APPENDIX E: EXISTING VEGETATION REFERENCES AND CODES

February 2014

Existing Vegetation References

Code	Name	Author
SAF	**Forest Cover Types of the United States and Canada**.	F.H. Eyre, Editor. Society of American Foresters (1980)
SRM	Society for Range Management	

Existing SAF Vegetation Codes

Ref.	Code	Description
SAF	000	Non Forest Types
SAF	206	Engelmann spruce-subalpine fir
SAF	209	Bristlecone pine
SAF	210	Interior Douglas-fir
SAF	211	White fir
SAF	216	Blue spruce
SAF	217	Aspen - Western forests - Middle elevation - Interior
SAF	219	Limber pine
SAF	220	Rocky Mountain juniper
SAF	235	Cottonwood - willow
SAF	237	Interior ponderosa pine
SAF	239	Pinyon – juniper
SAF	240	Arizona cypress
SAF	241	Western live oak
SAF	242	Mesquite

Existing SRM Vegetation Codes

Ref.	Code	Description
SRM	001	Urban
SRM	002	Agriculture
SRM	004	Forest Land
SRM	005	Water
SRM	007	Barren Land
SRM	000	Non-vegetated
SRM	109	Ponderosa pine – shrubland
SRM	110	Ponderosa pine – grassland
SRM	201	Blue oak woodland
SRM	203	Riparian woodland
SRM	207	Scrub oak mixed chaparral

Existing SRM Vegetation Codes (cont.)

Ref.	Code	Description
SRM	208	Ceanothus mixed chaparral
SRM	209	Montane shrubland
SRM	210	Bitterbrush
SRM	211	Creosote bush scrub
SRM	212	Blackbush
SRM	213	Alpine grassland
SRM	215	Valley grassland
SRM	216	Montane meadows
SRM	217	Wetlands
SRM	301	Bluebunch wheatgrass - blue grama
SRM	303	Bluebunch wheatgrass - western wheatgrass
SRM	310	Needle-and-thread - blue grama
SRM	313	Tufted hairgrass – sedge
SRM	317	Bitterbrush - bluebunch wheatgrass
SRM	320	Black sagebrush - bluebunch wheatgrass
SRM	322	Curlleaf mountain-mahogany - bluebunch wheatgrass
SRM	401	Basin big sagebrush
SRM	402	Mountain big sagebrush
SRM	403	Wyoming big sagebrush
SRM	405	Black sagebrush
SRM	408	Other sagebrush types
SRM	409	Tall forb
SRM	410	Alpine rangeland
SRM	411	Aspen woodland
SRM	412	Juniper - pinyon woodland
SRM	413	Gambel oak
SRM	414	Salt desert shrub
SRM	415	Curlleaf mountain-mahogany
SRM	416	True mountain-mahogany
SRM	417	Littleleaf mountain-mahogany
SRM	418	Bigtooth maple
SRM	419	Bittercherry
SRM	420	Snowbush
SRM	421	Chokecherry - serviceberry – rose
SRM	422	Riparian
SRM	501	Saltbush – greasewood
SRM	502	Grama – galleta
SRM	503	Arizona chapparal
SRM	504	Juniper - pinyon pine woodland
SRM	505	Grama - tobosa shrub
SRM	506	Creosotebush - bursage
SRM	507	Palo Verde - cactus
SRM	508	Creosotebush - tarbush
SRM	509	Oak - juniper woodland and mahogany-oak
SRM	601	Bluestem prairie
SRM	604	Bluestem - grama prairie
SRM	605	Sandsage prairie

Existing SRM Vegetation Codes (cont.)

Ref.	Code	Description
SRM	606	Wheatgrass - bluestem - needlegrass
SRM	607	Wheatgrass - needlegrass
SRM	608	Wheatgrass - gama - needlegrass
SRM	609	Wheatgrass - gama
SRM	610	Wheatgrass
SRM	611	Blue grama - buffalograss
SRM	612	Sagebrush - grass
SRM	613	Fesque grassland
SRM	614	Crested wheatgrass
SRM	615	Wheatgrass - saltgrass - grama
SRM	701	Alkali sacaton - tobosagrass
SRM	702	Black grama - alkali sacaton
SRM	703	Black grama - sideoats grama
SRM	704	Blue grama - western wheatgrass
SRM	705	Blue grama - galleta
SRM	706	Blue grama - sideoats grama
SRM	707	Blue grama - sideoats grama - black grama
SRM	708	Bluestem - dropseed
SRM	709	Bluestem - grama
SRM	710	Bluestem prairie
SRM	711	Bluestem - sacahuista prairie
SRM	712	Galleta - alkali sacaton
SRM	713	Grama - muhly - threeawn
SRM	714	Grama - bluestem
SRM	715	Grama - buffalograss
SRM	716	Grama - feathergrass
SRM	717	Little bluestem - Indiangrass - Texas wintergrass
SRM	718	Mesquite - grama
SRM	722	Sand sagebrush - mixed prairie
SRM	724	Sideoats grama - New Mexico feathergrass- winterfat
SRM	725	Vine mesquite - alkali sacaton
SRM	727	Mesquite - buffalograss
SRM	728	Mesquite - granjeno - acacia
SRM	729	Mesquite
SRM	730	Sand shinnery oak
SRM	733	Juniper - oak
SRM	734	Mesquite - oak
SRM	735	Sideoats grama - sumac - juniper
SRM	801	Savanna
SRM	805	Riparian
SRM	809	Mixed hardwood and pine
SRM	916	Sedge - shrub tundra
SRM	917	Tall shrub swamp
SRM	919	Wet meadow tundra
SRM	921	Willow

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APPENDIX F: POTENTIAL VEGETATION REFERENCES

Code	Name/Author
301	**Plant Associations of Arizona and New Mexico,** edition 3, July 1997. Volume 1: Forests and Volume 2: Woodlands.

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APPENDIX G: POTENTIAL VEGETATION CODES

Reference Code 301

PV Code	Common Name	Scientific Name
001010	white fir/Rocky Mountain maple	ABCO/ACGL
001011	white fir/Rocky Mountain maple/creeping barberry	ABCO/ACGL/MARE11
001012	white fir/Rocky Mountain maple/rockspirea	ABCO/ACGL/HODU
001013	white fir/Rocky Mountain maple (riparian)	ABCO/ACGL
001020	white fir/creeping barberry	ABCO/MARE11
001021	white fir/creeping barberry/New Mexico locust	ABCO/MARE11/RONE
001022	white fir/creeping barberry/common juniper	ABCO/MARE11/JUCO6
001030	white fir/sprucefir fleabane	ABCO/EREX4
001040	white fir/Arizona fescue	ABCO/FEAR2
001041	white fir/Arizona fescue/muttongrass	ABCO/FEAR2/POFE
001042	white fir/Arizona fescue/Gambel oak	ABCO/FEAR2/QUGA
001050	white fir/Gambel oak	ABCO/QUGA
001051	white fir/Gambel oak/screwleaf muhly	ABCO/QUGA/MUVI2
001052	white fir/Gambel oak/Arizona fescue	ABCO/QUGA/FEAR2
001053	white fir/Gambel oak/pine muhly	ABCO/QUGA/MUDU
001054	white fir/Gambel oak/rockspirea	ABCO/QUGA/HODU
001060	white fir/screwleaf muhly	ABCO/MUVI2
001070	white fir/Nevada pea	ABCO/LALAL3
001080	white fir/bigtooth maple	ABCO/ACGR3
001081	white fir/bigtooth maple/rockspirea	ABCO/ACGR3/HODU
001090	white fir/kinnikinnick	ABCO/ARUV
001100	white fir/whortleberry	ABCO/VAMY2
001110	white fir/New Mexico locust	ABCO/RONE
001111	white fir/New Mexico locust/dryspike sedge	ABCO/RONE/CAFO3
001120	white fir/beardless wildrye	ABCO/LETR5
001130	white fir/Arizona walnut	ABCO/JUMA
001140	white fir/mountain snowberry/ponderosa pine	ABCO/SYOR2/PIPO
001141	white fir/mountain snowberry/limber pine	ABCO/SYOR2/PIFL2
001150	white fir/dryspike sedge	ABCO/CAFO3
001160	white fir/burnet ragwort	ABCO/PASA12
003	subalpine fir (riparian)	ABLAL
003060	subalpine fir/tall fringed bluebells	ABLAL/MECI3
003080	subalpine fir/sprucefir fleabane	ABLAL/EREX4
003090	subalpine fir/common juniper	ABLAL/JUCO6
003110	subalpine fir/moss	ABLAL/2MOSS
003111	subalpine fir/moss/Engelmann spruce	ABLAL/2MOSS/PIEN
003112	subalpine fir/moss/Douglas-fir	ABLAL/2MOSS/PSME
003200	subalpine fir/whortleberry	ABLAL/VAMY2
003201	subalpine fir/whortleberry/twinflower	ABLAL/VAMY2/LIBO3
003202	subalpine fir/whortleberry/thimbleberry	ABLAL/VAMY2/RUPA
003203	subalpine fir/whortleberry/fivepetal cliffbush	ABLAL/VAMY2/JAAM
003231	subalpine fir/thimbleberry/Rocky Mountain maple	ABLAL/RUPA/ACGL
003240	subalpine fir/thimbleberry	ABLAL/RUPA
003300	subalpine fir/burnet ragwort	ABLAL/PASA12
003301	subalpine fir/burnet ragwort/Douglas-fir	ABLAL/PASA12/PSME

Reference Code 301 (cont.)

