APPENDIX E: EXISTING VEGETATION REFERENCES AND CODES

February 2014

Existing Vegetation References

Code	Name	Author
FSHR9	**Forest Service Handbook.** Milwaukee, Wisconsin. FSH 2409.21d-R9, Compartment Prescription Handbook, FSH 6/84. Amendment 20, April 1974. pp 260.2-2.	USDA Forest Service
FIADB	**The Forest Inventory and Analysis Database: Database Description and Users Manual** Version 1.0 Gen. Tech. Rep NC-218. St. Paul, MN: U.S.D.A., Forest Service, North Central Research Station. 130 pp	U. S. Dept. of Agriculture

Existing FSHR9 Vegetation Codes

Code	Description	Code	Description
1	Jack pine	31	Loblolly pine
2	Red pine	32	Shortleaf pine
3	Eastern white pine	33	Virginia pine
4	Eastern white pine – hemlock	35	Eastern redcedar
5	Hemlock	38	Pitch pine
6	Scotch pine	41	Eastern white pine-northern red oak/white ash
7	Norway spruce	42	Eastern redcedar-hardwood
8	White spruce	43	Oak-eastern white pine
9	Conifers (Allegheny)	44	Shortleaf pine-oak
10	Spruce	45	Virginia pine-hardwoods
11	Balsam fir – aspen/paper birch	46	Oak-shortleaf pine
12	Black spruce	47	Oak-aspen
13	Red spruce – balsam fir	48	Jack pine-oak
14	Northern white cedar	49	Red pine-oak
15	Tamarack	50	Pin oak
16	White spruce-balsam fir	51	Post oak/blackjack oak
17	Upland black spruce	52	Chestnut oak
18	Mixed swamp conifers	53	Black oak/scarlet oak/hickory
19	Northern white cedar-aspen/paper birch	54	White oak
20	Northern hardwoods-hemlock	55	Northern red oak
21	Mixed northern hardwoods	56	Yellow poplar/white oak/northern red oak
22	Upland northern white cedar	57	Scarlet oak (Mark Twain)
23	White spruce-balsam fir-aspen	58	Sweetgum-yellow poplar
24	Balsam fir	59	Mixed oaks
30	Mixed pines	60	Oak-hardwoods

Existing FSHR9 Vegetation Codes (cont.)

Code	Description	Code	Description
61	Swamp chestnut oak/cherrybark oak/pin oak	88	Black locust
62	Sweetgum-Nuttall oak/willow oak	89	Mixed upland hardwoods
63	Northern pin oak	90	Sugar maple-beech/basswood
67	Baldcypress/water tupelo	91	Quaking aspen
70	Sugar maple-black cherry	92	Paper birch
71	Black ash-American elm/red maple	93	Bigtooth aspen
72	River birch/sycamore	94	Balsam poplar
73	Cottonwood	95	Aspen-white spruce/balsam fir
74	White ash	96	Birch
75	Sycamore-pecan/American elm	97	Lowland shrubs
76	Red maple (wet site)	98	Upland shrubs
77	Green ash	99	Open
78	Black walnut	100	Reserved for Midewin Tall Grass Prairie
79	Mixed lowland hardwoods	101	Reserved for Midewin Tall Grass Prairie
80	Sugar maple-northern red oak	102	Reserved for Midewin Tall Grass Prairie
81	Sugar maple-beech/yellow birch	103	Reserved for Midewin Tall Grass Prairie
82	Sugar maple-basswood	104	Reserved for Midewin Tall Grass Prairie
83	Black cherry-white ash/yellow poplar	105	Reserved for Midewin Tall Grass Prairie
84	Red maple (dry site)	106	Reserved for Midewin Tall Grass Prairie
85	Sugar maple	107	Reserved for Midewin Tall Grass Prairie
86	Beech	108	Reserved for Midewin Tall Grass Prairie
87	Sugar maple-beech-yellow birch/red spruce	109	Reserved for Midewin Tall Grass Prairie

Existing FIADB Vegetation Codes

Code	Description	Code	Description
100	White/Red/Jack Pine Group	140	Longleaf/Slash Pine Group
101	Jack pine	141	Longleaf pine
102	Red pine	142	Slash pine
103	Eastern white pine	160	Loblolly/Shortleaf Pine Group
104	White pine/hemlock	161	Loblolly pine
105	Eastern hemlock	162	Shortleaf pine
120	Spruce/Fir Group	163	Virginia pine
121	Balsam fir	164	Sand pine
122	White spruce	165	Table-mountain pine
123	Red spruce	166	Pond pine
124	Red spruce/balsam fir	167	Pitch pine
125	Black spruce	168	Spruce pine
126	Tamarack	180	Pinyon/Juniper Group
127	Northern white-cedar		

Existing FIADB Vegetation Codes

Code	Description	Code	Description
181	Eastern redcedar	269	Blue spruce
182	Rocky Mountain juniper	270	Mountain hemlock
183	Western juniper	271	Alaska-yellow-cedar
184	Juniper woodland	280	Lodgepole Pine Group
185	Pinyon juniper woodland	281	Lodgepole pine
200	Douglas-fir Group	300	Hemlock/Sitka Spruce Group
201	Douglas-fir	301	Western hemlock
202	Port-Orford-cedar	304	Western redcedar
220	Ponderosa Pine Group	305	Sitka spruce
221	Ponderosa pine	320	Western Larch Group
222	Incense cedar	321	Western larch
223	Jeffrey pine/Coulter pine/bigcone Douglas-fir	340	Redwood Group
224	Sugar pine	341	Redwood
225	Jeffery pine	342	Giant sequoia
226	Coulter pine	360	Other Western Softwoods Group
240	Western White Pine Group	361	Knobcone pine
241	Western white pine	362	Southwest white pine
260	Fir/Spruce/Mountain Hemlock Group	363	Bishop pine
261	White fir	364	Monterey pine
262	Red fir	365	Foxtail pine/bristlecone pine
263	Noble fir	366	Limber pine
264	Pacific silver fir	367	Whitebark pine
265	Engelmann spruce	368	Misc. western softwoods
266	Engelmann spruce/subalpine fir	370	California Mixed Conifer Group
267	Grand fir	371	California mixed conifer
268	Subalpine fir	380	Exotic Softwoods Group
		381	Scotch pine

Existing FIADB Vegetation Codes

Code	Description	Code	Description
181	Eastern redcedar	269	Blue spruce

Code	Description
382	Australian pine
383	Other exotic softwoods
384	Norway spruce
385	Introduced larch
390	Western cypress group
400	Oak/Pine Group
401	White pine/red oak/white ash
402	Eastern redcedar/hardwood
403	Longleaf pine/oak
404	Shortleaf pine/oak

405	Virginia pine/southern red oak
406	Loblolly pine/hardwood
407	Slash pine/hardwood
409	Other pine/hardwood
500	Oak/Hickory Group
501	Post oak/blackjack oak
502	Chestnut oak
503	White oak/red oak/hickory
504	White oak
505	Northern red oak
506	Yellow-poplar/white oak/red oak
507	Sassafras/persimmon
508	Sweetgum/yellow-poplar
509	Bur oak
510	Scarlet oak
511	Yellow-poplar
512	Black walnut
513	Black locust
514	Southern scrub oak
515	Chestnut oak/black oak/scarlet oak
519	Red maple/oak
520	Mixed upland hardwoods
600	Oak/Gum/Cypress Group
601	Swamp chestnut oak/cherrybark oak
602	Sweetgum/Nuttall oak/willow oak
605	Overcup oak/water hickory
606	Atlantic white-cedar
607	Baldcypress/water tupelo
608	Sweetbay/swamp tupelo/red maple
700	Elm/Ash/Cottonwood Group
701	Black ash/American elm/red maple
702	River birch/sycamore
703	Cottonwood
704	Willow
705	Sycamore/pecan/American elm
706	Sugarberry/hackberry/elm/green ash
707	Silver maple/American elm
708	Red maple/lowland
709	Cottonwood/willow

Existing FIADB Vegetation Codes

Code	Description	Code	Description
181	Eastern redcedar	269	Blue spruce

Code	Description
722	Oregon ash
800	Maple/Beech/Birch Group
801	Sugar maple/beech/yellow birch
802	Black cherry
803	Cherry/ash/yellow-poplar

805	Hard maple/basswood
807	Elm/ash/locust
809	Red maple/upland
900	Aspen/Birch Group
901	Aspen
902	Paper birch
904	Balsam poplar
910	Alder/Maple Group
911	Red alder
912	Bigleaf maple
920	Western Oak Group
921	Gray pine
922	California black oak
923	Oregon white oak
924	Blue oak
925	Deciduous oak woodland
926	Evergreen oak woodland
931	Coast live oak
932	Canyon live oak/interior live oak
940	Tanoak/Laurel Group
941	Tanoak
942	California laurel
943	Giant chinkapin
950	Other Western Hardwoods Group
951	Pacific madrone
952	Mesquite woodland
953	Cercocarpus woodland
954	Intermountain maple woodland
955	Misc. western hardwood woodlands
960	Western woody shrublands-chaparral
980	Tropical Hardwoods Group
981	Sable palm
982	Mangrove
989	Other tropical
990	Exotic Hardwoods Group
991	Paulownia
992	Melaluca
993	Eucalyptus
995	Other exotic hardwoods
999	Non stocked

APPENDIX F: POTENTIAL VEGETATION REFERENCES

Code	Name	Author
901	**Habitat Classification System Field Guide for Upper Peninsula of Michigan and Northeastern Wisconsin**. CRPFS; School of Forestry and Wood Products, Michigan Technological Univ, Houghton, MI 49931.	Michael S. Coffman et. al. 1984
902	**Field Guide to Ecological Classification and Inventory System of the Huron-Manistee National Forests**. USDA Forest Service, Michigan State University, and the North Central Experiment Station	
903	**Wayne National Forest Ecological Classification Handbook**. USDA Forest Service, Wayne National Forest.	Jeffery N. Pearcy, David M. Hix, and James R. McClenahen
904	**Field Guide to the Native Plant Communities of Minnesota; the Laurentian Mixed Forest Province.** 2003	Minnesota Department of Natural Resources
905	**A Field Guide to Forest Communities and Habitat Types of Northern Wisconsin**. Department of Ecology and Management, University of Wisconsin-Madison. 2002	Kotar, John, J.A. Kovach and T.L. Burger
906	**A Field Guide to Forest Communities and Habitat Types of Central and Southern Wisconsin.** Department of Ecology and Management, University of Wisconsin-Madison. 1996	Kotar, John and Timothy L. Burger.

