Field Location Reference

STATE _____ **COUNTY** _____ **P2 #** _____ **MAP** _____
CPN _____ **HEX #** _____

FIELD CREW
RECORDER _____ CRUISER 1 _____ CRUISER 2 _____ CRUISER 3 _____

LC COORDINATES
GPS NUMBER _____ ERROR _____ # READINGS _____ ELEVATION _____
ZONE _____ EASTING _____ NORTHING _____

TRUCK COORDINATES
ZONE _____ EASTING _____ NORTHING _____

REFERENCE POINT
RP SPECIES _____ DIAMETER _____ AZIMUTH _____ H.DISTANCE _____
SLOPE DIST. _____
RP DESCRIPTION: _____

RP COORDINATES
ERROR _____ # READINGS _____ ZONE _____ EASTING _____
NORTHING _____

LC WITNESS TREES
X SPECIES _____ X DIAMETER _____ X AZIMUTH _____ X DISTANCE _____
Y SPECIES _____ Y DIAMETER _____ Y AZIMUTH _____ Y DISTANCE _____
NOTES: _____

OWNER INFORMATION (do not put private landowner information into the PDR)

FIELD CREW EDIT
NAME _____ DATE _____

Revised 12/3/02

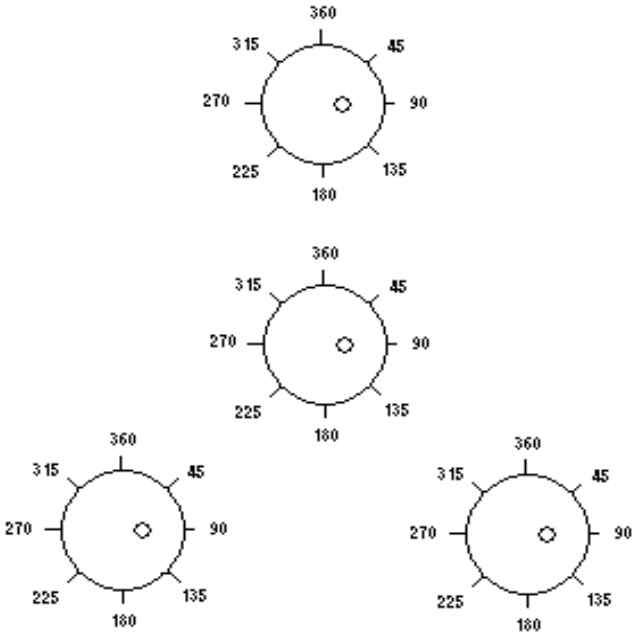
APPENDIX A.2 Field Location Map and Condition Boundary Map

FIELD LOCATION MAP
(Truck to RP/LC)

N

LC REFERENCE &
CONDITION BOUNDARY MAP

N



APPENDIX A.3 Field Location Description and Subplot Description Record

Field Location Description and Subplot Description Record

PLOT ID DATA

State _____ County _____ P2 Location # _____ USGS Map # _____

CPN _____ P3 Hex # _____ P3 Plot # _____ Date (mm/dd/yy) _____

Inventory Phase _____

FIELD CREW

Crew #1 _____ Crew # 2 _____ Crew #3 _____ Crew # 4 _____

Crew Type _____ QA Status _____

PLOT DESCRIPTION

Sample Kind _____ Reg Sample Kind _____ Plot Status _____ Condition Change _____

Previous Plot # _____ Dist to Imp.Rd _____ Water on Plot _____ Nonsampled reason _____

LC COORDINATES

GPS Unit _____ GPS Serial # _____ GPS Error _____ # of Readings _____

UTM Zone _____ Easting _____ Northing _____ Azimuth to LC _____

GPS Elevation _____ Dist to LC _____

OTHER

Future Forest Potential _____

NOTES:

SUBPLOT DESCRIPTION

	SUBPLOT 1	SUBPLOT 2	SUBPLOT 3	SUBPLOT4	
Subplot Status					NOTES:
Subplot Condition List					
Nonsampled Reason					
Subplot Cntr Cond.					
Micro Cntr Cond.					
% Slope					
Aspect					
Water Depth					
Root Disease (MT,ID)					

BOUNDARY INFORMATION

	SUBPLOT 1			SUBPLOT 2			SUBPLOT 3			SUBPLOT4			
Subplot #													Notes:
Plot Type													
Bndry Change													
Contrasting Cond #													
Azimuth left													
Corner Azimuth													
Corner Dist													
Azimuth Right													

PLOT NOTES: _____

APPENDIX A.4 Condition Class Description Record

Condition Class Description Record

State _____ County _____ P2 Location # _____ P3 Hex # _____

	Condition 1	Condition 2	Condition 3	Condition 4
Condition Class #				
Condition Class Change				
Condition Status				
Condition Nonsample Reason				
Present Nonforest Land Use				
Reserved Status				
Owner Group				
Owner Class				
Forest Type				
Stand Size				
Regeneration Status				
Regeneration Species				
Tree Density				
Private/Industrial Status				
Physiographic Class				
Stand Age				
Habitat Type 1				
Habitat Type 2				
Crown Cover				
% Bare Ground				
Disturbance 1				
Dist. Year 1				
Disturbance 2				
Dist. Year 2				
Disturbance 3				
Dist. Year 3				
Treatment 1				
Treatment Year 1				
Treatment 2				
Treatment Year 2				
Treatment 3				
Treatment Yr 3				

Condition Class Comments: _____

APPENDIX A.5 **TREE DATA**

STATE: **COUNTY:** **LOCATION:** **HEX:** **PAGE** **OF** revised 1/04

Subplot Number	Tree Record Number	Horizontal Distance	Azimuth	Condition Class Number	Previous Tree Status*	Present Tree Status	Reconcile*	Standing Dead*	Species	Previous Diameter*	Diameter	Diameter Check	Past Number of Stems*	Number of Stems	Past Tree Length*	Total Length	Past Actual Length*	Actual Tree Length	Length Method	Uncompacted Crown (P3)	Compacted Crown	Crown Light (P3)	Crown Position (P3)	Crown Class	Crown Density (P3)	Crown Dieback (P3)	Foliage Transparency (P3)	Mistletoe Class	Damage Agent 1	Damage Agent 2	Damage Agent 3	Damage 1 LOCATION (P3)	Damage 1 TYPE (P3)	Damage 1 SEVERITY (P3)	Damage 2 LOCATION (P3)	Damage 2 TYPE (P3)	Damage 2 SEVERITY (P3)	Decay Class	Rotten/Missing Cull	% Vol Missing Top	% Sound Dead	% Form Defect	Past Tree Class*	Current Tree Class	Radial Growth	Tree Age	Growth/Age Check	Site Tree	Mortality	Mortality Year	Cause of Death
X	xxx	xxx	xxx	x	x	x	x	x	xxxx	xxxx	xxxx	x	xx	xx	xxx	xxx	xxx	xxx	x	xx	xx	xx	x	x	xx	xx	xx	x	xx	xx	xx	x	xx	xx	xx	xx	xx	x	xx	xx	xx	xxx	x	x	xx	xxx	x	x	x	xxxx	xx

* = Remeasurement (Sample Kind 2) only

APPENDIX A.6 Sapling/Seedling Data

STATE: **COUNTY:** **LOCATION:** **HEX:**

Updated 2/03

SAPLING DATA																													SEEDLING DATA					
Subplot Number	Tree Record Number	Horizontal Distance	Azimuth	Condition Class	Previous Tree Status*	Present Tree Status	Reconcile*	Species	Previous Diameter*	Diameter	Diameter Check	Past Number of Stems*	Number of Stems	Past Total Tree Length*	Total Tree Length	Past Actual Tree Length*	Actual Tree Length	Length Method	Uncompacted Crown **(P3)**	Compacted Crown	Crown Light **(P3)**	Crown Position **(P3)**	Crown Class	Crown Vigor **(P3)**	Mistletoe Class	Tree Class	Radial Growth	Tree Age	SUBPLOT #	Condition Class	Species	Seedling Count	Count Check	Seedling Age
x	xxx	xxx	xxx	x	x	x	x	xxxx	xxxx	xxxx	x	xx	xx	xxx	xxx	xxx	xxx	x	xx	xx	xx	xx	x	x	x	x	xx	xxx	x	x	xxx	x	x	xx

* = Remeasurement (Sample Kind 2) only

APPENDIX A.7 UNDERSTORY VEGETATION DESCRIPTION

Feb-00

STATE ____ MAP ____ CPN ____

COUNTY ____ LOC# _____

		PART I											
		TREES			SHRUBS			FORBS			GRASS		
SUBPT	COND #	SPECIES	COVER	LAYER	SPECIES	COVER	LAYER	SPECIES	COVER	LAYER	SPECIES	COVER	LAYER
		XXXXX	XXX	X	XXXXX	XXX	X	XXXXX	XXX	X	XXXXX	XXX	X

PART II				
GROUP	COVER LAYER 1 (0-1.5 feet)	COVER LAYER 2 (1.5-6 feet)	COVER LAYER 3 (> 6 feet)	TOTAL COVER (AERIAL VIEW)
	XXX	XXX	XXX	XXX

PART I - Do not include species with < 5% cover

5% of a 1/24-acre subplot entails a circle with radius 5.4 ft.

