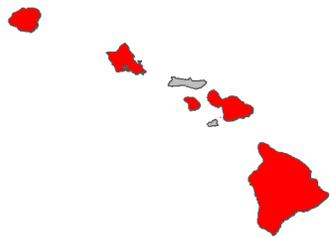


# Fire risk report for *Arundo donax*

<b>Full Species Name</b> <i>Arundo donax</i> L.
<b>Family:</b> Poaceae
<b>Common names:</b> Spanish reed giant reed
<b>Synonyms:</b>
Known occurrences (as of 2020) 
Year first documented as naturalized in Hawai'i: 1985
This species has been ranked by the Hawai'i Weed Risk Assessment program as High Risk with a score of 12.
<a href="#">View photos on Starr Environmental</a>
<a href="#">View on Wikipedia</a>
<a href="#">View occurrences on iNaturalist</a>
<a href="#">View at Plants of Hawaii</a>
<a href="#">View photos on Flickr</a>

0 | .5 1  
 Lowest risk ⇔ Highest risk

This species is likely a **high** fire risk in Hawai'i with a fire risk score of **0.72**.

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	Non Fire-prone
Fire promoting plant in its native range	No
Fire promoting plant in its introduced range*	Yes
Regenerates after fire	Yes
Promoted by fire	Yes
Reported flammable*	High
Relative is flammable*	Yes

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

Detailed summary of Fire Ecology

<p>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?)</p>	<p>Non Fire-prone</p>	<p>"Believed to be native to freshwaters of eastern Asia (Polunin and Huxley, 1987), <i>A. donax</i> has been cultivated throughout Asia, southern Europe, north Africa, and the Middle East for thousands of years (Perdue, 1958; Zohary, 1962) and has naturalized in the countries surrounding the Mediterranean Sea (Lewandowski et al., 2003). From this area, the species was widely dispersed into subtropical and warm temperate regions around the world by humans for multiple uses (Perdue, 1958)."  <a href="https://doi.org/10.1016/j.aquabot.2007.08.015">https://doi.org/10.1016/j.aquabot.2007.08.015</a>                  Ahmad, R., Liow, P. S., Spencer, D. F., &amp; Jasieniuk, M. (2008). Molecular evidence for a single genetic clone of invasive <i>Arundo donax</i> in the United States. <i>Aquatic Botany</i>, 88(2), 113-120.</p>
<p>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?)</p>	<p>No</p>	<p>#No mention of fire promotion in native range. Literature focuses on fire promotion as an invader.</p>
<p>Fire promoting plant in its introduced range (Same as Fire Promoting Native but within the species introduced range)</p>	<p>Yes</p>	<p>"<i>A. donax</i> is highly flammable and can change fire regimes in invaded areas (USDA-ARS, 2014)."  <a href="https://www.cabi.org/isc/datasheet/1940">https://www.cabi.org/isc/datasheet/1940</a>                  -----                  "Once established, giant reed can form huge clones, sometimes covering hundreds of acres. It is highly flammable and resprouts quickly after burning. Fires help transform communities of native plants into solid stands of giant reed, changing riverbank forests from flood- to fire-defined habitats"  <a href="http://www.hear.org/Pier/species/arundo_donax.htm">http://www.hear.org/Pier/species/arundo_donax.htm</a>                  -----                  "Although evidence is entirely anecdotal, several accounts (e.g., [11,20,29,84,95]) describe changes in fuels, fire characteristics, and/or postfire plant community response in southern California riparian areas invaded by giant reed</p>

