USDA United States Department of Agriculture

RESOURCE UPDATE FS-144

FORESTS OF U.S. Virgin Islands, 2014

This resource update provides a short overview of the status of forest resources in the U.S. Virgin Islands (St. Croix, St. John, and St. Thomas) based on the third forest inventory funded and conducted by the U.S. Forest Service, Forest Inventory and Analysis (FIA) program of the Southern Research Station and by the International Institute of Tropical Forestry. Data estimates are based on field data collected using the FIA annualized sample design for the measurement year 2014 with comparisons made to data collected in 2009 and 2004. The sample plot population presented here for the U.S. Virgin Islands (USVI) consists of 106 plots (54 plots for St. Croix, 23 plots for St. John, and 29 plots for St. Thomas), collected across a period of 1 year. The data used in this publication were accessed from the FIA Database at http://fia.fs.fed.us/tools-data/ on May 2017.

For methods used for forest area estimation and field data collection see Brandeis and Oswalt 2007.

Overview

Forest cover on the USVI remained relatively stable from 2009 to 2014 because the small change of 1.8 thousand acres (4 percent) is within the estimated sampling error (table 1). The number of estimated live trees with diameter at breast height (d.b.h.) ≥ 1.0 inch on forest land increased from 85.1 billion trees in 2009 to 92.2 billion trees in 2014, but this change (8 percent) is also within the error estimate. Nevertheless, net volume and aboveground biomass of live trees (d.b.h. ≥ 5.0 inches) increased 6.7 million cubic feet (46.6 percent) and 246.6 thousand tons (32.2 percent) respectively. Changes in annual net growth, annual removals, and annual mortality on forest land are within sampling errors and it is better to state that they held relatively steady at 0.76 million cubic feet, 0.03 million cubic feet, and 0.11 million cubic feet respectively. These estimates reveal a positive growth-to-removals ratio and a net total gain of 3.66 million cubic feet of volume over the entire 5-year period.

Table 1—U.S. Virgin Islands forest statistics, change between 2009 and 2014

Forest Statistics	2009 Estimate	Sam-pling error percent	2014 Estimate	Sampling error percent	Change since 2009
Forest land					
Area (*thousand acres*)	45.16	9.36	46.97	8.66	1.80
Number of live trees >1 inch d.b.h. (*million trees*)	85.13	11.48	92.20	11.12	7.07
Net volume live trees >5 inches d.b.h. (*million cubic feet*)	14.29	18.80	20.95	17.84	6.66
Live trees aboveground biomass (*thousand oven-dry tons*)	766.96	12.18	1,013.58	12.17	246.62
Net growth live trees >5 inches d.b.h. (*million cubic feet per year*)	0.94	24.03	0.76	20.15	-0.17
Annual removals of live trees >5 inches d.b.h. (*million cubic feet per year*)	0.04	68.18	0.03	55.18	-0.01
Annual mortality of live trees >5 inches d.b.h. (*million cubic feet per year*)	0.16	35.60	0.11	26.79	-0.04
Timberland					
Area (*thousand acres*)	12.02	24.77	9.98	27.09	-2.05
Number of live trees >1 inch d.b.h (*million trees*)	24.72	24.84	16.95	27.90	-7.77
Net volume live trees >5 inches d.b.h. (*million cubic feet*)	4.41	41.19	4.28	41.10	-0.12
Live trees aboveground biomass (*thousand oven-dry tons*)	236.65	27.98	201.95	31.57	-34.70
Net growth live trees >5 inches d.b.h. (*million cubic feet per year*)	0.22	61.60	0.19	30.47	-0.02
Annual removals of live trees >5 inches d.b.h. (*million cubic feet per year*)	0.02	100.00	0.02	70.77	0.00
Annual mortality of live trees >5 inches d.b.h. (*million cubic feet per year*)	0.09	59.05	0.05	44.21	-0.05

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Forest Area

The USVI form an archipelago comprising the major islands of St. Croix, St. John, and St. Thomas, among other numerous smaller islands with forests typically described using the Holdridge life zone classification system (fig. 1).

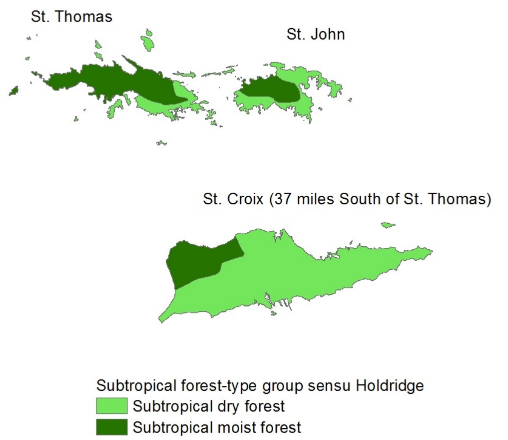

Figure 1—Forest-type groups sensu Holdridge in the U.S. Virgin Islands.

