

VEGETATION INVENTORY AND FOREST HEALTH ASSESSMENT

SITKA NATIONAL HISTORICAL PARK

Prepared for:

U.S.D.I. NATIONAL PARK SERVICE
ALASKA REGIONAL OFFICE

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Prepared by:

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Vegetation Inventory and Forest Health Assessment
Sitka National Historic Park

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PURPOSE AND USE OF THIS REPORT

This report is designed to meet the objectives specified in Interagency Agreement Number IA-9700-2-9017 as modified for FY 1993 per Amendment I. The agreement is between the United States Department of the Interior, National Park Service, Alaska Region Office and the United States Department of Agriculture, Forest Service, Chatham Area. The objectives are as follows:

1. To conduct and establish a baseline inventory of vegetative resources in Sitka National Historical Park.
2. To conduct a Forest Health Assessment within the Sitka National Historical Park.
3. To identify hazard trees.

In order to meet these objectives, inventory efforts were designed to build upon the Ecological Inventory (final report dated February 26, 1993) conducted under terms of the above mentioned interagency agreement.

This information may be used by Park personnel to assess resources and make management decisions concerning resources as well as Park visitors.

All maps and information in this report were prepared for use by the United States Department of the Interior, National Park Service.

VEGETATIVE SETTING OF THE SITKA NATIONAL HISTORICAL PARK

The forest of southeast Alaska is a segment of the temperate rain forest extending along the Pacific coast from northern California to Cook Inlet in Alaska. Much of the forest in southeast Alaska is old-growth. Significant differences in forested stands occur due to age, species, vigor, disturbance and growing conditions.

The forest tree cover is generally unbroken unless interrupted by disturbance, wetness or altitude. Soil drainage is extremely important in governing species distribution, forest development, and vigor. The best growing sites are on well drained valley bottoms and uplifted beaches. The climate is maritime --- cool and moist. The rugged topography of southeast Alaska results in pronounced variations of mean annual precipitation within relatively short distances. For example, Sitka experiences 84 inches of annual precipitation while Juneau receives only 53 inches (USDA 1979). Interspersed with forested stands are sphagnum bogs and sedge fen, occurring where drainage is inhibited. Alpine tundra occupies the zone above the forested ecosystems.

The topography has been and is presently being shaped and sculpted by glaciers. Glaciers have had a profound influence on the development of the landscape, soils, and consequently vegetation in southeast Alaska. With the retreat of glaciers from their maximums (maximum ice thickness at Sitka may have been as much as 2750 feet) glacial rebound, or readjustment of the land surface to the position it held before it was depressed by the weight of the ice, is occurring. Rate of uplift at Sitka is about .12 inches per year (Journal of Geophysical Research 1965). For comparison, the rate of uplift at Glacier Bay is 1.6 inches per year. Portions of the land near Sitka and in the Sitka National Historical Park have been uplifted above mean high tide due to glacial rebound.

Tree species composition varies by location, topography, drainage, soil type and stand history. Based on the number of trees of 1-inch diameter and larger on timberland within the Sitka Forest Inventory Unit (PNW-101 page 15) species composition is yellow-cedar, 7 percent; Sitka spruce, 25 percent; western hemlock, 51 percent; mountain hemlock, 15 percent; and red alder and other hardwoods, 2 percent (USDA 1983).

Tree and shrub species found within Sitka National Historical Park are Western hemlock, Sitka spruce, red alder, Sitka alder, crab apple, Sitka willow and Sitka mountain ash (see vascular plant species list in the Ecological Unit Inventory report for scientific names).

There are 11 permanent vegetation plots, established during the spring of 1993. On these plots three tree species were found: western hemlock, Sitka spruce and red alder.

In general in southeast Alaska forests, western hemlock occurs in dense stands in association with Sitka spruce, mountain hemlock, yellow-cedar and other conifers. It is a large tree growing from 100 to 150 feet in height on well drained, low elevation sites in valley bottoms and lower mountain slopes. Mature tree diameters are often 2 to 4 feet.

Western hemlock seedlings regenerate well on organic soils, undisturbed forest duff, well mixed organic soils as well as mineral soils. Rotten wood is an excellent growth medium under a forest canopy where young seedlings are protected from drying. Western hemlock is seldom a pioneer on recently exposed land. Western hemlock is considered to be very tolerant of shade and is more tolerant than Sitka spruce or yellow-cedar. It will become established beneath stands of Sitka spruce or mixed hemlock-spruce and, if left undisturbed will gradually dominate the site (USDA 1974).

Sitka spruce grows to a large to very large tree up to 160 feet in height and 3 to 5 feet in diameter. It grows best on well-drained bottom land and lower slopes. Sitka spruce is not as shade tolerant as hemlock but is more so than yellow-cedar. Seedlings establish on mineral soil, organic soils and under light shade on rotten logs or stumps. Many of these stilt-rooted trees are readily visible within the Historical Park, where the original "nurse log" has decayed leaving arching roots supporting the tree.

Red alder is commonly found along beaches, streams and disturbed areas. In successional stands, they are usually shaded out by conifers after 40 to 50 years. Red alder is a small to medium tree pioneering on moist sites. Seed is very light and are dispersed great distances by the wind.

Other tree/shrub species observed during the walk through examination of the Sitka National Historical Park were:

Sitka alder - deciduous shrub or small tree to 30 feet in height and 8 inches in diameter (USDA Handbook 410).

Oregon crab apple - deciduous small tree to 25 feet in height and 5 inches in diameter (USDA Handbook 410).

Sitka willow - shrub or small tree 10 to 20 feet in height (USDA Handbook 410).

? Sitka mountain ash - deciduous or small tree 15 to 20 feet tall and 6 inches in diameter (USDA Handbook 410).

HOW THE INVENTORY WAS MADE

The inventory was based on the following ecological land units differentiated in the Ecological Unit Inventory completed February 26, 1993.

- Stream Terrace
- Moraine
- Uplifted Beach
- Uplifted Beach Meadow
- Floodplain

Permanent Vegetation Plots

A total of eleven permanent vegetation plots were located within six ecological land units within the Park. Plot centers are marked with aluminum monuments (see appendix 1 for a more complete description of the monuments and locations). Establishing a baseline was one of the objectives of this inventory. Permanent plots were established so future remeasurement would be possible, perhaps in 10 years. Ten permanent vegetation monuments were established within the five ecological land units listed above. An eleventh monument was established within the Estuary unit (see appendix 1 for traverse notes and monument descriptions). Two fixed radius and one variable radius plots were measured at each of the eleven monuments to determine tree species, size, disease and other tree information. For the variable radius plots, a 40 basal area factor was used for trees greater than or equal to 5.0 inches in diameter at breast height (d.b.h.; diameter outside the bark 4.5 feet above the ground). An 11.8 foot fixed radius plot was used to measure trees greater than 4 1/2 feet in height but less than 5.0 inches in diameter at breast height. Finally, a 6.8 foot fixed radius plot was used to measure trees less than 4 1/2 feet in height.

In order to measure cover of shrubs, forbs, graminoids and ferns, a 42 foot radius plot was centered at each monument and cover was estimated by species. Total cover by vegetative layer was also recorded. Tree canopy cover was divided into overstory and understory. A 16 foot wide belt transect, running from plot top to bottom was measured for coarse woody debris (larger than 5 inch average diameter). At each monument, general environmental data such as aspect, slope, ground cover, and wildlife use were also taken.

One monument was established in the Floodplain Ecological Unit (number 8), 3 in the Stream Terrace (numbers 3, 7, and 9), two in the Moraine unit (numbers 2 and 10), two in the Uplifted Beach Unit (1 and 6), two in the Uplifted Beach Meadow (4 and 5), and one in the Estuary (number 11) Ecological Land Unit.

Tree data recorded at each of the eleven plots is displayed in appendix 2. The tree data was processed using a computer program developed by Atterbury Consultants, Inc. of Beaverton, Oregon, called Super Stand (see appendix 3 for copies of the reports). Vegetation and environmental data is shown in appendix 7.

Walk Through Examination

In addition to the data collected at the permanent monuments, each of the forested ecological units was walked through with observations taken as to stand structure, species composition, history of disturbance, and insect and disease activity.

Hazard Trees, Insect and Disease Evaluations

The Environmental Health and Protection group of the USDA, Forest Service was contacted and asked to conduct a Forest Health Evaluation. The evaluation was conducted in March 1993. A copy is included in Appendix 6.

SITKA NATIONAL HISTORICAL PARK: ECOLOGICAL UNIT MAP



STREAM TERRACE

Structure and Composition - This ecological unit is a western hemlock - Sitka spruce forest type (Society of American Foresters 1980) in the transition old-growth stage of stand development (Oliver and Larsen 1990). In Southeast Alaska, on well drained western hemlock plant associations, this stage of stand development begins at approximately 150 to 250 years of age. Although there are portions of the stream terrace stand exhibiting more of an even-aged structure, particularly on the terrace on the west side of Indian River, the minimum requirements of main canopy large trees, stand structure, standing dead trees, down logs and forb cover meet old-growth minimum requirements per Alaska Region R10-TP-28 Ecological Definitions for Old-growth Forest Types in Southeast Alaska.

Basal Area (cross sectional area of tree boles at breast height) is normally used to determine forest type where poletimber or sawtimber dominates the stand. In the Stream Terrace Unit, poletimber (5.0 to 8.9 inch d.b.h. trees) and larger western hemlock has a basal area of 41 square feet per acre, red alder 27, and Sitka spruce 160. The basal area of sapling size trees (1.0 to 4.9 inch d.b.h.) is 8.9 square feet per acre, 5.3 in western hemlock and 3.6 in red alder.

In the Stream Terrace unit, there are an average of 233 saplings (0.1 to 4.9 inches d.b.h.) per acre, 101 poletimber trees per acre, 30 trees per acre in small and medium sawtimber (9.0 to 29.9 inches d.b.h.) and 18 trees per acre in large sawtimber (30.0+ inches d.b.h.).

The average diameter for all species (weighted by trees per acre) of 0.1 inch diameter and larger trees is 10.6 inches at breast height.

At this time many of the overstory trees are becoming less vigorous and in some cases dying or becoming victims of blowdown. The remaining overstory trees are not occupying the newly available growing space. New germinants or advance regeneration are growing into the canopy gaps.

There are approximately 120 dead standing trees per acre. Most of these trees are in the poletimber size class. These smaller trees can not compete effectively for growing space with their larger neighbors and consequently many are now dying.

The portion of the Stream Terrace ecological unit that lies west of Indian River has a greater proportion of Sitka spruce than occurs in the portion of the unit to the east of the river. The western portion is dominated by Sitka spruce, is more highly disturbed, and younger than the eastern portion of the Unit. The western portion is typical of Sitka spruce stands on stream terraces. The canopy is open, allowing significant amounts of light to reach the forest floor. The additional light and disturbance is reflected by the understory of salmonberry and devils club as compared to the eastern portion of the unit with more western hemlock and blueberry. The largest trees in the eastern portion of the unit are older than the western portion. The eastern portion is typical old-growth with multiple canopy layers, larger down logs, snags and large old trees.

Plant Associations found on plots 3, 7, and 9 - Plot 3 PA 330
Plot 7 PA 160
Plot 9 PA 352

The portion of the stream terrace lying to the west of Indian River is dominated by Sitka Spruce plant associations (330, 335, and 320).

The portion of the stream terrace lying to the east of Indian River is dominated by western hemlock/blueberry plant associations and is less disturbed than the western portion.

Age - Nine trees had growth increment cores removed at 4 1/2 feet above the ground. These trees ranged in age from a low of 13 years at breast height from a red alder located on plot 9 to a high of 121 years on a Sitka spruce located on plot 3. It is important to note that these measurements do not represent the oldest individuals in this ecological unit. There are a number of extremely large (40+ dbh) western hemlock and Sitka spruce that are hundreds of years old - probably greater than 300 years of age. The oldest trees lie near plot 7, where an old-growth stand structure is evident.

Productivity - Site index is a measure of the relative productivity of a stand based on the height of the dominant trees in the stand at an arbitrarily chosen age. The arbitrary age for western hemlock and Sitka spruce has varied from 100 years in the past to 50 years at the present. Site index was estimated using Pacific Northwest Range and Forest Experiment Station Research Paper PNW-326 (1984). Based on the dominant Sitka spruce measured on the stream terrace plots 3 and 7, a site index of 82 feet in 50 years is estimated. This means that dominant Sitka spruce have the potential on this site of reaching a height of 82 feet in 50 years.

Another measure of productivity is the volume of wood produced. Volume of wood is probably less reliable than site index as it is highly dependent on stand age, past management, insect and disease activity and other disturbance factors. The stream terrace unit has a live tree gross volume of 8,690 cubic feet per acre or, in terms of board feet, 42,414 (Scribner C, 32 foot log).

Insects, Disease and Abiotic Disorders - The major insects, diseases and disorders viewed in the stream terrace stand are spruce aphid, hemlock dwarf mistletoe and hemlock fluting. In addition, minor amounts of dead and broken tops were observed.

Spruce aphid - This insect causes defoliation of Sitka spruce and has sporadically caused serious damage and mortality in the past (USDA 1985). Spruce aphid damage was noted on 34 percent of the Sitka spruce on the three permanent plots within the unit. Most damage is minor but an occasional spruce may die as a direct result of aphid feeding that occurred during the mild winter of 1991/92.

Hemlock dwarf mistletoe - This seed bearing plant causes one of the most destructive diseases in old-growth forests of southeast Alaska (USDA 1985). The stand is heavily infected with mistletoe with approximately 54 percent of the western hemlock trees being infected to some extent and 100 percent of the western hemlock that is 9.0 inches and larger in diameter.

Western hemlock stem fluting - Fluted hemlock are found throughout southeast Alaska, most frequently in coastline stands that develop after catastrophic disturbances such as clearcutting or windthrow (USDA 1989). The degree to which western hemlock trees are fluted varies with tree age. Flutes often begin to form at the root collar when the tree is about 10 years old. With time, flutes progressively deepen and eventually trap bark within the stem. After several centuries bark becomes completely engulfed and flutes may not longer be outwardly visible. Western hemlock is genetically predisposed to form fluted trunks.

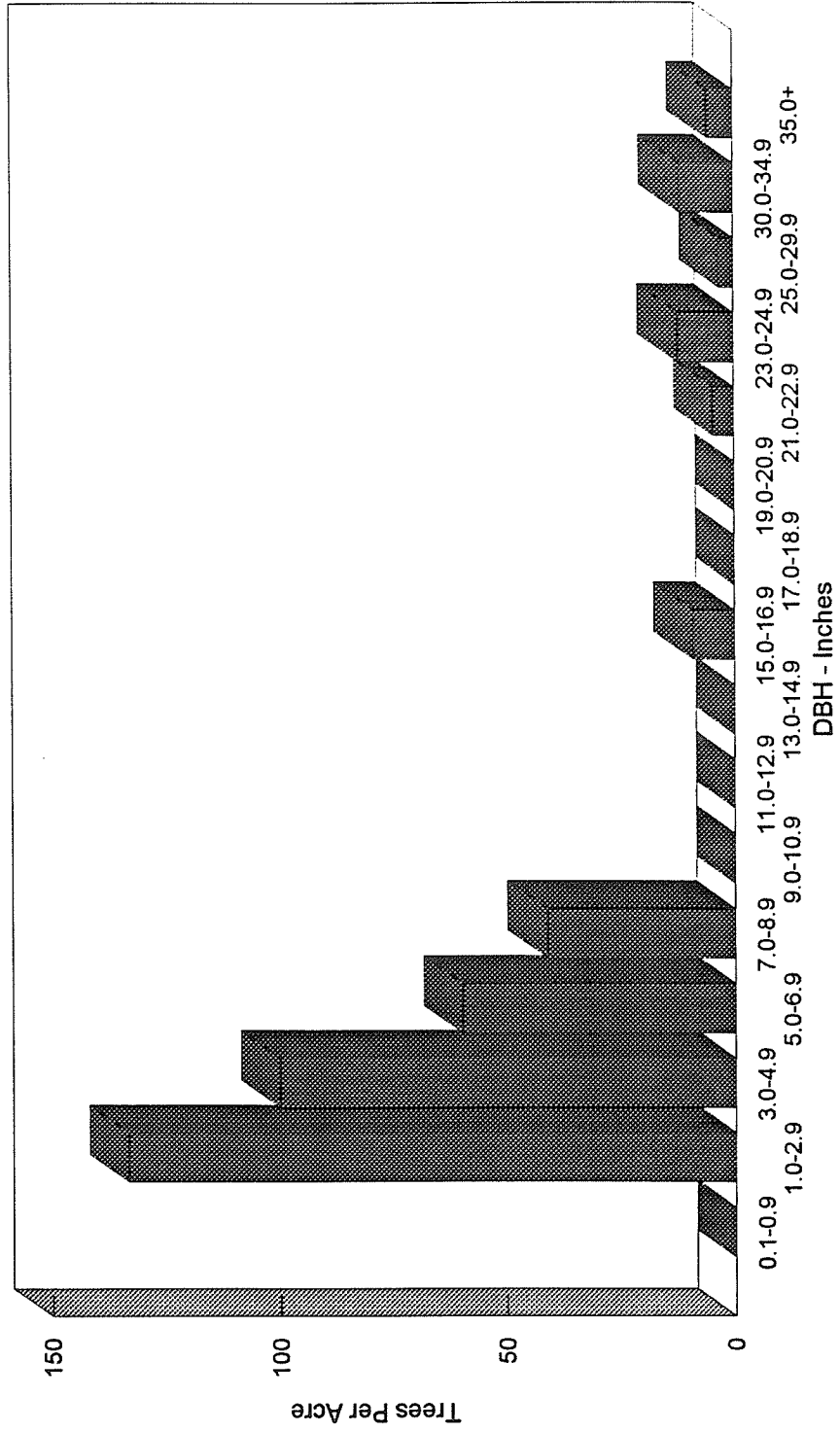
Only two percent of the Western hemlock in this stand exhibit fluting. The fluted trees in this stand may actually be more stable in a windy environment than non-fluted hemlock. Fluted trees have a broader base and pronounced buttressing, probably making them more stable in the wind.

Finally, the stand is experiencing mortality due to windthrow. The stand is exposed to the wind from the east due to the openings created by land clearing at the Post Office and other developments on the east side of the Park. Scattered trees in the stand are continuing to be blown down either through uprooting or stem failure, often at the site of stem decays. As previously mentioned, this ecological unit is presently occupied by an old-growth stand. However, openings and edge effects can influence old-growth forest function by altering abiotic and biotic processes (Concannon 1991). It is foreseeable that the edge and openings found to the east will continue to have an influence on interior climate and blowdown within the Park.

A storm resulted in a small patch of mainly young-growth within the stream terrace on the west side of Indian River, approximately 250 feet south of plot 3 on the trail that parallels the west bank of the River. This small patch of about 2 acres is in the stem exclusion stage of stand development with few forbs and shrubs in the understory and high rates of mortality occurring in the stand due to competition for light and nutrients. Both western hemlock and red alder were sampled for age. These trees varied in age between 30 and 40 years (core taken near groundline). Therefore, it is likely that the storm event that resulted in their establishment occurred between 1953 and 1963.

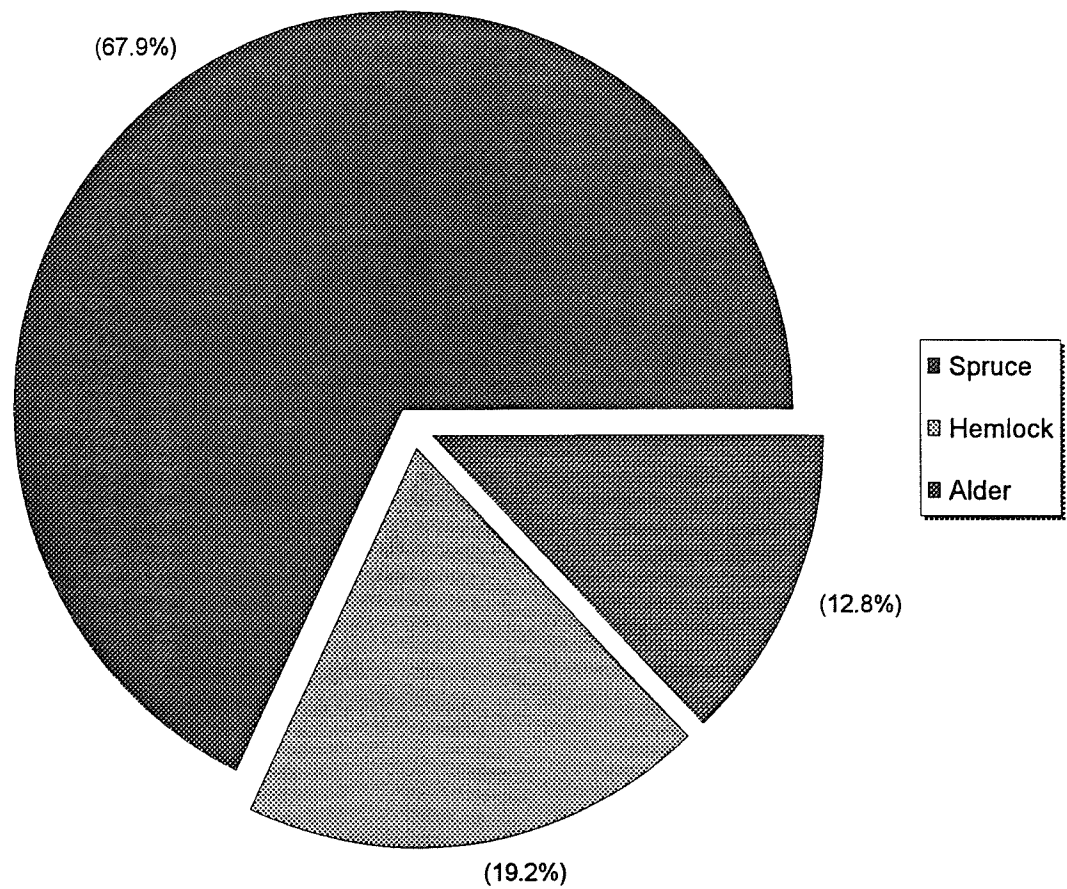
There is little evidence of harvesting within the western portion of the unit except along walking trails. On the east side of the ecological unit near the parking lot there are several large stumps that were cut many decades ago. A 68 year old Sitka spruce (age at d.b.h.) has taken root on the top of one of the stumps. Estimating approximately 20 years for the tree to become established and grow to 4 1/2 feet, the cutting took place about 1905, which attests to the persistence of large organic debris in the cool maritime climate of southeast Alaska.

Terrace Diameter Distribution



Terrace

Species Composition - Basal Area



MORaine

Structure and Composition - This ecological unit is a western hemlock - Sitka spruce stand. There are two portions of this unit. There is an eastern and a western portion separated by Indian River. The western portion is an even-aged single story stand in the understory reinitiation stage of stand development. The western portion is an old-growth stand.

Basal Area (cross sectional area of tree boles at breast height) is normally used to determine forest type where poletimber or sawtimber dominates the stand. In this unit, poletimber and larger western hemlock has a basal area of 280 square feet per acre and Sitka spruce 180. The basal area of sapling size western hemlock is 13.8 square feet per acre. There are no Sitka spruce saplings measured on either plot.

There are an average of 150 saplings (0.1 to 4.9 inches diameter at breast height d.b.h.) per acre, 269.6 poletimber trees per acre (5.0 to 8.9 inches d.b.h.), 180.2 trees per acre in small and medium sawtimber (9.0 to 29.9 inches d.b.h.) and 14.8 trees per acre in large sawtimber (30.0+ inches d.b.h.).

The average diameter for all species (weighted by trees per acre) of 0.1 inch diameter and larger trees is 11.9 inches at breast height.

The even-aged portion, to the west of Indian River, of this ecological unit is a dense stand of trees that is beginning to occupy growing space less vigorously than in the past. Windthrow as well as competition between trees has resulted in mortality with an increase in light penetrating the forest canopy and reaching the ground. At this time the overstory trees are becoming less vigorous and dying or becoming a victim of blowdown. The remaining overstory trees are not able to occupy the newly available growing space and newly germinating or advance regeneration is growing into the available canopy gaps. The eastern portion of the unit is an old-growth stand with patches of dense pole size timber of blowdown origin. This blowdown is approximately 30 to 40 years old and probably originated from the same storm event mentioned in the stream terrace section of this report.

There are approximately 275 dead standing trees per acre. Most of these trees are in the sapling size class. These trees are concentrated within the saplings on the plot 10 portion, eastern side of the unit. These small trees are in the stem exclusion stage where intense competition for growing space is occurring within the 30 to 40 year old blowdown "thickets".

Plant Associations found on plots 2 and 7 - Plot 2 PA 120
Plot 10 PA 110

Age - Eight trees had growth increment cores removed from the tree at 4 1/2 feet above the ground. These trees ranged in age from a low of 18 years at breast height from a western hemlock located on plot 10 to a high of 144 years on a Sitka spruce located on plot 2. The even-aged portion of the ecological unit to the west of Indian River was probably harvested at the same time as the uplifted beach unit (120-150 years ago).

These measurements do not represent the oldest individuals in this ecological unit. There are a number of extremely large (30 to 40+ inch d.b.h.) western hemlock and Sitka spruce that are hundreds of years old on the eastern portion of the moraine. The oldest portion of this ecological unit lies to the east of Indian River, where old-growth stand structure is evident.

Productivity - Site index is a measure of the relative productivity of a stand based on the height of the dominant trees in the stand at an arbitrarily chosen age. Site index was estimated using Pacific Northwest Range and Forest Experiment Station Research Paper PNW-326 (1984). Based on the dominant Sitka spruce measured on the moraine vegetation plot 2, a site index of 83 feet in 50 years is estimated.

Another measure of productivity is the volume of wood produced, often expressed in terms of an annual increment. The moraine ecological unit has a live tree gross volume of 18,463 cubic feet per acre or, in terms of board feet, 83,547.

Insects, Disease and Abiotic Disorders - The major insects, diseases, and disorders viewed in the moraine unit are spruce aphid, hemlock dwarf mistletoe and hemlock fluting. In addition, minor amounts of dead and broken tops were observed.

Spruce Aphid - This insect causes defoliation of Sitka spruce and has sporadically caused serious damage and mortality in the past. Spruce aphid damage was noted on 70 percent of the Sitka spruce on the two permanent plots within the unit. Most damage is minor but about 1/4 of the damage is severe. The aphid feeding took space during the winter of 1991/92.

Hemlock dwarf mistletoe - This seed bearing plant causes one of the most destructive diseases in old-growth forests of southeast Alaska. The stand is moderately infected with mistletoe with approximately 21 percent of the western hemlock trees being infected to some extent.

Western hemlock stem fluting - Fluted hemlock are found throughout southeast Alaska, most frequently in coastline stands that develop after catastrophic disturbances such as clearcutting or windthrow. The degree to which western hemlock trees are fluted varies with tree age. Flutes often begin to form at the root collar when the tree is about 10 years old. With time, flutes progressively deepen and eventually trap bark within the stem. After several centuries bark becomes completely engulfed and flutes may not longer be outwardly visible. Western hemlock is genetically predisposed to form fluted trunks. Fluted stands frequently occupy uplifted beach soils such as found in this stand.

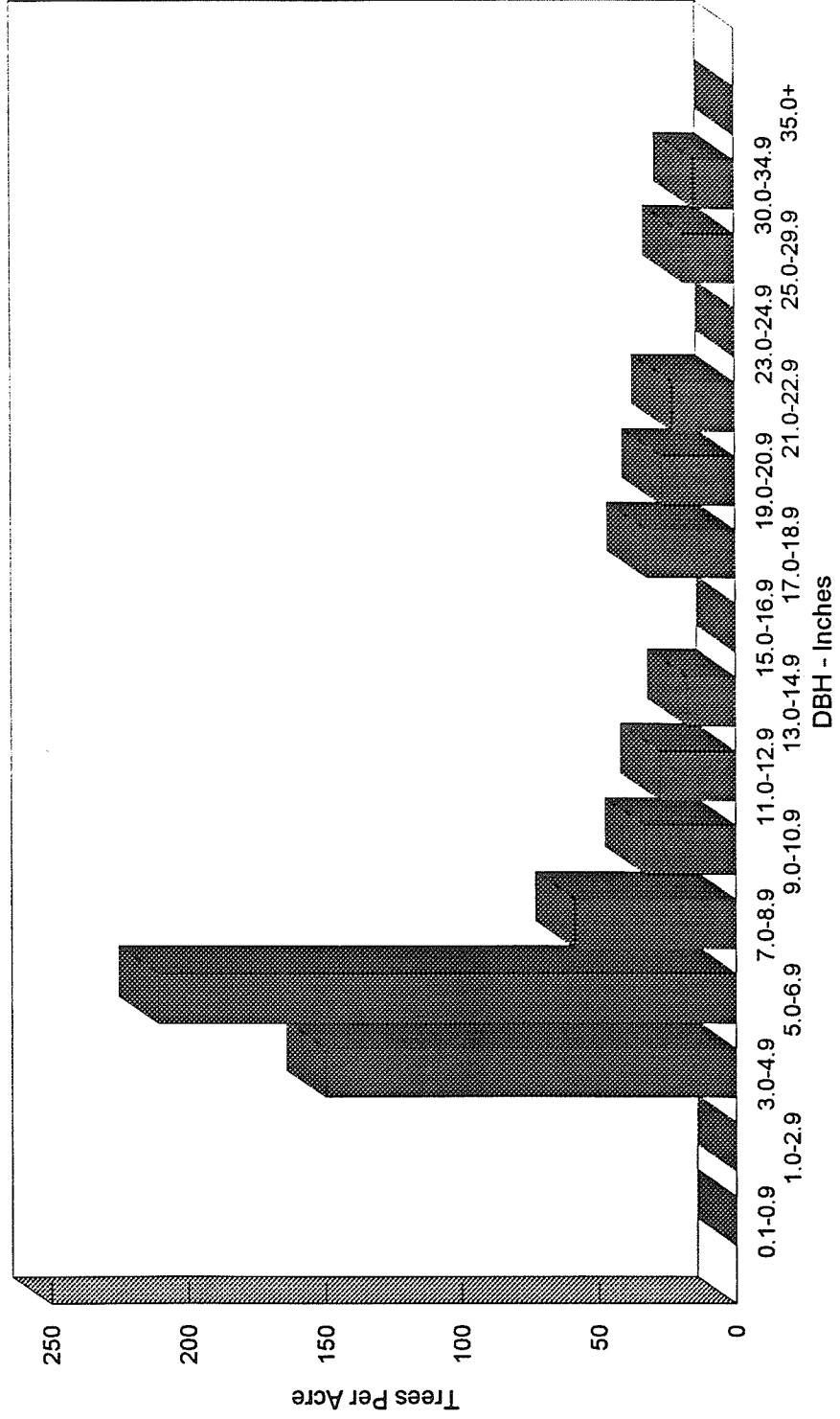
Seventy-three percent of the Western hemlock in this stand exhibit fluting. The fluted trees in this stand may actually be more stable in a windy environment than non-fluted hemlock. Fluted trees have a broader base and pronounced buttressing, probably making them more stable in the wind.

Finally, the stand is experiencing mortality due to windthrow. The stand is exposed to the wind from the east due to the openings created by land clearing at the Post Office, trailer court and other developments on the east side of the Park. Scattered trees in the stand are continuing to be blown down either through uprooting or stem failure, often at the site of stem decays.

The storm or storms that resulted in even-aged inclusions of young growth within the stream terrace on the west side of Indian River, also seems to have affected the moraine unit on both sides of Indian River. A windthrow generated western hemlock on the west portion of the moraine was determined to be 40 years old and a western hemlock on the eastern portion of the unit which was growing on the root wad of a large root thrown tree was determined to be 37 years old.

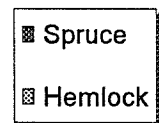
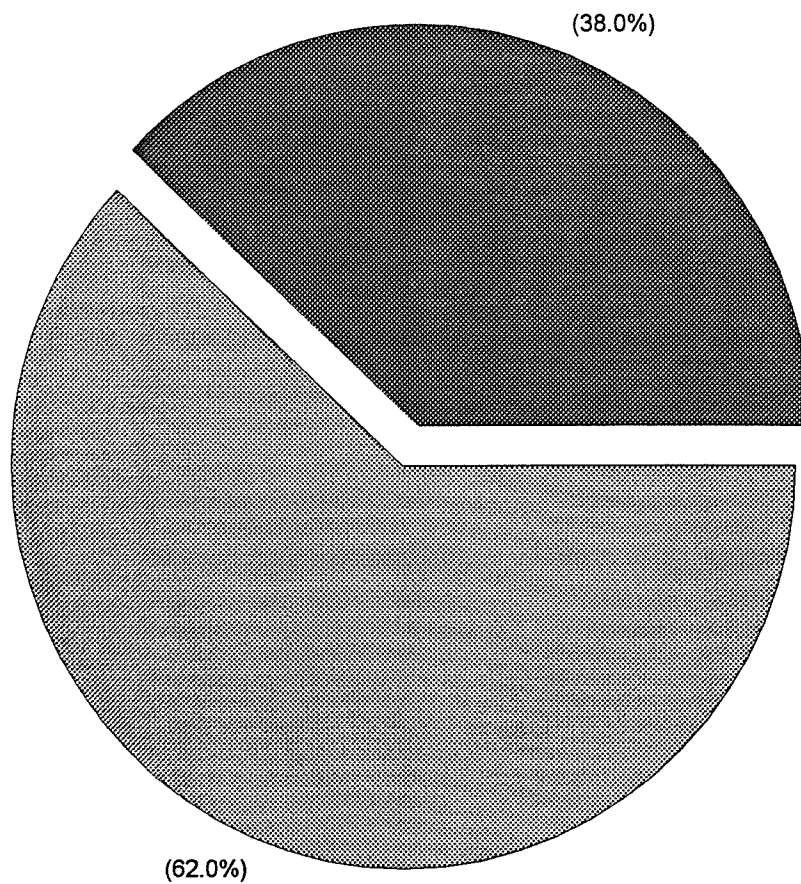
Past and Future Development - There is little evidence of recent harvesting in this ecological unit, except along walking trails. The western portion of the unit was probably harvested at the same time as the Uplifted Beach Unit (120 - 150 years ago).

Moraine Diameter Distribution



Moraine

Species Composition - Basal Area



UPLIFTED BEACH

Structure and Composition - This ecological unit lies within an even-aged single story western hemlock - Sitka spruce forest in the understory reinitiation stage of stand development. In southeast Alaska, this stage of stand development begins at approximately 80 to 100 years of age. A low stratum of herbs, shrubs and conifer regeneration, usually western hemlock, develops on the forest floor.

Stand level attributes considered necessary to define a functioning old-growth stand are defined by Alaska Region R10-TP-28, Ecological Definitions for Old-growth Forest Types in Southeast Alaska (1992). This stand does not meet minimum old-growth requirements due mainly to the young age of the stand and few canopy layers.

Basal Area - Total basal area within this ecological unit is 360 square feet. Poletimber and larger western hemlock occupies a basal area of 200 square feet per acre and Sitka spruce 160. The basal area of sapling size trees is 0.5 square foot per acre, all of it western hemlock.

There are an average of 6,000 western hemlock seedlings per acre, 250 saplings per acre (0.1 to 4.9 inches diameter at breast height d.b.h.), 151 trees per acre in small and medium sawtimber (9.0 to 29.9 inches d.b.h.) and 7 large sawtimber trees per acre (30+ inches d.b.h.). There are no poletimber trees (5.0 to 8.9 inches d.b.h.).

The average diameter for all species (weighted by trees per acre) of 0.1 inch diameter and larger is 12.7 inches at breast height.

At this time the overstory trees are occupying the growing space less aggressively than they have in the past. Minor disturbances such as windthrow, insect and disease effects and the natural senescence of trees, have all contributed to additional light penetrating the forest canopy in this stand.

There are approximately 57 dead standing trees per acre, many of which have died as a result of increased competition for nutrients and light between trees in the stand. Most of the mortality has occurred in the poletimber size class. These smaller trees cannot compete effectively with their larger neighbors and consequently some are now dying.

Additional light penetrating the canopy has allowed a lush growth of herbs such as deerberry and twisted stalk. Shrubs such as red huckleberry, salmonberry, and rusty menziesia have also responded to the increased light. Shield, oak and lady fern are present (see vascular plant species list in the Ecological Unit Inventory report for scientific names).

Plant Associations found on plots 1 and 6 - Plot 1 PA 120
Plot 6 PA 120

Age - Eight Western hemlock and Sitka spruce had growth increment cores removed from the tree. These tree cores ranged from a low of 112 years to a high of 145 years at 4 1/2 feet above the ground. Based on the measured tree ages, it is estimated that either a catastrophic blowdown or logging event occurred approximately 120 to 150 years ago or sometime around the years 1843 to 1873. There are a number of older trees scattered throughout the stand that survived the logging or blowdown event. It is likely that the area was harvested as the pits and mounds often created by upturned root wads due to windthrow are not prevalent on a large scale within the area. Another bit of evidence leading to the likelihood of harvest is the area's close proximity to Sitka and comments made by W.J. Lewis who in 1913 reported that the timber near the waterfront appears to have been cleared (Antonson, p.46, 1987).

Productivity - Site index was estimated using Pacific Northwest Range and Forest Experiment Station Research Paper PNW-326 (1984). Based on the dominant Sitka spruce measured on the Uplifted Beach plots, a site index of 89 feet in 50 years is estimated.

Another measure of productivity is the volume of wood produced. The Uplifted Beach unit has a live tree gross volume of 16,567 cubic feet per acre or, in terms of board feet 74,700. The growth of this stand is slowing as the mean annual increment of 127 cubic feet per year (17,209 cubic feet / 135 years) is compared to the periodic annual increment for the last 10 years of 58 cubic feet.

Insects, Disease and Abiotic Disorders - As with the Stream Terrace Ecological Unit, the major insect, disease and disorders viewed in the Uplifted Beach Unit are spruce aphid, hemlock dwarf mistletoe and hemlock fluting. In addition, minor amounts of stem decays were observed.

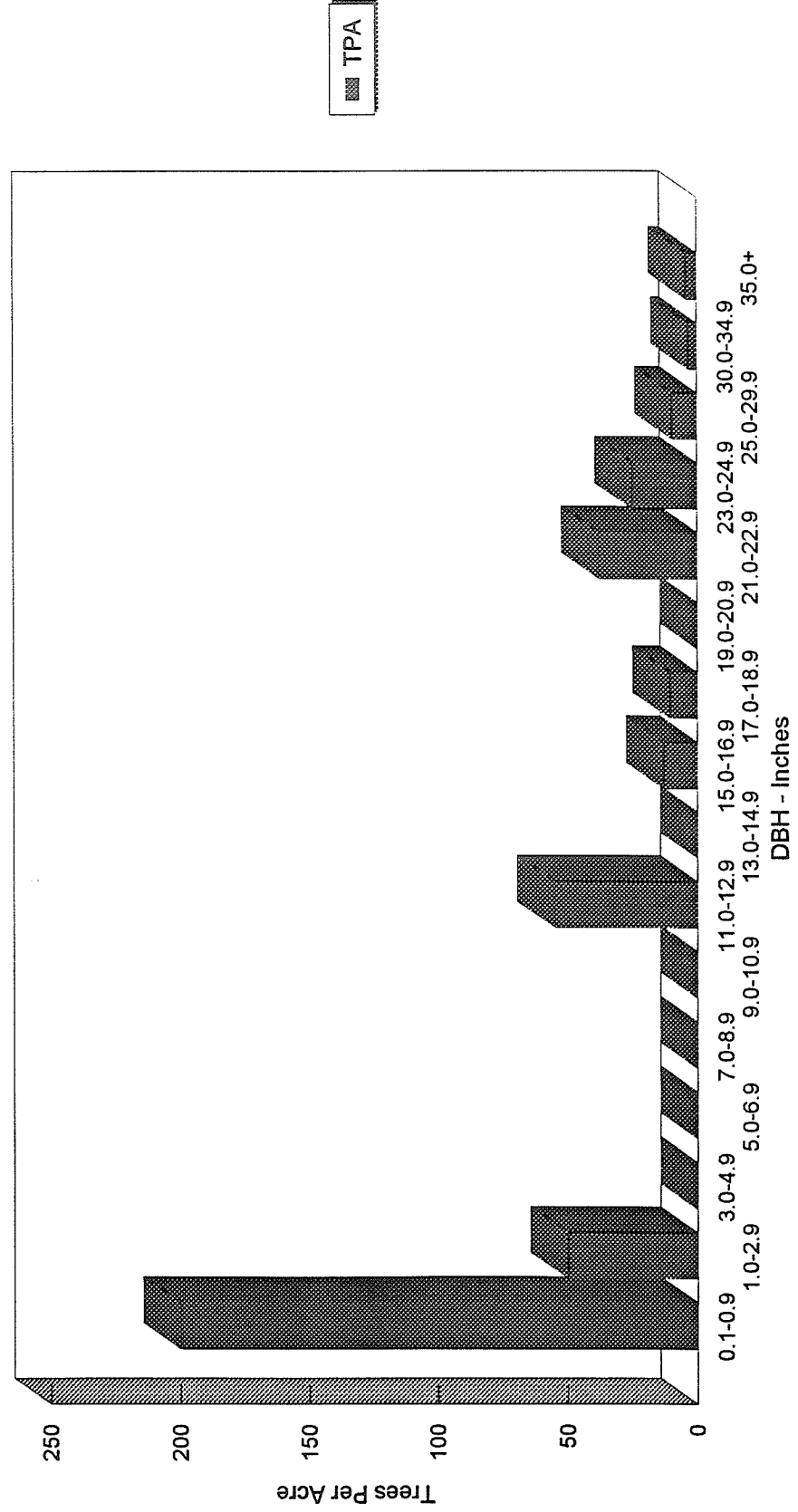
Spruce Aphid - This insect causes defoliation of Sitka spruce and has sporadically caused serious damage and mortality in the past. Spruce aphid damage was noted on 100 percent of the Sitka spruce on the two permanent plots within the Uplifted Beach unit. Most damage is minor but about 1/3 of the spruce were severely defoliated as a result of the aphid feeding that occurred during the mild winter of 1991/92.

Hemlock dwarf mistletoe - The unit is heavily infected with mistletoe with approximately 80 percent of the western hemlock trees being infected to some extent. Of interest is a 43.3 inch d.b.h. Sitka spruce on plot 1 which is also infected with the disease. This is rare as Sitka spruce is not often infected with mistletoe.

Western hemlock stem fluting - Sixty percent of the western hemlock found on plots 1 and 6 exhibit fluting.

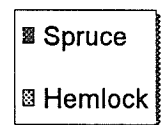
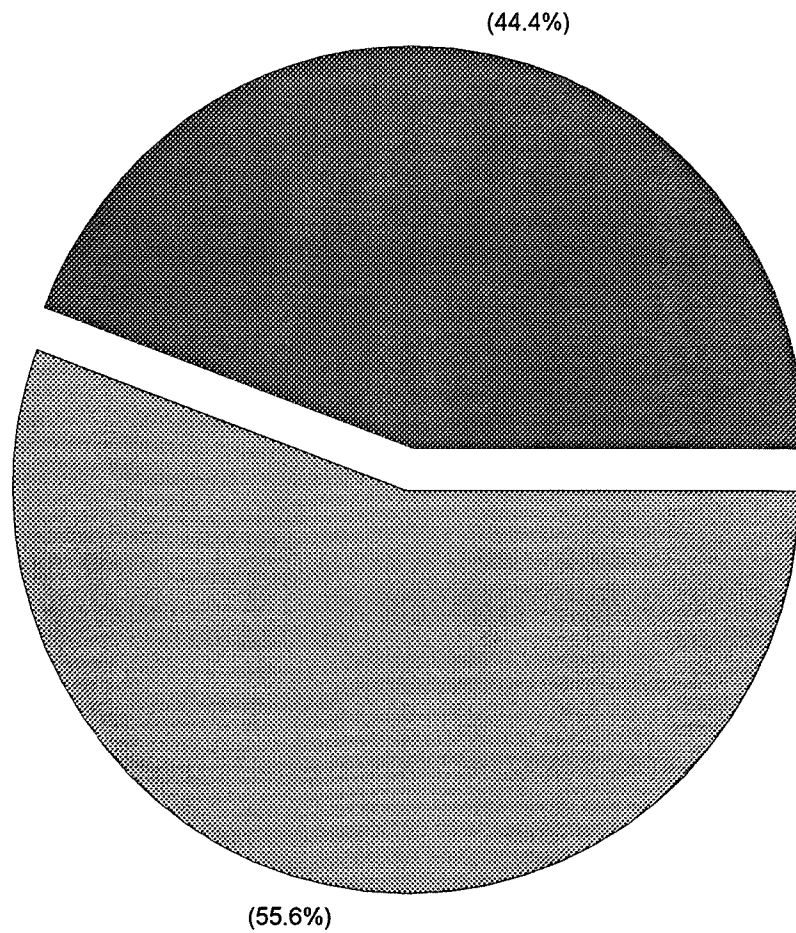
Finally, the stand is experiencing mortality due to windthrow. Windthrow within the last 10 to 15 years has resulted in the formation of a small gap in the canopy northeast of plot 1. Herbs, shrubs and young western hemlock regeneration is responding to the increase in light and are rapidly occupying the disturbed area.

Uplifted Beach Diameter Distribution



Uplifted Beach

Species Composition - Basal Area



UPLIFTED BEACH MEADOW.

Structure and Composition - This ecological unit is a small area of uplifted beach that is periodically flooded during extreme high tides or storms. The areas that are slightly higher are flooded to a lesser extent and are being invaded by Sitka spruce, Sitka alder and red alder. The lower portions of the unit which are more frequently flooded by saltwater are dominated by grass and umbels. However, even in these flooded areas, some Sitka spruce are becoming established on old beach logs that provide rooting sites as the logs decompose. This ecological unit is undergoing primary forest succession. Species that are invading the unit are salt tolerant and are relatively shade intolerant.

The two plots have on average only .4 square foot of basal area in western hemlock and Sitka spruce sapling sized trees with 250 trees per acre. All of the 250 trees were in the 0.1 to 0.9 inch diameter class. No alder was found on either plot, but there is a significant alder component on the higher portions of the ecological unit. One Sitka spruce seedling was found in the plots which was growing on a decomposing beach log. This represents 150 seedlings per acre.

At this time the trees are relatively open grown and the stand is developing in the initiation stage. As this stand matures, vertical structure will increase at the expense of plant diversity.

