

2025 Florida Southern Pine Beetle Forecast

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Background: *Dendroctonus frontalis*, commonly known as the southern pine beetle (SPB), is among the most destructive native forest pests in the southeastern United States. Since 1995, the Florida Forest Service (FFS) has participated in a coordinated, multi-state spring trapping survey in collaboration with other state forest agencies throughout the South and Northeast. This annual survey monitors the number of adult SPBs, and their checkered beetle predators (*Thanasimus dubius*) captured in pheromone-baited flight traps during the SPB primary spring dispersal period. The results are used with a predictive model to provide an early-season forecast of SPB population trends and activity levels. Using the results from the trapping survey allows forest managers to identify areas of potential SPB activity in advance of aerial detection flights. The survey also provides data for monitoring SPB population levels year by year.

2025 Results Summary: The results of the 2025 survey indicate that the probability of SPB activity is **low** for most of Florida, with the likelihood of any SPB infestations (areas where SPB is actively killing trees) occurring in the counties highlighted in green being minimal (Figure 1). An elevated risk of one or more SPB infestations occurring is predicted for Alachua (15.6%), Gadsden (17.9%), Leon (8.6%), Liberty (9%), Okaloosa (16.1%), and Wakulla (21.2%) Counties. The probability of a major outbreak (defined here as any county having >50 infestations) did not exceed 2.5% for any of the counties in Florida where trapping was conducted (Appendix Table 1).

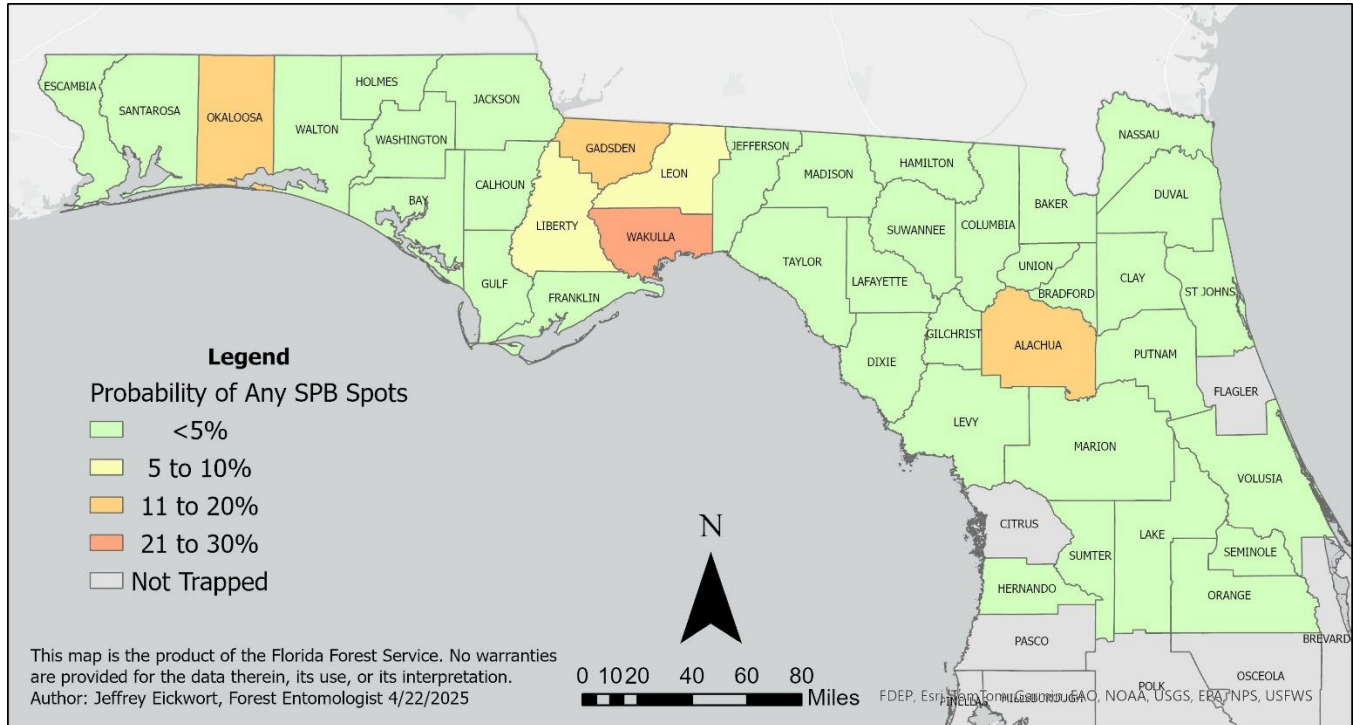


Figure 1: Forecasted probability of any southern pine beetle activity occurring during the 2025 season in the Florida counties surveyed. These results are based on the predictive model developed by the Dartmouth Applied Learning and Innovation (DALI) Lab at Dartmouth College.

