



Department of  
Environmental  
Conservation

# NEW YORK STATE SOUTHERN PINE BEETLE RESPONSE

## 2014-2015 Annual Report

Division of Lands and Forests - Forest Health

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## Executive Summary

To help effectively manage the response to southern pine beetle (SPB) in New York State, the Department of Environmental Conservation (DEC) has established an incident command structure. To detect and track SPB in Long Island from 2014-2015, DEC used multiple aerial surveys to map thousands of acres of potentially infested trees. Early detection traps in Bear Mountain State Park and Minnewaska State Park in the Hudson River Valley captured SPB, showing that SPB has also moved further north into NY. From aerial survey maps, ground surveyors verified and delimited SPB infestations on 297 acres of Long Island, however found no SPB-infested trees in the Hudson River Valley. Ground surveyors marked about 6,500 trees for sawyers to cut during fall spot suppression. DEC and Northeastern Forest Fire Compact crews cut 7,563 infested trees during suppression efforts. DEC created preventative thinning stand prescriptions for forest stands in Rocky Point Pine Barrens State Forest, which will go out to bid in 2016. DEC research has examined SPB-suppressed stand characteristics, stand susceptibility, expansion rate, and winter temperatures and mortality to help inform management decisions.

## Southern Pine Beetle in New York State

Southern pine beetle was first detected in New York State with a trap in July, 2014 by NYS Agriculture and Markets and was discovered in trees in Long Island during October 2014. Prior to this, SPB had been detected as far north as Pennsylvania and New Jersey (Payne, 1980) and has since spread further north in NY and to Connecticut, Massachusetts, and Rhode Island. Southern pine beetles attract each other to individual trees using pheromones and attack pine trees en masse, which overwhelms the tree's defenses and kills the tree in 2-4 months. In Long Island, pitch pine is common, especially in the Central Pine Barrens where pitch pine dominates or co-dominates over 100,000 acres. Aerial and ground surveys show that SPB is widespread and abundant in Long Island, has killed thousands of trees, and continues to expand rapidly. SPB has also been found in the Hudson River Valley, where pitch pine is prevalent on the Shawangunk Ridge and other mountaintops in the area.

## Incident Command Structure

To help effectively manage the response to SPB in New York State, an incident command structure is in place (Figure 1, p.5). Incident command was originally established in the DEC Central Office (Albany, NY) to coordinate the response and was then transferred to Region 1. However, incident command was transferred back to Central Office to apply consistent implementation of the response as SPB spreads. SPB has been found in DEC Regions 1, 2, and 3. In 2015, five DEC Forest Health staff were trained in Incident Command System (ICS) 300, bringing the total number of staff trained to this level up to 9. Four other staff members have been trained up to the ICS 200 level. The incident command management system allows for the management of personnel and resources across multiple jurisdictions and provides for a clear path of communication between all parties involved in the response. This has been critical in Long Island for communication and participation between several partner groups such as the DEC Central Office and Region 1, the Central Pine Barrens Joint Planning and Policy Commission, the US Fish and Wildlife Service, the National Park Service, the US Forest Service, Brookhaven National Laboratory, NY Office of Parks Recreation and Historic Preservation, Suffolk County, the Town of Brookhaven, the Town of Islip, and the Town of Southampton.

