77.8
41	78.0	78.2	78.4	78.6	78.8	79.0	79.2	79.4	79.5	79.7
42	79.9	80.1	80.3	80.5	80.7	80.9	81.1	81.3	81.4	81.6
43	81.8	82.0	82.2	82.4	82.6	82.8	83.0	83.2	83.4	83.5
44	83.7	83.9	84.1	84.3	84.5	84.7	84.9	85.1	85.3	85.4
45	85.6	85.8	86.0	86.2	86.4	86.6	86.8	87.0	87.2	87.3
46	87.5	87.7	87.9	88.1	88.3	88.5	88.7	88.9	89.1	89.3
47	89.4	89.6	89.8	90.0	90.2	90.4	90.6	90.8	91.0	91.2
48	91.3	91.5	91.7	91.9	92.1	92.3	92.5	92.7	92.9	93.1
49	93.2	93.4	93.6	93.8	94.0	94.2	94.4	94.6	94.8	95.0
50	95.2	95.3	95.5	95.7	95.9	96.1	96.3	96.5	96.7	96.9

*Prepared by multiplying the BAF 20 Plot Radius Factor 1.902 * DBH. For example, if DBH = 14.3 inches, then 14.3 * 1.903 = 27.*

Table 21: BAF 30 Plot Radii in Feet and Tenths of Feet from Plot Center to Face of Tree at DBH for 0% Slope

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	7.7	7.9	8.0	8.2	8.3	8.5	8.7	8.8	9.0	9.1
6	9.3	9.4	9.6	9.7	9.9	10.0	10.2	10.4	10.5	10.7
7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	12.1	12.2
8	12.4	12.5	12.7	12.8	13.0	13.1	13.3	13.5	13.6	13.8
9	13.9	14.1	14.2	14.4	14.5	14.7	14.8	15.0	15.2	15.3
10	15.5	15.6	15.8	15.9	16.1	16.2	16.4	16.5	16.7	16.9
11	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4
12	18.6	18.7	18.9	19.0	19.2	19.3	19.5	19.6	19.8	19.9
13	20.1	20.3	20.4	20.6	20.7	20.9	21.0	21.2	21.3	21.5
14	21.6	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	23.0
15	23.2	23.3	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6
16	24.7	24.9	25.0	25.2	25.4	25.5	25.7	25.8	26.0	26.1
17	26.3	26.4	26.6	26.7	26.9	27.1	27.2	27.4	27.5	27.7
18	27.8	28.0	28.1	28.3	28.4	28.6	28.8	28.9	29.1	29.2
19	29.4	29.5	29.7	29.8	30.0	30.1	30.3	30.5	30.6	30.8
20	30.9	31.1	31.2	31.4	31.5	31.7	31.8	32.0	32.2	32.3
21	32.5	32.6	32.8	32.9	33.1	33.2	33.4	33.5	33.7	33.9
22	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4
23	35.6	35.7	35.9	36.0	36.2	36.3	36.5	36.6	36.8	36.9
24	37.1	37.3	37.4	37.6	37.7	37.9	38.0	38.2	38.3	38.5
25	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	40.00
26	40.2	40.4	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6
27	41.7	41.9	42.1	42.2	42.4	42.5	42.7	42.8	43.0	43.1
28	43.3	43.4	43.6	43.8	43.9	44.1	44.2	44.4	44.5	44.7

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
29	44.8	45.0	45.1	45.3	45.5	45.6	45.8	45.9	46.1	46.2
30	46.4	46.5	46.7	46.8	47.0	47.2	47.3	47.5	47.6	47.8
31	47.9	48.1	48.2	48.4	48.5	48.7	48.9	49.0	49.2	49.3
32	49.5	49.6	49.8	49.9	50.1	50.2	50.4	50.6	50.7	50.9
33	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.3	52.4
34	52.6	52.7	52.9	53.0	53.2	53.3	53.5	53.6	53.8	54.0
35	54.1	54.3	54.4	54.6	54.7	54.9	55.0	55.2	55.3	55.5
36	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	57.0
37	57.2	57.4	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6
38	58.7	58.9	59.1	59.2	59.4	59.5	59.7	59.8	60.0	60.1
39	60.3	60.4	60.6	60.8	60.9	61.1	61.2	61.4	61.5	61.7
40	61.8	62.0	62.1	62.3	62.5	62.6	62.8	62.9	63.1	63.2
41	63.4	63.5	63.7	63.8	64.0	64.2	64.3	64.5	64.3	64.8
42	64.9	65.1	65.2	65.4	65.6	65.7	65.9	66.0	66.2	66.3
43	66.5	66.6	66.8	66.9	67.1	67.3	67.4	67.6	67.7	67.9
44	68.0	68.2	68.3	68.5	68.6	68.8	69.0	69.1	69.3	69.4
45	69.6	69.7	69.9	70.0	70.2	70.3	70.5	70.7	70.8	71.0
46	71.1	71.3	71.4	71.6	71.7	71.9	72.0	72.2	72.4	72.5
47	72.7	72.8	73.0	73.1	73.3	73.4	73.6	73.7	73.9	74.1
48	74.2	74.4	74.5	74.7	74.8	75.0	75.1	75.3	75.4	75.6
49	75.8	75.9	76.1	76.2	76.4	76.5	76.7	76.8	77.0	77.1
50	77.3	77.5	77.6	77.8	77.9	78.1	78.2	78.4	78.5	78.7

Prepared by multiplying the BAF 30 Plot Radius Factor 1.546 * DBH. For example, if DBH = 14.3 inches, then $14.3 * 1.546 = 22$.

Table 22: BAF 40 Plot Radii in Feet and Tenths of Feet from Plot Center to Face of Tree at DBH for 0% Slope

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	6.7	6.8	6.9	7.1	7.2	7.3	7.5	7.6	7.7	7.9
6	8.0	8.1	8.3	8.4	8.5	8.7	8.8	8.9	9.1	9.2
7	9.3	9.5	9.6	9.7	9.9	10.0	10.1	10.3	10.4	10.5
8	10.7	10.8	10.9	11.1	11.2	11.3	11.5	11.6	11.7	11.9
9	12.0	12.1	12.3	12.4	12.5	12.7	12.8	12.9	13.1	13.2
10	13.3	13.5	13.6	13.7	13.9	14.0	14.1	14.3	14.4	14.5
11	14.7	14.8	14.9	15.1	15.2	15.3	15.5	15.6	15.7	15.9
12	16.0	16.1	16.3	16.4	16.5	16.7	16.8	16.9	17.1	17.2
13	17.3	17.5	17.6	17.7	17.9	18.0	18.1	18.3	18.4	18.5
14	18.7	18.8	18.9	19.1	19.2	19.3	19.5	19.6	19.7	19.9
15	20.0	20.1	20.3	20.4	20.5	20.7	20.8	20.9	21.1	21.2
16	21.3	21.5	21.6	21.7	21.9	22.0	22.1	22.3	22.4	22.5
17	22.7	22.8	22.9	23.1	23.2	23.3	23.5	23.6	23.7	23.9
18	24.0	24.1	24.3	24.4	24.5	24.7	24.8	24.9	25.1	25.2
19	25.3	25.5	25.6	25.7	25.9	26.0	26.1	26.3	26.4	26.5
20	26.7	26.8	26.9	27.1	27.2	27.3	27.5	27.6	27.7	27.9
21	28.0	28.1	28.3	28.4	28.5	28.7	28.8	28.9	29.1	29.2
22	29.3	29.5	29.6	29.7	29.9	30.0	30.1	30.3	30.4	30.5
23	30.7	30.8	30.9	31.1	31.2	31.3	31.5	31.6	31.7	31.9
24	32.0	32.1	32.3	32.4	32.5	32.7	32.8	32.9	33.1	33.2
25	33.3	33.5	33.6	33.7	33.9	34.0	34.1	34.3	34.4	34.5
26	34.7	34.8	34.9	35.1	35.2	35.3	35.5	35.6	35.7	35.9
27	36.0	36.1	36.3	36.4	36.5	36.7	36.8	36.9	37.1	37.2
28	37.3	37.5	37.6	37.7	37.9	38.0	38.1	38.3	38.4	38.5

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
29	38.7	34.8	34.9	35.1	35.2	35.3	35.5	35.6	35.7	35.9
30	40.0	40.1	40.3	40.4	40.5	40.7	40.8	40.9	41.1	41.2
31	41.3	41.5	41.6	41.7	41.9	42.0	42.1	42.3	42.4	42.5
32	42.7	42.8	42.9	43.1	43.2	43.3	43.5	43.6	43.7	43.9
33	44.0	44.1	44.3	44.4	44.5	44.7	44.8	44.9	45.1	45.2
34	45.3	45.5	45.6	45.7	45.9	46.0	46.1	46.3	46.4	46.5
35	46.7	46.8	46.9	47.1	47.2	47.3	47.5	47.6	47.7	47.9
36	48.0	48.1	48.2	48.4	48.5	48.7	48.	48.9	49.1	49.2
37	49.3	49.5	49.6	49.7	49.9	50.0	50.1	50.3	50.4	50.5
38	50.7	50.8	50.9	51.1	51.2	51.3	51.5	51.6	51.7	51.9
39	52.0	52.1	52.2	52.4	52.5	52.7	52.8	52.9	53.1	53.2
40	53.3	53.5	53.6	53.7	53.9	54.0	54.1	54.3	54.4	54.5
41	54.7	54.8	54.9	55.1	55.2	55.3	55.5	55.6	55.7	55.9
42	56.0	56.1	56.2	56.4	56.5	56.7	56.8	56.9	57.1	57.2
43	57.3	57.5	57.6	57.7	57.9	58.0	58.1	58.3	58.4	58.5
44	58.7	58.8	58.9	59.1	59.2	59.3	59.5	59.6	59.7	59.9
45	60.0	60.1	60.2	60.4	60.5	60.7	60.8	60.9	61.1	61.2
46	61.3	61.5	61.6	61.7	61.9	62.0	62.1	62.3	62.4	62.5
47	62.7	62.8	62.9	63.1	63.2	63.3	63.5	63.6	63.7	63.9
48	64.0	64.1	64.2	64.4	64.5	64.7	64.8	64.9	65.1	65.2
49	65.3	65.5	65.6	65.7	65.9	66.0	66.1	66.3	66.4	66.5
50	66.7	66.8	66.9	67.0	67.2	67.3	67.4	67.6	67.7	67.8

Prepared by multiplying the BAF 40 Plot Radius Factor 1.333 * DBH. For example, if DBH = 14.3 inches, then $14.3 * 1.333 = 19.1$ feet.

Table 23: BAF 60 Plot Radii in Feet and Tenths of Feet from Plot Center to Face of Tree at DBH for 0% Slope

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	5.4	5.5	5.6	5.7	5.8	5.9	6.1	6.2	6.3	6.4
6	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.4	7.5
7	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5
8	8.6	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6
9	9.7	9.8	9.9	10.1	10.2	10.3	10.4	10.5	10.6	10.7
10	10.8	10.9	11.0	11.1	11.2	11.4	11.5	11.6	11.7	11.8
11	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.8	12.9
12	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9
13	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	15.0
14	15.1	15.2	15.4	15.5	15.6	15.7	15.8	15.9	16.0	16.1
15	16.2	16.3	16.4	16.5	16.6	16.7	16.9	17.0	17.1	17.2
16	17.3	17.4	17.5	17.6	17.7	17.8	17.9	18.1	18.2	18.3
17	18.4	18.5	18.6	18.7	18.8	18.9	19.0	19.1	19.2	19.3
18	19.5	19.6	19.7	19.8	19.9	20.0	20.1	20.2	20.3	20.4
19	20.5	20.6	20.8	20.9	21.0	21.1	21.2	21.3	21.4	21.5
20	21.6	21.7	21.8	21.9	22.1	22.2	22.3	22.4	22.5	22.6
21	22.7	22.8	22.9	23.0	23.1	23.2	23.3	23.5	23.6	23.7
22	23.8	23.9	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.8
23	24.9	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8
24	25.9	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9
25	27.0	27.1	27.2	27.3	27.5	27.6	27.7	27.8	27.9	28.0
26	28.1	28.2	28.3	28.4	28.5	28.6	28.8	28.9	29.0	29.1
27	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	30.1	30.2
28	30.3	30.4	30.5	30.6	30.7	30.8	30.9	31.0	31.1	31.2

Inches	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
29	31.3	31.5	31.6	31.7	31.8	31.9	32.0	32.1	32.2	32.3
30	32.4	32.5	32.6	32.8	32.9	33.0	33.1	33.2	33.3	33.4
31	33.5	33.6	33.7	33.8	33.9	34.1	34.2	34.3	34.4	34.5
32	35.7	35.8	35.9	36.0	36.1	36.2	36.3	36.4	36.5	36.6
33	35.7	35.8	35.9	36.0	36.1	36.2	36.3	36.4	36.5	36.6
34	36.8	36.9	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7
35	37.8	37.9	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8
36	38.9	39.0	39.1	39.2	39.3	39.5	39.6	39.7	39.8	39.9
37	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.8	40.9	41.0
38	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	42.1
39	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	43.0	43.1
40	43.2	43.3	43.5	43.6	43.7	43.8	43.9	44.0	44.1	44.2
41	44.3	44.4	44.5	44.6	44.8	44.9	45.0	45.1	45.2	45.3
42	45.4	45.5	45.6	45.7	45.8	45.9	46.1	46.2	46.3	46.4
43	46.5	46.6	46.7	46.8	46.9	47.0	47.1	47.2	47.3	47.5
44	47.6	47.7	47.8	47.9	48.0	48.1	48.2	48.3	48.4	48.5
45	48.6	48.8	48.9	49.0	49.1	49.2	49.3	49.4	49.5	49.6
46	49.7	49.8	49.9	50.1	50.2	50.3	50.4	50.5	50.6	50.7
47	50.8	50.9	51.0	51.1	51.2	51.3	51.5	51.6	51.7	51.8
48	51.9	52.0	52.1	52.2	52.3	52.4	52.5	52.6	52.8	52.9
49	53.0	53.1	53.2	53.3	53.4	53.5	53.6	53.7	53.8	53.9
50	54.1	54.2	54.3	54.4	54.5	54.6	54.7	54.8	54.9	55.0

Prepared by multiplying the BAF 60 Plot Radius Factor 1.081 * DBH. For example, if DBH = 14.3 inches, then $14.3 * 10.81 = 15.5$ feet.