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APPENDIX G: POTENTIAL VEGETATION CODES

REF	CODE	Common Name	Scientific Name
901	AOC	maple/sweetroot-cohosh	ACER/OSMOR-CAULO
901	AQVac	maple-oak/blueberry	ACER-QUERC/VACCI
901	AQVib	maple-oak/viburnum	ACER-QUERC/VIBUR
901	ATD	maple-hemlock/woodfern	ACER-TSUGA/DRYOP
901	AVO	maple/violet-sweetroot	ACER/VIOLA-OSMOR
901	FE	ash/thoroughwort	FRAXI/EUPAT
901	FI	ash/touch-me-not	FRAXI/IMPAT
901	FMC	ash/mint/sedge	FRAXI/MENTH/CAREX
901	PCS	spruce/leatherleaf/sphagnum	PICEA/CHAMA5/SPHAG2
901	PO	spruce/osmunda	PICEA/OSMUN
901	PVC	pine/blueberry/sedge	PINUS/VACCI/CAREX
901	PVD	pine/blueberry/hairgrass	PINUS/VACCI/DESCH
901	QAE	oak-maple/trailing arbutus	QUERC-ACER/EPIGA
901	TAM	hemlock-maple/mitchella	TSUGA-ACER/MITCH
901	TM	hemlock/mayflower	TSUGA/MAIAN
901	TMC	hemlock/mayflower-goldthread	TSUGA/MAIAN-COPTI
901	TMV	hemlock/mayflower-blueberry	TSUGA/MAIAN-VACCI
901	TTL	hemlock-red cedar/honeysuckle	TSUGA-THUJA/LONIC
901	TTM	hemlock-red cedar/miterwort	TSUGA-THUJA/MITEL
901	TTP	hemlock-red cedar/butterbur	TSUGA-THUJA/PETAS
901	TTS	hemlock-red cedar/sphagnum	TSUGA-THUJA/SPHAG2
902	62	mixed oak-red maple/vaccinium (poorly drained, acidic sands)	QUERC-ACRU/VACCI
902	63	northern red oak-red maple-paper birch/mayflower	QURU-ACRU-BEPA/MAIAN
902	64	white ash-American basswood/violet	FRAM2-TIAM/VIOLA
902	72	red maple-paper birch/wintergreen	ACRU-BEPA/PYROL
902	73	red maple-paper birch/bunchberry dogwood	ACRU-BEPA/COCA13
902	74	black ash-American basswood/violet	FRNI-TIAM/VIOLA
902	80	sedge (cattails and open water)	CAREX
902	81	acid organics (stagnant drainages)	
902	82	non-acid organics (floodplains)	
902	DSH	mixed oak-red maple/starflower (dry ice-contact and sand hills)	QUERC-ACRU/TRIEN
902	HPM	sugar maple-beech/mayflower (herb poor moraines)	ACSA3-FAGUS/MAIAN
902	HPM42	suger maple/mayflower	ACSA3/MAIAN
902	HPM43	sugar maple-northern red oak/mayflower	ACSA3-QURU/MAIAN
902	HRM	sugar maple-white ash/sweetroot (herb rich moraines)	ACSA3-FRAM2/OSMOR
902	HRM47	sugar maple-white ash/cohosh	ACSA3-FRAM2/CAULO
902	MSH	northern red oak-red maple/viburnum (mesic ice-contact sand hills)	QURU-ACRU/VIBUR
902	MSH37	northern red oak-red maple/ticktrefoil	QURU-ACRU/DESMO
902	OWP	black oak-white oak/blueberry (outwash plains)	QUVE-QUAL/VACCI
902	OWP1	northern pin oak-white oak/hairgrass	QUEL-QUAL/DESCH
903	10	chestnut oak-white oak/upright carrionflower	QUPR2-QUAL/SMEC

Potential Vegetation Codes (cont.)

REF	CODE	Common Name	Scientific Name
903	11	tuliptree-sugar maple/woodland stonecrop-Canadian woodnettle	LITU-ACSA3/SETE3-LACA3
903	110	scarlet oak-chestnut oak/blueberry	QUCO2-QUPR2/VACCI
903	120	shagbark hickory-pignut hickory/smooth Solomon's seal-American pokeweed	CAOV2-CAGL8/POBI2-PHAM4
903	21	chestnut oak/wreath goldenrod-upright carrionflower	QUPR2/SOCA4-SMEC
903	211	chestnut oak-scarlet oak/smooth yellow false foxglove/poverty oatgrass	QUPR2-QUCO2/AUFL/DASP2
903	212	red maple-northern red oak-white oak/Canada lily/sedge	ACRU-QURU-QUAL/LICA3/CAREX
903	22	chestnut oak-white oak/nakedflower ticktrefoil-wreath goldenrod	QUPR2-QUAL/DENU4-SOCA4
903	221	scarlet oak-chestnut oak-white oak/whorled yellow loosestrife	QUCO2-QUPR2-QUAL/LYQU2
903	222	white oak-black cherry-red maple/early bluegrass-sedge	QUAL-PRSE2-ACRU/POCU4-CAREX
903	23	white oak/viburnum-blueberry	QUAL/VIBUR-VACCI
903	230	white oak-black oak-sugar maple-northern red oak/Indianpipe-Bosc's panicgrass	QUAL-QUVE-ACSA3-QURU/MOUN3-DIBO2
903	24	white oak/azure bluet-rue anemone	QUAL/HOCA4-THTH2
903	31	oak/Christmas fern	QUERC/POAC4
903	311	white oak-black oak-blackgum	QUAL-QUVE-NYSY
903	312	northern red oak-sugar maple-American beech/hairy Solomon's seal-lanceleaf wild licorice	QURU-ACSA3-FAGR/POPU4-GALA3
903	32	tuliptree-sugar maple/Canadian clearweed-Clayton's sweetroot	LITU-ACSA3/PIPU2-OSCL
903	321	white oak-black oak-hickory/nakedflower ticktrefoil-American alumroot	QUAL-QUVE-CARYA/DENU4-HEAM6
903	322	northern red oak-sugar maple-American beech/hairy skullcap-sedge	QURU-ACSA3-FAGR/SCEL-CAREX
903	33	mixed hardwoods/northern spicebush-bigleaf aster	2TD/LIBE3-EUMA27
903	330	white oak-northern red oak-ash/nakedflower ticktrefoil-white avens	QUAL-QURU-FRAXI/DENU4-GECA7
903	34	mixed hardwoods/bigleaf aster-Canadian honewort	2TD/EUMA27-CRCA9
903	411	white oak-tuliptree-American hornbeam-sugar maple/golden ragwort-upright carrionflower	QUAL-LITU-CACA18-ACSA3/PAAU3-SMEC
903	412	white oak-green ash-yellow buckeye-American beech-American basswood-American sycamore/basil beebalm-jumpseed	QUAL-FRPE-AEFL-FAGR-TIAM-PLOC/MOCL2-POVI2
904	APN80	Northern Spruce Bog	
904	APN80a1	Black Spruce Bog, Treed subtype	
904	APN80a2	Black Spruce Bog, Semi-treed subtype	
904	APN81	Northern Poor Conifer Swamp	
904	APN81a	Poor Black Spruce Swamp	
904	APN81b1	Poor Tamarack - Black Spruce Swamp, Black Spruce subtype	
904	APN81b2	Poor Tamarack - Black Spruce Swamp, Tamarack subtype	
904	APN90	Northern Open Bog	

Potential Vegetation Codes (cont.)

REF	CODE	Common Name	Scientific Name
904	APN90a	Low Shrub Bog	
904	APN90b1	Graminoid Bog, Typic subtype	
904	APN90b2	Graminoid Bog, Schlenke subtype	
904	APN91	Northern Poor Fen	
904	APN91a	Low Shrub Poor Fen	
904	APN91b	Graminoid Poor Fen	
904	APN91c1	Graminoid Poor Fen (Water track), Featureless Water Track subtype	
904	APN91c2	Graminoid Poor Fen (Water track), Flark subtype	
904	CTN11	Northern Dry Cliff	
904	CTN11a	Dry Mafic Cliff (Northern)	
904	CTN11b	Dry Mafic Cliff (Northern)	
904	CTN11c	Dry Thomson Cliff (Northern)	
904	CTN11d	Dry Felsic Cliff (Northern)	
904	CTN11e	Dry Sandstone Cliff (Northern)	
904	CTN12	Northern Open Talus	
904	CTN12a	Dry Open Talus (Northern)	
904	CTN12b	Mesic Open Talus (Northern)	
904	CTN24	Northern Scrub Talus	
904	CTN24a	Dry Scrub Talus (Northern)	
904	CTN24b	Mesic Scrub Talus (Northern)	
904	CTN32	Northern Mesic Cliff	
904	CTN32a	Masic Mafic Cliff (Northern)	
904	CTN32b	Mesic Rove Cliff (Northern)	
904	CTN32c	Mesic Thomson Cliff (Northern)	
904	CTN32d	Mesic Felsic Cliff (Northern)	
904	CTN32e	Mesic Sandstone Cliff (Northern)	
904	CTN42	Northern wet Cliff	
904	CTN42a	Wet Mafic Cliff (Northern)	
904	CTN42b	Wet Rove Cliff (Northern)	
904	CTN42c	Wet Felsic Cliff (Northern)	
904	CTN42d	Wet Sandstone Cliff (Northern)	
904	CTU22	Lake Superior Cliff	
904	CTU22a	Exposed Mafic Cliff (Lake Superior)	
904	CTU22b	Exposed Felsic Cliff (Lake Superior)	
904	CTU22c	Sheltered Mafic Cliff (Lake Superior)	
904	FDN12	Northern Dry-Sand Pine Woodland	
904	FDN12a	Jack Pine Woodland (Sand)	
904	FDN12b	Red Pine Woodland (Sand)	
904	FDN22	Northern Dry-Bedrock Pine (oak) Woodland	
904	FDN22a	JackPine Woodland (Bedrock)	
904	FDN22b	Red Pine - White Pine Woodland (Northeastern Bedrock)	
904	FDN22c	Pin Oak woodland (Bedrock)	
904	FDN22d	Red Pine - White Pine Woodland (Eastcentral Bedrock)	
904	FDN32	Northern Poor Dry-Mesic Mixed Woodland	
904	FDN32a	Red Pine - White Pine Woodland (Canadian Shield)	
904	FDN32b	Red Pine - white Pine Woodland (Minnesota Point)	
904	FDN32c1	Black Spruce - Jack Pine Woodland, Jack Pine - Balsam Fir	

Potential Vegetation Codes (cont.)

REF	CODE	Common Name	Scientific Name
904	FDN32c2	Black Spruce - Jack Pine Woodland, Black Spruce - Feathermoss subtype	
904	FDN32c3	Black Spruce - Jack Pine Woodland, Jack Pine - Balack Spruce - Aspen subtype	
904	FDN32d	Jack Pine - Black Spruce Woodland (Sand)	
904	FDN32e	Spruce - Fir woodland (North Shore)	
904	FDN33	Northern Dry-Mesic Mixed Woodland	
904	FDN33a1	Red Pine - White Pine Woodland, Balsam Fir subtype	
904	FDN33a2	Red Pine - White Pine Woodland, Mountain Maple subtype	
904	FDN33b	Aspen - Birch Woodland	
904	FDN33c	Black Spruce Woodland	
904	FDN43	Northern Mesic Mixed Forest	
904	FDN43a	White Pine - Red Pine Forest	
904	FDN43b1	Aspen - Birch Forest, Balsam Fir subtype	
904	FDN43b2	Aspen - Birch Forest, Hardwood subtype	
904	FDN43c	Upland white Cedar Forest	
904	FDC12	Central Poor Dry Pine Woodland	
904	FDC12a	Jack Pine - (Bearberry) woodland	
904	FDC23	Central Dry Pine Woodland	
904	FDC23a1	Jack Pine - (Yarrow) Woodland, Ericaceous Shrub subtype	
904	FDC23a2	Jack Pine - (Yarrow) Woodland, Bur Oak - Aspen subtype	
904	FDC24	Central Rich Dry Pine Woodland	
904	FDC24a1	Jack Pine - (Bush Honeysuckle) Woodland, Bracken subtype	
904	FDC24a2	Jack Pine - (Bush Honeysuckle) Woodland, Bur Oak - Aspen subtype	
904	FDC25	Central Dry Oak-Aspen (Pine) Woodland	
904	FDC25a	Jack Pine - Oak Woodland	
904	FDC25b	Oak - Aspen Woodland	
904	FDC34	Cebtral Dry-Mesic Pine-Hardwood Forest	
904	FDC34a	Red Pine - White Pine Forest	
904	FDC34b	Oak - Aspen Forest	
904	FFN57	Northern Terrace Forest	
904	FFN57a	Black Ash - Silver Maple Terrace Forest	
904	FFN67	Northern Floodplain Forest	
904	FFN67a	Silver Maple - (Sensitive Fern) Floodplain Forest	
904	FFS59	Southern Terrace Forest	
904	FFS59a	Silver Maple - Green Ash - Cottonwood Terrace Forest	
904	FFS59b	Swamp White Oak Terrace Forest	
904	FFS59c	Elm - Ash - Basswood Terrace Forest	
904	FPN62	Northern Rich Spruce Swamp (Basin)	
904	FPN62a	Rich Black Spruce Swamp (Basin)	
904	FPN63	Northern Cedar Swamp	
904	FPN63a	White Cedar Swamp (Northeastern)	
904	FPN63b	White Cedar Swamp (Northcentral)	
904	FPN63c	White Cedar Swamp (Northwestern)	
904	FPN71	Northern Rich Spruce Swamp (Water Track)	

Potential Vegetation Codes (cont.)