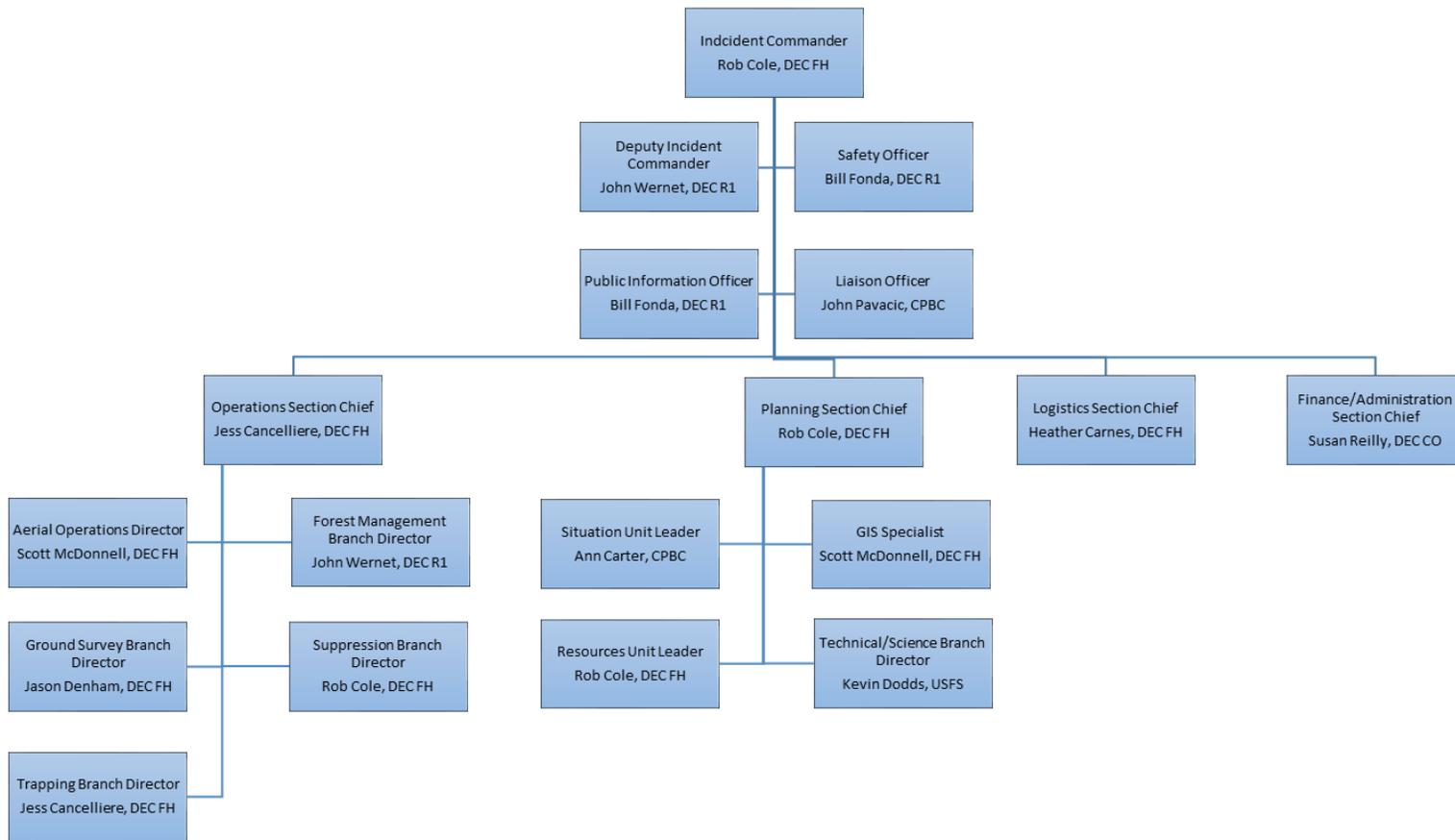


Figure 1. Incident command structure in place December 31, 2015.

## Detection and Monitoring

### Trapping

Traps were used as an early detection method for the Hudson River Valley (Figure 2, p.7). Eight traps were used for early detection in Albany, Columbia, Ulster, Orange, and Westchester Counties from April to August (Table 1) at sites with pitch pine. Three early detection trapping sites, one in Bear Mountain State Park and two in Minnewaska State Park, captured SPB. This alerted the DEC that SPB is further north in New York State than Long Island and allowed aerial and ground monitoring for SPB damage to begin.

In Long Island, traps were used to monitor beetle populations (Figure 2, p.7). Thirteen SPB traps were used for population monitoring in Nassau and Suffolk Counties from April to August (Table 1). This preliminary population monitoring trap data will help keep track of beetle populations and determine outbreak levels as more data is collected over the next several years.

<b>DEC Region</b>	<b>Function</b>	<b>County</b>	<b>Number of traps</b>
Region 1	Population monitoring	Nassau	2
		Suffolk	11
Region 3	Early Detection	Orange	1
		Ulster	3
		Westchester	1
Region 4	Early Detection	Albany	2
		Columbia	1



Figure 2. Location of SPB traps in New York State. Note: Bethpage traps did not capture SPB, however SPB was found in Bethpage.

