

A plot consists of four 24-foot radius circular subplot, covering about 7,238 square feet (total), or roughly 1/6th of an acre. (Technical terms, such as <i>plot</i> and <i>subplot</i>, appear in italics throughout this report. You can find more detailed definitions for all italicized words in the Appendix.)					
State:	Hawaii	County:	Hawaii	Location number:	2447
Number of conditions on plot:		3	Plot elevation:	46 feet	Date of visit: 8/17/2021
Plot aspect¹ (range of subplots 1-4):		152° SE to SE	Plot slope¹ (range of subplots 1-4):		5%

Attributes of Condition 1:		Attribute description
Condition Class Status:	Accessible Forest Land	Using specific protocols, the <i>condition</i> was classified according to one of the following five categories: <i>accessible forest land</i> , <i>nonforest land</i> , <i>noncensus water</i> , <i>census water</i> , and <i>nonsampled</i> (with a possibility of forest land). The <i>condition class status</i> determines what data will be collected. See Definitions in the Appendix for more information.
Forest Type	Strand or halophytic vegetation	The <i>tree</i> species with the greatest amount of stocking in all live trees that are not overtopped within the <i>stand</i> .
Number of live trees	105	Calculated from the count of all live <i>trees</i> (diameters 5.0-inch and greater) and <i>saplings</i> (diameters 1.0 to 4.9 inches) on the <i>plot</i> . Expressed as <i>trees per acre</i> (TPA).
Live tree canopy cover	40%	The average percent of live tree canopy (crown) cover for the <i>stand</i> . Live canopy cover includes foliage of all live <i>trees</i> , <i>saplings</i> , and <i>seedlings</i> .
Live+missing tree canopy cover	40%	The percent of live plus missing tree canopy (crown) cover for the <i>stand</i> . 'Missing' canopy is an estimate of damaged foliage, dead trees, and removed trees, based on field observations, aerial photos, and historical plot data (when available).
Stand age	Unable to get a reasonable estimate	The average total age of all live trees (greater than 5 inch diameter) in the stand. If no trees were present, average total sapling (diameter 1-4.9 inches) age is shown.
Stand size	Pole sized: 5.0-8.9 inches for softwoods/ 5.0-10.9 inches for hardwoods	The range in tree <i>diameters</i> that best represents the predominant crown cover of all live trees in the <i>stand</i> .
Disturbance 1	None	A disturbance is any mortality and/or damage agent that results in damage to 25 percent of the soil, vegetation or trees in a <i>stand</i> , or 50 percent of an individual tree species. The area affected must have been at least 1.0 acre in size. The damage must have occurred within the last 5 years, or since the previous inventory on <i>remeasurement plots</i> . Disturbance can indicate positive or negative effects.
Disturbance 2	None	Up to three different disturbances per <i>condition</i> (or <i>stand</i>) may be recorded, from most important (disturbance 1) to least important (disturbance 3).
Disturbance 3	None	See above
Treatment 1	Cutting	Treatments are silvicultural applications such as cutting, slash burning, seeding, planting, or other prescriptive silvicultural actions. For a treatment to be recorded, it must have occurred within the last 5 years or since the previous inventory on <i>remeasurement plots</i> .
Treatment 2	None	Up to three different treatments per <i>condition</i> (or <i>stand</i>) may be recorded, from most important (treatment 1) to least important (treatment 3).
Treatment 3	None	See above

¹Aspect is the compass direction to which a slope faces. No aspect is recorded on land with a slope less than five degrees. The range of slope and aspect values recorded from all four *subplots* is shown, with numbers representing the lowest and highest recorded values.

Refer to "Condition 1: Attribute description" on previous page and Definitions in the Appendix for explanatory descriptions of attributes.