REF	CODE	Common Name	Scientific Name
904	FPN71a	Rich Black Spruce Swamp (water Track)	
904	FPN72	Northern Rich Tamarack Swamp (Eastern Basin)	
904	FPN72a	Rich Tamarack Swamp (Eastcentral)	
904	FPN73	Northern Alder Swamp	
904	FPN73a	Alder Swamp	
904	FPN81	Northern Rich Tamarack Swamp (water Track)	
904	FPN81a	Rich Tamarack (Sundew - Pitcher Plant) Swamp	
904	FPN82	Northern Rich Tamarack Swamp (western Basin)	
904	FPN82a	Rich Tamarack - (Alder) Swamp	
904	FPN82b	Extremely Rich Tamarack Swamp	
904	FPS63	Southern Rich Conifer Swamp	
904	FPS63a	Tamarck Swamp (Southern)	
904	FPW63	Northwestern Rich Conifer Swamp	
904	FPW63a	Tamarack - Black Spruce Swamp (Aspen Parkland)	
904	FPW63b	Tamarack Seepage Swamp (Aspen Parkland)	
904	LKI32	Inland Lake Sand/Gravel/Cobble Shore	
904	LKI32a	Sand Beach (Inland Beach)	
904	LKI32b	Gravel/Cobble Beach (Inland Lake)	
904	LKI43	Inland Lake Rocky shore	
904	LKI43a	Boulder Shore (Inland Lake)	
904	LKI43b	Bedrock Shore (Inland Lake)	
904	LKI54	Linland Lake Clay/Mud Shore	
904	LKI54a	Clay/Mud Shore (Inland Lake)	
904	LKI54b1	Mud Flat (Inland Lake), Saline subtype	
904	LKI54b2	Mud Flat (Inland Lake), Non-Saline subtype	
904	LKU32	Lake Superior Sand/Gravel/Cobbel Shore	
904	LKU32a	Beachgrass Dune (Lake Superior)	
904	LKU32b	Juniper Dune Shrubland (Lake Superior)	
904	LKU32c	Sand Beach Shrubland (Lake Superior)	
904	LKU32d	Beach Ridge Shrubland (Lake Superior)	
904	LKU32e	Gravel/Cobble Beach (Lake Superior)	
904	LKU43	Lake Superior Rocky Shore	
904	LKU43a	Dry Bedrock Shore (Lake Superior)	
904	LKU43b1	Wet Rocky Shore (Lake Superior), Cobble subtype	
904	LKU43b2	Wet Rocky Shore (Lake Superior), Bedrock subtype	
904	MHN35	Northern Mesic Hardwood Forest	
904	MHN35a	Aspen - Birch - Basswood Forest	
904	MHN35b	Red Oak - Sugar Maple - Basswood - (Bluebead Lily) Forest	
904	MHN44	Northern wet-Mesic Boreal Hardwood-Conifer Forest	
904	MHN44a	Aspen - Birch - Red Maple Forest	
904	MHN44b	White Pine - White Spruce - Paper Birch Forest	
904	MHN44c	Aspen - Fir Forest	
904	MHN44d	Aspen - Birch - Fir Forest	
904	MHN45	Northern Mesic Hardwood (Cedar) Forest	
904	MHN45a	Paper Birch - Sugar Maple Forest (North Shore)	
904	MHN45b	White Cedar - Yellow Birch Forest	
904	MHN45c	Sugar Maple Forest (North Shore)	
904	MHN46	Northern Wet-Mesic Hardwood Forest	

Potential Vegetation Codes (cont.)

REF	CODE	Common Name	Scientific Name
904	MHN46a	Aspen - Ash Forest	
904	MHN46b	Black Ash - Basswood Forest	
904	MHN47	Northern Rich Mesic Hardwood Forest	
904	MHN47a	Sugar Maple - Basswood - (Bluebead Lily) Forest	
904	MHN47b	Sugar Maple - Basswood - (Horsetail) Forest	
904	MHC26	Central Dry-Mesic-Oak-Aspen Forest	
904	MHC26a	Oak - Aspen - Red Maple Forest	
904	MHC26b	Red Oak - Sugar Maple - Basswood - (Large-Flowered Trillium) Forest	
904	MHC36	Central Mesic Hardwood Forest (Eastern)	
904	MHC36a	Red Oak - Basswood Forest (Noncalcareous Till)	
904	MHC36b	Red Oak - Basswood Forest (Calcareous Till)	
904	MHC37	Central Mesic Hardwood Forest (Western)	
904	MHC37a	Aspen - (Sugar Maple -Basswood) Forest	
904	MHC37b	Sugar Maple - Basswood - (Aspen) Forest	
904	MHC47	Central Wet-Mesic Hardwood Forest	
904	MHC47a	Basswood - Black Ash Forest	
904	MRN83	Northern Mixed Cattail Marsh	
904	MRN83a	Cattail - Sedge Marsh (Northern)	
904	MRN83b	Cattail Marsh (Northern)	
904	MRN93	No. Bulrush-Spikerush Marsh	
904	MRN93a	Bulrush Marsh (Northern)	
904	MRN93b	Spikerush - Bur Reed Marsh (Northern)	
904	MRU94	Lake Superior Coastal Marsh	
904	MRU94a	Estuary Marsh (Lake Superior)	
904	OPN81	Northern Shrub Shore Fen	
904	OPN81a	Bog Birch - Alder Shore Fen	
904	OPN81b	Bog Birch - Alder Shore Fen	
904	OPN91	Northern Rich Fen (Water Track)	
904	OPN91a	Shrub Rich Fen (water Track)	
904	OPN91b1	Graminoid Rich Fen (Water Track), Featureless Water Track subtype	
904	OPN91b2	Graminoid Rich Fen (Water Track), Flark subtype	
904	OPN92	Northern Rich Fen (Basin)	
904	OPN92a	Graminoid Rich Fen (Basin)	
904	OPN92b	Graminoid - Sphagnum Rich Fen (Basin)	
904	OPN93	Northern Extremely Rich Fen	
904	OPN93a	Spring Fen	
904	RON12	Northern Bedrock Outcrop	
904	RON12a	Sandstone Outcrop (Northern)	
904	RON12b	Crystalline Bedrock Outcrop (Northern)	
904	RON23	Northern Bedrock Shrubland	
904	RON23a	Bedrock Shrubland (Inland)	
904	RON23b	Bedrock Shrubland (Lake Superior)	
904	RVX32	Sand/Gravel/Cobble River Shore	
904	RVX32a	Willow Sandbar Shrubland (River)	
904	RVX32b1	Sand Beach/Sandbar (River), Intermittent Streambed subtype	

Potential Vegetation Codes (cont.)

REF	CODE	Common Name	Scientific Name
904	RVX32b2	Sand Beach/Sandbar (River), Permanent Stream subtype	
904	RVX32c1	Gravel/Cobble Beach (River), Intermittent Streambed subtype	
904	RVX32c2	Gravel/Cobble Beach (River), Permanent Stream subtype	
904	RVX43	Rocky River Shore	
904	RVX43a1	Bedrock/Boulder Shore (River), Intermittent Streambed subtype	
904	RVX43a2	Bedrock/Boulder Shore (River), Permanent Stream subtype	
904	RVX54	Clay/Mud River Shore	
904	RVX54a	Slumping Clay/Mud Slope (River)	
904	RVX54b1	Clay/Mud Shore (River), Intermittent Streambed subtype	
904	RVX54b2	Clay/Mud Shore (River), Permanent Stream subtype	
904	WFN53	Northern Wet Cedar Forest	
904	WFN53a	Lowland White Cedar Forest (North Shore)	
904	WFN53b	Lowland White Cedar Forest (Northern)	
904	WFN55	Northern Wet Ash Swamp	
904	WFN55a	Black Ash - Aspen - Balsam Poplar Swamp (Northeastern)	
904	WFN55b	Black Ash - Yellow Birch - Red Maple - Basswood Swamp (Eastcentral)	
904	WFN55c	Black Ash - Mountain Maple Swamp (Northern)	
904	WFN64	Northern Very Wet Ash Swamp	
904	WFN64a	Black Ash - Conifer Swamp (Northeastern)	
904	WFN64b	Black Ash - Yellow Birch - Red Maple - Alder Swamp (Eastcentral)	
904	WFN64c	Black Ash - Alder Swamp (Northern)	
904	WFS57	Southern Wet Ash Swamp	
904	WFS57a	Black Ash - (Red Maple) Seepage Swamp	
904	WFS57b	Black Ash - Sugar Maple - Basswood - (Blue Beech) Seepage Swamp	
904	WFS57c	Black Ash - Basswood Seepage Swamp	
904	WFW54	Northwestern Wet Aspen Forest	
904	WFW54a	Lowland Black Ash - Aspen - Balsam Poplar Forest	
904	WMN82	Northern Wet Meadow/Carr	
904	WMN82a	Willow - Dogwood Shrub Swamp	
904	WMN82b1	Sedge Meadow, Bluejoint subtype	
904	WMN82b2	Sedge Meadow, Tussock Sedge subtype	
904	WMN82b3	Sedge Meadow, Beaked Sedge subtype	
904	WMN82b4	Sedge Meadow, Lake Sedge subtyoe	
905	AAs	sugar maple/Jack in the pulpit	ACSA3/ARTRT3
905	AAt	sugar maple/common ladyfern	ACSA3/ATFI
905	AAtRp	sugar maple/common ladyfern-dwarf red blackberry	ACSA3/ATFI-RUPU
905	ACaCi	sugar maple/blue cohosh-broadleaf enchanter's nightshade	ACSA3/CATH2-CILUC
905	ACal	sugar maple/blue cohosh-jewelweed	ACSA3/CATH2-IMCA
905	ACl	sugar maple/bluebead	ACSA3/CLBO3
905	AFAd	sugar maple-American beech/northern maidenhair	ACSA3-FAGR/ADPE
905	AFAl	sugar maple-American beech/wild leek	ACSA3-FAGR/ALTR3

Potential Vegetation Codes (cont.)