## Aerial Detection Surveys

DEC aerial detection surveys were conducted in December in 2014 and in January, March, June, July, and August in 2015 over Long Island to map potential SPB infestation damage. Aerial detection surveys were conducted with NYS Office of Parks, Recreation and Historic Preservation over Bear Mountain and Minnewaska State Parks in the summer of 2015, however no SPB damage was detected. Southern pine beetle infestations were mapped across Suffolk County to inform the public, as well as in the Central Pine Barrens to inform ground surveys and suppression efforts. Aerial detection surveys mapped out 14,946 acres of potential infestations across Suffolk County in December of 2014 and January 2015. Aerial surveys in August 2015 mapped 16,465 acres of potential SPB infestations in and around the Central Pine Barrens Core Preservation and Compatible Growth Areas.

## Ground-truthing Surveys

Spots mapped in aerial surveys or that were reported by the public were confirmed with ground surveys. Combined aerial and ground surveys (SPB traps and ground-truthing surveys) in New York State show that SPB is widespread in Long Island and is moving into the Hudson River Valley (Figure 3, p.9). In Long Island, ground-truthing surveys were first conducted from January through April 2015 and again from September to November 2015 to further map and verify SPB infestations detected in aerial surveys. Spots detected in aerial surveys with higher trees/acre were verified first. In Long Island, 6,593 acres were ground-truthed for SPB in 2015. Of these, 296 SPB-infested acres were delimited during ground surveys. Crews from the Northeastern Forest Fire Compact assisted with ground surveys in the spring and summer. In the spring, a Northeastern Forest Fire Compact crew of six forest health specialists from Maine, New Hampshire, and Nova Scotia ground surveyed 3,149 acres and delimited 49.4 infested acres from 25 aerial survey polygons.

During the September to November 2015 ground-truthing surveys, surveyors marked trees to be removed with spot suppression. Approximately 6,500 trees were marked during late summer ground-truthing surveys for sawyers to cut down during fall spot suppression efforts. In the fall, a Northeastern Forest Fire Compact crew of eight forest health specialists from Maine, Massachusetts, Rhode Island, and Vermont ground surveyed 1,628 acres and delimited and marked 16.7 infested acres from seven aerial survey polygons. The majority of land ground surveyed and marked for suppression was owned by Suffolk County (Table 2, p.10) Many of the marked spots had expanded to infest more trees by the time suppression was started and one site had to be ground surveyed again, indicating that suppression should happen sooner after ground-truthing surveys. Southern Pine Beetle was also verified in the Green-Wood Cemetery in Brooklyn (Region 2) with ground-truthing surveys.

Ground surveys at high hazard, unique areas in Bear Mountain State Park, Minnewaska State Park, and the Mohonk Preserve were based on summer aerial surveys and data from the National Agriculture Imagery Program. No infested trees were found during ground surveys in the Hudson River Valley.

