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Phytomass in Southeast Alaska

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Abstract

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Phytomass tables are presented for the southeast Alaska archipelago. Average phytomass for each sampled species of tree, shrub, grass, forb, lichen, and moss in 10 forest and 4 nonforest vegetation types is shown.

Keywords: Alaska, southeast, phytomass, biomass, inventory, wildlife, plant ecology.

Summary

Phytomass tables are presented for the southeast Alaska archipelago. Average phytomass for each sampled species of tree, shrub, grass, forb, lichen, and moss in 10 forest and 4 nonforest vegetation types is shown. These data provide a tool for estimating habitat carrying capacity for many wildlife species. They also may be used for estimating extent of the resources for traditional uses, such as berry production, and relative abundance of other plants that may be important to a subsistence lifestyle. Tree phytomass is reported for the entire aboveground tree, thereby allowing estimates of total fiber content.

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Introduction

The Pacific Resource Inventory, Monitoring, and Evaluation (PRIME) Program of the USDA Forest Service, Pacific Northwest Research Station, has responsibility for measuring and evaluating resources in Alaska, California, Oregon, Washington, and Hawaii. The Alaska PRIME unit has developed vegetation measurement techniques using phytomass estimates that quantify nonforest and marginal forest areas as well as heavily timbered vegetation types.

The coastal rain forest of southeast Alaska is dominated by Sitka spruce, western hemlock, cedar, and lodgepole pine. Nonforest areas occur at high elevations and on steep slopes and avalanche chutes, as well as boglands. It is an area dominated by old growth, and is culturally and environmentally sensitive. Southeast Alaska is valuable spawning ground for anadromous salmon, and it has several wildlife species that depend on old-growth ecosystems to different degrees. Traditional timber inventory procedures give a limited assessment of such resources. Timber inventories normally concentrate on highly productive forest lands and large trees, but this inventory sought to gain additional information about the vegetation resource over the whole ecosystem. Consequently, multiresource procedures were developed to measure all types of vegetation on both forest and nonforest land. A major objective of this procedure development was to incorporate phytomass estimates by plant species (Mead 1992).

Several habitat evaluation models have been constructed for wildlife populations in Alaska and elsewhere, which require knowledge of vegetation resources in the area of interest (Hanley and Rogers 1989, Hobbs and Swift 1985, Lennartz and McClure 1979, Sheffield 1982, Telfer 1980, U.S. Department of the Interior, Fish and Wildlife Service 1980, Walmo and others 1977). Foliar cover and phytomass estimates by species provide inputs into wildlife models (Mead and others 1987). This type of vegetation data also has been applied successfully in classifying forest vegetation into plant associations (Reynolds 1990). Plant associations were then used in a system for rating the risk of spruce-beetle (*Dendroctonus rufipennis* (Kirby)) outbreaks on the Kenai Peninsula (Reynolds and Hard 1991).

The multiresource inventory of the 10.878 million-hectare southeast Alaska unit (fig. 1) was conducted in 1982-83 by using the Alaska Integrated Resource Inventory System (AIRIS). The southeast inventory unit lies between 130.00° and 141.00° W. longitude and 54°30' and 60° N. latitude. It encompasses U.S. lands from the Canadian border on the southern and eastern ends of the panhandle north to the U.S.-Canada boundary on the 141st degree of longitude. At the point where the 141st degree of longitude boundary bears east, the survey unit boundary runs southwest through the center of Icy Bay. This area encompasses 7.36 percent of the land mass of Alaska.

Methods

The AIRIS used regression sampling in a multiphase statistical design. This design called for selected 8-hectare sample plots to be located and measured at four phases:

1. LANDSAT satellite multispectral scanner imagery (MSS).
2. High-altitude, small-scale infrared photography (HAP) 1:60,000 scale.
3. Large-scale infrared photography (LSP) 1:5,000 scale.
4. Ground-measured plots.

All plots were described by using the Alaska vegetation classification system.[1] Statistical analysis, using this system, produced area estimates by vegetation type.

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[1] Viereck, Leslie A.; Dyrness, C.T.; Batton, A.R. 1986. The 1986 revision of the Alaska vegetation classification. Anchorage, AK: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 112 p. (Plus bibliography). Unpublished report. On file with: Pacific Northwest Research Station, Forestry Sciences Laboratory, 3301 C Street, Suite 200, Anchorage, AK 99503-3954.

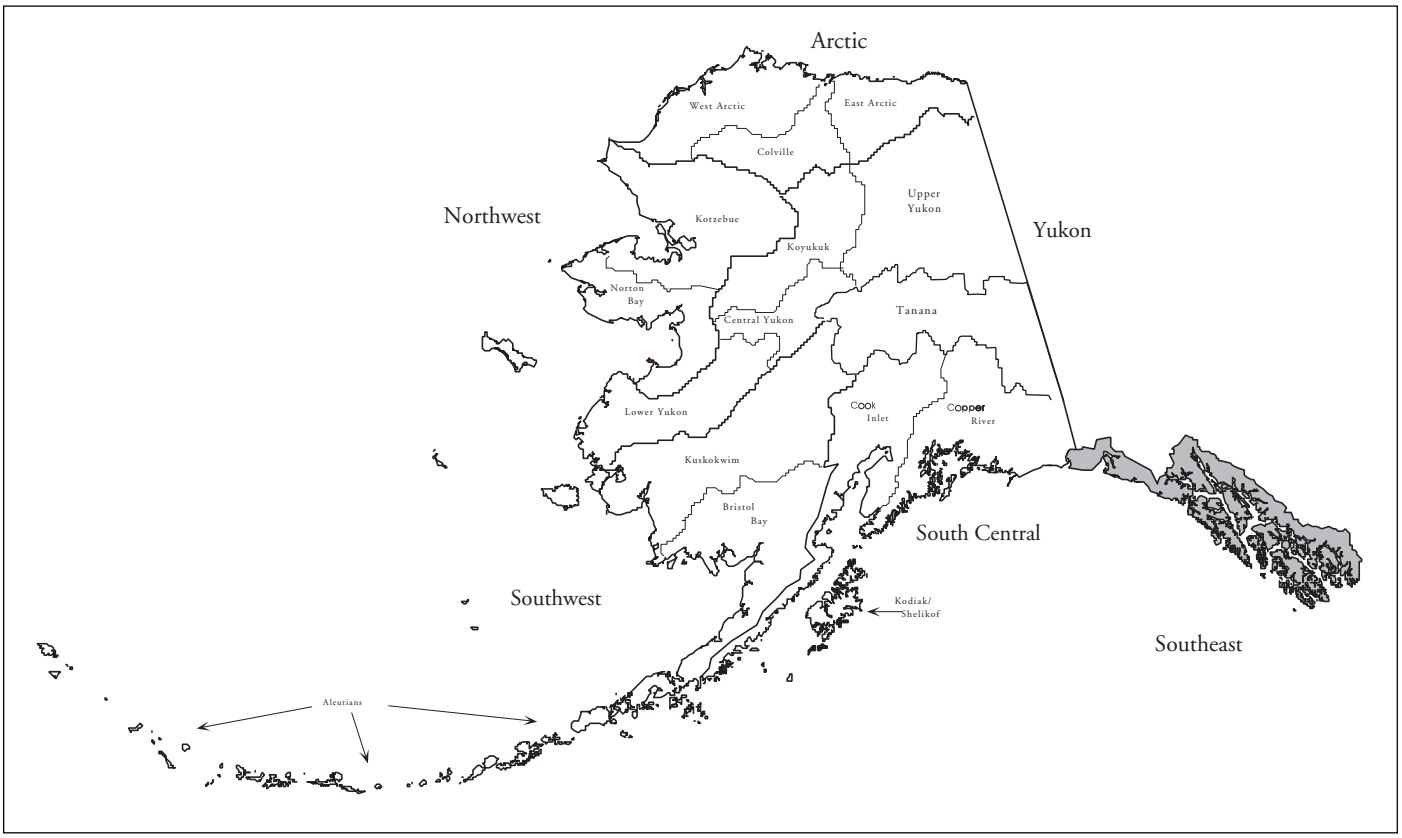

Figure 1—Location of the southeast Alaska unit within Alaska.

Sampling Grid

Sample plots were located on uniformly spaced geographic grids in both forest and nonforest vegetation types by using a metric map coordinate system, the Universal Transverse Mercator (UTM) grid. LANDSAT MSS samples were taken every 5 kilometers. Vegetation types were delineated and classified on an 8-hectare circular plot on high-altitude, small-scale (1:60,000) color infrared photography every 10 kilometers. Vegetation was type-mapped on large-scale, color infrared photography every 20 kilometers. Ground measurement samples were taken every 40 kilometers; however, because so many plots in this unit were ice and snow, an additional set of 31 plots were randomly selected from the 20-kilometer LSP grid to be ground sampled. The number of vegetated ground plots was chosen by estimating the number of multiresource plots that could be measured in two field seasons, based on previous work in the Tanana River basin. This resulted in ground samples at 85 locations. At each of these locations, an 8-hectare circular area was sampled which often represented several distinct vegetation types. A total of 401 tree plots and 167 vegetation plots were measured at these 85 locations. These represented about 149 type-mapped polygons. Figure 2 gives a graphic representation of the sampling grids. The following tabulation shows the proportion of the area sampled at each sampling level:

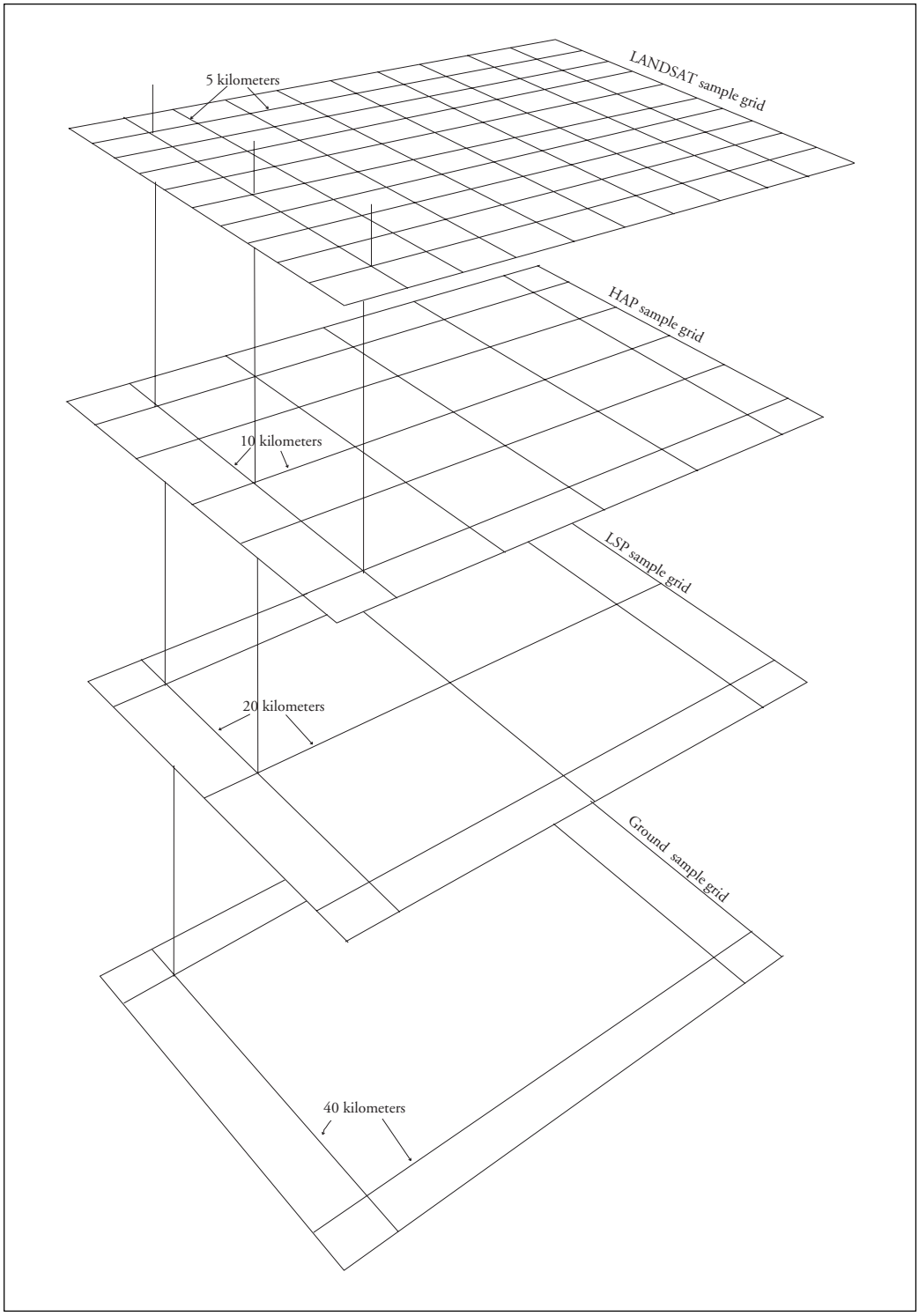

Figure 2—Sample grid spacing at each sampling phase: LANDSAT satellite, high-altitude photography (HAP), large-scale photography (LSP), and ground-sampling phases.