PV Code	Common Name	Scientific Name
003310	subalpine fir/Nevada pea	ABLAL/LALAL3
003320	subalpine fir/fivepetal cliffbush	ABLAL/JAAM
003350	subalpine fir (scree)	ABLAL
003370	subalpine fir/dryspike sedge	ABLAL/CAFO3
004060	Engelmann spruce/moss	PIEN/2MOSS
004061	Engelmann spruce/moss/Engelmann spruce	PIEN/2MOSS/PIEN
004062	Engelmann spruce/moss/Douglas-fir	PIEN/2MOSS/PSME
00415	Engelmann spruce/whortleberry/Jacob's-ladder	PIEN/VAMY2/POPUD3
004151	Engelmann spruce/whortleberry/Jacob's-ladder/Engelmann spruce	PIEN/VAMY2/POPUD3/PIEN
004152	Engelmann spruce/whortleberry/Jacob's-ladder/subalpine fir	PIEN/VAMY2/POPUD3/ABLA
004300	Engelmann spruce/Rocky Mountain maple	PIEN/ACGL
004310	Engelmann spruce/sprucefir fleabane	PIEN/EREX4
004320	Engelmann spruce/beardless wildrye	PIEN/LETR5
004330	Engelmann spruce/Ross' avens	PIEN/GERO2
004340	Engelmann spruce/gooseberry currant	PIEN/RIMO2
00435	Engelmann spruce/bittercress ragwort	PIEN/PACA34
004350	Engelmann spruce/bittercress ragwort/subalpine fir	PIEN/PACA34/ABLAL
004351	Engelmann spruce/bittercress ragwort/white fir	PIEN/PACA34/ABCO
004360	Engelmann spruce/whortleberry	PIEN/VAMY2
006010	blue spruce/redosier dogwood	PIPU/COSES
00604	blue spruce/twinflower	PIPU/LIBO3
006060	blue spruce/dryspike sedge	PIPU/CAFO3
006070	blue spruce/sprucefir fleabane	PIPU/EREX4
006071	blue spruce/sprucefir fleabane/ponderosa pine	PIPU/EREX4/PIPO
006080	blue spruce/kinnikinnick	PIPU/ARUV
006090	blue spruce/Arizona fescue	PIPU/FEAR2
006130	blue spruce/bittercress ragwort	PIPU/PACA34
011	blue spruce (riparian)	PIPU
011030	ponderosa pine/blue grama	PIPO/BOGR2
011031	ponderosa pine/blue grama/little bluestem	PIPO/BOGR2/SCSC
011032	ponderosa pine/blue grama/sand bluestem	PIPO/BOGR2/ANHA
011033	ponderosa pine/blue grama/big sagebrush	PIPO/BOGR2/ARTR2
011034	ponderosa pine/blue grama/gray oak	PIPO/BOGR2/QUGR3
011035	ponderosa pine/blue grama/Gambel oak	PIPO/BOGR2/QUGA
011090	ponderosa pine/Arizona fescue	PIPO/FEAR2
011091	ponderosa pine/Arizona fescue/Parry's oatgrass	PIPO/FEAR2/DAPA2
011092	ponderosa pine/Arizona fescue/blue grama	PIPO/FEAR2/BOGR2
011093	ponderosa pine/Arizona fescue/Gambel oak	PIPO/FEAR2/QUGA
011130	white fir (scree)	ABCO
011210	ponderosa pine/Gambel oak	PIPO/QUGA
011211	ponderosa pine/Gambel oak/Arizona fescue	PIPO/QUGA/FEAR2
011212	ponderosa pine/Gambel oak/longtongue muhly	PIPO/QUGA/MULO
011213	ponderosa pine/Gambel oak/twoneedle pinyon	PIPO/QUGA/PIED
011214	ponderosa pine/Gambel oak/mountain muhly	PIPO/QUGA/MUMO
011215	ponderosa pine/Gambel oak/blue grama	PIPO/QUGA/BOGR2
011216	ponderosa pine/Gambel oak/New Mexico locust	PIPO/QUGA/RONE
011220	ponderosa pine/silverleaf oak	PIPO/QUHY

Reference Code 301 (cont.)

PV Code	Common Name	Scientific Name
011320	ponderosa pine/Stansbury cliffrose	PIPO/PUST
011330	ponderosa pine/mountain muhly	PIPO/MUMO
011340	ponderosa pine/screwleaf muhly	PIPO/MUVI2
011341	ponderosa pine/screwleaf muhly/Gambel oak	PIPO/MUVI2/QUGA
011350	ponderosa pine/Indian ricegrass	PIPO/ACHY
011360	ponderosa pine/gray oak/mountain muhly	PIPO/QUGR3/MUMO
011361	ponderosa pine/gray oak/longtongue muhly	PIPO/QUGR3/MULO
011370	ponderosa pine/wavyleaf oak	PIPO/QUPA4
011380	ponderosa pine/black sagebrush	PIPO/ARNO4
011390	ponderosa pine/screwleaf muhly-Arizona fescue	PIPO/MUVI2-FEAR2
011391	ponderosa pine/screwleaf muhly-Arizona fescue/blue grama	PIPO/MUVI2-FEAR2/BOGR2
011392	ponderosa pine/screwleaf muhly-Arizona fescue/Gambel oak	PIPO/MUVI2-FEAR2/QUGA
011400	ponderosa pine/kinnikinnick	PIPO/ARUV
011410	ponderosa pine/Arizona white oak	PIPO/QUAR
011411	ponderosa pine/Arizona white oak/blue grama	PIPO/QUAR/BOGR2
011420	ponderosa pine/pointleaf manzanita	PIPO/ARPU5
011430	ponderosa pine/netleaf oak	PIPO/QURU4
011440	ponderosa pine/Emory oak	PIPO/QUEM
011460	ponderosa pine (scree)	PIPO
011470	ponderosa pine/Arizona walnut	PIPO/JUMA
011500	ponderosa pine/rockland	PIPO
01203	Douglas-fir/creeping barberry	PSME/MARE11
01213	Douglas-fir/mountain ninebark	PSME/PHMO4
012140	Douglas-fir/Gambel oak	PSME/QUGA
012141	Douglas-fir/Gambel oak/Arizona fescue	PSME/QUGA/FEAR2
012142	Douglas-fir/Gambel oak/screwleaf muhly	PSME/QUGA/MUVI2
012143	Douglas-fir/Gambel oak/rockspirea	PSME/QUGA/HODU
01231	Douglas-fir/kinnikinnick	PSME/ARUV
012320	Douglas-fir/fringed brome	PSME/BRCI2
012330	Douglas-fir/Arizona fescue	PSME/FEAR2
012331	Douglas-fir/Arizona fescue/bristlecone pine	PSME/FEAR2/PIAR
012332	Douglas-fir/Arizona fescue/limber pine	PSME/FEAR2/PIFL2
012333	Douglas-fir/Arizona fescue/quaking aspen	PSME/FEAR2/POTR5
012340	Douglas-fir/mountain muhly/twoneedle pinyon	PSME/MUMO/PIED
012341	Douglas-fir/mountain muhly/limber pine	PSME/MUMO/PIFL2
012350	Douglas-fir/screwleaf muhly	PSME/MUVI2
012360	Douglas-fir/silverleaf oak/ponderosa pine	PSME/QUHY/PIPO
012361	Douglas-fir/silverleaf oak/Chihuahuan pine	PSME/QUHY/PILE
012362	Douglas-fir/silverleaf oak/netleaf oak	PSME/QUHY/QURU4
012380	Douglas-fir (scree)	PSME
01239	Douglas-fir/bigtooth maple	PSME/ACGR3
01241	Douglas-fir/rockspirea	PSME/HODU
01242	Douglas-fir/wavyleaf oak	PSME/QUPA4
012420	Douglas-fir/wavyleaf oak	PSME/QUPA4
012430	Douglas-fir/Arizona white oak	PSME/QUAR
03101	Arizona cypress/silverleaf oak	CUAR/QUHY
03102	Arizona cypress/Sonoran scrub oak	CUAR/QUTU2

Reference Code 301 (cont.)