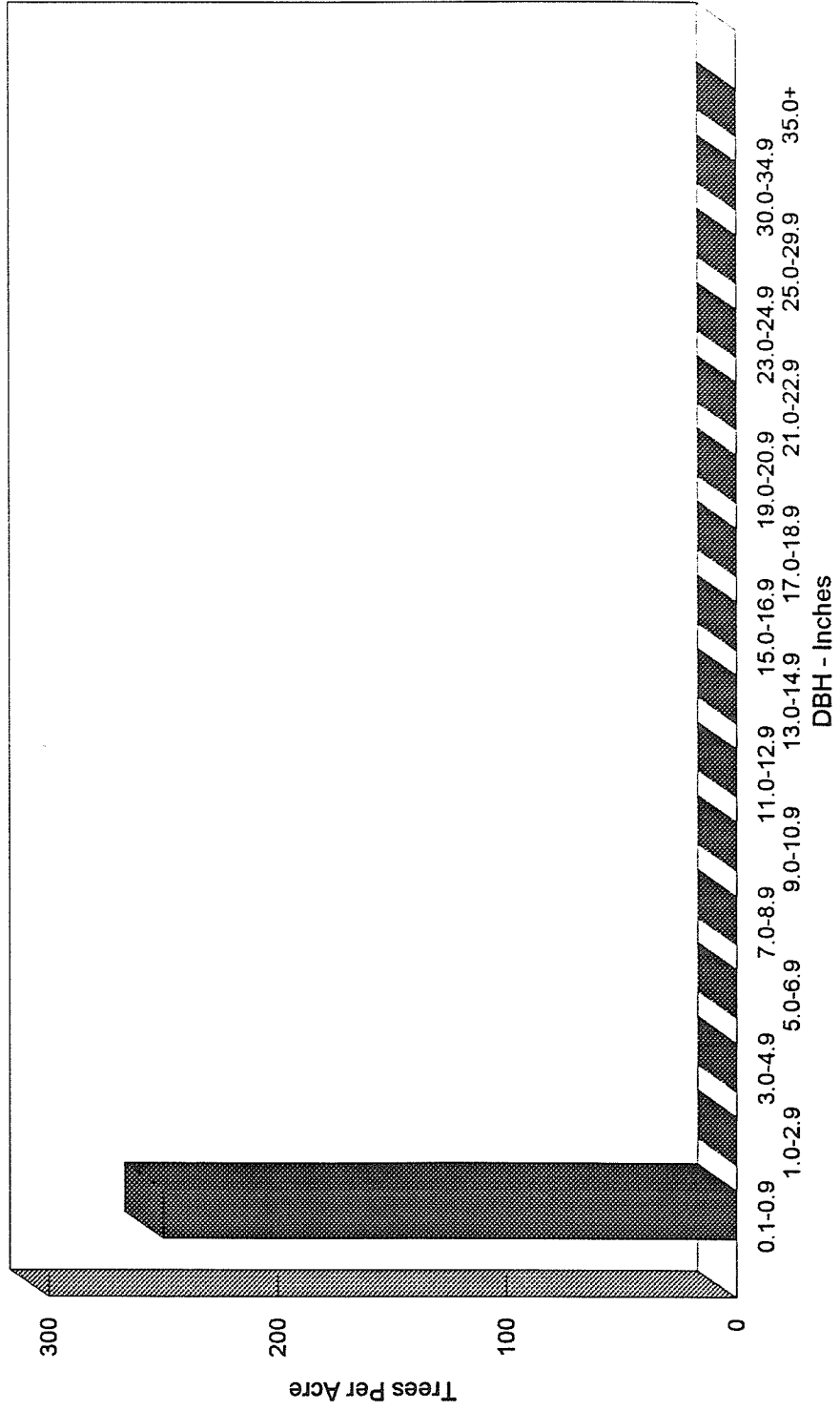
Age - No trees in this unit were measured for age. Trees are young, most being less than an estimated 20 years of age.

Productivity - The soils on this ecological unit are deep well drained and young. The Sitka spruce and western hemlock is growing well, with an average height growth of .9 feet per year.

Insects, Disease and Abiotic Disorders - There was no insect, disease damage or disorders observed on the trees on either of the two permanent plots. Minor amounts of spruce aphid damage was observed on Sitka spruce within the ecological unit but off of the permanent plots.

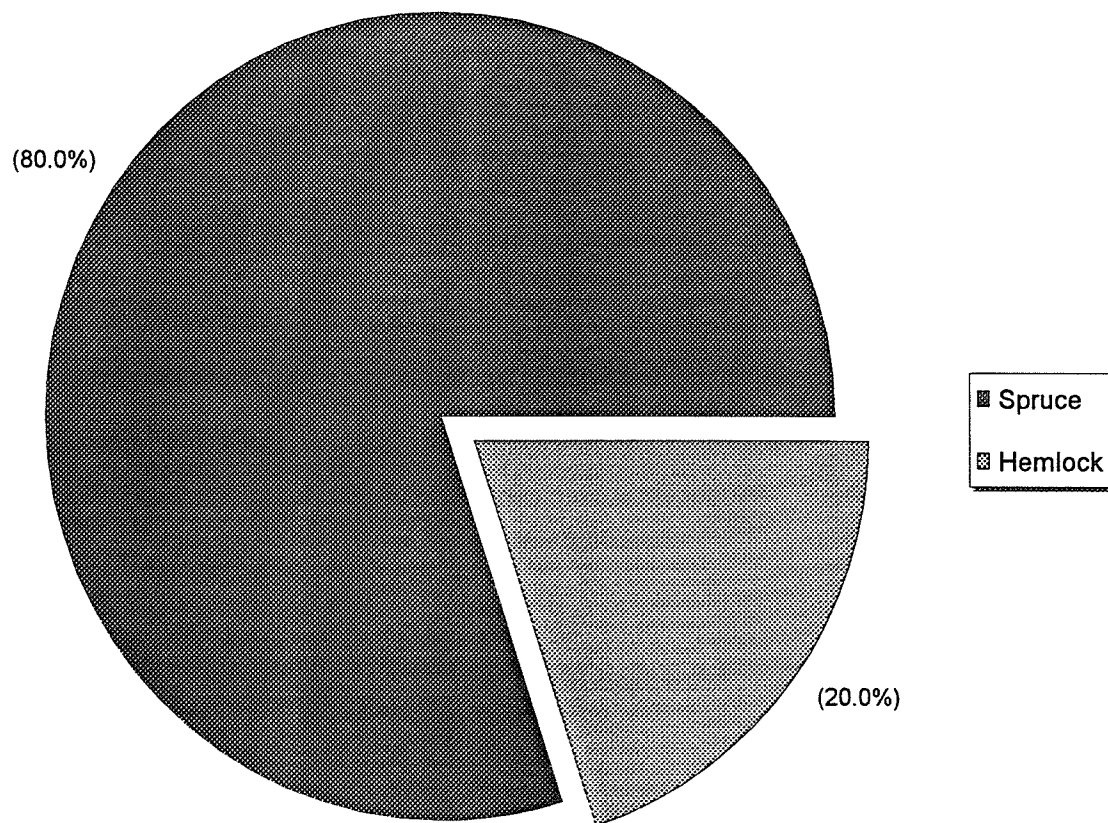
Meadow Diameter Distribution

TPA



Meadow

Species Composition - Trees Per Acre



FLOODPLAIN

Structure and Composition - This ecological unit is in an even-aged, two story red alder stand. The overstory is red alder. Although no Sitka spruce was found on the permanent plot, a scattered understory of young Sitka spruce is developing under the alder. This stand will be replaced by Sitka spruce in the absence of further major flood events or other significant disturbance. Red alder is a pioneer species on mineral soil and thrives on moist sites. Red alder has the ability to directly fix atmospheric nitrogen from the air. In addition, it has an abundant leaf fall which adds needed humus to the soil. It is therefore an important species in improving and stabilizing disturbed soils.

Basal Area of red alder is 120. The basal area of sapling size red alder is 80 and of sawtimber size is 40.

There are an average of 196 red alder poletimber per acre. There are 73 small sawtimber per acre. There is some mortality in red alder saplings due to competition for light and growing space. Approximately 100 red alder saplings per acre have recently died.

The average diameter for this stand (weighted by trees per acre) of 0.1 inch diameter and larger is 9.0 inches.

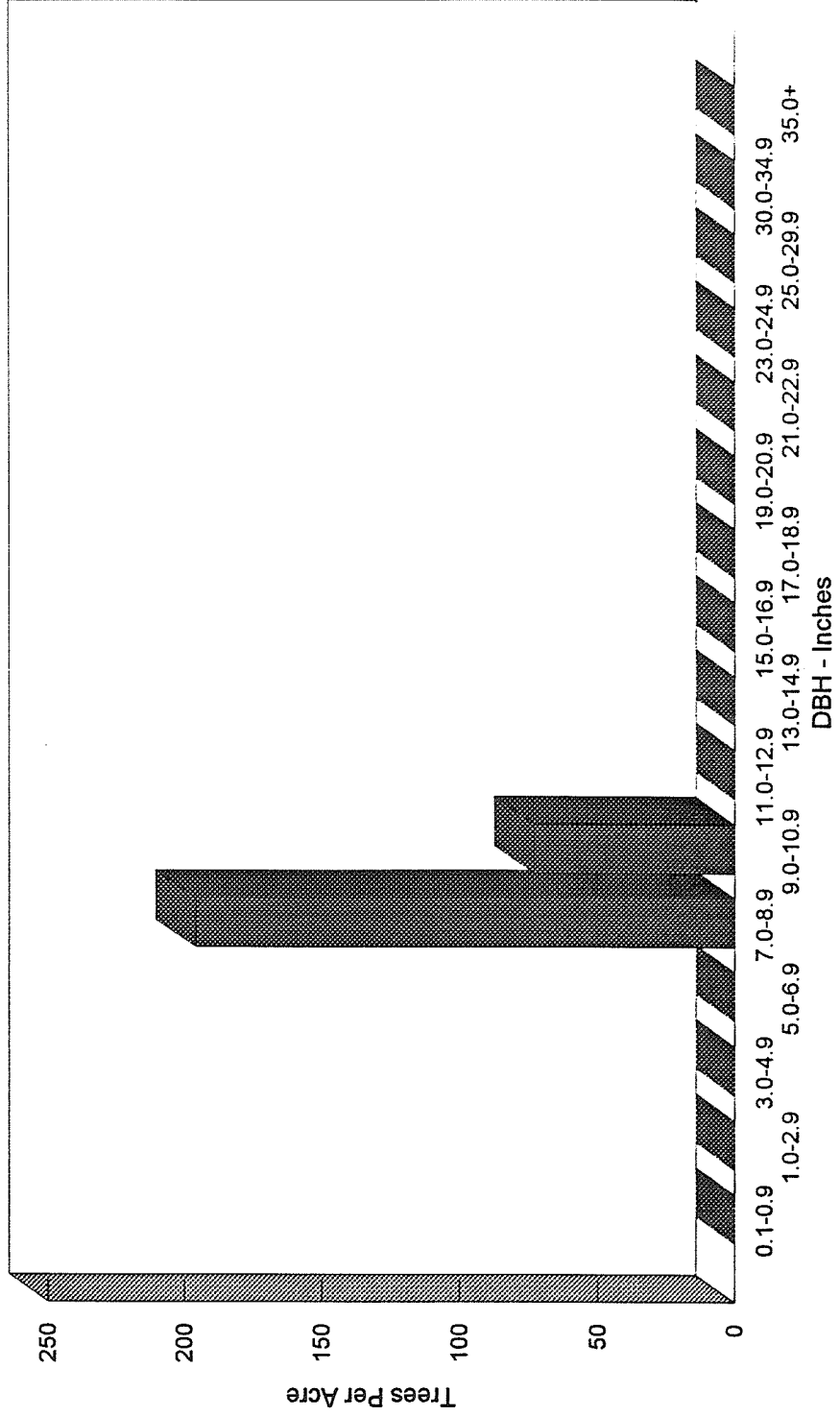
Light penetrating the alder canopy has allowed a dense salmonberry understory.

Age - Two red alder trees had growth increment cores removed from the trees at 4 1/2 feet above the ground. These trees ranged in age from a low of 33 years to a high of 36 years at breast height. Alder is a rapid growing tree and will grow up to one foot during the first year and up to 3 to 4 feet for the next few years. Therefore, the disturbance that resulted in the establishment of this stand occurred around the mid 1950's.

Productivity - Although no site index curves are available for red alder in Alaska, the alder on the site is tall, with many trees over 70 feet in height in less than 40 years. These alder will not grow much more in height although diameter growth will continue. There is significant competition for growing space occurring between the alder and a good deal of mortality will occur during the next decade.

Insect and Disease - No insect or disease damage was observed. Some degree of forks, crooks or sweep was observed in most of the trees in the stand.

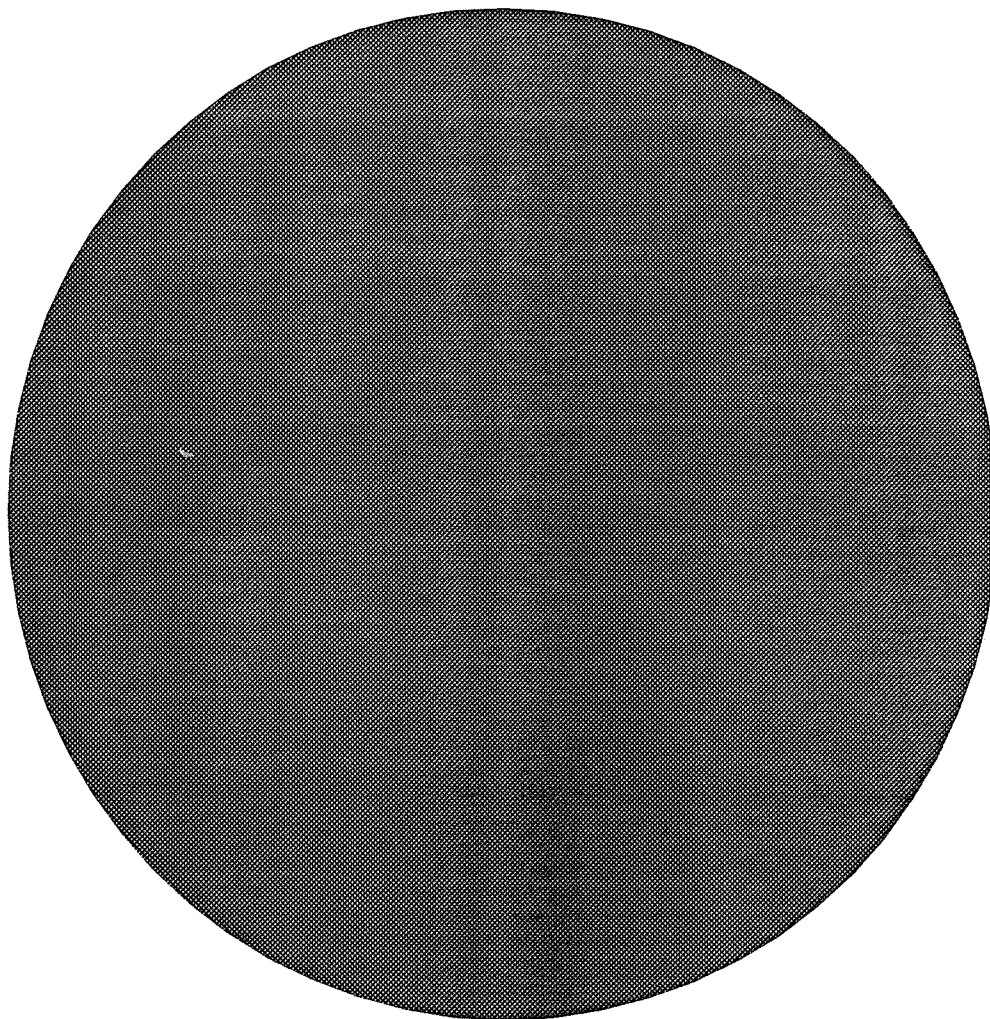
Floodplain Diameter Distribution



TPA

Floodplain

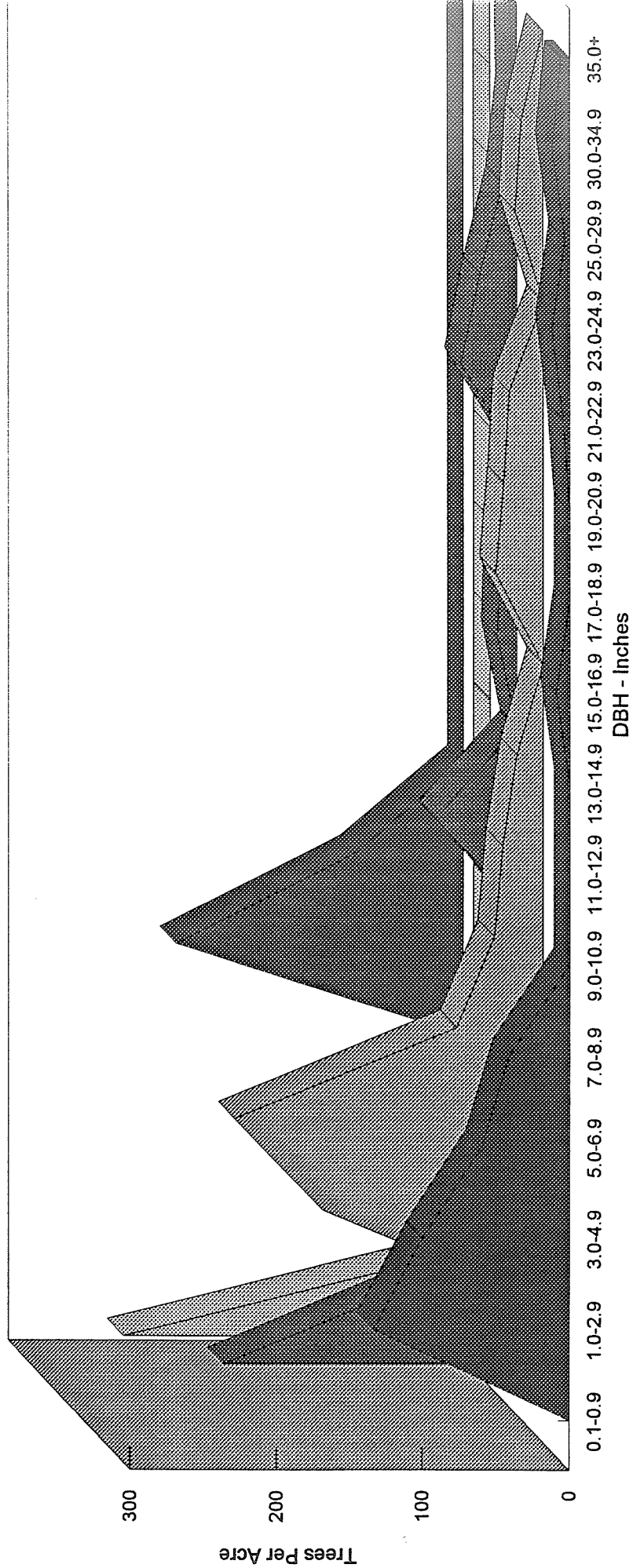
Species Composition - Basal Area



■ Alder

Diameter Class Distribution

For All Ecological Units



Terrace
 Moraine
 Uplifted Beach
 Meadow
 Floodplain

Diameter Class Distribution For All Ecological Units

DBH Class	Terrace	Moraine	Uplifted Beach	Meadow	Floodplain
	TPA	TPA	TPA	TPA	TPA
0.1-0.9	0	0	200	250	0
1.0-2.9	133.3	0	50	0	0
3.0-4.9	100	150	0	0	0
5.0-6.9	59.7	210.8	0	0	0
7.0-8.9	41.2	58.8	0	0	196.2
9.0-10.9	0	33.3	0	0	73.3
11.0-12.9	0	27.7	55	0	0
13.0-14.9	0	17.9	0	0	0
15.0-16.9	9.3	0	13.1	0	0
17.0-18.9	0	32.4	10.6	0	0
19.0-20.9	0	26.8	0	0	0
21.0-22.9	4.7	23.1	38	0	0
23.0-24.9	12.5	0	25	0	0
25.0-29.9	3.3	19	9.6	0	0
30.0-34.9	12.1	14.8	3.3	0	0
35.0+	5.8	0	4.1	0	0

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APPENDIX 1. TRAVERSE OF PLOT LOCATIONS

TRAVERSE INFORMATION TO PERMANENT PLOT LOCATIONS IN SITKA NATIONAL HISTORICAL PARK

On March 30 1993, Jim Russell and Bill Dougan of the USDA, Forest Service, traversed to 11 permanent vegetation plot locations in Sitka National Historical Park. The traverse started near the southwest corner of the Visitor Center at a brass monument located in the center of the asphalt path which accesses the main entrance on the south side of the Visitor Center. The brass monument is inscribed 78-1 USDI NPS. The monument was established by the Department of the Interior. A Criterion 400 Survey Laser Instrument was used to record magnetic azimuths and horizontal distances. An arbitrary Northing and Easting point was assigned to the location of the brass monument of 10000.0000 and 5000.0000.

The plot centers of the 11 vegetation permanent plots were established by driving aluminum rods of approximately three feet in length into the ground and driving on an aluminum monument "cap" of approximately 2 inches in diameter. Inscribed on the top of the monument is NPS 1, NPS 2 through NPS 11. A magnet is located within the aluminum monument so a metal detector can be used to find the monument in the likely event that it is buried by organic debris or sediment over the years. The monuments were placed flush with the ground to minimize their visibility to Park visitors and to reduce the risk of vandalism.

The traverses, for the most part, follow existing visitor walking trails. Traverse 1 starts at the brass monument mentioned above and ends at vegetation plot 11 in the estuary on the Northeast side of Indian River. Traverses 2 through 8 branch off of traverse 1 and end at vegetation plot monuments 2, 3, 6, 1, 8, 7, 9, and 10. The locations of vegetation plot monuments 5, 4, and 11 are to be found in traverse 1 notes. The following notes are for the eight traverses which will allow the 11 permanent vegetation plots to be located at a future time for remeasurement.

----- TRAVERSE PROCESSING STARTED AT 04/16/1993 12:30 PM -----
 ***** NEW TRAVERSE CREATED VIA KEYED DATA INPUT *****

OPEN TRAVERSE
 NPS-TOTEM PARK TRAVERSE - TRAVERSE NUMBER 1

HORIZONTAL							
PT#	BEARING / AZIMUTH	MAGNETIC DISTANCE	NORTHING	EASTING	NOTES		
1			10000.0000	5000.0000	PT. 1 AT BRASS MONUMENT IN SIDEWALK ON SOUTH SIDE OF PARK SERVICE VISITOR CENTER. INSCRIPTION ON MONUMENT READS 78-1		
					USDI NPS		
2	S 87-42-00 E (92.3)	223.11	9991.0462	5222.9303	OCEANSIDE TRAIL UPLIFTED BEACH		
3	S 42-12-00 E (137.8)	155.13	9876.1252	5327.1343	" " " "		
4	S 49-30-00 E (130.5)	161.15	9771.4666	5449.6737	" " " "		
5	S 42-54-00 E (137.1)	301.15	9550.8613	5654.6728	" " " "		
6	S 49-06-00 E (130.9)	221.16	9406.0589	5821.8373	" " " "		
7	S 67-06-00 E (112.9)	126.53	9356.8230	5938.3949	" " " "		
8	S 83-48-00 E (96.2)	124.70	9343.3555	6062.3656	AT TRAIL JUNCTION UPLIFTED BEACH		
9	S 50-30-00 E (129.5)	148.73	9248.7516	6177.1293	OCEANSIDE TRAIL UPLIFTED BEACH		
10	S 75-12-00 E (104.8)	107.96	9221.1736	6281.5075			
11	N 43-24-00 E (43.4)	58.14	9263.4167	6321.4548	PLOT 5 UPLIFTED BEACH MEADOW		
12	N 38-42-00 E (38.7)	148.47	9379.2872	6414.2846	UPLIFTED BEACH MEADOW		
13	S 61-30-00 E (118.5)	24.08	9367.7972	6435.4465	PLOT 4 UPLIFTED BEACH MEADOW		
14	S 83-12-00 E (96.8)	76.00	9358.7985	6510.9119	OCEANSIDE TRAIL UPLIFTED BEACH MEADOW		
15	N 16-18-00 E (16.3)	143.67	9496.6937	6551.2353	OCEANSIDE TRAIL UPLIFTED BEACH		
16	N 8-36-00 W (351.4)	128.04	9623.2941	6532.0888	FORTSITE		
17	N 4-24-00 E (4.4)	224.96	9847.5911	6549.3475	FORTSITE TIE TO TNH EROSION PT. 214 1992		

HORIZONTAL

MAGNETIC/ MAGNETIC DISTANCE		NORTHING	EASTING	NOTES	EROSION PT. 212 1992	UPLIFTED BEACH
PT#	BEARING / AZIMUTH IN FEET					
18	N 4-42-00 E (4.7)	22.45	9869.9656	6551.1870	TRAIL ALONG INDIAN RIVER	
19	S 70-06-00 W (250.1)	78.91	9843.1063	6476.9888	TRAIL ALONG INDIAN RIVER	
20	S 88-12-00 W (268.2)	107.64	9839.7252	6369.4020	" "	" "
21	S 75-18-00 W (255.3)	156.37	9800.0451	6218.1503	" "	" "
22	S 70-18-00 W (250.3)	148.73	9749.9089	6078.1254	" "	" "
23	N 80-06-00 W (279.9)	153.93	9776.3739	5926.4875	" "	" "
24	N 68-12-00 W (291.8)	146.36	9830.7273	5790.5943	" "	" "
25	N 55-36-00 W (304.4)	63.57	9866.6423	5738.1419	" "	" "
26	S 74-18-00 W (254.3)	67.52	9848.3713	5673.1409	" "	" "
27	N 66-00-00 W (294.0)	145.51	9907.5556	5540.2109	" "	" "
28	N 19-18-00 W (340.7)	128.02	10028.3810	5497.8985	" "	" "
29	N 7-06-00 E (7.1)	130.90	10158.2772	5514.0779	" "	" "
30	N 55-24-00 W (304.6)	233.71	10290.9880	5321.7027	" "	" "
31	N 27-42-00 W (332.3)	73.96	10356.4717	5287.3230	START OF FOOT BRIDGE CROSSING INDIAN RIVER	
32	N 34-36-00 E (34.6)	111.06	10447.8892	5350.3877	END OF FOOT BRIDGE CROSSING INDIAN RIVER	
33	N 59-24-00 E (59.4)	89.96	10493.6826	5427.8201	TRAIL	
34	N 51-42-00 E (51.7)	125.56	10571.5021	5526.3566	JUNCTION OF TRAIL AND OLD SAWMILL CK. RD.	
35	S 66-00-00 E (114.0)	412.33	10403.7923	5903.0388	OLD SAWMILL CK. RD. STREAM TERRACE	
36	S 87-12-00 E (92.8)	338.95	10387.2347	6241.5841	" "	" "
37	N 89-24-00 E (89.4)	154.48	10388.8524	6396.0556	" "	" "
38	S 78-36-00 E (101.4)	196.73	10349.9673	6588.9044	" "	AT CAP TNH 90 1992
39	S 60-18-00 E (119.7)	145.33	10277.9623	6715.1426	" "	" "
40	S 35-06-00 W (215.1)	30.63	10252.9023	6697.5302	RUSSIAN MEMORIAL	
41	S 80-18-00 W (260.3)	194.54	10220.1244	6505.7714	TRAIL ALONG INDIAN RIVER	
42	N 79-06-00 W (280.9)	146.90	10247.9025	6361.5217	" "	" "
43	N 76-42-00 W (283.3)	39.19	10256.9182	6323.3828	" "	" "
44	S 23-12-00 W (203.2)	58.40	10203.2407	6300.3766	ESTUARY	
45	S 61-12-00 W (241.2)	197.46	10108.1136	6127.3411	PLOT 11 ESTUARY	

OPEN TRAVERSE
NPS-TOTEM PARK TRAVERSE - TRAVERSE NUMBER 2

HORIZONTAL				
PT#	MAGNETIC/ BEARING / AZIMUTH	MAGNETIC DISTANCE IN FEET	NORTHING	EASTING
				NOTES
1			9991.0462	5222.9303 AT PT. 2 TRAVERSE NUMBER 1
2	N 46-54-00 E(46.9)	106.35	10063.7124	5300.5831 UPLIFTED BEACH
3	N 32-36-00 E(32.6)	28.67	10087.8655	5316.0296 PLOT 2 MORaine
4	N 13-54-00 E(13.9)	39.44	10126.1505	5325.5042
5	N 14-24-00 E(14.4)	156.26	10277.5013	5364.3645
6	N 71-18-00 W(288.7)	42.39	10291.0921	5324.2122 PLOT 3 STREAM TERRACE

----- TRAVERSE PROCESSING COMPLETED AT 04/16/1993 02:56 PM -----

STARTED AT 04/20/1993 08:17 AM

OPEN TRAVERSE

NPS-TOTEM PARK TRAVERSE - TRAVERSE NUMBER 3

HORIZONTAL				NOTES
PT#	MAGNETIC / BEARING / AZIMUTH	MAGNETIC DISTANCE IN FEET	NORTHING	
1			9550.8613	5654.6728 AT PT. 5 TRAVERSE NUMBER 1
2	S 80-54-00 E (99.1)	68.60	9540.0117	5722.4094
3	N 58-42-00 E (58.7)	49.51	9565.7330	5764.7136 PLOT 6 UPLIFTED BEACH

----- TRAVERSE PROCESSING COMPLETED AT 04/20/1993 08:20 AM -----

----- TRAVERSE PROCESSING STARTED AT 04/20/1993 08:25 AM -----
***** NEW TRAVERSE CREATED VIA KEYED DATA INPUT *****

OPEN TRAVERSE
NPS-TOTEM PARK TRAVERSE - TRAVERSE NUMBER 4

HORIZONTAL			
MAGNETIC/ MAGNETIC DISTANCE			
PT#	BEARING / AZIMUTH	IN FEET	NORTHING EASTING NOTES
1			9356.8230 5938.3949 AT PT. 7 TRAVERSE NUMBER 1
2	N 32-48-00 E(32.8)	109.74	9449.0668 5997.8420
3	N 60-36-00 E(60.6)	104.06	9500.1502 6088.5005 PLOT 1 UPLIFTED BEACH

----- TRAVERSE PROCESSING COMPLETED AT 04/20/1993 08:27 AM -----

----- TRAVERSE PROCESSING STARTED AT 04/20/1993 08:30 AM -----
***** NEW TRAVERSE CREATED VIA KEYED DATA INPUT *****

OPEN TRAVERSE
NPS-TOTEM PARK TRAVERSE - TRAVERSE NUMBER 5

HORIZONTAL			
MAGNETIC/ MAGNETIC DISTANCE			
<u>PT#</u>	<u>BEARING / AZIMUTH</u>	<u>NORTHING</u>	<u>EASTING</u>
1		10493.6826	5427.8201
2	S 64-12-00 E(115.8)	96.18	5514.4128
3	S 76-18-00 E(103.7)	70.61	5583.0138
4	S 47-24-00 E(132.6)	37.08	5610.3083

AT PT. 33 TRAVERSE NUMBER 1
PLOT 8 FLOODPLAIN

----- TRAVERSE PROCESSING COMPLETED AT 04/20/1993 08:33 AM -----

----- TRAVERSE PROCESSING STARTED AT 04/20/1993 08:35 AM -----
***** NEW TRAVERSE CREATED VIA KEYED DATA INPUT *****

OPEN TRAVERSE
NPS-TOTEM PARK TRAVERSE - TRAVERSE NUMBER 6

HORIZONTAL					
MAGNETIC/ MAGNETIC DISTANCE					
PT#	BEARING / AZIMUTH	IN FEET	NORTHING	EASTING	NOTES
1			10571.5021	5526.3566	AT PT. 34 TRAVERSE NUMBER 1
2	N 69-30-00 W(290.5)	301.21	10676.9881	5244.2216	
3	N 37-42-00 W(322.3)	127.16	10777.6000	5166.4598	
4	N 37-18-00 W(322.7)	100.70	10857.7042	5105.4368	
5	N 74-24-00 E(74.4)	68.82	10876.2113	5171.7216	PLOT 7 STREAM TERRACE

----- TRAVERSE PROCESSING COMPLETED AT 04/20/1993 08:37 AM -----

----- TRAVERSE PROCESSING STARTED AT 04/20/1993 08:42 AM -----
***** NEW TRAVERSE CREATED VIA KEYED DATA INPUT *****

OPEN TRAVERSE
NPS-TOTEM PARK TRAVERSE - TRAVERSE NUMBER 7

HORIZONTAL				
MAGNETIC/ MAGNETIC DISTANCE				
PT#	BEARING / AZIMUTH	IN FEET	NORTHING	EASTING
NOTES				
1			10387.2347	6241.5841
2	N 18-24-00 W	75.76	10459.1215	6217.6705
3	N 13-48-00 W	20.83	10479.3503	6212.7019
AT PT. 36 TRAVERSE NUMBER 1				
PLOT 9 STREAM TERRACE (DRAINAGE AREA, SOMETIMES FLOODED)				

----- TRAVERSE PROCESSING COMPLETED AT 04/20/1993 08:44 AM -----

----- TRAVERSE PROCESSING STARTED AT 04/20/1993 08:47 AM -----
***** NEW TRAVERSE CREATED VIA KEYED DATA INPUT *****

OPEN TRAVERSE
NPS-TOTEM PARK TRAVERSE - TRAVERSE NUMBER 8

HORIZONTAL			
MAGNETIC/ MAGNETIC DISTANCE			
PT#	BEARING / AZIMUTH	IN FEET	NORTHING EASTING NOTES
1			10388.8524 6396.0556 AT PT. 37 TRAVERSE NUMBER 1
2	S 19-42-00 E(160.3)	65.72	10326.9790 6418.2095 PLOT 10 MORaine

----- TRAVERSE PROCESSING COMPLETED AT 04/20/1993 08:49 AM -----

APPENDIX 2. TREE PLOT INFORMATION

SITKA NATIONAL HISTORICAL PARK PERMANENT VEGETATION PLOT NUMBER 1
UPLIFTED BEACH ECOLOGICAL UNIT

TREE NO.	MAGNETIC AZIMUTH	HORIZ. DIST. FEET	TYPE OF TREE	DIAMETER		10 YR. GROWTH IN 20THS OF AN INCH.	AGE AT 4 1/2 FT.	TOTAL TREE		CROWN RATIO	CROWN CLASS	DAMAGE SEVERITY		DAMAGE SEVERITY	
				IN INCHES AT 4 1/2 FT.	SPECIES			IN FT.	HEIGHT IN FT.			SEVERITY	DAMAGE	SEVERITY	DAMAGE
1	346	12.2	40	3	98	11.4		108		1	4	21	2		
2	353	24.4	40	2	98	21.6	123	120		3	3	21	1		
3	23	32.0	40	2	98	23.9	125	149		3	2	21	1		
4	71	23.8	40	5	263	41.3		130		3	3	45	9	30	6
5	153	25.7	40	3	263	24.0	145	130		6	3	30	4	98	1
6	184	27.8	40	3	263	21.1		106		4	3	30	4	98	2
7	245	32.0	40	2	98	43.3		134		6	2	30	1	98	1
8	258	12.1	40	3	263	24.7	116	115		7	3	98	2	30	4
9	356	10.0	1/100	2	263	1.2		11		9	5	30	4		
10	22	8.0	1/100	2	263	.4		6		7	5				
11	50	10.2	1/100	2	263	.4		7		7	5	30	1		

40 BASAL AREA FACTOR, 1/100 ACRE, AND 1/300 ACRE PLOTS USE THE SAME PLOT CENTER.

TREES 1 THROUGH 8 ARE PLOT TREES USING BASAL AREA FACTOR 40 PRISM WITH A DIAMETER GREATER THAN OR EQUAL TO 5.0 INCHES AT 4 1/2 FT. (DBH).

TREES 9 THROUGH 11 ARE IN TREES ON THE 1/100 ACRE, 11.8 FT. RADIUS PLOT WITH A MEASURABLE DBH LESS THAN 5.0 INCHES AT 4 1/2 FT.

IN ADDITION TO THE ABOVE 11 TREES 2 WESTERN HEMLOCK SEEDLINGS WERE MEASURED ON A 1/300 ACRE, 6.8 FT. RADIUS PLOT. THESE TREES ARE LESS THAN 4 1/2 FEET IN HEIGHT.

SITKA NATIONAL HISTORICAL PARK PERMANENT VEGETATION PLOT NUMBER 2
MORaine ECOLOGICAL UNIT

TREE NO.	MAGNETIC AZIMUTH	HORIZ. DIST. FEET	TYPE OF PLOT	DIAMETER		10 YR. GROWTH IN 20THS OF AN INCH.	AGE AT 4 1/2 FT.	TOTAL TREE HEIGHT IN FT.		CROWN RATIO	CROWN CLASS		SEVERITY DAMAGE	SEVERITY DAMAGE	SEVERITY DAMAGE	SEVERITY
				IN INCHES AT 4 1/2 FT.	SPECIES			4 1/2 FT.	IN FT.							
1	358	33.2	40	2	98	29.0	144	115	2	3	3	91	1	21	1	
2	21	12.7	40	3	263	20.7	106	128	3	3	3	31	2	30	2	31
3	24	25.5	40	3	263	30.4		133	3	3	3	98	1	31	2	2
4	43	18.8	40	3	263	21.3		136	3	3	3	98	2	31	2	
5	93	6.9	40	3	263	14.3		89	2	5	5	97	1	98	1	31
6	93	9.8	40	2	98	18.3	95	130	2	3	3	21	1			
7	116	33.4	40	2	98	29.4		144	3	2	2	21	1	98	1	
8	154	35.8	40	2	98	31.1		150	3	2	2	21	1			
9	217	19.2	40	3	98	19.6		111	1	4	4	21	2	96		98
10	221	28.1	40	2	98	25.4	123	139	2	3	3	21	1			
11	263	27.2	40	3	263	21.7		132	3	3	3	98	1	31	2	
12	276	23.3	40	3	263	22.5		127	4	3	3	98	1	31	2	
13	275	6.2	40	3	263	18.5		126	3	4	4	98	6	31	2	
14	307	22.8	40	2	98	20.5		116	2	3	3	98	1			
15	323	36.5	40	3	263	31.0		143	7	2	2	30	3	31	2	
16	335	20.3	40	3	263	18.5		128	6	4	4	98	2	31	2	

40 BASAL AREA FACTOR, 1/100 ACRE, AND 1/300 ACRE PLOTS USE THE SAME PLOT CENTER.
TREES 1 THROUGH 16 ARE PLOT TREES USING BASAL AREA FACTOR 40 PRISM WITH A DIAMETER GREATER THAN OR EQUAL TO 5.0 INCHES AT 4 1/2 FT. (DBH).
THERE WERE NO TREES ON THE 1/100 ACRE, 11.8 FT. RADIUS PLOT WITH A MEASURABLE DBH LESS THAN 5.0 INCHES AT 4 1/2 FT.
IN ADDITION TO THE ABOVE 16 TREES 2 WESTERN HEMLOCK SEEDLINGS WERE MEASURED ON A 1/300 ACRE, 6.8 FT. RADIUS PLOT. THESE TREES ARE LESS THAN
4 1/2 FEET IN HEIGHT.

SITKA NATIONAL HISTORICAL PARK PERMANENT VEGETATION PLOT NUMBER 3
STREAM TERRACE ECOLOGICAL UNIT

TREE NO.	MAGNETIC AZIMUTH	HORIZ. DIST. FEET	TYPE OF PLOT	TREE CLASS	DIAMETER IN INCHES		10 YR. GROWTH		AGE AT 4 1/2 FT	TOTAL TREE HEIGHT IN FT.		CROWN RATIO	CROWN CLASS	DAMAGE		SEVERITY		DAMAGE		SEVERITY	
					AT	4 1/2 FT.	IN 20THS OF AN INCH.	4 1/2 FT		IN FT.	CLASS			DAMAGE	SEVERITY	DAMAGE	SEVERITY	DAMAGE	SEVERITY		
1	358	28.1	40	2	98	24.8		5	121		130	2	3								
2	28	25.8	40	2	98	31.2					135	2	3								
3	79	20.9	40	2	98	22.7		13	101		118	2	3								
4	128	28.1	40	2	98	30.6					115	3	3								
5	183	14.6	40	3	98	43.2					120	5	3		98	4					
6	199	37.1	40	9	98	39.2					18				96	9					
7	220	19.9	40	3	98	34.3					121	4	3		21	1					
8	250	3.3	40	2	98	30.3					112	2	3		21	1					
9	253	29.7	40	2	98	37.5					144	5	2		21	1					
10	289	19.7	40	2	98	24.9		9	112		134	3	3		21	1					
11	360	8.8	1/100	2	263	3.1					16	8	5		30	4					
12	100	8.1	1/100	2	263	2.3					16	6	5								
13	105	11.1	1/100	2	263	3.6		4	38		22	4	5		30	4					
14	240	2.3	1/100	2	263	1.1					9	6	5								

40 BASAL AREA FACTOR, 1/100 ACRE, AND 1/300 ACRE PLOTS USE THE SAME PLOT CENTER.

TREES 1 THROUGH 10 ARE PLOT TREES USING BASAL AREA FACTOR 40 PRISM WITH A DIAMETER GREATER THAN OR EQUAL TO 5.0 INCHES AT 4 1/2 FT. (DBH).

TREES 10 THROUGH 14 ARE IN TREES ON THE 1/100 ACRE, 11.8 FT. RADIUS PLOT WITH A MEASURABLE DBH LESS THAN 5.0 INCHES AT 4 1/2 FT.

NO SEEDLINGS WERE MEASURED ON A 1/300 ACRE, 6.8 FT. RADIUS PLOT.

SITKA NATIONAL HISTORICAL PARK PERMANENT VEGETATION PLOT NUMBER 4
UPLIFTED BEACH MEADOW ECOLOGICAL UNIT

TREE NO.	MAGNETIC AZIMUTH	HORIZ. DIST. FEET	TYPE OF PLOT	CLASS	SPECIES	DIAMETER IN INCHES		5 YR. HEIGHT GROWTH		AGE AT 4 1/2 FT		TOTAL TREE HEIGHT IN FT.		CROWN RATIO	CROWN CLASS	DAMAGE SEVERITY	DAMAGE SEVERITY	DAMAGE SEVERITY
						AT 4 1/2 FT.	AT 4 1/2 FT.	IN FEET	IN FEET	AT 4 1/2 FT	AT 4 1/2 FT	IN FT.	IN FT.					
1	324	5.8	1/100	2	98	.2	.2	2.8	2.8			5	5	9	1			
2	25	5.0	1/100	2	98	.8	.8	5.8	5.8			7	7	9	1			
3	55	11.4	1/100	2	263	.3	.3	5.1	5.1			6	6	9	1			
4	154	9.4	1/100	2	98	.4	.4	4.1	4.1			5	5	9	1			
5	246	6.2	1/100	2	98	.6	.6	4.5	4.5			6	6	9	1			

40 BASAL AREA FACTOR, 1/100 ACRE, AND 1/300 ACRE PLOTS USE THE SAME PLOT CENTER.

NO TREES WERE MEASURED ON THE 40 BASAL AREA FACTOR VARIABLE RADIUS PLOTS

TREES 1 THROUGH 5 ARE TREES ON THE 1/100 ACRE, 11.8 FT. RADIUS PLOT WITH A MEASURABLE DBH LESS THAN 5.0 INCHES AT 4 1/2 FT.

NO SEEDLINGS WERE MEASURED ON A 1/300 ACRE, 6.8 FT. RADIUS PLOT.

TREE NO.	MAGNETIC AZIMUTH	HORIZ. DIST. FEET	TYPE OF TREE	DIAMETER IN INCHES		5 YR. HEIGHT		AGE AT GROWTH	TOTAL TREE HEIGHT	CROWN RATIO	CROWN CLASS	SEVERITY DAMAGE		SEVERITY DAMAGE	
				4 1/2 FT.	4 1/2 FT.	IN FEET	IN FT.					IN FT.	DAMAGE	DAMAGE	
1	100	10	Decid.	12	12	15	15	10	20	0.5	1	10	10	10	10
2	110	15	Conif.	18	18	20	20	15	30	0.7	2	15	15	15	15
3	120	20	Decid.	25	25	25	25	20	40	0.8	3	20	20	20	20
4	130	25	Conif.	30	30	30	30	25	50	0.9	4	25	25	25	25
5	140	30	Decid.	35	35	35	35	30	60	1.0	5	30	30	30	30

NO TREES WERE MEASURED ON THE 40 BASAL AREA FACTOR VARIABLE RADIUS PLOTS

ONE SITKA SPRUCE SEEDLING WAS MEASURED ON THE 1/300 ACRE, 6.8 FT. RADIUS PLOT. THIS SEEDLING WAS GROWING ON TOP OF A BEACH LOG WITHIN THE

THE 6.8 FOOT RADIUS PLOT.

SITKA NATIONAL HISTORICAL PARK PERMANENT VEGETATION PLOT NUMBER 6
UPLIFTED BEACH ECOLOGICAL UNIT

TREE NO.	MAGNETIC AZIMUTH	HORIZ. DIST. FEET	TYPE OF PLOT	DIAMETER IN INCHES		10 YR. GROWTH IN 20THS OF AN INCH.	AGE AT 4 1/2 FT	TOTAL TREE HEIGHT IN FT.		CROWN RATIO	CROWN CLASS	DAMAGE		SEVERITY		DAMAGE		SEVERITY	
				AT 4 1/2 FT.	AT			IN FT.	IN FT.			DAMAGE	SEVERITY	DAMAGE	SEVERITY	DAMAGE	SEVERITY		
1	49	29.2	40	2	98	27.4	112	149	3	2	21	1							
2	104	32.2	40	2	98	27.8		131	3	3	98	1	21	1				1	
3	128	20.9	40	3	98	22.4	114	119	2	3	98	1	21	1				1	
4	166	9.5	40	3	263	18.6		120	4	3	31	2							
5	181	5.0	40	3	263	11.7		106	5	4	98	1	31	2				2	
6	201	8.0	40	3	263	16.7	140	124	5	3	31	2							
7	216	18.5	40	3	263	22.1		125	5	3	98	1	31	2				2	
8	232	28.7	40	3	98	24.3	112	116	3	3	98	1	21	1				1	
9	276	15.3	40	9	263	27.3		27			96	9							
10	284	11.2	40	9	263	8.4		45											
11	335	42.9	40	3	263	33.3		124	4	3	98	4	31	1				1	
12	344	22.8	40	3	263	22.8		116	4	3	98	1	31	1				1	
13	64	2.7	1/100	2	263	.2		5	8	5									
14	156	11.4	1/100	2	263	.2		5	8	5									

40 BASAL AREA FACTOR, 1/100 ACRE, AND 1/300 ACRE PLOTS USE THE SAME PLOT CENTER.

TREES 1 THROUGH 12 ARE PLOT TREES USING BASAL AREA FACTOR 40 PRISM WITH A DIAMETER GREATER THAN OR EQUAL TO 5.0 INCHES AT 4 1/2 FT. (DBH).

TREES 13 THROUGH 14 ARE IN TREES ON THE 1/100 ACRE, 11.8 FT. RADIUS PLOT WITH A MEASURABLE DBH LESS THAN 5.0 INCHES AT 4 1/2 FT.

IN ADDITION TO THE ABOVE 14 TREES 18 WESTERN HEMLOCK SEEDLINGS WERE MEASURED ON A 1/300 ACRE, 6.8 FT. RADIUS PLOT. THESE TREES ARE LESS THAN 4 1/2 FEET IN HEIGHT.

