The Role of Dead Trees in a Healthy Forest: Quantifying the Abundance and Average dbh of Snags in Six of the CBP Community Types.

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Abstract

The Long Island Central Pine Barrens (CPB) has a variety of forest communities including Coastal Oak Forest, Oak-Pine Forest, Pine-Oak Forest, Scrub Oak Forest, Dwarf Pine Forest, and Pitch Pine Forest. The Foundation for Ecological Research in the Northeast (FERN) started a forest health-monitoring project in 2005 to assist land managers in preserving and protecting this natural resource. FERN evaluated Pine Barren forest health indicators including, but not limited to PH, canopy cover, sapling numbers and snags. Snags are standing dead trees, which are an important forest health indicator because they provide habitat for wildlife. The purpose of this research is to quantify the abundance of snags in six forest community types to determine in which community type they are most prevalent. Using Global Positioning System (GPS) and Geographic Information System (GIS) technology, random plots (16 x 25 meters) were selected. The quantity and average diameter at breast height (dbh) of snags in each community type were recorded for each plot. Results show that among the six community types, snags are more likely to be found in Oak-pine forest followed by Coastal oak, Pitch pine, Pine-oak, Scrub oak, and Dwarf pine Forest. Oak-pine and Coastal oak are two of the community types in which the greatest average dbh of snags exist. The research of 2005 and 2006 will be repeated in 2015 and 2016 to determine changes over time. This baseline data will also provide current information for the management of the CPB of Long Island.

Introduction

The Central Pine Barrens (CPB) is an area of Long Island that once encompassed approximately 250,000-acres in central Suffolk County but has now been reduced to 100,000 acres of relatively undeveloped land. The CPB represents one of the last strongholds of biodiversity on Long Island [2]. Many uncommon species find safe refuge to live among the sandy soils, scrublands, forests, and wetlands of the CPB. In 2005, The Foundation for Ecological Research in the Northeast (FERN) created a forest health-monitoring program in the CPB, in alliance with the Central Pine Barrens Planning and Policy Commission, Nature Conservancy, the Upton Ecological Research Reserve and Brookhaven National Laboratory, to provide forest health data.

Snags are standing dead trees, which are important forest health indicators because they provide food sources and habitat for wildlife. Moreover, the number and size of available snags affects not only the presence or absence of snag-dependent wildlife but also wildlife population levels. Commonly, the value of a snag tree increases as its size increases. To guarantee that the minimum requirements of most wildlife species are being met three snags of 12 inches dbh or greater should be available per acre [6].

The goals of this research were to 1) Quantify the abundance of snags in six of the forest community types Coastal Oak Forest, Oak-Pine Forest, Pine-Oak Forest, Scrub Oak Forest, Dwarf Pine Forest, and Pitch Pine Forest 2) Determine which community type contains a greater amount of available habitat 3) Establish the average diameter at breast height of snags in each community type.

MATERIALS AND METHODS

The data and methods of this research were collected in summers 2005 and 2006. This data came from the CPB Forest Health Monitoring Protocols by M. Batcher [1]. Plots in the Central Pine Barrens core preservation area in eastern Long Island were randomly selected using Geographic Information System (GIS). A Global Positioning System (GPS) was use to locate the plots and to insure that it was in the targeted community type located no closer than 50m to edges of human-dominated land use such as roads, and no closer than 25m to boundaries of other target community types. Field data was collected at 91 random plots (16 x 25meters). Using two 50-m tapes, chain pins, a rangefinder, and sighting compasses the corners and boundaries of the 16 x 25m plot were laid out in accordance with the protocols [1].

The entire plot was surveyed and data on trees, snags, and downed logs were collected. The diameter at breast height (dbh) was measured for all trees greater than 10 centimeters dbh, and if evident, the species was recorded. Trees 2.5 centimeters and 10 centimeters dbh were tallied by species but not measured. Trees with multiple stems were counted as one tree, but the dbh of both trunks was measured and recorded. For the downed logs, dbh's were taken at each end and in the middle of the log. The entire length of the log was also recorded.

RESULTS

In summers of 2005 and 2006, 91 plots were randomly sampled. Approximately, 210 snags were identified, and results shows that among the different communities types in the CPB Oak pine is the one that contains the greatest amount of snags with 52.3% followed by Coastal oak with 27.6%, then Pitch pine with 10.9%, Pine oak with 7.6%, Scrub oak with 1.4% and Dwarf pine plains with 0%. (See Table 1). Moreover, Average dbh show that the Scrub oak forest community contains the largest average dbh, followed by Coastal oak, Oak pine, Pine oak, Pitch pine and Dwarf pine. (See Figure 2).

In addition, results show that among the six communities types, Oak pine community contains the greatest amount of downed logs with a 31.6% followed by Coastal oak with 28.6%, Scrub oak with 22.7%, Pitch pine with 11%, Pine oak with 5.8% and finally scrub oak with 0%. Also, the Average dbh and length of downed logs was taken at each end and the middle. (See Figures 1-3).

Community Type	Plots Sampled	Average of Sags	Percentage of snags
Coastal Oak	19	58	27.6%
Pitch Pine	17	23	10.9%
Oak Pine	31	110	52.3%
Pine Oak	12	16	7.6%
Dwarf Pine	4	0	0%
Scrub Oak	7	3	1.5%
Total:	90 plots	210	99.9%

Table 1. The average number of snags in each community type and the number of plots sampled in each community type.

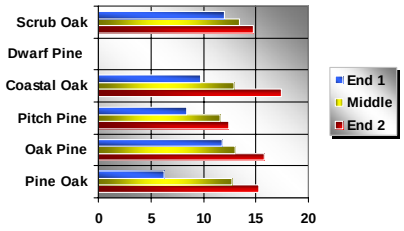

Figure 1. Average dbh of downed logs in the Six Community Types of the CBP.

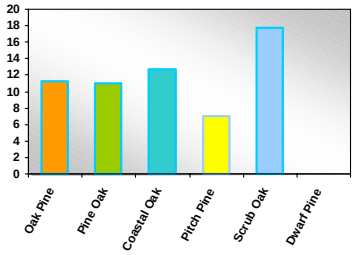

Figure 2. Average dbh of snags in of the different communities types of the CPB.

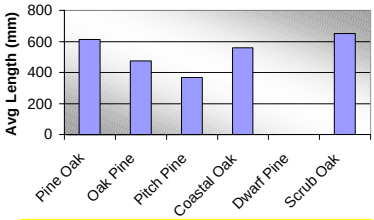

Figure 3. Average of the length of downed logs in six community types of Long Island CBP.

DISCUSSION AND CONCLUSION

When evaluating the health of a forest, it is important to consider the structural needs of wildlife. Snags are very important for a forest health because without them, there would be a decrease in the number and diversity of wildlife. Around five hundred species of birds, three hundred species of mammals, four hundred species of amphibians and reptiles and nearly all fish benefit from snags for food, nesting or shelter [6]. Therefore, it is very important to monitor and research existing snags and their effect on forest health.

Quercus alba makes the best snags, closely followed by the other *Quercus* species because they are long-lived. The Oak-Pine community has the greatest quantity of snags habitat. There were not many snags in Pine-oak or Pitch pine. A conclusion cannot be drawn on the Dwarf Pine community, as only four plots of this rare and unique community. However, none of those plots had any snags or downed trees found.

This research documents the abundance and average dbh of snags in six different communities of the CPB. When these same plots are researched again in 2015 and 2016, the changes in the quantity and average dbh of snags among the six communities will be learned. This data, in combination with other forest health data will show which areas are thriving, declining or staying the same.

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