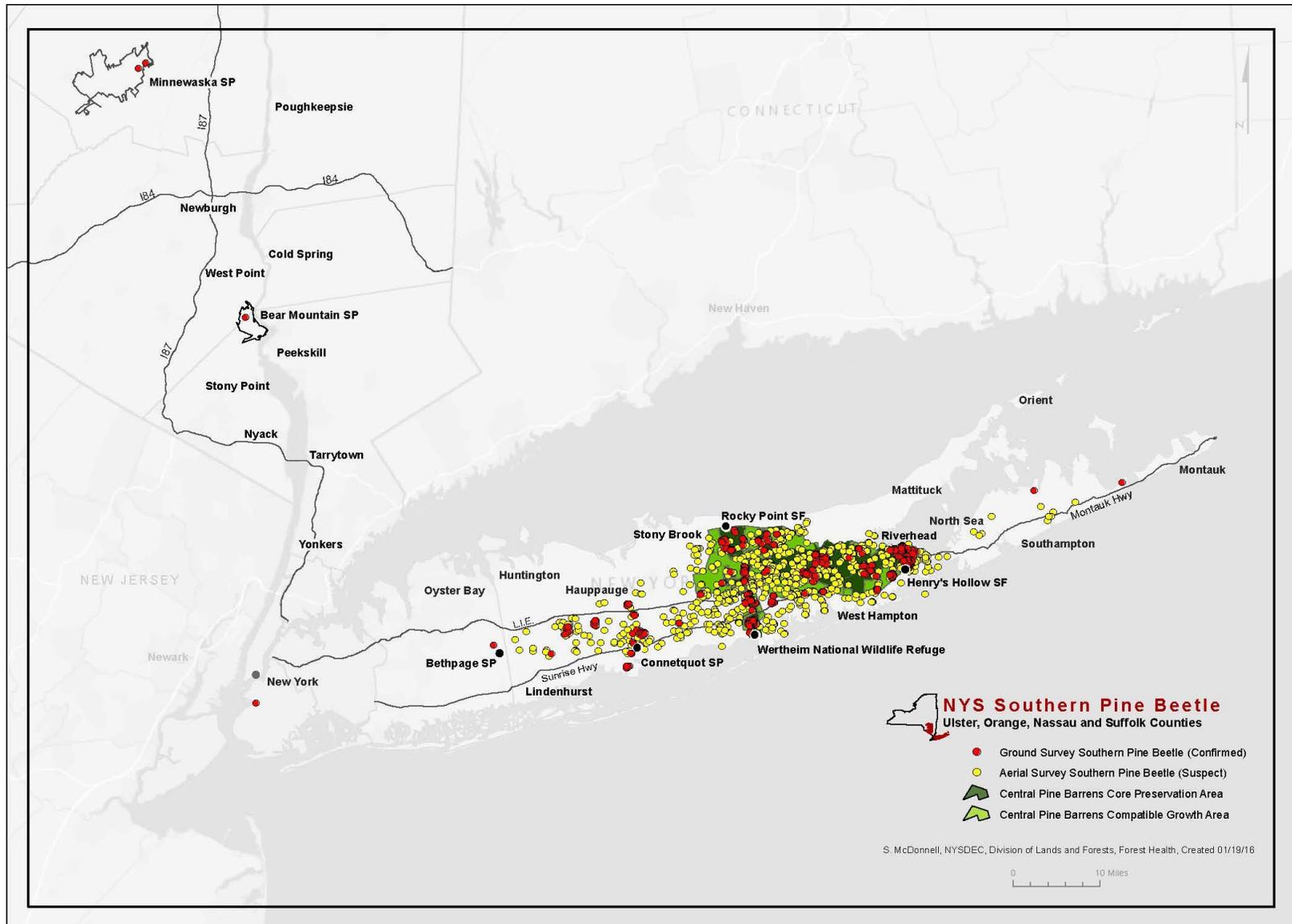


Figure 3. Combined aerial (suspect) and ground surveys (SPB traps and ground-truthing surveys, confirmed) in New York State.

	Federal	State	County	Municipal	Private
Ground surveyed polygons	10%	26%	51%	8%	5%
Acres ground surveyed	1%	27%	49%	11%	12%
Marked polygons for spot suppression	0%	9%	81%	2%	8%
Acres marked for spot suppression	0%	3%	62%	1%	34%

## Management Strategies

### Spot Suppression

As there were no infested trees found in the Hudson River Valley, suppression only occurred in Long Island. Live infested and buffer trees were cut before they could produce more SPB. Once the trees were on the ground, crews cut a groove along the bark to facilitate exposure of remaining beetles to winter weather and predation by other insects or fungi.

Spot suppression has been conducted by Northeastern Forest Fire Compact (from Quebec) and DEC crews (Table 3). In 2015, 7,563 infested trees were cut for suppression (Figure 4, p.11).

Sawyer crew	Number trees cut at site			
	Henry's Hollow	Bellows Pond	Munn's Pond	Red Creek
DEC Forest Health				2,043
DEC Region 1	2,562			
Northeastern Forest Fire Compact		2,373	633	



## Thinning

Thinning is a type of preventative ecosystem restoration that reduces competition between individual trees, which has been proven to make trees more resistant to SPB attack (Belanger 1980, Brown et al. 1987, Fettig et al. 2007, Thistle et al. 2011). Increasing the distance between trees also makes it more difficult for beetles to communicate and attract one another using pheromones, making it more difficult for them to attack trees in great numbers.

The first area that will have thinning applied is Rocky Point Pine Barrens State Forest. A forest inventory was completed in June by ten DEC foresters. The forest inventory data was then used to develop a hazard model (Figure 5, p.12) to predict which areas are the most susceptible to SPB. A prescription was written for one stand east of Currans Road (stand 4, 62 acres), two stands towards the north of Wading River Hollow Road on the east and west sides (stands 12 and 14, 75 acres), two stands further south off Wading River Hollow Road to the east (stands 25 and 35, 8 acres), and a stand north of Whiskey Road (stand 18, 56 acres). These stand prescriptions outline how the stands will be thinned and how the treatment will affect management goals in the area.