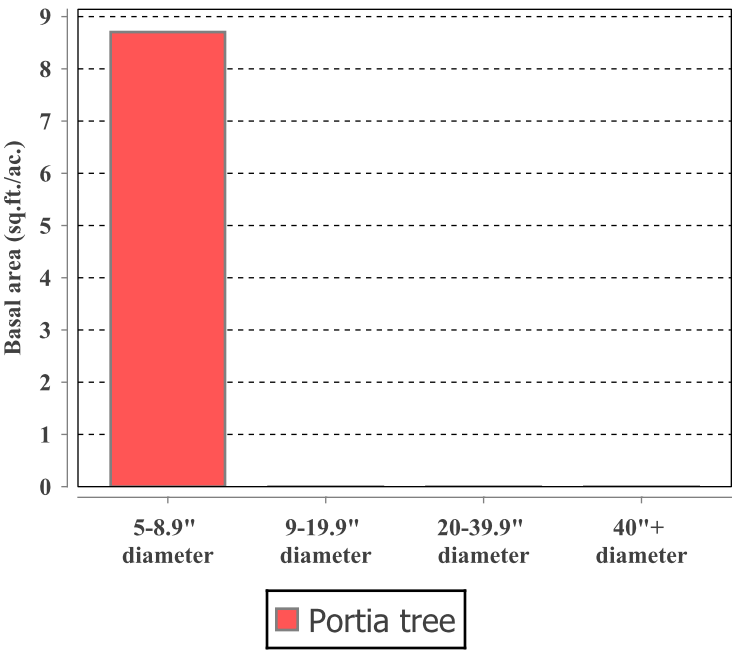
Attribute	Condition 2	Condition 3
Condition Class Status:	Census Water	Nonforest Land
Forest Type	null	N/A
Number of live trees	0	0
Live tree canopy cover	N/A	1%
Live+missing tree canopy cover	N/A	1%
Stand age	N/A	N/A
Stand size	N/A	N/A
Disturbance 1	None	None
Disturbance 2	None	None
Disturbance 3	None	None
Treatment 1	None	None
Treatment 2	None	None
Treatment 3	None	None

Tree Basal Area and Trees Per Acre

Basal Area (BA) is the amount of an acre covered in tree stems, expressed in square feet per acre. More technically, *BA* is the cross-sectional area of tree boles (trunks) at the point where *diameter* is measured. The chart and table to the right show the calculated *basal area* of each tree species, based on how large the trees were (i.e., size class). *Basal area* is useful for understanding forest productivity and relative growth. For example, the chart to the right tells us which species are producing the most wood, and in what general *diameter* size.

Throughout the tree section, we present data in terms of "how many trees like this you could expect to find on an acre in this *stand*" which is called **Trees per acre (TPA)**. Each tree 5.0 inches in *diameter* or larger on the plot represents 6 trees per acre, or TPA. For example, the **TPA chart (below)** shows the expected number (in *TPA*) of both live and dead trees on the acre according to each species and size class. We expressed numbers of trees in TPA instead of simple tree plot counts to offer a more useful landscape reference scale (i.e., the acre).⁴

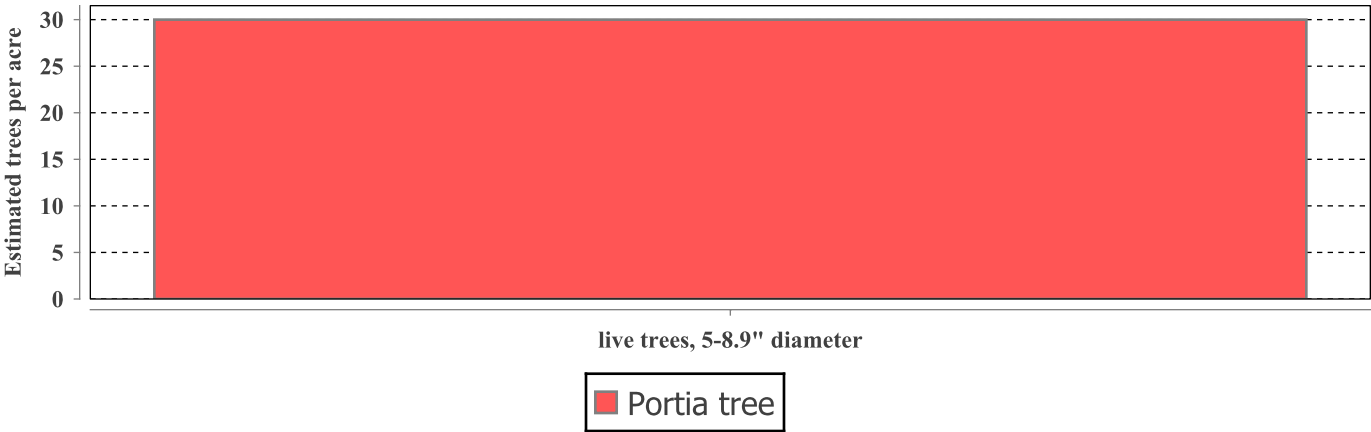
Live tree (5.0" diameter and larger) basal area (BA) in square feet per acre by species and diameter class size



	Live seedlings <1.0" diameter	Live Saplings 1.0" to 5.0" diameter	Live trees 5.0-8.9" diameter	Live trees 9.0-19.9" diameter	Live trees 20.0-39.9" diameter	Live trees 40.0+" diameter	Total for all live trees, >1.0" diameter	Total for all dead trees, >5.0" diameter
Basal Area (sq ft/ac)-all species	N/A	1.2	8.7	0.0	0.0	0.0	9.9	0.0
Trees per acre-all species	375	75	30	0	0	0	105	0

The **table above** provides a side by side look at both *TPA* and *BA* for all tree species, compared across *diameter* size classes. The final two columns show *basal area* and *trees per acre* totals of all live and dead trees for the acre.