Table 24: Limiting Distances to Face of Tree and Slope Correction Factors for Various Basal Area Factors

This table provides an expanded list of slope correction factors to the face of the tree for use with various basal area factors. To use the table, measure the slope and distance from plot-center to the face of the tree at DBH. To obtain the corrected limiting distance to a tree, multiply the tree's DBH by the "combined factor" shown under the appropriate BAF heading.

Slope	Factor	5 BAF	10 BAF	15 BAF	20 BAF	30 BF	40 BAF
1	1.00000	3.847	2.708	2.203	1.902	1.546	1.333
2	1.00020	3.848	2.709	2.203	1.902	1.546	1.333
3	1.00045	3.489	2.709	2.204	1.903	1.547	1.334
4	1.00080	3.850	2.710	2.205	1.904	1.547	1.334
5	1.00125	3.852	2.711	2.206	1.904	1.548	1.335
6	1.00180	3.854	2.713	2.207	1.905	1.549	1.335
7	1.00245	2.856	2.715	2.208	1.907	1.550	1.336
8	1.00319	3.859	2.717	2.210	1.908	1.551	1.337
9	1.00404	3.863	2.719	2.212	1.910	1.552	1.338
10	1.00499	3.866	2.722	2.214	1.911	1.554	1.340
11	1.00603	3.870	2.724	2.216	1.912	1.555	1.341
12	1.00717	3.875	2.727	2.219	1.916	1.557	1.341
13	1.00841	3.879	2.731	2.222	1.918	1.559	1.344
14	1.00975	3.884	2.734	2.224	1.921	1.567	1.346
15	1.01119	3.890	2.738	2.228	1.923	1.563	1/348
16	1.01272	3.896	2.742	2.231	1.926	1.566	1.350
17	1.01435	3.902	2.747	2.235	1.921	1.568	1.352
18	1.01607	3.909	2.752	2.238	1.933	1.571	1.354
19	1.01789	3.916	2.756	2.245	1.936	1.574	1.357
20	1.01980	3.923	2.762	2.245	1.940	1.577	1.359
21	1.02181	3.931	2.767	2.251	1.943	1.580	1.362

Slope	Factor	5 BAF	10 BAF	15 BAF	20 BAF	30 BF	40 BAF
22	1.02391	3.939	2.773	2.256	1.947	1.583	1.365
23	1.02611	3.947	2.779	2.261	1.952	1.586	1.368
24	1.02840	3.956	2.785	2.266	1.956	1.590	1.371
25	1.03078	3.965	2.791	2.271	1.967	1.594	1.374
26	1.03325	3.975	2.798	2.276	1.965	1.597	1.377
27	1.03581	3.985	2.805	2.282	1.970	1.601	1.381
28	1.03846	3.995	2.812	2.288	1.975	1.605	1.384
29	1.04120	4.005	2.820	2.294	1.980	1.610	1.388
30	1.04403	4.016	2.827	2.300	1.986	1.614	1.392
31	1.04695	4.028	2.835	2.306	1.991	1.619	1.396
32	1.04995	4.039	2.843	2.313	1.997	1.623	1.400
33	1.05304	4.051	2.852	2.320	2.003	1.628	1.404
34	1.05622	4.063	2.960	2.327	2.009	1.633	1.408
35	1.05948	4.076	2.869	2.334	2.015	1.638	1.412
36	1.06283	4.089	2.878	2.341	2.022	1.643	1.417
37	1.06626	4.102	2.887	2.349	2.028	1.648	4.421
38	1.06977	4.115	2.897	2.357	2.035	1.654	1.426
39	1.07336	4.129	2.907	2.365	2.042	1.659	1.431
40	1.07703	4.143	2.917	2.373	2.049	1.665	1.436
41	1.08079	4.158	2.927	2.381	2.056	1.671	1.441
42	1.08462	4.173	2.937	2.389	2.063	1.677	1.446
43	1.08853	4.188	2.948	2.398	2.070	1.683	1.451
44	1.09252	4.203	2.959	2.407	2.078	1.689	1.456
45	1.09659	4.219	2.970	2.416	2.086	1.695	1.462
46	1.10073	4.235	2.981	2.425	2.094	1.702	1.467

Slope	Factor	5 BAF	10 BAF	15 BAF	20 BAF	30 BF	40 BAF
47	1.10494	4.251	2.992	2.434	2.102	1.708	1.473
48	1.10923	4.267	3.004	2.444	2.110	1.715	1.479
49	1.11360	4.284	3.016	2.453	2.118	1.723	1.484
50	1.11803	4.301	3.028	2.463	2.126	1.728	1.490
51	1.12254	4.318	3.040	2.473	2.135	1.735	1.496
52	1.12712	4.336	3.052	2.483	2.144	1.743	1.502
53	1.13177	4.354	3.065	2.493	2.153	1.750	1.509
54	1.13649	4.372	3.078	2.504	2.162	1.757	1.515
55	1.14127	4.390	3.091	2.514	2.171	1.764	1.521
56	1.14612	4.409	3.104	2.525	2.180	1.772	1.528
57	1.15104	4.428	3.117	2.536	2.189	1.780	1.534
58	1.15603	4.447	3.131	2.547	2.199	1.788	1.541
59	1.16108	4.467	3.144	2.558	2.208	1.795	1.548
60	1.16619	4.486	3.158	2.569	2.218	1.803	1.555
61	1.17137	4.506	3.172	2.581	2.228	1.811	1.561
62	1.17661	4.526	3.186	2.592	2.238	1.819	1.568
63	1.18191	4.547	3.201	2.604	2.248	1.827	1.575
64	1.18727	4.567	3.215	2.616	2.258	1.836	1.583
65	1.19269	4.588	3.230	2.627	2.268	1.844	1.590
66	1.19817	4.609	3.245	2.640	2.279	1.852	1.597
67	1.20370	4.631	3.260	2.652	2.289	1.861	1.605
68	1.20930	4.652	3.275	2.664	2.300	1.870	1.612
69	1.21499	4.691	3.302	2.687	2.319	1.885	1.626
70	1.22066	4.696	3.306	2.689	2.322	1.887	1.627
71	1.22642	4.718	3.321	2.702	2.333	1.896	1.635

Slope	Factor	5 BAF	10 BAF	15 BAF	20 BAF	30 BF	40 BAF
72	1.23223	4.740	3.337	2.715	2.344	1.905	1.643
73	1.23810	4.763	3.353	2.728	2.355	1.914	1.650
74	1.24403	4.786	3.369	2.741	2.366	1.923	1.658
75	1.25000	4.809	3.385	2.754	2.378	1.933	1.666
76	1.25603	4.832	3.401	2.767	2.389	1.942	1.674
77	1.26210	4.855	3.418	2.780	2.401	1.951	1.682
78	1.26823	4.879	3.434	2.794	2.412	1.961	1.691
79	1.27440	4.903	3.451	2.808	2.424	1.970	1.699
80	1.28062	4.927	3.468	2.821	2.436	1.980	1.707
81	1.28690	4.951	3.485	2.835	2.448	1.990	1.715
82	1.29321	4.975	3.502	2.849	2.460	1.999	1.724
83	1.29958	4.999	3.519	2.863	2.472	2.009	1.732
84	1.30599	5.024	3.537	2.877	2.484	2.019	1.741
85	1.31244	5.049	3.554	2.891	2.496	2.029	1.749
86	1.31894	5.074	3.572	2.906	2.509	2.039	1.758
87	1.32548	5.099	3.589	2.920	2.521	2.049	1.767
88	1.33207	5.124	3.607	2.935	2.534	2.059	1.776
89	1.33870	5.150	3.625	2.949	2.546	2.070	1.784
90	1.34536	5.176	3.643	2.964	2.559	2.080	1.793
91	1.35207	5.201	3.661	2.979	2.572	2.090	1.802
92	1.35882	5.227	3.680	2.993	2.584	2.101	1.811
93	1.36561	5.254	3.698	3.008	2.597	2.111	1.820
94	1.37244	5.280	3.717	3.023	2.610	2.122	1.829
95	1.37931	5.306	3.735	3.039	2.623	2.132	1.839
96	1.38622	5.333	3.754	3.054	2.637	2.143	1.848

Slope	Factor	5 BAF	10 BAF	15 BAF	20 BAF	30 BF	40 BAF
97	1.39316	5.359	3.773	3.069	2.650	2.154	1.875
98	1.40014	5.386	3.792	3.085	2.663	2.165	1.866
99	1.40716	5.413	3.811	3.100	2.676	2.175	1.876
100	1.41421	5.440	3.830	3.116	2.690	2.186	1.885
102	1.42843	5.495	3.868	3.147	2.717	2.208	1.904
103	1.43558	5.523	3.888	3.163	5.730	2.219	1.914
104	1.44278	5.550	3.907	3.178	2.744	2.231	1.923
105	1.45000	5.578	3.927	3.194	2.758	2.242	1.933
106	1.45726	5.606	3.946	3.210	2.772	2.253	1.943
107	1.46455	5.634	3.966	3.226	2.876	2.264	1.952
108	1.47187	5.662	3.986	3.243	2.799	2.276	1.962
109	1.47922	5.691	4.006	3.259	2.813	2.287	1.972
110	1.48661	5.719	4.026	3.275	2.828	2.298	1.982
111	1.49402	5.747	4.046	3.291	2.842	2.310	1.992
112	1.50147	5.776	4.066	3.308	2.856	2.321	2.001
113	1.50894	5.805	4.086	3.324	2.870	2.333	2.011
114	1.51644	5.834	4.107	3.341	2.884	2.344	2.021
115	1.52498	5.863	4.127	3.357	2.899	2.356	2.031
116	1.53154	5.892	4.147	3.374	2.913	2.368	2.042
117	1.53912	5.921	4.168	3.391	2.927	2.379	2.052
118	1.54674	5.950	4.189	3.407	2.942	2.391	2.062
119	1.55438	5.980	4.209	3.424	2.956	2.403	2.072
120	1.56205	6.000	4.230	3.441	2.971	2.415	2.082
121	1.56975	6.039	4.251	3.458	2.985	2.427	2.092
122	1.57747	6.069	4.272	3.475	3.000	2.439	2.103

Slope	Factor	5 BAF	10 BAF	15 BAF	20 BAF	30 BF	40 BAF
123	1.58521	6.098	4.293	3.492	3.015	2.451	2.113
124	1.59298	6.128	4.314	3.509	3.030	2.463	2.123
125	1.60078	6.158	4.335	3.527	3.045	2.475	2.134
126	1.60860	6.188	4.356	3.544	3.060	2.487	2.144
127	1.61645	6.218	4.377	3.561	3.074	2.499	2.155
128	1.62432	6.249	4.399	3.578	3.089	2.511	2.165
129	1.63221	6.279	4.420	3.595	3.104	2.523	2.176
130	1.64012	6.310	4.441	3.613	3.120	2.536	2/186
131	1.64806	6.340	4.463	3.631	3.135	2.546	2.197
132	1.65602	6.370	4.485	3.648	3.150	2.560	2.207
133	1.66400	6.401	4.506	3.666	3.165	2.573	2.218
134	1.67200	6.432	4.528	3.683	3.180	2.585	2.229
135	1.68003	6.463	4.550	3.701	3.195	2.597	2.239
136	1.68808	6.494	4.571	3.719	3.211	2.261	2.250
137	1.69614	6.525	4.593	3.737	3.226	2.622	2.261
138	1.70423	6.556	4.615	3.754	3.241	2.635	2.272
139	1.71234	6.587	4.637	3.772	3.257	2.647	2.283
140	1.72047	6.619	4.659	3.790	3.272	2.660	2.293
141	1.72861	6.650	4.681	3.808	3.288	2.672	2.304
142	1.73678	6.681	4.703	3.826	3.303	2.685	2.315
143	1.74497	6.713	4.725	3.844	3.319	2.698	2.326
144	1.75317	6.744	4.748	3.862	3.335	2.710	2.337
145	1.76139	6.776	4.770	3.880	3.350	2.723	2.348
146	1.76963	6.808	4.792	3.898	3.366	2.736	2.359
147	1.77789	6.840	4.815	3.917	3.382	2.749	2.370

Slope	Factor	5 BAF	10 BAF	15 BAF	20 BAF	30 BF	40 BAF
148	1.78617	6.871	4.837	3.935	3.397	2.761	2.381
149	1.79446	6.903	4.859	3.953	3.413	2.774	2.392

APPENDIX K: DAMAGE CATEGORIES, AGENTS, SEVERITY RATINGS, AND TREE PARTS

DAMAGE CATEGORIES

Detailed descriptions and examples of the content in these tables is available using the Insect & Disease Codes links on the [FSVeg Documentation web page](#).