REF	CODE	Common Name	Scientific Name
905	AFTD	sugarmaple-eastern henlock-American beech/spinulose woodfern	ACSA3-TSCA-FAGR/DRCA11
905	AFVb	sugar maple-American beech/mapleleaf viburnium	ACSA3-FAGR/VIAC
905	AH	sugar maple/Shawnee salad	ACSA3/HYVI
905	AHVb	sugar maple/Shawnee salad-mapleleaf viburnium	ACSA3/HYVI-VIAC
905	AHi	sugar maple/Shawnee salad-jewelweed	ACSA3/HYVI-IMCA
905	AOCa	sugar maple/Clayron's sweetroot-bluecohosh	ACSA3/OSCL-CATH2
905	ASal	sugar maple/bloodroot-jewelweed	ACSA3/SACA13-IMCA
905	ASnMi	sugar maple/Maryland sanicle-partridgeberry	ACSA3/SAMA2-MIRE
905	ATAtOn	sugar maple-eastern hemlock/common ladyfern-sensitive fern	ACSA3-TSCA/ATFI-ONSE
905	ATD	sugar maple-eastern hemlock/spinulose woodfern	ACSA3-TSCA/DRCA11
905	ATDH	sugar maple-eastern hemlock/spinulose woodfern-Shawnee salad	ACSA3-TSCA/DRCA11-HYVI
905	ATFPo	sugar maple-eastern hemlock-American beech/hairy Solomon’s seal	ACSA3-TSCA-FAGR/POPU4
905	ATFSt	sugar maple-eastern hemlock-American beech/twistedstalk	ACSA3-TSCA-FAGR/ STLAR
905	ATM	sugar maple-eastern hemlock/Canada mayflower	ACSA3-TSCA/MACA4
905	AVCl	sugar maple/lowbush blueberry/bluebead	ACSA3/VAAN/CLBO3
905	AVDe	sugar maple/lowbush blueberry/pointedleaf ticktrefoil	ACSA3/VAAN/DEGL5
905	AVVb	sugar maple/lowbush blueberry-mapleleaf viburnium	ACSA3/VAAN-VIAC
905	AVb	sugar maple/mapleleaf viburnium	ACSA3/VIAC
905	ArAbCo	red maple-balsam fir/bunchberry dogwood	ACRU-ABBA/COCA13
905	ArAbSn	red maple-balsam fir/Maryland sanicle	ACRU-ABBA/SAMA2
905	ArAbVC	red maple-balsam fir/lowbush blueberry-threeleaf goldthread	ACRU-ABBA/VAAN-COTR2
905	ArAbVCo	red maple-balsam fir/lowbush blueberry-bunchberry dogwood	ACRU-ABBA/VAAN-COCA13
905	ArVRp	red maple/lowbush blueberry-dwarf red blackberry	ACRU/VAAN-RUPU
905	Avb-V	sugar maple/mapleleaf viburnium-lowbush blueberry	ACSA3/VIAC-VAAN
905	PArV	white pine-red maple/lowbush blueberry	PIST-ACRU/VAAN
905	PArV-U	white pine-red maple/lowbush blueberry/sessileleaf bellwort	PIST-ACRU/VAAN/UVSE
905	PArVAa	white pine-redmaple/lowbush blueberry-wild sarsaparilla	PIST-ACRU/VAAN-ARNU2
905	PArVAa-Po	white pine-redmaple/lowbush blueberry-wild sarsaparilla/hairy Solomon’s seal	PIST-ACRU/VAAN-ARNU2/POPU4
905	PArVAa-Vb	white pine-redmaple/lowbush blueberry-wild sarsaparilla/mapleleaf viburnium	PIST-ACRU/VAAN-ARNU2/VIAC
905	PArVAo	white pine-redmaple/lowbush blueberry-spreading dogbane	PIST-ACRU/VAAN-APAN2
905	PArVHa	white pine-red maple/lowbush blueberry-American witchhazel	PIST-ACRU/VAAN-HAVI4
905	PArVPo	white pine-red maple/lowbush blueberry/hairy Solomon’s seal	PIST-ACRU/VAAN/POPU4
905	PArVRh	eastern white pine-red maple/lowbush blueberry-bristly dewbwrry	PIST-ACRU/VAAN-RUHI
905	PQE	white pine-northern red oak/trailing arbutus	PIST-QURU/EPRE2

Potential Vegetation Codes (cont.)

REF	CODE	Common Name	Scientific Name
905	PQG	white pine-oak/eastern teaberry	PIST-QUERC/GAPR2
905	PQGCe	white pine-oak/eastern teaberry-New Jersey tea	PIST-QUERC/GAPR2-CEAM
905	Par/Vam	white pine-red maple/lowbush blueberry-American hogpeanut	PIST-ACRU/VAAN-AMPR2
905	Qap	white oak-oak/leadplant	QUAL-QUERC/AMCA6
905	TFAa	eastern hemlock-American beech/wild sarsaparilla	TSCA-FAGR/ARNU2
905	TMC	eastern hemlock/Canada mayflower-threeleaf goldthread	TSCA/MACA4-COTR2
906	AArL	sugar maple-red maple/fourflower yellow loosestrife	ACSA3-ACRU/LYQU
906	AArVb	sugar maple-red maple/mapleleaf viburnium	ACSA3-ACRU/VIAC
906	AFAs	sugar maple-American beech/Jack in the pulpit	ACSA3-FAGR/ARISA
906	AFAs-O	sugar maple-American beech/Jack in the pulpit-sweetroot	ACSA3-FAGR/ARISA-OSMOR
906	AFH	sugar maple-American beech/waterleaf	ACSA3-FAGR/HYDRO4
906	AFTD	sugar maple-American beech-hemlock/spinulose woodfern	ACSA3-FAGR-TSUGA/DRCA11
906	AFrDe	sugar maple-white ash/pointedleaf ticktrefoil	ACSA3-FRAM2/DEGL5
906	AFrDe-O	sugar maple-white ash/pointedleaf ticktrefoil-sweetroot	ACSA3-FRAM2/DEGL5-OSMOR
906	AFrDe-Vb	sugar maple-white ash/ticktrefoil-viburnium	ACSA3-FRAM2/DESMO-VIBUR
906	AQVb-Gr	sugar maple-oak/mapleleaf viburnum-spotted geranium	ACSA3-QUERC/VIAC-GEMA
906	ATDe	sugar maple-basswood/ticktrefoil	ACSA3-TILIA/DESMO
906	ATDe-Pr	sugarmaple-basswood/ticktrefoil-black cherry	ACSA3-TILIA/DESMO-PRSE2
906	ATiAs-De	sugar maple-basswood/Jack in the pulpit-ticktrefoil	ACSA3-TILIA/ARISA-DESMO
906	ATiCa	sugar maple-basswood/blue cohosh-laportea	ACSA3-TILIA/CATH2
906	ATiCa-Al	sugar maple-basswood/blue cohosh-onion	ACSA3-TILIA/CATH2-ALLIU
906	ATiCa-La	sugar maple-basswood/blue cohosh-laportea	ACSA3-TILIA/CATH2-LAPOR
906	ATiCr-As	sugar maple-basswood/gray dogwood-Jack in the pulpit	ACSA3-TILIA/CORA6-ARISA
906	ATiCr-O	sugar maple-basswood/gray dogwood-sweetroot	ACSA3-TILIA/CORA6-OSMOR
906	ATiDe-As	sugar maple-basswood/ticktrefoil-Jack in the pulpit	ACSA3-TILIA/DESMO-ARISA
906	ATiDe-Ha	sugar maple-basswood/ticktrefoil-witchhazel	ACSA3-TILIA/DESMO-HAMAM
906	ATiFrCa	sugar maple-basswood-whiteash/blue chohosh	ACSA3-TILIA-FRAM2/CATH2
906	ATiFrCa-O	sugar maple-basswood-white ash/blue cohosh-sweetroot	ACSA3-TILIA-FRAM2/CATH2-OSMOR
906	ATiFrCi	sugar maple-basswood-white ash/broadleaf enchanter's nightshade	ACSA3-TILIA-FRAM2/CILUC
906	ATiFrVb	sugar maple-basswood-white ash/viburnium	ACSA3-TILIA-FRAM2/VIBUR

Potential Vegetation Codes (cont.)

REF	CODE	Common Name	Scientific Name
906	ATiFrVb-Cr	sugar maple-basswood-white ash/viburnium-gray dogwood	ACSA3-TILIA-FRAM2/VIBUR-CORA6
906	ATiH	sugar maple-basswood/waterleaf	ACSA3-TILIA/HYDRO4
906	ATiSa	sugar maple-basswood/bloodroot	ACSA3-TILIA/SACA13
906	ATiSa-De	sugar maple-basswood/bloodroot-ticktrefoil	ACSA3-TILIA/SACA13-DESMO
906	ATiTr	sugar maple-hemlock/starflower	ACSA3-TSUGA/TRIEN
906	ArCi	red maple/enchanter's nightshade	ARCU/CIRCA
906	ArCi-Ph	red maple/enchanter's nightshade-phrym	ARCU/CIRCA-PHRYM
906	ArDe	red maple/ticktrefoil	ACRU/DESMO
906	ArDe-V	red maple/ticktrefoil-blueberry	ACRU/DESMO-VACCI
906	PEu	eastern white pine/flowering spurge	PIST/EUCO10
906	PVCr	eastern white pine/blueberry-gray dogwood	PIST/VACCI-CORA6
906	PVGy	eastern white pine/blueberry-huckleberry	PIST/VACCI-GAYLU
906	PVHa	eastern white pine/blueberry-witchhazel	PIST/VACCI-HAMAM
906	PVRh	eastern white pine/blueberry-bristly dewberry	PIST/VACCI-RUHI
906	PVg	eastern white pine/blueberry-snowberry	PIST/VACCU-GAULT
907	PVDc	eastern white pine/lowbush blueberry-wavy hairgrass	PIST/VAAN-DEFL
907	PVCx	eastern white pine/lowbush blueberry-sedge	PIST/VAAN-CAREX
907	PQE	eastern white pine-northern red oak/trailing arbutus	PIST-QURU/EPRE2
907	PArV	eastern white pine-red maple/lowbush blueberry	PIST-ACRU/VAAN
907	PArVw	eastern white pine-red maple/lowbush blueberry (Wisconsin variant)	PIST-ACRU/VAAN (Wisconsin variant)
907	PArVAa	eastern white pine-red maple/lowbush blueberry-wild sarsaparilla	PIST-ACRU/VAAN-ARNU2
907	PArVAaw	eastern white pine-red maple/lowbush blueberry-wild sarsaparilla (Wisconsin variant)	PIST-ACRU/VAAN-ARNU2 (Wisconsin variant)
907	PArV-Co	eastern white pine-red maple/lowbush blueberry-bunchberry dogwood (bunchberry variant)	PIST-ACRU/VAAN-COCA13 (bunchberry variant)
907	AArAst	sugar maple-red maple/bigleaf aster	ACSA3-ACRU/ASMA2
907	AArLy	sugar maple-red maple/stiff clubmoss	ACSA3-ACRU/LYAN2
907	AVVb	sugar maple/lowbush blueberry-mapleleaf viburnum	ACSA3/VAAN-VIAC
907	AVb	sugar maple/mapleleaf viburnum	ACSA3/VIAC
907	TMC	eastern hemlock/Canada mayflower-threeleaf goldthread	TSCA/MACA4-COGR13
907	ATM	sugar maple-eastern hemlock/Canada mayflower	ACSA3-TSCA/MACA4
907	ATM-O	sugar maple-eastern hemlock/Canada mayflower-Clayton's sweetroot	ACSA3-TSCA/MACA4-OSCL
907	ATM-Sm	sugar maple-eastern hemlock/Canada mayflower-feathery false lily of the valley	ACSA3-TSCA/MACA4-SMRA
907	ATFAs	sugar maple-eastern hemlock-American beech/Jack in the pulpit	ACSA3-TSCA-FAGR/ARAT5
907	ATD	sugar maple-eastern hemlock/spinulose woodfern	ACSA3-TSCA/DRSP4
907	ATD-Hp	sugar maple-eastern hemlock/spinulose woodfern-sharplobe hepatica	ACSA3-TSCA/DRSP4-HENOA

Potential Vegetation Codes (cont.)