Table 1—Alaska vegetation classification system

Level 1	Level II	Level III[a]
Forest	Needleleaf	Closed (60-100% canopy closure) Open (25-59% canopy closure) Woodland (10-24% canopy closure)
	Broadleaf	Closed (60-100% canopy closure) Open (25-59% canopy closure) Woodland (10-24% canopy closure)
	Mixed	Closed (60-100% canopy closure) Open (25-59% canopy closure) Woodland (10-24% canopy closure)
Scrub	Dwarf tree	Closed (60-100% canopy closure) Open (25-59% canopy closure) Woodland (10-24% canopy closure)
	Tall (> 1.5 meters)	Closed (75-100% canopy closure) Open (25-74% canopy closure)
	Low (0.2 meters to 1.4 meters)	Closed (75-100% canopy closure) Open (25-74% canopy closure)
	Dwarf (< 0.2 meters)	Closed (75-100% canopy closure) Open (25-74% canopy closure)
Herbaceous	Graminoid	Dry Mesic Wet
	Forb	Dry Mesic Wet
	Bryoid	Moss Lichen
	Aquatic	Freshwater Brackish Marine

[a] Level III of dwarf scrub was modified for this inventory from dryas, ericaceous, and willow categories to closed and open categories because of remote sensing limitations in determining small shrub species on aerial photographs.

Sample phase	Proportion of area sampled
Satellite imagery	1 hectare sampled for every 12.5 hectares on the ground
High-altitude photos (HAP)	1 hectare sampled for every 1250 hectares on the ground
Large-scale photos (LSP)	1 hectare sampled for every 5000 hectares on the ground
Ground samples	1 hectare sampled for every 16 000 hectares on the ground

Vegetation Classification System

The Alaska vegetation classification system is a multilevel classification, the first level having only three categories: forest, scrub, and herbaceous. The second level uses either species grouping or height class, depending on the category into which the vegetation falls. Level III uses foliar cover for all vegetation except herbaceous. Vegetation on each 8-hectare plot was type-mapped and classified down to level III at all photo sample levels, and for forest plots, to level IV at the large-scale photo and ground level. There were not enough plots in some categories to develop statistically significant estimates at level III or IV, so some tables report only at level I or II. An abbreviated description of the classification system is given in table 1, and the area in each category is shown in table 2. Ground plots were described down to level IV, a species descriptive level which is not shown in the following abbreviated outline.

Table 2—Area by vegetation type, southeast Alaska

Vegetation type	Area	Proportion
	Thousands of hectares	*Percent*
Closed-canopy needleleaf forest	3678.22	33.8
Open-canopy needleleaf forest	1338.73	12.3
Open-canopy needleleaf woodland	291.00	2.7
Closed-canopy broadleaf forest	137.15	1.3
Open canopy broadleaf woodland	247.78	2.3
Closed mixed broadleaf-needleleaf forest	41.98	.4
Dwarf tree scrub	339.99	3.1
Tall shrub scrub	823.31	7.6
Low shrub scrub	217.54	2.0
Dwarf shrub scrub	178.51	1.6
Herbaceous	357.59	3.3
Barren	2883.77	26.5
Water	342.41	3.1
Total, all types	10 877.96	100.0

Ground Sampling

Each 8-hectare ground sample area was permanently established by using land-survey referencing techniques. Sample trees were selected by using a relascope at each of 19 points within the 8-hectare area (fig. 3). Basal area factors of 9 square meters per hectare and 6.25 square meters per hectare were used to select sample trees.

We considered several alternatives for measuring nontree vegetation and tree seedlings. These included the following:

1. Measuring percentage of cover at set height intervals (every 0.5 meter).

2. Taking one height measurement for all plants in a particular group such as shrubs, forbs, and grasses.

3. Measuring the height and percentage of cover of each plant.

4. Using a unique parameter (for example, basal area and leaf length) to predict phytomass for each species rather than using percentage of cover as the predictor for all species.

The plot measurement techniques we finally chose we call a horizontal-vertical vegetation measurement plot (HV plot). This plot has a circular fixed radius with an area of 0.01 hectare (5.64-meter radius). On these HV plots, the percentage of foliar cover in each natural layer was estimated by using procedures developed by Daubenmire (1959). In a typical vegetation type, there are several natural layers: ground cover, forbs and grasses, low shrubs, tall shrubs, and trees. The heights of these layers differs from bottomland to alpine sites; however, because vegetation types may lack one of the layers, field crews were allowed to determine which layers were present. The heights of these natural layer breaks were measured and recorded, thereby allowing percentage of cover to be measured at variable heights, depending on the type of vegetation found on the plot. Sometimes plants would extend over more than one layer with a different percentage of cover in each layer.

This method was more descriptive than simply measuring plant cover at predetermined height intervals or taking one height measurement for all shrubs or forbs, etc. It was also more cost-effective than measuring height and cover on each plant or using a unique parameter for each plant to predict biomass. Using plant cover as a universal predictor for all nontree vegetation added speed and uniformity as well as cost savings.

Phytomass Estimation

Both the nontree phytomass coefficients and the tree phytomass equations were taken from previous studies (Alemdag 1984; Manning and others 1984; Yarie and Mead 1988, 1989; Singh 1983).

Phytomass was expressed in terms of ovendry weight, the unit of measure most commonly used across all plant groups.

Phytomass was calculated for various types of vegetation in the following way:

Tree Phytomass

We determined tree phytomass by using diameter at breast height (d.b.h.) and total tree height measurements and applying these to species phytomass equations. Tree phytomass shown in all tables is total aboveground weight including foliage.

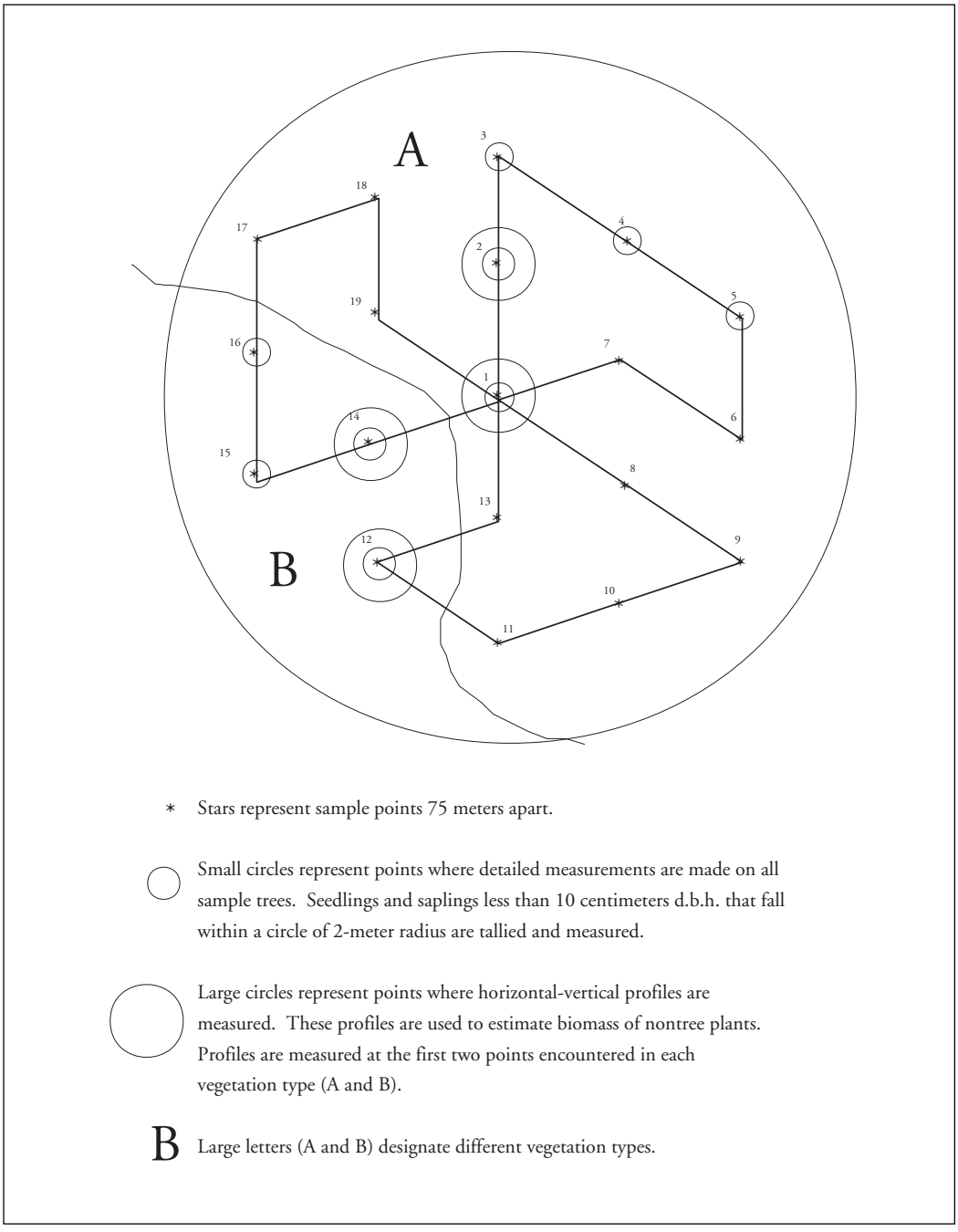

Figure 3—Distribution of 19 ground sampling points within the 8-hectare circular area.

Whole-tree phytomass equations were chosen by searching the available literature for tree species equations in areas geographically and climatically similar to interior Alaska. Where several species equations were available, one was selected by using the following evaluation criteria:

1. Equations using d.b.h. and total tree height as predictors were preferred to equations using diameter only. Tree height has been shown to better reflect site differences in total tree weight.

2. Equations developed in an area similar in latitude and climate to interior Alaska were preferred.

3. Equations developed by using a wide diameter range of trees were selected over those that did not.

4. Equations using the largest number of trees and having the lowest standard errors were preferred.

5. Sets of equations predicting both whole tree weight as well as weight of individual components (for example, bole, branch, and foliage) were preferred over those that did not.

6. Equations using metric standards of measurement and metric outputs were preferred over those that did not.

Species	Equation source
Sitka spruce	British Columbia, Canada (Standish 1983)
Western hemlock	Washington and Oregon (Shaw 1977)
Mountain hemlock	British Columbia, Canada (Krumlik 1974)
Alaska yellow cedar	British Columbia, Canada (Standish 1983)
Lodgepole pine	British Columbia, Canada (Adamovich 1975)
Western redcedar	Washington and Oregon (Shaw 1977)

Seedling phytomass of tree species was estimated by using HV plot percentage of cover data and phytomass coefficients.

Dead-tree phytomass was estimated by using the live-tree equations. The weight predicted was then reduced by a set percentage based on a field classification into one of six snag- or log-condition classes representing different stages of decomposition. Our snag-log condition classes are a modification of earlier descriptions by Maser and others (1979):

Condition class	Percent of deduction
Dead, intact	0
Loose bark; secondary branches gone	20
Clean, no branches	40
Clean, broken bole	60
Broken and decomposing	80
Decomposed	100

Tables displaying the vertical weight distribution of phytomass are available from the PRIME program. These may be useful in determining amount of browse that is either available above a certain snow depth or obtainable for a particular animal. Space limitations prevent their inclusion in this report. These tables are available for plants within the lowest two meters of height on the HV plot.

Nontree Phytomass

Shrubs, forbs, grasses, lichens, and mosses—

1. We applied species-specific coefficients to the percentage of cover and height measurements.

2. If a species-specific coefficient had not been developed for that plant, we applied a coefficient for the most similar plant.

Coefficients

The Alaska inventory team developed phytomass coefficients to predict the ovendry weight of a plant from average percentage of foliar cover and height. They developed the coefficients through cooperative studies with the University of Alaska, Fairbanks (Yarie and Mead 1988). The studies produced phytomass predictors for 120 of the most common species encountered. These species represent major plant taxonomic families and life forms, including lichens and mosses. A special consideration arose in the case of mosses, which in peat conditions can extend many feet below the ground surface. Only the green, active portion of moss phytomass is predicted by this method.