Part II - code 999 for snow

NOTES: _____

NOXIOUS WEEDS

SPECIES (XXXXXXX)	PRESENT ON SUBPLOT? (Y OR N)			

APPENDIX A.8 **MULTISTEMMED WOODLAND SPECIES TALLY**

STATE _____ **P2 #** _____
COUNTY _____ **P3 HEX #** _____

SUBPLOT NUMBER	TREE NUMBER	INDIVIDUAL STEM DIAMETERS Place a small "d" next to each dead stem																			NUMBER OF STEMS	COMPUTED DRC

*DRC = the square root of the squared individual stems

APPENDIX A.9 **CROWN/GROUND COVER SUPPLEMENTAL DATA FORM**

(Note: Save this record. Transfer percentages to Condition Description record)

3/03

STATE: _____ **COUNTY:**_____ **LOCATION:**_____ **HEX:**_____

COND#	**SUBPLOT**																**TOTAL**	**Cond**	
	1				2				3				4				**"HITS" or %**	**%**	
	N	S	E	W	N	S	E	W	N	S	E	W	N	S	E	W			
Crown Cover																			Hits
Bare Ground (Method 2)*																			# possible hits
% Bare Ground (Method 1)																			Total % / # of subplots

COND#	**SUBPLOT**																**TOTAL**	**Cond**	
	1				2				3				4				**"HITS" or %**	**%**	
	N	S	E	W	N	S	E	W	N	S	E	W	N	S	E	W			
Crown Cover																			Hits
Bare Ground (Method 2)*																			# possible hits
% Bare Ground (Method 1)																			Total % / # of subplots

COND#	**SUBPLOT**																**TOTAL**	**Cond**	
	1				2				3				4				**"HITS" or %**	**%**	
	N	S	E	W	N	S	E	W	N	S	E	W	N	S	E	W			
Crown Cover																			Hits
Bare Ground (Method 2)*																			# possible hits
% Bare Ground (Method 1)																			Total % / # of subplots

COND#	**SUBPLOT**																**TOTAL**	**Cond**	
	1				2				3				4				**"HITS" or %**	**%**	
	N	S	E	W	N	S	E	W	N	S	E	W	N	S	E	W			
Crown Cover																			Hits
Bare Ground (Method 2)*																			# possible hits
% Bare Ground (Method 1)																			Total % / # of subplots

* Method 2 is optional in determining % bare ground. Use if % bare ground is very high, as a calibration tool, or if crew is uncomfortable with an estimate.

NOTES: _____

APPENDIX A.10 Accounting Tree Data Record

Accounting Treee Data Record

State _____ County _____ Location _____ Map _____ CPN _____

Month	Day	Year	Points Accounted	Non Accounted Reason	Microplots Accounted	Land Use	Co-Located	Point Number	Tree Record Number	Azimuth	Distance	Previous Tree Status	Current Tree Status	New Tree Reconcile	Species	Past Diameter	Current Diameter	Diameter Check	Past Number of Stems	Current Number of Stems	Past Total Tree Length	Current Total Tree Length	Cause of Death	Past Tree Class	Current Tree Class

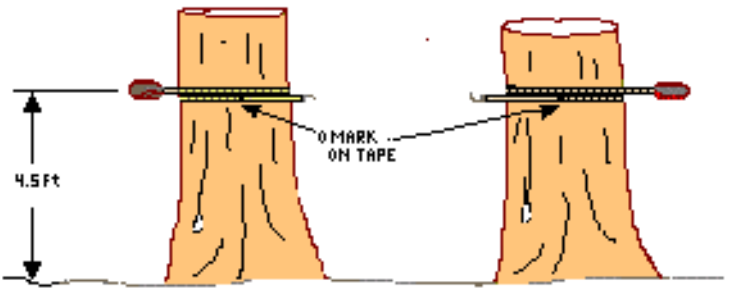
Revised 1/04

APPENDIX B

TREE DATA

APPENDIX B.1 Diameter Measurement Techniques for Timber Species

Correct method: Alternate left-handed method:

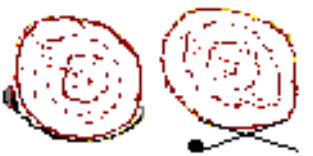


End of tape (with 0 mark) or hook crossed under

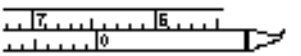
End of tape crossed under (Careful! Readings will be from an upside down d-tape)

Press tape firmly against the tree; Do not pull it out at a tangent to the tree at the point of measurement.

Correct Incorrect



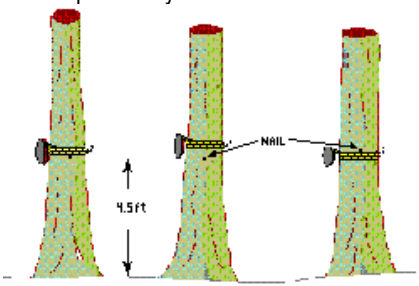
The diameter must be read at the exact point marked -- above the 0 mark. Always round down to the nearest 0.1 inch:



In this example, the diameter reading is 6.4-inches. Be carefull not to incorrectly read 7.5-inches. Examine the digits preceding and following the point above the 0 mark.

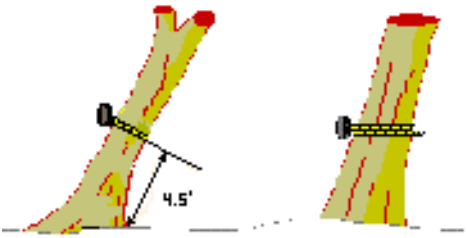
APPENDIX B.1 Diameter Measurement Techniques (contd).

Place the diameter tape directly above the nail:



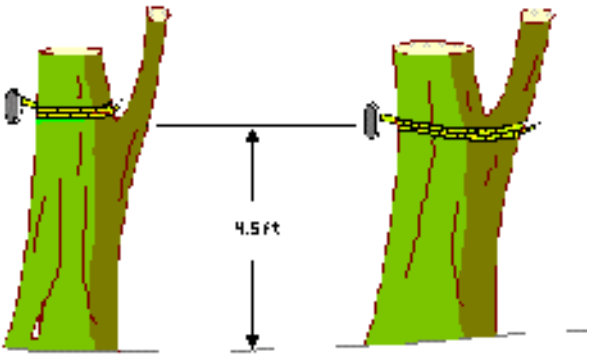
Correct Incorrect Incorrect

The tape must be at a right angle to the lean of the tree:



Correct Incorrect

Do not place the tape at an abnormal location on the stem/bole:



Correct Incorrect

APPENDIX B.2 Boring for Radial Growth and Age

Despite their appearance, increment borers are **delicate and expensive** equipment items. Extreme care must be exercised in their use.

Borers consist of three parts:

- a handle,
- a bit, and
- an extractor.

The tip of the bit is made of fine, thin steel and is easily damaged. Because the bit of an increment borer narrows at the tip, the resulting wood cores are smaller than the internal tube of the borer and can be easily extracted. If the cutting edge on the bit is nicked, it is not possible to adequately resharpen the bit because of this small tapering. For this reason, the following rules must be observed:

1. Keep the bit stored inside the bore handle when not in use.

2. Do not allow the tip of the bit to contact hard objects such as the ground or other field equipment.

3. If a core becomes jammed, **do not** use a nail or other hard object to attempt to push it out. Trying to push the core out through the narrowed tip will only cause further jamming. The best means for removing a severely jammed core is to place it in a low heat oven (200 degrees) for a couple of hours. This will reduce the moisture content of the wood, causing it to shrink without ruining the temper of the steel.

4. If, while boring a tree, the borer suddenly becomes very easy to turn, STOP! The bit may have contacted rotted wood, which is very difficult to remove from the bit. Extract the bit and examine it for signs of rot (dark, crumbled wood).

5. Be careful not to bore completely through small trees or the increment bore may get stuck in the tree.

6. Be careful when boring woodland trees; they are often very hard. **Do not bore cercocarpus species**.

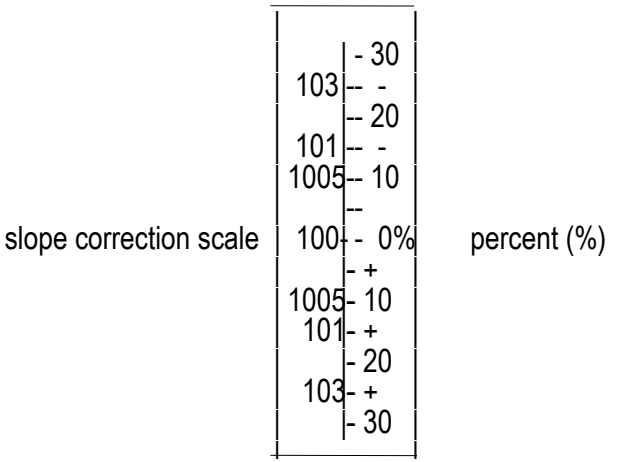
7. Do not dull the bit by boring hard, dead wood.

When boring for age start the increment borer immediately below the point of diameter measurement and bore into the center of the tree. Every effort must be made to reach the pith (center). **When boring for growth**, start with the increment borer immediately below the point of diameter measurement and bore into the tree just a few turns (**note:** for timber species, bore for growth on the side of the tree facing the point center, where reasonable, to reduce bias).

APPENDIX B.3 Determining Tree Height

Whenever possible, take tree height measurements standing on a level plane approximately even with the base of the tree or on a level above the tree base. The most important factor, however, is to be able to see both the tree base and the tree top. If the tree is leaning, stand perpendicular to the plane of the tree's lean. For trees with an excessive lean, visually "upright" the tree, and measure the top of the tree as if it were standing straight. If a tree has a missing top or has several leaders as a result of a broken top, estimate the height that the tree would have been had this loss of height not occurred. Record the estimate, and make a note on the data record indicating that tree height was estimated.

Determine tree height using a clinometer. The following examples are based on using a Suunto "percent / slope" clinometer. The clinometer wheel, as viewed internally, contains a percent (%) scale on the right side of the wheel and a "slope correction" (SC) scale on the left side of the wheel. Use the percent scale when making tree readings of the top or base of the tree
(**note:** the percent scale may also be used to determine % slope on the ground). If it is necessary to determine tree height on a slope (i.e., cruiser not on a level plane with the tree base), use the slope correction scale to determine a SC factor (refer to the tree height formula below). The clinometer scales are illustrated below (internal view of clinometer):



The formula for tree height with a "percent / slope" clinometer is as follows:

$$\text{Tree Height} = \frac{[\mathbf{T} + \mathbf{B}] \times (\mathbf{D}/100)}{\mathbf{SC}}$$

where:

T = percent scale reading for the **top** of the tree.

B = percent scale reading for the **base** of the tree at ground level.

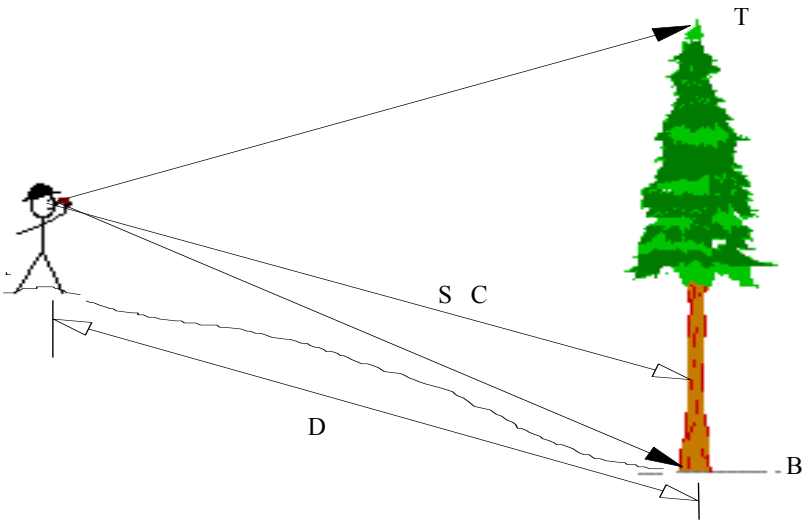
D = slope ground distance (between cruiser and tree, to the nearest foot).

