



***Plant Risk Evaluator -- PRE™
Evaluation Report***

Buddleja davidii -- Minnesota

2017 Farm Bill PRE Project

PRE Score: 13 -- Evaluate this plant further

Confidence: 71 / 100

Questions answered: 19 of 20 -- Valid (80% or more questions answered)

Privacy: Public

Status: Completed

Evaluation Date: August 22, 2017

This PDF was created on June 15, 2018



Plant Evaluated

Buddleja davidii



Image by J.S. Peterson



Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Buddleja davidii*) in an effort to understand the invasive history, reproductive strategies, and the impact, if any, on the region's native plants and animals. This research reflects the data available at the time this evaluation was conducted.

Summary

Buddleja davidii does not have a particularly good reputation given its invasive status on the West Coast and parts of Eastern US. At the time of this evaluation, two other PRE organizations have evaluated this plant - one in California and the other in Texas. The plant was evaluated as invasive in those areas. The somewhat less serious "watch" rating in this evaluation is largely a function of the Minnesota climate. In other words, *Buddleja davidii* is perhaps less invasive in a marginal climate such as Minnesota compared to the generally warmer climates of other parts of the US.

General Information

Status: Completed

Screener: Mike Monterusso

Evaluation Date: August 22, 2017

Plant Information

Plant: *Buddleja davidii*

Regional Information

Region Name: Minnesota



Climate Matching Map

To answer four of the PRE questions for a regional evaluation, a climate map with three climate data layers (Precipitation, UN EcoZones, and Plant Hardiness) is needed. These maps were built using a toolkit created in collaboration with GreenInfo Network, USDA, PlantRight, California-Invasive Plant Council, and The Information Center for the Environment at UC Davis.

Click [here](#) to see the generated climate matching map for this region. This climate match database is hosted by GreenInfo Network and publicly accessible.



Evaluation Questions

These questions are based in an original article published at the University of California, Davis, and can be found on the PLOS One website, here: <https://doi.org/10.1371/journal.pone.0121053>

Invasive History and Climate Matching (Questions 1 - 6)

1. Has the species (or cultivar or variety, if applicable; applies to subsequent "species" questions) become naturalized where it is not native?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screeners* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Buddleja davidii has naturalized in multiple US states and in Canada.

Reference(s):

- United States Department of Agriculture (2017). Plants Profile for *Buddleja davidii* (orange eye butterflybush).
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2. Is the species (or cultivar or variety) noted as being naturalized in the US or world in a similar climate?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screeners* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

There is no evidence that *B. davidii* has naturalized in a similar climate. However, it has naturalized in areas immediately adjacent to this climate.

Reference(s):

- [Anonymous] .



3. Is the species (or cultivar or variety) noted as being invasive in the U.S. or world?

- Answer: **Yes**, which contributes **2** points to the total PRE score.
- The *screeners* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

B. davidii is invasive in Oregon and Washington.

Reference(s):

- United States Department of Agriculture (2017). Plants Profile for *Buddleja davidii* (orange eye butterflybush).
 - Ream, J. (2006). Production and invasion of Butterfly bush (*Buddleja davidii*) in Oregon.
-

4. Is the species (or cultivar or variety) noted as being invasive in the US or world in a similar climate?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screeners* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

No evidence found.

Reference(s):

- [Anonymous] .
-



5. Are other species of the same genus (or closely related genera) invasive in a similar climate?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screeners* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

No evidence found.

Reference(s):

- [Anonymous] .
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6. Is the species (or cultivar or variety) found predominately in a climate matching the region of concern?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screeners* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Most occurrences of *B. davidii* are in Europe and E/SE Asia.

Reference(s):

- GBIF (2016). *Buddleja davidii* Franch..
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Impact on Native Plants and Animals (Questions 7 - 10)

7. Does this plant displace native plants and dominate (overtop or smother) the plant community in areas where it has established?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screeners* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

"It can escape from plantings and become invasive in a variety of habitats such as surface mined lands, coastal forest edges, roadsides, abandoned railroads, rural dumps, stream and river banks to displace native plants."

Reference(s):

- USDA Forest Service, Forest Health Staff (2005). Microsoft Word - Butterfly bush.doc - butterfly_bush.pdf.
 - Central Jersey Invasive Species Strike Team (2007). Invasive Plants Fact Sheet - *Buddleja davidii*_Invasive Plants Fact Sheet.pdf.
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8. Is the plant noted as promoting fire and/or changing fire regimes?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screeners* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

"Unknown relationship with fire, however by increasing biomass in shrub layer and therefore elevated fuels invasion by this species could alter fire intensity. It is unknown however to what extent."