Percentage of foliar cover for each sampled species was related to ovendry phytomass by means of regression analysis. This analysis showed a straight line relation between percentage of foliar cover and weight. The slope of that line is referred to as a phytomass regression coefficient.

Phytomass coefficient development followed techniques similar to those first used by Harcombe and Marks (1977) in a mesic forest in Texas, which are applicable to other areas as well. The original research was done by using U.S. Customary measurements to determine plot sizes and heights. They involve using a three-dimensional sampling frame made of rope or plastic pipe to randomly sample a set volume of vegetation 0.6096 meter wide, 0.9144 meter long, and 2.45 meters high. Foliar cover is measured for each plant species, and plants are clipped, bagged, ovendried, and weighed in vertical segments of 0.3048 meter. A regression analysis related foliar cover and measured weights to develop an equation for predicting weight from measured foliar cover for each species. The regression analysis resulted in a set of regression coefficients that could be used with height measurements to predict phytomass. Because height measurements on inventory plots are taken to a resolution of 10-centimeters, the coefficients were developed to predict for a 10-centimeter segment, even though the cover estimate used in their development was only done for 30.48-centimeter segments. The associated weight and cover was proportioned evenly for each 30.48-centimeter segment. Thus, regression coefficients predicted weight for a 10-centimeter segment based on percentage of the plot area with foliar cover. Measuring the height of the plants in each inventory sample plot allows us to determine the number of 10-centimeter vertical segments and thus the total phytomass.

Table 3—Plant group and range of coefficient of determination (r^2) associated with phytomass coefficients

Plant group	Range of r^2
Mosses	0.67-0.99
Ferns	.57- .93
Grasses	.66- .97
Forbs	.41- .97
Midsize shrubs	.64- .98
Tall shrubs	.55- .86

A discussion of errors associated with the regression coefficients is available in Yarie and Mead (1989). Over 70 percent of the regression equations had r^2 greater than 0.70. An r^2 of 0.70 indicates that 70 percent of the variation in weight was associated with the amount of foliar cover. At lower r^2 values, less of the variation is accounted for by a percentage of cover estimate and a less reliable estimate of weight is predicted from percentage of cover for that plant relative to a plant with a higher r^2. An r^2 of 1.00 would indicate a 100-percent correlation between foliar cover and plant weight. A brief summary of r^2 for plant groups is given in table 3.

Results

Forested Vegetation Types

Distribution of phytomass by plant species is displayed in all tables. Appendix table 6 shows the distribution of tree phytomass on forested vegetation types in the southeast Alaska archipelago. Live tree phytomass in the closed-canopy needleleaf vegetation type is 166 381 kilograms per hectare compared to 47 933 kilograms per hectare reported in the Tanana River basin of interior Alaska (Mead 1995). 0n average, woodland (with only 10 to 25 percent canopy cover) in southeast Alaska had almost as much live tree phytomass (46 072 kilograms per hectare) as did closed-canopy needleleaf forest in the interior of Alaska (47 933 kilograms per hectare). The woodland phytomass had only 28 percent as much live tree phytomass as the closed-canopy type. Dead tree phytomass was 7.69 percent of live phytomass in the closed-canopy forest type and ranged from 4.60 percent to 5.73 percent in the other forest types. Woodland needleleaf forest had the lowest percentage of dead tree phytomass (4.60 percent).

The shrublike, dwarf-tree type had only 13 percent (21 900 kilograms per hectare) as much live tree phytomass as the closed-canopy, needleleaf forest type (166 381 kilograms per hectare). The dwarf-tree type occupies only 3.1 percent of the total land area compared with 33.8 percent of the land area occupied by the high phytomass closed-canopy forest, making it a minor component of total phytomass.

Table 4—Plant species count and number of sample locations by forest vegetation type, southeast Alaska

Plant group	Closed needleleaf forest	Open needleleaf forest	Woodland needleleaf forest
		Number of species	
Trees	6	6	5
Shrubs	34	36	26
Forbs	65	84	45
Grasses	9	12	9
Lichens	15	12	7
Mosses	22	20	15
Total	151	170	107
		Number of locations	
	55	25	7

Phytomass of shrubs and other plants was highest in the tall shrub vegetation type (16 164 kilograms per hectare) and lowest in the herbaceous type (2049 kilograms per hectare).

Among forest vegetation types, the total number of plant species was highest in the open-canopy, needleleaf type with 170 different species encountered (table 4). This same type had the highest number of species in interior Alaska, although there the number of different species was only 156. Lowest number of species in the forest category was found on the woodland needleleaf vegetation type with 107 (table 4). The number of species encountered is dependent on the number of plots measured, the size of plots used, the dispersion of the vegetation type, the ability of the crew to distinguish among species, and many other factors in addition to the natural diversity present. The table of species counts per vegetation type is not a species diversity index, but it is a method by which vegetation diversity can be preliminarily assessed or ranked within broad categories.

Nonforest Vegetation Types

Total aboveground phytomass on nonforested vegetation types ranges from a low of 2987 kilograms per hectare in the herbaceous type to 21 862 kilograms per hectare in the tall shrub type. Even on nonforest vegetation types (with less than 10 percent tree crown closure), there is some tree phytomass. This ranges from none on some barren types to 5698 kilograms per hectare on tall shrub types. Shrub phytomass expressed as a percentage was highest on the tall shrub type comprising 64 percent of the total phytomass and lowest on the herbaceous type at only 32 percent of the total. Shrub phytomass ranged from a high of 14 100 kilograms per hectare to a low of 962 kilograms per hectare. Distribution of other components is shown below:

Type of vegetation	Minimum/ maximum	Proportion of total phytomass	Vegetation type
		Percent	
Shrubs	High	61	Tall shrub type
	Low	31	Herbaceous type
Lichens	High	1	Tall shrub type
	Low	<1	Herbaceous type
Moss	High	2	Tall shrub type
	Low	10	Herbaceous type
Forb	High	25	Herbaceous type
	Low	7	Tall shrub type
Grass	High	3	Herbaceous type
	Low	<1	Tall shrub type

Among nonforest vegetation types, the total number of plant species was highest in the tall shrub type with 114 different species encountered (table 5). This compares with a high of 170 on open needleleaf forest in southeast Alaska and with a range of 75 to 81 on tall shrub types in the Tanana River basin of interior Alaska. The lowest number of species in the nonforest category was found in the low shrub type with 68 (table 5). In contrast, the low shrub type in interior Alaska had the highest numbers of species (105) of any nonforest type. The number of species encountered is dependent on the number of plots measured, the size of plots used, the dispersion of the vegetation type, the ability of the crew to distinguish among species, and many other factors in addition to the natural diversity present. The table of species counts per vegetation type is not a species diversity index, but it is a method by which vegetation diversity can be preliminarily assessed or ranked within broad categories.

Table 5—Plant species count and number of sample locations by nonforest vegetation type, southeast Alaska

Plant group	Dwarf-tree scrub	Tall shrub	Low shrub	Herbaceous
		Number of species		
Trees	6	3	1	4
Shrubs	23	15	12	20
Forbs	34	71	45	52
Grasses	6	5	2	6
Lichens	11	7	1	4
Mosses	16	13	7	10
Total	96	114	68	96
		Number of locations		
	8	12	2	4

Conclusion

The vegetative resources in the southeast Alaska archipelago are vast and varied. This inventory was a first attempt by the Alaska PRIME unit to characterize and quantify the nonforest vegetation as well as to estimate tree biomass volumes. The data presented provide some comparison among vegetation types in both the quantity and diversity of the resource. The Alaska PRIME unit is continuing to refine and develop methods for quantifying and analyzing the vegetative resource with the objective of providing information useful to resource managers.

English Conversions

1 millimeter = 0.039 inch
1 meter = 3.281 feet or 1.094 yards
1 decimeter = 3.3937 inches
1 hectare = 2.471 acres
1 square meter = 10.7639 square feet
1 cubic meter = 1.308 cubic yards
1 kilogram = 2.205 pounds
1 kilogram per hectare = 0.89218 pound per acre
1.120 85 kilograms per hectare = 1 pound per acre
1 kilometer = 0.6214 mile

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Appendix A: Phytomass on General Vegetation Types

Tables 6-12 summarize forest and nonforest types and tables 13-23 give species data on individual level III types (in the Alaska vegetation classification system), which may be more useful in models of wildlife carrying capacity. Tables 24-29 list the scientific naming authority for each species encountered and provide additional information on frequency of occurrence and the phytomass coefficient used for each species.

For all tables, genus names are used when the plant was not keyed to species; therefore, when a genus name occurs in a table without an attached species name, it may include several species, including some of the species that are identified separately elsewhere in the table.

Table 6—Aboveground phytomass of trees on general vegetation types in southeast Alaska

	Vegetation type and crown-closure percentage						
	Closed[a] needleleaf forest	Open needleleaf forest	Woodland needleleaf forest	Dwarf tree scrub nonforest	Tall[b] shrub nonforest	Low shrub nonforest	Herbaceous nonforest
Species	60-100	25-59	10-24	10-100	25-100	25-100	0-100
	Kilograms per hectare						
Chamaecyparis nootkatensis	25 488	11 698	9884	3262	—	—	4
Picea sitchensis	49 208	17 117	9468	2987	5126	—	15
Pinus contorta	5287	7847	19 265	11 275	—	—	654
Thuja plicata	2646	1693	—	442	—	—	—
Tsuga heterophylla	58 182	12 305	1321	255	85	—	—
Tsuga mertensiana	25 570	22 461	6134	3679	487	1700	265
Total, needleleaf	166 381	73 121	46 072	21 900	5698	1700	938
Total, live trees	166 381	73 121	46 072	21 900	5698	1700	938
% of live phytomass	(97.48)	(93.93)	(90.81)	(92.86)	(26.06)	(35.67)	(31.40)
Total, other plants	4304	4722	2330	1684	16 164	3066	2049
Total, live plants	170 686	77 843	48 402	23 584	21 862	4766	2987
Downed trees and logs	651	—	—	—	—	—	—
Standing dead trees	13 566	4734	2332	1351	—	—	—
Total, dead trees	14 217	4734	2332	1351	—	—	—
Total, live and dead	184 903	82 577	50 734	24 935	21 862	4766	2987

— = plant not sampled in this type.

[a] Closed and open refer to crown-canopy closure.

[b] Tall shrubs are greater than 1.5 meters tall. Low shrubs are 20 centimeters to 1.5 meters tall.

Table 7—Aboveground phytomass of shrubs on general vegetation types in southeast Alaska

	Vegetation type and crown-closure percentage						
	Closed[a] needleleaf forest	Open needleleaf forest	Woodland needleleaf forest	Dwarf tree scrub nonforest	Tall[b] shrub nonforest	Low shrub nonforest	Herbaceous nonforest
Species	60-100	25-59	10-24	10-100	25-100	25-100	0-100
	Kilograms per hectare						
Alnus crispa	—	—	1	—	—	—	—
Alnus sinuata	468	622	171	16	7177	314	108
Andromeda polifolia	—	t	t	t	—	—	1
Artemisia arctica	—	t	—	—	—	—	—
Artemisia sp.	—	—	—	—	t	—	—
Cassiope mertensiana	2	248	228	431	—	60	220
Cassiope sp.	—	—	70	—	—	—	—
Cassiope stelleriana	t	8	11	20	—	—	11
Cladothamnus pyrolaeflorus	127	291	65	108	25	1108	124
Empetrum nigrum	8	18	66	74	—	—	20
Gaultheria shallon	118	31	—	49	—	—	—
Kalmia polifolia	4	16	40	48	—	—	3
Ledum groenlandicum	t	5	23	19	—	—	3
Linnaea borealis	1	t	—	t	—	—	—
Loiseleuria procumbens	—	t	—	t	—	—	—
Luetkea pectinata	t	2	t	3	—	6	7
Menziesia ferruginea	576	467	333	109	108	2	—
Oplopanax horridus	224	165	—	—	1474	33	—
Phyllodoce aleutica	2	4	6	12	—	—	2
Ribes bracteosum	t	1	—	—	148	141	121
Ribes lacustre	t	1	—	—	—	—	—
Ribes laxiflorum	—	15	—	—	12	—	—
Ribes sp.	2	—	—	—	6	—	—
Rubus arcticus	—	t	1	—	—	—	t
Rubus chamaemorus	t	t	10	7	—	—	—
Rubus parviflorus	3	—	—	—	—	—	—
Rubus pedatus	4	3	1	t	t	—	t
Rubus spectabilis	257	241	18	—	4038	541	199
Sambucus callicarpa	8	—	—	—	25	—	—
Sambucus racemosa	t	15	—	—	462	—	38
Salix sitchensis	t	—	—	—	—	—	—
Salix sp.	—	21	—	—	567	1	—
Sorbus sitchensis	t	5	6	—	—	—	—
Sorbus sp.	t	69	10	—	—	7	—
Spirea douglasii	—	—	—	3	—	—	—
Vaccinium	546	678	—	—	—	90	21
Vaccinum alaskensis	530	273	147	10	19	—	—
Vaccinium caespitosum	2	9	26	24	—	1	—
Vaccinum ovalifolium	206	330	144	124	39	—	29
Vaccinium oxycoccus	t	t	2	1	—	—	2
Vaccinum parvifolium	230	7	—	—	—	—	1
Vaccinium uliginosum	18	17	63	54	—	—	52
Vaccinium vitis-idaea	2	3	3	5	—	—	—
Viburnum edule	t	4	2	—	—	—	—
Total, shrub	3338	3569	1447	1117	14 100	2304	962
% of live phytomass	(1.96)	(4.32)	(2.85)	(4.74)	(64.45)	(48.34)	(32.21)

— = plant not sampled in this type.

t = trace, less than 1 kilogram per hectare.