SC = slope correction factor, taken to two decimal places. For example, a number of 103 on the SC scale (associated with 25% slope) would be converted to 1.03 for use in the formula. **Note:** The number 1005 (10% slope) on the SC scale would be converted to 1.005. Also, the SC factor is 1.00 if on a level plane (0% slope) with the tree.

Numbers or tree readings from the percent scale can be either positive (+) or negative (-). As shown by the above formula, add T and B if the two readings are opposite signs (+ and -); on the other hand, subtract T and B if both readings are the same sign (+ and +, or - and -).

To determine a SC factor, look through the clinometer at eye level on the tree along the slope and distance used to obtain tree height (e.g., if your eye level is at 5 feet, then look through the clinometer at a level of 5 feet above the ground on the tree); look at the SC scale and read the SC factor directly. This slope correction must be parallel to the slope of the measured distance.

The following example illustrates tree height calculation:



Distance (D) = 120 feet
SC = 1.03 (25 percent slope)

$$\text{Tree Height} = \frac{[T + B] \times (D/100)}{SC}$$

$$\text{Tree Height} = \frac{[28 + 30] \times (120/100)}{1.03}$$

Tree Height = 67 feet

APPENDIX B.4 - DEFECT CHART and GUIDELINES

Total Height	Defect Height									
	20	**34**	**50**	**67**	**83**	**100**	**116**	**133**	**149**	**166**
179	1						0.5		0.2	0.1
163	1						0.5	0.2	0.1	
147	2	1				0.5	0.2	0.1		
131	2	1			0.5		0.2			
115	2	1			0.5					
98	2		1		0.5					
82	2		1							
65	3	2	1							
49	4	2								
32	5									
	20	**34**	**50**	**67**	**83**	**100**	**116**	**133**	**149**	**166**

BROKEN TOP
- Allow 2 additional feet of defect below break

DEAD TOP
- Highest set of live limbs is the defect height

HEARTWOOD SCARS
- Severity Indicators
  Grey wood, Worm Holes, Long Cracks, Rot = Bad Scar
  Pitched over and healed = Minor Scar
- Use simple Pie Cut fractions
- True fir and Aspen = cull entire section
- 3 or more severity indicators = double pie cut fraction

WOUNDS AT BASE
- Allow 2 additional feet of defect above wound

WOUNDS NOT AT BASE
- Allow 2 additional feet of defect above and below wound
- Use % per foot value at the center of the wound

FROST CRACKS
- Severity indicators
  Closed wounds with no pitch or moisture = Minor Wound

Open cracks with pitch, moisture or rot = Severe Wound
- Use simple pie cut fractions
- Allow 2 additional feet of defect above wound
- Minor wound = ¼ pie cut fraction
- Severe wound = double pie cut fraction
-Multiple frost cracks = cull entire section of tree

LIGHTNING SCARS

- Allow 2 additional feet of defect above and below wound

CROOKS

- Severe crook = top to bottom deduction
- Minor crook = Use a simple fraction
- 8 feet of straight material must be between crooks not to cull

SWEEP

- Determine severity of sweep
- Severe sweep = no straight 8 foot material
- Use a simple fraction

FORKS

- Simple fork = small bark seam, straight logs above
- Complex fork = multiple bark seams, related defects such as crook etc.
- Simple forks = 2 foot deduction
- Complex forks = 4 foot deduction

Other defects occurring on a fork
- Divide the defect % by the number of merch. stems at defect height

CONKS

-Fomes Pini = 4 feet above, 8 feet below (DF,SP)
- Indian Paint = 8 feet above, 8 feet below (TF,SP)
- Velvet Top/Cow Dung = Look for scar or butt swell (ALL SPECIES)
  Scar = 2 feet above
  Butt swell = Use this height
  No butt swell = 4 feet

CANKERS
2 To 4 foot deduction at canker (TF,ASPEN)

APPENDIX C

TREE SPECIES LIST

Taken from:

Little, Elbert L. Jr. 1979. Checklist of United States trees (native and naturalized). U.S. Dep. Agric., Agriculture Handbook No. 541. 375 p.
List updated using USDA NRCS PLANTS database symbols and names: 7/98.

SCI_NAME	SYMBOL	COM_NAME
Abies concolor	ABCO	white fir
Abies concolor var. concolor	ABCOC	white fir
Abies concolor var. lowiana	ABCOL	white fir
Abies grandis	ABGR	grand fir
Abies lasiocarpa	ABLA	subalpine fir
Abies lasiocarpa var. arizonica	ABLAA	corkbark fir
Abies lasiocarpa var. lasiocarpa	ABLAL	subalpine fir
Abies magnifica	ABMA	California red fir
Acacia farnesiana	ACFA	sweet acacia
Acer glabrum	ACGL	Rocky Mountain maple
Acer glabrum var. diffusum	ACGLD3	Rocky Mountain maple
Acer glabrum var. douglasii	ACGLD4	Douglas maple
Acer glabrum var. glabrum	ACGLG2	Rocky Mountain maple
Acer glabrum var. neomexicanum	ACGLN2	New Mexico maple
Acer glabrum var. torreyi	ACGLT2	Torrey maple
Acacia greggii	ACGR	catclaw acacia
Acer grandidentatum	ACGR3	bigtooth maple
Acer grandidentatum var. grandidentatum	ACGRG	bigtooth maple
Acacia greggii var. greggii	ACGRG3	catclaw acacia
Acer grandidentatum var. sinuosum	ACGRS	canyon maple
Acer negundo	ACNE2	boxelder
Acer negundo var. arizonicum	ACNEA	Arizona boxelder
Acer negundo var. interius	ACNEI2	boxelder maple
Acer negundo var. negundo	ACNEN	boxelder
Acer negundo var. texanum	ACNET	ashleaf maple
Acer negundo var. violaceum	ACNEV	boxelder
Aesculus glabra	AEGL	Ohio buckeye
Ailanthus altissima	AIAL	tree of heaven
Alnus incana	ALIN2	mountain alder
Alnus incana ssp. tenuifolia	ALINT	thinleaf alder
Albizia julibrissin	ALJU	silktree
Alnus oblongifolia	ALOB2	Arizona alder
Alnus rhombifolia	ALRH2	white alder
Alnus rubra	ALRU2	red alder
Alnus viridis	ALVI5	sitka alder
Alnus viridis ssp. crispa	ALVIC	American green alder
Alnus viridis ssp. sinuata	ALVIS	Sitka alder
Amelanchier alnifolia	AMAL2	Saskatoon serviceberry
Amelanchier alnifolia var. alnifolia	AMALA	Saskatoon serviceberry
Amelanchier alnifolia var. cusickii	AMALC	Cusick's serviceberry
Amelanchier pallida	AMPA2	pale serviceberry

Amelanchier utahensis	AMUT	Utah serviceberry
Amelanchier utahensis ssp. covillei	AMUTC	Coville's serviceberry
Amelanchier utahensis ssp. utahensis	AMUTU	Utah serviceberry
Arbutus arizonica	ARAR2	Arizona madrone
Arbutus xalapensis	ARXA80	Texas madrone
Betula X eastwoodiae	BEEA	Eastwood's birch
Betula occidentalis	BEOC2	water birch
Betula papyrifera	BEPA	paper birch
Betula papyrifera var. commutata	BEPAC	western paper birch
Betula papyrifera var. papyrifera	BEPAP	paper birch
Betula pendula	BEPE3	European white birch
Betula X utahensis	BEUT	northwestern paper birch
Bursera fagaroides	BUFA	fragrant bursera
Bursera fagaroides var. elongata	BUFAE	fragrant bursera
Bursera microphylla	BUMI	elephanttree
Catalpa bignonioides	CABI8	southern catalpa
Calocedrus decurrens	CADE27	incense cedar
Castela emoryi	CAEM4	thorn of christ
Caesalpinia gilliesii	CAGI	bird-of-paradise shrub
Carnegia gigantea	CAGI7	saguaro
Canotia holacantha	CAHO3	crucifixion thorn
Catalpa speciosa	CASP8	northern catalpa
Cercis canadensis	CECA4	eastern redbud
Celtis laevigata	CELA	sugarberry
Celtis laevigata var. brevipes	CELAB	sugarberry
Celtis laevigata var. reticulata	CELAR	netleaf hackberry
Celtis laevigata var. texana	CELAT8	Texan sugarberry
Cercocarpus ledifolius	CELE3	curlleaf mountain mahogany
Cercocarpus ledifolius var. intercedens	CELEI	curlleaf mountain mahogany
Cercocarpus ledifolius var. intermontanus	CELEI4	curlleaf mountain mahogany
Cercocarpus ledifolius var. ledifolius	CELEL	curlleaf mountain mahogany
Celtis occidentalis	CEOC	common hackberry
Cephalanthus occidentalis	CEOC2	common buttonbush
Celtis occidentalis var. occidentalis	CEOCO2	western hackberry
Cercis orbiculata	CEOR9	Fabaceae
Chilopsis linearis	CHLI2	desert willow
Chilopsis linearis ssp. arcuata	CHLIA	desert willow
Chilopsis linearis ssp. linearis	CHLIL2	desert willow
Condalia globosa	COGL	bitter snakewood
Condalia globosa var. pubescens	COGLP	bitter snakewood
Cornus nuttallii	CONU4	Pacific dogwood
Cornus sericea	COSE16	redosier dogwood
Cornus sericea ssp. occidentalis	COSEO	western dogwood
Cornus sericea ssp. sericea	COSES	redosier dogwood
Crataegus chrysocarpa	CRCH	fireberry hawthorn
Crataegus columbiana var. columbiana	CRCOC4	Columbian hawthorn
Crataegus douglasii	CRDO2	black hawthorn
Crataegus douglasii var. douglasii	CRDOD	Douglas' hawthorn
Crataegus douglasii var. duchesnensis	CRDOD2	Duchesne black hawthorn
Crataegus erythropoda	CRER	cerro hawthorn
Crataegus monogyna	CRMO3	oneseed hawthorn
Crataegus rivularis	CRRI	river hawthorn