Live and dead trees per acre (TPA) by species and size class



²See Definitions in Appendix for more information on *diameters*, *basal area*, *timber* and *woodland* species.

³See Definitions in Appendix for more information regarding *TPA* and how it is calculated.

Live tree (5.0-inch diameter and larger) summary by species (in TPA)					
Estimated # of TPA by species	Tree species	Range ⁴ of diameters (inches)	Range ⁴ of tree heights (feet)	Age range ⁴ (years)	Any damage(s) on trees?
30	Portia tree (Thespesia populnea)	5.7 - 8.4	20 - 24	N/A	no

Summaries of data from one FIA plot provide a picture of what you might likely see on an acre of land in the *stand* where the plot fell. This is why, by summarizing data for the trees on the plot, the table above becomes a reliable description for the live "**Tree species**" (5.0 inch *diameter* and larger) in the *stand*. For example, the "**Estimated # of TPA by species**" column tells us how many trees of that species you could expect to find on an acre in that *stand*. (Again, TPA is calculated by taking the number of trees found on the 1/6-acre plot and multiplying by 6.) "**Range⁴ of diameters (inches)**" shows the range of *diameters* (low to high) that were measured for each species in that *stand*. Similarly, "**Range⁴ of tree heights**" refers to the range of heights that were measured for each species. The "**Age range⁴**" column displays the range (low to high) of ages, in years. The final row, "**Damages**", indicates whether or not any damages were found on trees of that species.

"**Damage agents**" are biotic organisms (e.g., bark beetles, root diseases) or abiotic occurrences (e.g., fires, landslides) that cause substantial damage to living trees. As with *stand*-level disturbances, the damage on any single tree must meet a significant threshold in order to be recorded. Significant thresholds vary considerably and are specific to each *damage agent*⁵. The table to the right lets us look at **damage agents** within the *stand* and get an estimate of how much of the *stand* is likely to have been affected by them in terms of the number of trees, tree species, and tree size. Similar to the table above, the "**Estimated TPA affected**" column shows how many trees of the particular species you could expect to find affected by the *damage agent*. "**Tree species affected**" shows tree species affected by the *damage agent*. "**Diameter range of affected trees (inches)**" displays the range of tree *diameters* of that species likely affected by the *damage agent*.

Live tree damage agent summary by species			
Estimated TPA affected	Tree species affected	Diameter range ⁴ of affected trees (in.)	Damage agent ⁵
75	Portia tree	1.7	Other damages and symptoms

The **table below** shows a summary of plot statistics for **Standing dead trees** (5.0 inch *diameter* and larger), grouped according to 1) cause of death (i.e., *mortality agent*), and 2) tree species. A '**mortality agent**' is the cause of death assigned to each tree (5.0 inches *diameter* and larger) that died within the past 10 years. Only one *mortality agent* can be listed per tree⁵. As in the above tables, the "**estimated TPA affected**" column shows how many trees of this species are likely to have died due to that *mortality agent* in a typical acre within the *stand*. The "**tree species affected**" lists the tree species that died by the *mortality agent*. The "**Range of diameters (in)**" and "**Range of tree heights (ft)**" columns show the ranges of dead tree *diameters* and heights for that species and *mortality agent*. "**Average % of top missing**" is an averaged percent of the tops of trees missing (for dead trees of that species and *mortality agent*). Note that this table represents standing dead trees only.

Standing dead tree (5.0 inch diameter and larger) summary by cause of death and species						
Estimate of TPA affected	Tree species affected	Range ⁴ of diameters (in.)	Range ⁴ of tree heights (ft.)	Average % top missing	Tree(s) died in last 10 years?	Mortality agent
	No standing dead trees (on plot)					

⁴If one number is displayed in a "range" column, there was only one tree on plot to represent the species.

⁵See Definitions in Appendix for more information on *Damage agents*, and *Mortality agents*.