[a] Closed and open refer to crown-canopy closure.

[b] Tall shrubs are greater than 1.5 meters tall. Low shrubs are 20 centimeters to 1.5 meters tall.

Table 8—Aboveground phytomass of forbs on general vegetation types in southeast Alaska

	Vegetation type and crown-closure percentage						
	Closed[a] needleleaf forest	Open needleleaf forest	Woodland needleleaf forest	Dwarf tree scrub nonforest	Tall[b] shrub nonforest	Low shrub nonforest	Herbaceous nonforest
Species	60-100	25-59	10-24	10-100	25-100	25-100	0-100
	Kilograms per hectare						
Achillea borealis	—	—	—	—	t	—	—
Aconitum delphinifolium	—	t	—	—	t	1	2
Actaea rubra	t	—	—	—	—	—	—
Adiantum pedatum	t	—	—	—	1	—	—
Anemone narcissiflora	—	t	—	—	—	—	3
Anemone sp.	—	—	1	—	—	—	1
Angelica genuflexa	—	1	—	—	—	—	—
Apargidium boreale	—	t	—	t	—	—	—
Aquilegia formosa	—	—	—	—	2	—	—
Arnica latifolia	—	t	—	—	—	—	6
Arnica sp.	—	—	—	—	2	—	—
Aruncus sylvester	2	—	20	—	186	—	—
Athyrium filix-femina	29	66	—	—	751	363	258
Barbarea orthoceras	—	—	—	—	t	—	—
Blechnum spicant	21	19	1	7	—	—	—
Boschniakia rossica	t	—	—	—	—	—	—
Caltha biflora	10	7	—	17	—	—	—
Caltha leptosepala	2	4	5	—	—	—	—
Caltha sp.	—	t	—	—	—	1	—
Castilleja miniata	—	t	—	—	—	—	1
Castilleja parviflora	—	—	—	—	—	—	2
Cardamine umbellata	—	t	—	—	t	1	2
Cardamine sp.	—	—	—	—	—	—	t
Circaea alpina	t	t	—	—	t	—	—
Claytonia sarmentosa	—	—	—	—	—	—	t
Claytonia sibirica	—	t	—	—	t	—	1
Clintonia uniflora	t	t	t	—	t	—	—
Compositae	t	t	t	t	t	4	14
Coptis aspleniifolia	3	3	1	t	—	—	—
Coptis trifolia	t	t	1	1	—	—	t
Cornus canadensis	5	5	t	5	1	—	—
Cornus suecica	2	3	11	2	1	—	1
Cruciferae	—	—	—	—	1	—	—
Crytogramma crispa	—	t	—	—	—	—	t
Dodecatheon jeffreyi	t	t	t	t	—	—	—
Dodecatheon pulchellum	t	t	1	t	—	t	5
Dodecatheon sp.	—	—	—	t	—	—	—

Table 8—Aboveground phytomass of forbs on general vegetation types in southeast Alaska (continued)

Species	Vegetation type and crown-closure percentage						
	Closed[a] needleleaf forest	Open needleleaf forest	Woodland needleleaf forest	Dwarf tree scrub nonforest	Tall[b] shrub nonforest	Low shrub nonforest	Herbaceous nonforest
	60-100	25-59	10-24	10-100	25-100	25-100	0-100
	Kilograms per hectare						
Drosera rotundifolia	t	t	t	t	—	—	t
Drosera sp.	—	t	—	t	—	—	—
Dryopteris dilatata	17	20	1	—	175	3	12
Dryopteris sp.	—	—	—	—	2	—	—
Epilobium hornemannii	—	t	—	—	—	2	t
Epilobium angustifolium	—	1	—	—	—	—	6
Epilobium latifolium	—	—	—	—	t	—	—
Epilobium sp.	—	t	—	—	3	4	—
Equisetum arvense	—	—	—	—	t	—	—
Equisetum sp.	t	t	t	—	t	t	—
Erigeron peregrinus	t	t	1	t	t	1	—
Erigeron purpuratus	t	—	—	—	—	—	—
Erigeron sp.	—	—	—	—	—	t	—
Fauria cristi-galli	8	26	17	23	—	15	69
Fern	—	—	—	—	t	11	—
Forb	t	t	1	t	1	1	2
Fritillaria camschatcensis	—	1	t	—	—	6	2
Galium kamtschaticum	—	—	—	—	—	1	—
Galium sp.	t	t	—	—	—	—	—
Galium trifidum	—	t	—	—	—	—	—
Geocaulon triflorum	t	—	—	—	1	—	—
Gentiana douglasiana	t	1	3	t	—	—	4
Gentiana platypetala	—	—	—	—	—	t	—
Gentiana sp.	—	t	t	—	—	—	—
Geranium erianthum	—	—	—	—	—	—	8
Geocaulon lividum	—	—	t	—	—	—	—
Geum calthifolium	t	t	1	1	—	1	—
Geum macrophyllum	—	—	—	—	1	—	—
Geum sp.	—	—	—	—	—	t	—
Gymnocarpium dryopteris	5	4	t	—	4	2	4
Heracleum lanatum	—	14	—	—	163	18	72
Heuchera glabra	—	t	—	—	t	—	—
Hieracium sp.	—	—	—	—	2	—	—
Hieracium triste	—	t	—	—	—	—	—
Hippuris montana	—	t	—	t	—	t	—
Leptarrhena pyrolifolia	t	t	1	—	—	4	7
Listera caurina	t	t	—	—	—	—	—

Table 8—Aboveground phytomass of forbs on general vegetation types in southeast Alaska (continued)

	Vegetation type and crown-closure percentage						
	Closed[a] needleleaf forest	Open needleleaf forest	Woodland needleleaf forest	Dwarf tree scrub nonforest	Tall[b] shrub nonforest	Low shrub nonforest	Herbaceous nonforest
Species	60-100	25-59	10-24	10-100	25-100	25-100	0-100
	Kilograms per hectare						
Listera cordata	2	1	1	1	—	t	—
Listera sp.	t	—	—	—	—	—	—
Lupinus nootkatensis	—	t	—	—	—	—	3
Lysichiton americanum	64	67	109	3	—	—	—
Maianthemum dilatatum	2	2	1	t	2	—	—
Menyanthes trifoliata	—	t	—	—	—	—	—
Mitella pentandra	—	—	—	—	t	—	—
Mitella sp.	—	—	—	—	t	—	—
Moneses uniflora	t	t	—	—	—	—	—
Mushroom	t	t	t	t	t	t	t
Osmorhiza purpurea	t	t	—	—	t	—	2
Osmorhiza sp.	—	t	—	—	1	t	—
Oxyria digyna	—	—	—	—	1	—	—
Parnassia fimbriata	—	t	—	—	t	—	1
Pedicularis parviflora	—	—	—	—	—	—	3
Petasites hyperboreus	—	—	—	—	t	6	—
Pinguicula vulgaris	—	—	t	t	—	—	—
Plantago macrocarpa	—	3	2	—	—	—	1
Platanthera sp.	t	1	1	t	1	—	3
Polystichum braunii	t	—	—	—	3	—	—
Polystichum munitum	t	—	—	—	—	—	—
Polystichum sp.	—	—	—	—	t	—	—
Potentilla palustris	—	—	14	—	—	—	—
Polypodium vulgare	t	t	—	—	—	—	—
Prenanthes alata	t	t	—	—	t	t	1
Pteridium aquilinum	t	—	—	t	—	—	—
Pyrola secunda	t	—	—	t	—	—	—
Ranunculus cooleyae	—	—	—	—	—	1	—
Ranunculus nivalis	—	—	—	—	1	—	—
Ranunculus sp.	—	t	—	—	1	—	6
Rorippa sp.	—	—	—	—	t	—	—
Romanzoffia sitchensis	—	—	—	—	1	—	—
Sanguisorba menziesii	t	—	—	2	—	—	—
Sanguisorba sp.	t	1	17	1	3	8	46
Sanguisorba stipulata	—	2	2	t	2	—	—
Saxifraga adscendens	—	—	—	—	t	—	—
Saxifraga ferruginea	t	t	—	—	t	—	—

Table 8—Aboveground phytomass of forbs on general vegetation types in southeast Alaska (continued)

Species	Vegetation type and crown-closure percentage						
	Closed[a] needleleaf forest	Open needleleaf forest	Woodland needleleaf forest	Dwarf tree scrub nonforest	Tall[b] shrub nonforest	Low shrub nonforest	Herbaceous nonforest
	60-100	25-59	10-24	10-100	25-100	25-100	0-100
	Kilograms per hectare						
Saxifraga lyallii	—	—	—	—	t	—	—
Saxifraga punctata	—	t	—	—	t	t	1
Saxifraga sp.	t	—	—	—	—	t	1
Sedum rosea	—	—	—	—	t	—	—
Senecio triangularis	—	t	—	—	t	3	10
Smilacina stellata	t	—	—	—	—	—	—
Smilacina sp.	—	1	—	—	—	—	—
Spiranthes romanzoffiana	t	t	1	—	—	—	3
Stellaria crispa	—	—	—	—	—	t	—
Stellaria sp.	—	t	—	—	t	—	1
Streptopus amplexifolius	3	1	1	1	17	t	1
Streptopus roseus	11	5	1	t	3	t	—
Streptopus sp.	t	t	t	—	—	—	—
Streptopus streptopoides	t	1	—	—	t	t	1
Swertia perennis	—	—	2	—	—	—	—
Tellima grandiflora	—	t	—	—	2	—	—
Thelypteris phegopteris	t	t	—	—	1	t	—
Thelypteris sp.	t	—	—	—	—	—	—
Tiarella trifoliata	t	1	t	—	2	t	t
Tiarella unifoliata	t	t	—	—	1	2	t
Tofieldia glutinosa	—	t	t	2	—	—	3
Tolmiea menziesii	—	—	—	—	t	—	12
Trientalis europaea	t	t	1	—	1	—	—
Valeriana sitchensis	t	t	—	—	1	5	4
Veratrum viride	13	57	4	12	120	93	167
Viola glabella	t	t	—	—	5	t	—
Viola langsdorffii	t	t	—	—	t	—	—
Viola sp.	t	1	1	—	t	1	2
Total, forbs	199	319	224	78	1466	558	754
% of live phytomass	(0.12)	(0.44)	(0.44)	(6.23)	(6.72)	(11.71)	(25.03)

— = plant not sampled in this type.
t = trace, less than 1 kilogram per hectare.
[a] Closed and open refer to crown-canopy closure.
[b] Tall shrubs are greater than 1.5 meters tall. Low shrubs are 20 centimeters to 1.5 meters tall.