PV Code	Common Name	Scientific Name
032010	Apache pine/longtongue muhly	PIEN2/MULO
032030	Apache pine/silverleaf oak	PIEN2/QUHY
033010	Chihuahuan pine/pinyon ricegrass	PILE/PIFI
033020	Chihuahuan pine/Arizona white oak	PILE/QUAR
033030	Chihuahuan pine/silverleaf oak	PILE/QUHY
103	narrowleaf cottonwood (riparian)	POAN3
104	Rio grande cottonwood (riparian)	PODEW
123	thinleaf alder (riparian)	ALINT
130	Arizona sycamore (riparian)	PLWR2
201010	oneseed juniper/sideoats grama	JUMO/BOCU
201011	oneseed juniper/sideoats grama/sacahuista	JUMO/BOCU/NOMI
201020	oneseed juniper/blue grama	JUMO/BOGR2
201040	oneseed juniper/big sagebrush	JUMO/ARTR2
201331	oneseed juniper/rubber rabbitbrush-Apache plume	JUMO/ERNAN5-FAPA
201332	oneseed juniper/rubber rabbitbrush-Apache plume/big sagebrush	JUMO/ERNAN5-FAPA/ARTR2
201333	oneseed juniper/rubber rabbitbrush-Apache plume/gray oak	JUMO/ERNAN5-FAPA/QUGR3
201340	oneseed juniper/sand bluestem	JUMO/ANHA
201350	oneseed juniper/Bigelow sage	JUMO/ARBI3
20140	oneseed juniper/winterfat	JUMO/KRLA2
201400	oneseed juniper/wavyleaf oak	JUMO/QUPA4
201410	oneseed juniper/sacahuista-lechuguilla	JUMO/NOMI-AGLE
201420	oneseed juniper/lechuguilla	JUMO/AGLE
201430	Pinchot's juniper/creosote bush	JUPI/LATR2
202020	Utah juniper/big sagebrush	JUOS/ARTR2
202320	Utah juniper/blue grama	JUOS/BOGR2
202321	Utah juniper/blue grama/Stansbury cliffrose	JUOS/BOGR2/PUST
202330	Utah juniper/tobosagrass/mesquite	JUOS/PLMU3/PROSO
202331	Utah juniper/tobosagrass/singleleaf pinyon	JUOS/PLMU3/PIMOF
202500	Utah juniper-oneseed juniper/sparse	JUOS-JUMO
204010	twoneedle pinyon/big sagebrush/Utah juniper	PIED/ARTR2/JUOS
204011	twoneedle pinyon/big sagebrush/oneseed juniper	PIED/ARTR2/JUMO
204012	twoneedle pinyon/big sagebrush/Rocky Mountain juniper	PIED/ARTR2/JUSC2
204021	twoneedle pinyon/blue grama/Utah juniper	PIED/BOGR2/JUOS
204022	twoneedle pinyon/blue grama/oneseed juniper	PIED/BOGR2/JUMO
204023	twoneedle pinyon/blue grama/alligator juniper	PIED/BOGR2/JUDE2
204024	twoneedle pinyon/blue grama (hillslope)	PIED/BOGR2
2040301	twoneedle pinyon/alderleaf mountain mahogany/wavyleaf oak	PIED/CEMO2/QUPA4
2040302	twoneedle pinyon/alderleaf mountain mahogany/gray oak	PIED/CEMO2/QUGR3
2040303	twoneedle pinyon/alderleaf mountain mahogany/Gambel oak	PIED/CEMO2/QUGA
20404	twoneedle pinyon/Gambel oak	PIED/QUGA
204050	twoneedle pinyon/antelope bitterbrush	PIED/PUTR2
20406	twoneedle pinyon/muttongrass	PIED/POFE
20410	twoneedle pinyon/pine muhly	PIED/MUDU
20411	twoneedle pinyon/New Mexico muhly	PIED/MUPA2
204300	twoneedle pinyon/sand bluestem	PIED/ANHA

Reference Code 301 (cont.)

PV Code	Common Name	Scientific Name
20431	twoneedle pinyon/Arizona fescue	PIED/FEAR2
204320	twoneedle pinyon/Stansbury cliffrose	PIED/PUST
204321	twoneedle pinyon/Stansbury cliffrose/big sagebrush	PIED/PUST/ARTR2
204330	twoneedle pinyon/rubber rabbitbrush-Apache plume	PIED/ERNAN5-FAPA
204350	twoneedle pinyon/rockland	PIED
204360	twoneedle pinyon/wavyleaf oak	PIED/QUPA4
204370	twoneedle pinyon/Dore's needlegrass	PIED/ACNED
204400	twoneedle pinyon/pointleaf manzanita	PIED/ARPU5
20441	twoneedle pinyon/blackbrush	PIED/CORA
204500	twoneedle pinyon/sparse	PIED
230030	redberry juniper/crucifixion thorn	JUCO11/CAHO3
230040	redberry juniper/Sonoran scrub oak	JUCO11/QUTU2
230041	redberry juniper/Sonoran scrub oak/mesquite	JUCO11/QUTU2/PROSO
230042	redberry juniper/Sonoran scrub oak/blue grama	JUCO11/QUTU2/BOGR2
231010	alligator juniper/pointleaf manzanita	JUDE2/ARPU5
231020	alligator juniper/blue grama	JUDE2/BOGR2
231021	alligator juniper/blue grama/honey mesquite	JUDE2/BOGR2/PRGL2
231030	alligator juniper/desert ceanothus	JUDE2/CEGR
231040	alligator juniper/skunkbush sumac	JUDE2/RHTR
231050	alligator juniper/bullgrass	JUDE2/MUEM
232020	border pinyon/Arizona orange	PIDI3/CHDUA
232030	border pinyon/bullgrass	PIDI3/MUEM
23204	border pinyon/pinyon ricegrass	PIDI3/PIFI
232050	border pinyon/Toumey oak	PIDI3/QUTO2
232060	border pinyon/silverleaf oak	PIDI3/QUHY
232070	border pinyon/evergreen sumac	PIDI3/RHVIC
232330	border pinyon/rubber rabbitbrush-Apache plume	PIDI3/ERNAN5-FAPA
233010	singleleaf pinyon/pointleaf manzanita	PIMOF/ARPU5
233020	singleleaf pinyon/blue grama/alligator juniper	PIMOF/BOGR2/JUDE2
233021	singleleaf pinyon/blue grama/Utah juniper	PIMOF/BOGR2/JUOS
233022	singleleaf pinyon/blue grama/Stansbury cliffrose	PIMOF/BOGR2/PUST
233030	singleleaf pinyon/crucifixion thorn	PIMOF/CAHO3
233040	singleleaf pinyon/Sonoran scrub oak (vegetation)	PIMOF/QUTU2
233041	singleleaf pinyon/Sonoran scrub oak (typic phase)	PIMOF/QUTU2
233042	singleleaf pinyon/Sonoran scrub oak/Stansbury cliffrose	PIMOF/QUTU2/PUST
233050	singleleaf pinyon/banana yucca	PIMOF/YUBA
233330	singleleaf pinyon/rubber rabbitbrush-Apache plume	PIMOF/ERNAN5-FAPA
238040	bristlecone pine/gooseberry currant	PIAR/RIMO2
238300	bristlecone pine/Arizona fescue	PIAR/FEAR2
238310	bristlecone pine/Thurber's fescue	PIAR/FETH
240300	limber pine/kinnikinnick	PIFL2/ARUV
25000	woodland (scarp)	2TD
335	Bebb willow (riparian)	SABE2
610010	Mexican blue oak/mixed grama	QUOB/BOUTE
610020	Mexican blue oak/common sotol	QUOB/DAWH2
620010	Emory oak/pointleaf manzanita	QUEM/ARPU5
620020	Emory oak/sideoats grama	QUEM/BOCU
620021	Emory oak/sideoats grama/sacahuista	QUEM/BOCU/NOMI
620030	Emory oak/common sotol	QUEM/DAWH2

Reference Code 301 (cont.)

PV Code	Common Name	Scientific Name
620040	Emory oak/Arizona walnut	QUEM/JUMA
630010	gray oak/sideoats grama	QUGR3/BOCU
630020	gray oak/alderleaf mountain mahogany	QUGR3/CEMO2
630030	Arizona white oak/bullgrass	QUAR/MUEM
630040	Arizona white oak/skunkbush sumac	QUAR/RHTR
630041	Arizona white oak/skunkbush sumac/alligator juniper	QUAR/RHTR/JUDE2
630042	Arizona white oak/skunkbush sumac/oneseed juniper	QUAR/RHTR/JUMO
630043	Arizona white oak/skunkbush sumac/pinyon ricegrass	QUAR/RHTR/PIFI
630050	Arizona white oak/pinyon ricegrass	QUAR/PIFI
650010	silverleaf oak/longtongue muhly	QUHY/MULO

APPENDIX H: FUEL PHOTO REFERENCES AND CODES

Fuel Photo References

Code	Reference
6	Maxwell, Wayne G. and Franklin R. Ward. 1976. **Photo Series for Quantifying Forest Residues in the: Ponderosa Pine Type, Ponderosa Pine and Associated Species Type, Lodgepole Pine Type**. USDA For. Serv. Gen. Tech. Rep. PNW-52, 74 p. Pacific Northwest Range Exp. Stn., Portland, Oregon 97208.
10	Mackay, Douglas H. and Everett M. Stiger, Delman Goss, Byron Bonney. **Photo Series for Quantifying Forest Residues in: Douglas-fir, Engelmann Spruce Type, Limber Pine Type, Lodgepole Pine Type, Ponderosa Pine Type, Subalpine Fir Type for Eastern Montana**. USDA Forest Service Northern Region. 162 p.
12	Anonymous. **Photo Series For Quantifying Forest Residues in the Southwestern Region**. USDA Forest Service Southwest Region. Albuquerque, NM. Date Unknown. 227 p.
17	Ottmar, Roger D., R.E. Vihnanek, and S.C. Wright 2000. **Stereo Photo Series for Quantifying Natural Fuels in Lodgepole Pine, Quaking Aspen, and Gambel Oak Types in the Rocky Mountains**.
21	Ottmar, Roger D.; Robert E. Vihnanek, and Jon C. Regelbrugge. 2000. **Stereo Photo Series for Quantifying Natural Fuels. Volume IV: Pinyon-Juniper, Sagebrush, and Chaparral Types in the Southwestern United States**. PMS 833. Boise, ID: National Wildfire Coordinating Group, National Interagency Fire Center. 97p.