Results and Discussion

The forecast model predicts low levels of SPB activity throughout the rest of Florida. The overall low numbers of SPB collected from most trap locations (Figure 2) indicate that a continuation of the minimal SPB activity experienced in most of the state in recent years will likely continue in 2025. Traps in many counties in Florida captured some SPB, but usually averaged <10 beetles/trap/day over the course of the survey (Appendix Table 1). Additionally, the number of predatory checkered beetles trapped per day was greater than or equal to the number of SPB trapped per day in most locations. Checkered beetles eat SPB and are attracted to SPB pheromones. A robust population of checkered beetle predators will help to keep SPB populations at low levels.

In addition to the number of beetles collected in survey traps, the number of documented SPB spots in the previous two years is also taken into consideration in the forecast model, because analyses have found that this increases the predictive power of the model. Thus, the probability of spots occurring in Alachua, Liberty, and Wakulla Counties is raised by the SPB activity that occurred in those counties in 2023. This is why Wakulla County (where significant SPB activity occurred in 2023) has the highest predicted likelihood of SPB activity this year, despite having relatively low numbers of SPB collected (as seen in Appendix Table 1). No confirmed SPB spots were documented in Gadsden and Okaloosa Counties in 2023 or 2024, but enough SPB were collected in those traps to increase the forecasted probability of SPB activity. The FFS Forest Health Section recommends conducting early aerial surveillance flights in these six counties and surrounding areas, and routine monitoring for SPB infestations through the summer and fall of 2025.