Coral Bay and East End, St. John, U.S. Virgin Islands in 2014. (Photo by Humfredo Marcano-Vega)

The USVI experienced a period of forest loss from 56,607 acres (68.9 percent forest cover) in 1994 to 46,564 acres (56.7 percent forest cover) in 2004. This decrease was mostly associated with the loss of forest land in St. Thomas (fig. 2). But since 2004 the overall forest area in the USVI has experienced a period of relative stability, considering that forest cover changes are within sampling errors (fig. 2). A total of 46,967 acres of forest area (57.2 percent forest cover) was estimated in 2014 for the USVI.

Total forest area on St. Croix was estimated at 26,179 acres (49.6 percent forest cover) in 2009 and 29,610 acres (56.1 percent forest cover) in 2014 (fig. 2). There were 10,343 acres of forest (85.5 percent forest cover) on St. John in 2009 and 9,830 acres (81.3 percent forest cover) in 2014, while on St. Thomas there were 8,641 acres of forest (50.1 percent forest cover) in 2009 and 7,528 acres of forest (43.6 percent forest cover) in 2014. While these values appear to illustrate an increase in forest cover on St. Croix and a decrease on St. John and St. Thomas, the changes they represent are still within the sampling error estimates. Continuous monitoring through FIA will reveal if such small changes in forest area will prevail to show long-term trends of relative stability, gain or loss.

Forest area from 1994 through 2014 by forest type group shows a slight increase in subtropical dry forest from 2009 to 2014, after a period of relative loss from 1994 to 2004 (fig. 3). In the case of the subtropical moist forest, its area has remained relatively stable from 2004 to 2014 after a period of forest loss from 1994 to 2004. There were 33,536 acres of dry forest (71.4 percent of total forested land) and 13,432 acres of moist forest (28.6 percent of total forested land) in the USVI in 2014 (fig. 3).

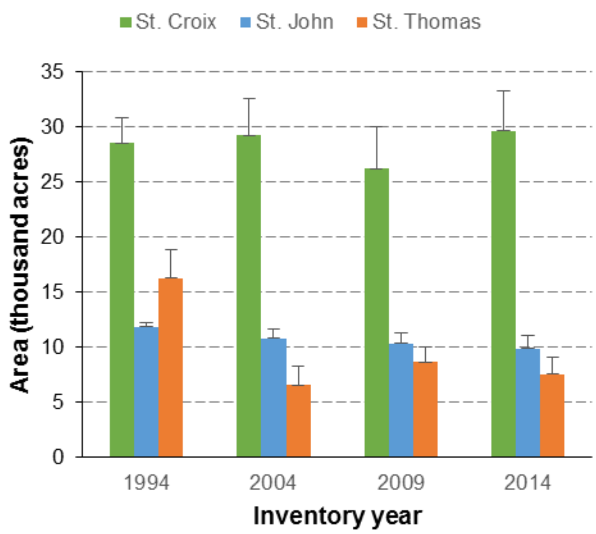

Figure 2—Forest area with sampling errors for the U.S. Virgin Islands, 1994-2014.

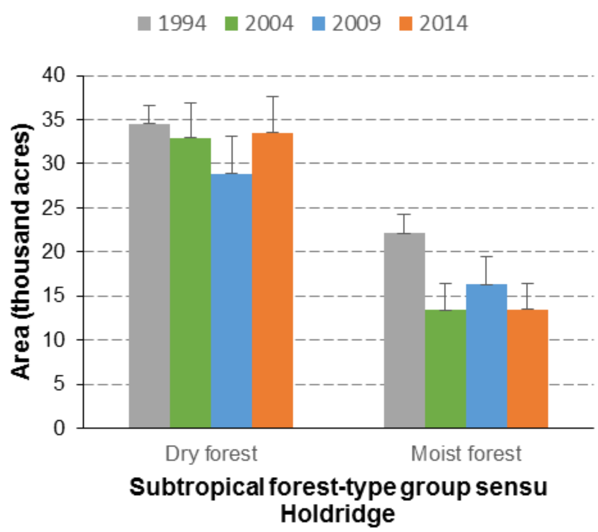

Figure 3—Forest area with sampling errors by forest-type group, U.S. Virgin Islands, 1994-2014.