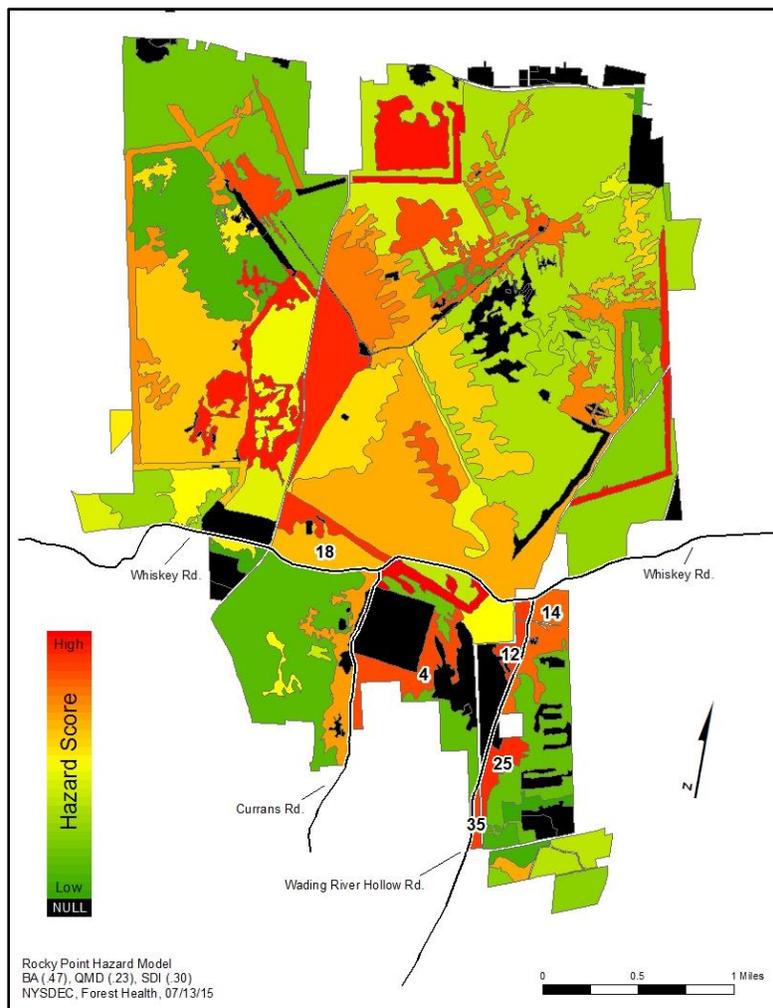


Figure 5. Rocky Point hazard model map with numbered preventative thinning stands.

## DEC Research

### 1. SPB-suppressed stand characteristics

Research was conducted on pitch pine trees in forest stands treated for SPB suppression to determine the average ages and sizes of trees that make up the forests in Long Island, to help determine how long it will take to replace these forests. The average tree age was 100 years (range 65-140 years), average diameter was 14.5 in., and average height was 59 ft. Therefore, it will take 100 years to replace the current forest conditions on Long Island after SPB. The pitch pine on Long Island reached 10 cm in diameter in 29 years. These forests may never be fully replaced if they are not thinned as trees will be susceptible to SPB attack again in 29 years if they successfully regenerate (Hassett and Cole, 2015a unpublished).

### 2. Stand susceptibility

Expansion rates were calculated by comparing the number of stage 1 trees (new infestations, still green) to stage 2 trees (older-infestations, color changed) between high (>80 BA) and low ( $\leq$ 80) pitch pine and total basal area (BA) stands. It was determined that stands with higher expansion rates were those with higher total basal areas (>99% confident), meaning that SPB attacks trees faster in stands that have higher (>80) total basal area (Hassett and Cole, 2015b unpublished).