REF	CODE	Common Name	Scientific Name
907	ATD-Ca	sugar maple-eastern hemlock/spinulose woodfern-blue cohosh	ACSA3-TSCA/DRSP4-CATH2
907	AOCa	sugar maple/Clayton's sweetroot-blue cohosh	ACSA3/OSCL-CATH2
907	PVE	eastern white pine/lowbush blueberry-trailing arbutus	PIST/VAAN-EPRE2
907	PArV	eastern white pine-red maple/lowbush blueberry	PIST-ACRU/VAAN
907	PArV-Ao	eastern white pine-red maple/lowbush blueberry-spreading dogbane (variant)	PIST-ACRU/VAAN-APAN2 (variant)
907	ATFD	sugar maple-eastern hemlock-American beech/spinulose woodfern	ACSA3-TSCA-FAGR/DRSP4
907	AFPo	sugar maple-American beech/hairy Solomon's seal	ACSA3-FAGR/POPU4
907	AFOAs	sugar maple-American beech/Clayton's sweetroot-Jack in the pulpit	ACSA3-FAGR/OSCL-ARAT5
907	PVCd	eastern white pine/lowbush blueberry-graygreen reindeer lichen	PIST/VAAN-CLRA60
907	PArVHa	eastern white pine-red maple/lowbush blueberry-American witchhazel	PIST-ACRU/VAAN-HAVI4
907	PArVVb	eastern white pine-red maple/lowbush blueberry-mapleleaf viburnum	PIST-ACRU/VAAN-VIAC
907	AFO	sugar maple-American beech/Clayton's sweetroot	ACSA3-FAGR/OSCL
907	AFOCa	sugar maple-American beech/Clayton's sweetroot-blue cohosh	ACSA3-FAGR/OSCL-CATH2
907	PArVCo	eastern white pine-red maple/lowbush blueberry-bunchberry dogwood	PIST-ACRU/VAAN-COCA13

APPENDIX H: FUEL PHOTO REFERENCES AND CODES

Fuel Photo References

Code	Reference
18	Ottmar, Roger D. and R.E. Vihnanek. 1999 **Stereo Photo Series for Quantifying Natural Fuels in Midwest Red and White Pine, Northern Tallgrass Prairie, and Mixed Oak Types in the Central Lake States**.
25	Frederick Wilcox, John McCarty and Barry Bungard. 1982. **Photo Series for Quantifying Residues in the: Northern Hardwood Type and Oak-Hickory Type**. USDA Forest Service, NA-FR-22
31	Richard W. Blank. 1982. **Stereo Photos for Evaluating Jack Pine Slash Fuels.** Gen. Tech. Rep. NC-77. St. Paul, MN: US Department of Agriculture, Forest Service, North Central Forest Experiment Station; 23 p.

Fuel Photo Codes

Fuel Photo Codes For Reference 18

JP01	JP09	JP17	MO06	MP03	MP11	TP06	TP14		
JP02	JP10	JP18	MO07	MP04	MP12	TP07	TP15		
JP03	JP11	JP19	MO08	MP05	MP13	TP08	TP16		
JP04	JP12	MO01	MO09	MP06	TP02	TP09	TP17		
JP05	JP13	MO02	MO10	MP07	TP04	TP10			
JP06	JP14	MO03	MO11	MP08	TP05	TP11			
JP07	JP15	MO04	MP01	MP09	TP01	TP12			
JP08	JP16	MO05	MP02	MP10	TP03	TP13			

Fuel Photo Codes For Reference 25

1-A21-N	4-A22-N	7-B22-N	10-A22-CC	13-A22-CC	
2-A22-N	5-B12-N	8-A22-N	11-B22-CC	14-B23-CC	
3-B21-N	6-A12-N	9-A11-N	12-A22-CC		

Fuel Photo Codes For Reference 31

1	3	5	7	9	
2	4	6	8	10	

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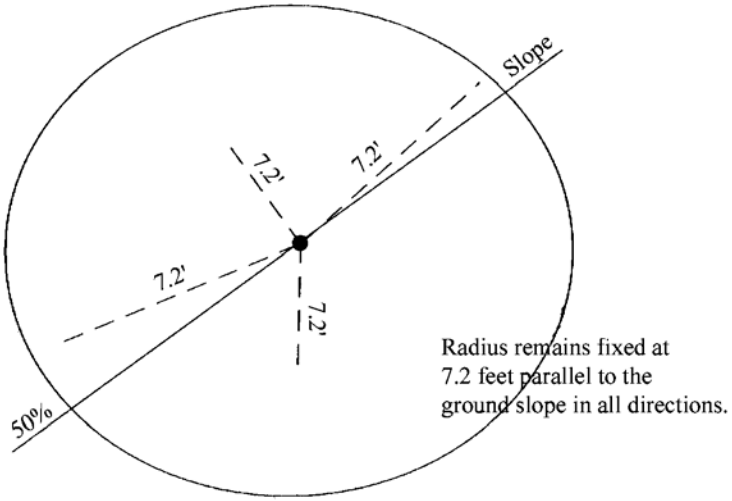
APPENDIX I: FIXED RADIUS PLOT

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
60-61	7.4	12.7	18.0	28.5	40.3	57.0

Circular Plot Radii Corrected for Slope (cont.)

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

Circular Plot Radii Corrected for Slope (cont.)

	Plot Size in Acres					
SLOPE %	**1/300**	**1/100**	**1/50**	**1/20**	**1/10**	**1/5**
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
52 to 53	28	1.13	98	44	1.40	134	53	1.67