Fuel Photo Codes

Fuel Photo Codes For Reference 6

1PP4CC	3PP4PC	2PP1TH	6PP1TH	4PP&ASSOC4PC	8PP&ASSOC4PC	3LP3PC	
2PP4CC	4PP4PC	3PP1TH	1PP&ASSOC4PC	5PP&ASSOC4PC	1LP3CC	4LP3PC	
1PP4PC	5PP4PC	4PP1TH	2PP&ASSOC4PC	6PP&ASSOC4PC	1LP3PC	5LP3PC	
2PP4PC	1PP1TH	5PP1TH	3PP&ASSOC4PC	7PP&ASSOC4PC	2LP3PC		

Fuel Photo Codes For Reference 12

1AZPPSPPRE01		1PP2(PNW-105)		2PP&ASSOC3		2PP4(PNW-105)		3PP3(PNW-105)		4PP4	
1AZPPSPPRE02		1PP2PC		2PP&ASSOC4		2PPSP3PC		3PP4		4PP4PC	
1AZPPSPPRE03		1PP3		2PP1		2SP3PC		3PP4PC		4WF3	
1AZPPSPPRE04		1PP3(BH)		2PP1TH		3MC2		3PP4(PNW-105)		5PP&ASSOC3	
1JU2		1PP3(PNW-105)		2PP1TH(BH)		3MC3		3PPSP3PC		5PP1TH	
1MC2		1PP3CC		2PP2		3PP&ASSOC3		3WF2		5PP1TH(BH)	
1MC3		1PP3PC		2PP2(BH)		3PP&ASSOC4		3WF3		5PP2PC	
1PP&ASSOC3		1PP4		2PP2(PNW-105)		3PP1		4PP&ASSOC3		5PP3	
1PP&ASSOC4		1PP4PC		2PP2PC		3PP1TH		4PP1TH		5PP4PC	
1PP1		1PP4(PNW-105)		2PP3CC		3PP1TH(BH)		4PP1TH(BH)		6PP1TH	
1PP1(BH)		1PPSP3PC		2PP3PC		3PP2		4PP2		6PP1TH(BH)	
1PP1TH		1SP3PC		2PP3		3PP2(PNW-105)		4PP2(PNW-105)		6PP3	
1PP1TH(BH)		2JU2		2PP3(PNW-105)		3PP2PC		4PP2PC		7PP1TH	
1PP2		2MC2		2PP4		3PP3PC		4PP3		7PP1TH(BH)	
1PP2(BH)		2MC3		2PP4PC		3PP3		4PP3(PNW-105)		7PP3	
										8PP3	

Fuel Photo Codes For Reference 17

GO01		GO06		LP02		LP07		LP12		QA04		QA09
GO02		GO07		LP03		LP08		LP13		QA05		QA10
GO03		GO08		LP04		LP09		QA01		QA06		QA11
GO04		GO09		LP05		LP10		QA02		QA07		QA12
GO05		LP01		LP06		LP11		QA03		QA08		QA13

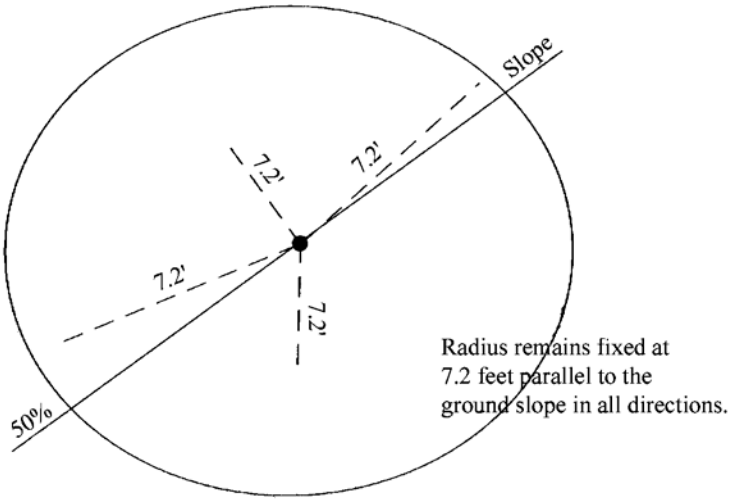
Fuel Photo Codes For Reference 21

CH01		CH07		CH13		PJ03		PJ09		SWSB01		SWSB07
CH02		CH08		CH14		PJ04		PJ10		SWSB02		SWSB08
CH03		CH09		CH15		PJ05		PJ11		SWSB03		SWSB09
CH04		CH10		CH16		PJ06		PJ12		SWSB04		SWSB10
CH05		CH11		PJ01		PJ07		PJ13		SWSB05		SWSB11
CH06		CH12		PJ02		PJ08		PJ14		SWSB06		

APPENDIX I: FIXED RADIUS PLOT

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.



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
58-59	7.3	12.7	17.9	28.4	40.1	56.7

Circular Plot Radii Corrected for Slope (cont.)

	Plot Size in Acres					
SLOPE %	**1/300**	**1/100**	**1/50**	**1/20**	**1/10**	**1/5**
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
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

Circular Plot Radii Corrected for Slope (cont.)

	Plot Size in Acres					
SLOPE %	**1/300**	**1/100**	**1/50**	**1/20**	**1/10**	**1/5**
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	70.7

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 plot on the slope. Following is a list of fixed plot sizes and the specific radius for each:

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

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

Slope Correction Table

Percent of Slope	Degree of Slope	Correction Factor	Percent of Slope	Degree of Slope	Correction Factor	Percent of Slope	Degree of Slope	Correction Factor
0 to 9	0-6	1.00	78 to 79	38	1.27	117	49	1.54
10 to 17	7-10	1.01	80	39	1.28	118 to 119	50	1.55
18 to 22	11-12	1.02	81 to 82	39	1.29	120	50	1.56
23 to 26	13-14	1.03	83	40	1.30	121	50	1.57
27 to 30	15-17	1.04	84 to 85	40	1.31	122	51	1.58
31 to 33	18	1.05	86	41	1.32	123 to 124	51	1.59
34 to 36	19-20	1.06	87 to 88	41	1.33	125	51	1.60
37 to 39	21	1.07	89	42	1.34	126	52	1.61
40 to 42	22	1.08	90 to 91	42	1.35	127 to 128	52	1.62
43 to 44	23	1.09	92	43	1.36	129	52	1.63
45 to 47	24	1.10	93 to 94	43	1.37	130	52	1.64
48 to 49	25-26	1.11	95	44	1.38	131	53	1.65
50 to 51	27	1.12	96 to 97	44	1.39	132 to 133	53	1.66

Slope Correction Table (cont.)

Percent of Slope	Degree of Slope	Correction Factor	Percent of Slope	Degree of Slope	Correction Factor	Percent of Slope	Degree of Slope	Correction Factor
52 to 53	28	1.13	98	44	1.40	134	53	1.67
54 to 55	29	1.14	99 to 100	45	1.41	135	53	1.68
56 to 57	29	1.15	101	45	1.42	136	54	1.69
58 to 59	30	1.16	102	46	1.43	137 to 138	54	1.70
60 to 61	31	1.17	103 to104	46	1.44	139	54	1.71
62 to 63	32	1.18	105	46	1.45	140	54	1.72
64 to 65	33	1.19	106 to107	47	1.46	141	55	1.73
66 to 67	34	1.20	108	47	1.47	142 to 143	55	1.74
68 to 69	34	1.21	109	47	1.48	144	55	1.75
70	35	1.22	110 to 111	48	1.49	145	55	1.76
71 to 72	36	1.23	112	48	1.50	146	56	1.77
73 to 74	37	1.24	113	48	1.51	147	56	1.78
75	37	1.25	114 to 115	49	1.52	148 to 149	56	1.79
76 to 77	38	1.26	116	49	1.53	150	56	1.80

APPENDIX J: VARIABLE RADIUS PLOT

Table J-1: 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	33.0	33.3	33.6	33.9	34.1	34.4	34.7	34.9
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	59.8	60.1	60.4	60.7	60.9	61.2	61.5	61.7	62.0
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	68.5	68.8	69.1	69.3	69.6	69.9	70.1
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	78.0	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	123.2	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 J-2: 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	16.7	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
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	66.0	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 J-3: 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	40.0
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
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	64.6	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 J-4: 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
29	38.7	38.8	38.9	39.1	39.2	39.3	39.5	39.6	39.7	39.9
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	48.8	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	66.6	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 J-5: 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	16.8	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
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	34.6	34.7	34.8	34.9	35.0	35.1	35.2	35.3	35.5	35.6
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 * 1.081 = 15.5 feet.

Table J-6: Limiting Distance 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 the distance from plot-center to the face of the tree at DBH. To obtain the corrected limiting distance to a tree multiply the trees DBH by the "combined factor" shown under the appropriate BAF heading.