### 3. Expansion rate

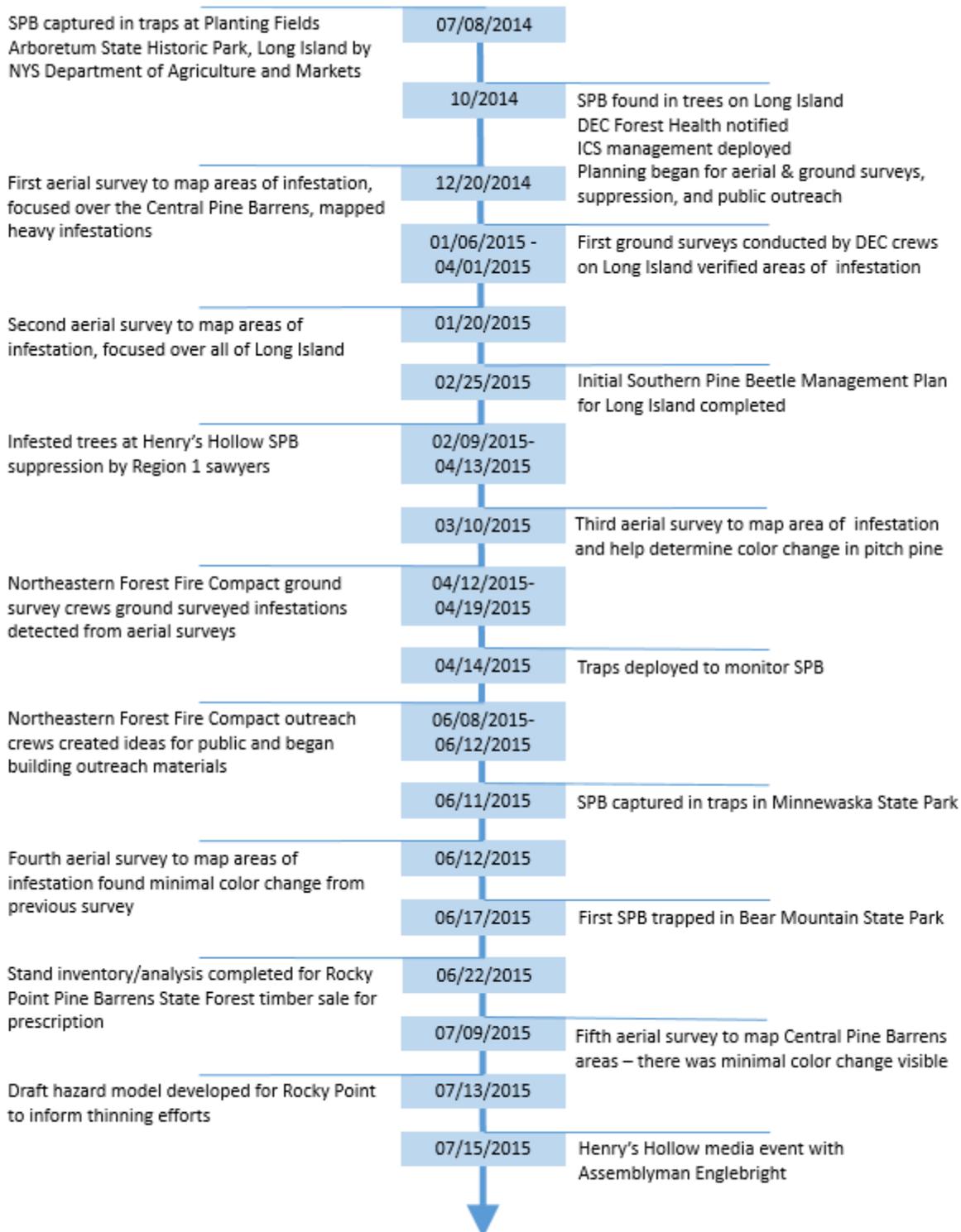
An average expansion rate of 460% over a three month period from late August to November was determined by comparing the number of stage 1 trees (new infestations, still green) to stage 2 trees (older-infestations, color changed). A regression equation derived from this will be applied to ground surveys conducted in the beginning of 2016 to predict how long it will take SPB to spread across Long Island without management.