Table 25: Damage category codes

Code	Description
10	General Insects
11	Bark Beetles
12	Defoliators
13	Chewing Insects
14	Sucking Insects
15	Boring Insects
16	Seed/Cone/Flower/Fruit Insects
17	Gallmaker Insects
18	Insect Predators
19	General Diseases
20	Biotic Damage
21	Root/Butt Diseases
22	Stem Decays/Cankers
23	Parasitic/Epiphytic Plants
24	Decline Complexes/Dieback/Wilts

Code	Description
25	Foliage Diseases
26	Stem Rusts
27	Broom Rusts
30	Fire
40	Animal Damage, Source Unknown
41	Wild Animals
42	Domestic Animals
50	Abiotic Damage
60	Competition
70	Human Activities
71	Harvest
80	Multi-Damage (Insect-Disease)
90	Unknown
99	Physical Effects

DAMAGE AGENTS

Detailed descriptions and examples of the content in these tables is available using the Insect & Disease Codes links on the [FSVeg Documentation web page](#).

Table 26: Damage agent codes

Category	Agent	Common Name	Scientific Name
10	000	General insects	n / a
10	001	Thrips	<i>n/a</i>
10	002	Tip moth	<i>n/a</i>
10	003	Wasp	<i>n/a</i>
10	007	Clerid beetle	<i>Cleridae</i>
10	008	Weevil	<i>Curculionidae</i>

Category	Agent	Common Name	Scientific Name
10	011	Ant	<i>Formicidae</i>
10	017	Bagworm moth	<i>Psychidae</i>
10	019	Scarab	<i>Scarabaeidae</i>
10	023	Wood wasps	<i>Siricidae spp.</i>
11	000	Bark beetles	n / a
11	001	Roundheaded pine beetle	<i>Dendroctonus adjunctus</i>
11	002	Western pine beetle	<i>Dendroctonus brevicomis</i>
11	004	Jeffrey pine beetle	<i>Dendroctonus jeffreyi</i>
11	005	Lodgepole pine beetle	<i>Dendroctonus murrayanae</i>
11	006	Mountain pine beetle	<i>Dendroctonus ponderosae</i>
11	007	Douglas-fir beetle	<i>Dendroctonus pseudotsugae</i>
11	009	Spruce beetle	<i>Dendroctonus rufipennis</i>
11	012	Red turpentine beetle	<i>Dendroctonus valens</i>
11	015	Western balsam bark beetle	<i>Dryocoetes confuses</i>
11	016	Unknown	<i>Dryocoetes sechelti</i>
11	019	Pinon ips	<i>Ips confuses</i>
11	021	Sixspined ips	<i>Ips calligraphus</i>
11	022	Emarginated ips	<i>Ips emarginatus</i>
11	025	Arizona five-spined ips	<i>Ips lecontei</i>
11	029	Pine engraver	<i>Ips pini</i>
11	030	Ips engraver beetles	<i>Ips spp/</i>
11	031	Unknown	<i>Ips tridens</i>
11	032	Western ash bark beetle	<i>Leperisinus californicus</i>
11	035	Cedar bark beetle	<i>Phloeosinus spp.</i>
11	036	Western cedar bark beetle	<i>Phloeosinus punctatus</i>

Category	Agent	Common Name	Scientific Name
11	037	Tip beetles	<i>Pityogenes spp.</i>
11	038	Douglas-fir twig beetle	<i>Pityophthorus pseudotsugae</i>
11	039	Twig beetles	<i>Pityophthorus spp.</i>
11	040	Four-eyed spruce beetle	<i>Polygraphus rufipennis</i>
11	041	Fir root bark beetle	<i>Pseudohylesinus granulates</i>
11	043	Douglas-fir pole beetle	<i>Pseudohylesinus nebulosus</i>
11	045	Small European elm bark beetle	<i>Scolytus multistriatus</i>
11	046	Spruce engraver	<i>Scolytus piceae</i>
11	048	True fir bark beetle	<i>Scolytus spp.</i>
11	049	Douglas-fir engraver	<i>Scolytus unispinosus</i>
11	050	Fir engraver	<i>Scolytus ventralis</i>
11	055	Spruce ips	<i>Ips pilifrons</i>
11	056	Mexican pine beetle	<i>Dendroctonus mexicanus</i>
12	000	Defoliators	n / a
12	001	Casebearer	<i>n/a</i>
12	002	Leaftier	<i>n/a</i>
12	003	Looper	<i>n/a</i>
12	004	Needleminer	<i>n/a</i>
12	005	Sawfly	<i>n/a</i>
12	006	Skeletonizer	<i>n/a</i>
12	009	Webworm	<i>n/a</i>
12	011	Western blackheaded budworm	<i>Acleris gloverana</i>
12	013	Whitefly	<i>Aleyrodoidae</i>
12	014	Fall cankerworm	<i>Alsophila pometaria</i>
12	016	Mountain mahogany looper	<i>Anacamptodes clivinaria profanata</i>

Category	Agent	Common Name	Scientific Name
12	020	Western larch sawfly	<i>Anoplonyx occidentis</i>
12	023	Boxelder defoliator	<i>Archips negundanus</i>
12	024	Oak leafroller	<i>Archips semifera</i>
12	025	Birch sawfly	<i>Arge pectoralis</i>
12	033	Boxelder leafroller	<i>Caloptilia negundella</i>
12	037	Large aspen tortrix	<i>Choristoneura conflictana</i>
12	039	Sugar pine tortrix	<i>Choristoneura lambertiana</i>
12	040	Western spruce budworm	<i>Choristoneura occidentalis</i>
12	043	Aspen leaf beetle	<i>Chrysomela crotchii</i>
12	044	Cottonwood leaf beetle	<i>Chrysomela scripta</i>
12	045	Leafhopper	<i>Cicadellidae</i>
12	047	Larch casebearer	<i>Coleophora laricella</i>
12	049	Lodgepole needleminer	<i>Coleotechnites milleri</i>
12	050	Ponderosa needleminer	<i>Coleotechnites spp.</i>
12	052	Pandora moth	<i>Coloradia Pandora</i>
12	056	Dusky birch sawfly	<i>Croesus latitatus</i>
12	060	Spruce coneworm	<i>Dioryctria reniculelloides</i>
12	066	White fir needleminer	<i>Epinotia meritana</i>
12	069	Pine needleminer	<i>Exoteleia pinifoliella</i>
12	072	Geometrid moth	<i>Geometridae</i>
12	073	Leafblotch miner	<i>Gracillariidae</i>
12	074	Spotted tussock moth	<i>Halisidota maculate</i>
12	077	Brown day moth	<i>Hemileuca eglanderina</i>
12	082	Fall webworm	<i>Hyphantria cunea</i>
12	084	Unknown	<i>Lambdina punctata</i>

Category	Agent	Common Name	Scientific Name
12	087	Willow leafblotch miner	<i>Lithocolletis spp.</i>
12	089	Gypsy moth	<i>Lymantria dispar</i>
12	094	Western tent caterpillar	<i>Malacosoma californicum</i>
12	096	Forest tent caterpillar	<i>Malacosoma disstria</i>
12	099	Blister beetle	<i>Meloidae</i>
12	116	Pine butterfly	<i>Neophasia menapia</i>
12	121	Rusty tussock moth	<i>Orgyia antiqua</i>
12	123	Douglas-fir tussock moth	<i>Orgyia pseudotsugata</i>
12	124	Western tussock moth	<i>Orgyia vetusta</i>
12	125	Spring cankerworm	<i>Paleacrita vernata</i>
12	128	Pine tussock moth	<i>Parorygia griseofacta</i>
12	135	Aspen leafminer	<i>Phyllocnistis populiella</i>
12	139	Larch sawfly	<i>Pristiphora erichsonii</i>
12	140	Mountain-ash sawfly	<i>Pristiphora geniculate</i>
12	141	Elm leaf beetle	<i>Prrhalta luetola</i>
12	143	Giant silkworm moth	<i>Saturniidae</i>
12	144	Redhumped caterpillar	<i>Schizura concinna</i>
12	150	Spruce needleminer (west)	<i>Taniva albolineana</i>
12	155	Leafroller/seed moth	<i>Tortricidae</i>
12	156	Willow defoliation	<i>Tortricidae</i>
12	160	Pine needle sheathminer	<i>Zelleria haimbachi</i>
12	178	Western oak looper	<i>Lambdina discellaria somniaria</i>
12	181	Tent Caterpillar	<i>Malacosoma spp.</i>
12	190	Hickory tussock moth	<i>Halisidota caryae</i>
12	191	Pin oak sawfly	<i>Caliroa lineata</i>

Category	Agent	Common Name	Scientific Name
12	192	Palmerworm	<i>Dichomeris ligulella</i>
12	193	Pitch pine looper	<i>Lambdina athasaria pellucidaria</i>
12	194	Red pine sawfly	<i>Neodiprion annulus annulus</i>
12	195	Pine tip moth	<i>Argyrotaenia pinatubana</i>
12	196	Baldcypress leafroller	<i>Archips goyerana</i>
12	197	Winter moth	<i>Operophtera</i>
12	198	Basswood thrip	<i>Neohydatothrips</i>
12	199	Noctuid moth	<i>Xylomyges simplex (walker)</i>
12	200	Pyralid moth	<i>Palpita magniferalis</i>
13	000	Chewing insects	n / a
13	001	Grasshopper	<i>n/a</i>
13	006	Cicadas	<i>Cicadidae</i>
13	008	Cutworms	<i>Euxoa excellens</i>
13	021	Ponderosa pine tip moth	<i>Rhyacionia zozana</i>
13	022	Pine needle weevil	<i>Scythropus spp.</i>
13	030	Adana tip moth	<i>Rhyacionia adana</i>
14	000	Sucking insects	n / a
14	001	Scale insect	<i>n/a</i>
14	002	Western larch wooly aphid	<i>Adelges oregonensis</i>
14	003	Balsam woolly adelgid	<i>Adelges piceae</i>
14	006	Aphid	<i>Aphididae</i>
14	008	Western pine spittlebug	<i>Aphrophora permutata</i>
14	012	Pine needle scale	<i>Chionaspis pinifoliae</i>
14	014	Giant conifer aphid	<i>Cinara spp.</i>
14	017	Spruce aphid	<i>Elatobium anatinum</i>

Category	Agent	Common Name	Scientific Name
14	018	Woolly apple aphid	<i>Eriosoma lanigerum</i>
14	024	Honeysuckle aphid	<i>Hyadaphis tataricae</i>
14	026	Lecanium scale	<i>Lecanium spp.</i>
14	028	Oystershell scale	<i>Lepidosaphes ulmi</i>
14	029	Pinyon needle scale	<i>Matsucoccus acalyptus</i>
14	035	Treehoppers	<i>Membracidae</i>
14	039	Black pineleaf scale	<i>Nuculaspis California</i>
14	040	Spruce spider mite	<i>Oligonychus ununquis</i>
14	043	Maple aphid	<i>Periphyllus spp.</i>
14	050	Mealybug	<i>Pseudococcidae</i>
14	054	Spruce mealybug	<i>Puto sandini</i>
14	069	Elm scurfy scale	<i>Chionaspis Americana</i>
15	000	Boring insects	n / a
15	001	Shoot borer	<i>n/a</i>
15	002	Termite	<i>n/a</i>
15	003	Ponderosa pine bark borer	<i>Acanthocinus princeps</i>
15	004	Bronze birch borer	<i>Agrilus anxius</i>
15	006	Bronze poplar borer	<i>Agrilus liragus</i>
15	007	Carpenter bees	<i>Apidae</i>
15	008	Flatheaded borer	<i>Buprestidae</i>
15	009	Golden buprestid	<i>Buprestis aurulenta</i>
15	010	Carpenter ants	<i>Camponotus spp.</i>
15	011	Gouty pitch midge	<i>Cecidomyia piniinopis</i>
15	013	Roundheaded borer	<i>Cermbycidae</i>
15	018	Carpenterworm moth	<i>Cossidae</i>

