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Appendix A.

Table 1. Height equations, for comparison of Lidar height metrics to field-estimated Lorey's mean height.

Research area	Species	Equation	r^2	n
North Yuba	*Abies concolor*	$h = (225.815\ dbh)/(424.225 + dbh)$	0.87	140
North Yuba	*Abies magnifica*	$h = -0.0958 + 0.4380\ dbh$	0.63	65
North Yuba	*Calocedrus decurrens*	$h = (50.55\ dbh)/(78.40 + dbh)$	0.69	15
North Yuba	hardwood species	$h = (84.88\ dbh)/(136.13 + dbh)$	0.28	62
North Yuba	*Pinus lambertiana*	$h = (140.26\ dbh)/(241.19 + dbh)$	0.82	68
North Yuba	*Pinus monticola*	$h = (71.52\ dbh)/(159.77 + dbh)$	0.87	7
North Yuba	*Pinus jeffreyi* and *Pinus ponderosa*	$h = 0.0646 + 0.4256\ dbh$	0.50	16
North Yuba	*Pseudotsuga menziesii*	$h = (91.33\ dbh)/(108.95 + dbh)$	0.84	39
Garcia	*Lithocarpus densiflorus*	$h = (37.17\ dbh)/(35.69 + dbh)$	0.46	63
Garcia	*Pseudotsuga menziesii*	$h = (54.99\ dbh)/(38.33 + dbh)$	0.70	71
Garcia	*Quercus chrysolepsis*	$h = (23.37\ dbh)/(19.86 + dbh)$	0.31	20
Garcia	*Sequoia sempervirens*	$h = (46.06\ dbh)/(45.37 + dbh)$	0.56	67
Garcia	other species	$h = (28.53\ dbh)/(17.82 + dbh)$	0.33	41
Mailliard	*Lithocarpus densiflorus*	$h = (192.52\ dbh)/(265.73 + dbh)$	0.64	27
Mailliard	*Pseudotsuga menziesii*	$h = (104.50\ dbh)/(96.06 + dbh)$	0.91	11
Mailliard	*Sequoia sempervirens*	$h = (97.49\ dbh)/(108.77 + dbh)$	0.80	37
Mailliard	other species	$h = (47.61\ dbh)/(45.23 + dbh)$	0.49	27

Variables: dbh = diameter at breast height (cm, at height = 1.37 m), h = height (m), n = number of trees in sample, r^2 = coefficient of determination.

Table 2. Allometric equations, to calculate biomass from field measurements. Wood density from Jenkins et al. (2004) was used to convert from volume to biomass, except for *Sequoia sempervirens*.

Species	Equation	Units (b, v, dbh, h)	Source
Abies concolor	$\ln(b_{tree}) = 4.36982 + 2.5043 \ln(dbh)$	g, _, cm, _	Westman 1987
Abies concolor	$\ln(b_{stem\ no\ bark}) = 3.11845 + 2.7011 \ln(dbh)$	g, _, cm, _	Westman 1987
Abies concolor	$\ln(b_{bark}) = 2.36182 + 2.6201 \ln(dbh)$	g, _, cm, _	Westman 1987
Abies magnifica	$\ln(b_{tree}) = 2.61856 + 2.9121 \ln(dbh)$	g, _, cm, _	Westman 1987
Abies magnifica	$\ln(b_{stem\ no\ bark}) = 2.55249 + 2.7821 \ln(dbh)$	g, _, cm, _	Westman 1987
Abies magnifica	$\ln(b_{bark}) = 1.46053 + 2.8468 \ln(dbh)$	g, _, cm, _	Westman 1987
Acer macrophyllum	$\ln(b_{bark}) = 2.3338 + 2.574 \ln(dbh)$	g, _, cm, _	Means 2005
Acer macrophyllum	$\ln(b_{stem\ no\ bark}) = 3.4148 + 2.723 \ln(dbh)$	g, _, cm, _	Means 2005
Acer macrophyllum	$\ln(b_{foliage}) = 3.14276 + 1.617 \ln(dbh)$	g, _, cm, _	Means 2005
Acer macrophyllum	$\ln(b_{live\ branches}) = 2.67176 + 2.430 \ln(dbh)$	g, _, cm, _	Means 2005
Acer macrophyllum	$\ln(b_{dead\ branches}) = 4.7918 + 1.092 \ln(dbh)$	g, _, cm, _	Means 2005
Arbutus menziesii	$v_{tree} = 0.0000821921\ dbh^{1.96628} h^{0.83458}$	_, m^3, cm, m	Pillsbury and Kirkley 1984
Arbutus menziesii	$v_{tree} = 0.0000378129\ dbh^{1.99295} h^{1.01532}$	_, m^3, cm, m	Pillsbury and Kirkley 1984
Calocedrus decurrens	$\ln(b_{stem}) = 2.112422 + 2.7818 \ln(dbh)$	g, _, cm, _	Means 2005
Cornus nuttallii	$b_{tree} = \mathrm{Exp}(-2.48 + 2.4835 \ln(dbh))$	kg, _, cm, _	Jenkins et al. 2003
Lithocarpus densiflorus	$\ln(v_{tree}) = 0.3484045 + 1.94165 \ln(dbh) + 0.86562 \ln(h)$	_, cm^3, cm, cm	Means 2005
Lithocarpus densiflorus	$\ln(v_{stem\ no\ bark}) = -3.150511 + 2.19576 \ln(dbh) + 1.14078 \ln(h)$	_, cm^3, cm, cm	Means 2005
Pinus jeffreyi	$\ln(b_{stem}) = 1.817891 + 2.952 \ln(dbh)$	g, _, cm, _	Means 2005
Pinus lambertiana	$\ln(b_{stem\ no\ bark}) = -3.984 + 2.6667 \ln(dbh)$	kg, _, cm, _	Jenkins et al. 2004
Pinus lambertiana	$\ln(b_{bark}) = -5.295 + 2.6186 \ln(dbh)$	kg, _, cm, _	Jenkins et al. 2004
Pinus lambertiana	$\ln(b_{live\ branches}) = -7.637 + 3.3648 \ln(dbh)$	kg, _, cm, _	Jenkins et al. 2004
Pinus lambertiana	$\ln(b_{dead\ branches}) = -5.413 + 2.172 \ln(dbh)$	kg, _, cm, _	Jenkins et al. 2004
Pinus lambertiana	$\ln(b_{foliage}) = -4.023 + 2.0327 \ln(dbh)$	kg, _, cm, _	Jenkins et al. 2004
Pinus lambertiana	$\ln(b_{new\ foliage}) = -5.846 + 2.085 \ln(dbh)$	kg, _, cm, _	Jenkins et al. 2004