Table 9—Aboveground phytomass of grass and grasslike species on general vegetation types in southeast Alaska

	Vegetation type and crown-closure percentage						
	Closed[a] needleleaf forest	Open needleleaf forest	Woodland needleleaf forest	Dwarf tree scrub nonforest	Tall[b] shrub nonforest	Low shrub nonforest	Herbaceous nonforest
Species	60-100	25-59	10-24	10-100	25-100	25-100	0-100
	Kilograms per hectare						
Calamagrostis canadensis	—	1	—	—	—	—	—
Calamagrostis nutkaensis	10	t	—	—	2	—	—
Calamagrostis sp.	t	6	15	3	5	—	1
Carex mertensii	—	11	—	—	—	—	—
Carex pauciflora	—	—	2	1	—	—	7
Carex sitchensis	5	t	72	—	—	—	13
Carex sp.	9	16	43	24	4	6	28
Eriophorum sp.	t	6	23	3	—	—	5
Grass	10	5	9	1	6	17	25
Juncus sp.	—	—	2	—	—	—	—
Luzula sp.	t	2	—	—	—	—	—
Phleum commutatum	—	—	—	—	t	—	—
Scirpus sp.	1	2	—	—	—	—	—
Secale sereale	—	t	t	—	—	—	—
Trichophorum caespitosum	t	3	21	8	—	—	—
Total, grasses	35	52	187	40	17	23	79
% of live phytomass	(0.02)	(0.07)	(0.39)	(0.17)	(0.08)	(0.48)	(2.62)

— = plant not sampled in this type.
t = trace, less than 1 kilogram per hectare.
[a] Closed and open refer to crown-canopy closure.
[b] Tall shrubs are greater than 1.5 meters tall. Low shrubs are 20 centimeters to 1.5 meters tall.

Table 10—Aboveground phytomass of lichens on general vegetation types in southeast Alaska

	Vegetation type and crown-closure percentage						
	Closed[a] needleleaf forest	Open needleleaf forest	Woodland needleleaf forest	Dwarf tree scrub nonforest	Tall[b] shrub nonforest	Low shrub nonforest	Herbaceous nonforest
Species	60-100	25-59	10-24	10-100	25-100	25-100	0-100
	Kilograms per hectare						
Alectoria sp.	22	18	40	10	—	—	—
Cetraria sp.	—	—	t	—	2	—	—
Cladina mitis	t	—	—	3	—	—	—
Cladina rangiferina	—	—	—	7	—	—	1
Cladina sp.	40	8	29	33	t	—	11
Cladina bellidiflora	t	t	—	1	—	—	—
Cladonia sp.	1	8	10	28	4	—	9
Hypogymnia enteromorpha	2251	4	t	—	—	—	—
Hypogymnia sp.	t	—	—	—	—	—	—
Lichen	16	10	32	8	392	36	1
Lobaria linita	t	1	3	22	9	—	—
Lobaria oregana	3	—	—	—	—	—	—
Lobaria sp.	4	8	—	—	—	—	—
Nephroma sp.	—	1	—	t	—	—	—
Parmelia sp.	t	2	—	3	3	—	—
Peltigera sp.	8	2	—	—	12	—	—
Pilophoron aciculare	t	—	—	—	—	—	—
Usnea sp.	t	16	—	—	—	—	—
Total, lichens	96	325	118	115	422	36	22
% of live phytomass	(0.06)	(0.42)	(0.23)	(0.49)	(1.79)	(0.76)	(0.74)

— = plant not sampled in this type.
t = trace, less than 1 kilogram per hectare.
[a] Closed and open refer to crown-canopy closure.
[b] Tall shrubs are greater than 1.5 meters tall. Low shrubs are 20 centimeters to 1.5 meters tall.

Table 11—Aboveground phytomass of mosses, clubmosses, and liverworts on general vegetation types in southeast Alaska

	Vegetation type and crown-closure percentage						
	Closed[a] needleleaf forest	Open needleleaf forest	Woodland needleleaf forest	Dwarf tree scrub nonforest	Tall[b] shrub nonforest	Low shrub nonforest	Herbaceous nonforest
Species	60-100	25-59	10-24	10-100	25-100	25-100	0-100
	Kilograms per hectare						
Conocephalum conicum	t	—	—	—	1	—	—
Dicranum sp.	37	27	23	32	1	4	106
Hepaticae	2	2	1	1	1	t	t
Herbertus lutchensis	t	t	—	—	—	—	—
Hookina lucens	t	—	—	—	—	—	—
Hylocomium splendens	82	42	41	34	3	—	1
Hypnum sp.	t	t	—	—	—	—	—
Kindberga praelonga	t	—	—	—	—	—	—
Lycopodium annotinum	2	1	1	1	—	—	—
Lycopodium clavatum	—	t	—	—	—	—	—
Lycopodium sabinaefolium	—	t	—	2	—	—	—
Lycopodium selago	t	1	t	1	t	—	1
Lycopodium sp.	t	t	—	—	—	—	—
Mnium sp.	42	20	3	2	32	15	23
Moss	208	141	23	56	96	109	50
Pleurozium ruthenica	1	—	—	—	—	—	—
Pleurozium schreberi	t	9	19	2	t	—	—
Polytrichum sp.	20	1	t	1	9	2	t
Porella navicularis	t	—	—	1	t	—	—
Ptilium crista-castrensis	2	2	28	3	—	—	—
Rhacomitrium lanuginosum	—	4	1	15	—	—	—
Rhacomitrium sp.	1	t	8	2	—	—	—
Rhytidiadelphus loreus	135	92	52	77	8	—	2
Rhytidiadelphus sp.	47	49	18	—	1	5	38
Sphagnum girgensohnii	2	—	—	—	—	—	—
Sphagnum sp.	41	57	128	103	3	10	81
Total, mosses	621	448	346	333	155	145	302
% of live phytomass	(0.36)	(0.58)	(0.68)	(1.41)	(0.66)	(3.02)	(10.11)

— = plant not sampled in this type.
t = trace, less than 1 kilogram per hectare.
[a] Closed and open refer to crown-canopy closure.
[b] Tall shrubs are greater than 1.5 meters tall. Low shrubs are 20 centimeters to 1.5 meters tall.

Appendix B: Phytomass on Closed-Canopy Needleleaf Forest Vegetation Types

Table 12—Aboveground phytomass of trees on mountain hemlock, hemlock-spruce, and hemlock-cedar vegetation types in southeast Alaska

Species	Vegetation type: Western hemlock-mountain hemlock	Sitka spruce-western hemlock	Western hemlock-Sitka spruce-western redcedar	Yellow cedar-mountain hemlock-western hemlock	Mountain hemlock
	Kilograms per hectare				
Chamaecyparis nootkatensis	6700	—	2622	114 880	2545
Picea sitchensis	32 289	220 328	81 416	33 810	23655
Pinus contorta	—	—	—	23 882	—
Thuja plicata	4	—	999	—	—
Tsuga heterophylla	72 499	110 106	120 799	8375	14 216
Tsuga mertensiana	38150	46838	8618	8693	104 192
Total, needleleaf	149 642	377 272	214 454	189 640	144 608
Total, all live trees	149 642	377 272	214 454	189 640	144 608
% of live phytomass	(97.96)	(99.00)	(98.58)	(98.04)	(94.92)
Total, other plants	3113	3792	3089	3789	7743
Total, all live plants	152 755	381 064	217 543	193 429	152 351
Downed trees and logs	940	—	—	1395	—
Standing dead trees	28 040	4243	2640	19 875	11 700
Total, dead trees	28 979	4243	2640	21 269	11 700
Total, live and dead	181 734	385 307	220 183	214 698	164 051

— = plant not sampled in this type.

Table 13—Aboveground phytomass of shrubs on mountain hemlock, hemlock-spruce, and hemlock-cedar vegetation types in southeast Alaska

Species	Vegetation type				
	Western hemlock-mountain hemlock	Sitka spruce-western hemlock	Western hemlock-Sitka spruce-western redcedar	Yellow cedar-mountain hemlock-western hemlock	Mountain hemlock
	Kilograms per hectare				
Alnus sinuata	—	—	26	117	2063
Cassiope mertensiana	7	—	—	—	4
Cassiope stelleriana	1	—	—	1	1
Cladothamnus pyrolaeflorus	20	—	—	316	382
Empetrum nigrum	41	—	—	12	1
Kalmia polifolia	2	—	—	26	—
Linnaea borealis	1	—	—	3	—
Luetkea pectinata	—	—	—	—	t
Menziesia ferruginea	445	649	583	878	264
Oplopanax horridum	28	244	206	—	883
Phyllodoce aleutica	2	—	—	3	4
Ribes bracteosum	—	25	—	—	—
Ribes lacustre	—	—	1	—	—
Ribes sp.	9	—	3	—	—
Rubus chamaemorus	—	—	—	t	—
Rubus parviflorus	—	—	11	—	—
Rubus pedatus	6	23	4	2	4
Rubus spectabilis	149	236	173	17	987
Salix sitchensis	—	—	—	—	t
Sorbus sitchensis	—	—	—	—	1
Sorbus sp.	—	—	—	—	3
Sambucus callicarpa	—	—	34	—	—
Vaccinium sp.	319	—	412	608	408
Vaccinium alaskensis	989	1492	582	394	665
Vaccinium caespitosum	1	—	2	2	1
Vaccinium ovalifolium	75	103	251	239	244
Vaccinium oxycoccus	—	—	t	—	—
Vaccinium parvifolium	83	—	100	174	t
Vaccinium vitis-ideae	—	—	—	13	—
Total, shrubs	2177	2772	2418	2804	5915
% of live phytomass	(1.43)	(0.73)	(1.11)	(1.45)	(3.88)

— = plant not sampled in this vegetation type.

Table 14—Aboveground phytomass of forbs on mountain hemlock, hemlock-spruce, and hemlock-cedar vegetation types in southeast Alaska

Species	Vegetation type				
	Western hemlock-mountain hemlock	Sitka spruce-western hemlock	Western hemlock-Sitka spruce-western redcedar	Yellow cedar-mountain hemlock-western hemlock	Mountain hemlock
	Kilograms per hectare				
Actaea rubra	—	—	3	—	—
Adiantum pedatus	—	—	t	—	—
Aruncus sylvester	—	—	9	—	—
Athyrium filix-femina	2	63	39	—	73
Blechnum spicant	19	20	5	16	25
Caltha biflora	—	—	—	7	30
Caltha leptosepala	—	—	—	—	14
Circaea alpina	—	t	t	—	—
Clintonia uniflora	7	—	t	—	—
Coptis aspleniifolia	6	13	3	5	5
Coptis trifolia	—	—	—	2	1
Cornus canadensis	4	6	6	6	1
Cornus suecica	12	17	1	3	—
Dodecatheon jeffreyi	—	—	—	t	—
Dodecatheon pulchellum	—	—	t	—	—
Dryopteris dilatata	8	28	49	—	11
Equisetum sp.	—	t	—	1	t
Erigeron purpuratus	—	—	—	t	t
Fauria crista-galli	3	—	—	16	36
Forb	—	—	t	—	t
Galium sp.	—	—	—	—	t
Galium triflorum	—	—	t	—	—
Gentiana douglasiana	—	—	t	1	—
Geum calthifolium	1	—	—	—	—
Gymnocarpium dryopteris	7	21	9	1	3
Leptarrhena pyrolifolia	—	—	t	—	—
Listera cordata	2	13	2	2	4
Lysichiton americanum	99	136	39	121	—
Maianthemum dilatatum	5	—	1	2	—
Moneses uniflora	1	3	t	—	t
Mushroom	t	t	t	t	t
Osmorhiza purpurea	—	—	t	—	—
Platanthera sp.	—	—	t	1	—
Polypodium vulgare	1	—	t	—	—
Polystichum braunii	—	—	3	—	—
Polystichum munitum	—	—	t	—	—
Prenanthes alata	—	—	t	t	—
Pyrola secunda	—	—	—	1	—

Table 14—Aboveground phytomass of forbs on mountain hemlock, hemlock-spruce, and hemlock-cedar vegetation types in southeast Alaska (continued)

Species	Vegetation type: Western hemlock-mountain hemlock	Sitka spruce-western hemlock	Western hemlock-Sitka spruce-western redcedar	Yellow cedar-mountain hemlock-western hemlock	Mountain hemlock
	Kilograms per hectare				
Sanguisorba menziesii	—	—	—	t	—
Sanguisorba sp.	—	—	t	1	—
Saxifraga ferruginea	—	—	—	—	t
Saxifraga sp.	—	—	1	—	—
Smilacina stellata	—	—	—	t	—
Spiranthes romanzoffiana	—	—	—	1	—
Streptopus amplexifolius	6	27	2	t	1
Streptopus roseus	40	14	2	2	24
Streptopus streptopoides	—	1	t	1	t
Thelypteris phegopteris	—	—	1	—	t
Thelypteris sp.	—	—	t	—	—
Tiarella trifoliata	t	1	2	—	2
Tiarella unifoliata	—	2	t	t	1
Trientalis europaea	—	—	t	t	—
Valeriana sitchensis	1	—	—	—	t
Veratrum viride	25	9	3	—	37
Viola glabella	t	—	t	—	—
Viola langsdorffii	—	—	1	—	—
Viola sp.	—	t	t	—	t
Total, forbs	249	374	181	191	268
% of live phytomass	(0.16)	(0.10)	(0.08)	(0.10)	(0.18)

— = plant not sampled in this vegetation type.
t = trace, less than 1 kilogram per hectare.