Category	Agent	Common Name	Scientific Name
15	019	Poplar and willow borer	<i>Cryptorhynchus lapathi</i>
15	021	Douglas-fir twig weevil	<i>Cylindrocopturus furnissi</i>
15	027	Ponderous borer	<i>Ergates spiculatus</i>
15	029	Western pine shoot borer	<i>Eucosma sonomana</i>
15	030	Eucosma species	<i>Eucosma spp.</i>
15	035	Powderpost beetle	<i>Lyctidae</i>
15	039	Locust borer	<i>Megacyclene robiniae</i>
15	041	Flatheaded fir borer	<i>Melanophila drummondi</i>
15	042	Whitespotted sawyer	<i>Monochamus scutellatus</i>
15	044	Western ash borer	<i>Neoclytus conjunctus</i>
15	050	White pine weevil	<i>Pissodes radiatae</i>
15	051	Lodgepole terminal weevil	<i>Pissodes terminalis</i>
15	052	Ambrosia beetles	<i>Platypus spp.</i>
15	057	Lilac borer	<i>Podosesia syringae</i>
15	060	Western subterranean termite	<i>Reticulitermes Hesperus</i>
15	064	Western pine tip moth	<i>Rhyacionia bushnelli</i>
15	068	Poplar borer	<i>Saperda calcarata</i>
15	070	Saperda shoot borer	<i>Saperda spp.</i>
15	071	Clearwing moths	<i>Sesiidae</i>
15	073	Roundheaded fir borer	<i>Tetropium abietis</i>
15	076	Douglas-fir pitch moth	<i>Vespamima novaroensis</i>
15	077	Sequoia pitch moth	<i>Vespamima sequoia</i>
15	087	Emerald ash borer	<i>Agrilus planipennis</i>
16	000	Seed / Cone / Flower / Fruit Insects	n / a
16	001	Douglas-fir cone moth	<i>Barbara colfaxiana</i>

Category	Agent	Common Name	Scientific Name
16	002	Lodgepole cone beetle	<i>Conophthorus contortae</i>
16	003	Limber pine cone beetle	<i>Conophthorus flexilis</i>
16	004	Mountain pine cone beetle	<i>Conophthorus monticolae</i>
16	005	Ponderosa pine cone beetle	<i>Conophthorus ponderosae</i>
16	010	Douglas-fir cone midge	<i>Contarinia oregonesis</i>
16	015	Fir coneworm	<i>Dioryctria abietivorella</i>
16	017	Pine cone worm	<i>Dioryctria merkeli</i>
16	019	Ponderosa twig moth	<i>Dioryctria ponderosae</i>
16	020	Unknown	<i>Dioryctria pseudotsugella</i>
16	021	Dioryctria moths	<i>Dioryctria spp.</i>
16	022	Lodgepole cone moth	<i>Eucosma rescissoriana</i>
16	023	Seed chalcid	<i>Eurytomidae</i>
16	025	Cone maggot	<i>Hylemya anthracina</i>
16	027	Ponderosa pine seed worm/moth	<i>Laspeyresia piperana</i>
16	028	Spruce seed moth	<i>Laspeyresia youngana</i>
16	029	Boxelder bug	<i>Leptocoris trivittatus</i>
16	031	Western conifer seed bug	<i>Leptoglossus occidentalis</i>
16	034	Spruce seed chalcid	<i>Magastigmus piceae</i>
16	035	Ponderosa pine seed chalcid	<i>Megastigmus albifrons</i>
16	036	Fir seed chalcid	<i>Megastigmus pinus</i>
16	037	Douglas-fir seed chalcid	<i>Megastigmus spermotrophs</i>
16	042	Coneworm	<i>Phycitidae</i>
16	043	Harvester ants	<i>Pogonomyrmex spp.</i>
16	049	Prairie tent caterpillar	<i>Malacosoma lutescens</i>
16	050	Jack pine tip beetle	<i>Conophthorus banksianae</i>

Category	Agent	Common Name	Scientific Name
17	000	Gallmarker insects	n / a
17	003	Cooley spruce gall adelgid	<i>Adelges cooleyi</i>
17	007	Douglas-fir needle gall midge	<i>Contarinia pseudotsugae</i>
17	010	Hackberry nipplegall maker	<i>Pachypsylla celtidismamma</i>
17	013	Gall aphid	<i>Phylloxera</i>
17	018	Gouty pitch midge	<i>Cecidomyia piniinopsis</i>
17	019	Spider mites	<i>Oligonychus spp.</i>
18	000	Insect predators	n / a
18	001	Lacewing	<i>n/a</i>
18	002	Blackbellied clerid	<i>Enoclerus lecontei</i>
18	003	Redbellied clerid	<i>Enoclerus sphegeus</i>
18	004	Unknown	<i>Formica rufa</i>
18	005	Western yellowjacket	<i>Vespula pennsylvanica</i>
19	000	General diseases	n / a
20	000	Biotic damage	n / a
20	001	Damping off	<i>n/a</i>
20	002	Gray mold	<i>Botrytis cinerea</i>
21	000	Root / butt diseases	n / a
21	001	Armillaria root disease	<i>Armillaria spp.</i>
21	004	Brown crumbly rot	<i>Fomitopsis pinicola</i>
21	007	White mottled rot	<i>Ganoderma applanatum</i>
21	008	Ganoderma rot of hardwoods	<i>Ganoderma lucidum</i>
21	009	Ganoderma rot of conifers	<i>Ganoderma tsugae</i>
21	010	Annosus root disease	<i>Heterobasidion annosum</i>
21	012	Tomentosus root disease	<i>Inonotus tomentosus</i>

Category	Agent	Common Name	Scientific Name
21	013	Charcoal root rot	<i>Macrophomina phaseolina</i>
21	014	Black stain root disease	<i>Ophiostoma wagneri</i>
21	015	Schweinitzii butt rot	<i>Phaeolus schweinitzii</i>
21	018	Phytophthora root rot	<i>Phytophthora cinnamomi</i>
21	022	Pythium root rot	<i>Pythium spp.</i>
21	024	Crown gall	<i>Agrobacterium tumefaciens</i>
21	027	Brown cubical rot	<i>Laetiporus sulphureus</i>
22	000	Stem decays/cankers	n/a
22	006	Black knot of cherry	<i>Apiosporina morbosa</i>
22	007	Atropellis canker	<i>Atropellis piniphila</i>
22	012	Black canker of aspen	<i>Ceratocystis fimbriata</i>
22	025	Cryptosphaeria canker of aspen	<i>Cryptosphaeria populina</i>
22	026	Cytospora canker of fir	<i>Cytospora abietis</i>
22	028	Rust-red stringy rot	<i>Echinodontium tinctorium</i>
22	029	Sooty-bark canker	<i>Encoelia pruinosa</i>
22	034	Scleroderris canker	<i>Gremmeniella abietina</i>
22	035	Amelanchier rust	<i>Gymnosporangium harknessianum</i>
22	036	Cedar apple rust	<i>Gymnosporangium juniper-virginianae</i>
22	038	Hypoxylon canker of aspen	<i>Hypoxylon mammatum</i>
22	047	Red ring rot	<i>Phellinus pini</i>
22	048	Aspen trunk rot	<i>Phellinus tremulae</i>
22	057	Cytospora canker of aspen	<i>Cytospora chrysosperma</i>
22	058	Dothichiza canker	<i>Dothichiza populae</i>
22	059	Red belt fungus	<i>Fomitopsis pinicola</i>

Category	Agent	Common Name	Scientific Name
22	060	Leucocytospora canker of spruce	<i>Leucocytospora kunzei</i>
22	061	Sooty bark canker	<i>Phialis singular</i>
22	064	Tinder fungus	<i>Fomes formntarius</i>
22	066	Pinyon black stain	<i>Leptographium wagnerii</i>
22	068	False tinder fungus	<i>Phellinus igniarius</i>
22	071	Oyster mushroom	<i>Pleurotus ostreatus</i>
22	074	Cedar brown pocket rot	<i>Poria serceomollis</i>
22	075	Lachnellula canker	<i>Lachnellula flavovirens</i>
22	076	Strumella canker	<i>Strumella coryneoidea</i>
22	077	Phomopsis blight	<i>Phomopsis juniperovora</i>
22	078	Fusarium canker of yellow poplar	<i>Fusarium solani</i>
22	079	Sterile conk of maple and beech	<i>Inonotus glomeratus</i>
22	080	Canker of spruce	<i>Aleurodiscus spp.</i>
22	081	Birch conk	<i>Piptoporus betulinusai</i>
22	082	Canker	<i>Discocainia treleasei</i>
23	000	Parasitic	Epiphytic plants
23	005	White fir dwarf mistletoe	<i>Arceuthobium abietinum f. sp. Concoloris</i>
23	006	Lodgepole pine dwarf mistletoe	<i>Arceuthobium americanum</i>
23	008	Western dwarf mistletoe	<i>Arceuthobium compylopodum</i>
23	009	Limber pine dwarf mistletoe	<i>Arceuthobium cyanocarpum</i>
23	010	Pinyon dwarf mistletoe	<i>Arceuthobium divaricatum</i>
23	011	Douglas-fir dwarf mistletoe	<i>Arceuthobium douglasii</i>
23	013	Larch dwarf mistletoe	<i>Arceuthobium laricis</i>
23	017	Southwestern dwarf mistletoe	<i>Arceuthobium vaginatum subsp. Cryptopodum</i>

Category	Agent	Common Name	Scientific Name
23	021	Red fir dwarf mistletoe	<i>Arceuthobium abietinum f. sp. Pauciflorum</i>
23	022	Juniper true mistletoe	<i>Phoradendron junipeum</i>
24	000	Decline complexes / dieback / wilts	n / a
24	004	Ash decline/yellows	<i>n/a</i>
24	011	Larch decline	<i>n/a</i>
24	017	True fir pest complex	<i>n/a</i>
24	018	Western X disease	<i>n/a</i>
24	019	Pinewood nematode	<i>Bursaphelenchus xylophilus</i>
24	030	Elm phloem necrosis	<i>Mycoplasma</i>
25	000	Foliage diseases	n / a
25	009	True fir needlecast	<i>n/a</i>
25	011	Cercospora blight of juniper	<i>Cercospora sequoia</i>
25	014	Ink spot of aspen	<i>Ciborinia whetzellii</i>
25	015	Pine needle rust	<i>Coleosporium spp.</i>
25	022	Elytroderma disease	<i>Elytroderma deformans</i>
25	027	Brown felt blight	<i>Herpotrichia juniper</i>
25	029	Hardwood anthracnose	<i>Kabatiella apocrypta</i>
25	031	Spruce needle cast	<i>Lirula macrospora</i>
25	033	White pine needle cast	<i>Lophodermella arcuata</i>
25	034	Lophodermella needle cast	<i>Lophodermella spp.</i>
25	035	Lophodermium needle cast	<i>Lophodermium spp.</i>
25	036	Marssonina blight	<i>Marssonina populi</i>
25	037	Melampsora rusts	<i>Melampsora medusa</i>
25	039	Larch needle cast	<i>Meria laricis</i>

Category	Agent	Common Name	Scientific Name
25	040	Dothistroma needle blight	<i>Mycosphaerella pini</i>
25	041	Brown felt blight of pines	<i>Neopeckia coulteri</i>
25	042	Snow blight	<i>Phacidum abietis</i>
25	050	Douglas-fir needle cast	<i>Rhabdocline spp.</i>
25	055	Septoria leaf spot	<i>Septoria alnifolia</i>
25	056	Septoria leaf spot and canker	<i>Septoria musiva</i>
25	057	Sirococcus tip blight	<i>Sirococcus conigenus</i>
25	058	Diplodia blight	<i>Sphaeropsis sapinea</i>
25	059	Leaf blister of oak	<i>Taphrina caerulescens</i>
25	060	Venturia leaf blight of maple	<i>Venturia acerina</i>
25	061	Shepherd's crook	<i>Venturia tremulae</i>
25	062	Dothistroma needle blight	<i>Dothistroma septospora</i>
25	064	Broom rust	<i>Chrysomyxa arctostaphyli</i>
25	065	Spruce needle rust	<i>Lophodermium picea</i>
25	067	Spruce needle cast	<i>Lophodermium picea</i>
25	068	Hardwood leaf rust	<i>Rhizosphaera pini</i>
25	071	Spruce needle cast	<i>Rhizosphaera pini</i>
25	073	Shepards crook	<i>Ventirua populina</i>
25	074	Delphinella shoot blight	<i>Delphinella abietis</i>
25	075	Tar spot	<i>Rhytisma acerinum</i>
26	000	Stem rusts	n/a
26	001	White pine blister rust	<i>Cronartium ribicola</i>
26	002	Western gall rust	<i>Peridermium harknessii</i>
26	003	Stalactiform blister rust	<i>Cronartium coleosporioides</i>
26	004	Comandra blister rust	<i>Cronartium comandrae</i>