Species	Equation	Units (b, v, dbh, h)	Source
Pinus monticola	$b_{tree} = 20800 + 0.1544\ dbh^2h$	g, _, cm, cm	Means 2005
Pinus monticola	$b_{bark} = 1200 + 0.0112\ dbh^2h$	g, _, cm, cm	Means 2005
Pinus monticola	$b_{stem\ no\ bark} = 2300 + 0.1204\ dbh^2h$	g, _, cm, cm	Means 2005
Pinus ponderosa	$b_{stem\ no\ bark} = 0.011\ dbh^{2.7587}$	kg, _, cm, _	Ter-Mikaelian and Korzukhin 1997
Pinus ponderosa	$b_{bark} = 0.0144\ dbh^{2.2312}$	kg, _, cm, _	Ter-Mikaelian and Korzukhin 1997
Pinus ponderosa	$b_{foliage} = 0.0119\ dbh^{2.0967}$	kg, _, cm, _	Ter-Mikaelian and Korzukhin 1997
Pinus ponderosa	$b_{live\ branches} = 0.0045\ dbh^{2.7185}$	kg, _, cm, _	Ter-Mikaelian and Korzukhin 1997
Pseudotsuga menziesii (coast)	$\ln(b_{foliage}) = 4.0616 + 1.7009 \ln(dbh)$	g, _, cm, _	Means 2005
Pseudotsuga menziesii (coast)	$\ln(b_{live\ branches}) = 3.2137 + 2.1382 \ln(dbh)$	g, _, cm, _	Means 2005
Pseudotsuga menziesii (coast)	$\ln(b_{dead\ branches}) = 3.3788 + 1.7503 \ln(dbh)$	g, _, cm, _	Means 2005
Pseudotsuga menziesii (coast)	$\ln(b_{stem\ no\ bark}) = 3.8682 + 2.5951 \ln(dbh)$	g, _, cm, _	Means 2005
Pseudotsuga menziesii (coast)	$\ln(b_{bark}) = 2.5975 + 2.43 \ln(dbh)$	g, _, cm, _	Means 2005
Pseudotsuga menziesii (Sierra)	$b_{tree} = 1054 + 0.2057\ dbh^2h$	g, _, cm, cm	Means 2005
Pseudotsuga menziesii (Sierra)	$b_{stem} = -115 + 0.1896\ dbh^2h$	g, _, cm, cm	Means 2005
Quercus agrifolia	$b_{tree} = \mathrm{Exp}(-2.0127 + 2.4342 \ln(dbh)$	kg, _, cm, _	Jenkins et al. 2003
Quercus chrysolepsis	$\ln(v_{tree}) = 1.4735389 + 2.20527 \ln(dbh) + 0.6119 \ln(h)$	_, cm^3, cm, cm	Means 2005
Quercus chrysolepsis	$\ln(v_{stem\ no\ bark}) = -0.211699 + 2.32519 \ln(dbh) + 0.74348 \ln(h)$	_, cm^3, cm, cm	Means 2005
Quercus kelloggii	$\ln(v_{tree}) = 0.5509162 + 1.97437 \ln(dbh) + 0.85034 \ln(h)$	_, cm^3, cm, cm	Means 2005
Quercus kelloggii	$\ln(v_{stem\ no\ bark}) = -0.183607 + 2.12635 \ln(dbh) + 0.83339 \ln(h)$	_, cm^3, cm, cm	Means 2005
Sequoia sempervirens (old-growth)	$\log_{10}(v_{stem\ no\ bark}) = 0.9784 \log_{10}(dbh^2h) - 0.4843$	_, m^3, m, m	Busing and Fujimori 2005
Sequoia sempervirens (secondary)	$v_{stem\ no\ bark} = 0.0283 * 0.0007903 * (3.28\ dbh)^{1.792}\ (3.28\ h)^{1.282}$	_, m^3, m, m	Wensel and Krumland 1983