Volume, Carbon, and Trends

Estimated values of net volume of live stems with d.b.h. ≥ 5 inches in 2014 show 397.1 cubic feet of wood per acre in dry forest, and 567.9 cubic feet per acre in moist forest (fig. 4). These values translate to 20.9 million cubic feet of total merchantable wood in the USVI's forests, showing a trend of increase between 2004 and 2014, and particularly in the dry forest life zone when considering sampling errors (fig. 4).

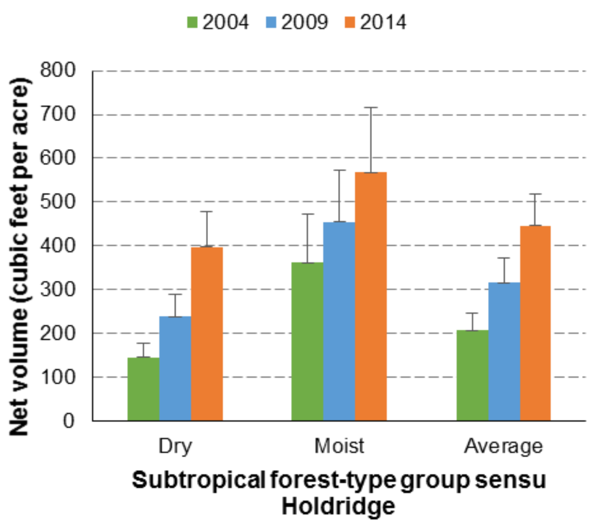

Figure 4—Net volume of live stems ≥ 5 inches d.b.h., with sampling errors, on forest land by forest-type group, U.S. Virgin Islands, 2004-2014.

Estimated values of live-tree carbon (above- and belowground) in stems with d.b.h. ≥1.0 inch in 2014 show 12.1 tons per acre in dry forest and 15.4 tons per acre in moist forest (fig. 5). These values translate to a total of 611,622 tons of carbon stored in the USVI's forests, from which 66.2 percent corresponds to carbon within the dry forest and 33.8 percent to carbon within the moist forest.

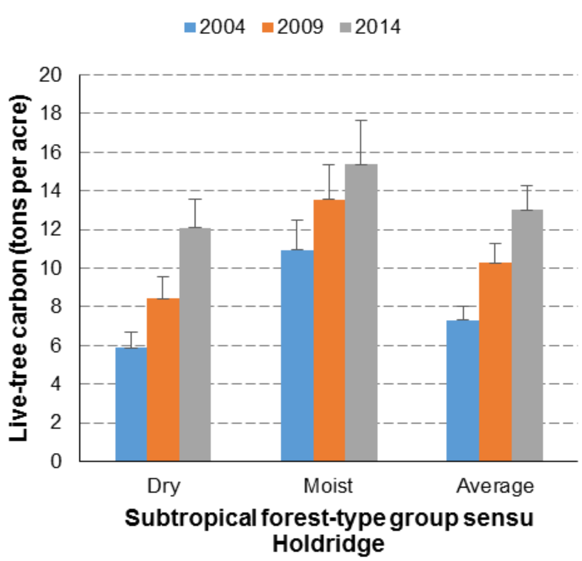

Figure 5—Total carbon (above- and belowground) of live stems ≥ 1 inch d.b.h., with sampling errors, by forest-type group, U.S. Virgin Islands, 2004-2014.

The increase in values of net volume and total carbon in live trees within the forested areas of the USVI suggest a tendency towards more mature stages of stand development from 2004 to 2014 (fig. 5).

A total of 118 species of live trees were recorded on the plots measured in 2014. Tan tan (*Leucaena leucocephala*) accounts for the species with highest biomass storage in 2014 (Table 2) with a high number of live stems ≥1.0 inch d.b.h. Other species with high biomass storage include the native black mampoo (*Guapira fragrans*) and the introduced genip (*Melicoccus bijugatus*).

Table 2—Number of stems and aboveground biomass of live trees ≥1.0 inch d.b.h. of the top 10 species for biomass on forest land, U.S. Virgin Islands, 2014

Scientific name	Number of stems	Aboveground biomass
	thousand trees	*thousand tons*
Leucaena leucocephala[a]	26,469.46	1216.9
Melicoccus bijugatus[a]	1,077.67	913.3
Guapira fragrans	4,072.75	909.1
Trema micranthum	7,680.95	590.1
Bourreria succulenta	4,173.21	581.1
Bursera simaruba	775.48	546.3
Acacia muricata	3,217.49	501.1
Swietenia mahagoni[a]	622.80	421.5
Mangifera indica[a]	263.95	329.0
Pisonia subcordata	412.84	313.7

[a] = Introduced species (Acevedo-Rodriguez and Strong 2012).