Reference(s):

- Victorian Resources Online, Agriculture Victoria (2017). Butterfly bush (*Buddleja davidii*).
-



9. Is the plant a health risk to humans or animals/fish? Has the species been noted as impacting grazing systems?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

There appears to be potentially indirect effects: "Although butterflies will use this plant as a nectar source their larvae cannot survive on it. By replacing native larval food source plants butterflybush can have a negative impact on wildlife."

Reference(s):

- Invasive Plant Atlas of the United States (2015). butterflybush: *Buddleja davidii* (Scrophulariales: Buddlejaceae): Invasive Plant Atlas of the United States.
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10. Does the plant produce impenetrable thickets, blocking or slowing movement of animals, livestock, or humans?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

"It can form dense thickets that outcompete native vegetation far from the original bush, and so it's been prohibited from use on public lands in New Jersey. It's even been banned from sale in Oregon where there are serious infestations." "Escapees from cultivated beds are quick to establish themselves either from seed or stem fragments and can quickly develop into thickets which crowd out native vegetation."

Reference(s):

- Straus, R. (2015). Why The Butterfly Bush Gets A Bad Rap.
 - Linde, C. (2012). *Buddleja davidii* 2012 NCREPMT.pdf.
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Reproductive Strategies (Questions 11 - 17)

11. Does this species (or cultivar or variety) reproduce and spread vegetatively?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screeener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

While *B. davidii* technically can reproduce vegetatively, as is done commonly in nursery production, this does not appear to happen frequently and possibly not without human intervention.

Reference(s):

- SF Gate (2017). Butterfly Bush Reproduction-Home Guides.
 - Tallent-Halsell, N. G., & Watt M. S. (2009). The Invasive *Buddleja davidii* (Butterfly Bush). *Botanical Review*. 75, 292–325.
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12. If naturally detached fragments from this plant are capable of producing new plants, is this a common method of reproduction for the plant?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screeener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

No evidence found.

Reference(s):

- [Anonymous] .
-



13. Does the species (or cultivar or variety) commonly produce viable seed?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screeener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

"A single mature *B. davidii* individual can produce millions of seeds..."

Reference(s):

- CABI (2015). *Buddleja davidii* (butterfly bush).
 - Tallent-Halsell, N. G., & Watt M. S. (2009). The Invasive *Buddleja davidii* (Butterfly Bush). *Botanical Review*. 75, 292–325.
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14. Does this plant produce copious viable seeds each year (> 1000)?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screeener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

"A single mature *B. davidii* individual can produce millions of seeds; however, estimates of the number of seeds produced vary (100,000 to 3,000,000) among cultivars"

Reference(s):

- CABI (2015). *Buddleja davidii* (butterfly bush).
 - Ream, J. (2006). Production and invasion of Butterfly bush (*Buddleja davidii*) in Oregon.
-



15. Is there significant germination (>25%) of seeds the next growing season, with no requirement of an infrequent environmental condition for seeds to germinate (i.e. fire) or long dormancy period?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screeener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"Rapid maturation, millions of wind-dispersed seeds and a high rate of germination will positively contribute to range expansion." "All of the *B. davidii* cultivars had high germination rates (> 80%)"

Reference(s):

- Ream, J. (2006). Production and invasion of Butterfly bush (*Buddleja davidii*) in Oregon.
 - Jefferson County Noxious Weed Control Board (2017). ButterflyBush_Jefferson.pdf.
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16. Does this plant produce viable seed within the first three years (for an herbaceous species) to five years (for a woody species) after germination?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screeener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"Butterfly bushes grow very fast and can reach mature size in 1 to 2 growing seasons."

Reference(s):

- Tanner, C. (2015). HGIC 1084 Butterfly Bush : Extension : Clemson University : South Carolina.
 - Victorian Resources Online, Agriculture Victoria (2017). Butterfly bush (*Buddleja davidii*).
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17. Does this plant continuously produce seed for >3 months each year or does seed production occur more than once a year?

Reference(s):

- [Anonymous] .
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Dispersal (Questions 18 - 20)

18. Are the plant's propagules frequently dispersed long distance (>100 m) by mammals or birds or via domestic animals?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screeener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

No evidence found.

Reference(s):

- [Anonymous] .
-

19. Are the plant's propagules frequently dispersed long distance (>100 m) by wind or water?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screeener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

"Propagules are adapted to wind dispersal." (no distance provided)



Reference(s):

- Chimera, C. (2010). WRA Species Report - *Buddleja saligna*.pdf.
 - Ream, J. (2006). Production and invasion of Butterfly bush (*Buddleja davidii*) in Oregon.
-

20. Are the plant's propagules frequently dispersed via contaminated seed (agriculture or wildflower packets), equipment, vehicles, boats or clothing/shoes?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screeners* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Germinants have been observed in the mud stuck to machinery and "scientists in England have documented that butterfly bush seeds are found in mud on car tires."