% of Slope	Slope Correction Factor	Combined Factor					
		5 BAF	10 BAF	15 BAF	20 BAF	30 BAF	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	3.849	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	3.856	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	1.343
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
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

Table J-6: Limiting Distance to Face of Tree and Slope Correction Factors for Various Basal Area Factors (cont.)

% of Slope	Slope Correction Factor	Combined Factor					
		5 BAF	10 BAF	15 BAF	20 BAF	30 BAF	40 BAF
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
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	1.21949	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
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

Table J-6: Limiting Distance to Face of Tree and Slope Correction Factors for Various Basal Area Factors (cont.)

% of Slope	Slope Correction Factor	Combined Factor					
		5 BAF	10 BAF	15 BAF	20 BAF	30 BAF	40 BAF
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
97	1.39316	5.359	3.773	3.069	2.650	2.154	1.857
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	2.786	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
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	4.370	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

Table J-6: Limiting Distance to Face of Tree and Slope Correction Factors for Various Basal Area Factors (cont.)

% of Slope	Slope Correction Factor	Combined Factor					
		5 BAF	10 BAF	15 BAF	20 BAF	30 BAF	40 BAF
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
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

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

Damage Categories

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
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

Category	Agent	Common Name	Scientific Name
10	**000**	**General Insects**	
SEVERITY RATING 1 = minor 2 = severe			
	001	Thrips	
	002	Tip moth	
	003	Wasp	
	007	Clerid beetle	*Cleridae*
	008	Weevil	*Curculionidae*
	011	Ant	*Formicidae*
	012	Stick insect	*Graeffea crovanii*
	014	Conifer swift moth	*Korsheltellus gracilis*
	017	Bagworm moth	*Psychidae*
	019	Scarab	*Scarabaeidae*
	021	unknown	*Steremnius carinatus*
	022	Pyralid moth	*Thliptoceras octoquttale*
	023	Wood wasps	*Siricidae spp.*
11	**000**	**Bark Beetles**	
SEVERITY RATING 1 = Unsuccessful bole attack: pitchout and beetle brood absent 2 = Strip attacks: galleries and brood present 3 = Successful current bole attack: galleries and brood present 4 = Topkill 5 = Successful attack last year 6 = Older dead			
	001	Roundheaded pine beetle	*Dendroctonus adjunctus*
	002	Western pine beetle	*Dendroctonus brevicomis*
	006	Mountain pine beetle	*Dendroctonus ponderosae*
	007	Douglas-fir beetle	*Dendroctonus pseudotsugae*
	009	Spruce beetle	*Dendroctonus rufipennis*
	012	Red turpentine beetle	*Dendroctonus valens*
	015	Western balsam bark beetle	*Dryocoetes confusus*
	019	Pinon ips	*Ips confusus*
	021	Sixspined ips	*Ips calligraphus*
	024	unknown	*Ips latidens*
	025	Arizona five-spined ips	*Ips lecontei*
	029	Pine engraver	*Ips pini*
	030	Ips engraver beetles	*Ips spp.*
	035	Cedar bark beetles	*Phloeosinus spp.*
	036	Western cedar bark beetle	*Phloeosinus punctatus*
	037	Tip beetles	*Pityogenes spp.*
	038	Douglas-fir twig beetle	*Pityophthorus pseudotsugae*
	039	Twig beetles	*Pityophthorus spp.*
	040	Foureyed spruce beetle	*Polygraphus rufipennis*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
11 (cont.)	048	True fir bark beetles	*Scolytus spp.*
	050	Fir engraver	*Scolytus ventralis*
	053	Four-eyed bark beetle	*Polygraphus spp.*
	055	Spruce ips	*Ips pilifrons*
	056	Mexican pine beetle	*Dendroctonus mexicanus*
12	**000**	**Defoliators**	
SEVERITY RATING 1 = Light defoliation (1-25%), no topkill 2 = Light defoliation (1-25%), topkill ≤10% 3 = Light defoliation (1-25%), topkill >10% 4 = Moderate defoliation (26-75%), no topkill 5 = Moderate defoliation (26-75%), topkill ≤10% 6 = Moderate defoliation (26-75%), topkill >10% 7 = Heavy defoliation (76-100%), no topkill 8 = Heavy defoliation (76-100%), topkill ≤10% 9 = Heavy defoliation (76-100%), topkill >10%			
	001	Casebearer	
	002	Leaftier	
	003	Looper	
	004	Needleminer	
	005	Sawfly	
	006	Skeletonizer	
	008	Spanworm	
	009	Webworm	
	013	Whitefly	*Aleyrodoidae*
	014	Fall cankerworm	*Alsophila pometaria*
	015	Alder flea beetle	*Altica ambiens*
	016	Mountain mahogany looper	*Anacamptodes clivinaria profanata*
	037	Large aspen tortrix	*Choristoneura conflictana*
	040	Western spruce budworm	*Choristoneura occidentalis*
	043	Aspen leaf beetle	*Chrysomela crotchi*
	044	Cottonwood leaf beetle	*Chrysomela scripta*
	045	Leafhopper	*Cicadellidae*
	050	Ponderosa needleminer	*Coleotechnites spp.*
	052	Pandora moth	*Coloradia pandora*
	054	Lace bugs	*Corythucha spp.*
	059	Walkingstick	*Diapheromera femorata*
	066	White fir needleminer	*Epinotia meritana*
	067	Linden looper	*Erannis tiliaria*
	069	Pine needleminer	*Exoteleia pinifoliella*
	072	Geometrid moth	*Geometridae*
	075	Pale tussock moth	*Halisidota tessellaris*
	077	Brown day moth	*Hemileuca eglanterina*
	078	Buck moth	*Hemileuca maia*
	082	Fall webworm	*Hyphantria cunea*
	084	unknown	*Lambdina punctat*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
12 (cont.)	085	Tent caterpillar moth	*Lasiocampidae*
	094	Western tent caterpillar	*Malacosoma californicum*
	097	Southwestern tent caterpillar	*Malacosoma incurvum*
	098	Leafcutting bees	*Megachilidae*
	099	Blister beetle	*Meloidae*
	123	Douglas-fir tussock moth	*Orgyia pseudotsugata*
	154	Bagworm	*Thyridopteryx ephemeraeformis*
	155	Leafroller/seed moth	*Tortricidae*
	156	Willow defoliation	*Tortricidae*
	160	Pine needle sheathminer	*Zelleria haimbachi*
	162	Cottonwood leaf beetle	*Chrysomela spp.*
	165	Leaf roller	*Epinotia solandriana*
	166	New Mexico fir looper	*Gelenara cansimillis*
	171	Pinon sawfly	*Neodiprion edulicolus*
	172	unknown	*Neodiprion gilletti*
	174	Pine looper	*Phaeoura mexicanaria*
	175	unknown	*Zadiprion rohweri*
	176	unknown	*Zadiprion townsendi*
	190	Hickory tussock moth	*Halisidota caryae*
	191	Pin oak sawfly	*Caliroa lineata*
	192	Palmerworm	*Dichomeris ligulella*
	193	Pitch pine looper	*Lambdina athasaria pellucidaria*
	194	Red pine sawfly	*Neodiprion nanulus nanulus*
	195	Pine tip moth	*Argyrotaenia pinatubana*
	196	Baldcypress leafroller	*Archips goyerana*
	197	Winter moth	*Operophtera*
	198	Basswood thrips	*Neohydatothrips*
	199	Noctuid moth	*Xylomyges simplex (walker)*
	200	Pyralid moth	*Palpita magniferalis*
	201	Pacific silver fir budmoth	*Zeiraphera sp. destitutana*
13	**000**	**Chewing Insects**	
SEVERITY RATING 1 = Minor: bottlebrush or shortened leaders, 0-2 forks on stem, OR <20% of branches affected 2 = Severe: 3 or more forks on bole, OR 20% or more branches affected, OR terminal leader dead			
	001	Grasshopper	
	002	Shorthorn grasshoppers	*Acrididae*
	006	Cicadas	*Cicadidae*
	019	Agamemnon butterfly	*Papilio agememnon*
	020	Northern pitch twig moth	*Petrova albicapitana*
	021	Ponderosa pine tip moth	*Rhyacionia zozana*
	022	Pine needle weevil	*Scythropus spp.*
	025	Unknown	*Thrips madronii*
	029	Deodar weevil	*Pissodes nemorensis*
	030	Adana tip moth	*Rhyacionia adana*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
14	**000**	**Sucking Insects**	
SEVERITY RATING 1 = Minor: bottlebrush or shortened leaders, 0-2 forks on stem, OR <20% of branches affected 2 = Severe: 3 or more forks on bole, OR 20% or more branches affected, OR terminal leader dead			
	001	Scale insect	
	006	Aphid	*Aphididae*
	008	Western pine spittlebug	*Aphrophora permutata*
	010	Spittlebug	*Cercopidae*
	012	Pine needle scale	*Chionaspis pinifoliae*
	014	Giant conifer aphids	*Cinara spp.*
	034	Prescott scale	*Matsucoccus vexillorum*
	017	Spruce aphid	*Elatobium abietinum*
	022	Pine thrips	*Gnophothrips spp.*
	029	Pinyon needle scale	*Matsucoccus acalyptus*
	031	Pine twig scale	*Matsucoccus californicus*
	032	Ponderosa pine scale	*Matsucoccus degeneratus*
	035	Treehoopers	*Membracidae*
	040	Spruce spider mite	*Oligonychus ununquis*
	041	Twig girdler	*Oncideres cingulata*
	050	Mealybug	*Pseudococcidae*
	061	Pine tortoise scale	*Toumeyella parvicornis*
	069	Elm scurfy scale	*Chionaspis americana*
15	**000**	**Boring Insects**	
SEVERITY RATING 1 = Minor: bottlebrush or shortened leaders, 0-2 forks on stem, OR <20% of branches affected 2 = Severe: 3 or more forks on bole, OR 20% or more branches affected, OR terminal leader dead			
	001	Shoot borer	
	002	Termite	
	003	Ponderosa pine bark borer	*Acanthocinus princeps*
	006	Bronze poplar borer	*Agrilus liragus*
	007	Carpenter bees	*Apidae*
	008	Flatheaded borer	*Buprestidae*
	009	Golden buprestid	*Buprestis aurulenta*
	010	Carpenter ants	*Camponotus spp.*
	011	Gouty pitch midge	*Cecidomyia piniinopis*
	013	Roundheaded borer	*Cerambycidae*
	018	Carpenterworm moths	*Cossidae*
	027	Ponderous borer	*Ergates spiculatus*
	029	Western pine shoot borer	*Eucosma sonomana*
	030	Eucosma species	*Eucosma spp.*
	035	Powderpost beetle	*Lyctidae*
	037	unknown	*Magdalis spp.*
	039	Locust borer	*Megacyllene robiniae*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
15 (cont.)	041	Flatheaded fir borer	*Melanophila drummondi*
	042	Whitespotted sawyer	*Monochamus scutellatus*
	043	Redheaded ash borer	*Neoclytus acuminutus*
	044	Western ash borer	*Neoclytus conjunctus*
	045	Oberea shoot borers	*Oberea spp.*
	052	Ambrosia beetles	*Platypus spp.*
	053	Cottonwood borer	*Plectrodera scalator*
	064	Western pine tip moth	*Rhyacionia bushnelli*
	065	Nantucket pine tip moth	*Rhyacionia frustrana*
	067	Southwestern pine tip moth	*Rhyacionia neomexicana*
	068	Poplar borer	*Saperda calcarata*
	070	Saperda shoot borer	*Saperda spp.*
	071	Clearwing moths	*Sesiidae*
	075	Western cedar borer	*Trachykele blondeli*
	076	Douglas-fir pitch moth	*Vespamima novaroensis*
	087	Emerald ash borer	*Agrilus planipennis*
16	**000**	**Seed/Cone/Flower/Fruit Insects**	
SEVERITY RATING 1 = minor 2 = severe			
	003	Limber pine cone beetle	*Conophthorus flexilis*
	005	Ponderosa pine cone beetle	*Conophthorus ponderosae*
	008	White pine cone beetle	*Conopthorus coniperda*
	015	Fir coneworm	*Dioryctria abietivorella*
	017	Pine coneworm	*Dioryctria auranticella*
	020	unknown	*Dioryctria pseudotsugella*
	021	Dioryctria moths	*Dioryctria spp.*
	023	Seed chalcid	*Eurytomidae*
	025	Cone maggot	*Hylemya anthracina*
	027	Ponderosa pine seed worm/moth	*Laspeyresia piperana*
	028	Spruce seed moth	*Laspeyresia youngana*
	029	Boxelder bug	*Leptocoris trivittatus*
	030	Leaffooted pine seed bug	*Leptoglossus corculus*
	031	Western conifer seed bug	*Leptoglossus occidentalis*
	034	Spruce seed chalcid	*Megastigmus piceae*
	035	Ponderosa pine seed chalcid	*Megastigmus albifrons*
	037	Douglas-fir seed chalcid	*Megastigmus spermotrophs*
	042	Coneworm	*Phycitidae*
	043	Harvester ants	*Pogonomyrmex spp.*
	048	Coneworm	*Hylemia spp.*
	049	Prairie tent caterpillar	*Malacosoma lutescens*
	050	Jack pine tip beetle	*Conophthorus banksianae*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
17	**000**	**Gallmaker Insects**	
SEVERITY RATING 1 = minor 2 = severe			
	003	Cooley spruce gall adelgid	*Adelges cooleyi*
	006	Gall midge	*Cecidomyiidae*
	008	Gall mite	*Eriophyidae*
	013	Gall aphid	*Phylloxeridae*
	015	Psyllid	*Psyllidae*
	019	Spider mites	*Oligonychus spp.*
18	**000**	**Insect Predators**	
SEVERITY RATING 1 = minor 2 = severe			
	001	Lacewing	
	002	Blackbellied clerid	*Enoclerus lecontei*
	003	Redbellied clerid	*Enoclerus sphegeus*
	004	unknown	*Formica rufa*
	005	Western yellowjacket	*Vespula pennsylvanica*
19	**000**	**General Diseases**	
SEVERITY RATING 1 = minor 2 = severe			
20	**000**	**Biotic Damage**	
SEVERITY RATING 1 = minor 2 = severe			
	001	Damping off	
	002	Gray mold	*Botrytis cinerea*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
21	**000**	**Root/Butt Diseases**	
SEVERITY RATING for trees 1 = Tree within 30 feet of tree with deteriorating crown, tree with diagnostic symptoms or signs, or tree killed by root disease 2 = Pathogen (sign) or diagnostic symptom detected - no crown deterioration 3 = Crown deterioration detected - no diagnostic symptoms or signs 4 = Both crown deterioration and diagnostic signs symptoms detected 5 = Bleeding present on bole 6 = Bleeding present on bole and adjacent mortality present 7 = Laboratory confirmed Sudden Oak Death			
SEVERITY RATING for Setting Level G2 = Minor evidence of RDS on plot G3 = RDS present, canopy reduction less then 20% G4 = RDS present, canopy reduction 20-30 % G5 = RDS present, canopy reduction 30-50% G6 = RDS present, canopy reduction 50-57%, most ground area infested G7 = RDS present, 76+% canopy reduction G8 = Entire area infested with RDS, one or very few susceptible overstory trees G9 = Entire area infested with RDS, no susceptible overstory trees present			
	001	Armillaria root disease	*Armillaria spp.*
	004	Brown crumbly rot	*Fomitopsis pinicola*
	007	White mottled rot	*Ganoderma applanatum*
	008	Ganoderma rot of hardwoods	*Ganoderma lucidum*
	010	Annosus root disease	*Heterobasidion annosum*
	012	Tomentosus root disease	*Inonotus tomentosus*
	014	Black stain root disease	*Ophiostoma wageneri*
	015	Schweinitzii butt rot	*Phaeolus schweinitzii*
	024	Crown gall	*Agrobacterium tumefaciens*
	027	Brown cubical rot	*Laetiporus sulphureus*
22	**000**	**Stem Decays/Cankers**	
SEVERITY RATING 0 = 0-4% rotten 1 = 5-15% rotten 2 = 16-25% rotten 3 = 26-35% rotten 4 = 36-45% rotten 5 = 46-55% rotten 6 = 56-65% rotten 7 = 66-75% rotten 8 = 76-85% rotten 9 = 86-100% rotten			
	001	Heart rot	
	002	Stem rot	
	003	Sap rot	
	004	Slime flux	