Seedling (<1.0 inch diameter) and sapling (1.0 to 5.0 inch diameter) summary

Seedlings are the smallest trees we measure. Technically for FIA purposes, *seedlings* are trees at least 0.5 feet tall (conifers) or at least 1.0 foot tall (hardwoods) with *diameters* less than 1.0 inch⁶. The table to the right shows, by species, the number of "**seedlings per acre (in TPA)**" that you might expect to see in the *stand* where the *plot* fell. The "**average age**" of the *seedlings* is recorded in the farthest right column.

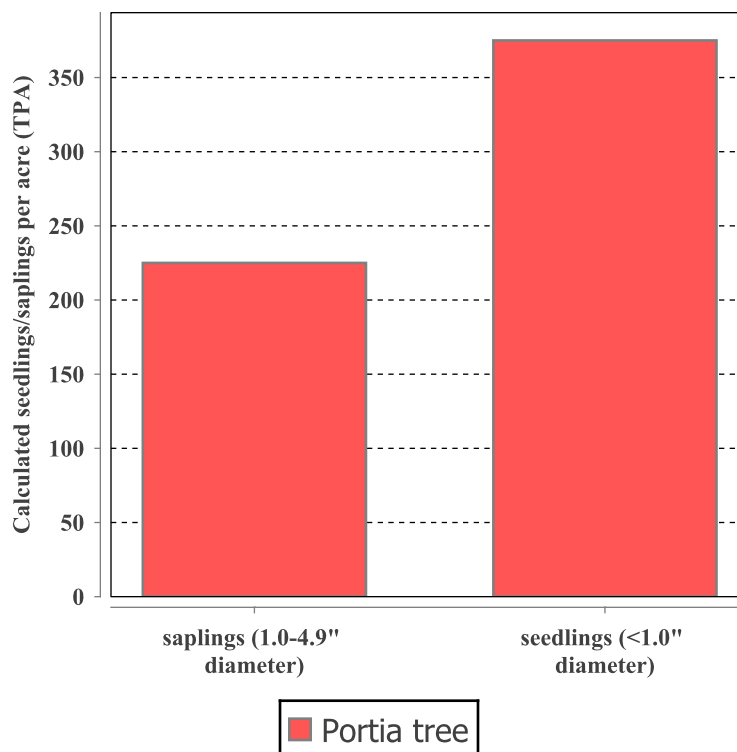
The trees per acre calculation for small trees (i.e., **seedlings and saplings**) differs from the calculation used for *trees* (i.e., 5.0 inches *diameter* and up). Specifically, the area surveyed for *seedlings* and/or *saplings* is much smaller than the area surveyed for trees (i.e., 1/75th of an acre versus 1/6th of an acre). This means a single *seedling/sapling* on the *plot* represents 75 *seedlings/saplings* for the acre. By contrast, every single *tree* (i.e., 5.0 inch *diameter* and up) represents only 6 trees per acre, because the surveyed area is much larger. Due to the small surveyed area, caution is advised in strictly interpreting seedling/sapling TPA's, as trees of this size often grow in clumps and/or are widely scattered. TPA is nevertheless a useful way for gaining a generalized understanding of how many *seedlings* and *saplings* may be present on the landscape⁷.

Saplings are trees 1 inch to 4.9 inches in *diameter*. The table at the bottom of the page shows summary data for each species of sapling found on the *plot*. As with seedlings, the "**saplings per acre (in TPA)**" indicates the number of saplings you might expect to see in the *stand* where the *plot* fell. "**Average diameter (inches)**" and "**Average tree height (ft.)**" express the averaged *diameter* and height for all saplings of the species. As with seedlings, the "**Average age**" for all saplings in the species is shown in the final column.

The graph to the right represents an estimate of seedling and sapling TPA by species for an average acre in the *stand*. Knowing how many seedlings/saplings are present, and of which species, helps land owners and managers answer questions about tree regeneration, competition, and potential species conversion.

Seedling summary by species		
Estimated number of seedlings per acre (in TPA)	Seedling species	Average age (years)
375	Portia tree (<i>Thespesia populnea</i>)	N/A

Estimated seedlings and saplings per acre (TPA) by species



Sapling (1.0\" to 4.9\" diameter) summary by species

Estimated saplings per acre (in TPA)	Sapling species	Average diameter (inches)	Average tree height (feet)	Average age (years)
225	Portia tree (<i>Thespesia populnea</i>)	1.4	18	N/A

⁶See Definitions in Appendix regarding *Seedlings* or *Saplings* for full definitions.