SITKA NATIONAL HISTORICAL PARK PERMANENT VEGETATION PLOT NUMBER 7
STREAM TERRACE ECOLOGICAL UNIT

TREE NO.	MAGNETIC AZIMUTH	HORIZ. DIST. FEET	TYPE OF PLOT	DIAMETER IN INCHES		10 YR. GROWTH IN 20THS OF AN INCH.	AGE AT 4 1/2 FT.		TOTAL TREE HEIGHT IN FT.	CROWN RATIO		CROWN CLASS		DAMAGE SEVERITY		DAMAGE SEVERITY	
				AT 4 1/2 FT.	AT 4 1/2 FT.												
1	62	23.9	40	3	98	23.0			91	5	3						
2	71	21.7	40	3	263	16.2	5	48	79	1	4	97	2	30	6		
3	155	28.9	40	2	98	27.3	32	84	107	6	3						
4	202	38.6	40	3	263	33.0			99	3	3	97	2	30	5	31	1
5	208	10.9	40	3	263	41.5	18		115	8	2	30	5	31	1		
6	277	47.4	40	3	98	42.1			116	7	2	21	1				

40 BASAL AREA FACTOR, 1/100 ACRE, AND 1/300 ACRE PLOTS USE THE SAME PLOT CENTER.

TREES 1 THROUGH 6 ARE PLOT TREES USING BASAL AREA FACTOR 40 PRISM WITH A DIAMETER GREATER THAN OR EQUAL TO 5.0 INCHES AT 4 1/2 FT. (DBH).

THERE WERE NO TREES ON THE 1/100 ACRE, 11.8 FT. RADIUS PLOT WITH A MEASURABLE DBH LESS THAN 5.0 INCHES AT 4 1/2 FT.

THERE WERE NO SEEDLINGS ON THE 1/300 ACRE, 6.8 FT. RADIUS PLOT.

SITKA NATIONAL HISTORICAL PARK PERMANENT VEGETATION PLOT NUMBER 8
FLOODPLAIN ECOLOGICAL UNIT

TREE NO.	MAGNETIC AZIMUTH	HORIZ. DIST. FEET	PLOT TYPE	DIAMETER IN INCHES		10 YR. GROWTH		AGE AT 1/2 FT.		TOTAL TREE HEIGHT IN FT.		CROWN RATIO		CROWN CLASS		DAMAGE SEVERITY		DAMAGE SEVERITY	
				AT	OF AN INCH.	IN 20THS	AT	4 1/2 FT.	4 1/2 FT.	IN FT.	IN FT.	RATIO	RATIO	3	3	98	98	98	98
1	6	4.0	40	2	351	12	33	8.8	33	88	10	2	2	3	3	98	98	98	98
2	21	3.6	40	9	351			4.3											
3	31	4.4	40	2	351			8.5		83		2	2	3	3	98	98	98	98
4	188	8.2	40	2	351	6	36	10.0		77		3	3	3	3	98	98	98	98

40 BASAL AREA FACTOR, 1/100 ACRE, AND 1/300 ACRE PLOTS USE THE SAME PLOT CENTER.
TREES 1 THROUGH 4 ARE PLOT TREES USING BASAL AREA FACTOR 40 PRISM WITH A DIAMETER GREATER THAN OR EQUAL TO 5.0 INCHES AT 4 1/2 FT. (DBH).
THERE WERE NO TREES ON THE 1/100 ACRE, 11.8 FT. RADIUS PLOT WITH A MEASURABLE DBH LESS THAN 5.0 INCHES AT 4 1/2 FT.
THERE WERE NO SEEDLINGS ON THE 1/300 ACRE, 6.8 FT. RADIUS PLOT.

SITKA NATIONAL HISTORICAL PARK PERMANENT VEGETATION PLOT NUMBER 9
STREAM TERRACE ECOLOGICAL UNIT

TREE NO.	MAGNETIC AZIMUTH	HORIZ. DIST. FEET	TYPE OF PLOT	DIA- METER IN INCHES AT 4 1/2 FT.	10 YR. GROWTH IN 20THS OF AN INCH.	AGE AT 4 1/2 FT.	TOTAL TREE HEIGHT IN FT.	CROWN			SEVERITY		
								RATIO	CLASS	DAMAGE	DAMAGE	SEVERITY	SEVERITY
1	142	2.4	40	9	263	6.1	18						
2	166	4.4	40	2	351	7.7	44	8	3				
3	180	5.8	40	9	263	6.8	17						
4	208	6.5	40	3	351	6.4	33	7	4	98	1		
5	172	8.4	1/100	3	351	3.2	28	6	5				
6	163	10.6	1/100	3	351	2.9	18	5	5				
7	150	10.1	1/100	3	351	1.0	15	2	5				

40 BASAL AREA FACTOR, 1/100 ACRE, AND 1/300 ACRE PLOTS USE THE SAME PLOT CENTER.

TREES 1 THROUGH 4 ARE PLOT TREES USING BASAL AREA FACTOR 40 PRISM WITH A DIAMETER GREATER THAN OR EQUAL TO 5.0 INCHES AT 4 1/2 FT. (DBH).

TREES 5 THROUGH 7 ARE IN TREES ON THE 1/100 ACRE, 11.8 FT. RADIUS PLOT WITH A MEASURABLE DBH LESS THAN 5.0 INCHES AT 4 1/2 FT.

NO SEEDLINGS WERE FOUND ON THE 1/300 ACRE, 6.8 FT. RADIUS PLOT.

SITKA NATIONAL HISTORICAL PARK PERMANENT VEGETATION PLOT NUMBER 10
MORAINE ECOLOGICAL UNIT

TREE NO.	MAGNETIC AZIMUTH	HORIZ. DIST. FEET	TYPE OF TREE	DIAMETER IN INCHES AT 4 1/2 FT.	10 YR. GROWTH IN 20THS OF AN INCH. 4 1/2 FT.	AGE AT 4 1/2 FT.	TOTAL TREE HEIGHT IN FT.	CROWN RATIO	CROWN CLASS	DAMAGE SEVERITY	DAMAGE SEVERITY	DAMAGE SEVERITY
1	77	5.0	40	9	263	12.1	36					
2	79	25.4	40	2	98	33.7	102	8	2			
3	177	5.7	40	3	263	11.5	59	3	4	31	1	
4	287	7.8	40	3	263	10.5	50	3	4	98	1	31
5	326	15.9	40	3	98	28.0	100	5	2			
6	348	8.8	40	3	263	7.9	45	2	4	31	1	
7	67	7.0	40	3	263	6.4	53	4	4	31	1	
8	120	1.0	1/100	3	263	3.8	41	2	4			
9	148	4.5	1/100	3	263	4.8	42	2	4	98	3	
10	149	5.6	1/100	7	263	2.0	16					
11	246	7.2	1/100	7	263	3.5	26					
12	266	4.7	1/100	7	263	2.0	20					
13	266	5.7	1/100	3	263	3.6	40	1	5			
14	264	6.9	40	3	263	5.5	32	2	5	98	7	31
15	288	5.4	1/100	7	263	2.7	15					
16	316	6.0	1/100	7	263	2.2	20					

40 BASAL AREA FACTOR, 1/100 ACRE, AND 1/300 ACRE PLOTS USE THE SAME PLOT CENTER.

TREES 1 THROUGH 7 AND 14 ARE PLOT TREES USING BASAL AREA FACTOR 40 PRISM WITH A DIAMETER GREATER THAN OR EQUAL TO 5.0 INCHES AT 4 1/2 FT.

(DBH).

TREES 8 THROUGH 13 AND 15 THROUGH 16 ARE IN TREES ON THE 1/100 ACRE, 11.8 FT. RADIUS PLOT WITH A MEASURABLE DBH LESS THAN 5.0 INCHES AT 4 1/2 FT.

NO SEEDLINGS WERE FOUND ON THE 1/300 ACRE, 6.8 FT. RADIUS PLOT.

SITKA NATIONAL HISTORICAL PARK PERMANENT VEGETATION PLOT NUMBER 11
ESTUARY ECOLOGICAL UNIT

TREE NO.	MAGNETIC AZIMUTH	HORIZ. DIST. FEET	TYPE OF TREE	DIAMETER IN INCHES		5 YR. HEIGHT GROWTH		AGE AT 4 1/2 FT		TOTAL TREE HEIGHT IN FT.	CROWN RATIO	CROWN CLASS	DAMAGE SEVERITY	DAMAGE SEVERITY
				AT 4 1/2 FT.	IN FEET	IN FEET	AT 4 1/2 FT.							

40 BASAL AREA FACTOR, 1/100 ACRE, AND 1/300 ACRE PLOTS USE THE SAME PLOT CENTER.
 NO TREES WERE MEASURED ON THE 40 BASAL AREA FACTOR VARIABLE RADIUS PLOTS
 NO TREES WERE MEASURED ON THE 1/100 ACRE, 11.8 FT. RADIUS PLOT.
 NO TREES WERE MEASURED ON THE 1/300 ACRE, 6.8 FT. RADIUS PLOT.

APPENDIX 3. ECOLOGICAL UNIT TREE REPORTS

TERRACE

TABLE #0

PROJECT NPSLOT3 TERRACE PLOTS 3,7,9
 FOREST: 03 CHATHAM AREA - TONGA
 EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD
 STAND NO: 0003

PAGE 1
 DATE: 05/11/93
 COMPARTMENT: 1
 CELL: 3

6 STATE: 50 ALASKA	16 BASAL AREA FACTOR: 40	MANAGEMENT AREA:
7 VCU: 01	17 BREAK POINT DBH: 5	LAND SUITABILITY:
8 COMPARTMENT: 1	18 FIXED RADIUS PLOT: 1/100th	BOUNDARY METHOD:
9 CELL: 3	19 RADIAL GROWTH PERIOD: 10	SITE: SPECIES INDEX
10 ACRES: 1	20 NUMBER SAMPLE PLOTS: 3	STAND AGE:
---- FIRE DATA ----		
SAMPLING PLANES		
11 SLOPE:	21 0-1 IN. 12	
12 ASPECT: 9 LEVEL OR	22 1-3 IN.	
13 TOPO SITE: 5 VALLEY B	23 3 + IN.	
14 ELEVATION:	-----STAND CLASSIFICATION-----	
16 EXAM DATE: 3/93	24 PLANT ASSOCIATION:	
	25 STAND STRUCTURE/HISTORY: 12	
	26 PERCENT:	
TOP DIB SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC		

SAMPLE PLOT DATA				COVER TYPE DATA			
PLOT	SUB	TOPO	PLANT	SITE	TYPE	PERCENT	VEG. HEIGHT
NO	GROUP	SLP	ASP SITE ASSOC	PREP	T P VH	T P VH	T P VH
03		9	5				
07							
09							

TR PLOT		CUT/LEAVE		CROWN DAMAGE/SEVERITY										-----COMPUTED VALUES-----SE												
NO	NO	CLS	GST	SPP	OPTA	OPTB	DBH	GROWTH	AGE	HGT	RAT	CLS	D	S	D	S	D	S	GIR	TREES/AC	BASAL	GCUFT	NCUFT	GBDFT	NBDFT	PC
001	03	2	3	098			24.8	5	121	130	2	3								11.9	40.0	162	162	794	794	
002	03	2		098			31.2			126*135	2	3								7.5	40.0	260	260	1373	1373	
003	03	2	3	098			22.7	13	101	118	2	3								14.2	40.0	124	124	557	557	
004	03	2		098			30.6			125*115	3	3								7.8	40.0	213	213	1031	1031	
005	03	3		098			43.2			147*120	5	3	98	4						3.9	40.0	432	432	2264	1811	
006	03	9		098			39.2			140* 18			96	9						4.8	40.0	63	63			
007	03	3		098			34.3			131*121	4	3	21	1						6.2	40.0	279	279	1438	1438	
008	03	2		098			30.3			124*112	2	3	21	1						8.0	40.0	204	204	963	963	
009	03	2		098			37.5			137*144	5	2	21	1						5.2	40.0	395	395	2216	2216	
010	03	2	3	098			24.9	9	112	134	3	3	21	1						11.8	40.0	168	168	839	839	
011	03	2		263			3.1			18* 16	8	5	30	4						100.0	5.2					
012	03	2		263			2.3			16	6	5								100.0	2.9					
013	03	2		263			3.6	4	38	22	4	5	30	4						100.0	7.1					
014	03	2		263			1.1			9	6	5								100.0	0.7					
001	07	3		098			23.0			111* 91	5	3								13.9	40.0	98	98	388	388	
002	07	3	3	263			16.2	5	48	79	1	4	97	2	30	6				27.9	40.0	43	43	160	144	
003	07	2	3	098			27.3	32	84	107	6	3								9.8	40.0	159	159	720	720	
004	07	3		263			33.0			174* 99	3	3	97	2	30	5	31	1		6.7	40.0	213	213	959	863	
005	07	3		263			41.5	18	218*115	8	2	30	5	31	1					4.3	40.0	383	383	1950	1950	

TERRACE

TABLE #0

PROJECT NPSPLOT3

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0003

PAGE 2

DATE: 05/11/93

COMPARTMENT: 1

CELL: 3

TR PLOT		CUT/LEAVE						CROWN				DAMAGE/SEVERITY						-----COMPUTED VALUES-----						SE		
NO	NO	CLS	GST	SPP	OPTA	OPTB	DBH	GROWTH	AGE	HGT	RAT	CLS	D	S	D	S	D	S	GIR	TREES/AC	BASAL	GCUFT	NCUFT	GBDFT	NBDFT	PC
006	07	3		098			42.1		145*116	7	2	21	1							4.1	40.0	397	397	2037	2037	
001	09	9		263			6.1		34*	18										197.1	40.0					
002	09	2	3	351			7.7	62	14	44	8	3								123.7	40.0	5	5	20	20	
003	09	9		263			6.8		37*	17										158.6	40.0	1	1			
004	09	3	3	351			6.4	34	13	33	7	4	98	1						179.1	40.0	1	1	10	10	
005	09	3		351			3.2			28	6	5								100.0	5.6					
006	09	3		351			2.9		15	18	5	5								100.0	4.6					
007	09	3		351			1.0			15	2	5								100.0	0.5					

TABLE #1

FOREST: 03 CHATHAM AREA - TONGA
EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD
STAND NO: 0003

PAGE 1
DATE: 05/11/93
COMPARTMENT: 1
CELL: 3

SPP/DBH CLASS	LIVE			LIVE DAMAGED			CULL	TOTAL CUT		TOTAL LEAVE		ALL DEAD			TOTAL
	DESIRE (TC 1)	ACCEPT (TC 2)	UNACCP (TC 3)	INSECT (TC 2 -5)	DISEASE	OTHER		OP A	OP B	OP A	OP B	LIVE (TC 1 - 5)	SALVABLE (TC6&8)	RECENT TC6&7)	
098-SITKA SP															
21.0-22.9TA		4.7										4.7			
BA		13.3										13.3			
SDI		18										18			
RD		3										3			
23.0-24.9TA		7.9	4.6	3.9								12.5			
BA		26.7	13.3	13.3								40.0			
SDI		34	18	17								52			
RD		5	3	3								8			
25.0-29.9TA		3.3										3.3			
BA		13.3										13.3			
SDI		16										16			
RD		3										3			
30.0-34.9TA		7.8	2.1	4.7								9.9			
BA		40.0	13.3	26.7								53.3			
SDI		47	15	31								62			
RD		7	2	5								10			
35.0+ TA		1.7	2.7	3.1		1.3						4.4			1.6
BA		13.3	26.7	26.7		13.3						40.0			13.3
SDI		15	28	28		14						42			
RD		2	4	4		2						6			
SPP TOT TA		25.5	9.4	11.8		1.3						34.9			1.6
BA		106.7	53.3	66.7		13.3						160.0			13.3
SDI		131	62	77		14						193			
RD		20	9	12		2						30			
MD&H		28	32	32		43						29			
CFV		4855	2146	3020		566						7001			100
RCF															
BFV		24025	9963	15523		2373						33988			
263-WHEMLOCK															
1.0- 2.9TA		66.7										66.7			
BA		1.2										1.2			
3.0- 4.9TA		66.7			66.7							66.7			
BA		4.1			4.1							4.1			
5.0- 6.9TA															118.6
BA															26.7
15.0-16.9TA			9.3		9.3	9.3						9.3			
BA			13.3		13.3	13.3						13.3			
SDI			20		20	20						20			
RD			3		3	3						3			
30.0-34.9TA			2.2		2.2	2.2						2.2			
BA			13.3		13.3	13.3						13.3			
SDI			15		15	15						15			
RD			2		2	2						2			

TABLE #1

CELL: 3

		LIVE		LIVE DAMAGED		TOTAL CUT		TOTAL LEAVE		ALL		DEAD				
SPP/DBH	CLASS	DESIRE (TC 1)	ACCEPT (TC 2)	UNACCP (TC 3)	INSECT (TC 4)	DISEASE (TC 5)	OTHER (TC 6)	CULL	OP A	OP B	OP A	OP B	LIVE (TC 1 - 5)	SALVABLE (TC 6&8)	RECENT (TC 6&7)	TOTAL (TC 6-9)
263-WHEMLOCK																
35.0+	TA			1.4		1.4							1.4			
	BA			13.3		13.3							13.3			
	SDI			14		14							14			
	RD			2		2							2			
SPP TOT	TA		133.3	13.0		79.6	11.6						146.3			118.6
	BA		5.3	40.0		44.1	26.7						45.3			26.7
	SDI			52		52	37						52			
	RD			8		8	6						8			
	MDBH			24		24	21						24			
	CFV			1422		1422	879						1422			53
	RCF															
	BFV			6047		6047	3279						6047			
351-R ALDER																
1.0- 2.9TA				66.7									66.7			
	BA			1.7									1.7			
3.0- 4.9TA				33.3									33.3			
	BA			1.9									1.9			
5.0- 6.9TA				59.7		59.7							59.7			
	BA			13.3		13.3							13.3			
	SDI			29		29							29			
	RD			5		5							5			
7.0- 8.9TA			41.2										41.2			
	BA		13.3										13.3			
	SDI		27										27			
	RD		5										5			
SPP TOT	TA		41.2	159.7		59.7							200.9			
	BA		13.3	16.9		13.3							30.2			
	SDI		27	29		29							56			
	RD		5	5		5							10			
	MDBH		8	6		6							7			
	CFV		206	60		60							266			
	RCF															
	BFV		825	567		567							1392			
ALL SPECIES																
1.0- 2.9TA			66.7	66.7									133.3			
	BA		1.2	1.7									2.9			
3.0- 4.9TA			66.7	33.3		66.7							100.0			
	BA		4.1	1.9		4.1							6.0			

TERRACE

TABLE #1

M

PROJECT NPSLOT3

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0003

PAGE 3

DATE: 05/11/93

COMPARTMENT: 1

CELL: 3

SPP/DBH CLASS	LIVE			LIVE DAMAGED			TOTAL CUT		TOTAL LEAVE		ALL	DEAD			
	DESIRE (TC 1)	ACCEPT (TC 2)	UNACCP (TC 3)	INSECT (TC 2 -5)	DISEASE	OTHER	CULL	OP A	OP B	OP A	OP B	LIVE (TC 1 - 5)	SALVABLE (TC6&8)	RECENT TC6&7)	TOTAL (TC6-9)
ALL SPECIES															
5.0- 6.9TA			59.7			59.7						59.7			118.6
BA			13.3			13.3						13.3			26.7
SDI			29			29						29			
RD			5			5						5			
7.0- 8.9TA		41.2										41.2			
BA		13.3										13.3			
SDI		27										27			
RD		5										5			
15.0-16.9TA			9.3		9.3	9.3						9.3			
BA			13.3		13.3	13.3						13.3			
SDI			20		20	20						20			
RD			3		3	3						3			
21.0-22.9TA		4.7										4.7			
BA		13.3										13.3			
SDI		18										18			
RD		3										3			
23.0-24.9TA		7.9	4.6	3.9								12.5			
BA		26.7	13.3	13.3								40.0			
SDI		34	18	17								52			
RD		5	3	3								8			
25.0-29.9TA		3.3										3.3			
BA		13.3										13.3			
SDI		16										16			
RD		5										5			
30.0-34.9TA		7.8	4.3	4.7	2.2	2.2						12.1			
BA		40.0	26.7	26.7	13.3	13.3						66.7			
SDI		47	30	31	15	15						77			
RD		7	5	5	2	2						12			
35.0+ TA		1.7	4.1	3.1	1.4	1.3						5.8			1.6
BA		13.3	40.0	26.7	13.3	13.3						53.3			13.3
SDI		15	42	28	14	14						56			
RD		2	6	4	2	2						8			
TOTAL	TA	200.0	182.1	11.8	79.6	72.6						382.1			120.2
	BA	125.3	110.2	66.7	44.1	53.3						235.5			40.0
	SDI	174	165	77	52	92						339			
	RD	28	27	12	8	16						55			
	MOBH	18	15	32	24	12						17			
	CFV	5061	3628	3020	1422	1504						8690			153
	RCF														
	BFV	24850	16577	15523	6047	6219						41427			

TERRACE

TABLE #2

PROJECT NPSLOT3

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0003

PAGE 1

DATE: 05/11/93

COMPARTMENT: 1

CELL: 3

SPP/DBH	TREES	DBH	AGE	HGT	BA	BFV	CFV	GRW	HTG/ BAG	PAICF	PAIBF	PCC	CCF	LCR	LPM
098-SITKA SP															
21.0-22.9	4.7	22.7	101.0	118.0	13.3	2643	588	13.0	0.15	6.6	26.6	1.1	18.9	20.0	5.
23.0-24.9	12.5	24.2	114.7	118.3	40.0	8257	1759	7.0	0.15	6.8	29.5	5.2	55.5	33.3	4.
25.0-29.9	3.3	27.3	84.0	107.0	13.3	2362	522	32.0	0.31	12.3	51.9	2.7	17.9	60.0	3.
30.0-34.9	9.9	31.5	126.5	120.8	53.3	11692	2332					5.6	70.1	27.5	2.
35.0+	4.4	40.7	143.0	126.7	40.0	9035	1800					6.3	50.6	56.7	1.
SPP TOTAL	34.9	29.0	122.0	120.2	160.0	33988	7001	14.8	0.61	25.7	108.0	20.9	213.0	38.3	3.
263-WHEMLOCK															
1.0- 2.9	66.7	1.8		14.7	1.2							1.4	4.4	60.0	
3.0- 4.9	66.7	3.4	29.5	19.4	4.1			4.0	0.05			3.0	8.7	57.0	
15.0-16.9	9.3	16.2	48.0	79.0	13.3	1341	401	5.0	0.08	2.8	9.4	3.4	12.2	10.0	10.
30.0-34.9	2.2	33.0	174.0	99.0	13.3	1938	478					6.7	10.5	30.0	2.
35.0+	1.4	41.5	218.0	115.0	13.3	2768	544	18.0	0.12	7.1	34.7	11.6	10.2	80.0	1.
SPP TOTAL	146.3	7.5	132.2	88.4	45.3	6047	1422	10.9	0.25	10.0	44.0	26.1	46.1	42.1	3.
351-R ALDER															
1.0- 2.9	66.7	2.2	13.4	17.7	1.7				0.1				13.5	46.8	
3.0- 4.9	33.3	3.2		28.0	1.9								8.7	60.0	
5.0- 6.9	59.7	6.4	13.0	33.0	13.3	567	60	34.0	1.38	6.9	65.4		31.1	70.0	
7.0- 8.9	41.2	7.7	14.0	44.0	13.3	825	206	62.0	2.06	37.7	150.8		26.8	80.0	25.
SPP TOTAL	200.9	5.3	12.7	36.7	30.2	1392	266	48.0	3.44	44.6	216.2		80.1	72.5	25.
ALL SPECIES															
1.0- 2.9	133.3	2.0	7.9	16.5	2.9				0.0			1.4	18.0	52.2	
3.0- 4.9	100.0	3.3	20.3	22.1	6.0			4.0	0.05			3.0	17.4	58.0	
5.0- 6.9	59.7	6.4	13.0	33.0	13.3	567	60	34.0	1.38	6.9	65.4		31.1	70.0	
7.0- 8.9	41.2	7.7	14.0	44.0	13.3	825	206	62.0	2.06	37.7	150.8		26.8	80.0	25.
15.0-16.9	9.3	16.2	48.0	79.0	13.3	1341	401	5.0	0.08	2.8	9.4	3.4	12.2	10.0	10.
21.0-22.9	4.7	22.7	101.0	118.0	13.3	2643	588	13.0	0.15	6.6	26.6	1.1	18.9	20.0	5.
23.0-24.9	12.5	24.2	114.7	118.3	40.0	8257	1759	7.0	0.15	6.8	29.5	5.2	55.5	33.3	4.
25.0-29.9	3.3	27.3	84.0	107.0	13.3	2362	522	32.0	0.31	12.3	51.9	2.7	17.9	60.0	3.
30.0-34.9	12.1	31.8	136.0	116.4	66.7	13630	2810					12.2	80.6	28.0	2.
35.0+	5.8	40.9	161.8	123.8	53.3	11803	2344	18.0	0.12	7.1	34.7	17.9	60.7	62.5	1.
TOTAL	382.1	10.6	109.9	103.4	235.5	41427	8690	21.9	4.30	80.2	368.2	47.0	339.2	43.4	3.

TERRACE

TABLE #5

PROJECT NPSLOT3

FOREST: 03 CHATHAM AREA - TONGA
EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD
STAND NO: 0003

PAGE 1
DATE: 05/11/93
COMPARTMENT: 1
CELL: 3

	PLOTS	TREES	TREES PER PLOT	ESTIMATED TOTAL TREES	PERCENT SAMPLE TREES
TOTAL	3	27	9.0		
CRUISE	3	27	9.0	502	5.4
COUNT					
BLANKS					

STAND SUMMARY									
	SAMPLE TREES	TREES /ACRE	AVE DBH	BASAL AREA	REL DEN	GROSS BF	NET BF	GROSS CUBIC	NET CUBIC
SITKA SP	13	36.4	29.5	173.3	32	34582	33988	7102	7102
WHEMLOCK	9	264.9	7.1	72.0	27	6411	6047	1475	1475
R ALDER	5	200.9	5.3	30.2	13	1422	1392	266	266
TOTAL	27	502.2	10.0	275.5	87	42414	41427	8843	8843

SD:1	COEFF.		SAMPLE TREES-BF			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	135.6	26.1	388	525	662			
WHEMLOCK	368.9	71.0	32	110	187			
R ALDER	384.1	73.9	0	1	2			
TOTAL	116.6	22.4	493	635	778	49	39	29

SD:1	COEFF.		TREES PER ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	113.7	65.6	12.5	36.4	60.4			
WHEMLOCK	74.3	42.9	151.2	264.9	378.6			
R ALDER	173.2	100.0		200.9	401.8			
TOTAL	88.8	51.3	244.6	502.2	759.9	46	32	21

SD:1	COEFF.		BASAL AREA/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	118.4	68.4	54.8	173.3	291.8			
WHEMLOCK	73.0	42.2	41.6	72.0	102.3			
R ALDER	173.2	100.0		30.2	60.5			
TOTAL	45.9	26.5	202.6	275.5	348.5	33	15	8

SD:1	COEFF.		NET BF/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	123.8	71.5	9686	33988	58291			
WHEMLOCK	173.2	100.0		6047	12094			
R ALDER	173.2	100.0		1392	2783			
TOTAL	92.9	53.7	19197	41427	63658	47	33	22

TERRACE

TABLE #5

PROJECT NPSLOT3

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0003

PAGE 2

DATE: 05/11/93

COMPARTMENT: 1

CELL: 3

SD:1	COEFF.		NET CUBIC FT/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	121.8	70.3	2106	7102	12097			
WHEMLOCK	164.0	94.7	79	1475	2872			
R ALDER	173.2	100.0		266	532			
TOTAL	89.2	51.5	4287	8843	13399	46	32	21

SD:1	COEFF.		PAI-CF PER ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	86.9	50.1	12.8	25.7	38.6			
WHEMLOCK	173.2	100.0		10.0	19.9			
R ALDER	173.2	100.0		44.6	89.1			
TOTAL	60.1	34.7	52.4	80.2	108.0	39	22	12

PERCENT OF AREA BY STOCKING CLASSES

LIVE TREES LESS THAN 5.0 DBH		***** ALL LIVE TREES *****			
TREES PER ACRE	% OF AREA	TREES PER ACRES	% OF AREA	BASAL AREA	% OF AREA
- 0	33.3	- 0			
1 - 100		1 - 100	33.3	0 - 20	
101 - 200		101 - 200		21 - 40	
201 - 300	33.3	201 - 300		41 - 60	
301 - 400	33.3	301 - 400		61 - 80	
401 - 500		401 - 500	33.3	81 - 100	
501 - 600		501 - 600		101 - 120	
601 - 700		601 - 700		121 - 140	
701 - 800		701 - 800		141 - 160	
801 - 900		801 - 900		161 - 180	33.3
901 +		901 +	33.3	181 +	66.7

TERRACE

TABLE #7

PROJECT NPSLOT3

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0003

PAGE 1

DATE: 05/11/93

COMPARTMENT: 1

CELL: 3

LIVE/ SEVER DEAD ITY	DBH CLASS	AVE AGE	TREES/ ACRE	BASAL AREA	AVE DBH	AVE HGT	GROSS CUFT	%VOL LOSS	NET CUFT	GROSS BDFT	%VOL LOSS	NET BDFT	TONS
098-SITKA SP													
LIVE	21.0-22.9	101	4.7	13.3	22.7	118	588		588	2643		2643	
LIVE	23.0-24.9	116	8.6	26.7	23.8	109	1097		1097	4949		4949	
LIVE	25.0-29.9	84	3.3	13.3	27.3	107	522		522	2362		2362	
LIVE	30.0-34.9	125	5.1	26.7	30.9	125	1209		1209	6140		6140	
098-SITKA SP APHIDS													
LIVE MINOR	23.0-24.9	112	3.9	13.3	24.9	134	662		662	3308		3308	
LIVE MINOR	30.0-34.9	127	4.7	26.7	32.1	116	1123		1123	5552		5552	
LIVE MINOR	35.0+	141	3.1	26.7	39.5	132	1234		1234	6662		6662	
098-SITKA SP BROKEN O													
DEAD 81-100%	35.0+	140	1.6	13.3	39.2	18	100		100				
098-SITKA SP FORKS, C													
LIVE 31-40%	35.0+	147	1.3	13.3	43.2	120	566		566	2966	20	2373	
SITKA SP LIVE TOTAL		117	34.9	160.0	28.4	119	7001		7001	34582	2	33988	
SITKA SP DEAD TOTAL		140	1.6	13.3	39.2	18	100		100				
263-WHEMLOCK													
LIVE	1.0- 2.9		66.7	1.2	1.7	13							
DEAD	5.0- 6.9	35	118.6	26.7	6.4	18	53		53				
263-WHEMLOCK MISTLETO													
LIVE MODERATE	3.0- 4.9	28	66.7	4.1	3.3	19							
LIVE HEAVY	15.0-16.9	48	9.3	13.3	16.2	79	401		401	1490	10	1341	4
LIVE HEAVY	30.0-34.9	174	2.2	13.3	33.0	99	478		478	2153	10	1938	6
LIVE HEAVY	35.0+	218	1.4	13.3	41.5	115	544		544	2768		2768	7
263-WHEMLOCK FLUTING													
LIVE MINOR	30.0-34.9	174	2.2	13.3	33.0	99	478		478	2153	10	1938	6
LIVE MINOR	35.0+	218	1.4	13.3	41.5	115	544		544	2768		2768	7
263-WHEMLOCK DEAD TOP													
LIVE 11-20%	15.0-16.9	48	9.3	13.3	16.2	79	401		401	1490	10	1341	4
LIVE 11-20%	30.0-34.9	174	2.2	13.3	33.0	99	478		478	2153	10	1938	6
WHEMLOCK LIVE TOTAL		21	146.3	45.3	4.2	22	1422		1422	6411	6	6047	18
WHEMLOCK DEAD TOTAL		35	118.6	26.7	6.4	18	53		53				
351-R ALDER													
LIVE	1.0- 2.9	7	66.7	1.7	2.0	17							
LIVE	3.0- 4.9		33.3	1.9	3.2	28							

TERRACE

TABLE #7

PROJECT WPSLOT3
 FOREST: 03 CHATHAM AREA - TONGA
 EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD
 STAND NO: 0003

PAGE 2
 DATE: 05/11/93
 COMPARTMENT: 1
 CELL: 3

LIVE/ SEVER DEAD ITY	DBH CLASS	AVE AGE	TREES/ ACRE	BASAL AREA	AVE DBH	AVE HGT	GROSS CUFT	%VOL LOSS	NET CUFT	GROSS BDFT	%VOL LOSS	NET BDFT	TONS
351-R ALDER													
LIVE	7.0- 8.9	14	41.2	13.3	7.7	44	206		206	825		825	
351-R ALDER FORKS, C													
LIVE 1-10%	5.0- 6.9	13	59.7	13.3	6.4	33	60		60	597	5	567	
R ALDER LIVE TOTAL		9	200.9	30.2	4.7	29	266		266	1422	2	1392	
ALL SPECIES													
LIVE		23	382.1	235.5	6.7	34	8690		8690	42414	2	41427	18
DEAD		37	120.2	40.0	6.8	18	153		153				

MORaine

STAND LIST

TABLE #0

PROJECT NPPL010

MORaine PLOTS 2, 10

FOREST: 03 CHATHAM AREA - TONGA

DISTRICT: 10 SITKA RD

EXAM TYPE: 11 MEETS STANDARDS - QU

STAND NO: 0010

PAGE 1

DATE: 05/11/93

COMPARTMENT: 1

CELL: 10

6 STATE: 50 ALASKA	16 BASAL AREA FACTOR: 40	MANAGEMENT AREA:
7 VCU: 01	17 BREAK POINT DBH: 5	LAND SUITABILITY:
8 COMPARTMENT: 1	18 FIXED RADIUS PLOT: 1/100th	BOUNDARY METHOD:
9 CELL: 10	19 RADIAL GROWTH PERIOD: 10	SITE: SPECIES 000 INDEX
10 ACRES: 1	20 NUMBER SAMPLE PLOTS: 2	STAND AGE:
----- FIRE DATA -----		
SAMPLING PLANES		
11 SLOPE:	21 0-1 IN. 12	
12 ASPECT: 9 LEVEL OR	22 1-3 IN. 50	
13 TOPO SITE: 5 VALLEY B	23 3 + IN. 90	
14 ELEVATION:	-----STAND CLASSIFICATION-----	
16 EXAM DATE: 3/93	24 PLANT ASSOCIATION:	
	25 STAND STRUCTURE/HISTORY: 32	
	26 PERCENT:	

TOP DIB SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC

SAMPLE PLOT DATA				COVER TYPE DATA			
PLOT	SUB	TOPO	PLANT	SITE	TYPE / PERCENT / VEG. HEIGHT		
NO	GROUP	SLP	ASP	SITE ASSOC	PREP	T P VH	T P VH

10	9	5
11		

TR PLOT	CUT/LEAVE				CROWN				DAMAGE/SEVERITY				-----COMPUTED VALUES-----						SE							
NO	NO	CLS	GST	SPP	OPTA	OPTB	DBH	GROWTH	AGE	HGT	RAT	CLS	D	S	D	S	D	S	GIR	TREES/AC	BASAL	GCUFT	NCUFT	GBDFT	NBDFT	PC
001	10	7		263			12.1		65*	36										50.1	40.0	13	13			
002	10	2		098			33.7		130*	102	8	2								6.5	40.0	228	228	1053	1053	
003	10	3	3	263			11.5	55	40	59	3	4	31	1						55.5	40.0	16	16	57	57	
004	10	3		263			10.5		57*	50	3	4	98	1	31	1				66.5	40.0	11	11	35	33	
005	10	3		098			28.0	9	120*	100	5	2								9.4	40.0	156	156	695	695	
006	10	3		263			7.9		43*	45	2	4	31	1						117.5	40.0	7	7	2	2	
007	10	3		263			6.4	5	33	53	4	4	31	1						179.1	40.0	5	5			
008	10	3		263			3.8		22*	41	2	4								100.0	7.9					
009	10	3		263			4.8	9	24	42	2	4	98	3						100.0	12.6					
010	10	7		263			2.0			16										100.0	2.2					
011	10	7		263			3.5		20*	26										100.0	6.7					
012	10	7		263			2.0			20										100.0	2.2					
013	10	3		263			3.6	11	18	40	1	5								100.0	7.1					
014	10	3		263			5.5		31*	32	2	5	98	7	30	3	31	1		242.4	40.0					
015	10	7		263			2.7			15										100.0	4.0					
016	10	7		263			2.2			20										100.0	2.6					
001	11	2	3	098			29.0	2	144	115	2	3	91	1	21	1				8.7	40.0	192	192	920	920	
018	11	3	3	263			20.7	5	106	128	3	3	31	2						17.1	40.0	113	113	529	529	
019	11	3		263			30.4		160*	133	3	3	31	2	98	1	30	2		7.9	40.0	244	244	1279	1215	
020	11	3		263			21.3		113*	136	3	3	31	2	98	2				16.2	40.0	128	128	608	547	

MORaine

TABLE #0

PROJECT NPPL0T10

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0010

PAGE 2

DATE: 05/11/93

COMPARTMENT: 1

CELL: 10

TR PLOT		CUT/LEAVE						CROWN				DAMAGE/SEVERITY				-----COMPUTED VALUES-----								SE		
NO	NO	CLS	GST	SPP	OPTA	OPTB	DBH	GROWTH	AGE	HGT	RAT	CLS	D	S	D	S	D	S	GIR	TREES/AC	BASAL	GCUFT	NCUFT	GBDFT	NBDFT	PC
021	11	3		263			14.3		76*	89	2	5	97	1	31	2	98	1		35.9	40.0	38	38	151	136	
022	11	2	3	098			18.3	4	95	130	2	3	21	1						21.9	40.0	92	92	425	425	
023	11	2		098			29.4		123*	144	3	2	21	1	98	1				8.5	40.0	248	248	1312	1246	
024	11	2		098			31.1		126*	150	3	2	21	1						7.6	40.0	289	289	1578	1578	
025	11	3		098			19.6		105*	111	1	4	21	2	96	1	98	1		19.1	40.0	88	88	387	368	
026	11	2	3	098			25.4	4	123	139	2	3	21	1						11.4	40.0	182	182	927	927	
027	11	3		263			21.7		115*	132	3	3	31	2	98	1				15.6	40.0	128	128	601	571	
028	11	3		263			22.5		119*	127	4	3	98	1	31	2				14.5	40.0	131	131	616	585	
029	11	3		263			18.5		98*	126	3	4	98	6	31	2				21.4	40.0	90	90	414	290	
030	11	2		098			20.5		107*	116	2	3	98	1						17.5	40.0	100	100	455	432	
031	11	3		263			31.0		163*	143	7	2	30	3	31	2				7.6	40.0	273	273	1455	1455	
032	11	3		263			18.5		98*	128	6	4	31	2	98	2				21.4	40.0	92	92	423	381	

MURRAINE

TABLE #1

PROJECT NPPL0T10
 FOREST: 03 CHATHAM AREA - TONGA
 EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD
 STAND NO: 0010

PAGE 1
 DATE: 05/11/93
 COMPARTMENT: 1
 CELL: 10

SPP/DBH CLASS	----- LIVE -----			-----LIVE DAMAGED-----				--TOTAL CUT--		-TOTAL LEAVE-		-ALL	-----DEAD-----		
	DESIRE (TC 1)	ACCEPT (TC 2)	UNACCP (TC 3)	INSECT (TC 2 -5)	DISEASE	OTHER	CULL	OP A	OP B	OP A	OP B	LIVE (TC 1 - 5)	SALVABLE (TC6&8)	RECENT TC6&7)	TOTAL (TC6-9)
098-SITKA SP															
17.0-18.9TA		10.9		10.9								10.9			
BA		20.0		20.0								20.0			
SDI		29		29								29			
RD		5		5								5			
19.0-20.9TA		8.7	9.5	9.5		18.3						18.3			
BA		20.0	20.0	20.0		40.0						40.0			
SDI		28	28	28		56						56			
RD		4	5	5		9						9			
25.0-29.9TA		14.3	4.7	14.3		8.6						19.0			
BA		60.0	20.0	60.0		40.0						80.0			
SDI		74	24	74		48						98			
RD		11	4	11		7						15			
30.0-34.9TA		7.0		3.8								7.0			
BA		40.0		20.0								40.0			
SDI		46		23								46			
RD		7		4								7			
SPP TOT TA		41.0	14.2	38.6		26.9						55.2			
BA		140.0	40.0	120.0		80.0						180.0			
SDI		179	53	156		105						232			
RD		28	8	25		17						36			
MDBH		25	23	24		23						24			
CFV		6636	1570	5867		3602						8205			
RCF															
BFV		32377	6760	28714		16581						39137			
263-WHEMLOCK															
1.0- 2.9TA													200.0		200.0
BA													5.5		5.5
3.0- 4.9TA			150.0			50.0						150.0	50.0		50.0
BA			13.8			6.3						13.8	3.3		3.3
5.0- 6.9TA			210.8		210.8	121.2						210.8			
BA			40.0		40.0	20.0						40.0			
7.0- 8.9TA			58.8		58.8							58.8			
BA			20.0		20.0							20.0			
SDI			40		40							40			
RD			7		7							7			
9.0-10.9TA			33.3		33.3	33.3						33.3			
BA			20.0		20.0	20.0						20.0			
SDI			36		36	36						36			
RD			6		6	6						6			
11.0-12.9TA			27.7		27.7							27.7			25.0
BA			20.0		20.0							20.0			20.0
SDI			35		35							35			
RD			6		6							6			

MORRINE

TABLE #1

PROJECT NPPL0T10

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0010

PAGE 2

DATE: 05/11/93

COMPARTMENT: 1

CELL: 10

		----- LIVE -----			-----LIVE DAMAGED-----			--TOTAL CUT--		-TOTAL LEAVE-		-ALL -----DEAD-----			
SPP/DBH	DESIRE	ACCEPT	UNACCP	INSECT	DISEASE	OTHER	CULL	OP A	OP B	OP A	OP B	LIVE	SALVABLE	RECENT	TOTAL
CLASS	(TC 1)	(TC 2)	(TC 3)	(	TC 2 -5	)						(TC 1 - 5)	(TC6&8)	TC6&7)	(TC6-9)
263-WHEMLOCK															
13.0-14.9TA			17.9		17.9	17.9						17.9			
BA			20.0		20.0	20.0						20.0			
SDI			32		32	32						32			
RD			5		5	5						5			
17.0-18.9TA			21.4		21.4	21.4						21.4			
BA			40.0		40.0	40.0						40.0			
SDI			58		58	58						58			
RD			9		9	9						9			
19.0-20.9TA			8.6		8.6							8.6			
BA			20.0		20.0							20.0			
SDI			28		28							28			
RD			4		4							4			
21.0-22.9TA			23.1		23.1	23.1						23.1			
BA			60.0		60.0	60.0						60.0			
SDI			81		81	81						81			
RD			13		13	13						13			
30.0-34.9TA			7.8		7.8	4.0						7.8			
BA			40.0		40.0	20.0						40.0			
SDI			47		47	24						47			
RD			7		7	4						7			
SPP TOT	TA		559.3		409.3	270.9						559.3		250.0	275.0
	BA		293.8		280.0	186.3						293.8		8.8	28.8
	SDI		376		376	237						376			
	RD		62		62	39						62			
	MOBH		15		15	17						15			
	CFV		10257		10257	6946						10257			326
	RCF														
	BFV		40434		40434	28656						40434			
ALL SPECIES															
1.0- 2.9TA														200.0	200.0
BA														5.5	5.5
3.0- 4.9TA			150.0			50.0						150.0		50.0	50.0
BA			13.8			6.3						13.8		3.3	3.3
5.0- 6.9TA			210.8		210.8	121.2						210.8			
BA			40.0		40.0	20.0						40.0			
7.0- 8.9TA			58.8		58.8							58.8			
BA			20.0		20.0							20.0			
SDI			40		40							40			
RD			7		7							7			
9.0-10.9TA			33.3		33.3	33.3						33.3			
BA			20.0		20.0	20.0						20.0			
SDI			36		36	36						36			
RD			6		6	6						6			

MORaine

TABLE #1

PROJECT NPPL0T10

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0010

PAGE 3

DATE: 05/11/93

COMPARTMENT: 1

CELL: 10

SPP/DBH CLASS	LIVE			LIVE DAMAGED			TOTAL CUT		TOTAL LEAVE		ALL		DEAD	
	DESIRE (TC 1)	ACCEPT (TC 2)	UNACPT (TC 3)	INSECT (TC 2 -5)	DISEASE (TC 2 -5)	OTHER (TC 2 -5)	OP A	OP B	OP A	OP B	LIVE (TC 1 - 5)	SALVABLE (TC6&8)	RECENT (TC6&7)	TOTAL (TC6-9)
ALL SPECIES														
11.0-12.9TA			27.7		27.7						27.7			25.0
BA			20.0		20.0						20.0			20.0
SDI			35		35						35			
RD			6		6						6			
13.0-14.9TA			17.9		17.9	17.9					17.9			
BA			20.0		20.0	20.0					20.0			
SDI			32		32	32					32			
RD			5		5	5					5			
17.0-18.9TA		10.9	21.4	10.9	21.4	21.4					32.4			
BA		20.0	40.0	20.0	40.0	40.0					60.0			
SDI		29	58	29	58	58					86			
RD		5	9	5	9	9					14			
19.0-20.9TA		8.7	18.1	9.5	8.6	18.3					26.8			
BA		20.0	40.0	20.0	20.0	40.0					60.0			
SDI		28	56	28	28	56					83			
RD		4	9	5	4	9					13			
21.0-22.9TA			23.1		23.1	23.1					23.1			
BA			60.0		60.0	60.0					60.0			
SDI			81		81	81					81			
RD			13		13	13					13			
25.0-29.9TA		14.3	4.7	14.3		8.6					19.0			
BA		60.0	20.0	60.0		40.0					80.0			
SDI		74	24	74		48					98			
RD		11	4	11		7					15			
30.0-34.9TA		7.0	7.8	3.8	7.8	4.0					14.8			
BA		40.0	40.0	20.0	40.0	20.0					80.0			
SDI		46	47	23	47	24					93			
RD		7	7	4	7	4					14			
TOTAL	TA	41.0	573.5	38.6	409.3	297.8					614.5		250.0	275.0
	BA	140.0	333.8	120.0	280.0	266.3					473.8		8.8	28.8
	SDI	179	431	156	376	344					618			
	RD	28	71	25	62	56					101			
	MDBH	25	16	24	15	19					17			
	CFV	6636	11827	5867	10257	10548					18463			326
	RCF													
	BFV	32377	47194	28714	40434	45237					79570			

MORaine

TABLE #2

1

PROJECT NPPL0T10

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0010

PAGE 1

DATE: 05/11/93

COMPARTMENT: 1

CELL: 10

SPP/DBH CLASS	TREES	DBH	AGE	HGT	BA	BFV	CFV	GRW	HTG/ BAG	PAICF	PAIBF	PCC	CCF	LCR	LPM
098-SITKA SP															
17.0-18.9	10.9	18.3	95.0	130.0	20.0	4654	1007	4.0	0.09	4.1	16.6	1.4	30.0	20.0	7.
19.0-20.9	18.3	20.0	106.0	113.5	40.0	7281	1713					2.9	58.0	15.0	6.
25.0-29.9	19.0	27.8	127.5	124.5	80.0	17819	3653	5.0	0.22	9.1	41.3	8.8	107.2	30.0	3.
30.0-34.9	7.0	32.3	128.0	126.0	40.0	9383	1832					6.8	52.4	55.0	2.
SPP TOTAL	55.2	24.5	119.2	123.0	180.0	39137	8205	4.8	0.31	13.1	57.9	19.9	247.7	31.1	4.
263-WHEMLOCK															
3.0- 4.9	150.0	4.1	21.9	41.2	13.8			9.7	0.45			5.3	25.5	17.4	
5.0- 6.9	210.8	5.9	32.0	42.5	40.0		448	5.0	0.31	1.6		21.9	58.8	30.0	
7.0- 8.9	58.8	7.9	43.0	45.0	20.0	118	411					8.9	23.8	20.0	
9.0-10.9	33.3	10.5	57.0	50.0	20.0	1106	366					11.3	21.6	30.0	15.
11.0-12.9	27.7	11.5	40.0	59.0	20.0	1580	444	55.0	1.87	80.2	279.1	10.7	20.0	30.0	17.
13.0-14.9	17.9	14.3	76.0	89.0	20.0	2437	681					7.2	18.6	20.0	11.
17.0-18.9	21.4	18.5	98.0	127.0	40.0	7184	1950					20.4	34.8	45.0	8.
19.0-20.9	8.6	20.7	106.0	128.0	20.0	4527	967	5.0	0.10	6.1	24.4	8.3	16.8	30.0	5.
21.0-22.9	23.1	21.8	115.7	131.7	60.0	13108	2980					26.2	51.0	33.3	5.
30.0-34.9	7.8	30.7	161.5	138.0	40.0	10373	2010					22.5	31.7	50.0	2.
SPP TOTAL	559.3	9.8	86.3	96.0	293.8	40434	10257	20.0	2.72	88.0	303.5	142.7	302.6	33.5	6.
ALL SPECIES															
3.0- 4.9	150.0	4.1	21.9	41.2	13.8			9.7	0.45			5.3	25.5	17.4	
5.0- 6.9	210.8	5.9	32.0	42.5	40.0		448	5.0	0.31	1.6		21.9	58.8	30.0	
7.0- 8.9	58.8	7.9	43.0	45.0	20.0	118	411					8.9	23.8	20.0	
9.0-10.9	33.3	10.5	57.0	50.0	20.0	1106	366					11.3	21.6	30.0	15.
11.0-12.9	27.7	11.5	40.0	59.0	20.0	1580	444	55.0	1.87	80.2	279.1	10.7	20.0	30.0	17.
13.0-14.9	17.9	14.3	76.0	89.0	20.0	2437	681					7.2	18.6	20.0	11.
17.0-18.9	32.4	18.4	97.0	128.0	60.0	11838	2957	4.0	0.09	4.1	16.6	21.8	64.8	36.7	8.
19.0-20.9	26.8	20.2	106.0	118.3	60.0	11808	2680	5.0	0.10	6.1	24.4	11.2	74.8	20.0	6.
21.0-22.9	23.1	21.8	115.7	131.7	60.0	13108	2980					26.2	51.0	33.3	5.
25.0-29.9	19.0	27.8	127.5	124.5	80.0	17819	3653	5.0	0.22	9.1	41.3	8.8	107.2	30.0	3.
30.0-34.9	14.8	31.5	144.8	132.0	80.0	19756	3842					29.3	84.1	52.5	2.
TOTAL	614.5	11.9	98.8	106.2	473.8	79570	18463	11.9	3.03	101.1	361.4	162.7	550.3	32.6	5.