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
22 (cont.)	005	Virus	
	006	Black knot of cherry	*Apiosporina morbosa*
	007	Atropellis canker	*Atropellis piniphila*
	008	Siberian elm canker	*Botryodiplodia hypodermia*
	012	Black canker of aspen	*Ceratocystis fimbriata*
	013	Sycamore canker stain	*Ceratocystis fimbriata f.sp. plataini*
	024	Gray-brown saprot	*Cryptoporus volvatus*
	025	Cryptosphaeria canker of aspen	*Cryptosphaeria populina*
	026	Cytospora canker of fir	*Cytospora abietis*
	027	Western red rot	*Dichomitus squalens*
	028	Rust-red stringy rot	*Echinodontium tinctorium*
	029	Sooty-bark canker	*Encoelia pruinosa*
	035	Amelanchier rust	*Gymnosporangium harknessianum*
	036	Cedar apple rust	*Gymnosporangium juniperi-virginianae*
	037	Hypoxylon canker of oak	*Hypoxylon atropunctatum*
	038	Hypoxylon canker of aspen	*Hypoxylon mammatum*
	039	Canker rot of oak	*Inonotus hispidus*
	040	Sterile conk trunk rot of birch	*Inonotus obliquus*
	047	Red ring rot	*Phellinus pini*
	048	Aspen trunk rot	*Phellinus tremulae*
	049	Stem decay of black walnut	*Phellinus weirianus*
	051	Phomopsis canker	*Phomopsis spp.*
	052	Leyland cypress canker	*Seiridium cardinale*
	054	Maple canker	*Steganosporium spp.*
	057	Cytospora canker of aspen	*Cytospora chrysosperma*
	059	Red belt fungus	*Fomitopsis pinicola*
	062	Brown heartrot	*Fomitopsis Officinalis*
	065	Purple conk	*Hirschioporus abietinus*
	068	False tinder fungus	*Phellinus igniarius*
	070	Yellow cap fungus	*Pholiota spp.*
	071	Oyster mushroom	*Pleurotus ostreatus*
	074	Cedar brown pocket rot	*Poria sericeomollis*
	075	Lachnellula canker	*Lachnellula flavovirens*
	076	Strumella canker	*Strumella coryneoidea*
	077	Phomopsis blight	*Phomopsis juniperovora*
	078	Fusarium canker of yellow poplar	*Fusarium solani*
	079	Sterile conk of maple and beech	*Inonotus glomeratus*
	080	Canker of spruce	*Aleurodiscus spp.*
	081	Birch conk	*Piptoporus betulinusai*
	082	Canker	*Discocainia treleasei*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
23	**000**	**Parasitic/epiphytic plants**	
SEVERITY RATING 1 = Hawksworth tree DMR rating = 1; light infection 2 = Hawksworth tree DMR rating = 2; light infection 3 = Hawksworth tree DMR rating = 3; medium infection 4 = Hawksworth tree DMR rating = 4; medium infection 5 = Hawksworth tree DMR rating = 5; heavy infection 6 = Hawksworth tree DMR rating = 6; heavy infection 7 = Vine damage: less than 50% of crown involved 8 = Vine damage: 50% or more of crown involved			
	001	Mistletoe	
	002	Parasitic plants	
	003	Vine damage	
	005	White fir dwarf mistletoe	*Arceuthobium abietinumf. sp. concoloris*
	007	Apache dwarf mistletoe	*Arceuthobium apachecum*
	010	Pinyon dwarf mistletoe	*Arceuthobium divaricatum*
	011	Douglas-fir dwarf mistletoe	*Arceuthobium douglasii*
	012	Chihuahua pine dwarf mistletoe	*Arceuthobium gillii*
	014	Western spruce dwarf mistletoe	*Arceuthobium microcarpum*
	017	Southwestern dwarf mistletoe	*Arceuthobium vaginatum subsp. crytopodum*
	018	Dodder	*Cuscuta spp.*
	019	White fir mistletoe	*Phoradendron bolleanum subsp. pauciflorum*
	020	True mistletoe (other)	
	022	Juniper true mistletoe	*Phoradendron juniperum*
24	**000**	**Decline Complexes/Dieback/Wilts**	
SEVERITY RATING 1 = Minor: minor crown symptoms 2 = Severe: severe crown symptoms			
	007	Complex	
	008	Decline	
	009	Fall hardwood defoliator complex	
	010	Joga decline	
	011	Larch decline	
	012	Looper; abiotic complex	
	013	Maple decline	
	014	Oak decline	
	016	Sprout dieback	
	017	True fir pest complex	
	023	Bacterial wetwood	*Erwinia nimipressuralis*
	026	unknown	*Xylella fastidiosa*
	027	Wetwood	
	030	Elm phloem necrosis	*Mycoplasma*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
25	**000**	**Foliage Diseases**	
SEVERITY RATING 1 = Minor: <20% of foliage affected or <20% of crown in brooms 2 = Severe: >20% of foliage affected or >20% of crown in brooms			
	001	Blight	
	002	Broom rust	
	003	Juniper blights	
	004	Leaf spots	
	005	Needlecast	
	006	Powdery mildew	
	009	True fir needlecast	
	010	Sycamore anthracnose	*Apiognomonia veneta*
	011	Cercospora blight of juniper	*Cercospora sequoiae*
	014	Ink spot of aspen	*Ciborinia whetzelii*
	015	Pine needle rust	*Coleosporium spp.*
	016	Anthracnose on Russian olive	*Colletotrichum spp.*
	017	Coronado limb rust	*Cronartium arizonicum*
	022	Elytroderma disease	*Elytroderma deformans*
	023	Fire blight	*Erwinia amylovora*
	025	Anthracnose	*Gnomonia spp.*
	027	Brown felt blight	*Herpotrichia juniperi*
	031	Spruce needle cast	*Lirula macrospora*
	032	Fir needle cast	*Lirula spp.*
	033	White pine needle cast	*Lophodermella arcuata*
	034	Lophodermella needle cast	*Lophodermella spp.*
	035	Lophodermium needle cast	*Lophodermium spp.*
	036	Marssonina blight	*Marssonina populi*
	037	Melampsora rusts	*Melampsora medusae*
	040	Dothistroma needle blight	*Mycosphaerella pini*
	041	Brown felt blight of pines	*Neopeckia coulteri*
	042	Snow blight	*Phacidum abietis*
	044	Phoma blight	*Phoma spp.*
	045	Phyllosticta leaf spot	*Phyllosticta spp.*
	046	Bud rot	*Phytophthora palmivora*
	050	Douglas-fir needle cast	*Rhabdocline spp.*
	059	Leaf blister of oak	*Taphrina caerulescens*
	061	Shepherd's crook	*Venturia tremulae*
	062	Dothistroma needle blight	*Dothistroma septospora*
	064	Broom rust	*Chrysomyxa arctostaphyli*
	066	Cedar leaf blight	*Gymnosporangium nootkatense*
	067	Spruce needle cast	*Lophodermium picea*
	068	Hardwood leaf rusts	*Melampsora spp.*
	071	Spruce needle cast	*Rhizosphaera pini*
	072	Sirococcus shoot blight	*Sirococcus strobilinus*
	073	Shephards crook	*Venturia populina*
	074	Delphinella shoot blight	*Delphinella abietis*
	075	Tar spot	*Rhytisma acerinum*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
26	**000**	**Stem Rusts**	
1 = Branch infections located greater than 2 feet from tree bole 2 = Branch infections located between 6 inches and 2 feet from tree bole 3 = Bole infections or branch infections located within 6 inches of bole 4 = Topkill			
	001	White pine blister rust	*Cronartium ribicola*
	002	Western gall rust	*Peridermium harknessii*
	004	Comandra blister rust	*Cronartium comandrae*
	005	Pinyon blister rust	*Cronartium occidentale*
	012	Limb rust	*Peridermium filamentosum*
	013	Southern cone rust	*Cronartium strobilinum*
27	**000**	**Broom Rusts**	
SEVERITY RATING 1 = Minor: <20% of crown in brooms 2 = Severe >20% of crown in brooms			
	001	Spruce broom rust	*Chrysomyxa arctostaphyli*
	003	Juniper broom rust	*Gymnosporangium nidus-avis*
	004	Fir broom rust	*Melampsorella caryophyllacearum*
30	**000**	**Fire**	
SEVERITY RATING 1 = minor 2 = severe			
	031	Wild-fire	
	032	Human caused fire	
	033	Crown fire damage	
	034	Ground fire damage	
40	**000**	**Animal damage, source unknown**	
SEVERITY RATING 1 = minor 2 = severe			
41	**000**	**Wild Animals**	
SEVERITY RATING 1 = Minor: <20% of crown affected, bole damage is <50% circumference 2 = Severe: >20% of crown affected, bole damage is >50% circumference, upper 1/3 of crown is killed 4 = Earthworms are present 5 = Earthworms are absent			
	001	Bear	
	002	Beaver	
	003	Big game (deer)	
	004	Mice or voles	
	005	Pocket gophers	
	006	Porcupines	
	007	Rabbits or hares	
	008	Sapsucker	
	009	Squirrels	
	010	Woodpeckers	
	011	Moose	