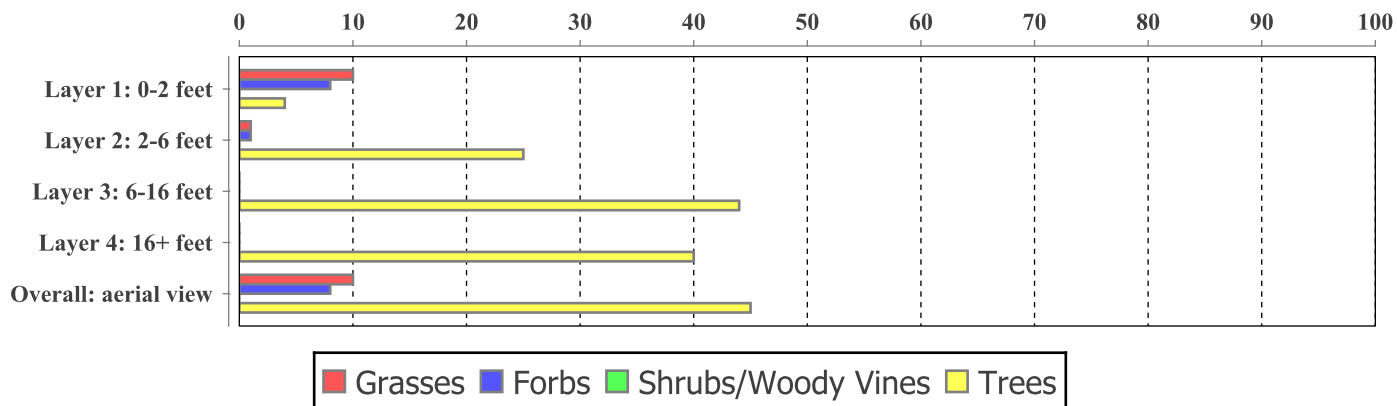
⁷See Definitions in Appendix regarding *TPA* for more information and how it is calculated for seedlings, saplings, and trees.

Vegetation data gives us a way to picture plant communities in terms of both the abundance and configuration for various plant species and types. This knowledge is helpful for assessing site characteristics such as forage potential, competition with tree growth, live fuel loading from understory vegetation, and overall potential site productivity. For instance, by monitoring changes in the relative abundance of understory plant species for a *stand*, (as in the "Vegetation Species" table, below), we may be able to better assess forest development, forest response to disturbance and forage potential for livestock or wildlife.

Vegetation Species	Form	Cover layer (height above ground in feet)	Average (% cover)	Range (% cover)
California laurel (<i>Umbellularia californica</i>)	Large Trees	+16 feet	44.3	20 - 80
California sycamore (<i>Platanus racemosa</i>)	Large Trees	+16 feet	11.3	0 - 45
bingleaf maple (<i>Acer macrophyllum</i>)	Large Trees	+16 feet	8.8	0 - 30
California black oak (<i>Quercus kelloggii</i>)	Large Trees	+16 feet	7.5	0 - 30
California laurel (<i>Umbellularia californica</i>)	Seedlings and Saplings	+16 feet	2.5	0 - 10
California blackberry (<i>Rubus ursinus</i>)	Shrubs/Woody Vines	0-2 feet	3.3	0 - 9
Pacific poison oak (<i>Toxicodendron diversilobum</i>)	Shrubs/Woody Vines	2-6 feet	2.5	0 - 10
bedstraw (<i>Galium</i>)	Forbs	0-2 feet	21.3	0 - 75
Italian plumeless thistle (<i>Carduus pycnocephalus</i>)	Forbs	0-2 feet	8.8	0 - 35
spreading hedgeparsley (<i>Torilis arvensis</i>)	Forbs	0-2 feet	4.8	0 - 12
licorice fern (<i>Polypodium glycyrrhiza</i>)	Forbs	0-2 feet	3.8	0 - 15
California maidenhair (<i>Adiantum jordanii</i>)	Forbs	0-2 feet	2.5	0 - 10
coastal woodfern (<i>Dryopteris arguta</i>)	Forbs	0-2 feet	1.8	0 - 7
miner's lettuce (<i>Claytonia perfoliata</i>)	Forbs	0-2 feet	1.8	0 - 4
vetch (<i>Vicia</i>)	Forbs	0-2 feet	1.0	0 - 4

The "Vegetation Species" table above displays tree, shrub, forb, and graminoid⁸ species covering at least 3% on one or more of the four *subplots*. The "Species" column lists both common and scientific names. Each species on the *subplot* is then assigned to one of the five "form" categories: large trees, *seedling/sapling*, shrub, forb, or graminoid⁸. "Cover Layer" is used to describe the general height above ground where a majority of the plant species is growing, based on four vertical height "layers"; 0-2 feet, 2-6 feet, 6-16 feet, and 16+ feet. Because vegetation data is collected separately for each of the four *subplots*, the "Average (% cover)" column shows the percent cover for each species, averaged across all four *subplots*. Likewise, "Range (% cover)" shows the range, from lowest to highest, of percent covers as recorded from all four *subplots*.