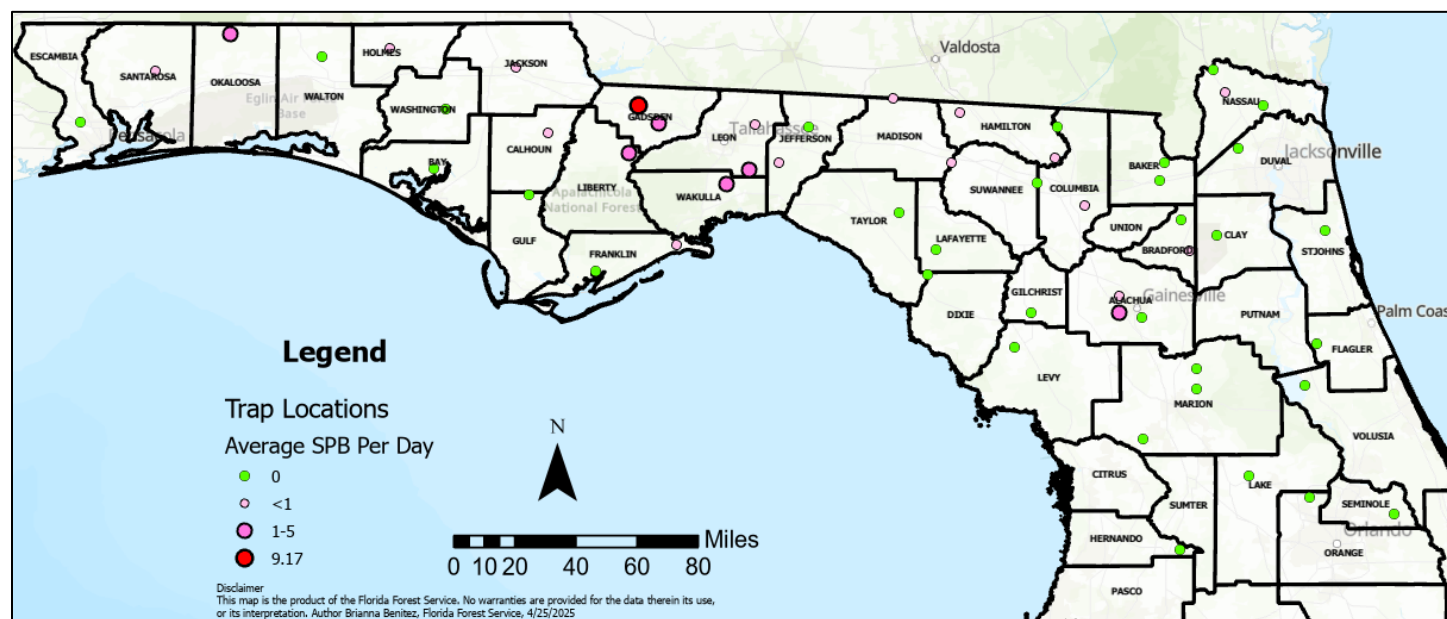


Figure 2: Southern pine beetle trap locations and the average number of SPB caught per day for each trap.

Although no confirmed SPB infestations were documented in the state of Florida in 2024, other states in the southeastern United States experienced the worst outbreak in over 20 years. Over 13,000 infestations were recorded across multiple states in the past year, causing devastating losses of pine forests on both private and public lands (Figure 3). Outbreak-level activity was correctly predicted in these regions by the 2024 spring trapping survey results. The magnitude of this event highlights the destructive potential of southern pine beetle, as well as the continued need for programs and practices aimed at predicting, detecting, and preventing SPB activity.

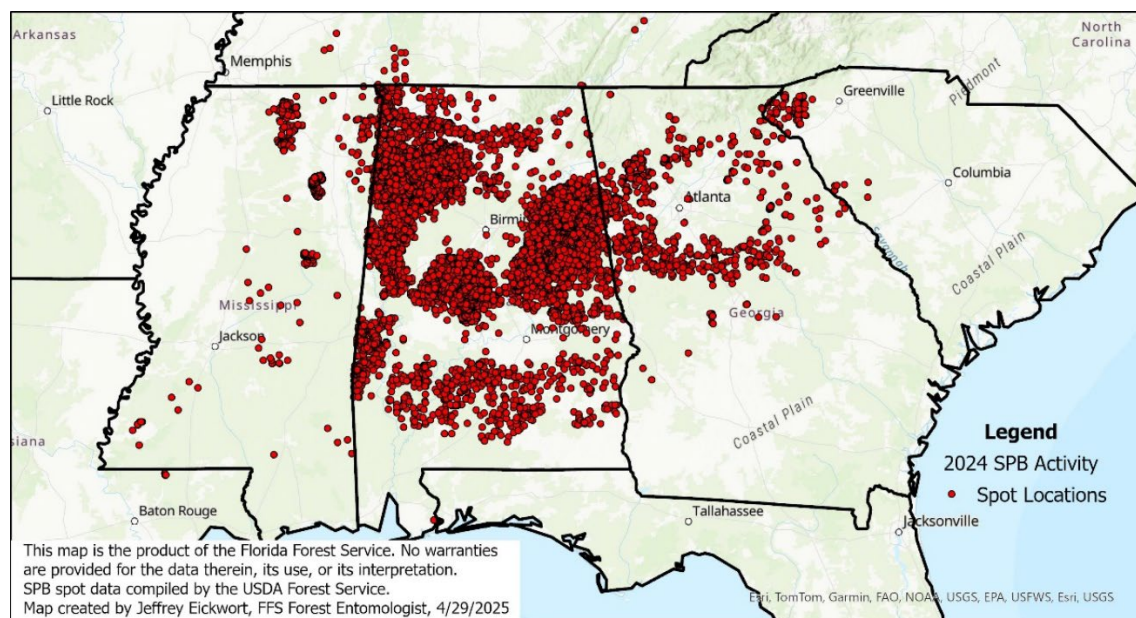


Figure 3: Locations of SPB infestations recorded in 2024, from data collected by multiple state agencies and compiled by the USDA Forest Service.

Methods

The 2025 Florida survey was conducted in 40 counties, utilizing 54 traps across north Florida, which includes those most likely to experience SPB activity based on historical outbreaks and their relative abundance of loblolly pines, a preferred host species of SPB. One to three traps (Lindgren funnel traps baited with alpha- and beta-pinene and the SPB aggregation pheromone frontalin) were set up in each of those counties. Each trap was set up in or near a different stand of susceptible forest type. *Endo-brevicomin* lures were placed near all traps to boost attractiveness to SPB adults, thereby increasing trap catches and prediction accuracy (based on previous research).