Category	Agent	Common Name	Scientific Name
26	005	Pinyon blister rust	<i>Cronartium occidentale</i>
26	011	Bethuli rust	<i>Peridermium bethuli</i>
26	012	Limb rust	<i>Peridermium filamentosum</i>
26	013	Southern cone rust	<i>Cronartium strobilinum</i>
27	000	Broom rusts	n / a
27	001	Spruce broom rust	<i>Chrysomyxa arctostaphyll</i>
27	002	Incense cedar broom rust	<i>Gymnosporangium libocedri</i>
27	003	Juniper broom rust	<i>Gymnosporangium nidus-avis</i>
27	004	Fir broom rust	<i>Melampsorella caryophyllacearum</i>
30	000	Fire	n / a
30	031	Wild-fire	<i>n/a</i>
30	032	Human caused fire	<i>n/a</i>
30	033	Crown fire damage	<i>n/a</i>
30	034	Ground fire damage	<i>n/a</i>
40	000	Animal damage, source unknown	n / a
41	000	Wild animals	n / a
41	001	Bear	<i>n/a</i>
41	002	Beaver	<i>n/a</i>
41	003	Big game (deer)	<i>n/a</i>
41	004	Mice or voles	<i>n/a</i>
41	005	Pocket gophers	<i>n/a</i>
41	006	Porcupines	<i>n/a</i>
41	007	Rabbits or hares	<i>n/a</i>
41	008	Sapsucker	<i>n/a</i>

Category	Agent	Common Name	Scientific Name
41	009	Squirrels	<i>n/a</i>
41	010	Woodpeckers	<i>n/a</i>
41	011	Moose	<i>n/a</i>
41	012	Elk	<i>n/a</i>
41	013	Deer	<i>n/a</i>
41	014	Feral pigs	<i>n/a</i>
41	015	Mountain beaver	<i>n/a</i>
41	016	Deer or elk	<i>n/a</i>
41	017	Earthworm	<i>Lumbricidae</i>
42	000	Domestic animals	n / a
42	001	Cattle	<i>n/a</i>
42	002	Goats	<i>n/a</i>
42	003	Horses	<i>n/a</i>
42	004	Sheep	<i>n/a</i>
50	000	Abiotic damage	n / a
50	001	Air pollutants	<i>n/a</i>
50	002	Chemical	<i>n/a</i>
50	003	Drought	<i>n/a</i>
50	004	Flooding/high water	<i>n/a</i>
50	005	Frost	<i>n/a</i>
50	006	Hail	<i>n/a</i>
50	007	Heat	<i>n/a</i>
50	008	Lightning	<i>n/a</i>
50	009	Nutrient imbalances	<i>n/a</i>
50	010	Radiation	<i>n/a</i>

Category	Agent	Common Name	Scientific Name
50	011	Snow/ice	<i>n/a</i>
50	013	Wind-tornado	<i>n/a</i>
50	014	Winter injury	<i>n/a</i>
50	015	Avalanche	<i>n/a</i>
50	016	Mud-land slide	<i>n/a</i>
50	017	Volcano	<i>n/a</i>
50	018	Other geologic events	<i>n/a</i>
50	019	Mechanical (non-human caused)	<i>n/a</i>
60	000	Competition	n / a
70	000	Human activities	n / a
70	001	Herbicides	<i>n/a</i>
70	003	Imbedded objects	<i>n/a</i>
70	004	Improper planting technique	<i>n/a</i>
70	005	Land clearing	<i>n/a</i>
70	006	Land use conversion	<i>n/a</i>
70	007	Logging damage	<i>n/a</i>
70	008	Mechanical	<i>n/a</i>
70	009	Pesticides	<i>n/a</i>
70	010	Roads	<i>n/a</i>
70	011	Soil compaction	<i>n/a</i>
70	012	Suppression	<i>n/a</i>
70	013	Vehicle damage	<i>n/a</i>
70	014	Road salt	<i>n/a</i>
71	000	Harvest	n / a
80	000	Multi-damage (insect / disease)	n / a

Category	Agent	Common Name	Scientific Name
80	001	Aspen defoliation	<i>n/a</i>
80	002	Subalpine fir mortality	<i>n/a</i>
80	004	Pinion pine decline	<i>n/a</i>
90	000	Unknown	n / a
99	000	Physical effects	n / a
99	001	Broken or top missing	<i>n/a</i>
99	002	Dead top	<i>n/a</i>
99	003	Limby (large limbs top to ground)	<i>n/a</i>
99	004	Forked top	<i>n/a</i>
99	005	Forked below merch top	<i>n/a</i>
99	006	Crook or sweep	<i>n/a</i>
99	007	Checks, bole cracks	<i>n/a</i>
99	008	Foliage discoloration	<i>n/a</i>
99	009	Mortality (for plantation surveys only)	<i>n/a</i>
99	010	Lack of seed source or dieback (for plantation surveys only)	<i>n/a</i>
99	011	Poor planting stock (for plantation surveys only)	<i>n/a</i>
99	012	Poor growth/fading/foliage is yellowing and loss of needles is occurring	<i>n/a</i>
99	013	Total board foot volume loss	<i>n/a</i>
99	014	Total cubic foot volume loss	<i>n/a</i>
99	015	Bark removal	<i>n/a</i>
99	016	Foliage loss	<i>n/a</i>
99	017	Sunscauld	<i>n/a</i>
99	018	Uproot	<i>n/a</i>

Category	Agent	Common Name	Scientific Name
99	019	Scorched foliage	<i>n/a</i>
99	020	Scorched bark	<i>n/a</i>
99	021	Dieback (for plantation surveys only)	<i>n/a</i>
99	022	Poor crown form	<i>n/a</i>
99	023	Severe forking	<i>n/a</i>
99	026	Open wound	<i>n/a</i>
99	031	Broken or dead branches	<i>n/a</i>
99	033	Damaged shoots, buds, or foliage (for plantation surveys only)	<i>n/a</i>
99	034	Excessively deformed sapling	<i>n/a</i>
99	036	Fire scar	<i>n/a</i>
99	037	Leaning tree	<i>>15% and self-supporting</i>
99	038	Charred bark	<i>Not recorded unless cambium is killed from heating</i>

DAMAGE SEVERITY RATINGS

Table 27: Damage severity rating codes

Category	Severity	Description
10	n / a	General insects
10	1	Minor: bottlebrush or shortened leaders, 0-2 forks on stem, OR <20% of branches affected, OR <50% of bole with visible larval galleries
10	2	Severe: 3 or more forks on bole, OR 20% or more branches affected, OR terminal leader dead, OR 50% or more of bole with visible larval galleries
11	n / a	Bark beetles

Category	Severity	Description
11	1	Unsuccessful bole attack: pitchout and beetle brood absent
11	2	Strip attacks: galleries and brood present
11	3	Successful current bole attack
11	4	Topkill
11	5	Successful attack last year
11	6	Older dead
12	n / a	Defoliators
12	1	Light defoliation (1-25%), no topkill
12	2	Light defoliation (1-25%), topkill $\leq 10\%$
12	3	Light defoliation (1-25%), topkill $> 10\%$
12	4	Moderate defoliation (26-75%), no topkill
12	5	Moderate defoliation (26-75%), topkill $\leq 10\%$
12	6	Moderate defoliation (26-75%), topkill $> 10\%$
12	7	Heavy defoliation (76-100%), no topkill
12	8	Heavy defoliation (76-100%), topkill $\leq 10\%$
12	9	Heavy defoliation (76-100%), topkill $> 10\%$
13	n / a	Chewing insects
13	1	Minor: bottlebrush or shortened leaders, 0-2 forks on stem, OR $< 20\%$ of branches affected
13	2	Severe: 3 or more forks on bole, OR 20% or more branches affected, OR terminal leader dead
14	n / a	Sucking insects
14	1	Minor: bottlebrush or shortened leaders, 0-2 forks on stem, OR $< 20\%$ of branches affected
14	2	Severe: 3 or more forks on bole, OR 20% or more branches affected, OR terminal leader dead

Category	Severity	Description
15	n / a	Boring insects
15	1	Minor: bottlebrush or shortened leaders, 0-2 forks on stem, OR <20% of branches affected
15	2	Severe: 3 or more forks on bole, OR 20% or more branches affected, OR terminal leader dead
16	n / a	Seed / cone / flower / fruit insects
16	1	Minor
16	2	Severe
17	n / a	Gallmaker insects
17	1	Minor
17	2	Severe
18	n / a	Insect predators
18	1	Minor
18	2	Severe
19	n / a	General diseases
19	1	Minor
19	2	Severe
20	n / a	Biotic damage
20	1	Minor
20	2	Severe
21	n / a	Root / butt diseases
21	1	(for individual trees) Tree within 30 feet of tree with deteriorating crown, tree with diagnostic symptoms or signs, or tree killed by root disease
21	2	(for individual trees) Pathogen (sign) or diagnostic symptom detected – no crown deterioration

Category	Severity	Description
21	3	(for individual trees) Crown deterioration detected – no diagnostic symptom or signs
21	4	(for individual trees) Both crown deterioration and diagnostic signs symptoms detected
21	5	(for individual trees) Bleeding present on bole
21	6	(for individual trees) Bleeding present on bole and adjacent mortality present
21	7	(for individual trees) Laboratory confirmed Sudden Oak Death
21	G2	(for setting level) Minor evidence of RDS on plot
21	G3	(for setting level) RDS present, canopy reduction less than 20%
21	G4	(for setting level) RDS present, canopy reduction 20-30%
21	G5	(for setting level) RDS present, canopy reduction 30-50%
21	G6	(for setting level) RDS present, canopy reduction 50-75%, most ground area infested
21	G7	(for setting level) RDS present, 76+ % canopy reduction
21	G8	(for setting level) Entire area infested with RDS, one or very few susceptible overstory trees
21	G9	(for setting level) Entire area infested with RDA, no susceptible overstory trees present
22	n / a	Stem decay/canker
22	0	0-4% rotten
22	1	5-15% rotten
22	2	16-25% rotten
22	3	26-35% rotten
22	4	36-45% rotten
22	5	46-55% rotten

Category	Severity	Description
22	6	56-65% rotten
22	7	66-75% rotten
22	8	76-85% rotten
22	9	86-100% rotten
23	n / a	Parasitic / epiphytic plants
23	1	Hawksworth tree DMR rating = 1; light infection
23	2	Hawksworth tree DMR rating = 2; light infection
23	3	Hawksworth tree DMR rating = 3; medium infection
23	4	Hawksworth tree DMR rating = 4; medium infection
23	5	Hawksworth tree DMR rating = 5; heavy infection
23	6	Hawksworth tree DMR rating = 6; heavy infection
23	7	Vine damage: less than 50% of crown involved
23	8	Vine damage: 50% or more of crown involved
24	n / a	Decline complexes / diebacks / wilts
24	1	Minor: minor crown symptoms
24	2	Severe: severe crown symptoms
25	n / a	Foliage diseases
25	1	Minor: <20% of foliage affected or <20% of crown in brooms
25	2	Severe: >20% of foliage affected or >20% of crown in brooms
26	n / a	Rust Stems
26	1	Branch infections located greater than 2 feet from tree bole

Category	Severity	Description
26	2	Branch infections located between 6 inches and 2 feet from tree bole
26	3	Bole infections or branch infections located within 6 inches of bole
26	4	Topkill
27	n / a	Broom rusts
27	1	Minor: <20% of crown in brooms
27	2	Severe: >20% of crown in brooms
30	n / a	Fire
30	1	Minor: <20% of crown affected
30	2	Severe: >20% of crown affected or any damage to the bole
40	n / a	Animal damage, source unknown
40	1	Minor
40	2	Severe
41	n / a	Wild animals
41	1	Minor: <20% of crown affected, bole damage is <50% circumference
41	2	Severe: >20% of crown affected, bole damage is >50% circumference, upper 1/3 of crown is killed
41	5	Earthworms are present
41	6	Earthworms are absent
50	n / a	Abiotic damage
50	1	Minor: <20% of crown affected, bole damage is <50% circumference
50	2	Severe: >20% of crown affected, bole damage is >50% circumference, upper 1/3 of crown is killed