Vegetation structure according to vegetative form group



% cover	Layer 1: 0-2 feet	Layer 2: 2-6 feet	Layer 3: 6-16 feet	Layer 4: 16+ feet	Overall: aerial view
Grasses	10	1	0	0	10
Forbs	8	1	0	0	8
Shrubs/Woody Vines	0	0	0	0	0
Trees	4	25	44	40	45

In addition to recording each *subplot's* vegetation species composition, we also gather information on **vegetation structure**. That is, how much of the plot's area (in percent) is occupied by shrubs, trees, forbs, or graminoids⁸ – collectively called "**vegetative form groups**." The above table and graph show the percent of plant cover by "**vegetative form group**" within four cover layers (i.e., 0-2 feet, 2-6 feet, 6-16 feet, and 16+ feet), averaged across all *subplots*. The "**aerial view**" column and bar represent the bird's eye perspective of cover for the vegetation category, also averaged across all four *subplots*. This chart and graph represent averaged estimates; and as such, they provide a rough estimate of how much area is covered by trees, shrubs, forbs or graminoids on the plot, while also offering a general idea for the height (or range of heights) of each vegetative form group.

⁸Graminoids include true grasses along with most other grass-like plants, such as sedges and rushes. Forbs include herbaceous, non-woody plants that are not considered graminoids.

Many external forces can have a profound influence on duff, litter, and soil depths, which in turn have consequences for ecosystem health. "**Litter**" is the undecomposed loose plant material, found on the top surface of the forest floor. "**Duff**" is the dark soil layer just below the litter layer and just above the uppermost mineral soil layer, largely composed of organic material resulting from the decomposition of plant and animal litter. Changing duff and litter layer depths can indicate changes in processes such as soil erosion, soil water holding capacity, fire behavior, and fire spread.

	Duff depth (in.)	Litter depth (in.)
Average	1.4	0.4
Range	1.4	.4

The table to the left shows the combined duff and litter depth measurements, taken from two samples on each of the four *subplots* (eight samples total). "**Average**" shows an average of all eight measurements, while "**Range**" shows the range, from lowest to highest, of all eight measurements.

Frequently Asked Questions

What is an FIA plot? A Forest Inventory and Analysis (FIA) plot is a permanent monitoring plot designed to measure forests and their surrounding vegetation. Once an FIA plot is installed, we will attempt to re-visit the plot every 10 years to re-measure everything that was surveyed during the previous inventory. By re-measuring the same plots multiple times, we gain the ability to detect change through time.

The plot area consists of four 24.0-foot radius subplot circles, each circle having an area of approximately 0.0415 or 1/24th of an acre. All four subplots combined have an (approximate) area of 4/24th, or 1/6th of an acre. Nested within each of these subplots is a 6.8-foot radius circle microplot, where trees smaller than 5.0 inches in *diameter* are measured. Each microplot has an area of approximately 1/300th acre, with a total area for all four microplots of 4/300th, or 1/75th of an acre. These four subplots combined with the nested microplots are called a plot. The plot is considered to be a reasonably accurate sample for the 1-acre area where it fell. When doing analysis on a landscape scale, each FIA plot represents roughly 6,000 acres of the surrounding area.

Why are FIA plots installed on private land?

Plots located on private property are valuable because they provide information about the overall status and trends of trees and other vegetation in your area. While FIA is not concerned with individual properties, we are responsible for assessing trends on all lands, including private lands.

Who has access to private land FIA plot data and locations?

The information collected on your property is publicly available, but the locations of any FIA plots are altered such that the actual locations and ownership status cannot be identified. Only the