Table 15—Aboveground phytomass of grass and grasslike species on mountain hemlock, hemlock-spruce and hemlock-cedar vegetation types in southeast Alaska

Species	Vegetation type				
	Western hemlock-mountain hemlock	Sitka spruce-western hemlock	Western hemlock-Sitka spruce-western redcedar	Yellow cedar-mountain hemlock-western hemlock	Mountain hemlock
	Kilograms per hectare				
Calamagrostis nutkaensis	—	—	23	—	—
Calamagrostis sp.	1	—	—	—	—
Carex sitchensis	—	—	—	31	—
Carex sp.	1	—	3	30	5
Grass	—	—	2	41	1
Total, grasses	2	—	28	102	6
% of live phytomass	(0.00)	(0.00)	(0.01)	(0.05)	(0.00)

— = plant not sampled in this vegetation type.

Table 16—Aboveground phytomass of lichens on mountain hemlock, hemlock-spruce, and hemlock-cedar vegetation types in southeast Alaska

Species	Vegetation type				
	Western hemlock-mountain hemlock	Sitka spruce-western hemlock	Western hemlock-Sitka spruce-western redcedar	Yellow cedar-mountain hemlock-western hemlock	Mountain hemlock
	Kilograms per hectare				
Alectoria sp.	3	8	4	121	12
Cladina sp.	4	—	—	—	312
Cladonia bellidiflora	—	—	—	—	t
Cladonia sp.	21	31	7	1	15
Hypogymnia enteromorpha	3	t	1	2	t
Hypogymnia sp.	t	—	—	—	—
Lichen	22	37	9	33	11
Lobaria linita	2	23	1	—	1
Lobaria oregana	t	—	—	23	—
Lobaria sp.	15	—	1	—	3
Parmelia sp.	—	—	t	—	—
Peltigera sp.	15	14	2	11	20
Pilophoron aciculare	t	—	—	—	—
Usnea sp.	—	—	—	—	3
Total, lichens	85	101	25	191	377
% of live phytomass	(0.06)	(0.03)	(0.01)	(0.10)	(0.25)

— = plant was not sampled in this type.
t = trace, less than 1 kilogram per hectare.

Table 17—Aboveground phytomass of mosses and clubmosses on mountain hemlock, hemlock-spruce, and hemlock-cedar vegetation types in southeast Alaska

Species	Vegetation type				
	Western hemlock-mountain hemlock	Sitka spruce-western hemlock	Western hemlock-Sitka spruce-western redcedar	Yellow cedar-mountain hemlock-western hemlock	Mountain hemlock
	Kilograms per hectare				
Conocephalum conicum	—	13	1	—	—
Dicranum sp.	55	73	36	33	60
Hepaticae	3	3	2	t	2
Herbertus lutchensis	—	—	t	t	—
Hookina lucens	—	—	t	—	—
Hylocomium splendens	104	48	70	111	22
Kindberga praelonga	—	—	—	t	—
Lycopodium annotinum	3	1	1	4	—
Lycopodium selago	—	—	t	—	t
Lycopodium sp.	—	—	t	—	t
Mnium sp.	51	78	50	12	34
Moss	80	87	70	73	871
Pleuroziopsis ruthenica	—	—	t	—	—
Pleurozium schreberi	—	—	1	4	—
Polytrichum sp.	28	—	12	—	10
Porella navicularis	1	5	t	—	—
Ptilium crista-castrensis	8	—	—	t	3
Rhacomitrium sp.	5	—	2	—	—
Rhytidiadelphus loreus	164	188	142	169	78
Rhytidiadelphus sp.	15	11	37	23	34
Sphagnum girgensohnii	—	—	6	—	—
Sphagnum sp.	81	25	6	68	63
Total, mosses	598	532	437	500	1177
% of live phytomass	(0.39)	(0.14)	(0.20)	(0.26)	(0.77)

— = plant was not sampled in this vegetation type.
t = trace, less than 1 kilogram per hectare.

Table 18—Aboveground phytomass of trees on western hemlock, and mixed western redcedar vegetation types in southeast Alaska

Species	Vegetation type				
	Western hemlock	Western redcedar-mountain hemlock-(yellow cedar)	Western redcedar yellow cedar-(lodgepole pine)	Western redcedar-mountain hemlock-western hemlock	Low site cedar-hemlock
	Kilograms per hectare				
Chamaecyparis nootkatensis	1	6966	85 341	1	29 535
Picea sitchensis	24 328	—	19 623	7553	5810
Pinus contorta	—	—	20 384	18 596	5922
Thuja plicata	11 601	—	1945	36 271	5917
Tsuga heterophylla	107 806	—	8097	3399	20 093
Tsuga mertensiana	—	42 871	6411	—	—
Total, needleleaf	143 736	49 837	141 801	65 821	67 274
Total, all live trees	143 736	49 837	141 801	65 821	67 274
% of live phytomass	(94.68)	(89.90)	(97.69)	(96.63)	(93.36)
Total, other plants	8078	5601	3356	2299	4785
Total, all live plants	151 814	55 438	145 157	68 120	72 059
Downed trees and logs	2934	21 495	817	1219	—
Standing dead trees	17 214	—	21 490	2224	11 036
Total, dead trees	20 138	21 495	22 307	3443	11 036
Total, live and dead	171 952	76 933	167 464	71 563	83 095

— = plant was not sampled in this vegetation type.

Table 19—Aboveground phytomass of shrubs on western hemlock and mixed western redcedar vegetation types in southeast Alaska

Species	Vegetation type				
	Western hemlock	Western redcedar-mountain hemlock-(yellow cedar)	Western redcedar yellow cedar-(lodgepole pine)	Western redcedar-mountain hemlock-western hemlock	Low site cedar-hemlock
	Kilograms per hectare				
Alnus sinuata	—	2390	328	16	700
Cassiope stelleriana	—	—	2	—	—
Cladothamnus pyrolaeflorus	—	143	141	3	721
Empetrum nigrum	—	1	9	—	3
Gaultheria shallon	282	—	274	552	606
Kalmia polifolia	—	—	11	—	—
Ledum groenlandicum	—	—	6	—	—
Linnaea borealis	—	—	8	1	—
Menziesia ferruginea	308	925	524	489	844
Oplopanax horridus	40	—	1	—	—
Phyllodoce aleutica	—	1	4	—	—
Rubus chamaemorus	—	—	t	—	—
Rubus parviflorus	—	—	—	—	—
Rubus pedatus	1	2	2	t	t
Rubus spectabilis	21	284	51	33	—
Sambucus racemosa	6	—	—	—	—
Vaccinium sp.	2452	—	326	—	—
Vaccinium alaskensis	37	524	398	102	—
Vaccinium caespitosum	—	20	3	—	—
Vaccinium ovalifolium	97	684	132	368	594
Vaccinium parvifolium	2174	—	93	68	2
Vaccinium uliginosum	—	—	111	—	—
Vaccinium vitis-ideae	—	—	8	1	—
Total, shrubs	5418	4974	2432	1633	3471
% of live phytomass	(3.57)	(8.97)	(1.68)	(2.40)	(4.82)

— = plant not sampled in this vegetation type.
t = trace amount, less than 1 kilogram per hectare.

Table 20—Aboveground phytomass of forbs on western hemlock and mixed western redcedar vegetation types in southeast Alaska

Species	Vegetation type				
	Western hemlock	Western redcedar-mountain hemlock-(yellow cedar)	Western redcedar yellow cedar-(lodgepole pine)	Western redcedar-mountain hemlock-western hemlock	Low site cedar-hemlock
	Kilograms per hectare				
Athyrium filix femina	5	—	4	1	—
Blechnum spicant	39	—	40	19	57
Caltha biflora	—	—	7	52	34
Clintonia uniflora	5	—	—	—	—
Compositae	t	—	—	—	—
Coptis aspleniifolia	t	t	4	2	1
Coptis trifolia	t	t	1	—	t
Cornus canadensis	1	—	6	4	3
Cornus suecica	—	4	1	—	—
Dodecatheon jeffreyi	—	—	t	—	2
Drosera rotundifolia	—	—	—	—	t
Dryopteris dilatata	14	—	—	—	—
Equisetum sp.	—	—	t	—	—
Erigeron peregrinus	—	—	t	t	t
Erigeron purpuratus	—	—	t	—	—
Fauria crista-galli	—	—	8	—	11
Forb	—	—	t	—	—
Gentiana douglasiana	—	—	1	—	—
Geum calthifolium	—	—	—	—	2
Gymnocarpium dryopteris	4	—	1	1	2
Listera caurina	t	—	—	t	—
Listera cordata	2	—	3	1	1
Listera sp.	—	—	t	—	—
Lysichiton americanum	1	—	98	82	32
Maianthemum dilatatum	12	—	2	1	2
Moneses uniflora	t	—	—	—	—
Mushroom	—	t	t	—	—
Platanthera sp.	—	—	1	1	—
Polypodium vulgare	—	—	—	2	—
Polystichum munitum	1	—	—	—	—
Prenanthes alata	—	—	t	—	—
Pteridium aquilinum	—	—	t	—	—
Pyrola secunda	—	—	t	—	—
Sanguisorba menziesii	—	—	t	—	—
Sanguisorba sp.	—	—	2	—	—
Saxifraga ferruginea	—	t	—	—	—

Table 20—Aboveground phytomass of forbs on western hemlock and mixed western redcedar vegetation types in southeast Alaska (continued)

Species	Vegetation type				
	Western hemlock	Western redcedar-mountain hemlock-(yellow cedar)	Western redcedar yellow cedar-(lodgepole pine)	Western redcedar-mountain hemlock-western hemlock	Low site cedar-hemlock
	Kilograms per hectare				
Smilacina stellata	—	—	t	—	—
Spiranthes romanzoffiana	—	—	1	—	2
Streptopus amplexifolius	1	—	1	t	t
Streptopus roseus	8	7	2	t	—
Streptopus sp.	—	—	—	—	t
Streptopus streptopoides	1	—	1	—	t
Thelypteris phegopteris	—	—	2	—	—
Tiarella trifoliata	t	—	t	t	t
Tiarella unifoliata	—	—	t	—	—
Trientalis europaea	—	—	t	—	t
Veratrum viride	—	—	16	3	14
Viola langsdorffii	—	—	—	—	t
Viola sp.	t	—	t	—	—
Total, forbs	94	11	201	170	164
% of live phytomass	(0.06)	(0.02)	(0.14)	(0.25)	(0.23)

— = plant not sampled in this vegetation type.
t = trace amount, less than 1 kilogram per hectare.

Table 21—Aboveground phytomass of grass and grasslike species on western hemlock and mixed western redcedar vegetation types in southeast Alaska

Species	Vegetation type				
	Western hemlock	Western redcedar-mountain hemlock-(yellow cedar)	Western redcedar yellow cedar-(lodgepole pine)	Western redcedar-mountain hemlock-western hemlock	Low site cedar-hemlock
	Kilograms per hectare				
Calamagrostis nutkaensis	—	—	23	—	—
Calamagrostis sp.	—	—	—	2	13
Carex sitchensis	—	—	14	—	—
Carex sp.	—	14	24	5	15
Eriophorum sp.	—	—	—	—	3
Grass	—	—	40	t	—
Scirpus sp.	—	—	8	—	—
Trichophorum caespitosum	—	—	—	—	5
Total, grasses	—	14	109	7	36
% of live phytomass	(0.00)	(0.03)	(0.08)	(0.01)	(0.05)

— = plant not sampled in this vegetation type.
t = trace amount, less than 1 kilogram per hectare.

Table 22—Aboveground phytomass of lichens on western hemlock and mixed western redcedar vegetation types in southeast Alaska

Species	Vegetation type				
	Western hemlock	Western redcedar-mountain hemlock-(yellow cedar)	Western redcedar yellow cedar-(lodgepole pine)	Western redcedar-mountain hemlock-western hemlock	Low site cedar-hemlock
	Kilograms per hectare				
Alectoria sp.	—	—	56	—	—
Cladina mitis	—	—	t	—	—
Cladina sp.	2	7	—	—	—
Cladonia sp.	2	44	t	4	1
Hypogymnia enteromorpha	—	31	1	—	—
Hypogymnia sp.	—	—	5	—	—
Lichen	2	71	19	2	—
Lobaria linita	4	5	—	—	—
Lobaria oregana	—	—	10	—	—
Lobaria sp.	1	—	t	—	11
Parmelia sp.	—	—	—	—	—
Peltigera sp.	3	38	5	—	—
Total, lichens	14	198	96	6	12
% of live phytomass	(0.01)	(0.36)	(0.07)	(0.01)	(0.02)

— = plant not sampled in this vegetation type.
t = trace amount, less than 1 kilogram per hectare.