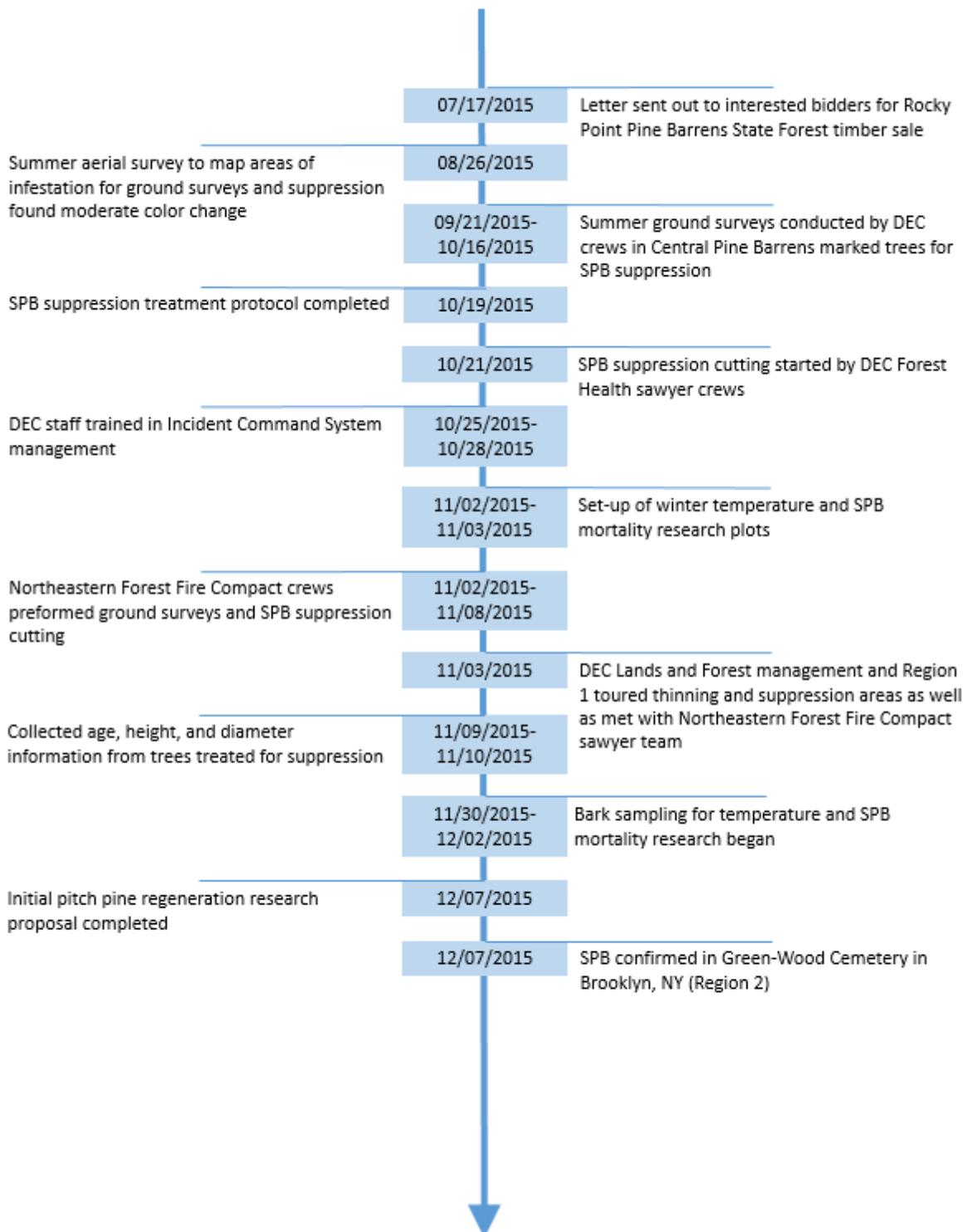
### 4. Winter temperatures and mortality

This study is in progress and will continue through March. Four pitch pine bark samples were collected from eight stage 1 or stage 2 trees within each of two stands in Southampton NY. Trees were marked with temperature sensors that will help determine if temperature correlates with winter mortality. Bark samples will be collected from these trees once a month through March. From each sample, larvae will be extracted to determine their life stage, location in the bark, and if they are alive to help determine how SPB larvae are overwintering and if they are dying from cold temperatures over the study period.

## Public Information and Outreach

Public information maps have been created from aerial surveys covering the extent of Long Island and will continue to be created each January as resources allow. Several tours have been given to cooperating agencies and elected officials showing areas selected for thinning and spot suppression treatments. In June, a Northeastern Forest Fire Compact crew from Maine, Massachusetts, Nova Scotia, and Virginia helped develop outreach materials. Several press releases, newspaper articles, and social media posts have been made announcing the discovery of SPB, the tours, and DEC management in the control of SPB.





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