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
	012	Elk	
	013	Deer	
	014	Feral pigs	
	015	Mountain beaver	
	016	Deer or elk	
	17	Earthworm	*Lumbricidae*
42	**000**	**Domestic Animals**	
SEVERITY RATING 1 = Minor <20% of crown affected, bole damage is <50% circumference 2 = Severe: >20% of crown affected, bole damage is >50% circumference, upper 1/3 of crown is killed			
	001	Cattle	
	002	Goats	
	003	Horses	
	004	Sheep	
50	**000**	**Abiotic Damage**	
SEVERITY RATING 1 = Minor: <20% of crown affected, bole damage is <50% circumference 2 = Severe: >20% of crown affected, bole damage is >50% circumference, upper 1/3 of crown is killed			
	001	Air pollutants	
	002	Chemical	
	003	Drought	
	004	Flooding/high water	
	005	Frost	
	006	Hail	
	007	Heat	
	008	Lightning	
	009	Nutrient imbalances	
	010	Radiation	
	011	Snow/ice	
	013	Wind-tornado	
	014	Winter injury	
	015	Avalanche	
	016	Mud-land slide	
	017	Volcano	
	018	Other geologic events	
	019	Mechanical (non-human caused)	
60	**000**	**Competition**	
SEVERITY RATING 1 = Minor: tree slightly deformed and has some live, terminal growth 2 = Severe: tree extremely deformed or has no live terminal, growth severely reduced relative to neighbors			

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
70	**000**	**Human Activities**	
SEVERITY RATING 1 = minor 2 = severe			
	001	Herbicides	
	003	Imbedded objects	
	004	Improper planting technique	
	005	Land clearing	
	006	Land use conversion	
	007	Logging damage	
	008	Mechanical	
	009	Pesticides	
	010	Roads	
	011	Soil compaction	
	012	Suppression	
	013	Vehicle damage	
	014	Road salt	