Crataegus saligna	CRSA2	willow hawthorn
Crataegus succulenta	CRSU5	fleshy hawthorn
Crataegus wootoniana	CRWO	Wooton's hawthorn
Cupressus arizonica	CUAR	Arizona cypress
Cupressus arizonica ssp. arizonica	CUARA	Cupressaceae
Cupressus glabra	CUGL6	Arizona smooth cypress
Diospyros virginiana	DIVI5	common persimmon
Dodonaea viscosa	DOVI	Florida hopbush
Elaeagnus angustifolia	ELAN	Russian olive
Euonymus atropurpurea	EUAT3	eastern wahoo
Eysenhardtia polystachya	EYPO	kidneywood
Fagus grandifolia	FAGR	American beech
Forestiera shrevei	FOSH	desert olive
Frangula alnus	FRAL4	buckthorn
Fraxinus americana	FRAM2	white ash
Fraxinus anomala	FRAN2	singleleaf ash
Fraxinus anomala var. anomala	FRANA	singleleaf ash
Fraxinus anomala var. lowellii	FRANL	singleleaf ash
Fraxinus berlandieriana	FRBE	Mexican ash
Frangula betulifolia ssp. betulifolia	FRBEB	beechleaf frangula
Fremontodendron californicum	FRCA6	California flannelbush
Fraxinus cuspidata	FRCU	fragrant ash
Fraxinus dipetala	FRDI2	two petal ash
Fraxinus gooddingii	FRGO	Goodding's ash
Fraxinus greggii	FRGR2	Gregg's ash
Fraxinus papillosa	FRPA4	Chihuahuan ash
Fraxinus pennsylvanica	FRPE	green ash
Frangula purshiana	FRPU7	Pursh's buckthorn
Fraxinus velutina	FRVE2	velvet ash
Gleditsia triacanthos	GLTR	honeylocust
Juniperus ashei	JUAS	Ashe's juniper
Juniperus californica	JUCA7	California juniper
Juniperus deppeana	JUDE2	alligator juniper
Juniperus coahuilensis	JUCO11	redberry juniper
Juglans major	JUMA	Arizona walnut
Juglans microcarpa	JUMI	little walnut
Juglans microcarpa var. microcarpa	JUMIM	little walnut
Juniperus monosperma	JUMO	oneseed juniper
Juglans nigra	JUNI	black walnut
Juniperus occidentalis	JUOC	western juniper
Juniperus occidentalis var. australis	JUOCA	western juniper
Juniperus occidentalis var. occidentalis	JUOCO	western juniper
Juniperus osteosperma	JUOS	Utah juniper
Juniperus pinchotii	JUPI	Pinchot's juniper
Juniperus scopulorum	JUSC2	Rocky Mountain juniper
Koeberlinia spinosa	KOSP	crown of thorns
Koeberlinia spinosa var. spinosa	KOSPS	crown of thorns
Koeberlinia spinosa var. tenuispina	KOSPT	crown of thorns
Larix lyallii	LALY	subalpine larch
Larix occidentalis	LAOC	western larch
Leucaena leucocephala	LELE10	white leadtree
Leucaena retusa	LERE5	littleleaf leadtree
Malus coronaria	MACO5	sweet crabapple
Maclura pomifera	MAPO	osageorange
Malus pumila	MAPU	cultivated apple
Malus sylvestris	MASY2	apple
Melia azedarach	MEAZ	Chinaberrytree
Morus alba	MOAL	white mulberry

Morus microphylla	MOMI	Texas mulberry
Nicotiana glauca	NIGL	tree tobacco
Olneya tesota	OLTE	desert ironwood
Ostrya knowltonii	OSKN	Knowlton's hophornbeam
Ostrya virginiana	OSVI	eastern hophornbeam
Ostrya virginiana var. virginiana	OSVIV	Virginia hophornbeam
Parkinsonia aculeata	PAAC3	Jerusalem thorn
Parkinsonia florida	PAFL6	blue paloverde
Parkinsonia microphylla	PAMI5	yellow paloverde
Pinus albicaulis	PIAL	whitebark pine
Pinus aristata	PIAR	bristlecone pine
Pinus arizonica	PIAR5	Arizona pine
Pinus arizonica var. arizonica	PIARA	Arizona pine
Pinus arizonica var. stormiae	PIARS2	Arizona pine
Pinus cembroides	PICE	Mexican pinyon
Pinus contorta	PICO	lodgepole pine
Pinus contorta var. latifolia	PICOL	tall lodgepole pine
Pinus contorta var. murrayana	PICOM	Murray lodgepole pine
Pinus discolor	PIDI3	border pinyon
Pinus edulis	PIED	twoneedle pinyon
Pinus edulis var. edulis	PIEDE	twoneedle pinyon
Picea engelmannii	PIEN	Engelmann's spruce
Pinus engelmannii	PIEN2	Apache pine
Pinus flexilis	PIFL2	limber pine
Picea glauca	PIGL	white spruce
Pinus jeffreyi	PIJE	Jeffrey pine
Pinus lambertiana	PILA	sugar pine
Pinus leiophylla	PILE	Chihuahuan pine
Pinus leiophylla var. chihuahuana	PILEC	Chihuahuan pine
Pinus longaeva	PILO	Great Basin bristlecone pine
Pinus monophylla	PIMO	singleleaf pinyon
Pinus monticola	PIMO3	western white pine
Pinus monophylla var. fallax	PIMOF	Pinaceae
Pinus ponderosa	PIPO	ponderosa pine
Pinus ponderosa var. ponderosa	PIPOP	ponderosa pine
Pinus ponderosa var. scopulorum	PIPOS	ponderosa pine
Picea pungens	PIPU	blue spruce
Pinus strobiformis	PIST3	southwestern white pine
Pinus washoensis	PIWA	Washoe pine
Platanus wrightii	PLWR2	Arizona sycamore
Populus X acuminata	POAC5	lanceleaf cottonwood
Populus alba	POAL7	white poplar
Populus angustifolia	POAN3	narrowleaf cottonwood
Populus balsamifera	POBA2	balsam poplar
Populus balsamifera ssp. balsamifera	POBAB2	balsam poplar
Populus balsamifera ssp. trichocarpa	POBAT	black cottonwood
Populus X brayshawii	POBR7	Brayshaw's poplar
Populus X canadensis	POCA19	Canada poplar
Populus deltoides	PODE3	eastern cottonwood
Populus deltoides ssp. deltoides	PODED	eastern cottonwood
Populus deltoides ssp. monilifera	PODEM	plains cottonwood
Populus deltoides ssp. wislizeni	PODEW	Rio Grande cottonwood
Populus fremontii	POFR2	Fremont's cottonwood
Populus fremontii ssp. fremontii	POFRF3	Fremont's cottonwood
Populus fremontii ssp. mesetae	POFRM	Fremont's cottonwood
Populus X hinckleyana	POHI8	Hinckley poplar

Populus X jackii	POJA2	Jack's poplar
Populus nigra	PONI	Lombardy poplar
Populus tremuloides	POTR5	quaking aspen
Prunus americana	PRAM	American plum
Prunus angustifolia	PRAN3	Chickasaw plum
Prunus angustifolia var. angustifolia	PRANA	Chickasaw plum
Prunus angustifolia var. watsonii	PRANW	Watson's plum
Prunus armeniaca	PRAR3	apricot
Prunus avium	PRAV	sweet cherry
Prunus cerasus	PRCE	sour cherry
Prunus domestica	PRDO	European plum
Prunus emarginata	PREM	bitter cherry
Prunus emarginata var. emarginata	PREME	bitter cherry
Prosopis glandulosa	PRGL2	honey mesquite
Prosopis glandulosa var. glandulosa	PRGLG	honey mesquite
Prosopis glandulosa var. torreyana	PRGLT	western honey mesquite
Prunus mahaleb	PRMA	Mahaleb cherry
Prunus pensylvanica	PRPE2	pin cherry
Prunus persica	PRPE3	peach
Prunus pensylvanica var. pensylvanica	PRPEP	fire cherry
Prunus pensylvanica var. saximontana	PRPES	fire cherry
Prosopis pubescens	PRPU	screwbean mesquite
Prunus serotina	PRSE2	black cherry
Prunus serotina var. rufula	PRSER2	black cherry
Prunus serotina var. virens	PRSEV	black cherry
Prunus spinosa	PRSP	blackthorn
Prosopis velutina	PRVE	velvet mesquite
Prunus virginiana	PRVI	common chokecherry
Prunus virginiana var. demissa	PRVID	western chokecherry
Prunus virginiana var. melanocarpa	PRVIM	black chokecherry
Pseudotsuga menziesii	PSME	Douglas fir
Pseudotsuga menziesii var. glauca	PSMEG	Rocky Mountain Douglas fir
Pseudotsuga menziesii var. menziesii	PSMEM	Douglas fir
Psorothamnus spinosus	PSSP3	smoketree
Ptelea trifoliata	PTTR	common hoptree
Ptelea trifoliata ssp. angustifolia	PTTRA	common hoptree
Ptelea trifoliata ssp. angustifolia var. angustifolia	PTTRA2	common hoptree
Ptelea trifoliata ssp. pallida var. cognata	PTTRC	common hoptree
Ptelea trifoliata ssp. pallida var. confinis	PTTRC2	common hoptree
Ptelea trifoliata ssp. pallida var. lutescens	PTTRL	common hoptree
Ptelea trifoliata ssp. pallida	PTTRP	common hoptree
Ptelea trifoliata ssp. polyadenia	PTTRP2	common hoptree
Ptelea trifoliata ssp. pallida var. pallida	PTTRP4	pallid hoptree
Ptelea trifoliata ssp. trifoliata	PTTRT	common hoptree
Purshia mexicana	PUME	Mexican cliffrose
Purshia stansburiana	PUST	Stansbury cliffrose
Pyrus communis	PYCO	common pear
Quercus arizonica	QUAR	Arizona white oak
Quercus chrysolepis	QUCH2	canyon live oak
Quercus chrysolepis var. chrysolepis	QUCHC	canyon live oak
Quercus dunnii	QUDU3	Palmer oak
Quercus emoryi	QUEM	Emory's oak
Quercus gambelii	QUGA	Gambel's oak
Quercus gambelii var. bonina	QUGAB2	Gambel's oak
Quercus gambelii var. gambelii	QUGAG	Gambel's oak
Quercus grisea	QUGR3	gray oak
Quercus hypoleucoides	QUHY	silverleaf oak
Quercus macrocarpa	QUMA2	bur oak