MORaine

TABLE #5

PROJECT NPPL0T10

FOREST: 03 CHATHAM AREA - TONGA
EXAM TYPE: 11 MEETS STANDARDS - QUDISTRICT: 10 SITKA RD
STAND NO: 0010PAGE 1
DATE: 05/11/93
COMPARTMENT: 1
CELL: 10

	PLOTS	TREES	TREES PER PLOT	ESTIMATED TOTAL TREES	PERCENT SAMPLE TREES
TOTAL	2	32	16.0		
CRUISE COUNT BLANKS	2	32	16.0	890	3.6

STAND SUMMARY									
	SAMPLE TREES	TREES /ACRE	AVE DBH	BASAL AREA	REL DEN	GROSS BF	NET BF	GROSS CUBIC	NET CUBIC
WHEMLOCK	23	834.4	8.4	322.6	111	43749	40434	10583	10583
SITKA SP	9	55.2	24.5	180.0	36	39798	39137	8205	8205
TOTAL	32	889.6	10.2	502.6	158	83547	79570	18788	18788

SD:1	COEFF.		SAMPLE TREES-BF			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
WHEMLOCK	199.2	35.2	117	181	245			
SITKA SP	184.4	32.6	161	239	317			
TOTAL	115.4	20.4	334	420	506	48	38	28

SD:1	COEFF.		TREES PER ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
WHEMLOCK	114.7	81.1	157.6	834.4	1511.1			
SITKA SP	100.9	71.4	15.8	55.2	94.6			
TOTAL	101.3	71.6	252.2	889.6	1526.9	47	35	25

SD:1	COEFF.		BASAL AREA/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
WHEMLOCK	16.4	11.6	285.2	322.6	360.0			
SITKA SP	78.6	55.6	80.0	180.0	280.0			
TOTAL	38.7	27.3	365.2	502.6	640.0	28	12	6

SD:1	COEFF.		NET BF/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
WHEMLOCK	121.8	86.1	5608	40434	75259			
SITKA SP	93.4	66.0	13302	39137	64972			
TOTAL	107.8	76.2	18909	79570	140231	48	36	26

SD:1	COEFF.		NET CUBIC FT/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
WHEMLOCK	88.1	62.3	3988	10583	17177			
SITKA SP	90.9	64.3	2932	8205	13479			
TOTAL	89.3	63.2	6920	18788	30656	46	32	21

MORaine

TABLE #5

f

PROJECT NPLOT10

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0010

PAGE 2

DATE: 05/11/93

COMPARTMENT: 1

CELL: 10

SD:1	COEFF.		PAI-CF PER ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
WHEMLOCK	121.8	86.1	12.2	88.0	163.8			
SITKA SP	35.3	25.0	9.9	13.1	16.4			
TOTAL	101.4	71.7	28.6	101.1	173.6	47	35	25

PERCENT OF AREA BY STOCKING CLASSES

LIVE TREES LESS THAN 5.0 DBH

***** ALL LIVE TREES *****

TREES PER ACRE	% OF AREA	TREES PER ACRES	% OF AREA	BASAL AREA	% OF AREA
- 0	50.0	- 0			
1 - 100		1 - 100		0 - 20	
101 - 200		101 - 200		21 - 40	
201 - 300		201 - 300	50.0	41 - 60	
301 - 400		301 - 400		61 - 80	
401 - 500		401 - 500		81 - 100	
501 - 600		501 - 600		101 - 120	
601 - 700		601 - 700		121 - 140	
701 - 800	50.0	701 - 800		141 - 160	
801 - 900		801 - 900		161 - 180	
901 +		901 +	50.0	181 +	100.0

MURRAINE
TABLE #7

PROJECT NPPL010

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0010

PAGE 1

DATE: 05/11/93

COMPARTMENT: 1

CELL: 10

LIVE/ SEVER DEAD	SEVER ITY	DBH CLASS	AVE AGE	TREES/ ACRE	BASAL AREA	AVE DBH	AVE HGT	GROSS CUFT	%VOL LOSS	NET CUFT	GROSS BDFT	%VOL LOSS	NET BDFT	TONS
098-SITKA SP														
LIVE		25.0-29.9	120	4.7	20.0	28.0	100	730		730	3251		3251	
LIVE		30.0-34.9	130	3.2	20.0	33.7	102	736		736	3400		3400	
098-SITKA SP APHIDS														
LIVE MINOR		17.0-18.9	95	10.9	20.0	18.3	130	1007		1007	4654		4654	
LIVE MINOR		25.0-29.9	129	14.3	60.0	27.7	133	2924		2924	14847	2	14568	
LIVE MINOR		30.0-34.9	126	3.8	20.0	31.1	150	1096		1096	5983		5983	
LIVE SEVERE		19.0-20.9	105	9.5	20.0	19.6	111	840		840	3694	5	3509	
098-SITKA SP LOGGING														
LIVE MINOR		25.0-29.9	144	4.4	20.0	29.0	115	837		837	4011		4011	
098-SITKA SP BROKEN O														
LIVE 1-10%		19.0-20.9	105	9.5	20.0	19.6	111	840		840	3694	5	3509	
098-SITKA SP FORKS, C														
LIVE 1-10%		19.0-20.9	106	18.3	40.0	20.0	113	1713		1713	7664	5	7281	
LIVE 1-10%		25.0-29.9	123	4.2	20.0	29.4	144	1052		1052	5566	5	5288	
SITKA SP LIVE TOTAL			114	55.2	180.0	23.9	123	8205		8205	39798	2	39137	
263-WHEMLOCK														
LIVE		3.0- 4.9	20	100.0	7.5	3.7	40							
DEAD		1.0- 2.9		200.0	5.5	2.2	18							
DEAD		3.0- 4.9	20	50.0	3.3	3.5	26							
DEAD		11.0-12.9	65	25.0	20.0	12.1	36	326		326				
263-WHEMLOCK MISTLETO														
LIVE MODERATE		5.0- 6.9	31	121.2	20.0	5.5	32							
LIVE MODERATE		30.0-34.9	161	7.8	40.0	30.7	138	2010		2010	10627	2	10373	25
263-WHEMLOCK FLUTING														
LIVE MINOR		5.0- 6.9	32	210.8	40.0	5.9	41	448		448				
LIVE MINOR		7.0- 8.9	43	58.8	20.0	7.9	45	411		411	118		118	4
LIVE MINOR		9.0-10.9	57	33.3	20.0	10.5	50	366		366	1164	5	1106	5
LIVE MINOR		11.0-12.9	40	27.7	20.0	11.5	59	444		444	1580		1580	6
LIVE SEVERE		13.0-14.9	76	17.9	20.0	14.3	89	681		681	2708	10	2437	8
LIVE SEVERE		17.0-18.9	98	21.4	40.0	18.5	127	1950		1950	8968	20	7184	20
LIVE SEVERE		19.0-20.9	106	8.6	20.0	20.7	128	967		967	4527		4527	10
LIVE SEVERE		21.0-22.9	116	23.1	60.0	21.8	132	2980		2980	14057	7	13108	32
LIVE SEVERE		30.0-34.9	161	7.8	40.0	30.7	138	2010		2010	10627	2	10373	25
263-WHEMLOCK DEAD TOP														
LIVE 1-10%		13.0-14.9	76	17.9	20.0	14.3	89	681		681	2708	10	2437	8

MORaine
TABLE #7

PROJECT NPPL0T10

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0010

PAGE 2

DATE: 05/11/93

COMPARTMENT: 1

CELL: 10

LIVE/ SEVER DEAD ITY	DBH CLASS	AVE AGE	TREES/ ACRE	BASAL AREA	AVE DBH	AVE HGT	GROSS CUFT	%VOL LOSS	NET CUFT	GROSS BDFT	%VOL LOSS	NET BDFT	TONS
263-WHEMLOCK FORKS, C													
LIVE 21-30%	3.0- 4.9	24	50.0	6.3	4.8	42							
LIVE 1-10%	9.0-10.9	57	33.3	20.0	10.5	50	366		366	1164	5	1106	5
LIVE 1-10%	13.0-14.9	76	17.9	20.0	14.3	89	681		681	2708	10	2437	8
LIVE 11-20%	17.0-18.9	98	10.7	20.0	18.5	128	986		986	4532	10	4079	10
LIVE 1-10%	21.0-22.9	116	23.1	60.0	21.8	132	2980		2980	14057	7	13108	32
LIVE 1-10%	30.0-34.9	160	4.0	20.0	30.4	133	968		968	5075	5	4821	12
LIVE 61-70%	5.0- 6.9	31	121.2	20.0	5.5	32							
LIVE 51-60%	17.0-18.9	98	10.7	20.0	18.5	126	964		964	4436	30	3105	10
WHEMLOCK LIVE TOTAL		42	559.3	293.8	8.1	54	10257		10257	43749	8	40434	108
WHEMLOCK DEAD TOTAL		10	275.0	28.8	3.4	21	326		326				
ALL SPECIES													
LIVE		49	614.5	473.8	9.6	60	18463		18463	83547	5	79570	108
DEAD		10	275.0	28.8	3.4	21	326		326				

UPLIFTED BEACH

STAND LIST

TABLE #0

PAGE 1

DATE: 05/12/93

PROJECT UPBEACH PLOTS 1,6 UPLIFTED BEACH

FOREST: 03 CHATHAM AREA - TONGA

DISTRICT: 10 SITKA RD

COMPARTMENT: 1

EXAM TYPE: 11 MEETS STANDARDS - QU

STAND NO: 0001

CELL: 1

6 STATE: 50 ALASKA	16 BASAL AREA FACTOR: 40	MANAGEMENT AREA:
7 VCU: 01	17 BREAK POINT DBH: 5	LAND SUITABILITY:
8 COMPARTMENT: 1	18 FIXED RADIUS PLOT: 1/100th	BOUNDARY METHOD:
9 CELL: 1	19 RADIAL GROWTH PERIOD: 10	SITE: SPECIES INDEX
10 ACRES: 1	20 NUMBER SAMPLE PLOTS: 2	STAND AGE:
---- FIRE DATA ----		
11 SLOPE:	SAMPLING PLANES	
12 ASPECT: 9 LEVEL OR	21 0-1 IN.	
13 TOPO SITE: 5 VALLEY B	22 1-3 IN.	
14 ELEVATION: 1	23 3 + IN.	
-----STAND CLASSIFICATION-----		
16 EXAM DATE: 4/93	24 PLANT ASSOCIATION:	
	25 STAND STRUCTURE/HISTORY: 12	
	26 PERCENT:	
TOP DIB SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC		

SAMPLE PLOT DATA					COVER TYPE DATA				
PLOT NO	SUB GROUP	TOPO SLP	PLANT ASP	SITE ASSOC	SITE PREP	TYPE / PERCENT / VEG. HEIGHT			
						T	P	VH	T P VH
01	0		9	5					
02	0		9	5					

TR PLOT		CUT/LEAVE		CROWN DAMAGE/SEVERITY										-----COMPUTED VALUES-----						SE							
NO	NO	CLS	GST	SPP	OPTA	OPTB	DBH	GROWTH	AGE	HGT	RAT	CLS	D	S	D	S	D	S	GIR	TREES/AC	BASAL	GCUFT	NCUFT	GBDFT	NBDFT	PC	
001	01	3		098			11.4			91*108	1	4	21	2							56.4	40.0	30	30	140	140	
002	01	2		098			21.6	18	123	120	3	3	21	1							15.7	40.0	115	115	522	522	
003	01	2		098			23.9	9	125	149	3	2	21	1							12.8	40.0	175	175	904	904	
004	01	5		263			41.3			217*130	3	3	45	9	30	6					4.3	40.0	428	214			5
005	01	3		263			24.0	11	145	130	6	3	30	4	98	1	31	2			12.7	40.0	152	152	735	698	
006	01	3		263			21.1			112*106	4	3	30	4	98	2	31	2			16.5	40.0	96	96	427	384	
007	01	2		098			43.3			147*134	6	2	30	1	98	1	21	1			3.9	40.0	483	483	2643	2511	
008	01	3		263			24.7	2	116	115	7	3	98	2	30	4	31	2			12.0	40.0	141	141	645	591	
009	01	2		263			1.2			11	9	5	30	4							100.0	0.8					
010	01	2		263			0.4			6	7	5									100.0	0.1					
011	01	2		263			0.4			7	7	5	30	1							100.0	0.1					
001	02	2	3	098			27.4	9	112	149	3	2	21	1							9.8	40.0	226	226	1190	1190	
002	02	2		098			27.8			120*131	3	3	98	1	21	1					9.5	40.0	202	202	1041	989	
003	02	3	3	098			22.4	4	114	119	2	3	98	1	21	1					14.6	40.0	122	122	551	523	
004	02	3		263			18.6			99*120	4	3	31	2							21.2	40.0	87	87	385	385	
005	02	3		263			11.7			63*106	5	4	98	1	31	2					53.6	40.0	31	31	140	133	
006	02	3	3	263			16.7	7	140	124	5	3	31	2							26.3	40.0	73	73	326	326	
007	02	3		263			22.1			117*125	5	3	98	1	31	2					15.0	40.0	125	125	576	547	
008	02	3	3	098			24.3	3	112	116	3	3	98	1	21	1					12.4	40.0	138	138	626	595	
009	02	9		263			27.3			144* 27			96	9							9.8	40.0	46	46			

UPLIFTED BEACH

TABLE #0

PROJECT UPBEACH
 FOREST: 03 CHATHAM AREA - TONGA
 EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD
 STAND NO: 0001

PAGE 2
 DATE: 05/12/93
 COMPARTMENT: 1
 CELL: 1

TR PLOT		CUT/LEAVE					CROWN DAMAGE/SEVERITY										-----COMPUTED VALUES-----						SE			
NO	NO	CLS	GST	SPP	OPTA	OPTB	DBH	GROWTH	AGE	HGT	RAT	CLS	D	S	D	S	D	S	GIR	TREES/AC	BASAL	GCUFT	NCUFT	GBDFT	NBDFT	PC
010	02	9		263			8.4		46*	45										103.9	40.0	8	8			
011	02	3		263			33.3		175*	124	4	3	98	4	31	1				6.6	40.0	270	270	1399	1119	
012	02	3		263			22.8		121*	116	4	3	98	1	31	1				14.1	40.0	123	123	548	521	
013	02	2		263			0.2		5	8	5									100.0	0.0					
014	02	2		263			0.2		5	8	5									100.0	0.0					

TABLE #1

CELL: 1

SPP/DBH	DESIRE (TC 1)	ACCEPT (TC 2)	UNACCP (TC 3)	INSECT (TC 2 -5)	DISEASE	OTHER	CULL	--TOTAL CUT-- OP A OP B	-TOTAL LEAVE- OP A OP B	-ALL LIVE (TC 1 - 5)	-DEAD----- (TC6&8) TC6&7)	TOTAL (TC6-9)
098-SITKA SP												
11.0-12.9TA			28.2	28.2						28.2		
BA			20.0	20.0						20.0		
SDI			35	35						35		
RD			6	6						6		
21.0-22.9TA		7.9	7.3	15.2		7.3				15.2		
BA		20.0	20.0	40.0		20.0				40.0		
SDI		27	27	54		27				54		
RD		4	4	9		4				9		
23.0-24.9TA		6.4	6.2	12.6		6.2				12.6		
BA		20.0	20.0	40.0		20.0				40.0		
SDI		26	26	52		26				52		
RD		4	4	8		4				8		
25.0-29.9TA		9.6		9.6		4.7				9.6		
BA		40.0		40.0		20.0				40.0		
SDI		49		49		24				49		
RD		8		8		4				8		
35.0+ TA		2.0		2.0	2.0	2.0				2.0		
BA		20.0		20.0	20.0	20.0				20.0		
SDI		21		21	21	21				21		
RD		3		3	3	3				3		
SPP TOT TA		25.9	41.7	67.6	2.0	20.2				67.6		
BA		100.0	60.0	160.0	20.0	80.0				160.0		
SDI		125	91	220	21	99				220		
RD		19	15	35	3	15				35		
MDBH		27	16	21	43	27				21		
CFV		5034	2595	7629	945	3652				7629		
RCF												
BFV		25322	11469	36791	4911	17122				36791		
263-WHEMLOCK												
0.1- 0.9TA		200.0			50.0					200.0		
BA		0.1			0.0					0.1		
1.0- 2.9TA		50.0			50.0					50.0		
BA		0.4			0.4					0.4		
7.0- 8.9TA												52.0
BA												20.0
11.0-12.9TA			26.8		26.8	26.8				26.8		
BA			20.0		20.0	20.0				20.0		
SDI			34		34	34				34		
RD			6		6	6				6		
15.0-16.9TA			13.1		13.1					13.1		
BA			20.0		20.0					20.0		
SDI			30		30					30		
RD			5		5					5		

UPLIFTED BEACH

TABLE #1

PROJECT UPBEACH

FOREST: 03 CHATHAM AREA - TCNGA

EXAM TYPE: 11 MEETS STANDARDS - GU

DISTRICT: 10 SITKA RD

STAND NO: 0001

PAGE 2

DATE: 05/12/93

COMPARTMENT: 1

CELL: 1

SPP/DBH CLASS	LIVE			LIVE DAMAGED			TOTAL CUT		TOTAL LEAVE		ALL		DEAD	
	DESIRE (TC 1)	ACCEPT (TC 2)	UNACCP (TC 3)	INSECT (	DISEASE TC 2 - 5	OTHER)	OP A	OP B	OP A	OP B	LIVE (TC 1 - 5)	SALVABLE (TC6&8)	RECENT (TC6&7)	TOTAL (TC6-9)
263-WHEMLOCK														
17.0-18.9TA			10.6		10.6						10.6			
BA			20.0		20.0						20.0			
SDI			29		29						29			
RD			5		5						5			
21.0-22.9TA			22.8		22.8	22.8					22.8			
BA			60.0		60.0	60.0					60.0			
SDI			81		81	81					81			
RD			13		13	13					13			
23.0-24.9TA			12.4		12.4	12.4					12.4			
BA			40.0		40.0	40.0					40.0			
SDI			52		52	52					52			
RD			8		8	8					8			
25.0-29.9TA														4.9
BA														20.0
30.0-34.9TA			3.3		3.3	3.3					3.3			
BA			20.0		20.0	20.0					20.0			
SDI			23		23	23					23			
RD			3		3	3					3			
35.0+ TA					2.1		2.1				2.1			
BA					20.0		20.0				20.0			
SPP TOT TA	250.0	89.0			191.2	65.3	2.1				341.2			56.9
BA	0.5	180.0			200.4	140.0	20.0				200.5			40.0
SDI		255			255	196					255			
RD		41			41	31					41			
MDBH		19			19	20					19			
CFV		8017			8477	6135	460				8477			642
RCF					460		460				460			
BFV		34512			34512	26145					34512			
ALL SPECIES														
0.1- 0.9TA		200.0			50.0						200.0			
BA		0.1			0.0						0.1			
1.0- 2.9TA		50.0			50.0						50.0			
BA		0.4			0.4						0.4			
7.0- 8.9TA														52.0
BA														20.0
11.0-12.9TA		55.0	28.2	26.8	26.8						55.0			
BA		40.0	20.0	20.0	20.0						40.0			
SDI		69	35	34	34						69			
RD		12	6	6	6						12			
15.0-16.9TA		13.1		13.1							13.1			
BA		20.0		20.0							20.0			
SDI		30		30							30			
RD		5		5							5			

TABLE #1

CELL: 1

SPP/DBH CLASS	DESIRE (TC 1)	LIVE		UNACCPT		INSECT		DISEASE		OTHER		CULL	--TOTAL CUT--		-TOTAL LEAVE-		-ALL		-----DEAD-----		TOTAL (TC6-9)
		ACCEPT (TC 2)	(TC 3)	(	TC 2 -5	)	OP A	OP B	OP A	OP B	LIVE (TC 1 - 5)		SALVABLE RECENT (TC6&8)	TC6&7)							
ALL SPECIES																					
17.0-18.9TA			10.6		10.6												10.6				
BA			20.0		20.0												20.0				
SDI			29		29												29				
RD			5		5												5				
21.0-22.9TA		7.9	30.1	15.2	22.8	30.1											38.0				
BA		20.0	80.0	40.0	60.0	80.0											100.0				
SDI		27	107	54	81	107											134				
RD		4	17	9	13	17											21				
23.0-24.9TA		6.4	18.6	12.6	12.4	18.6											25.0				
BA		20.0	60.0	40.0	40.0	60.0											80.0				
SDI		26	77	52	52	77											103				
RD		4	12	8	8	12											16				
25.0-29.9TA		9.6		9.6		4.7											9.6				4.9
BA		40.0		40.0		20.0											40.0				20.0
SDI		49		49		24											49				
RD		8		8		4											8				
30.0-34.9TA			3.3		3.3	3.3											3.3				
BA			20.0		20.0	20.0											20.0				
SDI			23		23	23											23				
RD			3		3	3											3				
35.0+ TA		2.0		2.0	4.1	2.0	2.1										4.1				
BA		20.0		20.0	40.0	20.0	20.0										40.0				
SDI		21		21	21	21											21				
RD		3		3	3	3											3				
TOTAL	TA	275.9	130.8	67.6	193.1	85.5	2.1										408.8				56.9
	BA	100.5	240.0	160.0	220.4	220.0	20.0										360.5				40.0
	SDI	125	346	220	278	297											475				
	RD	19	56	35	45	47											76				
	MDBH	27	18	21	20	22											20				
	CFV	5034	10613	7629	9422	9787	460										16107				642
	RCF				460		460										460				
	BFV	25322	45981	36791	39423	43267											71303				

UPLIFTED BEACH

TABLE #2

PROJECT UPBEACH

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0001

PAGE 1

DATE: 05/12/93

COMPARTMENT: 1

CELL: 1

SPP/DBH	TREES	DBH	AGE	HGT	BA	BFV	CFV	GRW	HTG/ BAG	PAICF	PAIBF	PCC	CCF	LCR	LPM
098-SITKA SP															
11.0-12.9	28.2	11.4	91.0	108.0	20.0	3950	846					1.2	37.1	10.0	14.
21.0-22.9	15.2	22.0	118.5	119.5	40.0	7928	1795	11.0	0.40	18.0	71.9	3.7	56.6	25.0	5.
23.0-24.9	12.6	24.1	118.5	132.5	40.0	9497	1980	6.0	0.20	9.8	42.2	3.7	55.8	30.0	4.
25.0-29.9	9.6	27.6	116.0	140.0	40.0	10505	2062	9.0	0.13	6.4	28.8	3.3	53.5	30.0	3.
35.0+	2.0	43.3	147.0	134.0	20.0	4911	945					2.9	24.9	60.0	1.
SPP TOTAL	67.6	20.8	118.0	128.3	160.0	36791	7629	8.6	0.73	34.2	142.9	14.8	227.8	30.0	5.
263-WHEMLOCK															
0.1- 0.9	200.0	0.3		6.2	0.1							2.0	5.8	72.0	
1.0- 2.9	50.0	1.2		11.0	0.4							1.1	2.3	90.0	
11.0-12.9	26.8	11.7	63.0	106.0	20.0	3563	830					11.1	19.3	50.0	15.
15.0-16.9	13.1	16.7	140.0	124.0	20.0	4286	960	7.0	0.17	9.8	38.3	11.0	17.3	50.0	7.
17.0-18.9	10.6	18.6	99.0	120.0	20.0	4081	922					9.9	17.2	40.0	6.
21.0-22.9	22.8	22.0	116.7	115.7	60.0	10946	2597					32.6	50.2	43.3	5.
23.0-24.9	12.4	24.3	130.5	122.5	40.0	7935	1815	6.5	0.22	14.1	59.5	27.5	33.1	65.0	4.
30.0-34.9	3.3	33.3	175.0	124.0	20.0	3701	893					10.7	15.5	40.0	2.
35.0+	2.1	41.3	217.0	130.0	20.0		460					9.2	14.9	30.0	
SPP TOTAL	341.2	10.4	130.2	119.3	200.5	34512	8477	6.7	0.38	23.9	97.8	115.1	175.5	47.1	6.
ALL SPECIES															
0.1- 0.9	200.0	0.3		6.2	0.1							2.0	5.8	72.0	
1.0- 2.9	50.0	1.2		11.0	0.4							1.1	2.3	90.0	
11.0-12.9	55.0	11.5	77.0	107.0	40.0	7513	1677					12.3	56.4	30.0	14.
15.0-16.9	13.1	16.7	140.0	124.0	20.0	4286	960	7.0	0.17	9.8	38.3	11.0	17.3	50.0	7.
17.0-18.9	10.6	18.6	99.0	120.0	20.0	4081	922					9.9	17.2	40.0	6.
21.0-22.9	38.0	22.0	117.4	117.2	100.0	18874	4392	11.0	0.40	18.0	71.9	36.3	106.8	36.0	5.
23.0-24.9	25.0	24.2	124.5	127.5	80.0	17431	3796	6.3	0.41	23.9	101.6	31.2	88.8	47.5	4.
25.0-29.9	9.6	27.6	116.0	140.0	40.0	10505	2062	9.0	0.13	6.4	28.8	3.3	53.5	30.0	3.
30.0-34.9	3.3	33.3	175.0	124.0	20.0	3701	893					10.7	15.5	40.0	2.
35.0+	4.1	42.3	182.0	132.0	40.0	4911	1405					12.1	39.8	45.0	1.
TOTAL	408.8	12.7	124.8	123.3	360.5	71303	16107	7.9	1.12	58.0	240.7	129.9	403.3	39.5	5.

UPLIFTED BEACH

TABLE #5

PROJECT UPBEACH

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0001

PAGE 1

DATE: 05/12/93

COMPARTMENT: 1

CELL: 1

	PLOTS	TREES	TREES PER PLOT	ESTIMATED TOTAL TREES	PERCENT SAMPLE TREES
TOTAL	2	25	12.5		
CRUISE	2	25	12.5	466	5.4
COUNT					
BLANKS					

	STAND SUMMARY								
	SAMPLE TREES	TREES /ACRE	AVE DBH	BASAL AREA	REL DEN	GROSS BF	NET BF	GROSS CUBIC	NET CUBIC
SITKA SP	8	67.6	20.8	160.0	35	37692	36791	7629	7629
WHEMLOCK	17	398.1	10.5	240.5	74	37008	34512	9580	9120

TOTAL	25	465.7	12.6	400.5	113	74700	71303	17209	16749

SD:1	COEFF.		SAMPLE TREES-BF			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	198.9	39.8	178	295	412			
WHEMLOCK	160.7	32.1	127	188	248			
TOTAL	117.2	23.4	370	483	596	35	29	23

SD:1	COEFF.		TREES PER ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	44.6	31.5	46.3	67.6	88.9			
WHEMLOCK	18.7	13.2	345.5	398.1	450.6			
TOTAL	9.5	6.7	434.4	465.7	496.9	3	1	0

SD:1	COEFF.		BASAL AREA/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP			160.0	160.0	160.0			
WHEMLOCK	46.8	33.1	161.0	240.5	320.0			
TOTAL	28.1	19.9	321.0	400.5	480.0	17	7	3

SD:1	COEFF.		NET BF/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	2.9	2.0	36047	36791	37535			
WHEMLOCK	50.5	35.7	22200	34512	46824			
TOTAL	22.9	16.2	59735	71303	82871	13	5	2

SD:1	COEFF.		NET CUBIC FT/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	0.1	0.1	7622	7629	7637			
WHEMLOCK	46.3	32.8	6132	9120	12107			
TOTAL	25.2	17.8	13769	16749	19729	15	5	3

UPLIFTED BEACH TABLE #5

PROJECT UPBEACH

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0001

PAGE 2

DATE: 05/12/93

COMPARTMENT: 1

CELL: 1

	SD:1	COEFF.		PAI-CF PER ACRE			# OF PLOTS REQ. - INF. POP.		
		VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
	SITKA SP	45.7	32.3	23.1	34.2	45.2			
	WHEMLOCK	25.5	18.0	19.6	23.9	28.2			
	TOTAL	37.4	26.4	42.7	58.0	73.4	22	10	5

PERCENT OF AREA BY STOCKING CLASSES

LIVE TREES LESS THAN 5.0 DBH		***** ALL LIVE TREES *****			
TREES PER ACRE	% OF AREA	TREES PER ACRES	% OF AREA	BASAL AREA	% OF AREA
- 0		- 0			
1 - 100		1 - 100		0 - 20	
101 - 200	50.0	101 - 200		21 - 40	
201 - 300	50.0	201 - 300		41 - 60	
301 - 400		301 - 400		61 - 80	
401 - 500		401 - 500	100.0	81 - 100	
501 - 600		501 - 600		101 - 120	
601 - 700		601 - 700		121 - 140	
701 - 800		701 - 800		141 - 160	
801 - 900		801 - 900		161 - 180	
901 +		901 +		181 +	100.0

UPLIFTED BEACH

TABLE #7

PROJECT UPBEACH

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0001

PAGE 1

DATE: 05/12/93

COMPARTMENT: 1

CELL: 1

LIVE/ SEVER DEAD ITY	DBH CLASS	AVE AGE	TREES/ ACRE	BASAL AREA	AVE DBH	AVE HGT	GROSS CUFT	%VOL LOSS	NET CUFT	GROSS BDFT	%VOL LOSS	NET BDFT	TONS
098-SITKA SP APHIDS													
LIVE MINOR	21.0-22.9	119	15.2	40.0	22.0	120	1795		1795	8130	2	7928	
LIVE MINOR	23.0-24.9	119	12.6	40.0	24.1	133	1980		1980	9691	2	9497	
LIVE MINOR	25.0-29.9	116	9.6	40.0	27.6	140	2062		2062	10752	2	10505	
LIVE MINOR	35.0+	147	2.0	20.0	43.3	134	945		945	5169	5	4911	
LIVE SEVERE	11.0-12.9	91	28.2	20.0	11.4	108	846		846	3950		3950	
098-SITKA SP MISTLETO													
LIVE LIGHT	35.0+	147	2.0	20.0	43.3	134	945		945	5169	5	4911	
098-SITKA SP FORKS, C													
LIVE 1-10%	21.0-22.9	114	7.3	20.0	22.4	119	892		892	4027	5	3826	
LIVE 1-10%	23.0-24.9	112	6.2	20.0	24.3	116	857		857	3888	5	3693	
LIVE 1-10%	25.0-29.9	120	4.7	20.0	27.8	131	958		958	4939	5	4692	
LIVE 1-10%	35.0+	147	2.0	20.0	43.3	134	945		945	5169	5	4911	
SITKA SP LIVE TOTAL		108	67.6	160.0	19.4	121	7629		7629	37692	2	36791	
263-WHEMLOCK													
LIVE	0.1- 0.9		150.0	0.1	0.3	5							
DEAD	7.0- 8.9	46	52.0	20.0	8.4	45	416		416				
263-WHEMLOCK MISTLETO													
LIVE LIGHT	0.1- 0.9		50.0	0.0	0.4	7							
LIVE MODERATE	1.0- 2.9		50.0	0.4	1.2	11							
LIVE MODERATE	21.0-22.9	112	8.2	20.0	21.1	106	791		791	3517	10	3165	9
LIVE MODERATE	23.0-24.9	131	12.4	40.0	24.3	123	1815		1815	8556	7	7935	20
LIVE HEAVY	35.0+	217	2.1	20.0	41.3	130	920	50	460				
263-WHEMLOCK FLUTING													
LIVE MINOR	21.0-22.9	121	7.1	20.0	22.8	116	868		868	3866	5	3672	9
LIVE MINOR	30.0-34.9	175	3.3	20.0	33.3	124	893		893	4626	20	3701	11
LIVE SEVERE	11.0-12.9	63	26.8	20.0	11.7	106	830		830	3750	5	3563	8
LIVE SEVERE	15.0-16.9	140	13.1	20.0	16.7	124	960		960	4286		4286	9
LIVE SEVERE	17.0-18.9	99	10.6	20.0	18.6	120	922		922	4081		4081	9
LIVE SEVERE	21.0-22.9	114	15.7	40.0	21.6	115	1729		1729	7842	7	7274	19
LIVE SEVERE	23.0-24.9	131	12.4	40.0	24.3	123	1815		1815	8556	7	7935	20
263-WHEMLOCK STEM DEC													
LIVE 81-100%	35.0+	217	2.1	20.0	41.3	130	920	50	460				
263-WHEMLOCK BROKEN O													
DEAD 81-100%	25.0-29.9	144	4.9	20.0	27.3	27	226		226				
263-WHEMLOCK FORKS, C													
LIVE 1-10%	11.0-12.9	63	26.8	20.0	11.7	106	830		830	3750	5	3563	8

UPLIFTED BEACH

TABLE #7

PROJECT UPBEACH

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0001

PAGE 2

DATE: 05/12/93

COMPARTMENT:

CELL:

1

1

LIVE/ SEVER DEAD	SEVER ITY	DBH CLASS	AVE AGE	TREES/ ACRE	BASAL AREA	AVE DBH	AVE HGT	GROSS CUFT	%VOL LOSS	NET CUFT	GROSS BDFT	%VOL LOSS	NET BDFT	TONS
263-WHEMLOCK FORKS, C														
LIVE	1-10%	21.0-22.9	116	22.8	60.0	22.0	115	2597		2597	11707	7	10946	28
LIVE	1-10%	23.0-24.9	131	12.4	40.0	24.3	123	1815		1815	8556	7	7935	20
LIVE	31-40%	30.0-34.9	175	3.3	20.0	33.3	124	893		893	4626	20	3701	11
WHEMLOCK LIVE TOTAL			29	341.2	200.5	5.4	36	8938	5	8477	37008	7	34512	86
WHEMLOCK DEAD TOTAL			54	56.9	40.0	10.0	43	642		642				
ALL SPECIES														
LIVE			42	408.8	360.5	7.7	50	16567	3	16107	74700	5	71303	86
DEAD			54	56.9	40.0	10.0	43	642		642				

UPLIFTED MEADOW

TABLE #0

PROJECT NPSLOT4 UPLIFTED MEADOW PLOTS 4,5

FOREST: 03 CHATHAM AREA - TONGA
EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD
STAND NO: 0004

PAGE 1
DATE: 05/11/93
COMPARTMENT: 1
CELL: 4

6 STATE: 50 ALASKA	16 BASAL AREA FACTOR: 40	MANAGEMENT AREA:
7 VCU: 01	17 BREAK POINT DBH: 5	LAND SUITABILITY:
8 COMPARTMENT: 1	18 FIXED RADIUS PLOT: 1/100th	BOUNDARY METHOD:
9 CELL: 4	19 RADIAL GROWTH PERIOD: 10	SITE: SPECIES INDEX
10 ACRES: 1	20 NUMBER SAMPLE PLOTS: 2	STAND AGE:
----- FIRE DATA -----		
11 SLOPE:	SAMPLING PLANES	
12 ASPECT: 9 LEVEL OR	21 0-1 IN.	
13 TOPO SITE: 5 VALLEY B	22 1-3 IN.	
14 ELEVATION:	23 3 + IN.	
-----STAND CLASSIFICATION-----		
16 EXAM DATE: 4/93	24 PLANT ASSOCIATION:	
	25 STAND STRUCTURE/HISTORY: 11	
	26 PERCENT:	

TOP DIB SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC

SAMPLE PLOT DATA						COVER TYPE DATA										
PLOT	SUB	TOPO PLANT		SITE		TYPE / PERCENT / VEG. HEIGHT										
NO	GROUP	SLP	ASP	SITE	ASSOC	PREP	T	P	VH	T	P	VH	T	P	VH	
04	0		9	5												
05	0		9	5												

TR PLOT		CUT/LEAVE		CROWN DAMAGE/SEVERITY										-----COMPUTED VALUES-----SE												
NO	NO	CLS	GST	SPP	OPTA	OPTB	DBH	GROWTH	AGE	HGT	RAT	CLS	D	S	D	S	D	S	GIR	TREES/AC	BASAL	GCUFT	NCUFT	GBDFT	NBDFT	PC
001	04	2		098			0.2	28		5	9	1								100.0	0.0					
002	04	2		098			0.8	58		7	9	1								100.0	0.3					
003	04	2		263			0.3	51		6	9	1								100.0	0.0					
004	04	2		098			0.4	41		5	9	1								100.0	0.1					
005	04	2		098			0.6	45		6	9	1								100.0	0.2					

TABLE #1

CELL: 4

[illegible]

UPLIFTED MEADOW

TABLE #2

PROJECT NPSPL074

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0004

PAGE 1

DATE: 05/11/93

COMPARTMENT: 1

CELL: 4

SPP/DBH CLASS	TREES	DBH	AGE	HGT	BA	BFV	CFV	GRW	HTG/ BAG	PAICF	PAIBF	PCC	CCF	LCR	LPM
098-SITKA SP															
0.1- 0.9	200.0	0.5		6.4	0.3				0.9			2.9	16.5	90.0	
SPP TOTAL	200.0	0.5		6.4	0.3				0.9			2.9	16.5	90.0	
263-WHEMLOCK															
0.1- 0.9	50.0	0.3		6.0	0.0				1.0			0.6	1.4	90.0	
SPP TOTAL	50.0	0.3		6.0	0.0				1.0			0.6	1.4	90.0	
ALL SPECIES															
0.1- 0.9	250.0	0.5		6.3	0.4				0.9			3.5	17.9	90.0	
TOTAL	250.0	0.5		6.3	0.4				0.9			3.5	17.9	90.0	

UPLIFTED MEADOW

TABLE #5

PROJECT NPSLOT4

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0004

PAGE 1

DATE: 05/11/93

COMPARTMENT: 1

CELL: 4

	PLOTS	TREES	TREES PER PLOT	ESTIMATED TOTAL TREES	PERCENT SAMPLE TREES
TOTAL	2	5	2.5		
CRUISE	1	5	5.0	250	2.0
COUNT					
BLANKS	1				

	STAND SUMMARY									
	SAMPLE TREES	TREES /ACRE	AVE DBH	BASAL AREA	REL DEN	GROSS BF	NET BF	GROSS CUBIC	NET CUBIC	
SITKA SP	4	200.0	0.5	0.3	0					
WHEMLOCK	1	50.0	0.3	0.0	0					
TOTAL	5	250.0	0.5	0.4	0					

SD:1	COEFF.		SAMPLE TREES-BF			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP								
WHEMLOCK								
TOTAL								

SD:1	COEFF.		TREES PER ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	141.4	100.0		200.0	400.0			
WHEMLOCK	141.4	100.0		50.0	100.0			
TOTAL	141.4	100.0		250.0	500.0	1	1	1

SD:1	COEFF.		BASAL AREA/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP	141.4	100.0		0.3	0.7			
WHEMLOCK	141.4	100.0		0.0	0.0			
TOTAL	141.4	100.0		0.4	0.7	1	1	1

SD:1	COEFF.		NET BF/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP								
WHEMLOCK								
TOTAL								

SD:1	COEFF.		NET CUBIC FT/ACRE			# OF PLOTS REQ. - INF. POP.		
	VAR.%	S.E.%	LOW	AVE	HIGH	5%	10%	15%
SITKA SP								
WHEMLOCK								
TOTAL								

UPLIFTED MEADOW

TABLE #5

PROJECT NPSLOT4

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0004

PAGE 2

DATE: 05/11/93

COMPARTMENT: 1

CELL: 4

SD:1	COEFF.	PAI-CF	PER ACRE	# OF PLOTS REQ. - INF. POP.
	VAR.%	S.E.%	LOW AVE HIGH	5% 10% 15%
SITKA SP				
WHEMLOCK				
TOTAL				

PERCENT OF AREA BY STOCKING CLASSES

LIVE TREES LESS THAN 5.0 DBH		***** ALL LIVE TREES *****			
TREES PER ACRE	% OF AREA	TREES PER ACRES	% OF AREA	BASAL AREA	% OF AREA
- 0	50.0	- 0	50.0		50.0
1 - 100		1 - 100		0 - 20	50.0
101 - 200		101 - 200		21 - 40	
201 - 300		201 - 300		41 - 60	
301 - 400		301 - 400		61 - 80	
401 - 500	50.0	401 - 500	50.0	81 - 100	
501 - 600		501 - 600		101 - 120	
601 - 700		601 - 700		121 - 140	
701 - 800		701 - 800		141 - 160	
801 - 900		801 - 900		161 - 180	
901 +		901 +		181 +	

UPLIFTED MEADOW

TABLE #7

PROJECT NPSLOT4

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0004

PAGE 1

DATE: 05/11/93

COMPARTMENT: 1

CELL: 4

LIVE/	SEVER	DBH	AVE	TREES/	BASAL	AVE	AVE	GROSS	%VOL	NET	GROSS	%VOL	NET	
DEAD	ITY	CLASS	AGE	ACRE	AREA	DBH	HGT	CUFT	LOSS	CUFT	BDFT	LOSS	BDFT	TONS
098-SITKA SP														
LIVE		0.1- 0.9		200.0	0.3	0.5	6							
263-WHEMLOCK														
LIVE		0.1- 0.9		50.0	0.0	0.3	6							
ALL SPECIES														
LIVE				250.0	0.4	0.5	6							

FLOODPLAIN

STAND LIST
TABLE #0

PROJECT NPSPL0T8

FOREST: 03 CHATHAM AREA - TONGA
EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD
STAND NO: 0008

PAGE 1
DATE: 05/04/93
COMPARTMENT: 1
CELL: 8

6 STATE: 50 ALASKA	16 BASAL AREA FACTOR: 40	MANAGEMENT AREA:
7 VCT: 01	17 BREAK POINT DBH: 5	LAND SUITABILITY:
8 COMPARTMENT: 1	18 FIXED RADIUS PLOT: 1/100th	BOUNDARY METHOD:
9 CELL: 8	19 RADIAL GROWTH PERIOD: 10	SITE: SPECIES INDEX
10 ACRES: 1	20 NUMBER SAMPLE PLOTS: 1	STAND AGE:

---- FIRE DATA ----

11 SLOPE:	SAMPLING PLANES	
12 ASPECT: 9 LEVEL OR	21 0-1 IN.	
13 TOPO SITE: 5 VALLEY B	22 1-3 IN.	
14 ELEVATION:	23 3 + IN.	