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
71	**000**	**Harvest**	
SEVERITY RATING 1 = minor 2 = severe			
80	**000**	**Multi-Damage (Insect/Disease)**	
SEVERITY RATING 1 = minor 2 = severe			
	001	Aspen defoliation	
	002	Subalpine fir mortality	
	004	Pinion pine decline	
99		**Physical Effects**	
	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.
	002	Dead top	% of total tree height that is dead
	003	Limby (large limbs top to bottom)	% of total tree height with many limbs/knots
	004	Forked top	% of total tree height above fork
	005	Forked below merch top	% of the total length of the bole affected
	006	Crook or sweep	% of total tree height, which contains the crook or sweep
	007	Checks, bole cracks	% of total tree height, which contains a crack or check
	008	Foliage discoloration	% of foliage discolored
	009	Mortality (for plantation surveys only)	1 = dead tree
	010	Lack of seed source (for plantation surveys only)	If present, 100%
	011	Poor planting stock source (for plantation surveys only)	If present, 100%
	012	Poor growth/fading/foliage is yellowing and loss of needles is occurring	1 = minor (reduced growth) 2 = severe (affecting survival)
	013	Total board foot volume loss	% of total board foot volume loss
	014	Total cubic foot volume loss	% of total cubic foot volume loss
	015	Bark removal	% of tree circumference missing bark
	016	Foliage loss	1 = minor 2 = severe
	017	Sunscald	1 = minor 2 = severe
	018	Uproot	1 = uprooted tree
	019	Scorched foliage	% of foliage scorched
	020	Scorched bark	% of bark scorched
	021	Dieback source (for plantation surveys only)	1 = minor 2 = severe

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
	022	Poor crown form	1 = minor 2 = severe
	023	Severe forking	% of bole with forks
	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."
	031	Broken or dead branches	% of branches broken or dead
	033	Damaged shoots, buds, or foliage (for plantation surveys only)	1 = minor 2 = severe
	034	Excessively deformed sapling	% of sapling deformed
	036	Fire scar	% of bole covered by fire scar
	037	Leaning tree	% lean from vertical
	038	Charred bark	Not recorded unless cambium is killed from heating

Tree Parts

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

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
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
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	

Sample Design Criteria

Field	Tolerance
Form Type	
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

Plot Data

Field	Tolerance
Plot Number	No Errors
Plot Latitude	No Errors
Plot Longitude	No Errors
Capable Grow Area	± 10 Percent
Plot Aspect	± 45°
Plot Slope	± 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 if 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	

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	Height Range / Diameter Range / Trees on Point / Tolerance *All / All / 0 / 0 trees ≤0.5 feet / / 1-5 / ± 2 trees ≤0.5 feet / / 6+ / ± 50% >0.5 feet / <0.5 in. / 1-5 / ± 1 tree >0.5 feet / <0.5 in / 6+ / ± 20% All / .5" - breakpoint d.b.h / 1-5 / ± 1 tree All / .5" - breakpoint d.b.h. / 6+ / ± 10% All / breakpoint d.b.h. + / 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. 1/ Grouping 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 incidence of damage.
Number Stems	No Errors
DBH/DRC	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
Height	± 10 %
Height to Crown	± 10 %
Radial Growth	± 1/20 inch
Radial Growth #2	± 1/20 inch
Height Growth	± 1 foot / trees >6 feet ± 0.1 foot / trees ≤6 feet

Tree Data (cont.)

Field	Tolerance	
Tree Age	± 10% (Based on actual tree ring count at breast height for trees ≥ 3.0" DBH otherwise based on total age recorded.)	
Crown Ratio	± 10 %	
Crown Class	No Errors	
Crown width	No Errors	
Wildlife Use	No Errors	
Log/Snag Decay	No Errors	
Cone Serotiny	No Errors	
Damage Category	No Errors	
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.
41-42	Animal Damage	No misses on live trees with terminal leader damage or with greater than 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 1/4 of the bole circumference or if an open wound is in contact with the ground.
Damage Agent		
Damage Part		
Damage Severity		
Tree Remarks		

Ground Surface Cover

Field	Tolerance
Plot Number	No Errors
Cover Type	No Errors
Cover Percent	± 10 Percent

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% of Height
Average Height	± 10% of Height
Maximum Height	± 10% of Height
Canopy Cover	± 10 Percent
Average Diameter	No Errors
Maturity	No Errors
Cover Remarks	
User Field	

Down Woody

Field	Tolerance
Plot Number	No Errors
First Duff	± 1/2 inch
Second Duff	± 1/2 inch
Fuel Depth	No Errors
Twigs 0 - .24	± 40%
Twigs .25 - .99	± 30%
Branch 1.0 - 2.99	± 20%
Volume 1	
Weight 1	
Volume 2	
Weight 2	
Volume 3	
Weight 3	
Volume 4	
Weight 4	
Piece Count	No missed pieces
Decay Class	No Errors
Diameter	± 1 inch on measurements
Piece Length	No Errors

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APPENDIX M: GLOSSARY OF TERMS

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, for forbs and grasses, measured 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.
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 is 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 its, 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 3 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.

Glossary of Terms (cont.)

Term	Definition
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.
Down Woody Material	Woody pieces of trees and shrubs that have been uprooted (no longer supporting growth) or severed from their root system, are 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, which refers to points above the earth's surface.
Fuel Bed	The fuel bed is the accumulation of dead, woody residue on the forest floor. It begins at the top of the duff layer and above. It includes litter, dead limbwood and bolewood 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 Talley	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.
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.

Glossary of Terms (cont.)

Term	Definition
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. **IN** - The object is "in" if the measured distance is equal to or less than the subplot radius. **OUT** - 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.
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.

Glossary of Terms (cont.)

Term	Definition
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.
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.

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		Short grass (1 foot)	Grass and grass-dominated	Original 13	0.74	0	0	1
2		Timber (grass and understory)	Grass and grass-dominated	Original 13	2	1	0.500	1
3		Tall grass (2.5 feet)	Grass and grass-dominated	Original 13	3.01	0	0	2.50
4		Chaparral (6 feet)	Chaparral and shrub fields	Original 13	5.01	4.010	2	6
5		Brush (2 feet)	Chaparral and shrub fields	Original 13	1	0.500	0	2
6		Dormant brush, hardwood slash	Chaparral and shrub fields	Original 13	1.50	2.500	2	2.50
7		Southern rough	Chaparral and shrub fields	Original 13	1.13	1.870	1.500	2.50
8		Closed timber litter	Timber litter	Original 13	1.50	1	2.500	0.20
9		Hardwood litter	Timber litter	Original 13	2.92	0.410	0.150	0.20
10		Timber (litter and understory)	Timber litter	Original 13	3.01	2	5.010	1
11		Light logging slash	Slash	Original 13	1.50	4.51	5.510	1
12		Medium logging slash	Slash	Original 13	4.01	14.03	16.53	2.30
13		Heavy logging slash	Slash	Original 13	7.01	23.04	28.05	3
91	NB1	Urban/Developed	Nonburnable	Scott and Burgan	0	0	0	0
92	NB2	Snow/Ice	Nonburnable	Scott and Burgan	0	0	0	0
93	NB3	Agricultural	Nonburnable	Scott and Burgan	0	0	0	0
98	NB4	Open Water	Nonburnable	Scott and Burgan	0	0	0	0
99	NB5	Bare Ground	Nonburnable	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 Grass (Dynamic)	Grass	Scott and Burgan	0.10	0	0	1
103	GR3	Low Load, Very Coarse, Humid Climate Grass (Dynamic)	Grass	Scott and Burgan	0.10	0.40	0	2

Fuel Models (cont.)

Fuel Model	Fuel Model Code	Fuel Model Name	Fuel Type	Model Set	Fuel 1-Hr	Fuel 10-Hr	Fuel 100-Hr	Fuel Bed Depth
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
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	3.50	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

Fuel Models (cont.)

Fuel Model	Fuel Model Code	Fuel Model Name	Fuel Type	Model Set	Fuel 1-Hr	Fuel 10-Hr	Fuel 100-Hr	Fuel Bed Depth
161	TU1	Low Load, Dry Climate Timber-Grass-Shrub (Dynamic)	Timber-Understory	Scott and Burgan	0.20	0.900	1.500	0.60
162	TU2	Moderate Load, Humid Climate Timber-Shrub	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
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	Moderate Load Activity Fuel or Low 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

Detailed Description 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 may 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.
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 contain 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 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, is 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, overmature 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 50 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.
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.

Detailed Description of the Fuel Models (cont.)

Code	Detailed Description
92	Land covered by permanent snow and ice. Areas covered by seasonal snow and ice can be mapped to two different fuels models.
93	Agricultural land maintained in a nonburnable 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 or 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 is 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 compare 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.
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 or mostly cured.
121	The primary carrier of fire is grass and shrubs combined. Shrubs are about 1 foot high, 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 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 very high; flame length very high. Moisture of extinction is high.
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.

Detailed Description of the Fuel Models (cont.)

Code	Detailed Description
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 4-6 feet tall; some herbaceous fuel may be present. Spread rate is high; flame length 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 with grass and shrub components. 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 load, 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.
187	The primary carrier of fire is heavy load of forest litter, includes large diameter downed logs. Spread rate 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 down 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 id total, fuelbed is not compacted, most foliage and fine fuel still attached to blowdown. Spread rate is very high; flame length very high.