Quercus macrocarpa var. macrocarpa	QUMAM	bur oak
Quercus mohriana	QUMO	Mohr's oak
Quercus muehlenbergii	QUMU	chinkapin oak
Quercus oblongifolia	QUOB	Mexican blue oak
Quercus X organensis	QUOR	oak
Quercus X palmeriana	QUPA3	Palmer's oak
Quercus X pauciloba	QUPA4	wavyleaf oak
Quercus pungens	QUPU	pungent oak
Quercus pungens var. pungens	QUPUP	pungent oak
Quercus rugosa	QURU4	netleaf oak
Quercus toumeyi	QUTO2	Toumey's oak
Quercus turbinella	QUTU2	shrub live oak
Quercus turbinella var. ajoensis	QUTUA	shrub live oak
Quercus turbinella var. turbinella	QUTUT	shrub live oak
Rhamnus cathartica	RHCA3	common buckthorn
Rhus glabra	RHGL	smooth sumac
Rhus hirta	RHHI2	staghorn sumac
Rhus kearneyi	RHKE	Kearney's sumac
Rhus lanceolata	RHLA3	prairie sumac
Rhus ovata	RHOV	sugar sumac
Rhus virens var. choriophylla	RHVIC	evergreen sumac
Ricinus communis	RICO3	castorbean
Robinia X holdtii	ROHO	Holdt's locust
Robinia neomexicana	RONE	New Mexico locust
Robinia neomexicana var. neomexicana	RONEN	New Mexico locust
Robinia neomexicana var. rusbyi	RONER	Rusby's locust
Robinia pseudoacacia	ROPS	black locust
Salix X alba	SAAL17	Salicaceae
Salix alba	SAAL2	white willow
Salix alba var. vitellina	SAALV	golden willow
Salix amygdaloides	SAAM2	peachleaf willow
Salix babylonica	SABA2	weeping willow
Salix bebbiana	SABE2	Bebb willow
Sapium biloculare	SABI4	Mexican jumpingbean
Salix bonplandiana	SABO	red willow
Sambucus cerulea var. cerulea	SACEC	blue elderberry
Salix discolor	SADI	pussy willow
Salix exigua	SAEX	sandbar willow
Salix fragilis	SAFR	crack willow
Salix geyeriana	SAGE2	Geyer's willow
Salix gooddingii	SAGO	Goodding's willow
Salix lasiolepis	SALA6	arroyo willow
Salix lasiolepis var. lasiolepis	SALAL2	Tracy willow
Salix ligulifolia	SALI	strapleaf willow
Salix lucida	SALU	shining willow
Salix lucida ssp. caudata	SALUC	greenleaf willow
Salix lucida ssp. lasiandra	SALUL	Pacific willow
Salix melanopsis	SAME2	dusky willow
Salix monticola	SAMO2	park willow
Sambucus nigra ssp. canadensis	SANIC4	Caprifoliaceae
Sambucus nigra ssp. cerulea	SANIC5	Caprifoliaceae
Salix petiolaris	SAPE5	meadow willow
Salix prolixa	SAPR3	MacKenzie's willow
Sambucus racemosa var. racemosa	SARAR3	Caprifoliaceae
Salix X rubens	SARU3	rubens willow
Sapindus saponaria	SASA4	wingleaf soapberry
Sapindus saponaria var. drummondii	SASAD	western soapberry

Salix scouleriana	SASC	Scouler's willow
Salix X sepulcralis	SASE10	sepulcral willow
Salix sitchensis	SASI2	Sitka willow
Salix taxifolia	SATA	yewleaf willow
Shepherdia argentea	SHAR	silver buffaloberry
Sorbus aucuparia	SOAU	European mountainash
Sophora secundiflora	SOSE3	mescal bean
Sorbus sitchensis	SOSI2	western mountainash
Sorbus sitchensis var. sitchensis	SOSIS2	Sitka mountainash
Tamarix africana	TAAF	African tamarisk
Tamarix aphylla	TAAP	Athel tamarisk
Taxus brevifolia	TABR2	Pacific yew
Tamarix canariensis	TACA9	Canary Island tamarisk
Tamarix chinensis	TACH2	fivestamen tamarisk
Tamarix gallica	TAGA	French tamarisk
Tamarix parviflora	TAPA4	smallflower tamarisk
Tamarix ramosissima	TARA	saltcedar
Tecoma stans	TEST	yellow trumpetbush
Thuja plicata	THPL	western redcedar
Tsuga heterophylla	TSHE	western hemlock
Tsuga mertensiana	TSME	mountain hemlock
Ulmus americana	ULAM	American elm
Ulmus pumila	ULPU	Siberian elm
Ungnadia speciosa	UNSP	Mexican buckeye
Vauquelinia californica	VACA5	Arizona rosewood
Vauquelinia californica ssp. californica	VACAC	California rosewood
Vauquelinia californica ssp. pauciflora	VACAP	Arizona rosewood
Vauquelinia californica ssp. sonorensis	VACAS	Sonora rosewood
Viburnum lantana	VILA	wayfaringtree
Viburnum lentago	VILE	nannyberry
Washingtonia filifera	WAFI	California fan palm

ITEM CODING GUIDE -- SUBPLOT DESCRIPTION ITEMS

		ACCESSIBLE FOREST LAND PRESENT		NO ACCESSIBLE FOREST LAND PRESENT
SUBPLOT NUMBER		X		X
SUBPLOT/ANNULAR PLOT STATUS		X		X
SUBPLOT CONDITION LIST		X		X
SUBPLOT NONSAMPLED REASON		SS		SS
SUBPLOT CENTER CONDITION		X		X
MICROPLOT CENTER CONDITION		C		C
SUBPLOT SLOPE		X		
SUBPLOT ASPECT		X		
SNOW/WATER DEPTH		X		
ROOT DISEASE SEVERITY RATING (MT & ID ONLY)		CX		

X = ALWAYS RECORD

CX = ON REMEASUREMENT LOCATIONS, PREVIOUS DATA MAY BE PRINTED ON DATA SHEETS OR DOWNLOADED; COPY OLD DATA IF VALID, OTHERWISE RECORD NEW.

SS = WHEN SUBPLOT/ANNULAR PLOT STATUS IS 3

C = WHEN SUBPLOT CENTER IS CONDITION CLASS STATUS OF 1,2,3

ITEM CODING GUIDE -- FIELD LOCATION DESCRIPTION ITEMS (PLOT IDENTIFICATION DATA)

		ACCESSIBLE FOREST LAND PRESENT		NO ACCESSIBLE FOREST LAND PRESENT
STATE		DX		DX
COUNTY		DX		DX
P2 LOCATION NUMBER		DX		DX
USGS MAP NUMBER		DX		DX
CONSECUTIVE POINT NUMBER		DX		DX
P3 HEXAGON NUMBER		P3		P3
P3 PLOT NUMBER		P3		P3
INVENTORY PHASE		DX		DX
PLOT NUMBER		X		X
MONTH		X		X
DAY		X		X
YEAR		X		X
CREW NUMBER(S)		X		X
CREW TYPE		X		X
QA STATUS		X		X
SAMPLE KIND		X		X
REGIONAL SAMPLE KIND		X		X
PLOT STATUS		X		X
PLOT NONSAMPLED REASON		S		S
CONDITION CLASS CHANGE		R		
PREVIOUS PLOT NUMBER		R		
SUBPLOT RADIUS		X		
MICROPLOT RADIUS		X		
MICROPLOT LOCATION		X		
HORIZONTAL DISTANCE TO IMPROVED ROAD		X		
WATER ON PLOT		X		
GPS UNIT		DX		F
GPS SERIAL NUMBER		DX		F
COORDINATE SYSTEM		DX		F
GPS ERROR		DX		F
NUMBER OF READINGS		DX		F
GPS ELEVATION		DX		F
UTM ZONE		DX		F
EASTING (X) UTM		DX		F
NORTHING (Y) UTM		DX		F
AZIMUTH TO PLOT CENTER		G		FG
DISTANCE TO PLOT CENTER		G		FG
FUTURE FOREST POTENTIAL				X

X = ALWAYS RECORD

DX = DOWNLOADED FOR VERIFICATION OR ALWAYS RECORD

CX = ON REMEASUREMENT LOCATIONS, PREVIOUS DATA MAY BE PRINTED ON DATA SHEETS OR DOWNLOADED; COPY OLD DATA IF VALID, OTHERWISE RECORD NEW.