-----STAND CLASSIFICATION-----

16 EXAM DATE: 3/93	24 PLANT ASSOCIATION:
	25 STAND STRUCTURE/HISTORY: 11
	26 PERCENT:

TOP DIB SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC SPP FC

SAMPLE PLOT DATA				COVER TYPE DATA			
PLOT	SUB	TOPO	PLANT	SITE	TYPE / PERCENT / VEG. HEIGHT		
NO	GROUP	SLP	ASP	SITE ASSOC	PREP	T P VH	T P VH
08		9	5				

TR PLOT	CUT/LEAVE				CROWN DAMAGE/SEVERITY										-----COMPUTED VALUES-----						SEV					
NO	NO	CLS	GST	SPP	OPTA	OPTB	DBH	GROWTH	AGE	HGT	RAT	CLS	D	S	D	S	D	S	GIR	TREES/AC	BASAL	GCUFT	NCUFT	GBDFT	NBDFT	PCT
001	08	2		351			8.8	12	33	88	2	3	98	1						94.7	40.0	8	8	20	19	
002	08	9		351			4.3				10								100.0	10.1						
003	08	2		351			8.5			83	2	3	98	1					101.5	40.0	6	6	20	19		
004	08	2		351			10.0	6	36	77	3	3	98	1					73.3	40.0	13	13	40	38		

FLOODPLAIN

STOCKING BY TREE CLASS, SPECIES AND DIAMETER CLASS TABLE #1

PROJECT NPSLOT8 FLOODPLAIN
FOREST: 03 CHATHAM AREA - TONGA
EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD
STAND NO: 0008

PAGE 1
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		----- LIVE -----			-----LIVE DAMAGED-----			--TOTAL CUT--		-TOTAL LEAVE-		-ALL		-----DEAD-----		
SPP/DBH	CLASS	DESIRE (TC 1)	ACCEPT (TC 2)	UNACCT (TC 3)	INSECT (	DISEASE TC 2 -5	OTHER)	CULL	OP A	OP B	OP A	OP B	LIVE (TC 1 - 5)	SALVABLE (TC6&8)	RECENT TC6&7	TOTAL (TC6-9)
351-R ALDER																
3.0-	4.9TA															100.0
	BA															10.1
7.0-	8.9TA		196.2				196.2						196.2			
	BA		80.0				80.0						80.0			
	SDI		155				155						155			
	RD		27				27						27			
9.0-	10.9TA		73.3				73.3						73.3			
	BA		40.0				40.0						40.0			
	SDI		73				73						73			
	RD		13				13						13			
SPP TOT	TA		269.6				269.6						269.6			100.0
	BA		120.0				120.0						120.0			10.1
	SDI		229				229						229			
	RD		40				40						40			
	MDBH		9				9						9			
	CFV		2320				2320						2320			
	RCF															
	BFV		6515				6515						6515			
ALL SPECIES																
3.0-	4.9TA															100.0
	BA															10.1
7.0-	8.9TA		196.2				196.2						196.2			
	BA		80.0				80.0						80.0			
	SDI		155				155						155			
	RD		27				27						27			
9.0-	10.9TA		73.3				73.3						73.3			
	BA		40.0				40.0						40.0			
	SDI		73				73						73			
	RD		13				13						13			
TOTAL	TA		269.6				269.6						269.6			100.0
	BA		120.0				120.0						120.0			10.1
	SDI		229				229						229			
	RD		40				40						40			
	MDBH		9				9						9			
	CFV		2320				2320						2320			
	RCF															
	BFV		6515				6515						6515			

FLOODPLAIN

STOCKING BY SPECIES AND DIAMETER CLASS

TABLE #2

PROJECT NPSLOT8
 FOREST: 03 CHATHAM AREA - TONGA
 EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD
 STAND NO: 0008

PAGE 1
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 COMPARTMENT: 1
 CELL: 8

SPP/DBH CLASS	TREES	DBH	AGE	HGT	BA	BFV	CFV	GRW	HTG/ BAG	PAICF	PAIBF	PCC	CCF	LCR	LPH
351-R ALDER															
7.0- 8.9	196.2	8.6	16.5	85.5	80.0	3728	1367	12.0	1.08	21.1	50.1		156.0	20.0	26.3
9.0-10.9	73.3	10.0	36.0	77.0	40.0	2787	953	6.0	0.48	11.5	33.7		70.0	30.0	26.3
SPP TOTAL	269.6	9.0	23.0	82.7	120.0	6515	2320	9.0	1.56	32.6	83.8		226.0	23.3	26.3
ALL SPECIES															
7.0- 8.9	196.2	8.6	16.5	85.5	80.0	3728	1367	12.0	1.08	21.1	50.1		156.0	20.0	26.3
9.0-10.9	73.3	10.0	36.0	77.0	40.0	2787	953	6.0	0.48	11.5	33.7		70.0	30.0	26.3
TOTAL	269.6	9.0	23.0	82.7	120.0	6515	2320	9.0	1.56	32.6	83.8		226.0	23.3	26.3

FLOODPLAIN

STATISTICAL SUMMARY - STAND

TABLE #5

PROJECT NPSLOT8
 FOREST: 03 CHATHAM AREA - TONGA
 EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD
 STAND NO: 0008

PAGE 1
 DATE: 05/04/93
 COMPARTMENT: 1
 CELL: 8

	PLOTS	TREES	TREES PER PLOT	ESTIMATED TOTAL TREES	PERCENT SAMPLE TREES
TOTAL	1	4	4.0		
CRUISE	1	4	4.0	370	1.1
COUNT					
BLANKS					

STAND SUMMARY									
	SAMPLE TREES	TREES /ACRE	AVE DBH	BASAL AREA	REL DEN	GROSS BF	NET BF	GROSS CUBIC	NET CUBIC
R ALDER	4	369.6	8.0	130.1	46	6858	6515	2320	2320
TOTAL	4	369.6	8.0	130.1	46	6858	6515	2320	2320

PERCENT OF AREA BY STOCKING CLASSES							
LIVE TREES LESS THAN 5.0 DBH				***** ALL LIVE TREES *****			
TREES PER ACRE	% OF AREA	TREES PER ACRES	% OF AREA	BASAL AREA	% OF AREA		
- 0		- 0					
1 - 100	100.0	1 - 100				0 - 20	
101 - 200		101 - 200				21 - 40	
201 - 300		201 - 300				41 - 60	
301 - 400		301 - 400			100.0	61 - 80	
401 - 500		401 - 500				81 - 100	
501 - 600		501 - 600				101 - 120	
601 - 700		601 - 700				121 - 140	100.0
701 - 800		701 - 800				141 - 160	
801 - 900		801 - 900				161 - 180	
901 +		901 +				181 +	

FLOODPLAIN

DAMAGE BY SPECIES AND DIAMETER CLASS TABLE #7

PROJECT NPSLOT8

FOREST: 03 CHATHAM AREA - TONGA

EXAM TYPE: 11 MEETS STANDARDS - QU

DISTRICT: 10 SITKA RD

STAND NO: 0008

PAGE 1

DATE: 05/04/93

COMPARTMENT: 1

CELL: 8

LIVE/ SEVER DEAD ITY	DBH CLASS	AVE AGE	TREES/ ACRE	BASAL AREA	AVE DBH	AVE HGT	GROSS CUFT	%VOL LOSS	NET CUFT	GROSS BDFT	%VOL LOSS	NET BDFT	TONS
351-R ALDER													
DEAD	3.0- 4.9		100.0	10.1	4.3	10							
351-R ALDER FORKS, C													
LIVE 1-10%	7.0- 8.9	16	196.2	80.0	8.6	85	1367		1367	3924	5	3728	
LIVE 1-10%	9.0-10.9	36	73.3	40.0	10.0	77	953		953	2934	5	2787	
R ALDER LIVE TOTAL		21	269.6	120.0	9.0	83	2320		2320	6858	5	6515	
R ALDER DEAD TOTAL			100.0	10.1	4.3	10							
ALL SPECIES													
LIVE		21	269.6	120.0	9.0	83	2320		2320	6858	5	6515	
DEAD			100.0	10.1	4.3	10							

APPENDIX 4. TREE CODES

FIELD 11 - STAND SLOPE PERCENT (2-digit code)

Enter the average slope of the major portion of the stand. The correct code is the actual slope percent. Slopes over 99% should be entered as 99.

<u>Code</u>	<u>Actual Slope</u>
<u>1 6</u>	16%
<u>9 9</u>	110%

FIELD 12 - STAND ASPECT (1-digit code)

Record the average direction toward which the stand slopes.

<u>Code</u>	<u>Average Stand Slope Direction</u>
<u>1</u>	North
<u>2</u>	Northeast
<u>3</u>	East
<u>4</u>	Southeast
<u>5</u>	South
<u>6</u>	Southwest
<u>7</u>	West
<u>8</u>	Northwest
<u>9</u>	Level or Rolling

FIELD 13 - STAND TOPO SITE - TOPOGRAPHIC SITE (1-digit code)

Topographic site is the slope position or physiographic location of a specific plot or the stand as a whole.

Scale of recognition is that of mountains and main valleys. Record the general topographic site of the stand location.

<u>Code</u>	<u>Description</u>
<u>1</u>	Ridge top
<u>2</u>	Concave slope
<u>3</u>	Even slope
<u>4</u>	Convex slope
<u>5</u>	Valley bottom

Plot topo site (Field 31) is a specific description of the individual plot location (as shown by the detailed code listing on page 28), and stand topo site is a more general description as illustrated by the less specific coding for this field.

Stand topographic site provides a measure of the general location of the stand with regard to water concentration or dispersion characteristics: of the major land feature (surface) within which the stand lies. Aerial photographs may be helpful in determining Stand Topo Site.

FIELD 14 - STAND ELEVATION (2-digit code)

Enter the elevation of the midpoint of the stand to the nearest 100 feet.

<u>Code</u>	<u>Actual Elevation</u>
-------------	-------------------------

<u> </u> <u>5</u>	500 feet
--------------------	----------

<u>3</u> <u>6</u>	3,570 feet
-------------------	------------

<u>3</u> <u>5</u>	3,540 feet
-------------------	------------

FIELD 15 - EXAM DATE (4-digit code)

Month: the first 2 digits of the 4-digit code, e.g., June = 0 6, October = 1 0.

Calendar Year: the last 2 digits of the 4-digit code, e.g., 1981 = 8 1.

For example, record June of 1981 as 0 6 8 1.

FIELD 16 - BAF (2-digit code)

Select an appropriate BAF for the exam. Only one BAF per stand is allowed because changing BAF's on each plot would bias the sample. As a rule of thumb, use a BAF which yields 4 to 8 trees per variable plot.

A default BAF may be set in the user's Edit Table File. Otherwise, no BAF is assumed.

FIELD 17 - BREAKPOINT DBH (2-digit code)

Record the breakpoint DBH to the nearest inch, i.e., 3.0" = 3, 5.0" = 5, etc. Trees of this size and larger are included on the variable radius (BAF) plot. If a breakpoint DBH is not recorded, the default value will be used. A default breakpoint DBH may be set in the user's edit table file. If the default is blank, the value of 5 inches is assumed.

FIELD 18 - FIXED RADIUS PLOT SIZE (3-digit code)

Record the size of the fixed plot; e.g., 1/300 acre plot, record 3 0 0. Only one fixed plot size per stand is allowed. If the fixed plot size is not recorded, a default plot size will be used. This default is set in the user's ETF.

FIELD 19 - RADIAL INCREMENT GROWTH PERIOD (2-digit code)

Enter the radial increment growth period for this stand (only one period per stand is allowed).

<u>Code</u>	<u>Description</u>
<u> </u> <u>5</u>	if radial increment period is 5 years
<u>1</u> <u>0</u>	" " " " " 10 "
<u>2</u> <u>0</u>	" " " " " 20 "
	etc., as appropriate

This field is for recording the time period for radial growth measurements. The standard time period for most exams is 10 years. If a time period is not recorded, the default value will be used. A default value may be set in the user's ETF. If the default is blank, the value of 10 years is assumed.

There may be some types of surveys where a shorter (or longer) radial increment growth period is desired. For example: surveys of thinned stands 5 years, 7 years, 15 years, etc., after thinning; budworm effect surveys, etc. This would allow the user to get a display of current increment (PAI) to evaluate the effects of recent influences or treatments.

FIELD 20 - NUMBER OF SAMPLE PLOTS IN THIS STAND (3-digit code)

This information is part of the editing procedure to ensure that all unique sample plot numbers have been included and entered into the computer. The field crew should determine this by checking the number of plots taken against the sample plots shown on the stand map, etc. The computer program counts the number of sample plots found in the stand. If the number is not the same as that entered on Card Type 1 in Field 20, an error message is provided on the EDIT error listing.

FIELD 25 - STAND STRUCTURE/HISTORY (2-digit code)

The first digit of the 2-digit code identifies stand structure. Stand Structure is a description of the distribution of tree size-classes within the stand.

<u>Code</u>	
<u>1</u> <u> </u>	Even-aged
<u>2</u> <u> </u>	Two-storied
<u>3</u> <u> </u>	Uneven-aged
<u>4</u> <u> </u>	Mosaic

<u>Code</u>	<u>Stand Structure Description</u>
1	Even-aged - A stand composed of trees having no, or relatively small, differences in age (can be as much as 30 percent in rotations more than 100 years of age). A single even canopy characterizes the stand. The greatest number of trees are in a height class represented by the average height of the stand; there are substantially fewer trees in height classes above and below this mean.

- 2 Two-storied - Two relatively even canopy levels can be recognized in the stand. Understory or overtopped trees are common. Neither canopy level is necessarily continuous or closed but both canopy levels tend to be uniformly distributed across the stand.
- 3 Uneven-aged - A stand composed of intermingling trees that differ markedly in age (at least 25 percent of rotation length). At least three size classes are commonly represented in the stand. Generally, the canopy is broken and uneven although multiple canopy levels may be distinguishable. The various size classes tend to be uniformly distributed throughout the stand.
- 4 Mosaic - At least two distinct size classes are represented and these are not uniformly distributed but are grouped in small repeating aggregations, or occur as stringers less than two chains wide, throughout the stand. Each size class aggregation is too small to be recognized and mapped as an individual stand. The aggregations may or may not be even-aged. The second-digit of the 2-digit code refers to stand history (logged, fire, etc.). If this second column is left blank, the program will default to 0 and no history will be recorded for the plot.

Field 26

<u>Code</u>	<u>Description</u>
<u>_ 1</u>	No evidence of management activity.
<u>_ 2</u>	Management activity has occurred on the site within the last 20 years.
<u>_ 3</u>	Management activity has occurred on the site more than 20 years ago.
<u>_ 4</u>	There is evidence of wildfire activity.

FIELD 27 - SAMPLE PLOT NO. (2-digit code)

Record a 2-digit code for every line of data, e.g., _ 1 for Sample Plot 1, 6 7 for Sample Plot 67, etc.

The maximum number of sample plots per plot card is 2 plots per side. The maximum number of data lines per sample is 50. If you have over 50 data lines per sample plot, you must group your trees in Field 53 to reduce the number of data lines to 50 per plot.

FIELDS 29, and 30 (Card Type 3) - SAMPLE PLOT SLOPE (2-digit code) AND SAMPLE PLOT ASPECT (1-digit code)

Codes are the same as those used for Field 11 (Stand Slope) and Field 12 (Stand Aspect). The only difference is that the overall or majority of the stand is reflected by the basic stand data fields and the sample plot data fields describe local conditions.

FIELD 31 - SAMPLE PLOT TOPO SITE-TOPOGRAPHIC SITE (1-digit code)

Sample plot topographic site provides a description of the sample plots with regard to water concentration or dispersion characteristics as indicated by the local physiographic variations within the stand. Scale of recognition is that of spur ridges and draws. Record the specific topo site of the sample plot. Sample Plot Topo Site must be recorded in this field.

<u>Code</u>	<u>Description</u>
<u>1</u>	Sharp ridgetop
<u>2</u>	Flat ridgetop
<u>3</u>	Sidehill - upper 1/3
<u>4</u>	Sidehill - middle 1/3
<u>5</u>	Sidehill - lower 1/3
<u>6</u>	Canyon bottom
<u>7</u>	Bench or terrace
<u>8</u>	Broad flat

FIELD 40 - TREE CLASS (1-digit code)

Tree Class codes are used to describe the physical condition of each sample tree in relation to its potential to satisfy silvicultural objectives.

<u>Code</u>	<u>Live Trees</u>
<u>0</u>	Off-Plot Site Tree
<u>1</u>	Desirable Tree
<u>2</u>	Acceptable Tree
<u>3</u>	Unacceptable Tree
<u>4</u>	Rough Tree
<u>5</u>	Rotten Tree
	<u>Dead Trees</u>
<u>6</u>	Salvable Recent Dead
<u>7</u>	Non-Salvable Recent Dead
<u>8</u>	Salvable Older Dead
<u>9</u>	Non-Salvable Older Dead

Tree class refers to the tree's ability to live, grow, and yield commercial products. Each sample tree is assigned a Tree Class code individually, without regard for the other trees in the stand. A silvicultural treatment prescription is not implied by the tree class coding; cut/leave designation (Field 43) is used for this purpose. Also, the assignment of tree class does not presume any particular stocking guidelines, cutting cycles, or rotation ages.

A tree is considered "live" if it has, at the time of sampling, any amount of green foliage and normal root contact with the soil. In the case of deciduous trees, green foliage may be absent at the time of sampling so the condition of the meristematic tissue (cambium or buds) should be substituted for the foliage criteria. "Dead" trees never have any green foliage or healthy meristematic tissue unless the tree has recently been uprooted or severed from its roots. The determination of Tree Class is, in part, based on whether the tree currently or potentially meets sawlog merchantability standards. These merchantability standards are for the field cruising portion of the stand exam and in order to fit the given tree class, a standard must be adopted. The output tables are built around these standards. (See Program User's Guide.)

Merchantability Standards in Live and Dead Trees

<u>Species</u>	<u>D.B.H.</u>	<u>Minimum Top D.O.B.</u>	<u>Percent Sound In Cubic Feet</u>
All Species	9.0 inches	6.0 inches	20

LIVE TREES

Non-cull

Code 0, Off Plot Site Tree

Off plot site trees are the only trees which use Code 0. (Refer to page 38).

Code 1, Desirable Tree

Desirable trees have all of the following characteristics:

- a. The tree is a commercial species.
- b. The tree has no damage or defect.
- c. The tree is relatively vigorous. Relative vigor can be a function of site potential, tree age and species as well as management objectives. Relative vigor can be measured using diameter or height increment, crown ratio, crown condition or bark characteristics.

Code 2, Acceptable Trees

Acceptable trees are trees of commercial species which are now or will be more than 20 percent sound (total cubic foot volume, including missing parts) and have one or more of the following undesirable characteristics:

- a. The tree has one or more minor damage or defect ratings which will not affect the trees ability to survive at least 10 years.
- b. The tree is relatively non-vigorous.

Code 3, Unacceptable Trees

Unacceptable trees are trees of commercial species of any size (including seedlings) which are now, or are expected to contain, more than 20 percent sound volume (total cubic foot volume, including missing parts), and have one or more of the following undesirable characteristics:

- a. The tree has one or more severe damage or defect ratings.
- b. The tree is expected to die within 10 years.
- c. The tree is not accumulating net volume, nor is it capable of accumulating net volume if released from competition; it is deteriorating more rapidly than it is growing.

Cull - Cull trees are trees of (1) non-commercial species or (2) commercial species of any size which are not now and/or will never be expected to contain more than 20 percent sound cubic foot volume because of damage or defect.

Code 4, Rough Trees

The rough tree class includes only those cull trees which are less than or equal to 50 percent cull because of rot or decay (existing cubic foot volume, excluding missing parts), including seedlings.

Field 41

Code 5, Rotten Trees

Rotten trees are cull trees of commercial species which are more than 50 percent cull specifically because of rot or decay (existing cubic foot volume, excluding missing parts).

DEAD TREES

Guides for determining time since death are found in Appendix J.

Code 6, Salvable Recent Dead

Salvable recent dead trees are trees of commercial species, at least 20 percent sound (total cubic foot volume, including missing parts), ≥ 9.0 " DBH, which have died within the last 5 years.

Code 7, Non-Salvable Recent Dead

Non-salvable recent dead trees are unmerchantable trees of any size which have died within the last 5 years and are (1) non-commercial species or (2) commercial species which are less than 20 percent sound (total cubic foot volume, including missing parts).

Code 8, Salvable Older Dead

Salvable older dead trees are trees of commercial species, at least 20 percent sound (total cubic foot volume, including missing parts), ≥ 9.0 " DBH, which have died more than 5 years ago.

Code 9, Non-Salvable Older Dead

Non-salvable older dead trees are unmerchantable trees of any size which have died more than 5 years ago and are (1) non-commercial species or (2) commercial species which are less than 20 percent sound (total cubic foot volume, including missing parts).

Trees < 9.0 DBH, which are commercial species, may be any tree class except 6 (Salvable Recent Dead) or 8 (Salvable Older Dead).

FIELD 41 - GST/OTHER (1-digit code)

This field is used to record whether a tree is a Growth Sample Tree (GST) and/or site tree, or a down tree.

Code

- | | |
|----------|---|
| <u>1</u> | GST with all data measured (age, height, growth). |
| <u>2</u> | GST with height and growth measured, but age has not been measured. |
| <u>3</u> | Site tree on sample plot. |
| <u>4</u> | Site tree off sample plot. |
| <u>5</u> | Down tree. |

Leave Field 41 blank for all trees which are not GST's, site trees or down trees.

GROWTH SAMPLE TREES

The purpose of Growth Sample Tree (GST) information is to develop a good overall idea of how the stand is currently growing (existing stand conditions). GST data is used to build regression equations for projecting missing height, growth and age measurements. The key to good GST data is to obtain unbiased, spatially distributed GST information by species and size class, using selection criteria which avoid oversampling or undersampling.

It is not the intent of the Growth Sample Tree procedure to sample only the "best growing" trees. Using the systematic GST selection criteria provides a representative sample of how any one tree is growing. The combination of GST data collected within a stand then provides an unbiased, representative sample of how the entire stand is growing.

Once one tree is designated as a Growth Sample Tree on a plot, all other trees on the plot must conform to the GST sampling rules.

GST Definitions and Selection Criteria

A growth sample tree is the first live, standing tree (including seedlings) of each commercial species encountered on the fixed or variable radius sample plot (moving clockwise from 0 degree azimuth to 360 degrees azimuth) in each of the DBH groups on the following table. If using the GST procedure: all trees equal to or greater than the breakpoint DBH (Field 17), should be tallied on the variable radius plot, even though they may fall within the fixed radius plot. This procedure must be used on the entire plot.

Growth Data Fields

GST data is required in these fields as noted)

<u>DBH Group</u> (Inches & 10ths)	<u>Field 45</u> (Radial Growth/5-Year Height Growth)	<u>Field 46</u> (Age)	<u>Field 47</u> (Height)
0.1-0.4	5-Year Height Growth <u>1/</u>	Yes	Yes
0.5-2.9	5-Year Height Growth <u>1/</u>	Yes	Yes
3.0-4.9	Radial Growth	Yes <u>2/</u>	Yes
5.0-8.9	Radial Growth	Yes <u>2/</u>	Yes
9.0-14.9	Radial Growth	Yes <u>2/</u>	Yes
15.0-29.9	Radial Growth	Yes <u>2/</u>	Yes
First $\geq$ 30.0 <u>3/</u>	Radial Growth	Yes <u>2/</u>	Yes
Largest $\geq$ 30.0 <u>3/</u>	Radial Growth	Yes <u>2/</u>	Yes

1/ When trees have completed at least 5 years height growth, record height growth measurements to the nearest 1/10 foot. When trees have not completed at least 5 years height growth, no entry is required in this field.

2/ If rot or voids prevent an accurate ring count for age determination, make no entry in Field 46 (Total Age), note reason preventing age measurement in "Comments" section on the reverse side of the Stand Exam Stand Data form, and enter a Code 2 in Field 41 (GST/Other). Note damage in Fields 50-52.

3/ If the first tree of each species over 30.0 inches DBH is also the largest, record the first tree only. If, however, the first tree is 30.4 inches DBH, and the largest tree of the same species is 32.2 inches DBH, both trees should be tallied as Growth Sample Trees.

SITE TREES

Coding of site trees is required if the user desires site productivity information be displayed as output on Table 6 of the optional report tables. This is the only use of site index in the R-6 TSE Program.

Site Tree Definition and Selection Criteria

A site tree is any Tree Class 1 (Desirable Tree) or Tree Class 2 (Acceptable Tree) tree upon which measurements are taken to establish the relationship between tree age and tree height. This serves as an index to potential productivity of the site where the tree is located through use of site index curves. Site index curves display the height-age relationships for trees of a given species growing on sites of different quality.

Trees of each predominant species occurring on the plot should be selected as site trees (if contained on the Site Index Species list below). Site trees should be dominants or codominants which have never suffered top damage and are not intolerant species with severe overtopping. All dominant site trees would be a better sample than all codominants, unless dominants are residual old growth.

In a two-storied stand, the requirement that they be dominants or codominants will generally mean that site trees come from the overstory. If the overstory is very light or if the stand is patchy so that trees in a younger age class can still be dominant, it is possible that site trees could come from a younger age class. Site index is an even-aged stand concept that is often applied to uneven-aged stands; but when this is done, it is best to proceed as if it were an even-aged situation.

Site Index Tree Selection Preference

Species selected for site trees should be chosen from the following list:

<u>CODE</u>	<u>SITE INDEX SPECIES</u>
202	Douglas-fir
263,264	Western and Mountain hemlock (uses Western hemlock table)
098	Sitka spruce (uses Englemann spruce table)
122	Ponderosa pine
108	Lodgepole pine
015,017	White/Grand fir
021	Shasta red fir (uses Noble fir table)
119	Western white pine
351	Red alder
073	Western larch
093	Engelmann spruce
022	Noble fir
081	Incense Cedar
011	Pacific Silver fir (uses Noble fir table)

Do not select any other species for site index trees because reliable site index curves are not available at this time. The site index curve used is the same as the site index species listed unless otherwise indicated.

Code 3 - Site Tree on the Sample Plot

If a GST meets the Site Tree criteria, it is coded a "3" instead of a "1". Record DBH (Field 44), Radial Growth (Field 45), Age (Field 46), and Height (Field 47). Radial growth is recorded for this site tree only because it is also a GST.

A tree which is not needed to meet the definition of a GST may meet the site tree criteria and be selected as a site tree. This tree should be recorded as a site tree, using Code "3" in Field 41. Record Age (Field 46) and Height (Field 47), but do not record radial growth and this tree will not be used as a GST. In this case, use as a GST could bias the stand growth projections due to the strict site tree selection criteria.

Code 4 - Site Tree Off the Sample Plot (Non-tally tree)

Record off-plot site trees using the nearest sample plot number with a zero (0) in Tree Class (Field 40) and 4 in Field 41 to indicate they are off the plot. These off-plot site trees are used for site estimates only and are not included in the stand's volume tables or stocking statistics. Record Species (Field 42), DBH (Field 44), Age (Field 46), and Height (Field 47) for these site trees.

FIELD 42 - TREE SPECIES (3-digit code)

See Appendix L for field key to conifer identification. Record 3 numeric characters for tree species, as appropriate. The numbers are taken from FSH 4809.11, Forest Survey Handbook.

Alaska cedar (c. nootkatensis)	0 4 2
Sitka spruce (Picea sitchensis)	0 9 8
Western hemlock (Tsuga heterophylla)	2 6 3
Red alder (Alnus rubra)	3 5 1

FIELD 44 - DBH (3-digit code)

For stand exams in Region 6, DBH means "diameter at breast height (outside bark)" and "breast height" means 4.5 feet above ground on the uphill side of the tree. Trees less than 4.5' are considered seedlings, and should be coded _ _ 1. DBH is required for all trees, including site trees (DBH is not used in the site calculations, but is used to check age and height values in the Edit Table File. For this reason DBH may be estimated for site trees). Trees may be recorded as individuals or as groups (trees of any DBH, Field 53), but in any case three positions are available for recording diameter. Leading zeros are not necessary. Some examples of how to record DBH for individual trees:

<u>Code</u>	<u>If DBH is:</u>
_ _ 1	less than 4.5' in height
_ 1 0	1.0"
_ 9 1	9.1"
2 0 4	20.4"
8 4 0	84"
= 1 6	116" (DBH greater than 99.9")

Recording trees to the nearest tenth inch is optional. Trees greater than 99.9 inches DBH are coded to the nearest whole inch with a negative (-) symbol in the left-most position of this field instead of a 1.

Trees that are not GST's or site trees may be grouped and recorded by one species and one tree class, with an average DBH and average tree height for the group (see Field 53).

Sometimes it is impractical or impossible to make a realistic diameter reading at breast height because of forks, branches, swellings, bumps, depressions, or other bole characteristics that would yield a diameter which would not provide a good estimate for the tree. In such circumstances, the diameter should be measured where the exam person ascertains the best estimate can be obtained. This should be as close as possible to the standard 4.5 feet height; but at a height no higher than 6 feet above ground, and no lower than 3 feet above ground, for practical reasons. Trees that are forked below DBH are tallied as two separate trees and a diameter is recorded for each fork.

FIELD 45 - RADIAL GROWTH/5-YEAR HEIGHT GROWTH (3-digit code)

Field 45 must be recorded for all Growth Sample Trees (GST's).

RADIAL GROWTH

If a GST's DBH = 3.0 inches or larger, enter radial growth to the nearest 1/20th inch. Radial growth is usually 10-year radial growth; and, if any other, it must be so indicated on the Stand Exam Stand Data form (Card Type 1,2), Radial Increment Growth Period (Field 19). The same radial growth period must be used for all trees in the stand. When no radial growth increment period is recorded in Field 19, a 10-year growth period is assumed and a default value of 1 0 is used, unless an override value is established by the Forest in the ETF.

For example, to record a 10-year radial growth for GST's with 3.0" DBH and larger, record 10-year radial growth to the nearest 1/20th inch:

Code

 6 = 6/20ths
 2 1 = 21/20th, etc.

Increment Boring for Radial Growth and Age

To obtain radial growth, make an increment boring at breast height facing plot center; see Appendix H (one increment boring is used to obtain both radial growth and age). Bore immediately below the point of DBH measurement and at right angle to the bole. Attempt to hit the center of the tree. Extract the core and count 10 annual rings from the outside (bark edge) of the boring core, toward the center of the tree. Disregard the bark and any soft pulpy tissues (phloem). Begin the count with the first "latewood" ring, i.e., the dark summer and fall rings. If for example, a 10-year growth period is used, measure the length of the 10 rings with a scale in 20ths of an inch and record this length in Field 45. Save the core for the age count.

5-YEAR HEIGHT GROWTH

If a GST's DBH = 2.9 inches or smaller, enter 5-year height growth in feet and tenths of feet. Measure the last 5-year's height growth not including current leader growth (unless current height growth is complete).

Recording 5-Year Growth

For Trees which have completed at least 5 years of growth: Record the height growth measurement to the nearest 1/10 foot. For example:

Code

_ 8 6 = 5-year height growth of 8.6 feet
1 2 6 = 5-year height growth of 12.6 feet

For Trees which have not completed at least 5 years of growth: No height growth measurement is necessary since the total height which should be recorded in Field 47 is sufficient.

At least fifteen trees of the same species per stand must have growth recorded so that trees which are not measured can be supplied an estimated growth based on regression analysis prior to running the report tables. If there is insufficient data to produce a regression analysis, the default regression equation is used to fill in non-measured growth. A variation in measured growths per species will help produce a more reasonable regression equation.

FIELD 46 - BREAST HEIGHT AGE (3-digit code)

Required Age Measurements

Breast height age must be recorded for all:

- Growth Sample Trees (GSTs) (See Field 41 for definition of GST's).
- Site Trees (See Field 41 for definition of Site Trees).

If trees that are not measured are to be supplied an estimated age, at least six trees of the same species per stand must have age recorded so that trees which are not measured can be supplied an estimated age based on regression analysis prior to running the report tables. Just six trees may not result in the desired output. A variation in measured ages per species will help produce a more reasonable regression equation. If there is insufficient data to produce a regression analysis, the default regression equation is used to fill in non-measured ages.

For trees 3.0 inches or greater, record breast height age as the actual age measured at 4.5 feet (DBH). Do not make an adjustment for the difference in age between ground height and DBH.

If the tree is smaller than 3.0" DBH, do not use the increment borer. Obtain total age by branch whorl count or by destructive sampling. Sample trees should not be destroyed if plots will be remeasured or inspected.

Age by Increment Boring (for trees 3.0 inches DBH and larger)

Breast height age is that age that is measured at DBH:

- a. Count the number of annual rings obtained by the increment boring at breast height.
- b. If the increment boring missed the center of the tree, estimate years to center and add this to the ring count in step (a) above.
- c. Total age equals (a.) + (b.)

If an accurate ring count cannot be made due to rot or voids, etc., then age should not be recorded. Record a 2 in Field 41 (GST/Other) for the tree. By definition, this cannot be a site tree.

FIELD 47 - TREE HEIGHT - TOTAL/TRUNCATED (3-digit code)

Record tree heights to the nearest whole foot. For example:

<u>Code</u>	<u>Actual Height</u>
- - -	less than 0.5 feet
- - 7	6.5 - 7.4 feet
1 5 1	151 feet

Any seedlings that are growing on decayed logs, moss, stumps, etc., and not in proper contact with mineral soil, and those seedlings less than 6" tall, should not be tallied.

Record tree heights according the following explanation and instructions:

a. Required Tree Height

If trees that are not measured are to be supplied an estimated height, at least six trees of the same species per stand must have height recorded so that trees which are not measured can be supplied an estimated height based on regression analysis prior to running the report tables. Just six trees may not result in the desired output. A variation in measured heights per species is essential for the program to produce a reasonable regression equation. If there is insufficient data to produce a regression analysis, the default regression equation is used to fill in non-measured heights.

Tree Height MUST be measured and recorded for these sample plot trees:

- Site trees.
- Growth Sample Trees (GST's). If the user elects to use the GST procedure on a given sample plot, the rules must be followed throughout the entire sample plot.

- Trees with damaged tops, e.g., Damage Code 96 (broken/missing top), or Damage Codes 10-19 (Defoliators) with top kill Severity 2, 3, 5, 6, 8 or 9. For live trees with Damage Code 97 (Dead Top), height measurement is also required. These heights must be measured to accurately predict volumes for trees with these damage codes. None of these trees will be used in the regression calculations for the stand.

- Old growth trees, if a volume estimate based on Girard top is specified. The computer will not estimate for Girard tops if height measurements are missing.

b. Optional Tree Height (Does not apply to Old Growth)

- All trees less than 5.0" DBH, if the prescriber is interested in a reasonable estimate of average height for these trees. If trees less than 3.0" DBH are grouped for recording, record the average height of the trees represented in the group.

It is not necessary to measure and record tree height for sample trees which do not meet the above conditions. If tree height is left blank, the R6-Edit program will calculate tree heights by a species-specific regression against diameter from the recorded diameters and heights. However, tree heights may be field recorded for all trees if this can be done efficiently and accurately. Any estimated tree heights must meet the same accuracy standards specified for measured heights.

c. Total Tree Height equals:

- Height to the main stem top for all trees which do not have a broken/missing top (Damage Code 96) or a forked tree (Damage Code 98).

- Height of the tallest fork or of each measured fork for trees with Damage Code 98.

d. Truncated Tree Height equals:

- Height to the main stem break for all trees which have a broken/missing top (Damage Code 96) to nearest foot.

e. Girard Tree Height equals:

- Height of the tree at 40% of DBH (inside bark).

Girard height is generally used when measuring old growth. The total tree height method for volume calculation assumes relatively even taper, and old growth taper typically narrows somewhat abruptly in the upper portion of the bole.

If a Girard tree height is measured, you MUST enter an X X (Girard top) in Field 53 to flag the Girard height in order to calculate volume with an alternative procedure.

FIELD 48 - CROWN RATIO (1-digit code)

Crown ratio, or percent live crown, is related to vigor and growth of a tree and is recorded only for live trees. Crown ratio is required if an estimate of radial growth is desired for a measured tree.

Crown ratio is expressed as a percent of total tree height to the nearest 10 percent and is recorded as a 1-digit code. It is that portion of the tree bole that supports green healthy-appearing foliage. A full, even crown in the upper portion of the tree is simply estimated. For trees of uneven crown growth and/or uneven crown distribution, visually transfer the lower branches on the longer side to the short side to achieve a balanced crown. Note the height to the lowest balanced live crown and estimate the ratio of live crown length/total tree height. Record this ratio as follows:

Field 49

<u>Code</u>	<u>Description</u>
	<u>Percent Live Crown</u> <u>of Total Tree Length</u>
<u>1</u>	1-10
<u>2</u>	11-20
<u>3</u>	21-30
<u>4</u>	31-40
<u>5</u>	41-50
<u>6</u>	51-60
<u>7</u>	61-70
<u>8</u>	71-80
<u>9</u>	81-100

If the tree is dead, leave Field 48 blank.

FIELD 49 - CROWN CLASS/BRUSH COVER CROWN CLASS (1-digit code)

Definition of Tree Crown Classes/Brush Cover Crown Classes:

Crown class is a description of the relative position of the tree crown with respect to competing vegetation that surrounds the tree. Report table, Output Option 4 (Crown Class/Brush Cover Crown Class) requires coding in this field.

Record Field 49 for live trees only by the following 1-digit codes:

<u>Code</u>	<u>Tree Crown Class</u>
<u>1</u>	open-grown or isolated
<u>2</u>	dominant
<u>3</u>	codominant
<u>4</u>	intermediate
<u>5</u>	overtopped or suppressed

Brush Cover Crown Class

- 6 leader above brush
- 7 leader within brush
- 8 leader overtopped by brush

Code 1 - Open-grown or Isolated: Trees which are receiving full sunlight from above and from all sides. In even-aged stands, these trees have their crown well above the general canopy.

Code 2 - Dominant: Trees which are receiving full sunlight from above and partly from the side. In even-aged stands, dominant trees rise somewhat above the general canopy.

Code 3 - Codominant: Trees which are receiving full sunlight from above but comparatively little from the sides. In even-aged stands, codominants form the general canopy level.

Code 4 - Intermediate: These crowns occupy a definitely subordinate position and are subject to strong lateral competition from crowns of dominants and codominants, although they may receive some direct light from above through small holes in the canopy.

Code 5 - Overtopped or Suppressed: These crowns receive no direct sunlight from above or from the sides and are entirely below the general canopy level in even-aged stands.

Code 6 - Leader Above Brush: The terminal leader of these trees is above the surrounding brush while the middle or lower crown may be within the brush canopy.

Code 7 - Leader Within Brush: The terminal leader and upper crown of these trees is within the brush canopy.

Code 8 - Leader Overtopped by Brush: The crowns of these trees are completely overtopped by the surrounding brush.

Application of Crown Classes

Although crown classes were originally conceived to classify trees in even-aged stands, they can be a useful descriptor of competitive status of trees in all structural types of stands. Crown class for each tree is judged in the context of its immediate environment, i.e. those trees or shrubs which are competing for sunlight with the subject tree.

In some multi-storied stands, application of crown classes is complicated by having to determine which "canopy layer" is competing for light with trees on a tree-by-tree basis. A useful concept that the user may wish to consider in these situations is to mentally "stratify" the stand into layers of crown competition. After the layers are formed, then the application of crown classes can be easier. For example, in a multi-storied ponderosa pine stand, the overstory trees primarily compete with each other for sunlight. Pole sized trees can primarily compete with each other for light, but they may have some interference from the overstory. Saplings compete with each other, but are affected by the overstory and poles. Seedlings have all overstory components providing competition, but also may face more severe light competition from other seedlings, shrubs, forbs, etc. It is possible to have trees in all crown classes in each layer by using this system. Remember: You are rating the trees against those which, in the context of its immediate environment, are competing with it for sunlight.

Brush Cover Crown Class Codes 6, 7, & 8 are only applicable to potential crop trees which have brush competition. These codes are used in seedling and sapling-sized or younger stands and where overstory tree competition is absent. In other words, brush cover crown class codes are used as modifiers for opengrown or dominant trees. Competition from adjacent trees is deemed more important than competition from shrubs if they both occur.

FIELDS 50, 51, 52 - DAMAGE/SEVERITY (3-digit code in each field)

Three fields are provided to facilitate recording up to three damage conditions per tree. The first two digits of each field are the damage and the third digit of each field is the severity. For example:

<u>Code</u>	<u>Description</u>
--	Blank = no damage present
<u>1 1 5</u>	Damage Code 13 = Western spruce and Modoc budworms, Severity Code 5 = moderate defoliation with 1-10% topkill
<u>3 0 2</u>	Damage Code 30 = Dwarf mistletoe, Severity Code 2 = more than 1/2 of the branches infected on 1/3rd of the crown; or, less than 1/2 of the branches infected on 2/3rd's of the crown.

The damage/cause of death and severity codes are used to describe the status of damaging agents affecting live trees, the causes of death for recent dead trees (those which died in the last 5 years), the kind and amount of defect in sawlog volume yield, and the amount of rot in cull trees. The defect in sawlog volume yield is described by the Stem Decay Codes, Stem-branch Canker Codes, and the Physical Defect Codes along with their respective severity codes. The Stem Decay codes and Stem-branch Canker Codes with their severity ratings are also used to describe the amount of rot in cull trees. Although cull trees have no sawlog volume yields, they frequently will yield some sound wood suitable for pulp or firewood. By estimating the amount of rot in cull trees and the amount of sound defect in merchantable sawlog trees, the total quantity of sound wood which does not meet sawlog merchantability standards can be accumulated for the stand. The severity of damage caused by stem decays (and stem-branch cankers) is rated for all infected trees including salvable dead and cull trees. These severity codes are used to describe the amount of sawlog volume loss, in terms of cubic feet, for all live non-cull and salvable dead trees of merchantable size. For live cull trees, non-salvable dead, and trees smaller than merchantable size the severity codes are used to record the amount of rotten wood in order to indirectly estimate the sound wood volume yield suitable for pulp or firewood. The percent rotten estimate for these "unmerchantable" trees should be made in terms of cubic foot measure. Because the percent of tree volume in log sections is similar for cubic foot and board foot measures, the procedure for estimating percent rotten is the same for cull and non-cull trees of merchantable size. The extent of decay in one-log or smaller trees is estimated directly in cubic foot terms.

If no severity code is entered for a damage code, the program assumes a minor severity and prints a warning in the output tables.

The damage/cause of death codes are described with instructions for each category. Codes are provided for general categories of damaging agents as well as for specific agents. The general codes should be used if there is any question as to the identity of the specific damaging agent. The following table summarizes the application of the damage/cause of death and severity codes for specific purposes by Tree Class (Field 40).

TABLE OF DAMAGE/CAUSE OF DEATH AND SEVERITY CODES

	:Applicable	:Applicable	:
	:Damage/Cause	:Severity	:
Tree Class	:of Death Codes	:Codes	:Purpose
	:	:	:
Live non-	:	:	: Describes the status
cull trees	:	:	: of damaging agents,
(Code 1)	: None	: None	: and sawlog volume
(Code 2)	: All	: Minor Only	: defect.
(Code 3)	: All	: All	:
	:	:	:
	:	:	:
Rough and	: All	: All	: Describes the status
rotten live	:	:	: of damaging agents
cull trees	:	:	: and sound vs. rotten
(Codes 4-5)	:	:	: wood yield.
	:	:	:
	:	:	:
Salvable	: All	:Only those for	:
recent dead	:	:stem-branch	: Describes the cause
(Code 6)	:	:cankers (Codes	: of death and sawlog
	:	:40 -45), stem	: volume defect.
	:	:decays (Codes	:
	:	:46-52) and	:
	:	:physical defects:	:
	:	:(Codes 95-99)	:
	:	:	:
Non-salvable:	: All	:Only those for	: Describes the causes
recent dead	:	:stem decays	: of death and sound
(Code 7)	:	:(Codes 46-52).	: vs. rotten wood
	:	:	: yield.
	:	:	:
	:	:	:
Salvable	:Only stem-branch	:	:
older dead	:cankers (Codes	:Only those for	: Describes sawlog
(Code 8)	:40-45), stem	:stem-branch	: volume defect (time
	:decays (Codes 46-	:cankers, stem	: since death is too
	:52) and physical	:decays, and	: long to determine
	:defects (Codes	:physical defects:	: cause of death).
	:95-99)	:	:
	:	:	:
Non-salvable:	:Only stem decays	:Only those for	: Describes sound vs.
older dead	:(Codes 46-52)	:stem decays.	: rotten wood yield
(Code 9)	:and broken/	:	: (time since death
	:missing top	:	: is too long to
	:(Code 96).	:	: determine cause of
	:	:	: death).
	:	:	:

Other Insects

<u>Code</u>	<u>Damage/Cause of Death</u>	<u>Code</u>	<u>Severity</u> (for live trees only)
<u>2 0</u> _	Other insects	_ _ <u>1</u>	minor
<u>2 1</u> _	Aphids	_ _ <u>2</u>	severe

Instructions: Use Damage Code 20 when insect damage is apparent but not caused by bark beetles or defoliators.

The severity of damage caused by other insects is subjectively determined to be either minor or severe depending on the tree's ability to survive and yield sawlog products. Minor damage (Severity Code 1) applies to trees which will have reduced growth rates or some defect associated with product yield. Severe damage (Severity Code 2) applies to trees which are not expected to yield merchantable sawlog products or which will die within 10 years. For Other Insects, a Severity Code 2 places the tree in an "unacceptable" Tree Class.

Dwarf Mistletoes

<u>Code</u>	<u>Damage/Cause of Death</u>	<u>Severity code</u> (for live trees only)
<u>3 0</u> _	Dwarf mistletoe	_ _ <u>1</u> or _ _ <u>2</u> light
		_ _ <u>3</u> or _ _ <u>4</u> moderate
		_ _ <u>5</u> or _ _ <u>6</u> severe
31	Hemlock Fluting	1 Minor
		2 Severe

Instructions: Use Damage Code 30 whenever dwarf mistletoe is found on a tree.

The 6-class Dwarf Mistletoe Rating System by Hawksworth (General Technical Report RM-48) is used to code severity of infection. The live crown is divided into thirds and each third is assigned a numerical score of: "0" for no infection, "1" for 1/2 or less of the branches infected, or "2" for more than 1/2 of the branches infected. The scores for each third of the crown are totalled to give a severity rating of 1 through 6. A bole infection without branch infections is assigned a numerical score of "1".

The severity of damage caused by fluting in hemlock is subjectively determined to be either minor or severe depending on the tree's ability to yield sawlog products. Minor damage (severity code 1) applies to trees which will have some defect associated with product yield. Severe damage (severity code 2) applies to trees which are not expected to yield merchantable sawlog products.

Stem Decays

		<u>Severity</u>	
		(for all trees > = 5.0 "dbh)	
<u>Code</u>	<u>Damage/Cause of Death</u>	<u>Code</u>	<u>Percent Volume Loss</u>
			(Cubic feet)
<u>4 5</u> _	Stem decays (unknown or other)	_ _ <u>1</u> -	1-10%
		_ _ <u>2</u> -	11-20%
<u>46</u> _	Red ring rot	_ _ <u>3</u> -	21-30%
	<u>Phellinus</u> <u>pini</u>	_ _ <u>4</u> -	31-40%
<u>47</u> _	Indian Paint fungus	_ _ <u>5</u> -	41-50%
	<u>Echinodontium tinctorium</u>	_ _ <u>6</u> -	51-60%
<u>48</u> _	Velvet top fungus	_ _ <u>7</u> -	61-70%
	<u>Phaeolus schweinitzii</u>	_ _ <u>8</u> -	71-80%
<u>49</u>	Red belt fungus	_ _ <u>9</u> -	81-100%
	<u>Fomitopsis pinicola</u>		

Instructions: If a stem decay is observed but the species of disease cannot be determined or is not listed above, use Damage Code 45. Otherwise, identify the principle fungus by using the appropriate code. Velvet top fungus (Damage Code 48) is also listed under Root Diseases. Velvet top fungus is coded as a stem decay when it occurs above stump height in the bole and causes merchantable volume loss. It may also be coded as a Root Disease.

Other Damage

<u>Code</u>	<u>Damage/Cause of Death</u>	<u>Code</u>	<u>Severity</u>
<u>9 0</u> _	Other damage (unspecified)	_ _ <u>1</u>	minor
<u>9 1</u> _	Logging damage (basal wounds or top breakage)	_ _ <u>2</u>	severe
<u>9 2</u> _	Fire		
<u>9 2</u> _	Improper planting technique		
<u>9 4</u> _	Air pollution		

Instructions: Use Damage Code 90 for any unspecified damage condition which cannot be classified as a general type of insect, disease, animal or weather problem. For instance, if unhealthy foliage is the symptom and it is not known whether foliar pathogens, weather, or air pollution is the cause, Damage Code 90 may be used to record the condition. If the unspecified damage is prevalent, its cause should be identified before stand diagnosis for treatment need. Other damage conditions do not account for any volume loss.