Category	Severity	Description
60	n / a	Competition
60	1	Minor: tree slightly deformed and has some lie, terminal growth
60	2	Severe: tree extremely deformed or has no live terminal, growth severely reduced relative to neighbors
70	n / a	Human activities
70	1	Minor
70	2	Severe
71	n / a	Harvest
71	1	Minor
71	2	Severe
80	n / a	Multi-damage (insect / disease)
80	1	Minor
80	2	Severe
90	n / a	Unknown
90	0	0 – 9% affected
90	1	10 – 19% affected
90	2	20 – 29% affected
90	3	30 – 39% affected
90	4	40 – 49% affected
90	5	50 – 59% affected
90	6	60 – 69% affected
90	7	70 – 79% affected
90	8	80 – 89% affected
90	9	90 – 100% affected

Category	Severity	Description
99	n / a	Physical effects
99	001	Broken top
99	002	Dead top

Table 28: Category 99 damage severity rating codes

Category	Severity	Description	Actual percent of tree affected
99	n / a	Physical effects	n / a
99	001	Broken top	% of original height that is missing; for example, if a tree was originally 100 feet high, but 15 feet of the top is broken or missing; enter "15" in the severity code
99	002	Dead top	% of total tree height that is dead
99	003	Limby (large limbs top to bottom)	% of total tree height with many limbs/knots
99	004	Forked top	% of total tree height above fork
99	005	Forked below merch top	% of the total length of the bole affected
99	006	Crook or sweep	% of total tree height, which contains the crook or sweep
99	007	Checks, bole cracks	% of total tree height, which contains a crack or check
99	008	Foliage discoloration	% of foliage discolored
99	009	Mortality	1 = dead tree
99	010	Lack of seed source	If present, 100%
99	011	Poor planting stock source	If present, 100%
99	012	Poor growth	1 = minor (reduced growth); 2 = severe (affecting survival)
99	013	Total board foot volume loss	%of total board foot volume loss

Category	Severity	Description	Actual percent of tree affected
99	014	Total cubic foot volume loss	% of total cubic foot volume loss
99	015	Bark removal	% of tree circumference missing bark
99	016	Foliage loss	1 = minor; 2 = severe
99	017	Sunscald	1 = minor; 2 = severe
99	018	Uproot	1 = uprooted
99	019	Scorched foliage	% of foliage scorched
99	020	Scorched bark	% of bark scorched
99	021	Dieback source	1 = minor; 2 = severe
99	022	Poor crown form	1 = minor; 2 = severe
99	023	Severe forking	% of bole with forks
99	026	Open wound	% of bole or trunk affected using the height and width of the wound; for example, if a tree is 100 feet tall and the wound covers 15 feet of the bole, enter a value of "15"
99	031	Broken or dead branches	% of branches broken or dead
99	033	Damage shoots, buds, or foliage source	1 = minor; 2 = severe
99	034	Excessively deformed sapling	% of sapling deformed
99	036	Fire scar	% of bole covered by fire scar
99	037	Leaning tree	% lean from vertical
99	038	Charred bark	Not recorded unless cambium is killed from heating

TREE PARTS

Table 29: Tree part codes

Code	Description
UN	Unspecified
TO	Top
FO	Foliar (crown)
LI	Limb
BO	Bole, other than Top or Base
BA	Base
RO	Roots
WT	Whole tree
TT	Top third of crown
MT	Middle third of crown
BT	Bottom third of crown

APPENDIX L: ACCURACY STANDARDS

Table 30: Settings Measurements

Field	Tolerance
Project Name	No errors
Region	No errors
Proclaimed Forest	No errors
District	No errors
Location	No errors
Stand Number	No errors
Ownership	No errors

Field	Tolerance
State	No errors
County	No errors
Administrative Forest	No errors
Date	No errors
Photo ID	No errors
Exam Level	No errors
Exam Purpose	No errors
Stratum	No errors
Existing Vegetation Composition Type	No errors
Potential Vegetation Reference	No errors
Potential Vegetation	No errors
Structure	No errors
Capable Growing Area	± 10 percent
Fuel Model	No errors
Elevation	± 2 contour intervals
Aspect	± 45 degrees
Slope	± 10 percent
Slope Position	± 1 class
Acres	No errors
Radial Growth Interval	No errors
Radial Growth Interval #2	No errors
Height Growth Interval	No errors
Fuel Photo Reference	No errors
Precision Protocol	No errors
Examiner	No errors

Field	Tolerance
Stand Remarks	No errors
Damage Category	No errors
Damage Agent	No errors
Damage Severity	No errors
Species of Management Interest	No errors
Sketch Map and Traverse Notes	n/a

Table 31: Sample Design Criteria

Field	Tolerance
Form Type	n/a
Selection Method Type	No errors
Sample Expansion Factor	No errors
Plots Installed	No errors
Sub-population Filter	No errors
Starting Azimuth	No errors
Sample Design Remarks	No errors
Selection Criteria Number	No errors
Sub-pop Variable	No errors
Sub-pop Minimum Value	No errors
Sub-pop Maximum Value	No errors

Table 32: Plot Data

Field	Tolerance
Plot Number	No errors
Plot Latitude	No errors
Plot Longitude	No errors

Field	Tolerance
Capable Grow Area	± 10 percent
Plot Aspect	± 45
Plot Scope	± 10 percent
Slope Position	± 1 class
Slope Horizontal Shape	± 1 class
Slope Vertical Shape	± 1 class
Plot Elevation	± 2 contour intervals
Existing Vegetation	No errors
Potential Vegetation	Accurate to series understory union and phases
Plot History	No errors
Plot History Date	Year required in field 12 is other than code 10 or blank
Fuel Model	No errors
Residual Descriptive Code	No errors
Distance to Seed Wall	± 100 feet
Plot Remarks	n/a

Table 33: Tree Data

Field	Tolerance
Plot Number	No errors
Tag ID Number	No errors
Tree Status	No errors allowed in recognizing and coding down trees
Site/Growth Trees	No errors
Tree Species	No errors
Tree Count	See specifics in Table 34

Field	Tolerance
Number Stems	No errors
DBH/DRC Intensive Exam	See specifics in Table 35
DBH/DRC Extensive Exam	See specifics in Table 36
DBH/DRC Quick Exam	See specifics in Table 37
Height	10 percent
Height to Crown	10 percent
Radial Growth	1/20 th inch
Radial Growth #2	1/20 th inch
Height Growth	See specifics in Table 38
Tree Age	10 percent (based on actual tree ring count at breast height for trees ≥ 3.0" DBH otherwise based on total age recorded)
Crown Ratio	10 percent
Crown Class	No errors
Crown Width	No errors
Wildlife Use	No errors
Log/Snag Decay	No errors
Cone Serenity	No errors
Damage Category	No errors, specifics listed in Table 39
Damage Agent	No errors
Damage Part	No errors
Damage Severity	No errors
Tree Remarks	n/a

Table 34: Tree Data, Tree Count

Height Range	Diameter Range	Trees on Point	Tolerance
*All	All	0	0 trees
≤ 0.5 feet	All	1-5	± 2 trees
≤ 0.5 feet	All	6+	± 50 percent
> 0.5 feet	< 0.5 in.	1-5	± 1 tree
> 0.5 feet	< 0.5 in.	6+	± 20 percent
All	.5" – breakpoint DBH	1-5	± 1 tree
All	.5" – breakpoint DBH	6+	± 10 percent
All	Breakpoint DBH +	1+	0 trees

* There is no tolerance for recording a tree when none are actually present in any of the above size classes. The recording of a fixed plot tree when none are present will result in a single discrepancy. The recording of a variable plot tree when none are present will result in an unacceptable unit.

Group criteria are standardized to facilitate stand exam contract inspection and payment. However, distinguishing characteristics other than tree class, species, and size class may warrant individual tree recording or more refined grouping criteria. Such characteristics include: age, crown ratio, crown class, or incident of damage.

Table 35: Tree Data, DBH/DRC Intensive Exam

Tolerance	Diameter
No errors	<.5 inch
± .1 inch	.5 inch – 13.9 inches
± .2 inch	14.0 inches – 23.9 inches
± .3 inch	24.0 inches – 34.9 inches
± .5 inch	35.0 inches +
± .1 inch	Borderline variable plot trees
± .1 inch	Estimated DRC

Table 36: Tree Data, DBH/DRC Extensive Exam

Tolerance	Diameter
± 1 inch	≤ 20 inches
± 5% of diameter	> 20 inches

Table 37: Tree Data, DBH/DRC Quick Exam

Tolerance	Diameter
± 2 inches	≤ 20 inches
± 10% of diameter	> 20 inches

Table 38: Tree Data, Height Growth

Tolerance	Diameter
± 1 foot	Trees > 6 feet
± 0.1 foot	Trees ≤ 6 feet

Table 39: Tree Data, Damage Category

Damage Category	Damage Category Description	Tolerance
11	Bark Beetles	No misses on live trees with a severity of 2 or greater
12	Defoliators	No misses on live trees with a severity of 3 or greater
13-17	Other Insects	No misses of shoot moths or weevils on live trees
21	Root/Butt Diseases	No misses on live trees with a severity of 2 or greater
22	Stem Decays/Cankers	No misses on live trees with a severity of 3 or greater
25	Foliage Diseases	No misses on Elytroderma on live trees

Damage Category	Damage Category Description	Tolerance
41-42	Animal Damage	No misses on live trees with terminal leader damage or with greater than $\frac{1}{4}$ of bole circumference affected
50	Abiotic Damage	No misses on wind, snow, or ice bending, breakage, or bole cracks and frost damage to shoots on trees less than 1-inch diameter and lightning
70	Human Damage	No misses on live trees for logging damage or fire if the damage affects greater than $\frac{1}{4}$ of the bole circumference or if an open wound is in contact with the ground

Table 40: Ground Surface Cover

Field	Tolerance
Plot Number	No errors
Cover Type	No errors
Cover Percent	± 10 percent

Table 41: Vegetation Composition

Field	Tolerance
Plot Number	No errors
Live/Dead	No errors
Layer	No errors
Life form	No errors
Species	No error in species-level identification for dominant, common, or community type indicator plants; no plant name can be repeated within a layer
Minimum Height	± 10 percent of height

Field	Tolerance
Average Height	± 10 percent of height
Maximum Height	± 10 percent of height
Canopy Cover	± 10 percent
Average Diameter	No errors
Maturity	No errors
Cover Remarks	n/a
User Field	n/a

Table 42: Down Woody

Field	Tolerance
Plot Number	No errors
First Duff	± ½ inch
Second Duff	± ½ inch
Fuel Depth	No errors
Twigs 0 – .24	± 40 percent
Twigs .25 - .99	± 30 percent
Twigs 1.0 – 2.99	± 20 percent
Volume 1	n/a
Weight 1	n/a
Volume 2	n/a
Weight 2	n/a
Volume 3	n/a
Weight 3	n/a
Volume 4	n/a
Weight 4	n/a
Piece Count	No missed pieces

Field	Tolerance
Decay Class	No errors
Diameter	± 1 inch on measurements
Piece Length	No errors

APPENDIX M: GLOSSARY OF TERMS

Table 43: Glossary

Term	Definition
Aspect	A position facing or commanding a given direction; exposure. Aspect is the compass direction of the prevailing slope with respect to true north.
Azimuth	A horizontal angular measure from true north to an object of interest.
Basal Area	The cross-sectional area of the stem or stems of a plant or of all plants in a stand; generally expressed as square units per unit area. For trees, measured at 4.5 feet above ground; forbs and grasses are measure at the root crown
Bole Length	The straight-line distance measured parallel to the main bole of a tree, from its base to its tip.
Breast Height	A point located on the uphill side of the main stem, by measuring 4.5 feet along the uphill side of the bole from ground level or the predominant root collar. Preclude slight, non-compacted litter accumulations when establishing breast height.
CALVEG	Classification and Assessment with LANDSAT of Visible Ecological Groupings. It is a California-wide system for classifying vegetative and non-vegetative cover types. The primary cover type relates to life form and uses a 3-character alpha code.
Canopy Cover	The percent of a fixed area covered by the crown of an individual plant species or delimited by the vertical projection of its outermost perimeter; small openings in the crown are included.

Term	Definition
Compacted Live Crown Ratio	The percent of the total height of the tree that supports a full, live crown. For trees that have uneven length crowns, occularly transfer lower branches to fill holes in the upper portions of the crown, until a full, even crown is created.
Compartment	A land area, usually between 3,000 and 8,000 acres, easily identified on the ground by physical features. A compartment tis comparable in size to a sub-watershed, or landscape management unit. It is used as a convenience for maintaining stand records and planning vegetation management projects.
Crown Class	The relative position of the tree or shrub crown with respect to the competing vegetation around it. Crown class for each tree or shrub is judged in the context of its immediate environment, that is those trees or shrubs which are competing for sunlight with the subject tree or shrub.
Crown Length	The vertical distance from the top of the leader to the base of the crown, measured to the lowest live branch-whorl with live branches in at least three quadrants, and continuous with the main crown.
Crown Ratio	The ratio of compacted live crown length to bole length. Lengths are measured parallel to the bole from the base of the tree to the tip.
DEM	Digital Elevation Model. USGS geographic elevation data distributed in raster form. Digital representation of the shape of the earth's surface. Typically, digital elevation data consists of arrays of values that represent topographic elevations measured at equal intervals on the Earth's surface.
Diameter	The length of a straight-line segment passing through the center of an item and terminating at its periphery.
Diameter at Breast Height (DBH)	A measure at breast height (4.5 feet), outside bark, of the tree bole, perpendicular to the tree bole.
Diameter at Root Collar (DRC)	The straight line passing through the center of a cross section of a bole measured at the root collar of a shrub or tree.
Down Log	Stem material (conifer or hardwood) that is lying on the ground. If a stem material is leaning more than 45 degrees from vertical, is not self-supporting, and/or in contact with the ground, it is considered a down log.