P3 = P3 PLOTS ONLY

R = REMEASUREMENT PLOTS ONLY

G = WHEN LC COORDINATES ARE COLLECTED AT A LOCATION OTHER THAN THE LC

S = WHEN PLOT STATUS IS 3

F = FIELD VISITED NONFOREST PLOTS

FG = FIELD VISITED NONFOREST PLOTS WHERE LC COORDINATES ARE COLLECTED AT LOCATION OTHER THAN THE LC

ITEM CODING GUIDE -- CONDITION CLASS DESCRIPTION ITEMS

		ACCESSIBLE FOREST LAND	NONFOREST LAND	NONCENSUS WATER	CENSUS WATER	NONSAMPLED
CONDITION CLASS NUMBER		CX	X	X	X	X
CONDITION CLASS STATUS		1	2	3	4	5
CONDITION NONSAMPLED REASON						X
RESERVED STATUS		CX	X	X	X	X
OWNER GROUP		CX	X	X	X	X
FOREST TYPE		CX				
STAND SIZE CLASS		CX				
REGENERATION STATUS		X				
TREE DENSITY		X				
OWNER CLASS		CX	X	X	X	X
PRIVATE OWNER INDUSTRIAL STATUS		CX	X	X	X	X
ARTIFICIAL REGENERATION SPECIES		X				
STAND AGE		CX				
CONDITION HABITAT TYPE(S)		CX				
CROWN COVER		X				
PERCENT BARE GROUND		X				
DISTURBANCE 1		X				
DISTURBANCE YEAR 1		X				
DISTURBANCE 2		X				
DISTURBANCE YEAR 2		X				
DISTURBANCE 3		X				
DISTURBANCE YEAR 3		X				
TREATMENT 1		X				
TREATMENT YEAR 1		X				
TREATMENT 2		X				
TREATMENT YEAR 2		X				
TREATMENT 3		X				
TREATMENT YEAR 3		X				
PHYSIOGRAPHIC CLASS		X				
PRESENT NONFOREST LAND USE		CX	CX			
CONDITION STATUS CHANGE		R	R			

X = ALWAYS RECORD

CX = ON REMEASUREMENT LOCATIONS, PREVIOUS DATA MAY BE PRINTED ON DATA SHEETS OR DOWNLOADED; COPY OLD DATA IF VALID, OTHERWISE RECORD NEW

R = REMEASUREMENT PLOTS ONLY

Item Coding Guide: Tree Data

TREE TYPE	Tree Status past/present	Subplot Number	Tree Record Number	Horizontal Distance	Azimuth	PAST Condition Class #	CURRENT Condition Class #	Previous Tree Status	Present Tree Status	Reconcile	Standing Dead	Species	Previous DBH/DRC	Current DBH/DRC	Diameter Check	PAST Number to Stems	CURRENT Number of Stems	PAST Total Tree Length	CURRENT Total Tree Length	PAST Actual Tree Length	CURRENT Actual Tree Length	Uncompacted Crown Ratio	Length Method (Hi Check)	Compacted Crown Ratio	Crown Light	Crown Position	Crown Class	Crown Density	Crown Dieback	Foliage Transparency	Dwarf Mistletoe Class	Damage AGENT 1	Damage AGENT 2	Damage AGENT 3	Damage 1 LOCATION	Damage 1 TYPE	Damage 1 SEVERITY	Damage 2 LOCATION	Damage 2 TYPE	Damage 2 SEVERITY	Decay Class	% Rotten & Missing	% Vol Missing Top	% Sound Dead	% Form Defect	PAST Tree Class	CURRENT Tree Class	Age/ Radial Growth	Growth/Age Check	Site Tree	Mortality	Mortality Year	Cause of Death
New Trees --																																																						
Live tally 5.0"+ DBH/DRC	- / 1	X	X	X	X	-	X	-	1	R	-	X	-	X*	X	-	W	-	X	-	X	P3	X	X	P3	P3	X	P3	P3	P3	X	X	X	X	P3	P3	P3	P3	P3	P3	-	X	X	X	T	-	X	A	A	X	-	-	-
Dead tally 5.0"+ DBH/DRC	- / 2	X	X	X	X	-	X	-	2	R	-	X	-	X*	X	-	W	-	X	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	-	M	X	-	-	-	X	M	M
Live sap 1.0-4.9" DBH/DRC	- / 1	X	X	X	X	-	X	-	1	R	-	X	-	X*	X	-	W	-	X	-	X	P3	X	X	P3	P3	X	P3	P3	P3	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	A	A	-	-	-	-
Remeasurement Trees (includes center micro) --																																																						
Live 5.0"+ DBH/DRC	1 / 1	D	D	D	D	D	X	D	1	-	-	D	D	X*	X	D	W	D	X	DX	X	P3	X	X	P3	P3	X	P3	P3	P3	X	X	X	X	P3	P3	P3	P3	P3	P3	-	X	X	X	T	D	X	DX	DX	X	-	-	-
Live before, Dead now 5.0"+ DBH/DRC	1 / 2	D	D	D	D	D	X	D	2	-	X	D	D	X*	X	D	W	D	X	DX	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	-	D	X	-	-	-	X	X
Dead before, Dead now 5.0"+ DBH/DRC	2 / 2	D	D	D	D	D	X	D	2	-	X	D	D	X*	X	D	W	D	-	DX	DX	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	X	-	D	X	-	-	-	-	-
Live sap 1.0-4.9" DBH/DRC	1 / 1	D	D	D	D	D	X	D	1	-	-	D	D	X*	X	D	W	D	X	DX	X	P3	X	X	P3	P3	X	P3	P3	P3	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	X	A	A	-	-	-	-
Live sap before, Dead sap now 1.0-4.9" DBH/DRC	1 / 2	D	D	D	D	D	X	D	2	-	-	D	D	X*	X	D	W	D	D	DX	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	X	-	-	-	-	X	X
Live before, 1.0"+ DBH/DRC, Removed	1 / 3	D	D	D	D	D	X	D	3	-	-	D	D	-	-	D	-	D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	-	-	-	-	-	X	X
dead before, 1.0"+ DBH/DRC, Removed	2 / 3	D	D	D	D	D	X	D	3	-	-	D	D	-	-	D	-	D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	-	-	-	-	-	-	-
Live before, 1.0"+ DBH/DRC, No Status	1 / 0	D	D	D	D	D	X	D	4	-	-	D	D	-	-	D	-	D	-	-	-	P3	-	-	P3	P3	-	P3	P3	P3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	-	-	-	-	-	X	X
Dead before, 1.0"+ DBH/DRC, No Status	2 / 0	D	D	D	D	D	X	D	4	-	-	D	D	-	-	D	-	D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	-	-	-	-	-	-	-
Accounting Trees (Old variable-radius plots) --																																																						
New Live tally 5.0" + DBH/DRC	- / 1	X	X	X	X	-	-	-	1	AC	-	X	-	X*	X	-	W	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
Live before, Live now tally 5.0"+ DBH/DRC	1 / 1	D	D	D	D	-	-	D	1	-	-	D	D	X*	X	D	W	D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	X	-	-	-	-	-	-
Live before, Dead now 5.0"+ DBH/DRC	1 / 2	D	D	D	D	-	-	D	2	-	-	D	D	X*	X	D	W	D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	X	-	-	-	-	-	M
Live sap 1.0-4.9" DBH/DRC	1 / 1	D	D	D	D	-	-	D	1	-	-	D	D	X*	X	D	W	D	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	X	-	-	-	-	-	-
Live sap before, Dead sap now 1.0-4.9" DBH/DRC	1 / 2	D	D	D	D	-	-	D	2	-	-	D	D	X*	X	D	W	D	D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	X	-	-	-	-	-	M
Live before, 1.0"+ DBH/DRC, Removal	1 or 2 / 3	D	D	D	D	-	-	D	3	-	-	D	D	-	-	D	-	D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	-	-	-	-	-	-	X
Live before, 1.0"+ DBH/DRC, Missing	1 or 2 / 4	D	D	D	D	-	-	D	4	-	-	D	D	-	-	D	-	D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D	-	-	-	-	-	-	X
Nontallied site trees --																																																						
Live tree 5.0"+ DBH/DRC (timber spp. only)		D,X	D,X	D,X	D,X	D,-	X**	-	0	-	-	D,X	-	X	X	-	-	-	X	-	-	-	-	X	-	-	X	-	-	-	-	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	X	DX	DX	X	-	-	-

TREE TYPE	Subplot Number	Species	CURRENT Condition Class	Seedling Count	Count Check	Number of Seeds	Tree Age
Seedling group tally	X	X	X	X	X	X	X

X = ALWAYS RECORD
DX = MAY BE DOWNLOADED OR MAY HAVE TO FILL IN FROM PREVIOUS TREE COMMENTS
D = DOWNLOADED FOR REMEASUREMENT TREES; CHANGE ONLY IF PREVIOUS DATA IS IN ERROR
M = MORTALITY
R = REMEASUREMENT
T = TIMBER SPECIES
W = WOODLAND SPECIES
A = AGE & RADIAL GROWTH TREES AS DIRECTED
AC = NEW TREE ON ACCOUNTING LOCATION MICROPLOT
P3 = COLLECTED ONLY ON P3 PLOTS
* RECORD INDIVIDUAL STEMS AND LIVE/DEAD FOR WOODLAND SPECIES IN THE DATA RECORDER OR ON THE MULTISTEM WOODLAND SUPPLEMENTAL FORM
** IF A SITE TREE IS USED FOR OTHER CONDITION CLASSES, RECORD THOSE IN THE DATA RECORDER OR IN TREE COMMENTS SECTION OF FIELD FORM.

APPENDIX E

PLGR Operating Instructions

Use the instructions below for setting up and operating the Precision Lightweight GPS Receiver. Each section below corresponds to its counterpart in Chapter 2, "**Finding the Field Location Center – New Field Locations.**"

a. Verify PLGR Settings. The proper initial PLGR settings are critical for positioning and navigational accuracy. Once the PLGR settings are selected, they become the default value each time the PLGR is turned on.

***PLGR:* Setup.** To enter the **Setup Menu**, insert the PLGR batteries and turn the unit on. Push the **Menu** button, then use the right arrow key to highlight **Setup**. Use the down arrow key to select **Setup**.

Position	Line Heading	Setting
SCREEN 1		
Line 1, Field 1	Setup Mode	: **Cont**
Line 2 and 3		: na
Line 4, Field 1	SV-Type	: **Mixed**
SCREEN 2		
Line 1	Setup Units	: na
Line 2, Field 1		: **UTM/UPS**
Line 2, Field 2		: **English**
Line 3, Field 1	Elev.	: **Feet**
Line 3, Field 2	Elev**.**	: **MSL (Mean Sea Level)**
Line 4, Field 1	ANG.	: **DEG**
Line 4, Field 2	ANG**.**	: **Mag**
Line 1	Setup MAGVAR	: na
Line 2, Field 1	Type	: **Calc**
Line 2, Field 2	Type	: **deg**
Line 3	WM 1995	: na
SCREEN 4		
Line 1, Field 1	Setup Wage	: **ON**
Line 2, Field 1	ELHold	: **automatic**
Line 3, Field 1	TIME	: **Z-600 (Mountain Standard)** **Z-700 (Daylight Savings)**
Line 4, Field 1	ERR	: **EHE**
SCREEN 5		
Line 1, Field 1	Setup DTM	: **NAS-C**
Line 2	NA27CONUS/CLK66 (see note below)	
Line 3	Automatic Off	: na

Line 4, Field 1 Timer : **Off**

Note: Examine each topographic map to identify the UTM datum, located in the bottom left hand corner of the map. Most USGS maps in the West use the 1927 (NAS-C) datum. Notify the field supervisor if maps with the 1983 (NAR) datum are encountered because the UTM plot grid system used for the Program is based on the 1927 system.

b. **Verify that your PLGR has a Current Cryptographic Key.** Press the menu button twice. The word **CRYPTO** displays in the lower left corner of the screen if you have a current key. If this field is blank you do not have a cryptographic key installed. Inform your supervisor and obtain another PLGR or use baseline procedures to locate the LC.

c. **Verify WAGE Activation.** WAGE stands for Wide Area GPS Enhancements. WAGE allows the PLGR to use enhanced clock signals from the Precise Positioning Service Satellites. Approximately 15 minutes after the initial start up of the PLGR, a "**W"** will appear to the right of the Elevation Hold (**Elh**) field on the first page of the Positioning menu. A "W" indicates that the PLGR has an updated WAGE. If possible, do not record UTM coordinates at the RP or LC until the PLGR has an updated WAGE.

d. **Enter the LC coordinates into the PLGR.** All potential LC coordinates for a given work area should be uploaded to the PLGR prior to moving to a new work area. LC coordinates for a given work area will begin at waypoint number 101 in the PLGR leaving the first 100 waypoints empty for user waypoint entry. If the LC coordinates are not preloaded or are missing, obtain the coordinates from the location packet label or from the topographic map inside the packet and enter them manually.