The severity of damage caused by these "other agents" is subjectively rated as either minor or severe depending on the tree's ability to survive and yield merchantable sawlog products. Minor damage (severity code 1) applies to trees which will have reduced growth rates or some defect associated with product yields. severe damage (severity code 2) applies to trees which are not expected to yield any merchantable products or which will likely die within 10 years.

Physical Defects

		<u>Severity</u>	
		(for live and salvable dead trees)	
<u>Code</u>	<u>Damage/Cause of Death</u>	<u>Code</u>	<u>Percent Volume Loss</u>
		(Cubic feet)	
9 5	Unspecified defect	-- 1	1-10%
9 6	Broken/missing top	-- 2	11-20%
9 7	Dead top	-- 3	21-30%
9 8	Forks, crooks and sweep	-- 4	31-40%
9 9	Checks, bole cracks	-- 5	41-50%
		-- 6	51-60% *
		-- 7	61-70% *
		-- 8	71-80% *
		-- 9	81-100% *

* Severe

Instructions: Physical defects are recorded for all merchantable trees (live non-cull trees and salvable dead) in order to account for sawlog volume loss caused by any damaging agent except Stem Decays. For live cull trees Physical Defects are used to describe the reasons for cull classification. For non-salvable dead, Code 96, broken/missing top, is the only applicable code, and it is used to indirectly estimate sound wood volume by accounting for missing pieces. In this situation, an estimate of volume loss is not necessary. The casual agent need not be identified before recording physical defects. Use Code 95 for any type of defect other than rot and those listed above.

The severity of damage caused by physical defects is an expression of the amount of volume loss and is estimated in terms of cubic feet for all live trees and salvable dead trees. Severity need not be estimated for broken/missing top (Code 96) since the missing volume can be calculated from the diameter and actual height measurements.

APPENDIX 5. SITE INDEX ESTIMATES

SITE INDEX ESTIMATES

Site index, a measure of the relative productive capacity of a stand based on the height on dominant trees was estimated for for Uplifted Beach, Moraine, and Stream Terrace Ecological Units. Site index was curves for Sitka spruce used to estimate site index are found in Farr's 1984 publication Site Index and Height Growth Curves for Unmanaged Even-aged Stands of Western Hemlock and Sitka Spruce in Southeast Alaska.

Uplifted Beach Ecological Unit

<u>Plot</u>	<u>Tree Number</u>	<u>Tree Class</u>	<u>Species</u>	<u>Age at D.B.H.</u>	<u>Tree Height</u>	<u>Site Index</u>
1	2	Dominant	spruce	123	120	75
1	3	Dominant	spruce	125	149	95
6	1	Dominant	spruce	112	149	98
					Average	89

Moraine Ecological Unit

<u>Plot</u>	<u>Tree Number</u>	<u>Tree Class</u>	<u>Species</u>	<u>Age at D.B.H.</u>	<u>Tree Height</u>	<u>Site Index</u>
2	1	Dominant	spruce	144	115	69
2	6	Dominant	spruce	95	130	91
2	10	Dominant	spruce	123	139	89
					Average	83

Stream Terrace Ecological Unit

<u>Plot</u>	<u>Tree Number</u>	<u>Tree Class</u>	<u>Species</u>	<u>Age at D.B.H.</u>	<u>Tree Height</u>	<u>Site Index</u>
3	1	Dominant	spruce	121	130	83
3	3	Dominant	spruce	101	118	82
3	10	Dominant	spruce	112	134	86
7	3	Dominant	spruce	84	107	78
					Average	82

APPENDIX 6. FOREST HEALTH EVALUATION REPORT



United States
Department of
Agriculture

Forest Service

Alaska
Region



Forest Health Management Report

Biological Evaluation R10-TP-41

Forest Health Evaluation,
Sitka National Historical Park

January 1994



FOREST HEALTH EVALUATION,
SITKA NATIONAL HISTORICAL PARK

General Technical Report R10-TP-41

January 1994

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FOREST HEALTH EVALUATION, SITKA NATIONAL HISTORICAL PARK

General Forest Health Conditions

The forests in the Sitka National Historical Park have endured a number of different disturbance factors, some natural and some caused by humans, since the Park was officially recognized. Natural disturbance has been a common feature in the Park. Wind, associated with heart rot in trees or shallow soils, has resulted in trees that are snapped off at the lower bole, have their tops broken out, or are completely uprooted. Each of these occurrences has been common in the Park. These are the common gap-level disturbance factors that we believe are the driving forces behind the natural functioning and succession of southeast Alaskan forests. Uplifting and changing stream channels are affecting early seral vegetation but do not have significant effects on the mature Sitka spruce-western hemlock forests.

Logging, trail building, and drainage alteration have been among the disturbances caused by humans in the Park. There is also evidence of historic, cultural use in the form of axe marks on some scars of the oldest trees. Even though some of these activities occurred long ago, they have had a substantial influence on the health of the Park's forest today.

"Forest health" is a rather subjective attribute that should be evaluated from the perspective of management objectives (USDA 1993a). In the case of the Park, maintaining the aesthetic and historical condition of the forest is perhaps the primary goal of forest management. In addition, providing a relatively safe environment for the many recreational users is important. Insects and diseases are impairing efforts to achieve these goals.

Insect and Disease Conditions in Brief

Currently, the most significant insect and disease activity in the Sitka National Historical Park is caused by spruce needle aphid, hemlock dwarf mistletoe, and heart rot decay fungi. Each has a different effect on forest and tree health and will be discussed separately below. Also discussed below is the occurrence of fluted hemlock in the Park. Since the Park receives intensive use by visitors in developed recreation areas, the topic of decay fungi will be discussed with the results from an evaluation of potentially hazardous trees.

Hemlock Dwarf Mistletoe

This disease is distributed in much of the Park where western hemlock is a component of the forest stands (Fig. 1). Dwarf mistletoe is a common parasite of western hemlock at low elevations in southeast Alaska. Although infections on Sitka spruce are uncommon in Alaska, several spruce trees near the northwestern edges of the Park have the dense clusters of branches that are a distinctive symptom of the disease.

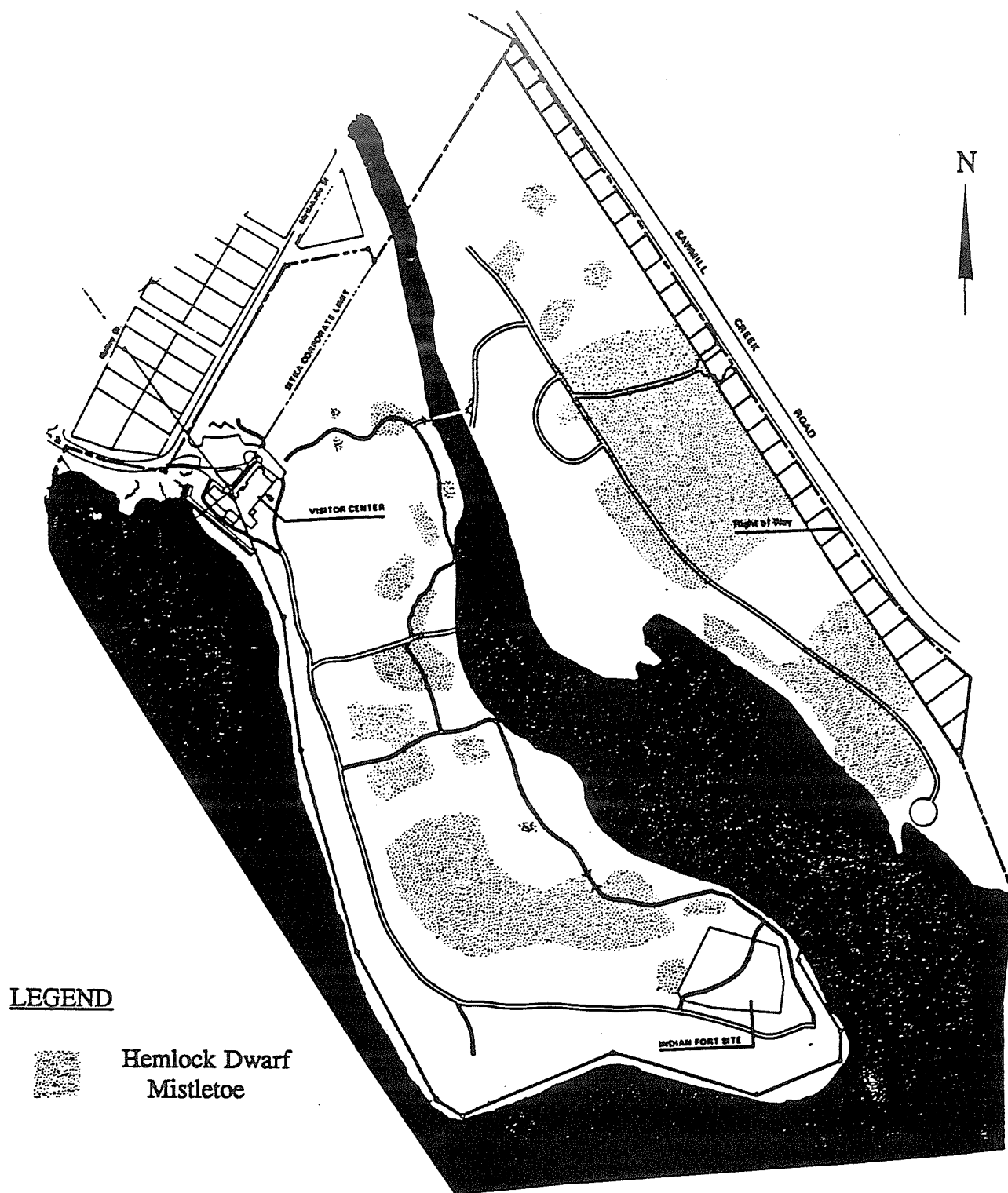


Figure 1. Distribution of hemlock dwarf mistletoe in the Sitka Historical Park, Sitka, AK.

The disease is caused by a small seed-bearing plant, hemlock dwarf mistletoe, that is adapted exclusively to a parasitic lifestyle. It has small leafless shoots that are produced on infections for the sole purpose of reproduction. After female plants are pollinated, they produce a single-seeded fruit. In the fall, seeds are dispersed from fruits by explosive discharge up to distances of 30 feet. The seeds are covered with a sticky substance allowing them to adhere to nearby trees. The seeds germinate on twigs, then roots of the parasite grow into the live tree tissues to initiate new infections.

Disturbance, whether caused by natural forces or forest management, influences the success of the disease's spread. The disease becomes abundant when a forest receives partial disturbance; that is, some large infected trees remain standing in areas where others are logged or windthrown. The additional light from these stand openings stimulates shoot, flower, and seed production by the parasite. In these situations, regenerating trees become heavily infected by spread of the parasite from the above canopy of the residual trees. This scenario appears to explain the abundance and distribution of dwarf mistletoe in the Park. For example, the disease was found to be severe (dwarf mistletoe ratings of 4.5 and 3.8 out of a possible 6) in our sampling plots 1 and 7 where large, old hemlocks are mixed with younger trees. Almost every younger hemlock is infected around large trees that remained after the logging in other areas, however. In areas where all large trees were removed by logging, the new forest is largely free of the disease (e.g., plots 6 and 10).

Hemlock dwarf mistletoe affects the tree's growth hormones at the point of infection. A swelling is the initial symptom but, after a number of years, a large proliferation of branches (witches-brooms) usually results. Heavily infected trees experience reduced height and radial growth, have a distorted form, and often eventually die from the disease. Numerous hemlocks have died from the dwarf mistletoe in the Park, but their death is scattered spatially and has not been synchronous. Thus, the disease is contributing to the canopy gap process of disturbance in the Park where small openings are created and new regenerating trees take the place of the dead tree. By hemlocks dying upright, snags are produced that enhance structural diversity and provide wildlife habitat. Since aesthetic qualities are so important in the Park, perhaps the largest impact of hemlock dwarf mistletoe is the stunting and disformity of trees caused in some of the most heavily infected stands. These diseased stands may not produce the large magnificent trees that are so desirable aesthetically. Efforts to maintain spruce, resistant to this disease, in these stands will yield trees that are largely unaffected by the disease.

Spruce Needle Aphid

Among the most significant forest insect activity in the Sitka National Historical Park, is that of the spruce needle aphid, *Elatobium abietinum* (Fig. 2). Spruce needle aphids are small insects (1/32 inch long) that are native to the spruce-hemlock forests of coastal southeast Alaska. Aphid populations may fluctuate greatly from year to year, depending to a large degree on fall and winter temperatures. Unlike most insects, spruce aphids feed actively (on spruce foliage) during

the fall and winter months. Because of this characteristic, they are extremely vulnerable to extended periods of sub-freezing (32° F) temperatures. A trait that may partially compensate for low temperature vulnerability, is the female aphid's ability to reproduce asexually, giving rise to substantial numbers of offspring over short periods of time. Historically, spruce aphid outbreaks in Southeast Alaska have been preceded by mild winters and have been of short duration (two to three years) (Eglitis 1986).

Spruce needle aphids commonly feed on stressed trees, such as those located in urban settings and along marine shorelines. Defoliation may result in reduced tree growth and vigor, and tree mortality has been documented in severe cases. Likewise, trees weakened by aphid defoliation may be more susceptible to other mortality agents. Spruce aphids feed by piercing the surface and sucking fluids from mature spruce needles (vs. those of the current year). Their impact is first evident in the inner, lower portions of spruce crowns. Feeding activity is most intense in late winter and early spring and often goes undetected until needles die and begin to fall later in the year.

During the late winter and early spring of 1992, feeding activity of the spruce needle aphid caused substantial defoliation of Sitka spruce in several southeast Alaska communities. The community of Sitka was among those most severely impacted. With its characteristic mild winters, Sitka has experienced numerous needle aphid outbreaks in the past. Likewise, numerous past needle aphid outbreaks are noted in the diary of the Sitka National Historical Park. Extended periods of sub-freezing temperatures in January and February, 1993, devastated aphid populations in the Sitka area and throughout southeast Alaska. As a result, minimal aphid-caused defoliation was observed in early 1993. As of January 1994, aphid populations in the Sitka area are rebounding, due in part to mild winter (1993-1994) temperatures.

The following observations were made in March, 1993 and pertain to the spruce needle aphid activity which occurred in the Sitka National Historical Park in 1992:

Some degree of aphid-caused defoliation was evident throughout the spruce-type in the Park (Fig. 2). Light defoliation was noted in the dense second-growth spruce occurring on the moraine to the east of the Indian River. Heavy defoliation of the lower 1/3 of tree crowns was common throughout the stands with a mature spruce component. Although such defoliation appears unsightly and tree crowns are subsequently thinner, in the absence of other tree mortality agents, these trees will not likely die. Heavy defoliation of entire crowns is limited primarily to the southern portion of the Park (Fig. 2). One common attribute of such areas is the presence of more open grown trees, where direct sunlight reaches the entire length of tree crowns. As has been noted in previous aphid outbreaks, the greatest amount of defoliation often occurs on trees in exposed (forest fringe or beach) settings. Some mortality is likely among the most heavily defoliated spruce in these areas.

As part of long-term forest health monitoring in the Park, forest insect activity was evaluated on six of the eleven permanent vegetation plots (reference Appendices 1 and 2). Plots were sampled within the uplifted beach (#s 1 and 6), stream terrace (#s 3 and 7), and moraine (#s 2

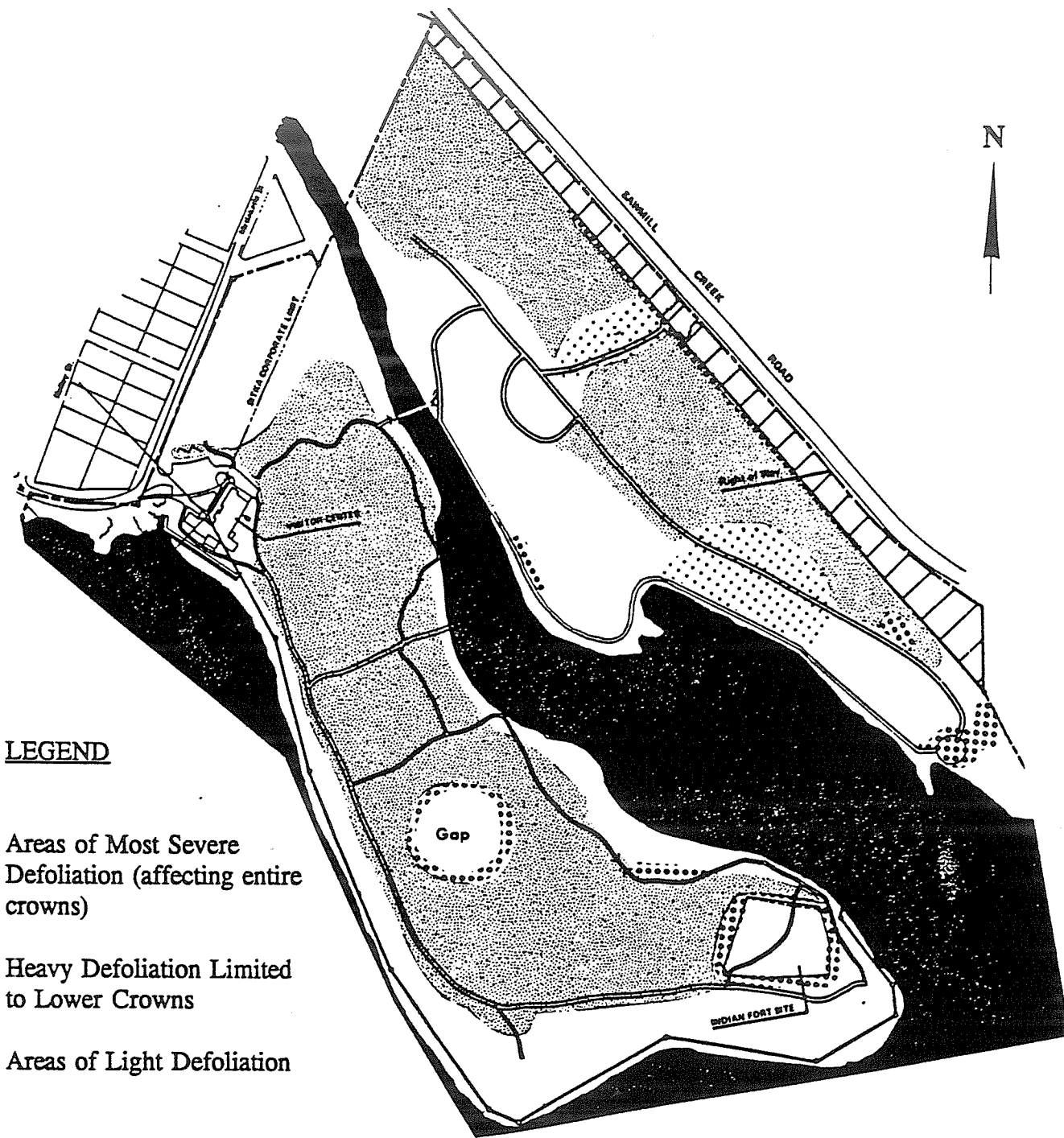


Figure 2. Incidence of spruce needle aphid defoliation, Sitka Historical Park, Sitka AK.

and 10) ecological units. Due to constraints related to the timing of the evaluation (March), insect investigations focused on the spruce needle aphid. All Sitka spruce on the six plots were evaluated for presence and severity of spruce aphid defoliation. Severity was rated on the upper, middle and lower thirds of each spruce crown as follows: no defoliation = 0; < 1/3 of mature foliage affected = 1; 1/3 to 2/3 of mature foliage affected = 2; and > 2/3 of mature foliage affected = 3. Results are summarized in Table 1. Results from the six plots supported the aforementioned park-wide defoliation assessment, as heavy defoliation of lower crowns was evident everywhere except among second-growth spruce sampled at Plot # 10. Future plot remeasurement will include re-examination (monitoring) and possible impact assessment related to aphid caused-defoliation.

Table 1. Spruce needle aphid defoliation occurrence and severity on six permanent vegetation plots in Sitka National Historical Park, March 1993.

Plot	Ecological Unit	Number of Spruce/ % Defoliated	Severity Rating by Crown Location ¹		
			Lower	Mid	Upper
1	Uplifted Beach	4 / 100	3.0	2.0	1.3
6	Uplifted Beach	4 / 100	3.0	2.3	0.8
2	Moraine	7 / 86	2.0	1.3	0.3
10	Moraine	2 / 100	1.5	1.0	1.5
3	Stream Terrace	9 / 100	2.6	2.2	1.2
7	Stream Terrace	6 / 100	2.5	2.0	1.0
Total / Average		32 / 98	Avg. 2.4	1.8	1.0

¹ Values are averages per plot. No defoliation = 0; < 1/3 mature foliage affected = 1; 1/3 to 2/3 mature foliage affected = 2; and > 2/3 mature foliage affected = 3.

Fluted Western Hemlock

Western hemlocks with fluted boles, distortion due to incised grooves and ridges extending vertically (Fig. 3), are common throughout Alaska. Fluted hemlock are likewise common within Sitka National Historical Park. Although the fluted condition is not considered a threat to forest health, it may appear as "abnormal" and does produce negative features related to wood and fiber production. Research indicates that western hemlock is genetically predisposed to formation of fluted trunks. Factors also associated with hemlock fluting include irregular translocation patterns below bole branches, increased wind firmness, and occurrence on shallow, well drained soils (such as uplifted beaches). Fluting severity increases with age to a point, then

flutes become engulfed by increased bole diameter. Fluted hemlock were present on all 6 of the Park's permanent vegetation plots (#'s 1,2,3,6,7 & 10) evaluated during this study. Ninety-one percent of the hemlocks on the six plots appeared fluted. Ages of fluted trees ranged from 33 to 145 years.

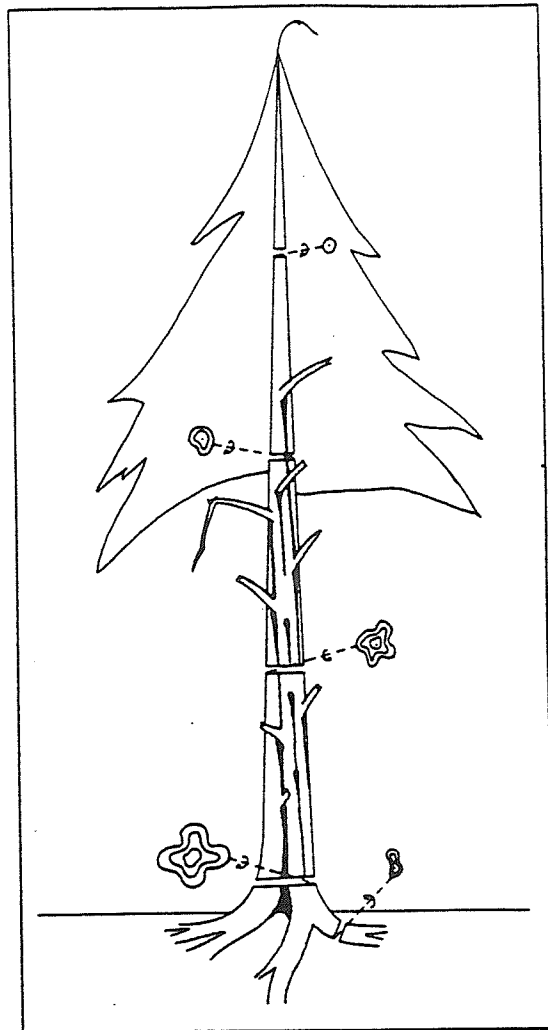


Figure 3. Fluting in western hemlock trees is characterized by deeply incised grooves along the bole that originate beneath decadent branches (from Julin and Farr 1989).

Potentially Hazardous Trees

The identification and treatment of potentially hazardous trees must be a concern of all managers of developed recreation sites in forested settings. For a detailed discussion on different aspects of hazard trees, from legal responsibilities to long-term management, a newly-published book on the subject is a highly recommended reference (see Harvey and Hessburg (1992)). This book explains

"a hazard exists when a tree or tree part will fail and cause injury or damage by striking a target. All standing trees, alive or dead, within areas occupied by people, structures, and property, present some level of hazard. Potential for failure by itself does not constitute a hazard. Hazard exists when a tree of sufficient size and mass to cause injury or damage is within striking distance of any object of value (target). Hazard increases with increasing tree defect, potential for failure, potential for damage, and target value. Management actions are taken to mitigate the hazard when risks are unacceptable...Risk is unacceptable when: 1. the amount of defect indicates failure is likely, and 2. the potential for failure and relationships to targets indicate damage is likely, and 3. target value is moderate or high."

We examined trees along all trails in the park during our March 1993 evaluation and noted the location (Fig. 4) of potentially hazardous trees, their dimensions, conditions that contribute to their possible failure, and proximity to targets (Table 2). We assigned numbers to each tree, but did not physically mark trees. Their numbers begin at #14 because personnel had already identified 13 potentially hazardous trees in an earlier evaluation (USDA 1993b). Many of the first 13 mapped trees were snags, some of which were small. Most of the potentially hazardous trees numbered 14-31 are large spruce trees. Some of these have evidence that they were wounded long ago. The large scars and long elapsed time has allowed decay fungi entry into these trees and time for substantial decay to develop. The slow degradation activity in the wood of effected trees causes a nearly complete breakdown of the components (lignin and cellulose) that give wood its structural strength.

Trees are rated for hazard with the same numerical scores as used with the first 13 trees -- 1. trees that should be monitored, 2. trees that should be considered for removal, and 3. trees that are a definite hazard because they are severely weakened and valuable targets or human life is in jeopardy. The rating for each tree (1-3) represents both the likelihood of failure and proximity to important targets.

The decision to remove or leave a tree that is suspected of being hazardous is a difficult one. Several of the largest trees with the greatest aesthetic appeal in the Park have indications that they are weakened structurally and are likely to fail. Trees thought to be severely weakened may not fail for a long time, however. Conversely, trees without any indication of defect sometimes fail through uprooting or breakage. The trees listed in the following table, however, are those that we believe have the highest probability of failing and striking a valuable target. Please note that we did not examine trees along the southeast perimeter of the park where large trees are adjacent to the trailer park.

Personnel of the Sitka National Historical Park will be responsible for making decisions about whether to remove or leave a tree that has indications that it may be hazardous. In the following table, we have attempted to describe the current condition of these trees with notes on factors that suggest hazard.

Management alternatives

To some extent, insects and diseases are impairing efforts to achieve the management goals of Sitka National Historical Park. Potentially hazardous trees, caused primarily by heart rot, may jeopardize the safety of visitors. Thus, heart rot fungi should probably be viewed as the most serious threat of the insect and disease agents in the Park. Hazardous trees could be felled in place and not removed if there is interest in contributing to coarse woody debris on the forest floor. Care should be taken during tree falling to avoid wounding adjacent trees because large wounds provide infection courts for decay fungi, thereby leading to future hazard trees. Any other activities that may wound tree roots or boles should be conducted carefully.

Hemlock dwarf mistletoe and fluted boles of hemlock are abundant in the Park, but neither is significantly hampering major management objectives. These conditions reduce timber values, but fiber production is not a management goal for the Park. In addition, both may have beneficial characteristics: dwarf mistletoe enhances structural diversity and wildlife habitat and hemlock fluting may contribute to windfirmness of effected trees. Large hemlocks killed by dwarf mistletoe may be hazardous as snags; thus, they should be evaluated as other potentially hazardous trees if they are located near trails or valuable structures.

To the extent that spruce needle aphid defoliation directly or indirectly results in spruce tree mortality, such trees near park developments may become "hazard trees." Since trees are often able to withstand significant amounts of defoliation, any decision regarding hazard tree management due to aphid defoliation would be premature prior to the actual death of the tree(s). As of early 1994, needle aphid activity is again evident in the Sitka area and may serve to exacerbate previous aphid impacts. Thus, monitoring of the most heavily defoliated areas (of 1992) is recommended.

Table 2. Description and location of trees that are potentially hazardous in the Sitka Historical National Park, Sitka, AK. The "Hazard rating" is on a scale from 1-3 (3 being the most serious threat) based on the probability of tree failure and importance and proximity of targets. See the discussion for explanation and related literature.

<u>Tree (no.)</u>	<u>Species</u>	<u>Diameter (inches)</u>	<u>Height (feet)</u>	<u>Rating</u>	<u>Target</u>
14	Spruce	30	110	2	Trail
Location: 5 feet from trail; 250 degrees, 70 feet from tree #15. Condition: large, old scar 5 feet from the ground. Evidence of cultural activity (hatchet markings) on scar. Scar faces trail. No conks present, but internal wood has extensive brown rot. Some sound wood observed by increment boring on the side of the tree opposite the scar.					
15	Spruce	23	100	1-2	Trail where people linger at sign
Location: 1 foot from trail; 234 degrees, 10 feet from sign, "Fort Site Battleground, Picnic Area, Russian Memorial". Condition: old scar 4 feet from the ground. Extensive exposed wood decay present in scar, no conks. Sound wood observed by increment boring on the side of the tree opposite the scar.					
16	Spruce	23	100	2-3	Trail and bridge
Location: 5 feet from southwest entrance to bridge. Condition: large, old scar at 3 feet from the ground facing bridge. Another smaller scar on side of tree 4 feet from the ground. Both scars have conks of the fungus <i>Fomitopsis pinicola</i>. Scars appear "case-hardened" meaning that they have a firm surface but soft rotten wood is extensive internally. Besides the potential for injury to humans, this tree could seriously damage the bridge.					
17	Spruce	44	88	2	Trail
Location: 3 feet from trail; 164 degrees, 50 feet from sign, "Salmon run". Condition: large, old basal scar faces to the south (along trail, not across trail). Evidence of cultural activity (hatchet markings) on scar. Extensive wood decay is occurs in the scar; no conks are present. Tree had its top broken out long ago 22 feet up. It now has 6 separate tops and probably has associated wood decay at the old break. The tree could fail near the ground due to decay in the basal scar or when one or more of the tops break out due to decay and weakness at the old break.					

Table 2 continued

<u>Tree (no.)</u>	<u>Species</u>	<u>Diameter (inches)</u>	<u>Height (feet)</u>	<u>Rating</u>	<u>Target</u>
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18	Spruce	60	100	2	Trail
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Location: 3 feet on the north side of the trail. This large tree is just past where the trail turns away (to the west) from the river.

Condition: Large scars are not present, but the occurrence of many conks of the heart rot fungus *Fomitopsis pinicola* indicate certain extensive wood decay. These conks are growing from various roots and the lower bole up to 15 feet high. The size and distribution of the conks suggests extensive root and butt rot.

19	Hemlock	26	40	1	Trail
----	---------	----	----	---	-------

Location: 8 feet from trail, 30 feet along trail to the southwest of tree #20

Condition: dead (snag) with forked top. Large, old conk of the fungus *Fomitopsis pinicola* indicates extensive decay in lower portion of bole.

20	Spruce	27	30	1	Trail
----	--------	----	----	---	-------

Location: 4 feet from trail; 30 feet to the northeast of tree #19.

Condition: dead (snag) with no branches retained. No bark at base of snag. Many conks of the fungus *Fomitopsis pinicola* throughout indicate extensive decay. Slight lean away from trail suggests that tree is unlikely to fall on the trail.

21	Spruce	45	100	2-3	Trail
----	--------	----	-----	-----	-------

Location: 10 feet from trail; 333 degrees, 146 feet from totem pole with a frog on top.

Condition: large, long scar extending from ground line up to where forked tops begin at 15 feet.

Scar is deep and has extensive, exposed wood decay. Tree could fail at the lower bole or at the old break (forked top) due to wood decay.

22	Spruce	61	75	1-2	Trail
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Location: 3 feet from trail; adjacent (on the northeast side) to the large chip pile.

Condition: the tree appears sound, but has a large, dead, hanging top that is only partially attached.

Table 2 continued

<u>Tree (no.)</u>	<u>Species</u>	<u>Diameter (inches)</u>	<u>Height (feet)</u>	<u>Rating</u>	<u>Target</u>
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23	Spruce	60	130	1-2	Exercise station on trail
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Location: 65 feet from trail; 43 degrees, 63 feet from sign #1, "Game field course; warm up game."

Condition: large, old scar faces the trail. Evidence of cultural activity (hatchet marks) are present. A hollow area and extensive wood decay are associated with the scar and indicate that the tree has lost significant structural support.

24	Spruce	30	100	2-3	Trail and outhouses
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Location: 3 feet from trail; 210 degrees, 52 feet from sign #1, "Game field course; warm up game."

Condition: old scar is 3 feet from the ground and faces the trail. Exposed wood decay and conks of the fungus *Phaeolus schweinitzii* are present. Conks of this fungus indicate significant decay of the lower bole and probable decay of the root system. The tree has a slight lean over the men's and women's restrooms.

25	Spruce	91	80	2	Parking area, trail, bike lane, and road
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Location: 285 degrees, 30 feet from parking barrier log.

Condition: This is undoubtedly the largest diameter tree, although not the tallest tree, in the Park. It is surely an ancient tree, but heart rot will inhibit efforts to determine its age. It has abundant conks of the fungus *Fomitopsis pinicola* on all sides of the bole, which indicate that it has little structural support remaining. The fact that the top has broken out some time in the past may help it to remain standing since there is less crown to be acted upon by the forces of wind and gravity.

26	Spruce	60	93	2-3	Trail
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Location: 3 feet from trail; 320 degrees, 62 feet from tree #27.

Condition: large, old, deep, basal scar has hollow areas and exposed wood decay. Conks of the fungus *Fomitopsis pinicola* are present on the scar and nearby roots. They indicate extensive wood decay.

27	Spruce	40	95	2-3	Exercise station and trail
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Location: 5 feet from trail; 345 degrees, 18 feet from sign #7, "Overhead ladder"

Condition: large, old basal scars. Several large conks of the fungus *Phaeolus schweinitzii* are associated with the scars and indicate extensive wood decay.

Table 2 continued

<u>Tree (no.)</u>	<u>Species</u>	<u>Diameter (inches)</u>	<u>Height (feet)</u>	<u>Rating</u>	<u>Target</u>
-----------------------	----------------	------------------------------	--------------------------	---------------	---------------

28	Hemlock	25	85	1-2	Exercise station and trail
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Location: 35 feet from trail; 215 degrees, 37 feet from sign, "stop, walk to the next game."

Condition: tree dead (snag) with old, basal scar with exposed wood decay. The fungus *Armillaria* sp. is present on the roots.

29	Spruce	38	105	1	Exercise station and trail
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Location: 12 feet from trail; directly across the trail from the sign, "Stop, walk to the next game."

Condition: small, but old scar 4 feet up tree's bole. Exposed wood decay is present. Because of the scar's apparent age, the original wound was probably much larger but has callused over. The tree probably has far more wood decay than is indicated by the current size of the scar. The tree has a forked top where an old break occurred at 30 feet high. The tree could fail at the scar, the top could break out again, or the bole could split from the top down to the scar.

30	Spruce	50	140	2-3	Exercise station and trail
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Location: 356 degrees, 35 feet from the sign, "Side jump conditioning game."

Condition: large, old, basal scar. The tree base is hollow and adjacent areas of extensive wood decay. Conks of the fungus *Fomitopsis pinicola* are present on the scar. They indicate the already obvious extensive wood decay. The tree has a forked top at 85 feet high where the original top broke out long ago. This indicates probable wood decay in the area of the old break where the tree might fail. The basal area of hollow and wood decay is a more likely location for failure, however.

31	Spruce	30	80	2-3	Memorial and trail
----	--------	----	----	-----	--------------------

Location: 3 feet from trail; 133 degrees, 20 feet from the white cross with white fencing.

Condition: large, old, basal scar with exposed wood decay and conks of the fungus *Fomitopsis pinicola*. Tree has a slight lean downhill away from the memorial.

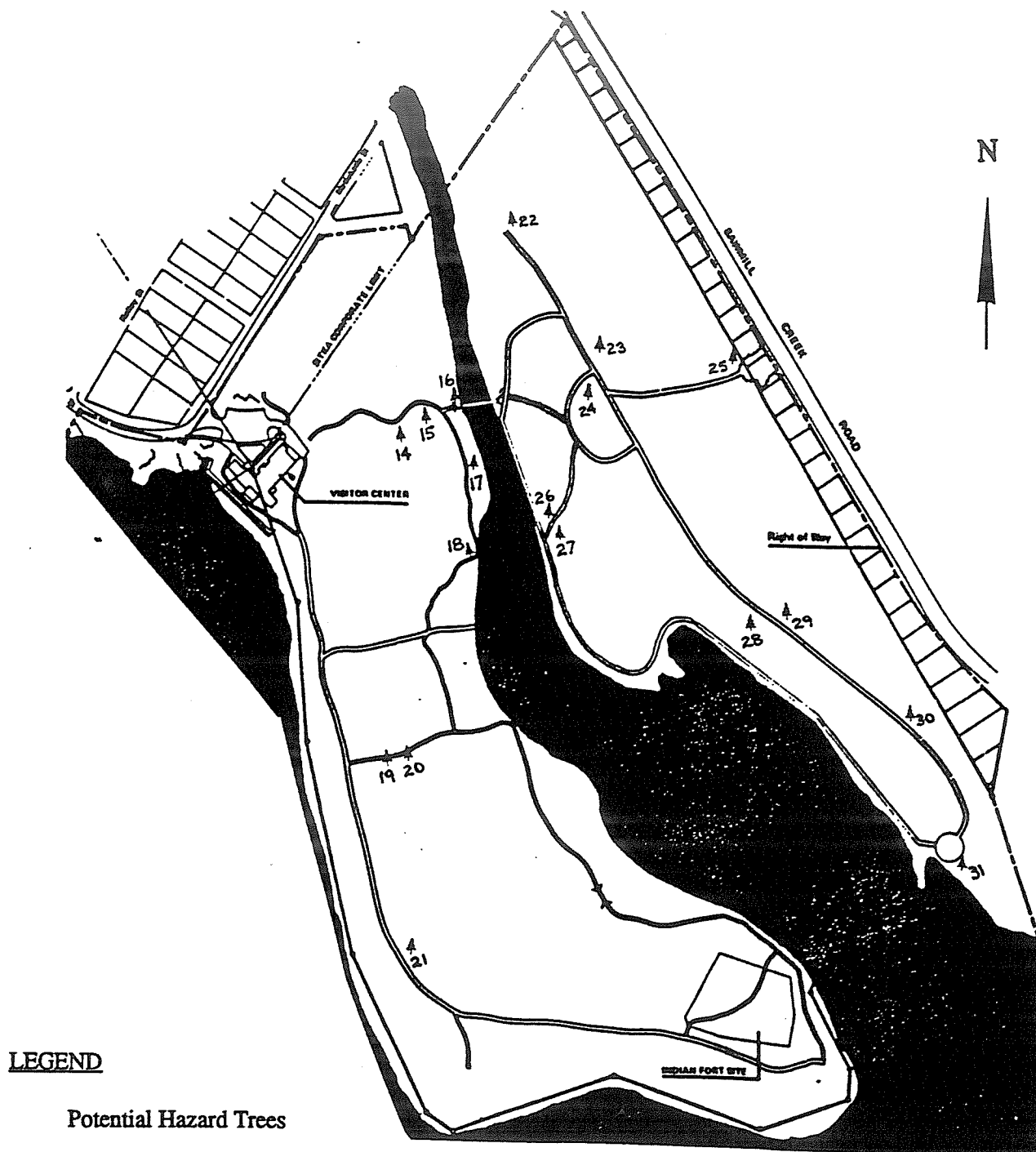


Figure 4. Location of trees that are potentially hazardous in the Sitka Historical Park, Sitka, AK. Note that trees numbered 1 through 13 are not represented. These trees are mapped and described in: USDA Forest Service. 1993. Ecological Inventory: Sitka Historical Park. USDI, National Park Service. Sitka, AK.

ACKNOWLEDGEMENTS

We wish to thank Paul Reid, Jim Russell, and Bill Dougan for field assistance. We also wish to recognize Michelle Hellickson, the past Superintendent of the Sitka National Historic Park, without whose cooperation this evaluation would not have been possible.

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APPENDIX 7. VEGETATION CARDS FOR PLOTS 1-11

plot 1

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA (5/93)										
GENERAL INFORMATION										
IDENTIFICATION										
KEY ID 93SJT13	MONTH/DAY 6/11	VCU —	CONTROL NO. 5212	PERMANENT PLOT ID SNHP1	ASSOC. DATA CARDS SP ☒ MU SE WL WD GR O			EDIT STATUS 1		
MAP UNIT KEY ID —	PURPOSE IR	PLOT SIZE 42 ☒ M W FT M	PHOTOS ROLL — EXP. —	STAND ID —	MAP UNIT —	BLOCK/UNIT/SETTING (GRIT) —				
LOCATION										
GENERAL LOCATION Sitka National Historical Park		QUAD Sitka A-4	1/4 QUAD NW NE SW SE	LEGAL LOCATION 1/4 OF THE 1/4 OF SECTION T. S. R. E. DATE			AERIAL PHOTOGRAPH ID			
LATITUDE DEG. N MIN. SEC. HSEC.				LONGITUDE DEG. W MIN. SEC. HSEC.						
SITE										
ELEV. (FT.) —	ASPECT (°) 152 (0 FOR FLAT)	SLOPE (%) 5	ANGLE TO THE HORIZON (% WITH + OR -) 126 +7 +1		LANDFORM 74		LANDSCAPE POSITION 18			
HORIZ. SHAPE U	VERT. SHAPE U	EROSION ST STATUS	TYPE N		NOTES Rock frags under rootwads Low tree diversity, high density					
GROUND COVER (%)										
BARE GRD. T	ROCK FRAGS. 1	ROCK OUTCRP. 0	LITTER (< 1/4") 30	SM. WOODY 2	WOODY (> 5") 20	MOSS/LICHEN 50	MOSS ON RK. 0	WATER 0	OTHER	
VEGETATION										
PLANT ASSOC. 120	SERE 5	FOREST TYPE X	VACC. HGT. (FT.) 3	VERATRUM (HELLEBORE) 0 ABUNDANCE POSITION CLUMPED?			LYSICHITUM (SKUNK CABBAGE) 0 ABUNDANCE POSITION CLUMPED?			
lichen abun. 1	SNAG ABUN. 1	MTOE 3	FLUTING 3	FOPAGE 0 DEER (Vaccin) MOOSE (Salix) BEAR (Lysame)			NOTES Mistletoe on Tsunet + Picisit Gap in plot - blowdown			
WILDLIFE/DISTURBANCE OBSERVATIONS										
WILDLIFE OBSERVATIONS (especially bear, deer, moose, wolf, otter, mink, marten, bat, eagle, hawk, owl, murrelet)										
SPECIES Raven	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER ☒ feathers									
SPECIES Eagle	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER ☒ feathers									
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
avalanche	mass waste	slumps	flooding	blowdown	jackstraw	pistol butt	logged	road	other human	
Y ☒ N	Y ☒ N	Y ☒ N	Y ☒ N	☒ N EXTENT 1	Y ☒ N	Y ☒ N	Y ☒ N AGE	Y ☒ N	☒ N TYPE Trails	

PLOT 1

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA

GENERAL INFORMATION (SIDE 2)

[illegible]

plot 1

USDA FOREST SERVICE TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA VEGETATION CARD (5/93)														
KEYID 93JJT 13 SAMPLED N														
FIXED RADIUS PLOT														
Plot radius = 42 ft; 4 ft. rad. = 1%; 9 ft. rad. = 5%; 13 ft. rad. = 10%														
VARIABLE PLOT (TREES)														
Basal Area Factor		20 40 Other		Mean Hgt Canopy					(feet)					
Tree- Num	Core #	Species (6 code)	Tree Class	DBH (in.)	HGT (ft.)	Meas	Proj	Lean	Crown Ratio	Crown Class	Snag Decay			
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
* Label cores with plot KEYID, variable plot TREENUM, and # of pieces.														
COARSE WOODY DEBRIS (> 5 in.; transect 16 ft. wide, plot top to bottom)														
Woody- num	Species (6-code)	Diam (in.)	Length (ft.)	Decay Class	Root- wad	Stump	Wind- snap	Wind- throw						
1	TSUHET	14	17	3	✓			✓						
2		5	17	3	✓			✓						
3		9	17	3	✓			✓						
4		18	17	3	✓			✓						
5		8	8	3	✓			✓						
6		15	40	3	✓			✓						
7		13	24	3	✓			✓						
8		18	25	2	✓			✓						
9		6	4	4	✓			✓						
10		—	5	2	✓			✓						
11		7	7	5	✓			✓						
12		6	6	3	✓			✓						
13		6	2	3	✓			✓						
14		5	15	2										
15		5	6	3										
16		30	10	4										
17		32	1	5										

Plot 1

13 ✓
 14 ✓
 15 ✓
 16 ✓
 17 ✓

STRATUM TOTALS		
	%	%
Overstory	55	20
Understory	10	—
Seedling	7	60
Sapling	3	15
Total Trees (Under + Over)	60	1/2
		80

FIXED RADIUS PLOT		
	% Over	% Under TREES
ALNRUB		Alnus rubra
CHANO		Chamaecyparis nootkatensis
PICSI	15	Picea sitchensis
PINCON		Pinus contorta
POPTRI		Populus trichocarpa
TSUHET	40	Tsuga heterophylla
TSUMER		Tsuga mertensiana

TALL SHRUBS		
	%	Hgt. (ft)
ALNSIN		Alnus sinuata
CLAPYR		Cladophamnus pyrolaeifolia
MENFER	7	Menziesia ferruginea
MYRGAL		Myrica gale
OPHORI	4	Oplopanax horridum
RIB		Ribes
RUBPAR		Rubus parviflorus
RUBSPE	72	Rubus spectabilis
SALIX		Salix sp.
SAMRAC		Sambucus racemosa
SORSIT	1	Sorbus sitchensis
VACCIN	2	Vaccinium ovalifolium/alaskae
VACPAR	6	Vaccinium parvifolium
VIBEDU		Viburnum edule

TALL SHRUBS		
	%	Hgt. (ft)
ALNSIN		Alnus sinuata
CLAPYR		Cladophamnus pyrolaeifolia
MENFER	7	Menziesia ferruginea
MYRGAL		Myrica gale
OPHORI	4	Oplopanax horridum
RIB		Ribes
RUBPAR		Rubus parviflorus
RUBSPE	72	Rubus spectabilis
SALIX		Salix sp.
SAMRAC		Sambucus racemosa
SORSIT	1	Sorbus sitchensis
VACCIN	2	Vaccinium ovalifolium/alaskae
VACPAR	6	Vaccinium parvifolium
VIBEDU		Viburnum edule

Plot

[illegible]

plot 2

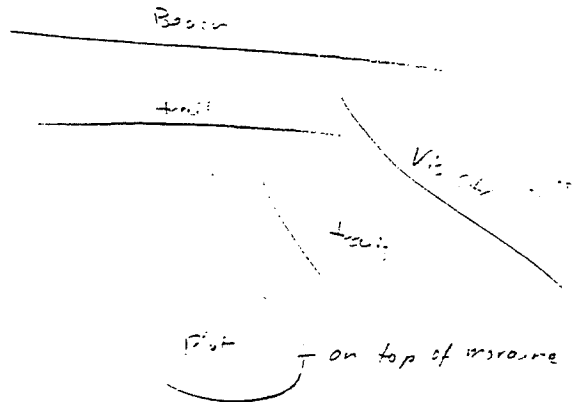
USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA (5/93)											
GENERAL INFORMATION											
IDENTIFICATION											
KEY ID 93SJT 11	MONTH/DAY 6/11	VCU —	CONTROL NO. 5210	PERMANENT PLOT ID SNHP2	ASSOC. DATA CARDS SP ☒ MU SE WL WD GR O			EDIT STATUS 1			
MAP UNIT KEY ID —	PURPOSE IR	PLOT SIZE L 42.5 M W 42.5 M	PHOTOS ROLL — EXP. —	STAND ID —	MAP UNIT —	BLOCK/UNIT/SETTING (GRIT) —					
LOCATION											
GENERAL LOCATION Sitka National Historical Park		QUAD Sitka A-4	1/4 QUAD NW NE SW SE	LEGAL LOCATION 1/4 OF THE 1/4 OF SECTION T. S. R. E. DATE			AERIAL PHOTOGRAPH ID				
LATITUDE DEG. N MIN. SEC. HSEC.				LONGITUDE DEG. W MIN. SEC. HSEC.				Plots located by GPS so location info. not completed			
SITE											
ELEV. (FT.) —	ASPECT (°) 214 (0 FOR FLAT)	SLOPE (%) 6	ANGLE TO THE HORIZON (% WITH + OR -) E +27 S +8 W -2		LANDFORM 61		LANDSCAPE POSITION 18				
HORIZ. SHAPE U	VERT. SHAPE U	EROSION ST STATUS	N TYPE		Elevations more accurate off Park's surveyed map so not completed						
GROUND COVER (%)											
BARE GRD. 0	ROCK FRAGS. T	ROCK OUTCRP 0	LITTER (< 1/4") 45	SM. WOODY 5	WOODY (> 5") 15	MOSS/LICHEN 35	MOSS ON RK. 0	WATER 0	OTHER —		
VEGETATION											
PLANT ASSOC. 120	SERE 5	FOREST TYPE X	VACCI HGT (FT.) 4	VERATRUM (HELLEBORE) 0 — — ABUNDANCE POSITION CLUMPED?			LYSICHITUM (SKUNK CABBAGE) 0 — — ABUNDANCE POSITION CLUMPED?				
LICHEN ABUN. 0	SNAG ABUN. 0	MTOE 1	FLUTING 3	FORAGE 0 — — DEER (Vaccin) MOOSE (Salix) BEAR (Lysame)			NOTES				
WILDLIFE/DISTURBANCE OBSERVATIONS											
WILDLIFE OBSERVATIONS (especially bear, deer, moose, wolf, otter, mink, marten, bat, eagle, hawk, owl, murrelet)											
SPECIES Red squirrel	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE.										
SPECIES Winter wren	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE.										
SPECIES Kingfisher	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE.										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE.										
AVAILANCHE	MASS WASTE	SLUMPS	FLOODING	BLOWDOWN	JACKSTRAW	PISTOL BUTT	LOGGE				
Y (N)	Y (N)	Y (N)	Y (N)	Y (N) EXTENT	Y (N)	Y (N)	Y (N) AGE				

plots located by GPS tie to GIS

PLOTS

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA
GENERAL INFORMATION (SIDE 2)

NOTES	DIAGRAM
Just above Park walk	
and. Cut wood in plot	
cut stump. Old	
Indice in 2	



USDA FOREST SERVICE TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA VEGETATION CARD (5/93)

KEYID Q35JT 11 SAMPLED N

VARIABLE PLOT (TREES)

Tree- Num	Core *	Species (6 code)	Tree Class	DBH (in.)	HGT (ft.)	Mean Hgt Canopy				(feet)	
						Meas	Proj	Lean	>20°	Crown Ratio	Crown Class
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											

* Label cores with plot KEYID, variable plot TREENUM and # of pieces.