Table 23—Aboveground phytomass of mosses and clubmosses on western hemlock and mixed western redcedar vegetation types in southeast Alaska

Species	Vegetation type: Western hemlock	Western redcedar-mountain hemlock-(yellow cedar)	Western redcedar yellow cedar-(lodgepole pine)	Western redcedar-mountain hemlock-western hemlock	Low site cedar-hemlock
	Kilograms per hectare				
Dicranum sp.	36	24	25	21	6
Hepaticae	1	2	1	1	1
Herbertus lutchensis	t	—	t	—	—
Hylocomium splendens	126	82	97	112	72
Hypnum sp.	—	—	t	t	t
Kindberga praelonga	—	—	t	—	—
Lycopodium annotinum	—	—	5	1	—
Lycopodium selago	1	—	1	t	7
Lycopodium sp.	t	—	—	—	—
Mnium sp.	102	5	25	25	25
Moss	1970	72	62	109	758
Pleurozium schreberi	2	14	2	—	—
Polytrichum sp.	13	10	59	9	—
Porella navicularis	1	—	—	2	—
Ptilium crista-castrensis	—	6	t	—	—
Rhytidiadelphus loreus	86	156	125	156	192
Rhytidiadelphus sp.	204	—	64	—	—
Sphagnum sp.	10	35	53	46	41
Total, mosses	2552	406	519	483	1101
% of live phytomass	(1.68)	(0.73)	(0.36)	(0.71)	(1.53)

— = plant not sampled in this vegetation type.
t = trace amount, less than 1 kilogram per hectare.

Appendix C: Scientific Name Authority, Frequency of Plant Occurrence on Sampled Plots, Phytomass Coefficient Used, and Common Name

Table 24—Scientific name authority, frequency of tree-seedling species occurrence on sampled plots, phytomass coefficient used, and common name[a]

Scientific name	Frequency	Coefficient	Common name
Chamaecyparis nootkatensis (D. Don) Spach[b]	48	5.87	Yellow cedar
Picea sitchensis (Bong.) Carr.[b]	92	20.02	Sitka spruce
Pinus contorta Dougl. ex Loud.[b]	22	17.64	Lodgepole pine
Thuja plicata Donn ex D. Don	30	20.02	Western redcedar
Tsuga heterophylla (Raf.) Sarg.[b]	117	8.87	Western hemlock
Tsuga mertensiana (Bong.) Carr.[b]	90	17.90	Mountain hemlock

[a] Coefficients are used in the following equation to determine plant weight.
Phytomass = [(percentage foliar cover of first layer) (coefficient) (height of first layer in decimeters] + [(percentage foliar cover of second layer) (coefficient) (height of second layer in decimeters)] ... + [(percentage foliar cover of layer n) (coefficient) (height of layer n in decimeters)].
[b] Species for which a phytomass coefficient was developed. Other species were assigned coefficients of the most similar species. Source of scientific names, Viereck and Little 1972.

Table 25—Scientific name authority, frequency of forb species occurrence on sampled plots, phytomass coefficient used, and common name[a]

Scientific name	Frequency	Coefficient	Common name
Achillea borealis Bong.	3	1.28	Common yarrow
Aconitum delphinifolium DC.	5	.96	Monkshood
Actaea rubra (Ait.) Willd.	2	3.50	Red baneberry
Adiantum pedatum L.	3	1.28	Maiden hair fern
Anemone L.	1	1.86	Anemone
Anemone narcissiflora L.	4	1.86	Wild narcissus
Angelica L.	2	3.50	Wild celery
Angelica genuflexa Nutt.	2	3.50	Bent-leaved angelica
Apargidium boreale (Bong.) Torr. & Gray	3	2.94	—
Aquilegia formosa Fisch.	1	.96	Western columbine
Arnica L.	1	3.50	Arnica
Arnica latifolia Bong.	2	3.50	Mountain arnica
Aruncus sylvester Kostel.	12	1.78	Goatsbeard
Athyrium filix-femina (L.) Roth[b]	73	2.66	Common lady fern
Barbarea orthoceras Ledeb.	1	.96	Wintercress
Blechnum spicant (L.) Roth[b]	92	5.59	Deer fern
Boschniakia rossica (Cham. & Schlect.) Fedtsch.	1	2.94	Ground-cone
Caltha L.	2	3.79	Marshmarigold
Caltha biflora DC.	15	3.79	Broadleaf marshmarigold
Caltha leptosepala DC.	9	3.79	Mountain marshmarigold
Cardamine L.	2	.96	Bittercress
Cardamine umbellata Greene	6	.96	Umbel bittercress
Castilleja miniata Dougl.	3	1.81	Scarlet indian paintbrush
Castilleja parviflora Bong.	2	1.81	Mountain paintbrush
Circaea alpina L.	8	.23	Enchanted nightshade
Claytonia sarmentosa C.A. Mey.	1	1.81	Alaska spring beauty
Claytonia sibirica L.	4	1.81	Siberian sp. beauty
Clintonia uniflora (Schult.) Kunth	16	1.48	One-flowered clintonia
Compositae family	12	3.50	Aster, daisy family
Coptis aspleniifolia Salisb.[b]	97	.87	Fern-leaf goldthread
Coptis trifolia (L.) Salisb.	32	.87	Three-leaf goldthread
Cornus canadensis L.[b]	104	.84	Bunchberry
Cornus suecica L.	54	1.48	Swedish cornel
Cruciferae	3	3.50	Mustard family
Cryptogramma crispa (L.) R.Br.	4	1.86	Parsley fern
Cystopteris fragilis (L.) Bernh.	1	1.28	Fragile fern
Dodecatheon L.	1	.96	Shooting-star
Dodecatheon jeffreyi Van Houtte	6	.96	Jeffrey shooting-star
Dodecatheon pulchellum (Raf.) Merr.	9	.96	Pretty shooting-star
Draba aurea Vahl	2	1.81	Golden rockcress
Drosera L.	4	.11	Sundew
Drosera rotundifolia L.	17	.11	Round-leaf sundew
Dryopteris Adans.	1	2.07	Shield-fern
Dryopteris dilatata (Hoffm.) Gray[b]	71	2.07	Spinulose shield fern
Epilobium L.	11	3.50	Willow herb
Epilobium angustifolium L.[b]	4	3.50	Common fireweed

Table 25—Scientific name authority, frequency of forb species occurrence on sampled plots, phytomass coefficient used, and common name[a] (continued)

Scientific name	Frequency	Coefficient	Common name
Epilobium hornemannii Rchb.	6	1.88	Alpine willow herb
Epilobium latifolium L.	1	3.50	Dwarf fireweed
Equisetum L.	10	1.28	Horsetail
Equisetum arvense L.[b]	1	1.28	Field horsetail
Erigeron L.[b]	2	.65	Fleabane
Erigeron peregrinus (Pursh) Greene	18	.65	Coastal fleabane
Erigeron purpuratus Greene	1	.65	Fleabane
Fauria crista-galli (Menzies) Makino[b]	75	1.93	Deer cabbage
Fern	3	1.88	Unknown fern
Forb	28	1.81	Unknown forb
Fragaria chiloensis (L.) Duchesne	2	3.79	Beach strawberry
Fritillaria camschatcensis (L.) Ker-Gawl.	6	3.50	Black lily
Galium kamtschaticum Steller	2	3.79	Northern wild-licorice
Galium L.	6	3.79	Bedstraw
Galium trifidum L.	1	3.79	Small bedstraw
Galium triflorum Michx.	5	3.79	Sweet-scented bedstraw
Gentiana L.	2	1.87	Gentian
Gentiana douglasiana Bong.[b]	27	1.87	Swamp gentian
Gentiana platypetala Griseb.	1	3.79	Broad-petaled gentian
Geocaulon lividum (Richards.) Fern.[b]	1	1.88	Northern comandra
Geranium erianthum DC.	1	.96	Northern geranium
Geum L.	1	1.81	Avens
Geum calthifolium Menzies	16	1.81	Caltha-leaved avens
Geum macrophyllum Willd.	2	1.81	Large-leaf avens
Gymnocarpium dryopteris L. (Newm.)[b]	89	.82	Oak-fern
Heracleum lanatum Michx.	19	1.83	Cow parsnip
Heuchera glabra Willd.	5	1.88	Alpine heuchera
Hieracium L.	2	3.79	Hawkweed
Hieracium triste Willd.	2	3.79	Woolly hawkweed
Hippuris montana Ledeb.	8	1.28	Mountain marestail
Leptarrhena pyrolifolia (D. Don) Ser.	10	3.79	Leatherleaf saxifrage
Listera R.Br.	1	2.94	Twayblade
Listera caurina Piper	3	2.94	Western twayblade
Listera cordata (L.) R.Br.	76	2.94	Heart-leaved twayblade
Lupinus nootkatensis Donn	5	1.88	Nootka lupine
Lysichiton americanum Hult. & St. John)[b]	68	3.60	Yellow skunk cabbage
Maianthemum dilatatum (How.) Nels. & Macbr.[b]	53	1.46	Deerberry
Menyanthes trifoliata L.	1	1.48	Buckbean
Mitella L.	1	3.79	Mitrewort
Mitella pentandra Hook.	1	3.79	Alpine mitrewort
Moneses uniflora (L.) Gray	17	1.86	Single delight
Osmorhiza Raf.	4	1.28	Sweet cicely
Osmorhiza purpurea (Coult. & Rose) Suksd.	6	1.28	Sitka sweet cicely
Oxyria digyna (L.) Hill	3	1.81	Mountain sorrel
Parnassia L.	1	1.86	Grass-of-parnassus
Parnassia fimbriata Konig	3	1.86	Fringed grass of parnassus

Table 25—Scientific name authority, frequency of forb species occurrence on sampled plots, phytomass coefficient used, and common name[a] (continued)

Scientific name	Frequency	Coefficient	Common name
Pedicularis parviflora J.E. Sm.	2	1.81	Small-flower lousewort
Pedicularis verticillata L.	1	1.81	Whorled lousewort
Petasites hyperboreus Rydb.	5	3.50	Far-northern coltsfoot
Pinguicula vulgaris L.	2	3.79	Common butterwort
Plantago macrocarpa Cham. & Schlecht.	4	1.48	Seashore plantain
Platanthera dilatata (Pursh) Lindl.	2	1.48	White bog-orchid
Platanthera L.C. Rich.	17	2.94	Bog-orchid
Polypodium vulgare L.	3	1.28	Common polypody
Polystichum Roth	1	.89	Polystichum
Polystichum braunii (Spenn.) Fee	8	.89	Prickly shield-fern
Polystichum lonchitis (L.) Roth	2	.89	Holly-fern
Polystichum munitum (Kaulf.) Presl	6	.89	Western sword-fern
Potentilla palustris (L.) Scop.	1	10.95	Marsh cinquefoil
Prenanthes alata (Hook.) Dietr.	17	.46	Rattlesnake root
Pteridium aquilinum (L.) Kuhn	2	.96	Western bracken
Pyrola asarifolia Michx.	4	3.79	Liverleaf wintergreen
Pyrola secunda L.[b]	6	3.79	One-sided wintergreen
Ranunculus cooleyae Vasey & Rose	1	3.79	Cooley buttercup
Ranunculus L.	5	3.79	Buttercup
Ranunculus nivalis L.	1	3.79	Snow buttercup
Romanzoffia sitchensis Bong.	3	1.86	Sitka mist-maid
Rorippa Scop.	1	.96	Yellowcress
Sanguisorba L.	28	1.88	Burnet
Sanguisorba menziesii Rydb.	3	1.88	Menzies burnet
Sanguisorba stipulata Raf.	10	1.88	Sitka burnet
Saxifraga L.	4	3.79	Saxifrage
Saxifraga adscendens L.	1	1.86	Wedge-leaf saxifrage
Saxifraga bronchialis L.	1	1.81	Spotted saxifrage
Saxifraga ferruginea Graham	4	2.94	Alaska saxifrage
Saxifraga lyallii Engler	1	1.86	Red-stem saxifrage
Saxifraga punctata L.	6	1.86	Brook saxifrage
Sedum rosea (L.) Scop.	2	1.81	Roseroot
Senecio triangularis Hook.	8	.96	Arrowleaf groundsel
Smilacina Desf.	1	3.50	Solomon-seal
Smilacina stellata (L.) Desf.	1	3.50	Starry solomon-seal
Spiranthes romanzoffiana Cham.	7	1.81	Ladies' tresses
Stellaria L.	9	1.28	Chickweed
Stellaria crispa Cham. & Schlecht.	2	1.28	Crisp starwort
Stellaria sitchana Steud.	2	1.28	Sitka starwort
Streptopus Michx.	9	.44	Twisted-stalk
Streptopus amplexifolius (L.) DC.[b]	77	.75	Cucumber-root twisted-stalk
Streptopus roseus Michx.[a]	58	1.52	Rosy twisted-stalk
Streptopus streptopoides (Ledeb.) Frye & Rigg	28	.75	Kruhsea
Swertia perennis L.	1	1.88	Alpine bog swertia
Tellima grandiflora (Pursh) Dougl.	3	1.88	Fringe-cups