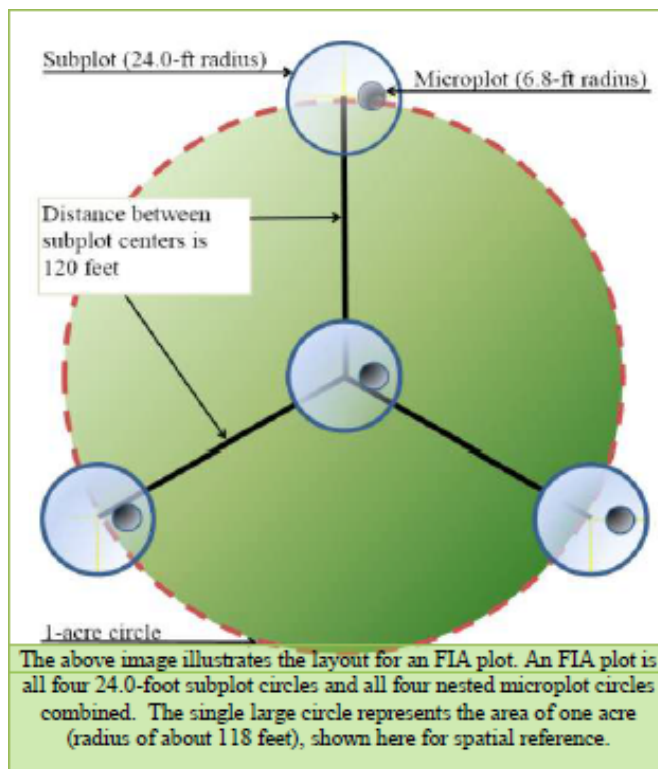
field crew and the FIA staff who process this data will have access to the locations of plots. By law, we cannot share any information that would allow someone to identify you as the owner of property where an FIA plot occurs.

How does having an FIA plot on my property affect me?

It will not affect you adversely, and the data summarized in this report may even be useful to some landowners. FIA is not concerned with any regulatory or taxation issues. If a field crew observes endangered species, for example, or improvements to your property, they cannot share that information with anyone and your rights as an owner of private property will not be affected. You may be contacted again in about ten years to request permission to collect data from the plot located on your property. Your permission to allow a field crew to access your property is voluntary, and we greatly appreciate your permission to collect the data summarized in this report.

Should I treat the plot area differently than I treat the rest of my land?

No. When you manage or treat your land, the plot area should be managed in the same manner as the surrounding lands, as though no plot was there. If the lands where the plots fall are treated as though there are no plots present, the data we collect becomes an unbiased reflection of all lands, regardless of ownership. In contrast, if lands where plots fall were to receive treatments different from the surrounding area due to the presence of the plots, the data would no longer represent an unbiased reflection of all lands across all ownership types. To avoid this bias, we request that landowners give no special consideration to the plot area.



Definitions

Basal Area (BA): The cross-sectional area of a tree stem/bole (trunk) at the point where diameter is measured, including bark. BA is calculated for trees one inch in diameter and larger, and is expressed in square feet. For timber species, the calculation is based on diameter at breast height (4.5 feet above ground level); for woodland species, it is based on diameter at root collar (near ground level).

Condition (also see *stand*): Condition (most often, stand) data provide the big picture description for areas that are somewhat uniform and at least one acre in size. Every plot has at least one condition. A "one condition plot" means that the area the plot lands in is relatively uniform. For example, it means that the plot lands on only one landowner's property, there are no large (>30.0 feet wide) bodies of water on plot, and the tree species, size and density are relatively uniform across the acre where the plot fell. Some plots have more than one condition. This means that there are clear differences between two or more areas on the plot, and those areas are each an acre or more in size. An example of a two condition plot is one where subplots 1 and 2 fall in a forested stand (larger than 1 acre), whereas subplots 3 and 4 fall in an open meadow (also larger than 1 acre). Field crews determine contrasting conditions based on precisely defined attributes such as ownership, forest type, stand size, and tree density. Where one (or more) contrasting condition is identified, one (or more) complete set of condition data are recorded.

Condition Class Status: The guidelines governing classification for the five condition class categories are complex (see pages 48-66 of P2 Field Procedures Manual, in References). What follows is a simplified, generalized description of the five condition class status categories:

1. **Accessible forest land:** Land with a combined tree, sapling, and seedling canopy cover that is, or has been in the past, 10% or greater, covering an acre or more.
2. **Nonforest land:** An acre or more of land with *less than* 10% tree, sapling and seedling canopy cover (including both live and missing canopy).
3. **Noncensus water:** Lakes, reservoirs, ponds, and similar bodies of water 1.0 acre to 4.5 acres in size. Rivers, streams, canals, etc., 30.0 feet to 200 feet wide.
4. **Census water:** Lakes, reservoirs, ponds, and similar bodies of water 4.5 acres in size and larger; and rivers, streams, canals, etc., more than 200 feet wide (1990 U.S. Census definition).
5. **Non-sampled (with a possibility of forest land) :** Land that currently or in the past, might meet the definition of forested land, but was not visited because access was denied or hazards were present (e.g., cliffs).