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
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	
	004	Chinese rose beetle	*Adoretus sinicus*
	005	Rose beetle	*Adoretus versutus*
	006	Coconut hispid beetle	*Brontispa longissima*
	007	Clerid beetle	*Cleridae*
	008	Weevil	*Curculionidae*
	009	Green rose chafer	*Dichelonyx backi*
	010	Allegheny mound ant	*Formica exsectoides*
	011	Ant	*Formicidae*
	012	Stick insect	*Graeffea crovanii*
	013	Hulodes cranea	*Hulodes cranea*
	014	Conifer swift moth	*Korsheltellus gracilis*
	015	Caroline shortnosed weevil	*Lophothetes spp.*
	016	Coconut rhinoceros beetle	*Oryctes rhinoceros*
	017	Bagworm moth	*Psychidae*
	018	Coconut palm weevil	*Rhobdoscelus asperipennis*
	019	Scarab	*Scarabaeidae*
	020	Ash white fly	*Siphoninus phillyreae*
	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 present 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*
	003	Southern pine beetle	*Dendroctonus frontalis*
	004	Jeffery pine beetle	*Dendroctonus jeffreyi*
	005	Lodgepole pine beetle	*Dendroctonus murrayanae*
	006	Mountain pine beetle	*Dendroctonus ponderosae*
	007	Douglas-fir beetle	*Dendroctonus pseudotsugae*
	008	Allegheny spruce beetle	*Dendroctonus punctatus*
	009	Spruce beetle	*Dendroctonus rufipennis*
	010	Eastern larch beetle	*Dendroctonus simplex*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
11 (cont.)	011	Black turpentine beetle	*Dendroctonus terebrans*
	012	Red turpentine beetle	*Dendroctonus valens*
	013	unknown	*Dryocoetes affaber*
	014	unknown	*Dryocoetes autographus*
	015	Western balsam bark beetle	*Dryocoetes confusus*
	016	unknown	*Dryocoetes sechelti*
	017	Ash bark beetles	*Hylesinus spp.*
	018	Native elm bark beetle	*Hylurgopinus rufipes*
	019	Pinon ips	*Ips confusus*
	020	Small southern pine engraver	*Ips avulsus*
	021	Sixspined ips	*Ips calligraphus*
	022	Emarginate ips	*Ips emarginatus*
	023	Southern pine engraver beetle	*Ips grandicollis*
	024	unknown	*Ips latidens*
	025	Arizona five-spined ips	*Ips lecontei*
	026	Monterey pine ips	*Ips mexicanus*
	027	California fivespined ips	*Ips paraconfusus*
	028	Northern spruce engraver beetle	*Ips perturbatus*
	029	Pine engraver	*Ips pini*
	030	Ips engraver beetles	*Ips spp.*
	031	unknown	*Ips tridens*
	032	Western ash bark beetle	*Leperisinus californicus*
	033	Oregon ash bark beetle	*Leperisinus oregonus*
	034	unknown	*Orthotomicus caelatus*
	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*
	041	Fir root bark beetle	*Pseudohylesinum granulatus*
	042	unknown	*Pseudohylesinus dispar*
	043	Douglas-fir pole beetle	*Pseudohylesinus nebulosus*
	044	Silver fir beetle	*Pseudohylesinus sericeus*
	045	Small European elm bark beetle	*Scolytus multistriatus*
	046	Spruce engraver	*Scolytus piceae*
	047	Hickory bark beetle	*Scolytus quadrispinosus*
	048	True fir bark beetles	*Scolytus spp.*
	049	Douglas-fir engraver	*Scolytus unispinosus*
	050	Fir engraver	*Scolytus ventralis*
	051	Striped ambrosia beetle	*Tryachykele lineatum*
	052	Sitka spruce engraver beetle	*Ips conncinnus*
	053	Four-eyed bark beetle	*Polygraphus spp.*
	054	Hemlock beetle	*Pseudohylesinus tsugae*
	055	Spruce ips	*Ips pilifrons*
	056	Mexican pine beetle	*Dendroctonus mexicanus*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
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	
	007	Larger elm leaf beetle	*Monocesta coryli*
	008	Spanworm	
	009	Webworm	
	010	Pine false webworm	*Acantholyda erythrocephala*
	011	Western blackheaded budworm	*Acleris gloverana*
	012	Eastern blackheaded budworm	*Acleris variana*
	013	Whitefly	*Aleyrodoidae*
	014	Fall cankerworm	*Alsophila pometaria*
	015	Alder flea beetle	*Altica ambiens*
	016	Mountain mahogany looper	*Anacamptodes clivinaria profanata*
	017	Birch leaffolder	*Ancylis disigerana*
	018	Oak worms	*Anisota spp.*
	019	Orange-striped oakworm	*Anisota senatoria*
	020	Western larch sawfly	*Anoplonyx occidens*
	021	Fruit tree leafroller	*Archips argyrospila*
	022	Uglynest caterpillar	*Archips cerasivorana*
	023	Boxelder defoliator	*Archips negundanus*
	024	Oak leafroller	*Archips semiferana*
	025	Birch sawfly	*Arge pectoralis*
	026	Arborvitae leafminer	*Argyresthia thuiella*
	027	Coconut scale	*Aspidiotus destructor*
	028	Texas leafcutting ant	*Atta texana*
	029	Oak skeletonizer	*Bucculatrix ainsliella*
	030	Pear sawfly	*Caliroa cerasi*
	031	Scarlet oak sawfly	*Caliroa quercuscoccineae*
	032	Elm calligrapha	*Calligrapha scalaris*
	033	Boxelder leafroller	*Caloptilia negundella*
	034	Maple petiole borer	*Caulocampus acericaulis*
	035	Spruce webspinning sawfly	*Cephalcia fascipennis*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
12 (cont.)	036	Two-year budworm	*Choristoneura biennis*
	037	Large aspen tortrix	*Choristoneura conflictana*
	038	Spruce budworm	*Choristoneura fumiferana*
	039	Sugar pine tortrix	*Choristoneura lambertiana*
	040	Western spruce budworm	*Choristoneura occidentalis*
	041	Jack pine budworm	*Choristoneura pinus*
	042	Modoc budworm	*Choristoneura retiniana*
	043	Aspen leaf beetle	*Chrysomela crotchi*
	044	Cottonwood leaf beetle	*Chrysomela scripta*
	045	Leafhopper	*Cicadellidae*
	046	Poplar tentmaker	*Clostera inclusa*
	047	Larch casebearer	*Coleophora laricella*
	048	Birch casebearer	*Coleophora serratella*
	049	Lodgepole needleminer	*Coleotechnites milleri*
	050	Ponderosa needleminer	*Coleotechnites spp.*
	051	Black Hills pandora moth	*Coloradia doris*
	052	Pandora moth	*Coloradia pandora*
	053	Sycamore lace bug	*Corythucha ciliata*
	054	Lace bugs	*Corythucha spp.*
	055	Oak leaftier	*Croesia semipurpurana*
	056	Dusky birch sawfly	*Croesus latitarsus*
	057	Walnut caterpillar	*Datana integerrima*
	058	Yellownecked caterpillar	*Datana ministra*
	059	Walkingstick	*Diapheromera femorata*
	060	Spruce coneworm	*Dioryctria reniculelloides*
	061	Introduced pine sawfly	*Diprion similis*
	062	Greenstriped mapleworm	*Dryocampa rubicunda*
	063	Spruce needleminer (east)	*Endothenia albolineana*
	064	Elm spanworm	*Ennomos subsignaris*
	065	Maple trumpet skeletonizer	*Epinotia aceriella*
	066	White fir needleminer	*Epinotia meritana*
	067	Linden looper	*Erannis tiliaria*
	068	Browntail moth	*Euproctis chrysorrhoea*
	069	Pine needleminer	*Exoteleia pinifoliella*
	070	Birch leafminer	*Fenusa pusilla*
	071	Elm leafminer	*Fenusa ulmi*
	072	Geometrid moth	*Geometridae*
	073	Leafblotch miner	*Gracillariidae*
	074	Spotted tussock moth	*Halisidota maculata*
	075	Pale tussock moth	*Halisidota tessellaris*
	076	Hesperiid moth	*Hasora choromus*
	077	Brown day moth	*Hemileuca eglanterina*
	078	Buck moth	*Hemileuca maia*
	079	Saddled prominent	*Heterocampa guttivitta*
	080	Variable oakleaf caterpillar	*Heterocampa manteo*
	081	Cherry scallop shell moth	*Hydria prunivorata*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
12 (cont.)	082	Fall webworm	*Hyphantria cunea*
	083	Hemlock looper	*Lambdina fiscellaria*
	084	unknown	*Lambdina punctat*
	085	Tent caterpillar moth	*Lasiocampidae*
	086	Satin moth	*Leucoma salicis*
	087	Willow leafblotch miner	*Lithocolletis spp.*
	088	Aspen blotchminer	*Lithocolletis tremuloidiella*
	089	Gypsy moth	*Lymantria dispar*
	090	Cottonwood leafminers	*Lyonetia spp.*
	091	Dogwood sawfly	*Macremphytus tarsatus*
	092	Rose chafer	*Macrodactylus subspinosus*
	093	Eastern tent caterpillar	*Malacosoma americanum*
	094	Western tent caterpillar	*Malacosoma californicum*
	095	Pacific tent caterpillar	*Malacosoma constrictum*
	096	Forest tent caterpillar	*Malacosoma disstria*
	097	Southwestern tent caterpillar	*Malacosoma incurvum*
	098	Leafcutting bees	*Megachilidae*
	099	Blister beetle	*Meloidae*
	100	Early birch leaf edgeminer	*Messa nana*
	101	Juniper sawfly	*Monoctenus fulvus*
	102	Willow sawfly	*Nematus spp.*
	103	Balsam fir sawfly	*Neodiprion abietis*
	104	Lodgepole sawfly	*Neodiprion burkei*
	105	Blackheaded pine sawfly	*Neodiprion excitans*
	106	Pine infesting sawflies	*Neodiprion fulviceps*
	107	Redheaded pine sawfly	*Neodiprion lecontei*
	109	Ponderosa pine sawfly	*Neodiprion mundus*
	110	White pine sawfly	*Neodiprion pinetum*
	111	Jack pine sawfly	*Neodiprion pratti banksianae*
	112	Virginia pine sawfly	*Neodiprion pratti pratti*
	113	European pine sawfly	*Neodiprion sertifer*
	114	Loblolly pine sawfly	*Neodiprion taedae linearis*
	115	Hemlock sawfly	*Neodiprion tsugae*
	116	Pine butterfly	*Neophasia menapia*
	117	False hemlock looper	*Nepytia canosaria*
	118	California tortoiseshell	*Nymphalis californica*
	119	Locust leafminer	*Odontota dorsalis*
	120	Bruce spanworm	*Operophtera bruceata*
	121	Rusty tussock moth	*Orgyia antiqua*
	122	Whitemarked tussock moth	*Orgyia leucostigma*
	123	Douglas-fir tussock moth	*Orgyia pseudotsugata*
	124	Western tussock moth	*Orgyia vetusta*
	125	Spring cankerworm	*Paleacrita vernata*
	126	Black citrus swallowtail butterfly	*Papilio polytes*
	127	Maple leafcutter	*Paraclemensia acerifoliella*
	128	Pine tussock moth	*Parorgyia grisefacta*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
12 (cont.)	129	Poinciana looper	*Pericyma cruegeri*
	130	Half-wing geometer	*Phigalia titea*
	131	Phoberia moth	*Phoberia atomaris*
	132	California oakworm	*Phryganidia californica*
	133	European snout beetle	*Phyllobius oblongus*
	134	Citrus leafminer	*Phyllocnistis citrella*
	135	Aspen leafminer	*Phyllocnistis populiella*
	136	Yellowheaded spruce sawfly	*Pikonema alaskensis*
	137	Tenlined June beetle	*Polyphylla decemlineata*
	138	Japanese beetle	*Popillia japonica*
	139	Larch sawfly	*Pristiphora erichsonii*
	140	Mountain-ash sawfly	*Pristiphora geniculata*
	141	Elm leaf beetle	*Pyrrhalta luteola*
	142	Spearmarked black moth	*Rheumaptera hastata*
	143	Giant silkworm moth	*Saturniidae*
	144	Redhumped caterpillar	*Schizura concinna*
	145	Redbanded thrips	*Selenothrips rubrocinctus*
	146	Larch looper	*Semiothisa sexmaculata*
	147	Maple leafroller	*Sparganothis acerivorana*
	148	Redhumped oakworm	*Symmerista canicosta*
	149	Orangehumped mapleworm	*Symmerista leucitys*
	150	Spruce needleminer (west)	*Taniva albolineana*
	151	Maple webworm	*Tetralopha asperatella*
	152	Pine webworm	*Tetralopha robustella*
	153	Imported basswood thrips	*Thrips calcaratus*
	154	Bagworm	*Thyridopteryx ephemeraeformis*
	155	Leafroller/seed moth	*Tortricidae*
	156	Willow defoliation	*Tortricidae*
	157	Euonymus caterpillar	*Yponomeuta spp.*
	158	Spruce bud moth	*Zeiraphera canadensis*
	159	Larch bud moth	*Zeiraphera improbana*
	160	Pine needle sheathminer	*Zelleria haimbachi*
	161	Cypress looper	*Anacamptodes pergracilis*
	162	Cottonwood leaf beetle	*Chrysomela spp.*
	163	Pine colaspis	*Colaspis pini*
	164	Saddle-backed looper	*Ectropis crepuscularia*
	165	Leaf roller	*Epinotia solandriana*
	166	New Mexico fir looper	*Gelenara cansimillis*
	167	Striped alder sawfly	*Hemichroa crocea*
	168	Green-striped looper	*Melanoplophia imitata*
	169	Willow leaf blotchminer	*Micrurapteryx salicifoliella*
	170	unknown	*Neodiprion autmnalis*
	171	Pinon sawfly	*Neodiprion edulicolus*
	172	unknown	*Neodiprion gilletti*
	173	unknown	*Neodiprion ventralis*
	174	Pine looper	*Phaeoura mexicanaria*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
12 (cont.)	175	unknown	*Zadiprion rohweri*
	176	unknown	*Zadiprion townsendi*
	177	Douglas-fir budmoth	*Zeiraphera hesperiana*
	178	Western oak looper	*Lambdina fiscellaria somniaria*
	179	Phantom hemlock looper	*Nepytia phantasmaria*
	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*
	003	Black cutworm	*Agrotis ipsilon*
	004	Palau coconut beetle	*Brontispa palauenis*
	005	Clearwinged grasshopper	*Camnula pellucida*
	006	Cicadas	*Cicadidae*
	007	Eurytomids	*Eurytoma spp.*
	008	Cutworms	*Euxoa excellens*
	009	Whitefringed beetles	*Graphognathus spp.*
	010	Pales weevil	*Hylobius pales*
	011	Vegetable weevil	*Listroderes difficilis*
	012	Periodical cicada	*Magicicada septendecim*
	013	Migratory grasshopper	*Melanoplus sanguinipes*
	014	Valley grasshopper	*Oedaleonotus enigma*
	015	Strawberry root weevil	*Otiorhyhchus ovatus*
	016	Black vine weevil	*Otiorhynchus sulcatus*
	017	Pandanus beetle	*Oxycephala pandani*
	018	Spaeth pandanus	*Oxycephala spaethi*
	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.*
	023	Coconut longhorned grasshopper	*Segestes unicolor*
	024	Clover root curculio	*Sitona hispidulus*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
13 (cont.)	025	Unknown	*Thrips madronii*
	026	Ash plant bug	*Tropidosteptes amoenus*
	027	Shorthorned grasshopper	*Valanga nigricornis*
	028	Pitch-eating weevil	*Pachylobius picivorus*
	029	Deodar weevil	*Pissodes nemorensis*
	030	Adana tip moth	*Rhyacionia adana*
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	
	002	Western larch woolly aphid	*Adelges oregonensis*
	003	Balsam woolly adelgid	*Adelges piceae*
	004	Hemlock woolly adelgid	*Adelges tsugae*
	005	Spiraling whitefly	*Aleurodicus dispersus*
	006	Aphid	*Aphididae*
	007	Pine spittlebug	*Aphrophora parallela*
	008	Western pine spittlebug	*Aphrophora permutata*
	009	Saratoga spittlebug	*Aphrophora saratogensis*
	010	Spittlebug	*Cercopidae*
	011	Wax scale	*Ceroplastes spp.*
	012	Pine needle scale	*Chionaspis pinifoliae*
	014	Giant conifer aphids	*Cinara spp.*
	015	White pine aphid	*Cinara strobi*
	016	Beech scale	*Cryptococcus fagisuga*
	017	Spruce aphid	*Elatobium abietinum*
	018	Woolly apple aphid	*Eriosoma lanigerum*
	019	Striped mealybug	*Ferrisia vergata*
	020	Elongate hemlock scale	*Fiorinia externa*
	021	Coconut red scale	*Furcaspis oceanica*
	022	Pine thrips	*Gnophothrips spp.*
	023	Leucaena psyllid	*Heteropsylla cubana*
	024	Honeysuckle aphids	*Hyadaphis tataricae*
	025	Egyptian fluted scale	*Icerya aegyptiaca*
	026	Lecanium scale	*Lecanium spp.*
	027	Common falsepit scale	*Lecanodiaspis prosopidis*
	028	Oystershell scale	*Lepidosaphes ulmi*
	029	Pinyon needle scale	*Matsucoccus acalyptus*
	030	Ponderosa pine twig scale	*Matsucoccus bisetosus*
	031	Pine twig scale	*Matsucoccus californicus*
	032	Ponderosa pine scale	*Matsucoccus degeneratus*
	033	Red pine scale	*Matsucoccus resinosae*
	034	Prescott scale	*Matsucoccus vexillorum*
	035	Treehoopers	*Membracidae*
	036	Hibiscus psyllid	*Mesohomotoma hibisci*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
14 (cont.)	037	Balsam twig aphid	*Mindarus abietinus*
	038	Hibiscus mealybug	*Nipaecoccus vastator*
	039	Black pineleaf scale	*Nuculaspis californica*
	040	Spruce spider mite	*Oligonychus ununquis*
	041	Twig girdler	*Oncideres cingulata*
	042	Woolly alder aphid	*Paraprociphilus tessellatus*
	043	Maple aphids	*Periphyllus spp.*
	044	Spruce bud scale	*Physokermes piceae*
	045	Red pine adelgid	*Pineus borneri*
	046	Pine leaf adelgid	*Pineus pinifoliae*
	047	White pine adelgid	*Pineus spp.*
	048	Pine bark adelgid	*Pineus strobi*
	049	Root aphid	*Prociphilus americanus*
	050	Mealybug	*Pseudococcidae*
	051	Cottony maple scale	*Pulvinaria innumerabilis*
	052	Fir mealybug	*Puto cupressi*
	053	Douglas-fir mealybug	*Puto profusus*
	054	Spruce mealybug	*Puto sandini*
	055	Hemispherical scale	*Saissetia coffeae*
	056	Woolly pine needle aphid	*Schizolachnus piniradiatae*
	057	Steatococcus scale	*Steatococcus samaraius*
	058	Pear thrips	*Taeniothrips inconsequens*
	059	Mulberry whitefly	*Tetraleurodes mori*
	060	Tuliptree scale	*Toumeyella liriodendri*
	061	Pine tortoise scale	*Toumeyella parvicornis*
	062	Citrus snow scale	*Unaspis citri*
	063	Birch aphid	*Euceraphis betulae*
	069	Elm scurfy scale	*Chionaspis americana*
	070	Magnolia scale	*Neolecanium cornuparvum*
	071	Beech blight aphid	*Grylloprociphilus imbricator*
	072	Beech woolly aphid	*Phyllaphis fagi*
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*
	004	Bronze birch borer	*Agrilus anxius*
	005	Twolined chestnut borers	*Agrilus bilineatus*
	006	Bronze poplar borer	*Agrilus liragus*
	007	Carpenter bees	*Apidae*
	008	Flatheaded borer	*Buprestidae*
	009	Golden buprestid	*Buprestis aurulenta*
	010	Carpenter ants	*Camponotus spp.*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
15 (cont.)	011	Gouty pitch midge	*Cecidomyia piniinopis*
	012	Shootboring sawflies	*Cephidae*
	013	Roundheaded borer	*Cerambycidae*
	014	Flatheaded apple tree borer	*Chrysobothris femorata*
	015	Cranberry girdler	*Chrysoteuchia topiaria*
	016	Columbian timber beetle	*Corthylus columbianus*
	017	Pitted ambrosia beetle	*Corthylus punctatissimus*
	018	Carpenterworm moths	*Cossidae*
	019	Poplar and willow borer	*Cryptorphynchus lapathi*
	020	Pine reproduction weevil	*Cylindrocopturus eatoni*
	021	Douglas-fir twig weevil	*Cylindrocopturus furnissi*
	022	Zimmerman pine moth	*Dioryctria zimmermani*
	023	Oak twig pruners	*Elaphidionoides spp.*
	024	Twig pruner	*Elaphidionoides villosus*
	025	Lesser cornstalk borer	*Elasmopalpus lignosellus*
	026	Red oak borer	*Enaphalodes rufulus*
	027	Ponderous borer	*Ergates spiculatus*
	028	Eastern pine shoot borer	*Eucosma gloriola*
	029	Western pine shoot borer	*Eucosma sonomana*
	030	Eucosma species	*Eucosma spp.*
	031	Sugar maple borer	*Glycobius speciosus*
	032	Goes borers	*Goes spp.*
	033	Pine root collar weevil	*Hylobius radicis*
	034	Warren's collar weevil	*Hylobius warreni*
	035	Powderpost beetle	*Lyctidae*
	036	Tarnished plant bug	*Lygus lineolaris*
	037	unknown	*Magdalis spp.*
	038	White pine bark miner	*Marmara fasciella*
	039	Locust borer	*Megacyllene robiniae*
	040	California flathead borer	*Melanophila californica*
	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.*
	046	Eucalyptus longhorned borer	*Phoracantha semipunctata*
	047	Northern pine weevil	*Pissodes approximatus*
	048	unknown	*Pissodes dubius*
	049	Monterey pine weevil	*Pissodes radiatae*
	050	White pine weevil	*Pissodes strobi*
	051	Lodgepole terminal weevil	*Pissodes terminalis*
	052	Ambrosia beetles	*Platypus spp.*
	053	Cottonwood borer	*Plectrodera scalator*
	054	Balsam shootboring sawfly	*Pleroneura brunneicornis*
	055	Pine gall weevil	*Podapion gallicola*
	056	Ash borer	*Podesesia syringae fraxini*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
15 (cont.)	057	Lilac borer	*Podosesia syringae*
	058	Carpenterworm	*Prionoxystus robiniae*
	059	Maple shoot borers	*Proterteras spp.*
	060	Western subterranean termite	*Reticulitermes hesperus*
	061	Coconut trunk weevil	*Rhabdoscelus asperipennis*
	062	New Guinea sugarcane weevil	*Rhabdoscelus obscurus*
	063	European pine shoot moth	*Rhyacionia buoliana*
	064	Western pine tip moth	*Rhyacionia bushnelli*
	065	Nantucket pine tip moth	*Rhyacionia frustrana*
	066	Lodgepole pine tip moth	*Rhyacionia montana*
	067	Southwestern pine tip moth	*Rhyacionia neomexicana*
	068	Poplar borer	*Saperda calcarata*
	069	Roundheaded appletree borer	*Saperda candida*
	070	Saperda shoot borer	*Saperda spp.*
	071	Clearwing moths	*Sesiidae*
	072	Dogwood borer	*Synanthedon scitula*
	073	Roundheaded fir borer	*Tetropium abietis*
	074	Western larch borer	*Tetropium velutinum*
	075	Western cedar borer	*Trachykele blondeli*
	076	Douglas-fir pitch moth	*Vespamima novaroensis*
	077	Sequoia pitch moth	*Vespamima sequoia*
	078	Black twig borer	*Xylosandrus compactus*
	079	Pacific dampwood termite	*Zootermopsis angusticollis*
	087	Emerald ash borer	*Agrilus planipennis*
	088	Hemlock borer	*Melanophila fulvoguttata*
16	**000**	**Seed/Cone/Flower/Fruit Insects**	
SEVERITY RATING 1 = minor 2 = severe			
	001	Douglas-fir cone moth	*Barbara colfaxiana*
	002	Lodgepole cone beetle	*Conophthorus contortae*
	003	Limber pine cone beetle	*Conophthorus flexilis*
	004	Mountain pine cone beetle	*Conophthorus monticolae*
	005	Ponderosa pine cone beetle	*Conophthorus ponderosae*
	006	Monterey pine cone beetle	*Conophthorus radiatae*
	007	Red pine cone beetle	*Conophthorus resinosae*
	008	White pine cone beetle	*Conopthorus coniperda*
	009	Black walnut curculio	*Conotrachelus retentus*
	010	Douglas-fir cone midge	*Contarinia oregonensis*
	011	Cone scale midge	*Contarinia washingtonensis*
	012	Pecan	*Curculio spp.*
	013	Caroline fruitfly	*Dacus frauenfeldi*
	014	Spruce bud midge	*Dasineura swainei*
	015	Fir coneworm	*Dioryctria abietivorella*
	016	Southern pine cone worm	*Dioryctria amatella*
	017	Pine coneworm	*Dioryctria auranticella*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
16 (cont.)	018	Loblolly pine cone worm	*Dioryctria merkeli*
	019	Ponderosa twig moth	*Dioryctria ponderosae*
	020	unknown	*Dioryctria pseudotsugella*
	021	Dioryctria moths	*Dioryctria spp.*
	022	Lodgepole cone moth	*Eucosma rescissoriana*
	023	Seed chalcid	*Eurytomidae*
	024	Slash pine flower thrips	*Gnophothrips fuscus*
	025	Cone maggot	*Hylemya anthracina*
	026	Longleaf pine seed worm/moth	*Laspeyresia ingens*
	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*
	032	Hollyhock thrips	*Liothrips varicornis*
	033	unknown	*Megastigmus lasiocarpae*
	034	Spruce seed chalcid	*Megastigmus piceae*
	035	Ponderosa pine seed chalcid	*Megastigmus albifrons*
	036	Fir seed chalcid	*Megastigmus pinus*
	037	Douglas-fir seed chalcid	*Megastigmus spermotrophs*
	038	Yellow poplar weevil	*Odontopus calceatus*
	039	Fruitpiercing moth	*Othreis fullonia*
	040	Roundheaded cone borer	*Paratimia conicola*
	041	Mango shoot caterpillar	*Penicillaria jocosatrix*
	042	Coneworm	*Phycitidae*
	043	Harvester ants	*Pogonomyrmex spp.*
	044	Citrus flower moth	*Prays citri*
	045	Fir cone maggot	*Strobilomyia abietis*
	046	Spruce cone maggot	*Strobilomyia anthracina*
	047	Shieldbacked pine seed bug	*Tetyra bipunctata*
	048	Coneworm	*Hylemia spp.*
	049	Prairie tent caterpillar	*Malacosoma lutescens*
	050	Jack pine tip beetle	*Conophthorus banksianae*
17	**000**	**Gallmaker Insects**	
SEVERITY RATING 1 = minor 2 = severe			
	001	Birch budgall mite	*Aceria rudis*
	002	Eastern spruce gall adelgid	*Adelges abietis*
	003	Cooley spruce gall adelgid	*Adelges cooleyi*
	004	Horned oak gall	*Callirhytis cornigera*
	005	Gouty oak gall	*Callirhytis quercuspunctata*
	006	Gall midge	*Cecidomyiidae*
	007	Douglas-fir needle gall midge	*Contarinia pseudotsugae*
	008	Gall mite	*Eriophyidae*
	009	Spruce gall midge	*Mayetiola piceae*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
17 (cont.)	010	Hackberry nipplegall maker	*Pachypsylla celtidismamma*
	011	Balsam gall midge	*Paradiplosis tumifex*
	012	Leaf stem gall adelgid	*Phylloxera caryaecaulis*
	013	Gall aphid	*Phylloxeridae*
	014	Alder gall mite	*Phytoptus laevis*
	015	Psyllid	*Psyllidae*
	016	Sugarberry psyllid	*Tetragonocephela flava*
	017	Mountain apple psyllid	*Trioza vitiensis*
	018	Gouty pitch midge	*Cedidomyia piniinopsis*
	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*
	003	Cassytha	*Cassytha filiformis*
	004	Hemlock fluting	

