Fire risk report for *Oenothera speciosa*

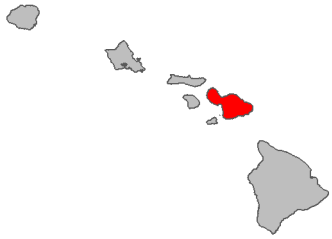
Full Species Name
Oenothera speciosa Nutt.

Family: Onagraceae

Common names:
white evening primrose

Synonyms:

Known occurrences (as of 2020)



Year first documented as naturalized in Hawai'i: 2009

This species has not yet been ranked by the Hawai'i Weed Risk Assessment program as of 2020.

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 **low** fire risk in Hawai'i with a fire risk score of **0.16**.

This species was ranked by our machine learning algorithm using the data presented on the next page. A predicted score of > .34 suggests the plant is a high fire risk.

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

*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	"Dry, open places; Mo. and Kans. to Tex., and intr. eastward." http://www.worldfloraonline.org/taxon/wfo-0000389747 --- "tallgrass prarie" Elder, B. D. (2002). The effects of fire on the life history traits of tallgrass prairie forbs. Disseration Kansas State https://search.proquest.com/docview/250001483/?pq-origsite=primo --- "Fire is probably the most important factor in maintaining blackland prairie vegetation [O.speciosa is also listed as occurring in this habitat]" Echols, S. L. (2007). Vascular flora of the remnant blackland prairies and associated vegetation of Georgia (Doctoral dissertation, University of Georgia). https://getd.libs.uga.edu/pdfs/echols_stephen_l_200708_ms.pdf --- "grows in open prairie" Leidolf, A., & McDaniel, S. (1998). A floristic study of black prairie plant communities at sixteen section prairie, Oktibbeha County, Mississippi. Castanea, 51-62. https://www.jstor.org/stable/pdf/4034055.pdf --- #If nothing else this is a generalist which occurs in fire adapted habitats.
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?)	No	#does not appear to contribute significant biomass to an ecosystem to modify fire regime
Fire promoting plant in its introduced range (Same as Fire Promoting Native but	No	

within the species introduced range)		
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	"[increased in frequency after june fire. table 2]" #Necessarily regenerated if it increased in frequency Hansmire, J. A., Drawe, D. L., Wester, D. B., & Britton, C. M. (1988). Effect of winter burns on forbs and grasses of the Texas coastal prairie. The Southwestern Naturalist, 333-338. https://www.jstor.org/stable/pdf/3671761.pdf
Promoted by fire (Does the plant increase in abundance after a fire?)	Yes	"[generally positive response to fires. table 2]" Hansmire, J. A., Drawe, D. L., Wester, D. B., & Britton, C. M. (1988). Effect of winter burns on forbs and grasses of the Texas coastal prairie. The Southwestern Naturalist, 333-338. https://www.jstor.org/stable/pdf/3671761.pdf --- "no strong correlation between seed germination rates and burn frequency" Abrams, M. D. (1988). Effects of burning regime on buried seed banks and canopy coverage in a Kansas tallgrass prairie. The Southwestern Naturalist, 65-70. https://www.jstor.org/stable/pdf/3672089.pdf --- "No clear trend was evident between fire frequency and either plant growth or reproduction. Plants on 2-yr bum treatments had the lowest performance among the four treatments with plants on 4-yr bum treatments having the greatest performance. Percent cover of O speciosa appears to be positively associated with high precipitation years, as its first major occurrence on the LTER permanent transects since 1981 occurred in 1993 (1981-1992 data not shown), a year of unusually high precipitation. Following its sudden appearance, it has declined in abundance since 1994 and ultimately disappeared from all permanent transects by 1996. Percent cover was not related to the life history traits measured for this study. There was no trade-off between aboveground ramet biomass and flower production." Elder, B. D. (2002). The effects of fire on the life history traits of tallgrass prairie forbs. Disseration Kansas State https://search.proquest.com/docview/250001483/?pq-origsite=primo (Elder disseration)
Reported flammable (Is the species described	No Data	"Categorized as "W" meaning "Plant species appropriate for use in wet fuel modification zones adjacent to reserve

as being flammable, being a major wildfire fuel, or high fire risk?)		lands. Acceptable in all other wet and irrigated dry (manufactured slopes) fuel modification locations and zones." #suggesting that it may be flammable in dry zones, weak evidence Planning & Development Services Section. "Technical Design for New Construction Fuel Modification Plans and Maintenance Program." Orange Country Fire Authority, January 1, 2014. https://www.ocfa.org/Uploads/SafetyPrograms/OCFA%20RSG%20-%20Vegetation%20Management%20Technical%20Design.pdf
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	No	

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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