COARSE WOODY DEBRIS (> 5 in.; transect 16 ft. wide, plot top to bottom)

Woody- num	Species (6 code)	Diam (in.)	Length (ft.)	Decay Class	Root wad	Stump	Wind- snap	Wind- throw
1	TSUHET	14	18	2				
2	TSUHET	28	2	5		✓		verse to pieces
3	TSUHET	15	1	3		✓		cut
4	TSUHET	12	1	4		✓		cut
5	TSUHET	6	10	3				
6	PICSI	6	7	3				
7	TSUHET	7	16	3				
8	PICSI	8	22	4				in pieces
9	TSUHET	10	8	4				
10	TSUHET	7	13	2				
11								
12								

FIXED RADIUS PLOT

Plot radius = 42 ft; 4 ft. rad. = 1%; 9 ft. rad. = 5%; 13 ft. rad. = 10%

	% Over	% Under TREES
ALNRUB		Alnus rubra
CHANO		Chamaecyparis nootkatensis
PICSI	15	Picea sitchensis
PINCON		Pinus contorta
POPTRI		Populus trichocarpa
TSUHET	65	Tsuga heterophylla
TSUMER		Tsuga mertensiana

	%	Hgt. (ft)	TALL SHRUBS
ALNSIN			Alnus sinuata
CLAPYR			Cladanthamnus pyrolaeif
MENFER	8	6 1/2	Menziesia ferruginea
MYRGAL			Myrica gale
OPLHOR	1	2	Oplopanax horridum
RIB			Ribes
RUBPAR			Rubus parviflorus
RUBSPE	5	5	Rubus spectabilis
SALIX			Salix sp.
SAMPAC			Sambucus racemosa
SORSIT	1	5	Sorbus sitchensis
VACCIN	7	4	Vaccinium oval./alaskae
VACPAR	6	4 1/2	Vaccinium parvifolium
VIBEDU			Viburnum edule

STRATUM TOTALS		
	%	%
Overstory	80	25
Understory	5	—
Seedling	5	30
Sapling	—	15
Total Trees	95	—
(Under + Over)		1

PLOT 2

[illegible]

plot 3

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA (5/93)										
GENERAL INFORMATION										
IDENTIFICATION										
KEY ID 9355T14	MONTH/DAY 6/11	VCU —	CONTROL NO. 5213	PERMANENT PLOT ID SHP3		ASSOC. DATA CARDS SP ☒ MU SE WL WD GR O		EDIT STATUS 1		
MAP UNIT KEY ID —	PURPOSE 1R	PLOT SIZE L 42 FT M W 42 FT M		PHOTOS ROLL X EXP.	STAND ID —	MAP UNIT —	BLOCK/UNIT/SETTING (GRIT) —			
LOCATION										
GENERAL LOCATION Sitka National Historical Park		QUAD Sitka A-4	1/4 QUAD NW NE SW SE		LEGAL LOCATION 1/4 OF THE 1/4 OF SECTION T. S. R. E. DATE			AERIAL PHOTOGRAPH ID		
LATITUDE DEG. N MIN. SEC. HSEC.				LONGITUDE DEG. W MIN. SEC. HSEC.						
SITE										
ELEV. (FT.) —	ASPECT (°) 110 (0 FOR FLAT)	SLOPE (%) 4	ANGLE TO THE HORIZON (% WITH + OR -) +20 E		LANDFORM +15 S +13 W 61		LANDSCAPE POSITION 22			
HORIZ. SHAPE U	VERT. SHAPE C	EROSION ST N		NOTES Plot = bit of a swale below mouline - old stream terrace						
STATUS		TYPE								
GROUND COVER (%)										
BARE GRD. 0	ROCK FRAGS. 0	ROCK OUTCRP 0	LITTER (< 1/4") 75	SM. WOODY 2	WOODY (> 5") 3	MOSS/LICHEN 25	MOSS ON RK 0	WATER 0	OTHER	
VEGETATION										
PLANT ASSOC. 330	SERE 5	FOREST TYPE S	VACCI HGT (FT.) 4	VERATRUM (HELLEBORE) 0 ABUNDANCE POSITION CLUMPED?			LYSICHITUM (SKUNK CABBAGE) 0 ABUNDANCE POSITION CLUMPED?			
LICHEN ABUN. T	SNAG ABUN. 1	MTCE 1	FLUTING 1	FORAGE 0 DEER (Vaccin) MOOSE (Salix) BEAR (Lysame)			NOTES Plot extends almost to creek side trail.			
WILDLIFE/DISTURBANCE OBSERVATIONS										
WILDLIFE OBSERVATIONS (especially bear, deer, moose, wolf, otter, mink, marten, bat, eagle, hawk, owl, murrelet)										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
AVAILANCHE	MASS WASTE	SLUMPS	FLOODING	BLOWDOWN	JACKSTRAW	PISTOL BUTT	LOGGED	ROAD	OTHER HUMAN	
Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒
EXTENT						AGE			TYPE Trails	

PLOT 3

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA
GENERAL INFORMATION (SIDE 2)

[illegible]

Plot #

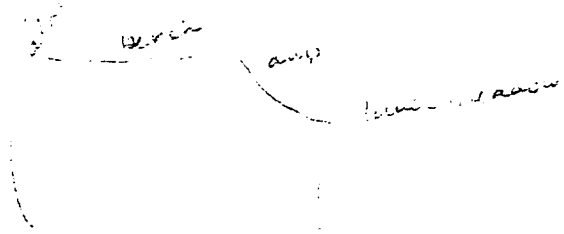
USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA (5/93)											
GENERAL INFORMATION											
IDENTIFICATION											
KEY ID 9355120	MONTH/DAY 6/12	VCU —	CONTROL NO. 5219	PERMANENT PLOT ID 34-04	ASSOC. DATA CARDS SP ☐ VG ☐ MU ☐ SE ☐ WL ☐ WD ☐ GR ☐ O ☐			EDIT STATUS 1			
MAP UNIT KEY ID —	PURPOSE IR	PLOT SIZE L(R) = 2 FT M W FT M	PHOTOS ROLL EXP.	STAND ID —	MAP UNIT	BLOCK/UNIT/SETTING (GRIT)					
LOCATION											
GENERAL LOCATION Sitka area Historical Point		QUAD Sitka A-4	1/4 QUAD NW NE SW SE	LEGAL LOCATION 1/4 OF THE 1/4 OF SECTION T. S. R. E. DATE			AERIAL PHOTOGRAPH ID				
LATITUDE DEG. N MIN. SEC. HSEC.				LONGITUDE DEG. W MIN. SEC. HSEC.							
SITE											
ELEV. (FT.) —	ASPECT (°) 290 (0 FOR FLAT)	SLOPE (%) 2	ANGLE TO THE HORIZON (% WITH + OR -) E +32 S +12 W +2		LANDFORM 74		LANDSCAPE POSITION 5				
HORIZ. SHAPE F	VERT. SHAPE B	EROSION ST STATUS	N TYPE		NOTES Bare above meadow - extends to alder buffer along trail on E side + trees colonizing plot						
GROUND COVER (%)											
BARE GRD. 0	ROCK FRAGS. 0	ROCK OUTCRP. 0	LITTER (< 1/4") 85	SM. WOODY 5	WOODY (> 5") 2	MOSS/LICHEN 15	MOSS ON RK. 0	WATER 0	OTHER		
VEGETATION											
PLANT ASSOC. 352	SERE 2	FOREST TYPE —	VACCINUM HGT. (FT.) —	VERATRUM (HELLEBORE) 0			LYSICHITUM (SKUNK CABBAGE) 0				
LICHEN ABUN. —		SNAG ABUN. —	MITCE —	FLUTING —	ABUNDANCE —	POSITION —	CLUMPED? —	ABUNDANCE —	POSITION —	CLUMPED? —	
				FORAGE —		NOTES Early successional from meadow to grassy area. PERSIT 6/97					
				DEER (Vaccin) —		MOOSE (Salix) —		BEAR (Lysame) —			
WILDLIFE/DISTURBANCE OBSERVATIONS											
WILDLIFE OBSERVATIONS (especially bear, deer, moose, wolf, otter, mink, marten, bat, eagle, hawk, owl, murrelet)											
SPECIES <i>Eagles</i>		OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES <i>Red squirrel</i>		OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER <i>nutcracks</i>									
SPECIES		OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES		OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
AVAILANCHE Y ☐ N ☒	MASS WASTE Y ☐ N ☒	SLUMPS Y ☐ N ☒	FLOODING Y ☒ N ☐	BLOWDOWN Y ☐ N ☒	JACKSTRAW Y ☐ N ☒	PISTOL BUTT Y ☐ N ☒	LOGGED Y ☐ N ☒	ROAD Y ☐ N ☒	OTHER HUMAN Y ☐ N ☒ Trails		

PLOT 4

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA
GENERAL INFORMATION (SIDE 2)

NOTES

DIAGRAM



PLOT 4

USDA FOREST SERVICE TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA VEGETATION CARD (5/93)															
FIXED RADIUS PLOT															
Plot radius = 42 ft; 4 ft. rad. = 1%; 9 ft. rad. = 5%; 13 ft. rad. = 10%															
VARIABLE PLOT (TREES)															
Basal Area Factor		20 40 Other		Mean Hgt Canopy											
Tree- Num	Core *	Species (6 code)	Tree Class	DBH (in.)	HGT (ft.)	Meas	Proj	Lean >20°	Crown Ratio	Crown Class	Snag Decay				(feet)
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															

* Label cores with plot KEYID, variable plot TREENUM and # of pieces.

COARSE WOODY DEBRIS (> 5 in.; transect 16 ft. wide, plot top to bottom)

Woody- num	Species (6-code)	Diam (in.)	Length (ft.)	Decay Class	Root- wad	Stump wad	Wind- snap	Wind- throw
1	121111	12	16	3				
2	↑	10	9	3				
3	↑	8	14	3				
4								
5								
6								
7								
8								
9								
10								
11								
12								

TALL SHRUBS		STRATUM TOTALS	
%	Hgt. (ft)	%	%
5	9 1/2	0	8
	Alnus sinuata	8	Low Shrub
	Cladanthamnus pyrolaeif	2	Forb
	Menziesia ferruginea	3	Fern/Fern Ally
	Myrica gale	8	Sedge/Graminoid
	Oplopanax horridum	3	CWD Regen
	Ribes		
	Rubus parviflorus		
1/2	Rubus spectabilis		
	Salix sp.		
3	Sambucus racemosa		
	Sorbus sitchensis		
	Vaccinium oval./alaskae		
	Vaccinium parvifolium		
	Viburnum edule		

[illegible]

plot 5

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA (5/93)										
GENERAL INFORMATION										
IDENTIFICATION										
KEY ID 9355-21	MONTH/DAY 6/12	VCU —	CONTROL NO. 5220	PERMANENT PLOT ID SN4P5	ASSOC. DATA CARDS SP ☒ MU SE WL WD GR O			EDIT STATUS /		
MAP UNIT KEY ID —	PURPOSE IR	PLOT SIZE 1/4 42.5 M W FT M	PHOTOS ROLL ☒ EXP.	STAND ID —	MAP UNIT —	BLOCK/UNIT/SETTING (GRIT) —				
LOCATION										
GENERAL LOCATION Sitka National Historical Park		QUAD Sitka A-4	1/4 QUAD NW NE SW SE	LEGAL LOCATION 1/4 OF THE 1/4 OF SECTION T. S. R. E. DATE			AERIAL PHOTOGRAPH ID			
LATITUDE DEG. N MIN. SEC. HSEC.				LONGITUDE DEG. W MIN. SEC. HSEC.						
SITE										
ELEV. (FT.) —	ASPECT (°) 58 (0 FOR FLAT)	SLOPE (%) 2	ANGLE TO THE HORIZON (% WITH + OR -) +12 E +9 W		LANDFORM 74		LANDSCAPE POSITION 16			
HORIZ. SHAPE F	VERT. SHAPE S	EROSION ST	N.		NOTES Center in clear zone - see jagged line on map mid-meadow					
STATUS		TYPE								
GROUND COVER (%)										
BARE GRD. 0	ROCK FRAGS. T	ROCK OUTCRP. 0	LITTER (< 1/4") 70	SM. WOODY 1	WOODY (> 5") 15	MOSS/LICHEN 20	MOSS ON RK. 0	WATER —	OTHER —	
VEGETATION										
PLANT ASSOC. 352	SERE 2	FOREST TYPE —	VACCI HGT (FT.) 3	VERATRUM (HELLEBORE) 0			LYSICHITUM (SKUNK CABBAGE) 0			
ABUNDANCE		POSITION		CLUMPED?		ABUNDANCE		POSITION		CLUMPED?
lichen ABUN.	SNAG ABUN.	M'TOE	FLUTING	FORAGE 0			NOTES			
				DEER (Vaccin)			MOOSE (Salix)		BEAR (Lysame)	
WILDLIFE/DISTURBANCE OBSERVATIONS										
WILDLIFE OBSERVATIONS (especially bear, deer, moose, wolf, otter, mink, marten, bat, eagle, hawk, owl, murrelet)										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
AVALANCHE	MASS WASTE	SLUMPS	FLOODING	BLOWDOWN	JACKSTRAW	PISTOL BUTT	LOGGED	ROAD	OTHER HUMAN	
Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒	Y ☒
EXTENT							AGE		TYPE TVCL2	

PLOT 5

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA
GENERAL INFORMATION (SIDE 2)

[illegible]

USDA FOREST SERVICE TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA VEGETATION CARD (5/93)

KEYID 935511 21 SAMPLED N

Basal Area Factor 20 40 Other

Tree- Num	Core #	Species (6 code)	Tree Class	DBH (in.)	HGT (ft.)	Meas	Mean Hgt Canopy			(feet)		
							Proj	Lean	Crown Ratio	Crown Class	Snag	Decay
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												

* Label cores with plot KEYID, variable plot TREENUM and # of pieces.

COARSE WOODY DEBRIS (> 5 in.; transect 16 ft. wide, plot top to bottom)

Woody- num	Species (6-code)	Diam (in.)	Length (ft.)	Decay Class	Root- wad	Stump	Wind- snap	Wind- throw
1	UPR12000	12	8	3				
2		9	14	3				
3		5	12	3				
4		10	4	3				
5		12	12	3				
6		12	12	3				
7		16	20	3				
8		10	4	3				
9		13	15	3				
10		16	5	3				
11		4	5	3				
12		12	4	3				

Washed in
Some into
Squard

FIXED RADIUS PLOT

Plot radius = 42 ft; 4 ft. rad. = 1%; 9 ft. rad. = 5%; 13 ft. rad. = 10%

	% Over	% Under TREES
ALNRUB	0	4
CHANO		Chamaecyparis nootkate
PICSIJ	0	Picea sitchensis
PINCON		Pinus contorta
POPTRI		Populus trichocarpa
TSUHET	0	Tsuga heterophylla
TSUMER		Tsuga mertensiana

	%	Hgt. (ft)	TALL SHRUBS
ALNSIN	1	5	Alnus sinuata
CLAPYR			Cladanthamnus pyrolaeif
MENFER	1/2	4 1/2	Menziesia ferruginea
MYRGAL			Myrica gale
OPLHOR			Oplopanax horridum
RIB			Ribes
RUBPAR			Rubus parviflorus
RUBSPR	1/2	3	Rubus spectabilis
SALIX			Salix sp.
SAMRAC			Sambucus racemosa
SORSIT	T	4	Sorbus sitchensis
VACCIN	T	3	Vaccinium oval./alaskae
VACPAR			Vaccinium parvifolium
VIBEDU			Viburnum edule

STRATUM TOTALS		
	%	%
Overstory	0	2
Understory	10	
Seedling +	2	20
Sapling +	1/2	1/2
Total Trees	10	60
(Under + Over)		100

PLOT 51

6 4 3
10 1 3
9 5 3

% LOW SHRUBS		% SEDGES AND RUSHES		% GRAMINOIDS	
ANDPOL	Andromeda polifolia Bog rosemary	CAR	Carex Sedge	GRAMIN	Grasses
EMPNIG	Empetrum nigrum Crowberry	CAR	Carex Sedge	AGROST	Agrostis spp.
KALPOL	Kalmia polifolia Bog laurel	CAR	Carex Sedge	CALCAN	Calamagrostis can Bluejoint
LEDGRO	Ledum groenlandi Labrador tea	CARANT	Carex anthoxanthea	CALNUT	Calamagrostis nut Pacific reedgrass
LUEPEG	Luetkea pectinata Luetkea	CARNIG	Carex nigricans	DESATR	Deschampsia atro Mountain halgrass
PHYGLA	Phyllocladus glandulosa Mountain heather	CARPAU	Carex pauciflora	ERIOPH	Eriophorum spp. Cotton grass
VACCAX	Vaccinium caespit Dwarf blueberry	CARPLU	Carex pluriflora	PHILALP	Phileum alpinum Alpine timothy
VACCXY	Vaccinium oxycoc Bog cranberry	CARSIT	Carex sitchensis	TRISSET	Trisetum spp. Oatgrass
VACULI	Vaccinium uliginos Bog blueberry	JUNCUS	Juncus spp.	ELYMUC	Elymus arvensis
VACVIT	Vaccinium vitis-ida Mountain cranberry	LUZ	Luzula spp.	POAPAL	Poa palustris
		SCICAE	Scirpus caespitos Tufted clubmoss		
% FORBS		% FORBS		% FERNES	
ARNICA	Arnica	LISCOR	Listera cordata Heart-leaved tway	ADIPED	Adiantum pedatu Malden-hair fern
CAL	Calluna	LYSAME	Lysochitum ameri Skunk cabbage	ATHFIL	Athyrium filix-feml Lady fern
CAS	Castilleja	MAIDIL	Malanthemum dill Deerberry	BLESPI	Blechnum apicant Deer fern
CIRALP	Circaea alpina	MONUNI	Moneses uniflora Single delight	DRYAUS	Dryopteris austriac Spinulose shield fern
CLASIB	Clintonia sibirica	OSM	Osmorhiza	GYMDRY	Gymnocarpium dr Oak fern
CLUNO	Clintonia uniflora	PREALA	Prenanthes alata Sweet cicely	POLGLY	Polypodium glycyrr Licorice fern
COPASP	Copita asplenifolia Fern-leaf goldthre	PYR	Pyrola Wintergreen	PTEAQU	Pteridium aquilinu Bracken fern
COPTRI	Copita trifolia	RAN PAC	Ranunculus pacificus Buttercup	THEPHE	Thelypteris phego Northern beech fern
CORCAN	Cornus canadensis Bunchberry	RUBARC	Rubus arcticus Nagoonberry		
DODECA	Dodecatheon spp. Shooting star	RUBCHA	Rubus chamaem Cloudberry		
DROSER	Drosera spp. Sundew	RUBPED	Rubus pedatus 5-leaf Bramble		
EPIMYS	Epilobium angustifolium Fireweed	SAN	Sanguisorba Burnet		
ERIPER	Eriogon pereginiu Subalpine daisy	SAX	Saxifraga Saxifrage		
FAUCRI	Fauria crista-galli Deer cabbage	STRAMP	Streptopus ample Claspig twisted-stalk		
GALTRI	Galium triflorum Bedstraw	STRSOS	Streptopus roseu Rosy twisted-stalk		
GENDOU	Gentiana douglasii Swamp gentian	STRSTR	Streptopus strept Krushe		
GEUMAC	Geum macrophyll Calth-leaved aven	TIATRI	Tiarella trifoliata Trifoliolate foamfl		
HAB	Habenaria Bog orchid	TRIEUR	Trientalis europaea Arcto starflower		
HERLAN	Heracleum lanatu Cow parsnip	VALSIT	Valeriana sitchens Silka valerian		
LINBOR	Linnaea borealis Twinflower	VERVIR	Veratrum viride False hellebore		
LISCAU	Listera caurina Twayblade	VIOGLA	Viola glabella Stream violet		
ANALUC	Anemone lucida	VIOLAN	Viola langsdorffii Alaska violet		
CONCHI	Conostictium chinense	AEELAT	Aster laevis		
LIGSRO	Ligustrum scoparium	CARDAM	Cardamine sp. Mustard		
VEGIG	Vicia gigantea	RUMTRA	Rumex crispus Dock		
ACHBOE	Achillea borealis	DENSAR	Dianthus sarmentosa		
TAROFF	Taraxacum officinale Dandelion				

* See key - supply for counts, etc.

plot 6

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA (5/93)											
GENERAL INFORMATION											
IDENTIFICATION											
KEY ID 93SJT 12	MONTH/DAY 6/11	VCU —	CONTROL NO. 5211	PERMANENT PLOT ID SNHP 6	ASSOC. DATA CARDS SP <u>VG</u> MU SE WL WD GR O			EDIT STATUS 1			
MAP UNIT KEY ID —	PURPOSE IR	PLOT SIZE 42 FT M W FT M	PHOTOS ROLL — EXP. —	STAND ID —	MAP UNIT —	BLOCK/UNIT/SETTING (GRIT) —					
LOCATION											
GENERAL LOCATION Sitka National Historical Park		QUAD Sitka A-4	1/4 QUAD NW NE SW SE	LEGAL LOCATION 1/4 OF THE 1/4 OF SECTION T. S. R. E. DATE			AERIAL PHOTOGRAPH ID				
LATITUDE DEG. N MIN. SEC. HSEC.				LONGITUDE DEG. W MIN. SEC. HSEC.							
SITE											
ELEV. (FT.) —	ASPECT (°) 170 (0 FOR FLAT)	SLOPE (%) 5	ANGLE TO THE HORIZON (% WITH + OR -) +14 E S W			LANDFORM 74	LANDSCAPE POSITION 18				
HORIZ. SHAPE X	VERT. SHAPE U	EROSION STATUS ST TYPE N		NOTES							
GROUND COVER (%)											
BARE GRD. 0	ROCK FRAGS. 0	ROCK OUTCRP 0	LITTER (< 1/4") 30	SM. WOODY 5	WOODY (> 5") 4	MOSS/LICHEN 60	MOSS ON RK. 0	WATER 0	OTHER		
VEGETATION											
PLANT ASSOC. 120	SERE 5	FOREST TYPE X	VACC HGT (FT.) 3 1/2	VERATRUM (HELLEBORE) 0			LYSICHITUM (SKUNK CABBAGE) 0				
ABUNDANCE		POSITION		CLUMPED?		ABUNDANCE		POSITION		CLUMPED?	
lichen abun. 0	snag abun. 1	mtce 1	fluting 3	forage 0			NOTES				
DEER (Vaccin)		MOOSE (Salix)		BEAR (Lysame)							
WILDLIFE/DISTURBANCE OBSERVATIONS											
WILDLIFE OBSERVATIONS (especially bear, deer, moose, wolf, otter, mink, marten, bat, eagle, hawk, owl, murrelet)											
SPECIES <u>raun</u>	OBSERVATION: <u>SIGHTING</u> , <u>SOUND</u> , SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, <u>OTHER</u> <u>feathers</u>										
SPECIES <u>nd squirrel</u>	OBSERVATION: <u>SIGHTING</u> , <u>SOUND</u> , SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, <u>OTHER</u> <u>middens</u>										
SPECIES <u>leash</u>	OBSERVATION: <u>SIGHTING</u> , <u>SOUND</u> , SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, <u>OTHER</u> <u>icavers</u>										
SPECIES <u>kinglets</u>	OBSERVATION: <u>SIGHTING</u> , <u>SOUND</u> , SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, <u>OTHER</u>										
avalanche	mass waste	slumps	flooding	blowdown	jackstraw	pistol butt	logged	road	other human		
Y <u>(N)</u>	Y <u>(N)</u>	Y <u>(N)</u>	Y <u>(N)</u>	Y <u>(N)</u>	Y <u>(N)</u>	Y <u>(N)</u>	Y <u>(N)</u>	Y <u>(N)</u>	Y <u>(N)</u>	Y <u>(Y)</u> N	
EXTENT						AGE				TYPE Trails	

PLOT 6

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA
GENERAL INFORMATION (SIDE 2)

[illegible]

PLOT 6

USDA FOREST SERVICE TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA VEGETATION CARD (5/93)														
KEYID 93SJ T 12 SAMPLED N										FIXED RADIUS PLOT				
VARIABLE PLOT (TREES)										Plot radius = 42 ft; 4 ft. rad. = 1%; 9 ft. rad. = 5%; 13 ft. rad. = 10%				
Basal Area Factor		20 40 Other		Mean Hgt Canopy				(feet)						
Tree-Num	Core *	Species (6 code)	Tree Class	DBH (in.)	HGT (ft.)	Meas	Proj	Lean >20°	Crown Ratio	Crown Class	Snag Decay			
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														

* Label core area with plot KEYID, variable plot TREENUM and # of pieces.

COARSE WOODY DEBRIS (> 5 in.; transect 16 ft. wide, plot top to bottom)														
Woody-num	Species (6-code)	Diam (in.)	Length (ft.)	Decay Class	Root-wad	Stump	Wind-snap	Wind-throw						
1	TSUHET	18	14	2					gnawed					
2	TSUHET	10	2	4										
3	TSUHET	5	8	3					cut					
4	TSUHET	6	1 1/2	3					cut					
5	TSUHET	17	3	5										
6	TSUHET	6	10	4										
7	PICSH	7	1	3					cut					
8	TSUHET	26	1	5										
9														
10														
11														
12														

STRATUM TOTALS				
	%	Hgt. (ft)	%	
Overstory	70			Tall Shrub
Understory	3			Low Shrub
Seedling	5			Forb
Sapling	1			Fern/Fern Ally
Total Trees (Under + Over)	75			Sedge/Graminoid
				CWD Regen

TALL SHRUBS				
	%	Hgt. (ft)	%	
ALNSIN				Silka alder
CLAPYR				Copperbush
MENFER	12	6 1/2		Rusty menziesia
MYRGAL				Sweet gale
OPLHOR	1	3		Devil's club
RIB				Current/gooseberry
RUBPAR				Thimbleberry
RUBSPE				Salmonberry
SALIX				Willow
SAMRAC				Elderberry
SORSIT				Mountain ash
VACCIN	8	3 1/2		Vaccinium oval./alaskae. Blueberry
VACPAR	15	5		Vaccinium parvifolium Red huckleberry
VIBEDU				Viburnum edule Highbush cranberry

% LOW SHRUBS		% SEDGES AND RUSHES		% GRAMINIDS	
ANDPOL	Andromeda polifolia	CAR	Carex	GRAMIN	Grasses
EMPNI	Empetrum nigrum	CAR	Carex	AGROST	Agrostis spp.
KALPOL	Kalmia polifolia	CAR	Carex	CALCAN	Calamagrostis can.
LEDGRO	Ledum groenlandi	CARANT	Carex anthoxanthea	CALNUT	Calamagrostis nut
LUEPEC	Luetkea pectinata	CARNIG	Carex nigricans	DESATR	Deschampsia atro
PHYGLA	Phyllodoce glauca	CARPAU	Carex pauciflora	ERIOPH	Eriophorum spp.
VACCOX	Vaccinium oxycoc	CARPLU	Carex pluriflora	PHILALP	Phileum alpinum
VACULI	Vaccinium uliginos	CARSIT	Carex sitchensis	TRISSET	Trisetum spp.
VACVIT	Vaccinium vitis-ida	JUNCUS	Juncus spp.		
		LUZ	Luzula spp.		
		SCICAE	Solipus caespitos		
			Tufted clubrush		
% FORBS		% FORBS		% FERNIS	
ARNICA	Arnica spp.	LISCOR	Listera cordata	ADIPED	Adiantum pedatu
CAL	Calla	LYSAME	Lysichitum ameri	ATHFIL	Athyrium filix-feml
CAS	Castilleja	MAIDIL	Malanthemum dill	BLESPI	Blechnum spicant
CIRALP	Circaea alpina	MONUNI	Moneses uniflora	DRYALUS	Dryopteris austriac
CLASIB	Claytonia alibrica	OSM	Osmorhiza	GYMDRY	Gymnocarpium dr
CLJUNI	Clintonia uniflora	PREALA	Prenanthes alata	POLGLY	Polypodium glycyrr
COPASP	Copitis asplenifolia	PYR	Pyrola	POTEAU	Peridium aquilinu
COPTRI	Copitis trifolia	RAN	Ranunculus	THEPHE	Thelypteris phego
CORCAN	Cornus canadensis	RUBARG	Rubus arcticus		
DODECA	Dodecatheon spp.	RUBCHA	Rubus chamaem		
DROSER	Drosera spp.	RUBPED	Rubus pedatus		
EPI	Epilobium	SAN	Sanguisorba		
ERIPER	Eriogon peregryn	SAX	Saxifraga		
FAUCRI	Fauria crista-galli	STRAMI	Streptopus ample		
GAL	Gallium	STRO9	Streptopus roseu		
GENDOU	Gentiana douglasii	STRSTR	Streptopus strept		
GEUMAG	Geum macrophyll	TIATRI	Tiarella trifoliata		
HAB	Habenaria	TRIEUR	Trientalis europea		
HERLAN	Hieracium lanatu	VALSIT	Valeriana sitchens		
LINBOR	Linnaea borealis	VERVIR	Veratrum viride		
LISCAU	Listera caurtina	VIOGLA	Viola glabella		
		VIOLAN	Viola lingsdortii		
		CORNER	Corallorhiza mertensiana		
			- Coral root		
% FERN ALLIES		% FERN ALLIES		% FERN ALLIES	
EQUISE	Equisetum spp.				
LYC	Lycopodium				
LYCANN	Lycopodium annot				
LYCCLA	Lycopodium clavat				
LYCSEL	Lycopodium selag				
LYCSIT	Lycopodium slitch				
SPHAG	Sphagnum spp.				
NOTES					
Compet of MIDOL - esp. 2. 1/3 plot w/ few shrub		well-distributed		low forb diversity, low density	

plot 7

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA (5/93)												
GENERAL INFORMATION												
IDENTIFICATION												
KEY ID 93SJT 15		MONTH/DAY 6/11		VCU —		CONTROL NO. 5214		PERMANENT PLOT ID SNHP 7		ASSOC. DATA CARDS SP ☒ VG MU SE WL WD GR O		EDIT STATUS 1
MAP UNIT KEY ID —		PURPOSE IR		PLOT SIZE 42.7 M W FT M		PHOTOS ROLL X EXP.		STAND ID —		MAP UNIT —		BLOCK/UNIT/SETTING (GRIT) —
LOCATION												
GENERAL LOCATION Sitka National Historical Park		QUAD Sitka A-4		1/4 QUAD NW NE SW SE		LEGAL LOCATION 1/4 OF THE 1/4 OF SECTION T. S. R. E. DATE				AERIAL PHOTOGRAPH ID		
LATITUDE				LONGITUDE								
DEG. N	MIN.	SEC.	HSEC.	DEG. W	MIN.	SEC.	HSEC.					
SITE												
ELEV. (FT.) —		ASPECT (α) 200 (0 FOR FLAT)		SLOPE (%) 2		ANGLE TO THE HORIZON (% WITH + OR -) +33 E		LANDFORM +16 S		LANDSCAPE POSITION +23 W		
HORIZ. SHAPE C		VERT. SHAPE U		EROSION ST STATUS		N TYPE		NOTES				
GROUND COVER (%)												
BARE GRD.	0	0	30	2	2	70	0	0	OTHER			
VEGETATION												
PLANT ASSOC. 160		SERIE 5		FOREST TYPE X		VACC HGT (FT.) 2		VERATRUM (HELLEBORE) 0		LYSICHITUM (SKUNK CABBAGE) 0		
LICHEN ABUN. 1		SNAG ABUN. 1		M/TCE 3		FLUTING 3		ABUNDANCE 0		CLUMPED?		
DEER (Vaccin)		MOOSE (Salix)		BEAR (Lysame)		NOTES						
WILDLIFE/DISTURBANCE OBSERVATIONS												
WILDLIFE OBSERVATIONS (especially bear, deer, moose, wolf, otter, mink, marten, bat, eagle, hawk, owl, murrelet)												
SPECIES		OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES		OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES		OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES		OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
AVALANCHE		MASS WASTE		SLUMPS		FLOODING		BLOWDOWN		JACKSTRAW		
Y	(N)	Y	(N)	Y	(N)	Y	(N)	Y	(N)	Y	(N)	
EXTENT		AGE		ROAD		OTHER HUMAN						

gravel, cup storage area

PLOT 7

USDA FOREST SERVICE TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA VEGETATION CARD (5/93)															
FIXED RADIUS PLOT															
Plot radius = 42 ft; 4 ft. rad. = 1%; 9 ft. rad. = 5%; 13 ft. rad. = 10%															
VARIABLE PLOT (TREES)															
SAMPLED 15															
Baal Area Factor 20 40 Other															
Tree- Num	Core *	Species (6 code)	Tree Class	DBH (in.)	HGT (ft.)	Meas	Proj	Lean > 20°	Crown Ratio	Crown Class	Snag Decay				
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
* Label cores with plot KEYID, variable plot TREENUM and # of pieces.															
COARSE WOODY DEBRIS (> 5 in.; transect 16 ft. wide, plot top to bottom)															
Woody- num	Species (6 code)	Diam (in.)	Length (ft.)	Decay Class	Root wad	Stump	Wind- snap	Wind- throw							
1	TSUHE	10	35	3											
2	TSUHE	13	1	4		✓									
3	PICST	17	32	3											
4	TSUHE	38	15	3											
5															
6															
7															
8															
9															
10															
11															
12															

% Over			% Under TREES		
ALNRUB	Alnus rubra				Red Alder
CHANO	Chamaecyparis nootkate				Yellow-cedar
PICST	Picea sitchensis	15			Sitka spruce
PINCON	Pinus contorta				Shorepine
POPTRI	Populus trichocarpa				Black Cottonwood
TSUHET	Tsuga heterophylla	35	6		Western Hemlock
TSUMER	Tsuga mertensiana				Mountain Hemlock

% Hgt. (ft) TALL SHRUBS		
ALNSIN	Alnus sinuata	Sitka alder
CLAPYR	Cladanthamnus pyrolaei	Copperbush
MENFER	Menziesia ferruginea	Rusty menziesia
MYRGAL	Myrica gale	Sweet gale
OPLHOR	Oplanax horridum	Devil's club
RIB BCT	Ribes bracteosum	Current/gooseberry
RUBPAR	Rubus parviflorus	Thimbleberry
RUBSPE	Rubus spectabilis	Salmonberry
SALIX	Salix sp.	Willow
SAMPAC	Sambucus racemosa	Elderberry
SORSIT	Sorbus sitchensis	Mountain ash
VACCIN	Vaccinium oval./alaskae	Blueberry
VAGPAR	Vaccinium parvifolium	Red huckleberry
VIBEDU	Viburnum edule	Highbush cranberry

STRATUM TOTALS		
Overstory	45	%
Understory	6	%
Seedling	1	%
Sapling	5	%
Total Trees (Under + Over)	50	%
Tall Shrub	30	%
Low Shrub	—	%
Forb	20	%
Fern/Forb Ally	15	%
Sedge/Graminoid	—	%
CWD Regen	100	%

[illegible]

plot 8

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA (5/93)											
GENERAL INFORMATION											
IDENTIFICATION											
KEY ID 930319	MONTH/DAY 6/12	VCU —	CONTROL NO. 5218	PERMANENT PLOT ID S-4P2	ASSOC. DATA CARDS SP (VG) MU SE WL WD GR O			EDIT STATUS /			
MAP UNIT KEY ID —	PURPOSE IR	PLOT SIZE L(R) 42 FT M W FT M	PHOTOS ROLL X EXP.	STAND ID —	MAP UNIT —	BLOCK/UNIT/SETTING (GRIT)					
LOCATION											
GENERAL LOCATION Sitka National Hatched Park		QUAD Sitka A4	1/4 QUAD NW NE SW SE	LEGAL LOCATION 1/4 OF THE 1/4 OF SECTION T. S. R. E. DATE				AERIAL PHOTOGRAPH ID			
LATITUDE DEG. N MIN. SEC. HSEC.				LONGITUDE DEG. W MIN. SEC. HSEC.							
SITE											
ELEV. (FT.) —	ASPECT (°) 202 (0 FOR FLAT)	SLOPE (%) 6	ANGLE TO THE HORIZON (% WITH + OR -) +46 E	+15 S	+35 W	LANDFORM 53		LANDSCAPE POSITION 45			
HORIZ. SHAPE U	VERT. SHAPE U	EROSION ST STATUS	N TYPE	Plot extends almost to trail; NOTES: to opening w/ picnic shelter (N side) (W side)							
GROUND COVER (%)											
1/2 BARE GRD.	T ROCK FRAGS.	0 ROCK OUTCRP	55 LITTER (< 1/4")	3 SM. WOODY	2 WOODY (> 5")	40 MOSS/LICHEN	0 MOSS ON RK.	0 WATER	OTHER		
VEGETATION											
PLANT ASSOC. 352	SERE 4	FOREST TYPE A	VACCI HGT. (FT.) —	VERATRUM (HELLEBORE) 0 ABUNDANCE POSITION CLUMPED?			LYSICHITUM (SKUNK CABBAGE) 1 3 ABUNDANCE POSITION CLUMPED?				
lichen abun. 1	SNAG ABUN. 0	MTOE —	FLUTING —	FORAGE — DEER (Vaccin) MOOSE (Salix) BEAR (Lysame)			NOTES				
WILDLIFE/DISTURBANCE OBSERVATIONS											
WILDLIFE OBSERVATIONS (especially bear, deer, moose, wolf, otter, mink, marten, bat, eagle, hawk, owl, murrelet)											
SPECIES Red squirrel	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
AVALANCHE Y	MASS WASTE Y	SLUMPS Y	FLOODING Y	BLOWDOWN Y	JACKSTRAW Y	PISTOL BUTT Y	LOGGED Y	ROAD Y	OTHER HUMAN Y TYPE Trail.		

Picnic shelter

Plot 8

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA

GENERAL INFORMATION (SIDE 2)

[illegible]

USDA FOREST SERVICE TONGASS NATIONAL FOREST - CHIATHAM AREA - ALASKA VEGETATION CARD (5/93)

KEYID Q351111 SAMPLED N

Plot radius = 42 ft; 4 ft. rad. = 1%; 9 ft. rad. = 5%; 13 ft. rad. = 10%

VARIABLE PLOT (TREES)									
Tree-Num	Core #	Species (6 code)	20	40	Other	Mean Hgt Canopy	DBH (in.)	HGT (ft.)	Mean
Basal Area Factor	Tree-Num	Core #	Species (6 code)	20	40	Other	Mean Hgt Canopy	DBH (in.)	HGT (ft.)
1	1								
2	2								
3	3								
4	4								
5	5								
6	6								
7	7								
8	8								
9	9								
10	10								
11	11								
12	12								
13	13								
14	14								
15	15								

* Label cores with plot KEYID, variable plot TREENUM and # of pieces.