Table 25—Scientific name authority, frequency of forb species occurrence on sampled plots, phytomass coefficient used, and common name[a] (continued)

Scientific name	Frequency	Coefficient	Common name
Thelypteris Schmidel	1	.96	Deciduous fern
Thelypteris phegopteris (L.) Slosson	18	.96	Beech-fern
Tiarella trifoliata L.[b]	68	.53	Three-leaf lace flower
Tiarella unifoliata Hook.	30	.53	One-leaf lace flower
Tofieldia glutinosa (Michx.) Pers.	12	2.78	Sticky tofieldia
Tolmiea menziesii (Pursh) Torr. & Gray	3	1.88	Youth-on-age
Trientalis europaea L.	24	.70	Starflower
Valeriana sitchensis Bong.	18	.96	Sitka valerian
Veratrum viride Ait.[b]	63	3.45	Northern false-hellebore
Viola L.[b]	27	.65	Violet
Viola glabella Nutt.	11	.65	Stream violet
Viola langsdorffii Fisch.	8	.65	Alaska violet

[a] Coefficients are used in the following equation to determine plant weight.
Phytomass = [(% foliar cover of first layer) (coefficient) (height of first layer in decimeters]
+ [(% foliar cover of second layer) (coefficient) (height of second layer in decimeters)]
... + [(% foliar cover of layer n) (coefficient) (height of layer n in decimeters)] .
[b] Species for which a phytomass coefficient was developed. Other species were assigned coefficients of the most similar species. Source of scientific names, Hulten 1974.

Table 26—Scientific name authority, frequency of grass and grasslike species occurrence on sampled plots, phytomass coefficient used, and common name[a]

Scientific name	Frequency	Coefficient	Common name
Calamagrostis Adans.[b]	27	1.21	Reed bent grass
Calamagrostis canadensis (Michx.) Beauv.	2	1.21	Bluejoint reedgrass
Calamagrostis nutkaensis (Presl) Steud.	9	1.21	Pacific reedgrass
Carex L.[b]	105	1.34	Sedge
Carex mertensii Prescott	1	2.92	Mertens sedge
Carex pauciflora Lightf.	3	2.92	Star sedge
Carex sitchensis Prescott	6	2.38	Sitka sedge
Eriophorum L.[b]	20	3.70	Cotton grass
Grass[b]	54	2.16	Unknown grass
Juncus L.	1	2.28	Rush
Luzula DC.	2	2.28	Woodrush
Phleum commutatum Gandoger	1	2.28	Mountain timothy
Scirpus L.	2	2.28	Bulrush
Secale sereale L.	3	2.28	Common rye
Trichophorum caespitosum (L.) Hartm.[b]	15	2.29	Tufted clubrush

— = no common name.

[a] Coefficients are used in the following equation to determine plant weight.
Phytomass = [(% foliar cover of first layer) (coefficient) (height of first layer in decimeters]
+ [(% foliar cover of second layer) (coefficient) (height of second layer in decimeters)]
... + [(% foliar cover of layer n) (coefficient) (height of layer n in decimeters)] .

[b] Species for which a phytomass coefficient was developed. Other species were assigned coefficients of the most similar species. Source of scientific names, Hulten 1974.

Table 27—Scientific name authority, frequency of lichen species occurrence on sampled plots, phytomass coefficient used, and common name[a]

Scientific name	Frequency	Coefficient	Common name
Alectoria	34	4.98	Fruticose lichen
Cetraria [b]	3	5.63	—
Cladina [b]	43	7.41	Reindeer lichen
Cladina mitis (Sandst.) Hale & Culb.	3	4.32	—
Cladina rangiferina (L.) Harm.	2	4.32	Reindeer lichen
Cladonia [b]	92	4.32	Cup-stalk lichen
Cladonia bellidiflora (Ach.) Schaer.	5	4.32	Red-cap cladonia
Cladonia pyxidata (L.) Hoffm.	2	4.32	—
Hypogymnia	2	4.98	Foliose lichen
Hypogymnia enteromorpha (Ach.) Nyl.	11	4.98	Foliose lichen
Lichen	79	4.98	Unknown lichen
Lobaria	24	4.98	Lobaria
Lobaria linita (Ach.) Rabh.	22	4.98	Felty lobaria
Lobaria oregana (Mull. Arg.) Hale	3	4.98	Oregon lobaria
Nephroma	3	4.98	Lettuce lichen
Parmelia	5	4.98	Foliose lichen
Peltigera [b]	56	4.98	Veined lichen
Pilophoron aciculare (Ach.) Nyl.	1		—
Usnea	3	18.44	Usnea

— = no common name.

[a] Coefficients are used in the following equation to determine plant weight.
Phytomass = [(percentage foliar cover of first layer) (coefficient) (height of first layer in decimeters] + [(percentage foliar cover of second layer) (coefficient) (height of second layer in decimeters)] ... + [(percentage foliar cover of layer n) (coefficient) (height of layer n in decimeters)] .

[b] Species for which a phytomass coefficient was developed. Other species were assigned coefficients of the most similar species. Source of scientific names, Hale 1979.

Table 28—Scientific name authority, frequency of moss, clubmoss, and liverwort species occurrence on sampled plots, phytomass coefficient used, and common name[a]

Scientific name	Frequency	Coefficient	Common name
Conocephalum conicum (L.) Dum.	7	5.36	—
Dicranum Hedw.[b]	154	4.05	Broom moss
Hepaticae[b]	120	.29	Liverwort
Herbertus lutchensis	5	.01	—
Hookina lucens	2	.01	—
Hylocomium splendens (Hedw.) BSG[b]	156	3.69	Stair-step moss
Hypnum Hedw.[b]	4	2.51	Moss
Kindberga praelonga	3	.01	—
Lycopodium L.	5	3.61	Clubmoss
Lycopodium annotinum L.	37	3.61	Stiff clubmoss
Lycopodium clavatum L.	1	3.61	Running clubmoss
Lycopodium sabinaefolium Willd.	4	3.61	Alaskan clubmoss
Lycopodium selago L.	33	3.61	Fir clubmoss
Mnium Hedw., nom. cons.[b]	137	4.52	—
Moss	213	3.92	Unknown moss
Pleuroziopsis ruthenica	1	3.52	Pleurocarpus moss
Pleurozium schreberi (Brid.) Mitt.[b]	23	3.52	Schreber's moss
Polytrichum Hedw.[b]	68	3.92	—
Porella navicularis	7	1.79	Liverwort
Ptilium crista-castrensis (Hedw.) De Not.	17	3.76	Knight's plume
Rhacomitrium Brid.	13	3.61	—
Rhacomitrium lanuginosum (Hedw.) Brid.	7	3.61	—
Rhytidiadelphus (Lindb. ex Limpr.) Warnst.[b]	56	5.46	—
Rhytidiadelphus loreus (Hedw.) Warnst.[b]	142	5.22	—
Sphagnum L.[b]	142	3.53	Sphagnum moss
Sphagnum girgensohnii Russ.	2	3.53	Sphagnum

— = no common name.

[a] Coefficients are used in the following equation to determine plant weight.
Phytomass = [(percentage foliar cover of first layer) (coefficient) (height of first layer in decimeters] + [(percentage foliar cover of second layer) (coefficient) (height of second layer in decimeters)] ... + [(percentage foliar cover of layer n) (coefficient) (height of layer n in decimeters)] .

[b] Species for which a phytomass coefficient was developed. Other species were assigned coefficients of the most similar species. Source of scientific names, Crum 1976.

Table 29—Scientific name authority, frequency of shrub species occurrence on sampled plots, phytomass coefficient used, and common name [a]

Scientific name	Frequency	Coefficient	Common name
Alnus crispa (Ait.) Pursh [b]	1	4.50	American green alder
Alnus rubra Bong.	2	4.43	Red alder
Alnus sinuata (Reg.) Rydb.	59	4.43	Sitka alder
Andromeda polifolia L.	6	2.81	Bog rosemary
Artemisia L.	1	1.88	Sagebrush
Artemisia arctica Less.	1	1.88	Arctic wormwood
Cassiope D. Don	1	4.61	Cassiope
Cassiope mertensiana (Bong.) D. Don [b]	37	21.32	Mertens cassiope
Cassiope stelleriana (Pall.) DC.[b]	35	4.61	Alaska moss heath
Cladothamnus pyrolaeflorus Bong.	53	6.20	Copperbush
Empetrum nigrum L.[b]	51	5.85	Black crowberry
Gaultheria shallon Pursh [b]	21	11.53	Salal
Kalmia polifolia Wang.[b]	34	4.48	Bog laurel
Ledum groenlandicum Oeder[b]	23	3.55	Labrador tea
Linnaea borealis L.	17	3.29	Twin-flower
Loiseleuria procumbens (L.) Desv.[b]	2	6.76	Alpine azalea
Luetkea pectinata (Pursh) Kuntze [b]	28	1.16	Luetkea
Menziesia ferruginea Sm.[b]	145	5.80	Rusty menziesia
Oplopanax horridus (Sm.) Miq.[b]	69	2.10	Devil's club
Phyllodoce aleutica (Spreng.) Heller	2	2.41	Aleutian mountain-heather
Ribes L.[b]	8	3.45	Currant
Ribes bracteosum Dougl.	11	3.45	Stink currant
Ribes lacustre (Pers.) Poir.	2	3.45	Swamp gooseberry
Ribes laxiflorum Pursh	6	3.45	Trailing black currant
Rubus arcticus Trautv.	6	.50	Nagoon berry
Rubus chamaemorus L.	11	4.11	Cloudberry
Rubus pedatus Sm.[b]	130	.50	Five-leaf bramble
Rubus parviflorus Nutt.	2	3.45	Thimbleberry
Rubus spectabilis Pursh [b]	81	5.91	Salmonberry
Salix L.	13	4.05	Willow
Salix polaris Wahlenb.	1	1.48	Polar willow
Salix sitchensis Sanson [b]	1	4.03	Sitka willow
Sambucus callicarpa Greene	2	4.29	Pacific red elderberry
Sambucus racemosa L.	17	4.29	Red elderberry
Sorbus S.F. Gray	6	8.70	Mountain ash
Sorbus sitchensis Roem.	6	8.70	Sitka mountain ash
Spiraea douglasii Hook.	1	10.95	Douglas spirea
Vaccinium L.	72	6.20	Blueberry
Vaccinium alaskensis (alaskaense) Howell [b]	53	6.19	Alaska blueberry
Vaccinium caespitosum Michx.[b]	54	2.62	Dwarf blueberry
Vaccinium parvifolium Sm.[b]	45	3.70	Red huckleberry

Table 29—Scientific name authority, frequency of shrub species occurrence on sampled plots, phytomass coefficient used, and common name[a] (continued)

Scientific name	Frequency	Coefficient	Common name
Vaccinium ovalifolium Sm.[b]	66	4.28	Early blueberry
Vaccinium oxycoccus var. *microcarpus* (Turcz.) Fedtsch. & Flerov.	13	2.29	Bog cranberry
Vaccinium uliginosum L.[b]	27	3.99	Bog blueberry
Vaccinium vitis-idaea L.[b]	28	4.14	Lowbush cranberry
Viburnum edule (Michx.) Raf.[b]	6	3.10	Highbush cranberry

— = no common name.

[a] Coefficients are used in the following equation to determine plant weight.
Phytomass = [(percentage foliar cover of first layer) (coefficient) (height of first layer in decimeters] + [(percentage foliar cover of second layer) (coefficient) (height of second layer in decimeters)] ... + [(percentage foliar cover of layer n) (coefficient) (height of layer n in decimeters)] .

[b] Species for which a phytomass coefficient was developed. Other species were assigned coefficients of the most similar species. Source of scientific names, Viereck and Little 1972.

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Phytomass tables are presented for the southeast Alaska archipelago. Average phytomass for each sampled species of tree, shrub, grass, forb, lichen, and moss in 10 forest and 4 nonforest vegetation types is shown.

Keywords: Alaska, southeast, phytomass, biomass, inventory, wildlife, plant ecology.

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