		<p>that are suggestive of an invasive grass/fire cycle. Because giant reed grows quickly and produces large amounts of biomass [74] in dense stands described as having "large quantities of dry material" [95],"</p> <p><a href="https://www.fs.fed.us/database/feis/plants/graminoid/arundo/all.html#FIRE%20ECOLOGY">https://www.fs.fed.us/database/feis/plants/graminoid/arundo/all.html#FIRE%20ECOLOGY</a></p>
<p>Regenerates after fire (Does the plant regrow after fire by any means? This includes resprouters, reseeder, and recruiters which dispersed into the area within approximately one year post fire)</p>	Yes	<p>"Once established, giant reed can form huge clones, sometimes covering hundreds of acres. It is highly flammable and resprouts quickly after burning. Fires help transform communities of native plants into solid stands of giant reed, changing riverbank forests from flood- to fire-defined habitats' (Randall, et al., 1996)."</p> <p><a href="http://www.hear.org/pier/species/arundo_donax.htm">http://www.hear.org/pier/species/arundo_donax.htm</a></p> <p>-----</p> <p>"As of this writing (2004), information on fire adaptations of giant reed are limited to anecdotal accounts and assertions based on known biological attributes. Giant reed's extensive rhizomes are likely to survive and sprout after fire removes top growth. Reviews (e.g., [11,28,95]) provide anecdotal evidence that indicates that sprouts emerge from rhizomes of giant reed soon after fire and grow quickly. Rieger and Kreager [80] observed rapid sprouting and growth of giant reed after removing top-growth by cutting"</p> <p><a href="https://www.fs.fed.us/database/feis/plants/graminoid/arundo/all.html#FIRE%20ECOLOGY">https://www.fs.fed.us/database/feis/plants/graminoid/arundo/all.html#FIRE%20ECOLOGY</a></p>
<p>Promoted by fire (Does the plant increase in abundance after a fire?)</p>	Yes	<p>"As of this writing (2004), information on fire adaptations of giant reed are limited to anecdotal accounts and assertions based on known biological attributes. Giant reed's extensive rhizomes are likely to survive and sprout after fire removes top growth. Reviews (e.g., [11,28,95]) provide anecdotal evidence that indicates that sprouts emerge from rhizomes of giant reed soon after fire and grow quickly. Rieger and Kreager [80] observed rapid sprouting and growth of giant reed after removing top-growth by cutting"</p> <p><a href="https://www.fs.fed.us/database/feis/plants/graminoid/arundo/all.html#FIRE%20ECOLOGY">https://www.fs.fed.us/database/feis/plants/graminoid/arundo/all.html#FIRE%20ECOLOGY</a></p>
<p>Reported flammable (Is the species described as being flammable, being a major wildfire fuel, or high fire risk?)</p>	High	<p>"A. donax is highly flammable and can change fire regimes in invaded areas (USDA-ARS, 2014)."</p> <p><a href="https://www.cabi.org/isc/datasheet/1940">https://www.cabi.org/isc/datasheet/1940</a></p> <p>-----</p> <p>"Once established, giant reed can form huge clones, sometimes covering hundreds of acres. It is highly flammable and resprouts quickly after burning. Fires help transform communities of native plants into solid stands of</p>

		<p>giant reed, changing riverbank forests from flood- to fire-defined habitats"  <a href="http://www.hear.org/Pier/species/arundo_donax.htm">http://www.hear.org/Pier/species/arundo_donax.htm</a>          -----          "According to Bell [9,11] giant reed is "extremely flammable" throughout most of the year, and once established increases the probability of wildfire occurrence and the intensity of fires that do occur."  <a href="https://www.fs.fed.us/database/feis/plants/graminoid/arudon/all.html#FIRE%20ECOLOGY">https://www.fs.fed.us/database/feis/plants/graminoid/arudon/all.html#FIRE%20ECOLOGY</a></p>
Relative is flammable (Does a plant in the same genus meet the Reported Flammable criteria?)	Yes	<p>"In its major site of occurrence of France, in and around the town of Fréjus (French Riviera, France), <i>A. donaciformis</i> persists in urban environments (Fig. 1b), where its protected status blocks a range of different construction projects. This rhizomatous grass forms dense patches of rigid culms (up to 3 m tall) which are often considered by environment service of Fréjus as fire risks, mosquito habitats or simply as aesthetic inconveniences."  <a href="https://doi.org/10.1016/j.jnc.2015.03.008">https://doi.org/10.1016/j.jnc.2015.03.008</a>          L.Hardion, C. Barthélémy, J.N. Consales, P Gauthier, J. D. Thompson, R. Verlaque, B. Vila" (2015) "An endangered reed, <i>Arundo donaciformis</i>, in a dynamic urban environment: The need for interdisciplinary conservation proposals" <i>Journal for Nature Conservation</i> 26, pp. 20-27.</p>

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

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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](mailto:faccenda@hawaii.edu)) in November 2021. Data were prepared by Ronja Steinbach and Kevin Faccenda in 2020.

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