COARSE WOODY DEBRIS (> 6 in.; transect 16 ft. wide, plot top to bottom)									
Woody-num	Species (6-code)	Diam (in.)	Length (ft.)	Decay Class	Root wad	Wind-snap	Wind-throw		
1	ALN	12	8	3	✓				
2	TSU	5	24	3					
3	TSU	15	7	3					
4	ALN	8	17	3	✓				
5									
6									
7									
8									
9									
10									
11									
12									

TALL SHRUBS									
Species	Hgt. (ft)	%	Notes	Species	Hgt. (ft)	%	Notes	Species	Hgt. (ft)
ALN				ALN				ALN	
CLPYR				CLPYR				CLPYR	
MENFER				MENFER				MENFER	
MYRGAL				MYRGAL				MYRGAL	
OPHOR				OPHOR				OPHOR	
RIB				RIB				RIB	
RUBPAR				RUBPAR				RUBPAR	
RUBSPE				RUBSPE				RUBSPE	
SAUX				SAUX				SAUX	
SAMRAC				SAMRAC				SAMRAC	
SORSIT				SORSIT				SORSIT	
VACCIN				VACCIN				VACCIN	
VACPAR				VACPAR				VACPAR	
VIBEDU				VIBEDU				VIBEDU	

STRATUM TOTALS									
Stratum	Species	Hgt. (ft)	%	Notes	Stratum	Species	Hgt. (ft)	%	Notes
Overstory	ALN	40	40		Overstory	ALN	40	40	
Understory	CLPYR	11	11		Understory	CLPYR	11	11	
Seedling	TSU	1	1		Seedling	TSU	1	1	
Sapling	ALN	4	4		Sapling	ALN	4	4	
Total Trees	ALN	80	80		Total Trees	ALN	80	80	
(Under + Over)	ALN	50	50		(Under + Over)	ALN	50	50	

Plot 89

plot 9

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA (5/93)										
GENERAL INFORMATION										
IDENTIFICATION										
KEY ID 935JT18	MONTH/DAY 6/11	VCU —	CONTROL NO. 5217	PERMANENT PLOT ID SNHP 9	ASSOC. DATA CARDS SP ☒ VG MU SE WL WD GR O			EDIT STATUS 1		
MAP UNIT KEY ID —	PURPOSE IR	PLOT SIZE 42 FT M W FT M	PHOTOS ROLL X EXP.	STAND ID —	MAP UNIT —	BLOCK/UNIT/SETTING (GRIT) —				
LOCATION										
GENERAL LOCATION Sitka National Historical Park		QUAD Sitka A-4	1/4 QUAD NW NE SW SE	LEGAL LOCATION 1/4 OF THE 1/4 OF SECTION T. S. R. E. DATE			AERIAL PHOTOGRAPH ID			
LATITUDE DEG. N MIN. SEC. HSEC.			LONGITUDE DEG. W MIN. SEC. HSEC.							
SITE										
ELEV. (FT.) —	ASPECT (°) 180 (0 FOR FLAT)	SLOPE (%) 4	ANGLE TO THE HORIZON (% WITH + OR -) +38 E S W			LANDFORM 61	LANDSCAPE POSITION 49, 15			
HORIZ. SHAPE C	VERT. SHAPE C	EROSION UE STATUS	DE TYPE	Soil area near road Receives road runoff Alder in presit, SRSIT			NOTES Water over bare ground in winter times			
GROUND COVER (%)										
BARE GRD. 10	ROCK FRAGS. 0	ROCK OUTCRP. 0	LITTER (< 1/4") 55	SM. WOODY 3	WOODY (> 5") 15	MOSS/LICHEN 20	MOSS ON RK. 0	WATER —	OTHER	
VEGETATION										
PLANT ASSOC. 352	SERE 3	FOREST TYPE A	VACCI HGT (FT.) 3	VERATRUM (HELLEBORE) 0 ABUNDANCE POSITION CLUMPED?			LYSICHITUM (SKUNK CABBAGE) 2 1 Y ABUNDANCE POSITION CLUMPED?			
lichen ABUN. 0	SNAG ABUN. 1	MTCCE 3	FLUTING 3	FORAGE 0 — 0 DEER (Vaccn) MOOSE (Salix) BEAR (Lysame)			NOTES			
WILDLIFE/DISTURBANCE OBSERVATIONS										
WILDLIFE OBSERVATIONS (especially bear, deer, moose, wolf, otter, mink, marten, bat, eagle, hawk, owl, murrelet)										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER									
avalanche	mass waste	slumps	flooding	blowdown	jackstraw	pistol butt	logged	road	other human	
Y ☒ N	Y ☒ N	Y ☒ N	Y ☒ N	Y ☒ N	Y ☒ N	Y ☒ N	Y ☒ N	Y ☒ N	Y ☒ N	Y ☒ N
EXTENT	AGE								TYPE Trail	

PLOT 9

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA
GENERAL INFORMATION (SIDE 2)

NOTES

DIAGRAM

PLOT 9

USDA FOREST SERVICE TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA VEGETATION CARD (5/93)														
FIXED RADIUS PLOT														
Plot radius = 42 ft; 4 ft. rad. = 1%; 9 ft. rad. = 5%; 13 ft. rad. = 10%														
VARIABLE PLOT (TREES)														
Basal Area Factor		20		40		Other		Mean Hgt Canopy			(feet)			
Tree-Num	Core *	Species (6 code)	Tree Class	DBH (in.)	HGT (ft.)	Meas	Proj	Lean	Crown Ratio	Crown Class	Snag	Decay		
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														

* Label cores with plot KEYID, variable plot TREENUM and # of places.														
COARSE WOODY DEBRIS (> 5 in.; transect 16 ft. wide, plot top to bottom)														
Woody-num	Species (6-code)	Diam (in.)	Length (ft.)	Decay Class	Root wad	Stump	Wind-snap	Wind-throw						
1	TSUHE	10	10	2	✓			✓						
2		9	3	4		✓		✓						
3		10	6	2	✓			✓						
4	PICST	26	22	3	✓			✓						
5	TSUHE	28	5	5			✓							
6		20	5	5										
7		30	6	3	✓			✓						
8		5	6	3	✓			✓						
9		25	9	4										
10														
11														
12														

STRATUM TOTALS															
										%		%			
Overstory											10		Tall Shrub	40	
Understory											25		Low Shrub		
Seedling											1		Forb	15	
Sapling											6		Fern/Fern Ally	7	
Total Trees (Under + Over)											25		Sedge/Grasshold	7	
												CWD Regen	100		

TALL SHRUBS																
										%		Hgt. (ft)				
ALNSIN											1		12	Sitka alder		
CLAPYR														Copperbush		
MENFEB											7		3	Rusty menziesia		
MYRGAL														Myrica gale		
OPLHOR											4		6	Oplopanax horridum		
RIB BKA											7		1	Ribes <i>broctosum</i>		
RUBPAR														Rubus parviflorus		
RUBSPE											20		7	Rubus spectabilis		
SALIX											7		20	Salix sp.		
SAMPAC											5		11	Sambucus racemosa		
SORSIT											4		25	Sorbus sitchensis		
VACCIN											4		3	Vaccinium oval/alaskae		
VACPAR														Vaccinium parvifolium		
VIBEDU														Viburnum edule		

Understory																
ALNSIN														Sitka alder		
CLAPYR														Copperbush		
MENFEB														Rusty menziesia		
MYRGAL														Myrica gale		
OPLHOR														Oplopanax horridum		
RIB BKA														Ribes <i>broctosum</i>		
RUBPAR														Rubus parviflorus		
RUBSPE														Rubus spectabilis		
SALIX														Salix sp.		
SAMPAC														Sambucus racemosa		
SORSIT														Sorbus sitchensis		
VACCIN														Vaccinium oval/alaskae		
VACPAR														Vaccinium parvifolium		
VIBEDU														Viburnum edule		



plot 10

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA (5/93)											
GENERAL INFORMATION											
IDENTIFICATION											
KEY ID 93SJT 17	MONTH/DAY 6/11	VCU —	CONTROL NO. 5216	PERMANENT PLOT ID SNHP 10	ASSOC. DATA CARDS SP ☒ VG MU SE WL WD GR O			EDIT STATUS 1			
MAP UNIT KEY ID —	PURPOSE 1R	PLOT SIZE 42 FT M	PHOTOS ROLL X EXP.	STAND ID —	MAP UNIT —	BLOCK/UNIT/SETTING (GRIT)					
LOCATION											
GENERAL LOCATION Sitka National Historical Park		QUAD Sitka AH	1/4 QUAD NW NE SW SE		LEGAL LOCATION 1/4 OF THE 1/4 OF SECTION T. S. R. E. DATE			AERIAL PHOTOGRAPH ID			
LATITUDE DEG. N MIN. SEC. HSEC.				LONGITUDE DEG. W MIN. SEC. HSEC.							
SITE											
ELEV. (FT.) —	ASPECT (°) 288 (0 FOR FLAT)	SLOPE (%) 2	ANGLE TO THE HORIZON (% WITH + OR -) +26 E S		LANDFORM +15 W		LANDSCAPE POSITION 61		18		
HORIZ. SHAPE U	VERT. SHAPE U	EROSION ST STATUS	TYPE N		NOTES Plot = 2nd growth Depauperate understory, extensive litter, woody debris. A few large residual trees. Plot extends almost to trees on either side						
GROUND COVER (%)											
BARE GRD. 0	ROCK FRAGS. 1	ROCK OUTCRP 0	LITTER (< 1/4") 90	SM. WOODY 5	WOODY (> 5") 25	MOSS/LICHEN 3	MOSS ON RK. 0	WATER 0	OTHER —		
VEGETATION											
PLANT ASSOC. 110	SERE 3	FOREST TYPE X	VACCI HGT. (FT.) —	VERATRUM (HELLESORE) 0			LYSICHITUM (SKUNK CABBAGE) 0				
ABUNDANCE	POSITION	CLUMPED?	ABUNDANCE	POSITION	CLUMPED?	ABUNDANCE	POSITION	CLUMPED?			
LICHEN ABUN. 1	SNAG ABUN. 1	MTCOE 1	FLUTING 3	FORAGE —			NOTES Tree = 3 under 5 residuals from blow down event Rock logs — w/ no stumps				
DEER (Vaccin)	MOOSE (Salix)	BEAR (Lysame)									
WILDLIFE/DISTURBANCE OBSERVATIONS											
WILDLIFE OBSERVATIONS (especially bear, deer, moose, wolf, otter, mink, marten, bat, eagle, hawk, owl, murrelet)											
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
AVALANCHE Y	MASS WASTE Y	SLUMPS Y	FLOODING Y	BLOWDOWN Y	JACKSTRAW Y	PISTOL BUTT Y	LOGGED Y	ROAD Y	OTHER HUMAN N		
(N)	(N)	(N)	(N)	EXTENT 2	(N)	(N)	(N)	(N)	TYPE Trails		

PLOT 10

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA
GENERAL INFORMATION (SIDE 2)

[illegible]

[illegible]

plot 11

USDA FOREST SERVICE - TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA (5/93)											
GENERAL INFORMATION											
IDENTIFICATION											
KEY ID 935JT16	MONTH/DAY 6/11	VCU —	CONTROL NO. 5215	PERMANENT PLOT ID SNHP11	ASSOC. DATA CARDS SP ☒ VG ☐ MU ☐ SE ☐ WL ☐ WD ☐ GR ☐ O ☐			EDIT STATUS 1			
MAP UNIT KEY ID —	PURPOSE 12	PLOT SIZE 42 FT M	PHOTOS ROLL X EXP.	STAND ID —	MAP UNIT —	BLOCK/UNIT/SETTING (GRIT) —					
LOCATION											
GENERAL LOCATION Sitter National Historical Park		QUAD Sitter A4	1/4 QUAD NW NE SW SE	LEGAL LOCATION 1/4 OF THE 1/4 OF SECTION T. S. R. E. DATE			AERIAL PHOTOGRAPH ID				
LATITUDE DEG. N MIN. SEC. HSEC.				LONGITUDE DEG. W MIN. SEC. HSEC.							
SITE											
ELEV. (FT.) —	ASPECT (°) 0 (0 FOR FLAT)	SLOPE (%) 0	ANGLE TO THE HORIZON (% WITH + OR -) +30 E		LANDFORM +10 S +2 W 71		LANDSCAPE POSITION 16				
HORIZ. SHAPE F	VERT. SHAPE F	EROSION UE STATUS	DE TYPE	NOTES Did not find census marker - used bearings, and marks distances to approximate plot location							
GROUND COVER (%)											
BARE GRD. 1	ROCK FRAGS. T	ROCK OUTCRP 0	LITTER (< 1/4") 10	SM. WOODY 0	WOODY (> 5") 0	MOSS/LICHEN 0	MOSS ON RK. 0	WATER —	OTHER slaweed 3		
VEGETATION											
PLANT ASSOC. 999	SERE —	FOREST TYPE —	VACCI HGT (FT.) —	VERATRUM (HELLEBORE) ABUNDANCE POSITION CLUMPED?			LYSICHITUM (SKUNK CABBAGE) ABUNDANCE POSITION CLUMPED?				
UCHEN ABUN. —	SNAG ABUN. —	MTOE —	FLUTING —	FORAGE DEER (Vaccin) MOOSE (Salix) BEAR (Lysame)			NOTES Non forest association Frequent flooding				
WILDLIFE/DISTURBANCE OBSERVATIONS											
WILDLIFE OBSERVATIONS (especially bear, deer, moose, wolf, otter, mink, marten, bat, eagle, hawk, owl, murrelet)											
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
SPECIES	OBSERVATION: SIGHTING, SOUND, SCAT, TRAIL, BED/DEN/NEST/ROOST, FOOD CACHE, EGGS, OTHER										
AVAILANCHE Y ☒ N	MASS WASTE Y ☒ N	SLUMPS Y ☒ N	FLOODING Y ☒ N	BLOWDOWN Y ☒ N EXTENT	JACKSTRAW Y ☒ N	PISTOL BUTT Y ☒ N	LOGGED Y ☒ N AGE	ROAD Y ☒ N	OTHER HUMAN TYPE Trails		

channel
sides

USDA FOREST SERVICE TONGASS NATIONAL FOREST - CHATHAM AREA - ALASKA VEGETATION CARD (5/93)

KEYID 93-337-16

SAMPLED 1

VARIABLE PLOT (TREES)

Tree- Num	Core #	Species (6 code)	20 40		Tree Class	Mean Hgt Canopy					(feet)	
			Basal Area Factor	Other		DBH (in.)	HGT (ft.)	Meas	Proj	Lean >20%	Crown Ratio	Snag Decay Class
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												

* Label cores with plot KEYID, variable plot TREENUM and # of pieces.

COARSE WOODY DEBRIS (> 5 in.; transect 16 ft. wide, plot top to bottom)

Woody- num	Species (6-code)	Diam (in.)	Length (ft.)	Decay Class	Root wad	Stump	Wind- snap	Wind- throw
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

FIXED RADIUS PLOT

Plot radius = 42 ft; 4 ft. rad. = 1%; 9 ft. rad. = 5%; 13 ft. rad. = 10%

	% Over	% Under	TREES
ALNRUB			Anus rubra
CHANO			Chamaecyparis nootkatensis
PICSI			Picea eldensis
PINCON			Pinus contorta
POPTRI			Populus trichocarpa
TSUHET			Tsuga heterophylla
TSUMER			Tsuga mertensiana

	%	Hgt. (ft)	TALL SHRUBS
ALNSIN			Anus sinuata
CLAPYR			Cladanthamnus pyrolaeif
MENFER			Menziesia ferruginea
MYRGAL			Myrica gale
OPLHOR			Oplopanax horridum
RIB			Ribes
RUBPAR			Rubus parviflorus
RUBSPE			Rubus spectabilis
SALIX			Salix sp.
SAMRAC			Sambucus racemosa
SORSIT			Sorbus sitchensis
VACCIN			Vaccinium oval./alaskae
VACPAR			Vaccinium parvifolium
VIBEDU			Viburnum edule

STRATUM TOTALS		%		%
Overstory			Tall Shrub	—
Understory			Low Shrub	—
Seedling			Forb	5
Sapling			Fern/Fern Ally	—
Total Trees (Under + Over)			Sedge/Graminoid	20
			CWD Regen	—

PLOT 11

LANDFORM CODES

10	MOUNTAIN SUMMITS LANDFORM ASSOCIATION
11	Rugged mountain summits
12	Founded mountain summits
13	Snow and ice
30	MOUNTAIN SLOPES LANDFORM ASSOCIATION
31	Frequently dissected, deeply incised mountain slopes
32	Frequently dissected, shallowly incised mountain slopes
35	Infrequently dissected, smooth mountain slopes
36	Broken mountain slopes or broken hill slopes
37	Mountain slope ravines
40	HILLS LANDFORM ASSOCIATION
42	Rolling hills
43	Frequently dissected hillslopes
44	Infrequently dissected, smooth hillslopes
45	Karst topography
50	VALLEY BOTTOM LANDFORM ASSOCIATION
51	Infrequently dissected footslopes
52	Frequently dissected footslopes and alluvial fans
53	Floodplains
54	Valley bottom gorges
60	LOWLANDS LANDFORM ASSOCIATION
61	Gently sloping lowlands
62	Flat lowlands
63	Kettle and kame topography
64	Outburst floodplains
65	Marine terraces
70	COASTAL LANDFORM ASSOCIATION
71	Estuaries
72	Beaches and dunes
73	Wave cut platforms and rock headlands
74	Uplifted beaches

LANDSCAPE POSITION

1	adjacent to	27	mound
2	backslope	28	nearly level
3	base of cliff	29	nose
4	beach fringe	30	old
5	bench	31	overflow channel
6	bench scarp	32	oversteep
7	blowdown	33	recent
8	bouldery slope	34	ridgetop
9	channel	35	rii
10	cirque headwall	36	rock outcrop
11	cliff	37	saddle
12	concave	38	seep
13	convex	39	shoulder
14	depositional slope	40	sideslope
15	depression	41	slide path
16	flat area	42	stable
17	footslope	43	steep
18	gently sloping	44	straight
19	hummock	45	swale
20	interfluv	46	talus apron
21	knob	47	toeslope
22	lower terrace	48	unstable
23	lower third	49	upper terrace
24	mid third	50	upper third
25	moderate	51	valley headwall
26	moraine	52	v-notch channel

PLANT ASSOCIATION CODES

WESTERN HEMLOCK SERIES

110	TSUHET/VACCIN	/blueberry
115	TSUHET/MENFER	/menziesia
120	TSUHET/VACCIN/DRYAU	/blueberry/shield fern
130	TSUHET/VACCIN/LYSAME	/blueberry/skunk cabbage
140	TSUHET/VACCIN/OPLHOR	/blueberry-devil's club
160	TSUHET/OPLHOR	/devil's club
165	TSUHET/OPLHOR-SHALLOW	/devil's club-shallow
170	TSUHET/OPLHOR/LYSAME	/devil's club/skunk cabbage

WESTERN HEMLOCK-YELLOW-CEDAR SERIES

210	TSUHET-CHANOO/VACCIN	/blueberry
220	TSUHET-CHANOO/VACCIN/LYSAME	/blueberry/skunk cabbage
230	TSUHET-CHANOO/MENFER	/menziesia
250	TSUHET-CHANOO/VACCIN-OPLHOR	/blueberry-devil's club

SITKA SPRUCE SERIES

310	PICSIT/VACCIN	/blueberry
320	PICSIT/VACCIN-OPLHOR	/blueberry-devil's club
330	PICSIT/OPLHOR	/devil's club
335	PICSIT/OPLHOR-RUBSPE	/devil's club-salmonberry
340	PICSIT/OPLHOR/LYSAME	/devil's club/skunk cabbage
345	PICSIT/OPLHOR-UPLAND	/devil's club-upland
352	PICSIT/ALNRUB/RUBSPE	/red alder/salmonberry
353	PICSIT/ALNSIT	/Sitka alder
350	PICSIT/CALNUT	/Pacific reedgrass
370	PICSIT/VACCIN/LYSAME	/blueberry/skunk cabbage
390	PICSIT-TSUMER/VACCIN	-mountain hemlock/blueberry

MIXED CONIFER SERIES

410	MXD CON/VACCIN	/blueberry
420	MXD CON/VACCIN/LYSAME	/blueberry/skunk cabbage
430	MXD CON/VACCIN/FAUCRI	/blueberry/deer cabbage
440	MXD CON/LYSAME-ATHFIL	/skunk cabbage-lady fern
491	MXD CON/CLAPYR	/copperbush

MOUNTAIN HEMLOCK SERIES

510	TSUMER/VACCIN	/blueberry
525	TSUMER/CLAPYR	/copperbush
530	TSUMER/CASSIO	/cassiope
540	TSEMER/VACCIN/FAUCRI	/blueberry/deer cabbage

SHOREPINE SERIES

610	PINCON/EMPNG	/crowberry
630	PINCON/CARSIT	/Sitka sedge

HORIZONTAL AND VERTICAL SLOPE

B	Broken	
C	Concave	
X	Convex	
F	Flat	(0-2% plot slope only)
S	Straight	
U	Undulating	

PARENT MATERIAL

A Volcanic ash
 AL Alluvium
 B Beach gravels and sands
 E Eluvium
 G Granitic bedrock
 GL Glaciomarine (fine sediments)
 GO Glacial Outwash
 M Calcareous Metasedimentary

N Non-calcareous metased.
 OF Organics, forest litter
 OG Organics, grass-sedge
 OS Organics, sphagnum
 OX Organics, shrub-forb
 R Residium
 S Colluvium
 T Ablation Till
 X Compact Till

Up to three codes may be used i.e. organic over till over granitics = OF-X-G

BEDROCK

G Granitics
 C Carbonate
 N Non-carbonate
 V Volcanics

BEDROCK2

CO Conglomerate
 DI Diorite
 GN Gneiss
 GR Granite
 GD Granodiorite
 GW Graywacke
 LS Limestone
 MB Marble
 PH Phyllite
 PS Phyllitic schist
 QZ Quartz
 QD Quartz diorite
 SS Sandstone
 SC Schist
 ST Siltite
 SL Slate
 TN Tonalite

ROCK FRACTURING

M Massive (no cracks)
 W Weak (some cracks)
 S Strong (highly broken)

ROCK WEATHERING

R Rotten
 I Intermediate
 H Hard

ROCK BEDDING

PP Perpendicular
 PL Parallel

IMPERMEABLE LAYER

X Compact till
 CA Compact ash
 P Placic
 B Bedrock
 F Fine sediments
 M Massive dense soil horizon

FLOODING Frequency

N None
 R Rare (0-5 in 100 yrs)
 O Occas (5-50/100 yrs)
 F Freq (>50/100 yrs)
 C Common (lumps O and F)

Duration

VB Very brief (less than 2 days)
 B Brief (2-7 days)
 L Long (7-30 days)
 VL Very long (>30 days)

Time Specify month(s) of flooding as numeral (e.g. May through Oct. = 5-10)

DRAINAGE

VP Very poorly drained
 P Poorly drained
 SP Somewhat poorly drained
 MW Moderately well drained
 W Well drained
 SE Somewhat excessively drained
 ED Excessively drained

SAMPLED

N Not sampled
 CS Correlation samples
 PP Private lab, partial
 PC Private, complete
 SP SCS Nat'l lab, partial
 SC SCS Nat'l lab, complete

EDIT STATUS

no entry field information taken but not verified
 1 field (evening office) verified
 2 database entry initiated, but problems pending resolution
 3 database entry finalized

PURPOSE

IR Integrated resource inventory
 EC Eco-team projects
 SE Stand exam
 WS Wildlife support
 GR GRIT projects
 TS Timber support
 ES Engineering support
 OT Other (specify)

EROSION STATUS

ST Soil surface stable and no evidence of accelerated erosion
 X Unable to assess
 UC Soil surface unstable due to compaction
 UD Soil surface unstable due to displacement and/or churning
 UE Soil surface unstable; accelerated erosion.

TYPE

N Not applicable SC Soil creep
 SE Sheet erosion SL Slump
 RE Rill erosion TD Terrace development
 GE Gully erosion SD Slide
 De Deposition OT Other (specify)
 WE Wind erosion

GROUND COVER

LITTER less than 1/4 inch diameter (for example, needles, twigs).
 SM WOODY larger than 1/4 inch but less than 5 inches ave. diam.
 WOODY coarse woody debris (larger than 5 inches ave. diam.)

SERE

1 Early successional: graminoid-forb
 2 Shrub-seedling
 3 Sapling-pole young forest (early second growth)
 4 Young saw timber (even-aged, >9" DBH)
 5 Mature
 6 Old growth (multiple canopy heights, >9" DBH, >150 years, developed understory)

FOREST TYPE

A Alder P Black cottonwood (Poplar)
 B Birch Q Aspen
 C Cedar S Spruce
 H Hemlock W White spruce
 L Lodgepole Pine (Shorepine) X or H/S Hemlock/spruce
 M Black spruce Z Cottonwood/spruce

VERATRUM, LYSAME, LICHENS, ETC.>

Abundance: 0 None 0-20% of plot
 1 Light 20-60% of plot or stand
 2 Moderate >60% of plot or stand
 3 Heavy

Position:

0 No particular position, scattered around site
 1 In depression or swale
 2 On sideslope
 3 On elevated ground
 4 Other (specify)

AVALANCHE ETC FIELDS

Extent: 1 limited; 2 moderate; 3 extensive.

Tree Classes:	1	Desirable Crop Tree	Crown Classes:	1	Open-grown/isolated
	2	Acceptable Crop Tree		2	Dominant
	3	Unacceptable Trees		3	Codominant
	4	Rough Trees (Sound Cull)		4	Intermediate
	5	Rotten Trees (Rotten Cull)		5	Overtopped
	6	Salvable Recent Dead			
	7	Non-Salvable Recent Dead			
	8	Salvable Older Dead			

Snag Decay	1	Recently dead; all limbs and fine branches present; pointed top; 100% bark remaining; sapwood sound and original color; heartwood sound and original color
	2	Early decay; fine branches missing; some bark missing or loose; sapwood sloughing, decaying, fibrous, firm to soft; heartwood sound at base but decaying in upper bole
	3	Moderate decay; limb stubs only; missing bark; top may be broken; sloughing sapwood, discoloring; heartwood decay beginning at base, more extensive in upper bole
	4	Few or no stubs; shorter tree; most bark missing; sapwood cubical, soft, dark; heartwood sloughing from upper bole, decaying at base, dark
	5	No stubs, stump only; 20% or less bark remaining; sapwood gone; heartwood sloughing, cubical or fibrous, dark, soft

Understory Suppressed or Overtopped - These crowns receive no direct sunlight from above or from the sides and are entirely below the general canopy level.
Sapling - Trees 1.0 inch through 4.9 inches in DBH (subset of understory).
Seedling - Trees less than 1.0 inch DBH (subset of understory).

Use the following key to determine tree class:

Tree dead

- Tree died more than five years ago (no fine twigs, bark is sloughing)---
 - Trees which have died six or more years ago and contain a merchantable dead sawlog.
SALVABLE OLDER DEAD - Code 8
 - Trees which have died six or more years ago and do not contain a merchantable dead sawlog.
NON-SALVABLE OLDER DEAD - Code 9
- Tree died five or less years ago ---
 - Trees which have died five years ago or less and contain a merchantable dead sawlog.
SALVABLE RECENT DEAD - Code 6
 - Trees which have died five years ago or less and do not contain a merchantable dead sawlog.
NON-SALVABLE RECENT DEAD - Code 7

Tree alive

- Tree has no potential to accumulate appreciable net merchantable volume AND/OR tree has serious defect
- Tree has no merchantable volume AND no potential to accumulate net merchantable volume because of serious rot or defect ---
 - Tree presently does not contain a merchantable live sawlog and the principle defects are something other than rot. ROUGH TREE (Sound Cull) - Code 4
 - Tree presently does not contain a merchantable live sawlog and the principle defect is rot. ROTTEN TREE (Rotten Cull) - Code 5
- Tree has merchantable volume BUT tree is severely suppressed (may be below merchantable size; OR tree is below merchantable size and may accumulate net merchantable volume but has serious rot or defect; OR the tree has severe damaging agents and/or defects and may die within the next 10 years; OR tree is not accumulating appreciable net volume growth or is deteriorating more rapidly than it is growing; OR if the tree were relieved of competition, it would not be expected to release and accumulate appreciable net merchantable volume. UNACCEPTABLE CROP TREE - Code 3
- Tree has potential to accumulate net merchantable volume AND has no serious defects or damaging agents
 - Tree has no damaging agents which affect growth or survival, although it may have minor defects; and is relatively vigorous for its age as evidenced by past growth rate or crown condition.
DESIRABLE CROP TREE - Code 1
 - Tree has some minor defects or damaging agents which will not affect the survival of the tree for at least the next 10 years; OR tree is relatively nonvigorous for its age as evidenced by slow past growth or poor crown condition, but still retains the potential to accumulate net merchantable volume.
ACCEPTABLE CROP TREE - Code 2

Minimum requirements for a merchantable sawlog are 8 feet in length, 9" bottom diameter and 6" top diameter.

INTEGRATED RESOURCE INVENTORY
VEGETATION SAMPLING AND DATA COLLECTION PROTOCOL

Tongass National Forest
Chatham Area
May 1993

The following is a description of reconnaissance level vegetation sampling procedures used in the Integrated Resource Inventory (IRI). The procedures are based on those developed for plant association classification field work by Jon Martin (Regional Ecologist; 1987) and modified by Susan Borchers (Chugach Ecologist; 1992). The procedures have been further revised to accompany new data cards and a new database created for the IRI and other field projects by John Rickers (Resource Information Specialist); Rick Foster, Brad Kriekhaus, and Susan Trull (IRI); and Jim Fincher, Tim Garvey, and Arden Warm (Eco-team).

Sampling locations are selected by a 2-3 person team consisting of a botanist/ecologist and a soil scientist. Locations are selected using aerial photographs, maps, and prior mapping information. Locations may be chosen to resolve conflicts in existing maps, such as between timber type maps and prior integrated resource inventory maps; to obtain data from which to develop a new mapping unit; to refine or confirm existing mapping units; or to verify specific site conditions, such as high hazard soils or riparian plant communities. Daily traverse areas are selected by each team prior to the on-the-ground search.

On the ground, stand selection is a team decision involving both expertise in vegetation and site factors. The following guidelines are used for stand selection:

- 1) Avoid areas of human disturbance.
- 2) The stand should be at least large enough to encompass the 500 m² (42 ft. radius) circular plot. Preferably stands should be at least 1/2 to 1 acre in size.
- 3) Where possible, sample stands which are in the old growth or climax successional stage. Mature stands may be sampled if they exhibit most of the characteristics of old growth. Mature stands will generally lack large snags and the large decadent trees typically found in old growth. Avoid sampling in seral communities except in those map units, such as floodplains, where the unit is defined to include early successional vegetation.
- 4) Select stands where the overstory and understory vegetation appear homogeneous. In the overstory, this means uniformity in canopy closure, overall stand height and species composition. In the understory, uniformity in the composition and distribution of the dominant plants is the primary criterion. For example, if all the blueberry shrubs occur on one side of a stand and all the skunk cabbage plants on the other side, then the stand is not homogeneous. The sample plot in this example should be located in either the skunk cabbage stand or the blueberry stand but not both at the same time. The understory would be considered homogeneous if the skunk cabbage plants were distributed throughout the stand between blueberry shrubs.
- 5) Select stands where the physical characteristics or abiotic factors appear homogeneous. The slope, aspect and microtopography should be uniform. The soils should also be relatively uniform. (This will be determined by the soil scientist.) There may be more than one soil within a stand, in which case, all the soils are described by the soil scientist. Since the vegetation is closely tied to environment, many of the problems of finding homogeneous

vegetation are alleviated if the site being sampled is homogeneous in terms of environment.

6) Select locations which are representative and relatively homogenous, but do not search excessively for the non-existent "perfect stand". Such a search not only limits the number of stands sampled, but leads to a failure to describe the range of characteristics of the vegetation and environment in the forest.

A general card, vegetation card, and soil profile card are completed for each stand that is sampled. In areas of obvious wind impact, a wind card may also be completed. Directions for the vegetation card are provided below. Data card field names are shown at left, database column names at right.

VEGETATION CARD

KEYID

KEYIDYR, KEYIDNUM, KEYIDINIT

The key identification number for a sampling location consists of three parts: the year, sampling location number, and the observer's initials. (These parts are entered into the database as KEYIDYR, KEYIDNUM, and KEYIDINIT respectively.) Record the year as the last two digits only, for example, 93. Record the sampling location number as 1 for a given observer's first plot, and continue consecutively upward toward 999 for the entire field season. Record observer initials as those for first, middle, and last names, using the team soil scientist's initials for all cards. (If an observer has more than one middle name, only the first middle name initial should be used. If an observer has no middle name, use only two initials.) For example, Rick Foster's first plot of the 1993 field season is given the KEYID 93RAF1. His second plot receives the KEYID 93RAF2.

SAMPLED

SAMPLED

If any plant samples are collected (whether for identification and disposal or for addition to the forest herbarium), record the number and type. For example, "2, unknowns" might be recorded in this space, or "1, DODECA voucher". In the database, only a Y (yes) or N (no) is recorded for this field, depending on whether any notation is made. The purpose of this field is to keep track of plant samples and insure that unknowns are identified and that any rare or unusual plant specimens are added to the herbarium.

Variable Plot

A variable radius plot is located at plot center of the fixed radius plot.

Basal Area Factor

BAF

Record the basal area factor used for the variable plot. This number is usually 40, but may be 10, 20 or 62.5 depending on the type of timber in the stand. The factor is chosen to give at least 6 count trees per sampling area (trees less than 5 inch DBH are not counted). If a basal area factor of 40 gives only 3 trees, 20 may be used. In areas of very large trees, the 62.5 factor may be used. The factor is determined from the basal area prism used, the relaskop setting, or the Cruz-all opening. Circle the appropriate factor on the card, or fill in the blank if a non-standard factor is used (only if Cruz-all/prism/relaskop not available).

Mean Hgt Canopy

CANHGT

Estimate and record the mean height of the stand canopy to the nearest 5 feet. The canopy height may be higher or lower than heights recorded for count trees in the variable plot. This field should be filled in

after at least one count tree has been measured to calibrate ocular estimates.

The following data fields apply to each count tree. Count trees include dead trees (snags) if they are at least 5 inches DBH and at least 12 feet tall.

Treenum TREENUM
A number is assigned to each count tree for database tracking purposes. The number is shown on the datacard.

Core CORE
Mark this field (check or X) if a tree core is taken from a count tree. All cores should be labelled with plot KEYID, Treenum, and number of pieces. Tape multiple core pieces together. This field is recorded in the database as Y (yes) or N (no) depending on whether the field is marked.

Species SPECIES
Record the 6-letter code for tree species (first three letters of genus followed by first three letters of species; use first 6 letters of genus if species unknown). Valid codes for common species are shown under the tree section of the fixed radius plot on the vegetation card.

Tree Class TREECLS
Assign a one-digit code for tree vigor/morphology. The classes range from very vigorous (1) to dead with no merchantable sawlog (9):

1	Desirable Crop Tree
2	Acceptable Crop Tree
3	Unacceptable Trees
4	Rough Trees (Sound Cull)
5	Rotten Trees (Rotten Cull)
6	Salvable Recent Dead
7	Non-Salvable Recent Dead
8	Salvable Older Dead
9	Non-Salvable Older Dead

Use the following key to determine tree class:

- 1A Tree dead -----6
1B Tree alive-----2
- 2A Tree has no potential to accumulate appreciable net merchantable volume AND/OR tree has serious defect -----4
2B Tree has potential to accumulate net merchantable volume AND has no serious defects or damaging agents -----3
- 3A Tree has no damaging agents which affect growth or survival, although it may have minor defects; and is relatively vigorous for its age as evidenced by past growth rate or crown condition. DESIRABLE CROP TREE - 1
3B Tree has some minor defects or damaging agents which will not affect the survival of the tree for at least the next 10 years; OR tree is relatively nonvigorous for its age as evidenced by slow past growth or poor crown condition, but still retains the potential to accumulate net merchantable volume. ACCEPTABLE CROP TREE - 2
- 4A Tree has no merchantable volume AND no potential to accumulate net merchantable volume because of serious rot or defect -----5
4B Tree has merchantable volume BUT tree is severely suppressed (may be below merchantable size; OR tree is below merchantable size and may accumulate net merchantable volume but has serious rot or defect; OR the

tree has severe damaging agents and/or defects and may die within the next 10 years; OR tree is not accumulating appreciable net volume growth or is deteriorating more rapidly than it is growing; OR if the tree were relieved of competition, it would not be expected to release and accumulate appreciable net merchantable volume.

UNACCEPTABLE CROP TREE - 3

5A Tree presently does not contain a merchantable live sawlog and the principle defects are something other than rot.

ROUGH TREE (Sound Cull) - 4

5B Tree presently does not contain a merchantable live sawlog and the principle defect is rot.

ROTTEN TREE (Rotten Cull) - 5

6A Tree died more than five years ago (no fine twigs, bark is sloughing) -----8

6B Tree died five or less years ago -----7

7A Trees which have died five years ago or less and contain a merchantable dead sawlog.

SALVABLE RECENT DEAD - 6

7B Trees which have died five years ago or less and do not contain a merchantable dead sawlog.

NON-SALVABLE RECENT DEAD - 7

8A Trees which have died six or more years ago and contain a merchantable dead sawlog.

SALVABLE OLDER DEAD - 8

8B Trees which have died six or more years ago and do not contain a merchantable dead sawlog.

NON-SALVABLE OLDER DEAD - 9

Minimum requirements for a merchantable sawlog are 8 feet in length, 9" bottom diameter and 6" top diameter.

DBH

DBH

Record diameter at breast height (4.5 feet above the ground) to the nearest inch for all count trees with DBH 5 or greater. Measure from the uphill side for trees on slopes or for leaning trees. For trees that fork below BH, measure both trunks. For trees that fork above BH, measure one trunk. If abnormalities such as swellings occur at BH, measure as near to BH as possible, trying to measure what the diameter would be if the abnormality were not present.

HGT

HGT

Measure the total height of a representative count tree using a measuring tape and clinometer or relaskop. If possible, measure height from a point along the contour, rather than from up or down slope, which decreases accuracy and may require a correction (relaskop has built-in slope correction). Record height to the nearest foot. Estimate the heights of the remaining count trees to the nearest 5 feet using the measured tree as a standard. If a count tree has a broken top, record the actual height (but see Proj). For leaning trees, record length, not the distance from treetop to ground.

Meas

MEAS

Mark this field if the tree height was measured rather than estimated. This field is recorded in the database as Y (yes) or N (no) depending on whether the field is marked.

Proj

PROJ

For trees with broken tops, estimate and record the projected height prior to the loss of top, to the nearest 5 feet. Use adjacent trees or broken sections to aid in estimating the projected height. This field is recorded in the database as Y (yes) or N (no) depending on whether the field is marked.

Lean**LEAN**

Mark this field if the tree leans at an angle greater than 20 degrees. This field is recorded in the database as Y (yes) or N (no) depending on whether the field is marked.

Crown Ratio**CROWN**

Record the percentage of the trunk which is live crown to the nearest 10 percent, that is, the length of the live crown divided by tree height. Average the ratio around all bole faces. Do not include small, younger branches on the lower trunk, well-separated from the main crown (epicormic branching). Record 0 for dead trees (snags).

Crown class**CRNCLS**

Record a single-digit code for the relative position of the tree crown with respect to competing vegetation surrounding the tree:

- 1 Open-grown or isolated: Trees receiving full sunlight from above and from all sides. In even-aged stands, these trees have their crown well above the general canopy.
- 2 Dominant: Trees receiving full sunlight from above and partly from the side. In even-aged stands, dominant trees rise somewhat above the general canopy.
- 3 Codominant: Trees receiving full sunlight from above, but comparatively little from the sides. In even-aged stands, codominants form the general canopy level.
- 4 Intermediate: These crowns occupy a definite subordinate position and are subject to strong lateral competition from crowns of dominants and codominants, although they may receive some direct light from above through small holes in the canopy.
- 5 Overtopped: These crowns receive no direct sunlight from above or from the sides and are entirely below the general canopy level.

Snag Decay**DECAY**

For dead count trees only, record a single-digit code for the decay class (an arbitrary division of a continual process). Classes loosely adapted from Spies and Harmon (1987) and Cline et al. (1980):

- 1 Recently dead; all limbs and fine branches present; pointed top; 100% bark remaining; sapwood sound and original color; heartwood sound and original color
- 2 Early decay; fine branches missing; some bark missing or loose; sapwood sloughing, decaying, fibrous, firm to soft; heartwood sound at base but decaying in upper bole
- 3 Moderate decay; limb stubs only; missing bark; top may be broken; sloughing sapwood, discoloring; heartwood decay beginning at base, more extensive in upper bole
- 4 Few or no stubs; shorter tree; most bark missing; sapwood cubical, soft, dark; heartwood sloughing from upper bole, decaying at base, dark
- 5 No stubs, stump only; 20% or less bark remaining; sapwood gone; heartwood sloughing, cubical or fibrous, dark, soft

NOTES**NOTES**

Record any notes regarding the variable plot in the note space on either side of the card. In the database, only Y (yes) or N (no) will be entered, depending on whether any notes are made regarding the variable plot.

Coarse Woody Debris Plot

The following data fields apply to each piece of down woody debris greater than 5 inches in average diameter within a belt transect crossing the fixed radius plot. Locate the transect from top of plot to bottom (if flat, use nearby sloping ground to determine "top"), as a 16 foot wide belt, centered on the plot top and bottom flags and center point. Down woody debris includes logs, dead or dying fallen trees, rootwads, and stumps less than 12 feet tall.

Woodynum

WOODYNUM

A number assigned to each debris piece for database tracking purposes. The number is shown on the datacard.

Species

SPECIES

Record the 6-letter code for tree species (first three letters of genus followed by first three letters of species; use first 6 letters of genus if species unknown). Valid codes for common species are shown under the tree section of the fixed radius plot on the vegetation card. If degree of decay prohibits identification, enter UNK for unknown.

Diam

DIAM

Estimate and record the average diameter in inches to the nearest inch for the length of woody debris within the belt, where the diameter is at least 5 inches. Measure at least one diameter per plot to calibrate estimates.

Length

LENGTH

Estimate and record the length in feet to the nearest foot for the piece of woody debris within the belt. Do not include any rootwad in the length. Measure stumps from the average ground level upwards. Measure at least one length per plot to calibrate estimates. Note that length will exceed 16 feet (width of the belt) where the debris lies at an angle other than perpendicular to the belt, but only record the length within the belt.

Decay Class

DECAY

Record a single-digit code for the decay class (an arbitrary division of a continual process). Classes loosely adapted from Spies and Harmon (1987) and Cline et al. (1980), similar to snag decay classes:

- 1 Recently dead; all limbs and fine branches present; 100% bark remaining; shape is round, elevated on support points.
- 2 Early decay; fine branches missing; some bark missing or loose; wood intact or partly pieces, slightly sagging, shape is round.
- 3 Moderate decay; limb stubs only; missing bark; wood large hard to soft blocky pieces, may be round, may be sagging.
- 4 Few or no stubs; shorter tree; most bark missing; wood is small, soft and powdery, shape is round.
- 5 No stubs, 20% or less bark remaining; wood is soft and powdery (when dry), log shape is oval (sometimes hard to see actual shape of log).

Rootwad

RWAD

Mark this field (check or X) if the piece of debris includes an exposed rootwad (whether or not the rootwad lies within the belt). This field is recorded in the database as Y (yes) or N (no) depending on whether the field is marked.

Stump

STUMP

Mark this field if the piece of debris is a stump. This field is recorded in the database as Y (yes) or N (no) depending on whether the field is marked.

Windsnap**WSNAP**

Mark this field if the piece of debris appears to have been snapped off a standing tree/snag by wind action. This field is recorded in the database as Y (yes) or N (no) depending on whether the field is marked.

Windthrow**WTHROW**

Mark this field if the piece of debris includes a rootwad and appears to have been blown over by the wind. If this field is marked, the Rootwad field must also be marked. However, Rootwad can be marked without Windthrow being marked, for example, if the tree appears to have fallen due to soil slump or stream undercutting. This field is recorded in the database as Y (yes) or N (no) depending on whether the field is marked.

NOTES**NOTES**

Record any notes regarding the woody debris plot in the note space on either side of the card. In the database, only Y (yes) or N (no) will be entered, depending on whether any notes are made regarding woody debris.

Fixed Radius Plot

Percent canopy cover is used to provide an estimate of relative abundance of all vascular plants within a temporary 42ft. radius (500 m²) circular plot. Each plot is marked with flagging at plot center and plot radius in four perpendicular locations. On sloped ground locate the flagging up and down slope and perpendicular to this line. For training purposes, 3 smaller plots are marked within the larger plot at the beginning of the field season (4 ft. radius = 1% canopy cover, 9 ft. radius = 5%, 13 ft. radius = 10%). These plots are used as a reference in making canopy cover estimates.

All vascular plants within the plot are identified to species. Plants which cannot be identified to the species level due to phenology are identified to the genus level. Mature plants which cannot be identified in the field are collected for later identification (and notation should be made under "Sampled", described above). Remember to label the specimen with plot KEYID and to make any notes which may assist with identification.

Use 6-letter species codes as described under the Variable Plot protocol for all vascular plants. Due to the difficulty of differentiating between *Vaccinium alaskense* and *Vaccinium ovalifolium* throughout the growing season, the two are identified only to genus (VACCIN). Most taxonomic nomenclature follows Welsh (1974), Hitchcock and Cronquist (1978) and Muller (1982). Nomenclature for the trees and shrubs is based on Viereck and Little (1972).

The species epithets for some genera are left blank. If the plant can be identified to species, fill in the three letter abbreviation for the species epithet and also fill in the full species name in the blank provided. Other blanks are provided at the bottom of each section for species not listed on the form. Record scientific name and 6-letter code if known; otherwise record common name. For unknowns, record percentages next to an identifier (such as unk1 or unk aster) that will be amended after identification.

Record percent canopy cover in 1% increments up to 10% (1,2,3...10) and in 5% increments from 10-100 (10,15,20,25...100). Percent canopy cover below 1% is recorded as either T (trace) or 1/2% (only used with forbs, ferns, fern allies, sedges, graminoids, mosses). Trace is typically reserved for a single or few specimens. Use of "1/2" or "0.5" is preferred to ".5", since the decimal point often is not visible by the time the data is entered to the database.

It is important to conduct a thorough search of the plot to accurately determine percent cover for each species. This is true for the smaller, less conspicuous plants as well as the larger plants. Often, it is helpful to first circumnavigate the plot noting which species are present (and perhaps placing a mark next to the name on the card) and getting a general idea of plant composition. Further rounds can be made to determine species cover. Some observers prefer to estimate cover in each quarter of the plot and then add their estimates. For example, one quarter may have 5% skunk cabbage (a 9 ft. radius circle worth), while the next quarter has 1% and the last two quarters have known. Skunk cabbage cover in the plot is then 6%. (Alternatively, each quarter can be regarded as a separate plot, cover estimates made, and then added and divided by 4 for the full plot cover, but this can become confusing.)

During early season sampling, some species such as devil's club, bunchberry, lady fern, or skunk cabbage may not be fully leafed out. Therefore, it is necessary to estimate percent cover for the peak season condition. Do not, however, make guesses as to other species that may occur in the plot during peak season.

TREES

SPECIES, OVER, UNDER

For each tree species present in the plot, estimate and record the percent cover the species occupies in both the overstory, in the field labelled "% Over", and the understory, in the field labeled "% Under". Overstory trees include isolated, dominant, codominant and intermediate trees greater than 5 inch DBH (see Variable Plot for definitions of tree classes). Understory trees include overtopped, seedlings and saplings. An understory tree may be greater than 5 inches DBH if it is overtopped.

Suppressed or Overtopped - These crowns receive no direct sunlight from above or from the sides and are entirely below the general canopy level.

Sapling - Trees 1.0 inch through 4.9 inches in DBH.

Seedling - Trees less than 1.0 inch DBH.

Determine percent cover as the vertical projection of the tree canopy onto the ground, ignoring small holes or irregularities.

Tall Shrubs

SPECIES, COVER, HGT

For each tall shrub species present in the plot, estimate and record the percent cover the species occupies. Also record the average height for that species in the plot, to the nearest 0.5 foot. "Tall" refers to the typical growth habit of a species, not necessarily its height in a given plot. Thus, devil's club is considered a tall shrub whether it occurs as 1/2 foot tall or 4 feet tall. Those common species considered tall shrubs are shown on the data card. Other species encountered which appear to typically be at least 2.5 feet tall may be added to the tall shrub portion of the card.

Stratum Totals

For each stratum (vegetative layer) of the plot, estimate the combined percent cover for all species in that stratum. Totals typically will not equal the sum of individual species cover due to overlap of plants, especially for the larger life forms. Note, however, that the strata totals cannot exceed the sum of individual species cover. Compare the strata totals with individual species sums to check estimates and ensure compatibility.

Overstory

TOTOV

Estimate and record the total overstory percent cover for all species. This is typically at least 5% less than the sum of individual tree species covers since the overstory trees often occur at multiple heights. In open plant associations, the total may equal the species sum.

Understory

TOTUN

Estimate and record the total understory percent cover for all species.

Seedling

TOTSEED

Estimate and record the total seedling percent cover for all species. Note that seedling cover is not estimated for individual species, but is included in the understory individual species covers.

Sapling

TOTSAP

Estimate and record the total sapling percent cover for all species. Note that sapling cover is not estimated for individual species, but is included in the understory individual species covers.

Total Trees

TOTTREE

Estimate and record the total percent cover in the plot for all tree

species, understory (including sapling and seedling) and overstory. This estimate is usually less than the sum of understory and overstory strata totals, unless understory trees only occur in gaps in the overstory, in which case, the sum would equal the estimate.

Tall Shrub TOTTSHB
Estimate and record the total tall shrub percent cover for all species.

Low Shrub TOTLSHB
Estimate and record the total low shrub percent cover for all species. This estimate may equal the sum of the individual species covers, since low shrubs often do not overlap.

Forb TOTFORB
Estimate and record the total forb percent cover for all species. This estimate may equal the sum of the individual species covers, since small forbs often do not overlap (but large ones such as skunk cabbage may).

Fern/Fern Ally TOTFERN
Estimate and record the total fern and fern ally percent cover for all species. This estimate may equal the sum of the individual species covers, since small ferns often do not overlap.

Sedge/Graminoid TOTSG
Estimate and record the total sedge and graminoid percent cover for all species.

CWD Regen CWDREG
Estimate and record the percent of the total tree seedlings and saplings (regeneration) which are growing on/from coarse woody debris larger than 5 inches diameter. For example, this includes seedlings and saplings on nurse logs and old stumps. Frequently, 100% of the plot regeneration will be on woody debris. Note that you are estimating the percent of the total regeneration, not a percent cover.

Fixed Radius Plot, Continued on Back Side of Vegetation Card

Low Shrubs SPECIES, COVER
For each low shrub species present in the plot, estimate and record the percent cover the species occupies. "Low" refers to the typical growth habit of a species, not necessarily its height in a given plot. Those common species considered low shrubs are shown on the data card. Other species encountered which appear to typically be less than 2.5 feet tall may be added to the low shrub portion of the card.

Forbs SPECIES, COVER
For each forb (herbaceous, non-graminoid) species present in the plot, estimate and record the percent cover the species occupies.

Sedges and Rushes SPECIES, COVER
For each sedge and rush species present in the plot, estimate and record the percent cover the species occupies.

Graminoids SPECIES, COVER
For each graminoid species present in the plot, estimate and record the percent cover the species occupies.

Ferns SPECIES, COVER
For each fern species present in the plot, estimate and record the percent cover the species occupies.