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.*
	002	Yellow stringy rot	*Corticium galactimum*
	003	Cylindrocladium root disease	*Cylindrocladium spp.*
	004	Brown crumbly rot	*Fomitopsis pinicola*
	005	Black root rot of pine	*Fusarium oxysporum*
	006	Fusarium root rot	*Fusarium spp.*
	007	White mottled rot	*Ganoderma applanatum*
	008	Ganoderma rot of hardwoods	*Ganoderma lucidum*
	009	Ganoderma rot of conifers	*Ganoderma tsugae*
	010	Annosus root disease	*Heterobasidion annosum*
	011	Circinatus root rot	*Inonotus circinatus*
	012	Tomentosus root disease	*Inonotus tomentosus*
	013	Charcoal root rot	*Macrophomina phaseolina*
	014	Black stain root disease	*Ophiostoma wageneri*
	015	Schweinitzii butt rot	*Phaeolus schweinitzii*
	016	Flame tree root disease	*Phellinus noxious*
	017	Laminated root rot	*Phellinus weirii*
	018	Phytophthora root rot	*Phytophthora cinnamomi*
	019	Littleleaf disease	*Phytophthora cinnamomi/Pythium*
	020	Port-Orford-cedar root disease	*Phytophthora lateralis*
	022	Pythium root rot	*Pythium spp.*
	023	Procera root disease of conifers	*Verticicladiella procera*
	024	Crown gall	*Agrobacterium tumefaciens*
	025	Borealis conk	*Climacocystis borealis*
	026	Yellow pitted rot	*Hericium abietis*
	027	Brown cubical rot	*Laetiporus sulphureus*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
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	
	005	Virus	
	006	Black knot of cherry	*Apiosporina morbosa*
	007	Atropellis canker	*Atropellis piniphila*
	008	Siberian elm canker	*Botryodiplodia hypodermia*
	009	Botryosphaeria canker	*Botryosphaeria ribis*
	010	Black rot fungus	*Botryosphaeria stevensii*
	011	Caliciopsis canker	*Caliciopsis pinea*
	012	Black canker of aspen	*Ceratocystis fimbriata*
	013	Sycamore canker stain	*Ceratocystis fimbriata f.sp. plataini*
	023	Chestnut blight	*Cryphonectria parasitica*
	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*
	030	Eutypella canker	*Eutypella parasitica*
	031	Fusarium cortical stem rot	*Fusarium avenaceum*
	032	Pitch canker	*Fusarium subglutinans*
	033	Fusicoccum canker	*Fusicoccum spp.*
	034	Scleroderris canker	*Gremmeniella abietina*
	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*
	041	European larch canker	*Lachnellula willkommii*
	042	Beech bark disease	*Nectria coccinea*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
22 (cont.)	043	Nectria canker	*Nectria galligena*
	044	Ash heart rot	*Pereniporia fraxinophila*
	047	Red ring rot	*Phellinus pini*
	048	Aspen trunk rot	*Phellinus tremulae*
	049	Stem decay of black walnut	*Phellinus weirianus*
	050	Phomopsis canker	*Phomopsis occulta*
	051	Phomopsis canker	*Phomopsis spp.*
	052	Leyland cypress canker	*Seiridium cardinale*
	053	Butternut canker	*Sirococcus clavigignenti-jugl.*
	054	Maple canker	*Steganosporium spp.*
	055	Thyronectria canker	*Thyronectria austro-americana*
	056	Citrus canker	*Xanthomonas citri*
	057	Cytospora canker of aspen	*Cytospora chrysosperma*
	058	Dothichiza canker	*Dothichiza populae*
	059	Red belt fungus	*Fomitopsis pinicola*
	060	Leucocytospora canker of spruce	*Leucocytospora kunzei*
	061	Sooty bark canker	*Phibalis singulare*
	062	Brown heartrot	*Fomitopsis Officinalis*
	063	unknown	*Coniophora puteana*
	064	Tinder fungus	*Fomes fomentarius*
	065	Purple conk	*Hirschioporus abietinus*
	066	Pinyon black stain	*Leptographium wagnerii*
	067	unknown	*Phellinus hartigii*
	068	False tinder fungus	*Phellinus igniarius*
	069	Robustus conk	*Phellinus robustus*
	070	Yellow cap fungus	*Pholiota spp.*
	071	Oyster mushroom	*Pleurotus ostreatus*
	072	White ring rot	*Poria albipellucida*
	073	Hemlock canker	*Xenomeris abietis*
	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 abietinum f. sp. concoloris*
	006	Lodgepole pine dwarf mistletoe	*Arceuthobium americanum*
	007	Apache dwarf mistletoe	*Arceuthobium apachecum*
	008	Western dwarf mistletoe	*Arceuthobium campylopodum*
	009	Limber pine dwarf mistletoe	*Arceuthobium cyanocarpum*
	010	Pinyon dwarf mistletoe	*Arceuthobium divaricatum*
	011	Douglas-fir dwarf mistletoe	*Arceuthobium douglasii*
	012	Chihuahua pine dwarf mistletoe	*Arceuthobium gillii*
	013	Larch dwarf mistletoe	*Arceuthobium laricis*
	014	Western spruce dwarf mistletoe	*Arceuthobium microcarpum*
	015	Eastern dwarf mistletoe	*Arceuthobium pusillum*
	016	Hemlock dwarf mistletoe	*Arceuthobium tsugense*
	017	Southwestern dwarf mistletoe	*Arceuthobium vaginatum subsp. crytopodum*
	018	Dodder	*Cuscuta spp.*
	019	White fir mistletoe	*Phoradendron bolleanum ssp. pauciflorum*
	020	True mistletoe (other)	
	021	Red fir dwarf mistletoe	*Arceuthobium abietinum f. sp. magnificae*
	022	Juniper true mistletoe	*Phoradendron juniperum*
24	**000**	**Decline Complexes/Dieback/Wilts**	
SEVERITY RATING 1 = Minor: minor crown symptoms 2 = Severe: severe crown symptoms			
	001	Alaska-yellow cedar decline	
	002	Norfolk Island pine decline	
	003	Stillwell's syndrome	
	004	Ash decline/yellows	
	005	Birch dieback	
	006	Cadang-cadang yellow mottle virus	
	007	Complex	