Term	Definition
Down Woody Material	Woody pieces of trees and shrubs that have been uprooted (no longer supporting growth) or severed from their root system, not self-supporting, and are lying on the ground.
Duff Layer	Duff is the fermentation and humus layer of the forest floor. It does not include the freshly cast material in the litter layer. The top of the duff is where needles, leaves, and other cast-off vegetative material have noticeably begun to decompose. Individual particles usually will be bound by fungi mycelium. When moss is present, the top of the duff is just below the green portion of the moss. The bottom of the duff is the start of the soil ("A" horizon).
Elevation	Vertical distance from a datum, usually mean sea level, to a point or object on the earth's surface. Not to be confused with altitude, this refers to points above the earth's surface.
Fuel Bed	The fuel bed is accumulation of dead, woody residue on the forest floor. It begins at the top of the duff layer and above. It includes litter, dead limb wood, and bole wood from tree species, as well as dead material from shrub, herbaceous, and grass species.
Fuel Model	Mathematical descriptions of fuel properties (e.g., fuel load and fuel depth) that are used as inputs to calculations of fire danger indices and fire behavior potential.
GPS	Global Positioning System. A network of radio-emitting satellites deployed by the U.S. Department of Defense. Ground-based GPS receivers can automatically derive accurate surface coordinates for all kinds of GIS, mapping, and surveying data collection.
Ground Level	The forest floor, made up by soil and duff layer. It does not include unincorporated woody debris that may rise above the ground line. In reference to a point of measure, it is the highest point of the ground touching the base of the object being referenced.
Group Tally	A count of one or more items of the same type or species and recorded as a single line entry.
Growth	A measure of the increase in growth layers for a specified time frame.
Height Growth	The increase in height over a set period of time.

Term	Definition
Intersect Diameter	Measurement of diameter at a point where the sampling plane intersects the geometric center of the object being tallied. No adjustment is made for stem irregularities at the point of intersection.
Lean (Tree)	The deflection from vertical, > 15 degrees of a straight line passing through the geometric center of the base and top of the main stem.
Length	The measurement of the extent of something along its greatest dimension.
Life Form	Species and individuals that are grouped into classes on the basis of their similarities in structure and function. A growth form that displays an obvious relationship to important environmental factors.
Limiting Distance	A comparative measurement between the subplot radius and the distance from the subplot center to the center of the object. The comparison is used to determine whether the object is in or out of the fixed area subplot. The object is "IN" if the measured distance is equal to or less than the subplot radius. The object is "OUT" if the measured distance is greater than the subplot radius.
Live Crown Length	The straight-line distance measured parallel to the main bole of a tree, from the top of the live crown to the base of the live crown.
Ownership	The identification of the legal owner/administrator on both the surface and subsurface estates.
Plant Species	The major subdivision of a genus or subgenus of a plant being described or measured.
Plot Configuration	The size and shape of the sampling unit (plot) and the spatial arrangement of subplots within that unit.
Plot	A sub-sample of a plot or stand exam. This is the unit on which data are recorded to individual trees, snags, logs, understory vegetation, and fuels. Data can be collected on either a fixed area or variable radius area.
Proclaimed Forest	Units of the National Forest System as originally proclaimed or designated by Congress.
Quadratic Mean Diameter	The diameter of the tree of average basal area.

Term	Definition
Radial Growth Increment	The increase in tree radius over a period of time at breast height, or occasionally at the base.
Random Sample	Any method of sample selection based on the theory of probability (degree of certainty). At any stage of the operation of selection, the probability of any set of units being selected must be known. It is the only method that can provide a measure of precision of the estimate.
Reconciliation Code	A code used to reflect the status of an individually tallied item with regards to previous surveys.
Slope	A deviation from the horizontal.
Species	A code that represents a fundamental category of taxonomic classification of an organism.
Stand	A spatially continuous group of trees and associated vegetation having similar structures and growing under similar soil and climatic conditions.
Stand Exam Grid	Basic data collection method for stand exams. It consists of a set of plots, separated by equal distances on a grid pattern. The lines of the grid (transects) are oriented in cardinal directions. There is a predetermined distance between plots. The number of transects and grid plots will vary depending upon the size and shape of the stand.
Stratified Sample	A method of sampling forest resources where stands or polygons of similar properties are lumped into strata. This improves the efficiency of an inventory by reducing the variability within a given population. The less variability there is within a strata, the fewer samples will need to be taken to achieve a statistically valid result.
Stratum	A group of stands within a condition class; similar characteristics such as forest type, tree size class, and canopy density.
Stump	The woody base of a tree remaining in contact with the soil after the trunk or main stem has been severed at a point less than 4.5 feet above ground height (measured on the uphill side).
Tree	A woody perennial plant, typically large, with a single well-defined stem carrying a more or less definite crown.

Term	Definition
Tree Age	Total age of the above-ground stem of a tree (not age of the root stock or the total age from seed). Total age is usually the annual ring count to the pith of the tree at breast height plus an estimate of the number of years it took the tree to reach breast height.

APPENDIX N: FUEL MODELS

The original 13 fuel models are from “Aids to Determining Fuel Models for Estimating Fire Behavior,” Hal E. Anderson, INT-122, 1982. The remaining fuel models are from “Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model” by Joe H. Scott and Robert E. Burgan. RMRS – GTR-153. June 2005.

Table 44: Fuel Models

Fuel Model	Fuel Model Code	Fuel Model Name	Fuel Type	Model Set	Fuel 1-hr	Fuel 10-hr	Fuel 100-hr	Fuel Bed Depth
1	n/a	Short grass (1 foot)	Grass and grass-dominated	Original 13	0.74	0	0	1
2	n/a	Timber (grass and understory)	Grass and grass-dominated	Original 13	2	1	0.500	1
3	n/a	Tall grass (2.5 feet)	Grass and grass-dominated	Original 13	3.01	0	0	2.50
4	n/a	Chaparral (6 feet)	Chaparral and shrub fields	Original 13	5.01	4.010	2	6
5	n/a	Brush (2 feet)	Chaparral and shrub fields	Original 13	1	0.500	0	2
6	n/a	Dormant brush, hardwood slash	Chaparral and shrub fields	Original 13	1.50	2.500	2	2.50
7	n/a	Southern rough	Chaparral and shrub fields	Original 13	1.13	1.870	1.500	2.50

Fuel Model	Fuel Model Code	Fuel Model Name	Fuel Type	Model Set	Fuel 1-hr	Fuel 10-hr	Fuel 100-hr	Fuel Bed Depth
8	n/a	Closed timber litter	Timber litter	Original 13	1.50	1	2.500	0.20
9	n/a	Hardwood litter	Timber litter	Original 13	2.92	0.410	0.150	0.20
10	n/a	Timber (litter and understory)	Timber litter	Original 13	3.01	2	5.010	1
11	n/a	Light logging slash	Slash	Original 13	1.50	4.51	5.510	1
12	n/a	Medium logging slash	Slash	Original 13	4.01	14.03	16.53	2.30
13	n/a	Heavy logging slash	Slash	Original 13	7.01	23.04	28.05	3
91	NB1	Urban/ Developed	Non-burnable	Scott and Burgan	0	0	0	0
92	NB2	Snow/Ice	Non-burnable	Scott and Burgan	0	0	0	0
93	NB3	Agricultural	Non-burnable	Scott and Burgan	0	0	0	0
98	NB4	Open Water	Non-burnable	Scott and Burgan	0	0	0	0
99	NB5	Bare Ground	Non-burnable	Scott and Burgan	0	0	0	0
101	GR1	Short, Sparse Dry Climate Grass (Dynamic)	Grass	Scott and Burgan	0.10	0	0	0.40
102	GR2	Low Load, Dry Climate (Dynamic)	Grass	Scott and Burgan	0.10	0	0	1

Fuel Model	Fuel Model Code	Fuel Model Name	Fuel Type	Model Set	Fuel 1-hr	Fuel 10-hr	Fuel 100-hr	Fuel Bed Depth
103	GR3	Low Load, Very Coarse, Humid Climate Grass (Dynamic)	Grass	Scott and Burgan	0.10	0.40	0	2
104	GR4	Moderate Load, Dry Climate Grass (Dynamic)	Grass	Scott and Burgan	0.25	0	0	2
105	GR5	Low Load, Humid Climate Grass (Dynamic)	Grass	Scott and Burgan	0.40	0	0	1.50
106	GR6	Moderate Load, Humid Climate Grass (Dynamic)	Grass	Scott and Burgan	0.10	0	0	1.50
107	GR7	High Load, Dry Climate Grass (Dynamic)	Grass	Scott and Burgan	1	0	0	3
108	GR8	High Load, Very Coarse, Humid Climate Grass (Dynamic)	Grass	Scott and Burgan	0.50	1	0	4
109	GR9	Very High Load, Humid Climate Grass (Dynamic)	Grass	Scott and Burgan	1	1	0	5
121	GS1	Low Load, Dry Climate Grass-Shrub (Dynamic)	Grass-Shrub	Scott and Burgan	0.20	0	0	0.90
122	GS2	Moderate load, Dry Climate Grass-Shrub (Dynamic)	Grass-Shrub	Scott and Burgan	0.50	0.500	0	1.50
123	GS3	Moderate Load, Humid Climate Grass-Shrub (Dynamic)	Grass-Shrub	Scott and Burgan	0.30	0.250	0	1.80

Fuel Model	Fuel Model Code	Fuel Model Name	Fuel Type	Model Set	Fuel 1-hr	Fuel 10-hr	Fuel 100-hr	Fuel Bed Depth
124	GS4	High Load, Humid Climate Grass-Shrub (Dynamic)	Grass-Shrub	Scott and Burgan	1.90	0.300	0.100	2.10
141	SH1	Low Load, Dry Climate Shrub (Dynamic)	Shrub	Scott and Burgan	0.25	0.250	0	1
142	SH2	Moderate Load, Dry Climate Shrub	Shrub	Scott and Burgan	1.35	2.400	0.750	1
143	SH3	Moderate Load, Humid Climate Shrub	Shrub	Scott and Burgan	0.45	3	0	2.40
144	SH4	Low Load, Humid Climate Timber-Shrub	Shrub	Scott and Burgan	0.85	1.150	0.200	3
145	SH5	High Load, Dry Climate Shrub	Shrub	Scott and Burgan	3.60	2.100	0	6
146	SH6	Low Load, Humid Climate Shrub	Shrub	Scott and Burgan	2.90	1.450	0	2
147	SH7	Very High Load, Dry Climate Shrub	Shrub	Scott and Burgan	3.5	5.300	2.200	6
148	SH8	High Load, Humid Climate Shrub	Shrub	Scott and Burgan	2.05	3.400	0.850	3
149	SH9	Very High Load, Humid Climate Shrub (Dynamic)	Shrub	Scott and Burgan	4.50	2.450	0	4.40
161	TU1	Low Load, Dry Climate Timber-Grass-Shrub (Dynamic)	Timber - Understory	Scott and Burgan	0.20	0.900	1.500	0.60

Fuel Model	Fuel Model Code	Fuel Model Name	Fuel Type	Model Set	Fuel 1-hr	Fuel 10-hr	Fuel 100-hr	Fuel Bed Depth
162	TU2	Moderate Load, Humid Climate Timber-Grass-Shrub (Dynamic)	Timber - Understory	Scott and Burgan	0.95	1.800	1.250	1
163	TU3	Moderate Load, Humid Climate Timber-Grass-Shrub (Dynamic)	Timber – Understory	Scott and Burgan	1.10	0.150	0.250	1.30
164	TU4	Dwarf Conifer with Understory	Timber – Understory	Scott and Burgan	4.50	0	0	0.50
165	TU5	Very High Load, Dry Climate Timber-Shrub	Timber – Understory	Scott and Burgan	4	4	3	1
181	TL1	Low Load Compact Conifer Litter	Timber Litter	Scott and Burgan	1	2.200	3.600	0.20
182	TL2	Low Load Broadleaf Litter	Timber Litter	Scott and Burgan	1.40	2.300	2.200	0.200
183	TL3	Moderate Load Conifer Litter	Timber Litter	Scott and Burgan	0.50	2.200	2.800	0.30
184	TL4	Small Downed Logs	Timber Litter	Scott and Burgan	0.50	1.500	4.200	0.40
185	TL5	High Load Conifer Litter	Timber Litter	Scott and Burgan	1.15	2.500	4.400	0.60
186	TL6	Moderate Load Broadleaf Litter	Timber Litter	Scott and Burgan	2.40	1.200	1.200	0.30
187	TL7	Large Downed Logs	Timber Litter	Scott and Burgan	0.30	1.400	8.100	0.40