Reference(s):

- Ream, J. (2006). Production and invasion of Butterfly bush (*Buddleja davidii*) in Oregon.
 - Tallent-Halsell, N. G., & Watt M. S. (2009). The Invasive *Buddleja davidii* (Butterfly Bush). *Botanical Review*. 75, 292–325.
-

Total PRE Score

PRE Score: 13 -- Evaluate this plant further

Confidence: 71 / 100

Questions answered: 19 of 20 -- Valid (80% or more questions answered)

PRE Score Legend

The PRE Score is calculated by adding the point totals for each (answered) question.

< 13 : accept (low risk of invasiveness)

13 - 15 : evaluate further

> 15 : reject (high risk of invasiveness)



Questions Answered Legend

It is important to answer at least 16 questions to consider a PRE Score as "valid".

>= 16 : valid (80% or more questions answered)

<= 15 : invalid (not enough questions answered)

Organization Ownership and Content Privacy

Organization: 2017 Farm Bill PRE Project

Content Privacy: Public



Evaluation Reviewers

The PRE approach is to base decisions on science and make decisions by consensus of diverse horticultural stakeholders. The literature review and process of answering PRE's questions are based on science; the decisions of which plants to prioritize are based on consensus. To ensure this process is in place and that PRE is collaborative, volunteer stakeholders are recruited from each region to review evaluations. The following experts in their profession (plant science, conservation, or horticultural trade) have participated as volunteer PRE reviewers for this evaluation:

- | | |
|-------------------|-------------------|
| • Chel Anderson | December 27, 2017 |
| • Laura Van Riper | November 30, 2017 |
| • Tom Buechel | November 10, 2017 |

This evaluation has a total of 3 reviewer(s).



Evaluation Issues

The following section lists all public issues for this evaluation. Issues provide a way for stakeholder reviewers to communicate any concerns or suggestions they might have with the plant or evaluation. Please email PlantRight@suscon.org if additional action is required to resolve open issues.

Issue ID # 5926

Date Created: November 22, 2017 - 8:46am

Date Updated: November 28, 2017 - 2:10pm

Submitted by: Laura Van Riper

Status: Fixed

Type: Suggestion

Severity: Minor

Scope: Q09. Is the plant a health risk to humans or animals/fish? Has the species been noted as impacting grazing systems?

Issue Description

The text for this question indicates that there is a health risk to butterflies. Butterfly decline is a major issue. A plant that has health impacts to butterfly larvae seems like it would qualify for a point for this question. Butterflies are animals.

Issue Resolution (Screener's Response to Issue)

Agreed, answer changed with medium confidence. The phenomenon seems more like native plant species (food source) displacement or habitat loss as opposed to direct detrimental effects such as thorns or poison.

Issue ID # 5795



Date Created: November 10, 2017 - 6:32am

Date Updated: November 28, 2017 - 2:21pm

Submitted by: Tom Buechel

Status: Fixed

Type: Comment

Severity: Minor

Scope: Evaluation as a whole

Issue Description

Buddleia is a complex issue as it does not do well in the upper midwest, hardly overwintering. However in warmer regions it is considered invasive and several cultivars have been produced with very low seed germination rates or even "sterility". I think the PRE Tool misses the watch variable on this one too as the score came in below watch for this region. Knowing the potential problem of the plant in other regions does help suggest that we should keep this one on the radar. As more new plants come out this would be less of a worry as the problem ones would be phased out quickly. Non the less watching is not a bad idea and it also alerts breeders to concentrate on new plant production that does not harm the environment. If a plant falls into the accepted column this may not alert breeders to the cause.

Issue Resolution (Screener's Response to Issue)

It's difficult to overcome the fact that a particular plant is on the edge of its range or simply doesn't survive in a given climate. One option is to consider the plant in the greater context. The evaluation does indicate that Buddleja is invasive in othe (warmer) parts of the country. In this case, the score was elevated to the "watch" category when the answer regarding being harmful to animals was changed from "no" to "yes". It's also worth watching due to climate change. Climate change itslef is reason enough to reevaluate most PRE plants after a certain time interval has passed.



About PRE and this Plant Evaluation Report

The PlantRight Plant Risk Evaluator -- PRE is an online database and platform enabling those involved in non-native, terrestrial plant production to know before they grow if a plant poses a regional invasive risk. This tool offers many benefits, and we encourage you to visit the PRE website (<https://pre.ice.ucdavis.edu>) for more information.

If you are a nursery trade association, or involved in the research, development or distribution of horticultural plants we invite you to join the PRE community. If you are a plant scientist, affiliated with a horticultural college or botanic garden, and would like to learn more about becoming a PRE Screener, please drop us an email, PlantRight@suscon.org, requesting a PRE Account.

PRE beta funding is provided by Sustainable Conservation (<http://www.suscon.org/>) and a USDA Farm Bill grant.