Site Selection: As in previous years, an effort was made to place traps in or near stands containing sawtimber size loblolly pine, or in areas where loblolly pine is most abundant. Traps were distanced at least 50 feet from any pine tree and checked weekly by foresters throughout February and March.

Data Collection: Numbers of SPB and their checkered beetle predator, *Thanasimus dubius*, were counted for each of the six weekly collections per trap. Florida joined with other states to record the SPB trap results in a standardized format using the ESRI application Survey123 for ArcGIS. This standardization enables data to be directly accessible and shared in real-time with all participating state and federal forestry agencies and other stakeholders. Once trapping results are entered into the Survey123 system, a variety of predictions can be generated, which forecast the likelihood of SPB activity on a county-by-county basis.

Prediction Modeling: The 2025 survey marks the seventh year that a new forecast model has been used to predict the likelihood of SPB activity. The forecast model was developed by researchers at Dartmouth College in cooperation with partners in the USDA Forest Service and state forestry agencies. This next-generation model is based on several variables that have been found to be highly predictive of SPB activity based on trapping and activity data collected since 1988. More information about the prediction model is available at <https://www.spbpredict.com/>.

The predictive model generates a forecast that displays the probability for various levels of SPB activity. Out of all the predictions tested, the probability of greater than 50 SPB spots was found to be the most accurate, although various forestry professionals may use other benchmarks. Trapping and activity data collected since 2011 were used to build the prediction model. In previous years, the model included variables such as the number of checkered beetles captured in the previous year, and SPB spot counts from both last year and two years ago. Upon further study of the trap data and SPB activity recorded in previous years, it was determined that most of the predictive power came from two variables: the average number of southern pine beetles captured per day in each trap this year, and the number of SPB spots that occurred in that county during the previous year. So, those two variables have been retained, resulting in a more simplified version of the model going forward. In some counties, the results shown for Florida on the [spbpredict.com](https://www.spbpredict.com) website may be based on SPB spot records that are unverified or incorrect. The model predictions shown in this report are from the same model, using SPB activity records that have been corrected and verified by the FFS Forest Health Section.



Left: Southern Pine Beetle (*Dendroctonus frontalis*) Length 2-4 mm. Image by Jeff Eickwort, Florida Forest Service.

Center: Lindgren funnel trap used to monitor southern pine beetle populations. Image by Brianna Benitez, Florida Forest Service.

Right: Checkered beetle (*Thanasimus dubius*), predator of the southern pine beetle. Image by Jeff Eickwort, Florida Forest Service.

Sincere thanks to all FFS personnel who were involved in installing traps, making weekly collections, and submitting samples for processing. We would also like to acknowledge the continuing support from the USDA Forest Service, as well as Matthew Ayers and Carissa Aoki for their work on the next generation SPB prediction model. Please forward this report to anyone who may be interested.

Because of limited survey inputs, a vast resource of potential habitat, and the limitations of the predictive model, the forecast presented here cannot be expected to be 100% accurate. Low SPB activity predictions do not guarantee that troublesome infestations will not develop on a local or limited basis in some counties. Activity predictions are likely to be more accurate for the 5-mile radius region around each trap than for the whole county.

Given the limitations of the forecast, local weather extremes and variations, and the potential for environmental conditions to change after the survey, areas of suspicious pine mortality should be promptly inspected for evidence of SPB in the coming months. The SPB Assistance and Prevention Program has been very successful in reducing available habitat for the beetle by encouraging private landowners to thin overcrowded and stressed pine stands that favor SPB infestations. Foresters are urged to be on the lookout for localized and sporadic infestations in stands that are over-stocked, over-mature, or have poor soil drainage.

As in previous years, FFS County Foresters and field staff will be asked to conduct at least one aerial SPB detection survey flight over all counties in Districts 1-12, with additional flights needed if any SPB activity is detected.