Fuel Model	Fuel Model Code	Fuel Model Name	Fuel Type	Model Set	Fuel 1-hr	Fuel 10-hr	Fuel 100-hr	Fuel Bed Depth
188	TL8	Long-Needle Litter	Timber Litter	Scott and Burgan	5.80	1.400	1.100	0.30
189	TL9	Very High Load Broadleaf Litter	Timber Litter	Scott and Burgan	6.65	3.300	4.150	0.60
201	SB1	Low Load Activity Fuel	Slash-Blowdown	Scott and Burgan	1.50	3	11	1
202	SB2	High Load Activity Fuel or Moderate Load Blowdown	Slash-Blowdown	Scott and Burgan	4.50	4.250	4	1
203	SB3	High Load Activity Fuel or Moderate Load Blowdown	Slash-Blowdown	Scott and Burgan	5.50	2.750	3	1.20
204	SB4	High Load Blowdown	Slash-Blowdown	Scott and Burgan	5.25	3.500	5.250	2.70

Table 45: Detailed Descriptions of the Fuel Models

Code	Detailed Description
1	Contains fine, very porous, and continuous herbaceous fuels that have cured or are nearly cured. Generally less than one-third of the area contains shrubs or timber. Grasslands and savanna are represented along with stubble, grass-tundra, and grass-shrub combinations. Annual and perennial grasses are included in this fuel model.
2	Herbaceous material with litter and dead-down stem wood from the open shrub or timber overstory. Open shrub lands and pine stands or scrub oak stands that cover one-third to two-thirds of the area. Stand many include clumps and may include pinyon-juniper.
3	Stands are tall, averaging about three feet, but considerable variation may occur. Approximately one-third or more of the stand is considered dead and cured. May include cultivated grains that have not been harvested, tall prairie, and marshland grasses.

Code	Detailed Description
4	Stands of mature shrubs, 6 feet or more tall such as California mixed chaparral, the high pocosin along the east coast, the pine barrens of New Jersey, or the closed jack pine stands of the north-central states. Besides flammable foliage, stand may contain dead woody material. May contains a deep litter layer.
5	Shrubs are young with little dead material, and the foliage contains little volatile material. Usually shrubs are short and almost totally cover the area. Young, green stands with no dead wood qualify: laurel, vine maple, alder, or even chaparral, manzanita, or chamise.
6	The shrubs are older, but not as tall as model 4, nor do they contain as much fuel as model 4. This model covers a broad range of shrub conditions: intermediate stands of chamise, chaparral, oak brush, low pocosin, Alaskan spruce taiga, and shrub tundra. May include hardwood slash that has been cured. Pinyon-juniper shrub lands may be represented.
7	Stands of shrubs are generally between 2 and 6 feet high. Palmetto-galliberry understory, with a pine overstory are typical. Low pocosin may be represented. Black spruce shrub combinations in Alaska may also be represented.
8	Contains closed canopy stands of short needle conifers or hardwoods that have leafed out. The compact litter layer is mainly needles, leaves, and occasionally twigs because little undergrowth is present. Representative conifer types are white pine, lodgepole pine, spruce, fir, and larch.
9	Both long-needle conifer stands and hardwood stands, especially the oak-hickory types, are typical. Closed stands of long-needled pine like ponderosa, Jeffrey, red pines, or southern pine plantations are grouped in this model. May contain concentrations of dead-down woody material.
10	Dead-down fuels include quantities of 3-inch or larger limb wood resulting from over maturity or natural events that create a large load of dead material on the forest floor. Any forest type may be considered if heavy down material is present; examples are insect- or disease-ridden stands, wind thrown stands, over-mature situations with deadfall, and aged light thinning or partial cut slash.
11	Contains slash and herbaceous material intermixed with slash. Light partial cuts or thinning operations in mixed conifer stands, hardwood stands, and southern pine harvests are considered. Clearcuts generally produce more slash than represented here. The less than 3-inch material load is less than 12 tons per acre. The greater than 3 inch is represented by not more than 10 pieces, 4 inches in diameter, along a 60 foot transect.
12	The visual impression is dominated by slash and much of it is less than 3 inches in diameter. The fuels are well distributed. Heavily thinned conifer stands, clearcuts, and medium or heavy partial cuts are represented. The material larger than 3 inches is represented by encountering 11 pieces, 6 inches in diameter along a 50 foot transect.

Code	Detailed Description
13	There is a continuous layer of slash. Large quantities of material larger than 3 inches are present. Clearcuts and heavy partial cuts in mature and over-mature stands are depicted where the slash load is dominated by the greater than 3 inch diameter material. Fuels less than 3 inches are generally only 10 percent of the total load. May include situations where the slash still has “red” needles attached.
91	Land covered by urban and suburban development. The area must not support wildland fire spread. In some cases the area may experience structural fire losses during a wildland fire incident; however, structure ignition in those cases is either house-to-house or by firebrands, neither of which is directly modeled using fire behavior fuel models. If sufficient vegetation surrounds structures such that wildland fire spread is possible, then choose a fuel model appropriate for the wildland vegetation.
92	Land covered by permanent snow and ice. Areas covered by seasonal snow and ice can be mapped to two different fuel models.
93	Agricultural land maintained in a non-burnable condition, examples include irrigated annual crops, mowed or tilled orchards, and so forth. However, there are many agricultural areas that are not kept in a non-burnable condition. For example, grass is often allowed to grow beneath vines or orchard trees, and wheat and similar crops are allowed to cure before harvest; in those cases use a different fuel model.
98	Land covered by open bodies of water such as lakes, rivers, and oceans.
99	Land devoid of enough fuel to support wildland fire spread. Such areas include: gravel pits, arid deserts with little vegetation, sand dunes, rock outcroppings, beaches, and so forth.
101	The primary carrier of fire in sparse grass, though small amounts of fine fuel may be present. The grass is generally short, either naturally or by grazing, and may be sparse or discontinuous. The moisture extraction is indicative of a dry climate fuelbed, but may also be applied in high-extinction moisture fuelbeds because in both cases predicted spread rate and flame length are low compared to other grass models.
102	The primary carrier of fire is grass, though small amounts of fine dead fuel may be present. Load is greater than 101, and fuelbed may be more continuous. Shrubs, if present, do not affect fire behavior.
103	The primary carrier of fire is continuous, coarse, humid-climate grass. Grass and herb fuel load is relatively light; fuelbed depth is about 2 feet. Shrubs are not present in significant quantity to affect fire behavior.
104	The primary carrier of fire is continuous, dry-climate grass. Load and depth are greater than 102; fuelbed depth is about 2 feet.
105	The primary carrier of fire is humid-climate grass. Load is greater than 103 but depth is lower, about 1-2 feet.

Code	Detailed Description
106	The primary carrier of fire is continuous humid-climate grass. Load is greater than 105 but depth is about the same. Grass is less coarse than 105.
107	The primary carrier of fire is continuous dry-climate grass. Load and depth are greater than 104. Grass is about 3 feet tall.
108	The primary carrier of fire is continuous, very coarse, humid-climate grass. Load and depth are greater than 106. Spread rate and flame length can be extreme if grass is fully cured.
109	The primary carrier of fire is dense, tall, humid-climate grass. Load and depth are greater than 108, about 6 feet tall. Spread rate and flame length can be extreme if grass is fully more mostly cured.
121	The primary carrier of fire is grass and shrubs combined. Shrubs are about 1 foot height, grass load is low. Spread rate is moderate; flame length is low. Moisture of extinction is low.
122	The primary carrier of fire is grass and shrubs combined. Shrubs are 1 to 3 feet high, grass load is moderate. Spread rate is high; flame length moderate. Moisture of extinction is low.
123	The primary carrier of fire is grass and shrubs combined. Moderate grass/shrub load, average grass/shrub depth less than 2 feet. Spread rate is high; flame length moderate. Moisture of extinction is high.
124	The primary carrier of fire is grass and shrubs combined. Heavy grass/shrub load, depth greater than 2 feet. Spread rate high; flame length very high. Moisture of extinction is high.
141	The primary carrier of fire is woody shrubs and shrub litter. Low shrub fuel load, fuelbed about 1 foot; some grass may be present. Spread rate is very low; flame length very low.
142	The primary carrier of fire is woody shrubs and shrub litter. Moderate shrub fuel load (higher than 141), depth about 1 foot, no grass fuel present. Spread rate is very low; flame length low.
143	The primary carrier of fire is woody shrubs and shrub litter. Moderate shrub load, possibly with pine overstory or herbaceous fuel, fuel bed depth 2 to 3 feet. Spread rate is low; flame length low.
144	The primary carrier of fire is woody shrubs and shrub litter. Low to moderate shrub and litter load, possibly with pine overstory, fuel bed depth about 3 feet. Spread rate is high; flame length moderate.
145	The primary carrier of fire is woody shrubs and shrub litter. Heavy shrub load, depth 4-6 feet. Spread rate is very high; flame length very high. Moisture of extinction is high.

Code	Detailed Description
146	The primary carrier of fire is woody shrubs and shrub litter. Dense shrubs, little or no herbaceous fuel, fuelbed depth about 2 feet. Spread rate is high; flame length high.
147	The primary carrier of fire is woody shrubs and shrub litter. Very heavy shrub load, depth 4 to 6 feet. Spread rate lower than 146, but flame length similar. Spread rate is high, flame length is very high.
148	The primary carrier of fire is woody shrubs and shrub litter. Dense shrubs, little or no herbaceous fuel, fuelbed depth about 3 feet. Spread rate is high; flame length high.
149	The primary carrier of fire is woody shrubs and shrub litter. Dense, finely branched shrubs with significant fine dead fuel, about 4 to 6 feet tall; some herbaceous fuel may be present. Spread rate is high; flame length is very high.
161	The primary carrier of fire is low load of grass and/or shrub with litter. Spread rate is low; flame length is low.
162	The primary carrier of fire is moderate litter load with shrub component. High extinction moisture. Spread rate is moderate; flame length is low.
163	The primary carrier of fire is moderate forest litter. High extinction moisture. Spread rate is high; flame length is moderate.
164	The primary carrier of fire is short conifer trees with grass or moss understory. Spread rate is moderate; flame length is moderate.
165	The primary carrier of fire is heavy forest litter with a shrub or small tree understory. Spread rate is moderate; flame length is moderate.
181	The primary carrier of fire is compact forest litter. Light to moderate loads, fuels 1 to 2 inches deep. May be used to represent a recently burned forest. Spread rate is very low; flame length is very low.
182	The primary carrier of fire is broadleaf (hardwood) litter. Low load, compact broadleaf litter. Spread rate is very low; flame length is very low.
183	The primary carrier of fire is moderate load conifer litter, light load of coarse fuels. Spread rate is very low; flame length low.
184	The primary carrier of fire is moderate load of fine litter and coarse fuels. Includes small diameter downed logs. Spread rate is low; flame length low.
185	The primary carrier of fire is high load of fine litter; light slash or mortality fuel. Spread rate is low; flame length low.
186	The primary carrier of fire is moderate load broadleaf litter, less compact than 182. Spread rate is very moderate; flame length is low.

Code	Detailed Description
187	The primary carrier of fire is heavy load of forest litter, includes large diameter downed logs. Spread rate is low; flame length low.
188	The primary carrier of fire is moderate load long-needle pine litter, may include small amount of herbaceous load. Spread rate is moderate; flame length low.
189	The primary carrier of fire is very high load, fluffy broadleaf litter. This can also be used to represent heavy needle-drape. Spread rate is very moderate; flame length moderate.
201	The primary carrier of fire is light dead and down activity fuel. Fine fuel load is 10 to 20 t/ac weighted towards fuels 1 to 3 inch diameter class; depth is less than 1 foot. Spread rate is moderate; flame length moderate.
202	The primary carrier of fire is moderate dead and downed activity fuel or light blowdown. Fine fuel load is 7 to 12 t/ac, evenly distributed across 0 to 0.25, 0.25 to 1, and 1 to 3 inch diameter classes, depth is about 1 foot. Blowdown is scattered, with many trees still standing. Spread rate is moderate; flame length moderate.
203	The primary carrier of fire is heavy dead and down activity fuel or moderate blowdown. Fine fuel load is 7 to 12 t/ac, weighted toward 0 to 0.25 inch diameter class, depth is more than 1 foot. Blowdown is moderate; trees compacted to near the ground. Spread rate is high; flame length high.
204	The primary carrier of fire is heavy blowdown fuel. Blowdown is total, fuelbed is not compacted, most foliage and fine fuel still attached to blowdown. Spread rate is very high; flame length very high.