PLGR: **Way Points.** A Way Point is a specific location marked in the PLGR for future reference. Examples of a potential Way Points include the location of the truck, a trailhead, a critical junction on a travel route to the plot, the reference tree, or the plot center location. There are three methods of setting Way Points in the PLGR: by uploading waypoints from a PC, by using the **Mark** Key, or by a manual input of the coordinates using the **WP** Key.

- **PC to PLGR Upload.** All potential LC coordinates for a given work area should be preloaded into the PLGR before moving to a new work area using this method. LC waypoints will be named using the following naming convention. State letter – County number – Location Number (e.g., A-029-0123.)

Refer to the **Waypoint Number– Location Center Cross Referencing List** to determine the waypoint number of the location you wish to visit. Use the **NAV** key to enter the navigation menu. Scroll to the first field on the second line and press the **NUMLOCK key**. Enter the desired waypoint

number. Press the **NUMLOCK** key again to display the page turn icon (**P**). Verify that the waypoint name and coordinates match those listed on the packet label.

- **Marking a Way Point.** Use the **Mark** key when currently at the desired Way Point position. After determining position coordinates at a given location (e.g., the trailhead), the crew may decide to use this location as a reference or Way Point to return to on their way out of the plot.

  Once the coordinates for the location (e.g., trailhead) are on the screen -- using the Positioning feature described above -- simply push the **Mark** button twice. This action automatically sets the current screen coordinates as the last Way Point in the list.

  Note: if a number of positions are collected to get an average fix on an RP, it is necessary to copy the position from the screen and manually enter the coordinates before saving as a waypoint. Depressing the "mark" key in averaging mode will not save the averaged position, just the last position fix.

- **Setting a Way Point.** Use the manual Way Point (WP) when it is necessary to navigate to a location that has not been marked. To get into the Way Point menu, push the **WP** key. Now the **ENTER** field should be flashing; use the down arrow key to select the **ENTER** field. The WP### in the upper left hand corner indicates the Way Point number to be saved (note this number for future reference). Scroll to the 1st field on the 3rd line using the right or left arrow key, and enter the desired Easting coordinates. Then highlight the northing field and enter the desired northing coordinates. The Easting information is usually located along the top or bottom margin of the topographic map, and the northing is located along the left or right margins. Entering the elevation information is useful but not necessary. Scroll to the end of the page and exit. The Way Point is stored, and the PLGR is prepared to navigate to that point.

- **Naming a Way Point.** To name a Way Point as something other than a number, push the WP key and select edit. Highlight the WP in the upper left hand corner and scroll to the Way Point number to name. Push the right arrow twice to highlight the field to the right (entire field should be flashing), then use the down arrow to highlight the first letter (1st character should be flashing). Depress the down/up arrow until the desired number or letter appears. Use the right arrow to select the next character. Up to 10 characters can be used to name a Way Point.

e. **Find the Position of the RP.** The Position (POS) feature of the PLGR provides coordinates for the present position on either the Universal Transverse Mercator (UTM) or on the Latitude/Longitude (Lat/Long) grid system.

***PLGR:* Positioning**

Push the **POS** button for approximately 5 seconds until the field in the upper left hand corner reads **AVG**. At this point the PLGR begins to acquire satellites. After sufficient satellites are acquired, the PLGR begins to average the satellite hits, indicated by numbers just to the right of the **AVG** symbol. Allow the PLGR to average at least 180 hits. In areas receiving poor satellite reception, it may be necessary to let the PLGR average more hits.

Record the UTM coordinates from the 3rd line on the screen. Do not move the PLGR while it is in the averaging mode.

In a situation where the RP itself blocks signal reception, measure from the RP into an open area and place a stake. Use this as your base-point (RP stake) for collecting the RP's coordinates and locating the LC. Record azimuth and distance from the RP to the RP stake in plot notes, and explain why you chose not to take the GPS coordinates at the RP tree (e.g., heavy crown cover at RP center). Record the RP coordinates in the PDR.

Note: The continuous mode can also be used for positioning; however, the reading is not as accurate. The continuous mode provides an instantaneous or continuous reading of position when a quick position fix is needed, but should not be used to collect GPS data for the RP.

f. **Chaining from the RP to LC.** Employ the PLGR's Navigate function to determine a distance and azimuth to LC from the RP. Use a chaining tape and compass for chaining from RP to LC.

***PLGR:* Navigation.** To enter into the navigation menu, push the **NAV** key. There are several modes of operation for navigating; for the purposes of this inventory work, use either the **Custom, Slow**, or **2d Fast** mode; these fields are located on the first screen after pushing the **NAV** key.

Slow direct mode. Leave the PLGR in the **Averaging** mode and set **NAV** to **slow direct** for determining the course to location center.

Screen 1 procedure:

1. Using the right arrow key, highlight the first field on the first line of the navigation menu. Select **Custom, Slow,** or **2D Fast** using the down arrow**.**
2. Using the right arrow key, select the 2nd field on line one. Select **direct** by pushing the down arrow**.**
3. Using the right arrow key, highlight the **WP** field. Select the Way Point number desired using the down arrow key.
4. Using the right arrow, scroll to the **P** at the bottom of the page. Use the down arrow key to change the page.

Screen 2 in **Custom** mode displays the azimuth (**AZ**) in degrees, range (**RNG**) or horizontal distance, and navigational steering arrows to the selected Waypoint. In **Slow** mode, "**RNG**" and "**AZ**" are displayed. **2dFast** mode displays track (**TRK**), azimuth, and steering arrows (**STR**).

Screen 3 in **Custom** mode is blank. In **Slow mode**, elevation difference (**ELD**), slant range (**SR**), "**AZ**", and elevation angle (**ELA**) are displayed. **2dFast** mode displays the "**RNG**", Time To Go (**TTG2**), "**ELD**", and minimum miss distance (**MMD2**). Make slope corrections as necessary when chaining to the LC.

Use the up or down arrow while the page icon is highlighted to select the desired navigation screens.

g. **Rng -Calc Function.**

Rng- Calc is a function found within the WAYPOINT Menu. Its purpose is to calculate UTM coordinates from a known position using distance and azimuth. (e.g. If the UTM's of Pt. 1 are known but inaccessible, one could use the **Rng-Calc** function to calculate the coordinates and chain to another point). To use **Rng-Calc**, follow the step-by-step procedures.

1) First of all, make sure that the known position you wish to calculate from is entered in the PLGR as a waypoint.
2) Depress the "**WP**" key from the PLGR keyboard. This will take you to the Waypoint Menu Screen.
3) Use **RIGHT / LEFT** Arrows on keyboard until **RNG-CALC** is flashing. Select by depressing the **UP or DOWN** Key.
4) This will take you to a screen with the words "**CALC** from **WPxxx**" at the top. **RIGHT ARROW** until the **WP** Number starts to flash. Use the **UP / DOWN** Key to select the stored waypoint you wish to calculate from.
5) When the Waypoint is selected, RIGHT ARROW until **RNG** starts to flash. Use **UP / DOWN** key to select and enter

the Distance, **RIGHT ARROW** until AZ starts to flash and select with the UP / DOWN Key. Enter the azimuth.
RIGHT ARROW until you see the "**up / down triangles**" next to the "**P**" at the lower right corner of the screen. Depress the "**DOWN**" key. This will bring you to the coordinate display screen.

6) This screen displays the calculated coordinates. This calculated position can then be saved by depressing the "**MARK**" button twice.

h. **DIST Function.**

Distance is a function that calculates the distance and azimuth between two points with known coordinates. It is to be used for establishing plots for the 1st time from a selected Reference Point. **DIST** is found within the **WAYPOINT** Menu. To use the **DIST** function, follow the step-by-step procedures:

1) First of all, make sure the 2 positions are entered as waypoints in the PLGR. (eg: RP and LC.). *Note: if a number of positions are collected to get an average fix on an RP, it is necessary to copy the position from the screen and manually enter the coordinates before saving as a waypoint. Depressing the "mark" key in averaging mode will not save the averaged position, just the last position fix.*

2) Depress the "**WP**" key from the PLGR keyboard. This will take you to the **Waypoint Menu Screen**.

3) Use the **RIGHT / LEFT** Arrows on keyboard until "**DIST**" is flashing. Select by depressing the **UP or DOWN key.**

4) This will take you to a screen with the words: **DIST WPxxx→→ xxx** at the top. The set of digits after the "**WP**" is the waypoint you want to chain ***from*** (RP) and the second set is the waypoint you are chaining ***to*** (LC). Use the **UP / DOWN** or **Num lock** key to select the waypoint you want to chain from and **RIGHT ARROW** until the second set of digits starts to flash. Use **num lock** or **arrow keys** to select the waypoint you wish to chain to. Distance and azimuth will be displayed.