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
24 (cont.)	008	Decline	
	009	Fall hardwood defoliator complex	
	010	Joga decline	
	011	Larch decline	
	012	Looper; abiotic complex	
	013	Maple decline	
	014	Oak decline	
	015	Pingelap disease	
	016	Sprout dieback	
	017	True fir pest complex	
	018	Western X disease	
	019	Pinewood nematode	*Bursaphelenchus xylophilus*
	020	Sapstreak disease of sugar maple	*Ceratocystis coerulescens*
	021	Oak wilt	*Ceratocystis fagacearum*
	022	Dutch elm disease	*Ceratocystis ulmi*
	023	Bacterial wetwood	*Erwinia nimipressuralis*
	024	Mimosa wilt	*Fusarium oxysporum f. sp. perniciosum*
	025	Verticillium wilt	*Verticilium albo-atrum*
	026	unknown	*Xylella fastidiosa*
	027	Wetwood	
	028	Hemlock decline	
	029	Pacific madrone decline	
	030	Elm phloem necrosis	*Mycoplasma*
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	
	007	Tobacco mosaic virus	
	008	Tobacco ringspot virus of ash	
	009	True fir needlecast	
	010	Sycamore anthracnose	*Apiognomonia veneta*
	011	Cercospora blight of juniper	*Cercospora sequoiae*
	013	Large-spored spruce-laborador tea rust	*Chrysomyxa ledicola*
	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*
	018	Leaf shothole	*Cylindrosporium spp.*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
25 (cont.)	019	Cedar leaf blight	*Didymascella thujina*
	020	Dogwood anthracnose	*Discula spp.*
	021	Mango scab	*Elsinoe magiferae*
	022	Elytroderma disease	*Elytroderma deformans*
	023	Fire blight	*Erwinia amylovora*
	024	Walnut anthracnose	*Gnomonia leptostyla*
	025	Anthracnose	*Gnomonia spp.*
	027	Brown felt blight	*Herpotrichia juniperi*
	028	Larch needle blight	*Hypodermella laricis*
	029	Hardwood anthracnose	*Kabatiella apocrypta*
	030	Cone damage	*Lasiodiplodia spp.*
	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*
	039	Larch needle cast	*Meria laricis*
	040	Dothistroma needle blight	*Mycosphaerella pini*
	041	Brown felt blight of pines	*Neopeckia coulteri*
	042	Snow blight	*Phacidum abietis*
	043	Swiss needle cast	*Phaeocryptopus gaumannii*
	044	Phoma blight	*Phoma spp.*
	045	Phyllosticta leaf spot	*Phyllosticta spp.*
	046	Bud rot	*Phytophthora palmivora*
	047	Ploioderma needle cast	*Ploioderma spp.*
	048	Ash rust	*Puccinia sparganioides*
	049	Fir needle rust	*Pucciniastrum spp.*
	050	Douglas-fir needle cast	*Rhabdocline spp.*
	051	Rhizoctonia needle blight	*Rhizoctonia spp.*
	052	Rhizophaeria needle cast	*Rhizophaeria spp.*
	053	Rhizopus rot	*Rhizopus artocarpi*
	054	Brown spot needle blight	*Scirrhia acicola*
	055	Septoria leaf spot	*Septoria alnifolia*
	056	Septoria leaf spot and canker	*Septoria musiva*
	057	Sirococcus tip blight	*Sirococcus conigenus*
	058	Diplodia blight	*Sphaeropsis sapinea*
	059	Leaf blister of oak	*Taphrina caerulescens*
	060	Venturia leaf blight of maple	*Venturia acerina*
	061	Shepherd's crook	*Venturia tremulae*
	062	Dothistroma needle blight	*Dothistroma septospora*
	063	Yellow-cedar shoot blight	*Apostrasseria spp.*
	064	Broom rust	*Chrysomyxa arctostaphyli*
	065	Spruce needle rust	*Chrysomyxa weirii*
	066	Cedar leaf blight	*Gymnosporangium nootkatense*

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
25 (cont.)	067	Spruce needle cast	*Lophodermium picea*
	068	Hardwood leaf rusts	*Melampsora spp.*
	070	Hemlock needle rust	*Pucciniastrum vaccinii*
	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*
26	**000**	**Stem Rusts**	
SEVERITY RATING 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*
	003	Stalactiform blister rust	*Cronartium coleosporioides*
	004	Comandra blister rust	*Cronartium comandrae*
	005	Pinyon blister rust	*Cronartium occidentale*
	006	Eastern gall rust	*Cronartium quercuum*
	007	Gall rust of jack pine	*Cronartium quercuum f. sp. banksignae*
	008	Gall rust of shortleaf pine	*Cronartium quercuum f. sp. echinatae*
	009	Fusiform rust	*Cronartium quercuum f. sp. fusiforme*
	010	Gall rust of virginia pine	*Cronartium quercuum f. sp. virginianae*
	011	Bethuli rust	*Peridermium bethuli*
	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*
	002	Incense cedar broom rust	*Gymnosporangium libocedri*
	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	

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
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	
	012	Elk	
	013	Deer	
	014	Feral pigs	
	015	Mountain beaver	
	016	Deer or elk	
	017	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	

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
50 (cont.)	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			
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	
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	

Damage Agents (cont.)

Category	Agent	Common Name	Scientific Name
90	**000**	**Unknown**	
SEVERITY RATING 0 = 0 – 9% affected 1 = 10 – 19% affected 2 = 20 – 29% affected 3 = 30 – 39% affected 4 = 40 - 49% affected 5 = 50 - 59% affected 6 = 60 - 69% affected 7 = 70 - 79% affected 8 = 80 - 89% affected 9 = 90 - 100% affected			
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
99 (cont.)	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 source (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

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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

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.
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.

Glossary of Terms (cont.)

Term	Definition
Down Woody Material	Woody pieces of trees and shrubs that have been uprooted (no longer supporting growth) or severed from their root system, not self-supporting, and are lying on the ground.
Duff Layer	Duff is the fermentation and humus layer of the forest floor. It does not include the freshly cast material in the litter layer. The top of the duff is where needles, leaves, and other cast-off vegetative material have noticeably begun to decompose. Individual particles usually will be bound by fungi mycelium. When moss is present, the top of the duff is just below the green portion of the moss. The bottom of the duff is the start of the soil ("A" horizon).
Elevation	Vertical distance from a datum, usually mean sea level, to a point or object on the earth's surface. Not to be confused with altitude, 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.
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.

Glossary of Terms (cont.)

Term	Definition
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.
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.

Region 9 Land Class Codes

Land Class	Name	Land Class	Name
100	Water	699	Tentatively suitable
165	Lake/pond 1-10 acres	700	Marginal forest land
170	Lakes greater than 10 acres	710	No restocking less than or equal to 5 years
180	Rivers greater than 120 feet wide	720	Marginal (steep slopes)
200	Non-Forested Land	730	Unstable soils
204	Utility ROW greater than 120 feet	735	Unique ecosystems
250	Wildlife Openings	740	Edit for forest use
253	Range	800	Edit for forest use
255	Grazing area	801	Edit for forest use
257	Cropland	802	Edit for forest use
268	Bogs	803	Experimental forest - cut
290	Roads greater than 120 feet wide	804	Edit for forest use
295	Administrative sites	807	OG-NEPA designated
300	Withdrawn by ACT	808	Nic-River corridor
397	Shipstead-Newton-N	809	Inapp FP S&G/NEPA
500	Suitable timber land	810	Edit for forest use
510	Edit for forest use	811	Edit for forest use
520	Rare II	812	Edit for forest use
540	Visual concerns	813	Old growth forest
550	Wildlife concerns	820	Edit for forest use
570	No current access	821	Limited legal access
600	Edit for forest use	830	Not cost effective access
610	T&E or FOR. Listed	840	Not cost effective physical
620	Cultural resources Preh.	880	Edit for forest use
660	Soil and water conservation	882	Within W&SSR
670	Edit for forest use	889	Withdrawn - CONV
675	Reporting gypsy	899	Invalid
676	LTS study site	900	UnProductive forest land

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.