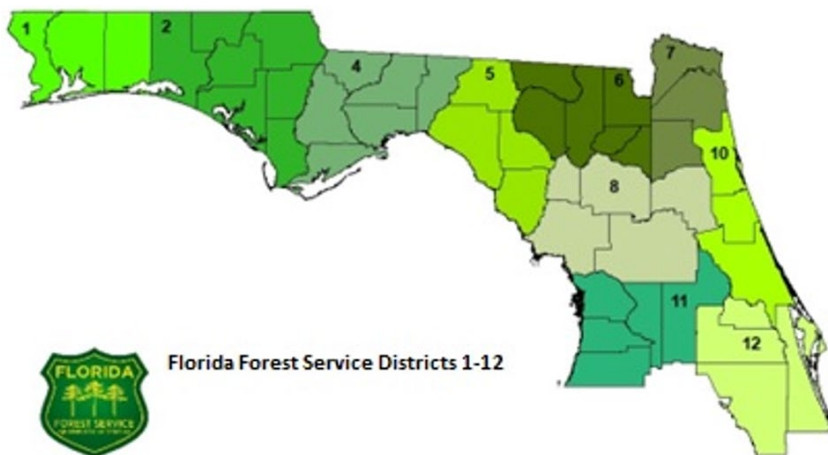
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Appendix



Table 1: County-level survey trapping data and variables used to generate SPB activity and outbreak probabilities from the SPB prediction model. The “Probability of greater than 50 SPB spots” is the probability of an outbreak level event occurring.

District	County	Number of traps	SPB per day	Checked beetles per day	# SPB spots last year	# SPB spots two years ago	Probability of any SPB spots occurring	Probability of greater than 50 SPB spots
Blackwater D-1	Escambia	1	0	1.29	0	0	3.4%	0.2%
D-1	Okaloosa	1	3.93	2.69	0	0	16.1%	2.1%
D-1	Santa Rosa	1	0.1	0.62	0	0	4.5%	0.3%
D-1	Bay	1	0	0.1	0	0	3.4%	0.2%
D-1	Calhoun	1	0.05	0.05	0	0	4.5%	0.3%
D-1	Gulf	1	0	0.05	0	0	3.4%	0.2%
D-1	Holmes	1	0.07	2.4	0	0	4.5%	0.3%
D-1	Jackson	1	0.05	0.21	0	0	3.4%	0.2%
D-1	Walton	1	0	0.48	0	0	3.4%	0.2%
D-1	Washington	1	0	0.31	0	0	3.4%	0.2%
Tallahassee D-4	Wakulla	1	3.09	0.63	0	52	21.2%	2.5%
D-4	Gadsden	2	11.57	0.74	0	0	17.9%	2.5%
D-4	Franklin	2	0.02	3.26	0	20	4.8%	0.2%
D-4	Liberty	1	1.06	2.2	0	18	9%	0.6%
D-4	Leon	2	1.18	0.33	0	0	8.6%	0.7%
D-4	Jefferson	2	0.05	0.38	0	0	4.5%	0.3%
Perry D-5	Lafayette	1	0	0.05	0	0	3.4%	0.2%
D-5	Madison	1	0.02	0.1	0	0	3.4%	0.2%
D-5	Dixie	1	0	0	0	0	3.4%	0.2%
D-5	Taylor	1	0	0.71	0	0	3.4%	0.2%
Suwannee D-6	Baker	2	0	0.26	0	0	3.4%	0.2%
D-6	Bradford	1	0.1	0.05	0	0	5.3%	0.3%
D-6	Columbia	2	0.02	0.24	0	0	3.4%	0.2%
D-6	Hamilton	2	0.1	0.64	0	0	4.5%	0.3%
D-6	Suwannee	2	0.2	1.40	0	0	3.4%	0.2%
D-6	Union	1	0	0.21	0	0	3.4%	0.2%
Jacksonville D-7	Clay	1	0	0.19	0	0	3.4%	0.2%
D-7	Duval	1	0	0.1	0	0	3.4%	0.2%
D-7	Nassau	3	0.02	0.64	0	0	3.4%	0.2%
Waccasassa D-8	Alachua	3	4.32	0.17	0	23	15.6%	1.6%
D-8	Gilchrist	1	0	0.05	0	0	3.4%	0.2%
D-8	Levy	1	0	0.02	0	0	3.4%	0.2%
D-8	Marion	3	0	1.10	0	0	3.4%	0.2%
D-8	Putnam	1	0	0	0	0	3.4%	0.2%
Bunnell D-10	St. Johns	1	0	0	0	0	3.4%	0.2%
D-10	Volusia	1	0	0	0	0	3.4%	0.2%
Withlacoochee	Hernando	1	0	0.02	0	0	3.4%	0.2%
D-11	Lake	1	0	0	0	0	3.4%	0.2%
Orlando D-12	Orange	1	0	0.02	0	0	3.4%	0.2%
D-12	Seminole	1	0	0	0	0	3.4%	0.2%