Species	Equation	Units (b, v, dbh, h)	Source
Sequoia sempervirens (old-growth)	$b_{tree} = 0.38\ 1.12\ v_{stem\ no\ bark}$	t, m^3, _, _	Busing and Fujimori 2005
Sequoia sempervirens (secondary)	$b_{tree} = 0.33\ 1.12\ v_{stem\ no\ bark}$	t, m^3, _, _	Busing and Fujimori 2005
Torreya californica	$b_{tree} = \text{Exp}(-2.5384 + 2.4814 \ln(dbh))$	kg, _, cm, _	Jenkins et al. 2003
Umbellaria californica	$b_{tree} = \text{Exp}(-2.48 + 2.4835 \ln(dbh))$	kg, _, cm, _	Jenkins et al. 2003

Variables: b_{bark} = biomass of bark of stem, $b_{dead\ branches}$ = biomass of dead branches, $b_{foliage}$ = foliage biomass, $b_{live\ branches}$ = biomass of live branches, $b_{new\ foliage}$ = biomass of new foliage, b_{stem} = biomass of stem with bark, $b_{stem\ no\ bark}$ = biomass of stem without bark, b_{tree} = total aboveground biomass of a tree, dbh = diameter at breast height (at height = 1.37 m), $\text{Exp}(x) = e^x$, h = height, $v_{stem\ no\ bark}$ = volume of stem without bark, v_{tree} = total aboveground tree volume.

Table 3. Fraction (%) of trees and forest carbon (C) in each area, by species, for trees of *dbh* ≥ 19.5 cm.

		North Yuba		Garcia		Mailliard	
Species	Common name	trees	C	trees	C	trees	C
Abies concolor	white fir	46	50				
Abies magnifica	red fir	14	20				
Acer macrophyllum	bigleaf maple	1	<1			1	<1
Arbutus menziesii	Pacific madrone			5	6	6	3
Calocedrus decurrens	incense cedar	3	1				
Lithocarpus decurrens	tanoak			27	47	50	22
Pinus jeffreyi	jeffrey pine	<1	<1				
Pinus lambertiana	sugar pine	9	9	3	2		
Pinus monticola	western white pine	1	1				
Pinus ponderosa	ponderosa pine	1	2				
Pseudotsuga menziesii	Douglas-fir	10	13	28	29	16	38
Quercus agrifolia	coast live oak			1	1		
Quercus chrysolepis	canyon live oak	6	1	3	2	1	<1
Quercus kelloggii	California black oak	9	3	2	2		
Sequoia sempervirens	coast redwood			28	9	24	36
Torreya californica	California nutmeg			1	<1	2	<1
Umbellularia californica	California laurel			1	2	<1	<1

Table 4. Species of shrubs or trees growing in shrub form recorded in the field plots.

Species	Common name	Garcia-Mailliard	North Yuba
Acer glabrum	mountain maple		√
Arctostaphylos nevadensis	pinemat manzanita		√
Arctostaphylos patula	greenleaf manzanita		√
Chrysolepis sempervirens	bush chinquapin		√
Cornus nuttallii	Pacific dogwood		√
Quercus chrysolepis	canyon live oak		√
Quercus vaccinifolia	huckleberry oak		√
Quercus wislizeni	interior live oak	√	
Rubus sp.	blackberry		√
Symphoricarpos mollis	creeping snowberry		√
Vaccinium caespitosum	dwarf huckleberry		√
Vaccinium ovatum	evergreen huckleberry	√	