APPENDIX F

LASER 200 INSTRUCTIONS

A. *Overview*

Accurate heights are necessary in our inventory in order to determine volume. The Laser can be used to get fast and accurate tree heights. It can also be used to measure distances and % slope. This instrument is more fragile than the GPS units. Some precautions must be taken with the Lasers to keep them working properly. These are:

1. Never look at the sun through the scope. Looking directly at the sun can permanently damage your eyes.
2. Never point the Laser directly at the sun. Exposing the lens system to direct sunlight, even for a brief period, may permanently damage the laser transmitter.
3. Do not expose the Laser to extreme temperatures. It is rated for a temperature range of -22 deg. F to +140 deg. F. Don't leave the instrument in the vehicle during the heat of the day.
4. Do not use batteries with "voltage check" features built on the batteries. The battery case of the Laser is too narrow for these batteries, and they could get stuck in the instrument.
5. Do not drop the Laser. Immediately return it to it's case when you get back to the vehicle. There is usually more danger of damaging the instrument in the vehicle than out in the woods.

B. *Basic operation*

All directions for using the Laser buttons are given assuming you are holding the instrument with the LCD display screen facing you and the 2 round lenses are facing the object you want to measure. The buttons will be referred to as:

L1	the left button closest to you
L2	the left button in the middle
L3	the left button furthest away from you
R1	the right button closest to you
R2	the right button in the middle
R3	the right button furthest away from you

Turn the Laser on by pushing L1 or R1
Turn it off by pushing L2 and L3 at the same time. The Laser may turn itself off after a period of inactivity. Once the instrument is on, push the R1 button to make the red dot appear in the sighting scope. If there is no red

sighting dot, repeatedly push the L2 button until the red dot appears and is the correct brightness. To light up the display screen, press L3. Press L3 again to turn off the light.

B. C. Settings

Make sure the settings are correct before using the Laser. To set the correct measurement units, go into the main menu and:

1. Press R2 or R3 to scroll through the menu until SYS is displayed in the upper right hand corner of the screen.
2. Press R1. ON or OFF will show in the center of the screen. FILTER will flash at the bottom.
3. Press R2 until OFFSET is flashing. The number displayed should be 0000.00.
4. Press R2 until PIVOT is flashing. The number displayed should be 0000.59. When this number is set at 0.00, the Laser is set to calculate heights using a tripod attached to the center of the instrument. The pivot point is the center of the Laser. We use the pivot value at 0.59 because this sets the pivot point at the rear of the instrument, and this allows you to shoot a height while using your head as the pivot point. To change this number, press L1 until the number you want to change is flashing. Press L2 or L3 until the correct number is showing. When the number is set at 0000.59, press R1.
5. Press R2 until UNITS is flashing. Select F (feet) using the R1 button.
6. Press R2 again and D (degrees) should be flashing. If not, press R1 to toggle on D.
7. Press R2 again and % should be flashing. It should say ON. If not, press R1.
8. Press R3 twice to accept the new settings and back out to the main display.

D. Filter and Reflectors

When you are working in areas of dense brush, you need to make sure the Laser is giving you the distance to the correct target. The best way to do this is to use a reflector as a target and use the filter option on the Laser. The Laser will only lock onto the highly reflective targets and ignore the less reflective brush. To use the filter option:

1. Place a reflector (or have someone hold it) on the tree where it can be seen from the required distance. The Laser will not work in the filter mode without a reflector as a target.
2. Go to the main menu on the Laser and push R2 or R3 until SYS is displayed on the screen.
3. Press R1 to select the SYS option. The FILTER option will blink, and it will say the FILTER is OFF or ON.

4. Push R1 to toggle FILTER between ON and OFF.
5. Press R3 to save the desired setting and to back out into the main display. When the FILTER is on, FILTER will appear at the bottom of the screen when the Laser is measuring distances.

E. Distances and % slope

Horizontal distance (HD): Turn the Laser on. The top-middle of the LCD screen will say HD. Point the red sighting dot at the target. Press R1 and hold it down until the Laser locks on the target, then release. You can tell when the instrument locks onto it's target by sound. It buzzes while it is searching for the target, then beeps when it locks on to a target or there is an error. If you get an error message, simply aim again and press R1.

Slope distance (SD) and Vertical distance (VD): Push R2 or R3 until the correct display is shown. Then aim and press R1 until the Laser locks on target. Or, measure a horizontal distance, then push R2 until the correct display is shown.

% slope: Press R2 or R3 until INC is displayed. Then aim and press R1.

F. Tree heights

The best way to measure a tree height is to make sure you have a clear shot at the leader or a clear shot of the tree trunk. Make sure you are getting a distance to the tree trunk, and not some branches in front of it. If you can't get a clear shot at the leader or the tree trunk, use a reflector (see section D). Once you are in position with your target in sight, go to the main menu:

1. Push R2 or R3 until HT is displayed in the upper left of the screen.
2. Push R1 once, aim at the target, then push R1 until the Laser locks on target. This will measure the horizontal distance.
3. The down arrow will flash. Aim at the base of the tree and push R1 to get the % slope.
4. The up arrow will flash. Aim at the top of the tree and push R1 again to get another % slope.
5. Press R1 once more and the Laser will display the height. Make sure this height is reasonable before recording it in the PDR.

G. *Gates*

The gate option can extend the Laser's minimum range or restrict its maximum range. It is most often used to help you make sure you are hitting the right target when objects near you or just beyond your target might give you false readings. You don't have to set both gates. You will probably only need to set the short gate because of brush or fog between you and your target. You can set a gate by shooting a target or by entering distances into the instrument. To set a short gate by laser, go to the main menu and:

1. Press R2 or R3 until GATE is shown on the display.
2. Push R1 to select the gate option.
3. Press R1 to toggle the gate between ON and OFF.
4. Push R2. The S indicator will flash.
5. Aim at a target that is at the distance you want to set as the short gate and press R1.
6. Now you can either set a long gate, or press R3 to go back to save the short gate and return to the main menu. The S will be displayed when you are measuring distances to show the short gate is on.

To set a long gate:

7. Push R2. The L indicator will flash.
8. Aim at an appropriate target and press R1
9. Press R3 to save the gate and go back to the main display. The L will be displayed when measuring distances.
   The gates are reset to OFF when the Laser is turned off, but gate values are saved in memory. This means that if you have saved a gate and turn off the instrument, when you turn it back on the gate will be set to OFF. If you go back into the gate option and turn the gate ON, it will remember the last distances you shot for the long and short gates.

To clear out a gate value: Display the gate values by following the instructions in this section (section G). When the desired gate value is displayed, press and hold down R3 until the number is deleted.

H. *Cumulative distances*

A cumulative distance measurement allows you to move from one target point to the next, stopping at each one to measure the distance to the next target point. The Laser accumulates the measured distances in both slope and horizontal distances (SD and HD) to give you a running total.
To take a cumulative distance, go to the main menu and:

1. Press R2 or R3 until MULTI is displayed on the screen.
2. Press R1 to enter the MULTI option. DIFF will be displayed.
3. Press R2 once. CUM will be displayed.
4. Press R1. Either SEL or a number will be displayed. If SEL is displayed, HD will flash on and off. Press R1 to toggle between HD and SD. Press R2 when the correct indicator is flashing. If a number is displayed, that means there is already a cumulative distance saved on this instrument. You can either clear out this distance by holding down R3 until 0.00 appears, or continue to add to the distance by going to step 5.
5. Aim at the target and press R1 to fire the laser.
6. If you are not satisfied with the measurement, repeat step 5 to retake the measurement. If you are satisfied with the measurement, and wish to add it to your total, press R2. The new total will be displayed.
7. Repeat steps 5 and 6 to add more measurements to the total.
   You can choose whether you want horizontal or slope distances at any time. If a distance has been measured, you can change from slope or horizontal distance by pressing R3 twice. SEL will be displayed. Push R1 to toggle between SD and HD. Press R2 twice to get back to the total distance. Go to step 5 to add more distances.
   The cumulative measurement total is saved in memory even if the instrument is turned off. Turn the instrument on and scroll back to the MULTI-CUM option and resume the procedure with step 5.
   To clear out the current total and begin another series of measurements, hold down R3 while the cumulative distance is showing until the number is deleted.

APPENDIX G

Western U.S. Site-Tree Selection Criteria

Ideally, site trees in the western U.S. should be between 35-80 years old. If preferred trees cannot be found in this age range, expand the age range to 15-250 years. Reject trees outside the 15-250 year age range, trees that exhibit signs of damage, trees with ring patterns that show signs of suppression, trees less than 5.0 inches DBH, trees with abnormalities at DBH, trees with rotten cores, and woodland species. A list of preferred site-tree species is provided. Site trees should be selected in the following order of preference:

1st Choice: representative of the stand, on the list for your region.
2nd Choice: representative of the stand, on the list for an adjoining western region.
3rd Choice: not representative of the stand, on the list for your region.
4th Choice: not representative of the stand, on the list for an adjoining western region.

Note: PNW = Pacific Northwest FIA, RMRS = Rocky Mountain FIA

Code	Common Name	Region
	---------- Softwood Species ----------	
0011	Pacific silver fir	PNW
0015	white fir	RMRS, PNW
0017	grand fir	RMRS, PNW
0018	corkbark fir	RMRS
0019	subalpine fir	RMRS, PNW
0020	California red fir	RMRS, PNW
0021	shasta red fir	PNW
0022	noble fir	PNW
0073	western larch	RMRS, PNW
0081	incense-cedar	RMRS, PNW
0093	Engelmann spruce	RMRS, PNW
0094	white spruce	RMRS, PNW
0095	black spruce	PNW
0096	blue spruce	RMRS
0098	sitka spruce	PNW
0104	foxtail pine	RMRS
0108	lodgepole pine	RMRS, PNW

Code	Common Name	Region
0109	Coulter pine	PNW
0112	Apache pine	RMRS
0116	Jeffrey pine	RMRS, PNW
0117	sugar pine	RMRS, PNW
0119	western white pine	RMRS, PNW
0120	bishop pine	PNW
0122	ponderosa pine	RMRS, PNW
0135	Arizona pine	RMRS
0201	bigcone Douglas-fir	PNW
0202	Douglas-fir	RMRS, PNW
0211	redwood	PNW
0231	Pacific yew	PNW
0242	western redcedar	RMRS, PNW
0263	western hemlock	RMRS, PNW
0264	mountain hemlock	RMRS, PNW
	---------- Hardwood Species ----------	
0312	bigleaf maple	PNW
0351	red alder	PNW
0375	paper birch	RMRS, PNW
0741	balsam poplar	RMRS, PNW
0745	plains cottonwood	RMRS
0746	quaking aspen	RMRS, PNW
0747	black cottonwood	RMRS, PNW
0748	Fremont poplar	RMRS
0749	narrowleaf cottonwood	RMRS