Changes in tree volume were explored by remeasuring trees from the 2009 inventory, which allows the estimation of net annual growth on all-live trees, average annual mortality, and average annual net removals. Mortality relative to total growth per acre showed different dynamics according to forest-type group (fig. 6).

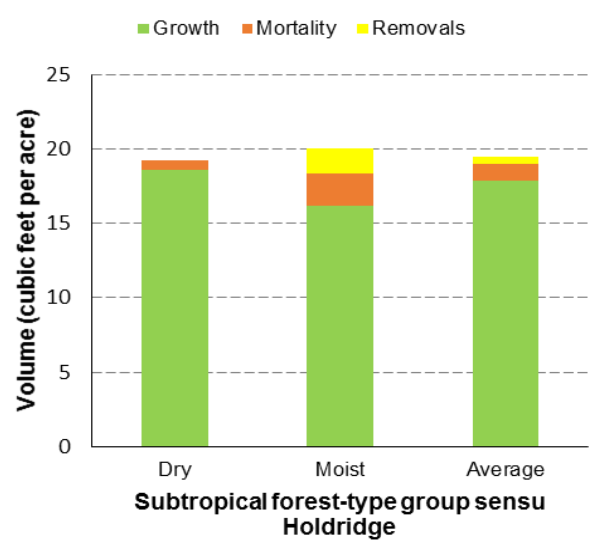

Figure 6—Annual growth, mortality, and removals by forest-type group, U.S. Virgin Islands, 2009-2014.

Forest Health Indicators

Various forest health indicators or agents that affect the aspect of trees (e.g., signs of advanced decay, wind effects, epiphytic growth) are recurrently recorded by the FIA Program for trees with d.b.h. ≥ 5 inches (Brandeis and Oswalt 2007). Forest health sampling efforts were expanded for this third USVI forest inventory to include the effects of insects and other agents on all trees (d.b.h. ≥ 1 inch), and seedlings (d.b.h. < 1.0 inch and ≥ 12.0 inches in length). Different types of indicators were found in 11.2 percent of trees and in 5.4 percent of seedlings. Evidence of stem decay represented 54.5 percent of effects found in trees (fig. 7), and defoliation by insects represented 79.5 percent of effects found in seedlings (fig. 8).

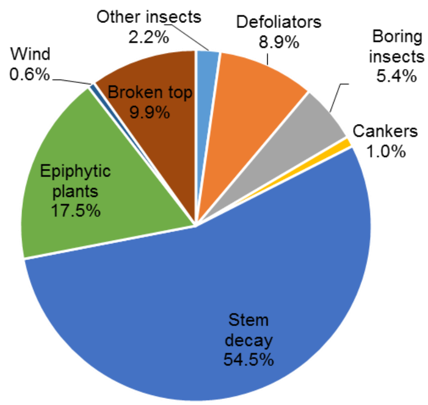

Figure 7—Frequency of forest health indicators on trees (d.b.h. ≥ 1 inch), U.S. Virgin Islands, 2014.

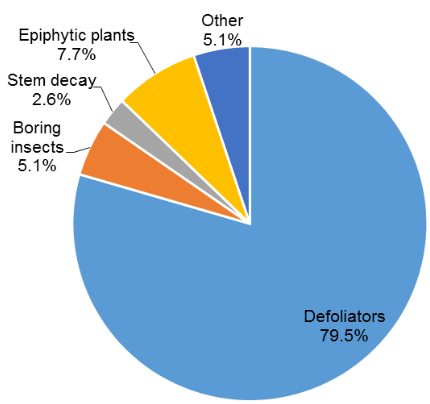

Figure 8— Frequency of forest health indicators on seedlings (d.b.h. < 1 inch), U.S. Virgin Islands, 2014.

Stem decay found in trees was of minor severity and not considered as a threat. On the other hand, when defoliation was found in seedlings, its severity represented a mean of 42.5 percent (5 to 99 percent range). This effect is yet considered as light for the forest seedling community since defoliation was found in only 4.3 percent of seedlings. The palm leaf skeletonizer (*Homaledra sabalella*) was nonetheless observed as a heavy defoliator in palm species, and the larva of the cactus moth (*Cactoblastis cactorum*) as a heavy feeder of native cacti. Precautions should thus be considered when interpreting results due to sampling limitations entailing the difficulty of visually recording insects within plot boundaries (0.17 acres) on a single visit. Future assessments ought to include setting traps for the collection/identification of specimens and tabulation, along with surveying for effects of forest insects in trees outside sampling boundaries on the way to each field plot.

Heavy defoliation by palm leaf skeletonizer (*Homaledra sabalella*). (Photo by Joe R. Williamson)

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