Fire risk report for *Pinus elliottii*

Full Species Name *Pinus elliottii* Engelm.
Family: Pinaceae
Common names: slash pine
Synonyms:
Known occurrences (as of 2020) 
Year first documented as naturalized in Hawai'i: 2000
This species has been ranked by the Hawai'i Weed Risk Assessment program as Evaluate with a score of 2.
View photos on Starr Environmental
View on Wikipedia
View occurrences on iNaturalist
View at Plants of Hawaii
View photos on Flickr

0 | .5 | 1

Lowest risk ⇔ Highest risk

This species is likely a **high** fire risk in Hawai'i with a fire risk score of **0.60**.

This species was ranked by 49 managers on a scale of 'no risk', 'low risk', 'medium risk', or 'high risk'. The numerical score ranges from 0 to 1 with higher scores indicating more managers considered it a higher risk. A score of > .31 indicates high risk.

Summary of Fire ecology	
Native habitat fire proneness	Fire-prone
Fire promoting plant in its native range	Yes
Fire promoting plant in its introduced range*	Yes
Regenerates after fire	Yes
Promoted by fire	No Data
Reported flammable*	High
Relative is flammable*	Yes

*These values were used by the model to predict fire risk

Detailed summary of Fire Ecology

Native habitat fire proneness (In any part of the plant's native range is its habitat described as fire prone due to natural or human caused fires?)	Fire-prone	"Estimates of the natural fire frequency of slash pine flatwoods range from 3 to 15 fires per century [8,21]. A fire interval of at least 5 to 6 years allows young trees to develop some fire resistance. Fires are ignited by lightning in late spring and summer [10,41]." https://www.fs.fed.us/database/feis/plants/tree/pinell/all.html#FIRE%20ECOLOGY
Fire promoting plant in its native range (Does the species act as a major fuel source, increase fire severity, frequency, or modify fuel bed characteristics within its native range?)	Yes	"Estimates of the natural fire frequency of slash pine flatwoods range from 3 to 15 fires per century [8,21]. A fire interval of at least 5 to 6 years allows young trees to develop some fire resistance. Fires are ignited by lightning in late spring and summer [10,41]. Ample soil moisture and seasonally wet depressions and drainages of slash pine habitat impede fire entry. Occasional fire serves to reduce hardwood competition and expose mineral soil which enhances germination " https://www.fs.fed.us/database/feis/plants/tree/pinell/all.html#FIRE%20ECOLOGY
Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)	Yes	"The November fire was more extensive and after spanning the 1.5 km wide Pumicestone Passage caused further damage in a private exotic pine (Pillll.l') plantation on Bribie Island. Altogether the tires affected around 18 thousand ha. including 9 thousand ha of plantations of Pinus species (mainly P elliottii var. elliottii Engelm.) in state forest and private stands. " https://doi.org/10.1080/00049158.1997.10674693 Hood, I. A., & Ramsden, M. (1997). Sapstain and decay following fire in stands of Pinus elliottii var. elliottii near Beerburrum, south east Queensland. Australian Forestry, 60(1), 7–15.
Regenerates after fire (Does the plant regrow after fire by any means? This includes resprouters, reseeders, and recruiters which dispersed into the area within approximately one year post fire)	Yes	"Young slash pine is susceptible to fire, but mature trees are fire resistant [4]. Thick bark and high, open crowns allow individuals to survive fire. " https://www.fs.fed.us/database/feis/plants/tree/pinell/all.html#FIRE%20ECOLOGY

Promoted by fire (Does the plant increase in abundance after a fire?)	No Data	likely
Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)	High	#plant itself does not seem to burn well, it's more of the leaf litter. --- "[shows litter is pretty flammable - pca chart]" https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs203/gtr_srs203-031.pdf Varner, J. M., Kane, J. M., Banwell, E. M., & Kreye, J. K. (2015). Flammability of litter from southeastern trees: a preliminary assessment. In In Proceedings of the 17th biennial southern silvicultural research conference. e–Gen. Tech. Rep. SRS–203. Asheville, NC: US Department of Agriculture, Forest Service, Southern Research Station. 5 p. (Vol. 2015, pp. 183-187). --- "The South Florida variety is more fire resistant than the typical variety because seedlings and saplings have thicker bark [1,2,24,42]. The estimated natural fire frequency of Florida slash pine communities is 25 fires per century [21]. Crown fires are rare because frequent fires reduce fuel build-up, trees self-prune well, and stands are open [1]." https://www.fs.fed.us/database/feis/plants/tree/pinell/all.html#FIRE%20ECOLOGY --- "The November fire was more extensive and after spanning the 1.5 km wide Pumicestone Passage caused further damage in a private exotic pine (Pillll.l') plantation on Bribie Island. Altogether the tires affected around 18 thousand ha. including 9 thousand ha of plantations of Pinus species (mainly P elliottii var. elliottii Engelm.) in state forest and private stands. " https://doi.org/10.1080/00049158.1997.10674693 Hood, I. A., & Ramsden, M. (1997). Sapstain and decay following fire in stands of Pinus elliottii var. elliottii near Beerburrum, south east Queensland. Australian Forestry, 60(1), 7–15.
Relative is flammable (Does a plant in the same genus meet the	Yes	"Its invasive capacity can vary depending on the type of vegetation and may be facilitated by fire (Richardson et al., 1994), which is commonly experienced in forests and woodlands dominated by P. pinaster due to its highly

Reported Flammable criteria?)		flammable resinous needles which accumulate under the canopy " https://doi.org/10.1016/j.foreco.2020.118042 Etten, Eddie van, C. Anne Belen, and María Calviño-Cancela. "Invasion Patterns of Pinus Pinaster in South-West Australia in Relation to Fire, Vegetation Type and Plantation Management." Forest Ecology and Management 463 (2020): 118042.

Text in quotes are direct quotes from the source
Text in square brackets was added by the assessor to clarify something or to summarize from a figure.
Text preceded by a "#" is comment from the assessor

The data presented were assembled from literature and database searches for each species using as much data as could be collected regarding the plant's fire ecology under natural conditions. Searches aimed to be exhaustive and consist of as much data as could be located in 2020. Our machine learning algorithm was trained on 49 species of plants which had their fire risk ranked by 49 managers in Hawai'i in November 2020. The model used a conditional random forest regression algorithm to predict scores for each species using the manager score as the response variable and the fire ecology traits of each plant as the predictor variables to generate a fire risk score. This trained model was then used to predict the fire risk for all species which were not ranked by managers. The model was calibrated such that it is 90% accurate at predicting high fire risk plants and 79% accurate at predicting low fire risk plants. This research and the resulting fire risk model has been published in the journal Biological Invasions by Kevin Faccenda and Curt Daehler (both at the University of Hawai'i at Mānoa).

Note that the analysis doesn't account for a plant species' spatial distribution, population density, or distinct climate and ecosystem conditions (which can also influence fire risk). The fire risk of these species are mostly under "worst case" environmental conditions where the climate is dry enough to maintain fire, but wet enough to allow for plant growth and fuel accumulation. The fire risk ranking should not be taken as a stand-alone risk metric in prioritizing weed control efforts. Rather, this information may also be useful for determining if a newly discovered species poses a potential fire threat in wildland areas.

More general information on the weed risks and ecology of non-native plants in Hawai'i is available from the Hawai'i Invasive Species Committee's Weed Risk Assessment database.

View more fact sheets at https://www.pacificfireexchange.org/weed-fire-risk-assessments

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Fact sheet prepared by Kevin Faccenda (faccenda@hawaii.edu) in November 2021. Data were prepared by Kevin Faccenda in 2020.

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