Damage Agent: Damage agents are biotic organisms (e.g., bark beetles, root diseases) or abiotic occurrences (e.g., fires, landslides) that cause substantial damage to living trees. As with stand-level disturbances, the damage on any single tree must meet a "significant threshold" in order to be recorded. Significant thresholds vary substantially and are specific to each damage agent. For example, the significant threshold for root and butt diseases is observed presence at any level, while broom rust must have 50% or more of the crown area affected in order to code it as a damage agent. Damages are assigned only to live trees. This is in contrast to *mortality agents*, which are only assigned to recently dead trees. Up to three damaging agents may be recorded per tree. In general, a damage code is recorded when it is likely to:

1. Prevent the tree from surviving more than 1-2 years
2. Reduce the growth of the tree in the near term
3. Negatively affect a tree's potentially marketable product

Diameter at Breast Height (dbh)/ Diameter at Root Collar (drc) : DBH is the diameter of a tree, including bark. Timber tree species such as white pine, spruce, or subalpine fir, are measured at breast height (i.e., 4.5 feet above ground level). Diameters of woodland tree species such as piñon pines are measured as close to ground level as possible, or at root collar (called DRC, or diameter at root collar).

Microplot: Nested within each subplot is a 6.8-foot radius microplot (approximately 1/300th acre) where trees smaller than 5.0 inches in diameter are measured. Each FIA plot has a total of four microplots. (For more, see drawing and description in **FAQ: "What is an FIA Plot"**).

Mortality Agents: A "mortality agent" is the cause of death assigned in the field to each tree (5.0 inches diameter and larger) that died within the past 10 years. Only one mortality agent can be listed per tree. Drawing conclusions from "mortality agents" should be done with care, as the actual agent that caused a tree's death may be difficult, if not impossible, to determine. Complex interactions between insects and diseases can also confound the selection of a single mortality agent for individual trees.

Plot: Where the term "plot" is used, it refers to all four subplots and microplots combined. These four subplots and microplots represent a reasonably accurate sample for the 1-acre area where the plot fell. (For more, see drawing and description in **FAQ: "What is an FIA Plot"**).

Remeasurement Plot: A remeasurement plot is an FIA plot of the same design as that which was previously established for that location. During a plot remeasurement, crews relocate the field plot, remeasure the trees from the previous inventory, and tally any new trees on the plot.

Stand: A community of trees that can be distinguished from adjacent communities due to similarities and uniformity in tree and site characteristics such as age-class distribution, species composition, spatial arrangement, structure, etc.

Subplot: A subplot is one of four 24-foot radius circles that make up an FIA plot. Put another way, an FIA plot is made up of four 24.0-foot radius subplot circles, each representing approximately 0.0415 or 1/24 acre in total. (For more, see drawing and description in **FAQ: "What is an FIA Plot"** .)

Trees per acre (TPA) : TPA is a metric of stand density,i.e., how crowded or open the stand is. TPA can also be used to understand how many trees within the stand you could expect to have a particular characteristic; for example, how many dead Douglas-firs you could expect to find on the acre. TPA is calculated using a number called an expansion factor which is based on the total area surveyed, relative to an acre. For example, the expansion factor is 6 for each tree on an FIA plot. This means each tree >5.0" diameter represents six trees on that acre. The expansion factor is 6 because the total area surveyed on an FIA plot is 1/6th of an acre (i.e., four 1/24th-acre subplots added together equal 1/6th of an acre). By contrast, each individual sapling or seedling represents **75** seedlings or saplings for that same acre. This is because four 1/300th-acre microplots added together equal 1/75th of an acre, with a resulting expansion factor of 75. The expansion factor is much larger for seedlings/saplings because these smaller trees are measured on microplots, which cover smaller areas (1/300th-acre each) than subplots which have larger areas (1/24th-acre each). *Where possible, graphs with the number of trees expressed in TPA are scaled to the corresponding expansion factor; i.e., in multiples of 6 (for trees) and 75 (seedlings and saplings).*

Sapling: Any tree (live or dead) with a diameter of at least 1 inch and less than 5 inches, as measured at breast height (4.5 feet above ground level) for timber (e.g., Douglas fir, ponderosa pine) tree species or at root collar (near ground level) for woodland (e.g., junipers, pinyon pine) tree species.

Seedling: Trees at least 0.5 feet tall (conifers) or at least 1.0 foot tall (hardwoods) and having diameters less than 1.0 inch as measured at breast height (4.5 feet above ground level) for timber tree species or at root collar (near ground level) for woodland tree species.

References

Pacific Northwest Research Station FIA P2 Field Procedures: <https://www.fs.fed.us/pnw/rma/fia-topics/documentation/field-manuals/>

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