



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

***Pyrus calleryana 'Bradford' -- Minnesota***

***2017 Farm Bill PRE Project***

**PRE Score:** 10 -- Accept (low risk of invasiveness)

**Confidence:** 76 / 100

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

**Privacy:** Public

**Status:** Submitted

**Evaluation Date:** September 15, 2017

*This PDF was created on June 15, 2018*



## Plant Evaluated

*Pyrus calleryana* 'Bradford'



Image by David Stephens, Bugwood.org



## Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Pyrus calleryana* 'Bradford') 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

*Pyrus calleryana* 'Bradford' has a PRE score of 10 for Minnesota because it is not hardy in the state. That said, the very southern portion of the state has potential to support Bradford pear in microclimates. With changing climate, this plant should be revisited in the coming years. Beyond the hardiness factor, Bradford pear, while sterile, will readily hybridize with other cultivars as well as its own rootstock resulting in viable seed production. This seed is readily dispersed by birds and has a relatively high germination rate.

## General Information

**Status:** Submitted

**Screener:** Mike Monterusso

**Evaluation Date:** September 15, 2017

## Plant Information

**Plant:** *Pyrus calleryana* 'Bradford'

### **If the plant is a cultivar, how does its behavior differs from its parent's?**

*Pyrus calleryana* 'Bradford', produce sterile fruits because they do not self-pollinate. They have been widely planted throughout the United States since the early 1900s as an ornamental. New cultivars of *Pyrus calleryana* were bred to reduce the tree's tendency to split in snow or high winds. The Bradford pear cultivar, other *P. calleryana* cultivars and *P. betulifolia* or Asian pear, can hybridize and produce fertile fruit. In addition to this, fertile pear varieties are commonly used as the rootstock when grafting. If the grafted crown is damaged the fertile rootstock can them dominate, producing fertile fruit.

## 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:

"*Pyrus calleryana*, a very commonly planted ornamental tree species, is documented as an escape from cultivation in the District of Columbia and 152 counties or parishes in 25 states..."

#### Reference(s):

- Vincent, M. A. (2005). On the Spread and Current Distribution of *Pyrus calleryana* in the United States. *Castanea*. 70, 20–31.
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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 **Medium** confidence in this answer based on the available literature.

#### Answer / Justification:

No solid evidence found. However, some evidence suggests that *P. calleryana* has naturalized in parts of Wisconsin, pending hardiness.



**Reference(s):**

- Sheehan, M. (2007). *Pyrus calleryana* Dcne. (1) Weed Risk Assessment -- Wisconsin DNR.
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**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 *screeener* has a **Very High** confidence in this answer based on the available literature.

**Answer / Justification:**

"The Callery pear is an invasive species in many areas of eastern North America, outcompeting many native plants and trees."

**Reference(s):**

- Wikipedia (2017). *Pyrus calleryana*.
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**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 *screeener* has a **Medium** confidence in this answer based on the available literature.

**Answer / Justification:**

No evidence found. *P. calleryana* cultivars are likely limited in their spread in Minnesota due to the climate, although this might not be such a limiting factor in southern Wisconsin.

**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 **High** confidence in this answer based on the available literature.

**Answer / Justification:**

In the US, *P. calleryana* is primarily found in the lower Midwest and the Southeastern states. Beyond the US, it is primarily found in SE Asia.

**Reference(s):**

- GBIF (2016). *Pyrus calleryana* Decne..
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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 *screeener* has a **Very High** confidence in this answer based on the available literature.

#### Answer / Justification:

"'Bradford' pear seeds are now commonly sown by birds, and so spread rapidly from plantings into nearby meadows, pastures, roadsides, woodland edges, hedgerows and other sunny habitats. The effect is to choke out the native grasses, flowers and shrubs that would normally provide critical habitat for many of Maryland's birds, insects and butterflies. These seedling clusters are beginning to dominate the landscape, frequently occupying the forest edge space where native serviceberry, redbud and dogwood normally grow. Pear seedlings have even been observed growing in open patches within mature forest."

#### Reference(s):

- Maryland Invasive Species Council (2007). *Invader of the Month*\_April 2007.
- 

### 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 *screeener* has a **High** confidence in this answer based on the available literature.

#### Answer / Justification:

No evidence found.

#### Reference(s):

- [Anonymous] .
-





**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 *screeners* has a **Low** confidence in this answer based on the available literature.

**Answer / Justification:**

"The Bradford cultivar is without thorns, however, plants that have crossed with other cultivars may develop thorns."

**Reference(s):**

- Missouri Department of Conservation (2012). [callerypearinvasive.pdf](#).
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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 *screeners* has a **High** confidence in this answer based on the available literature.

**Answer / Justification:**

"Once established Callery pear forms dense thickets that push out other plants including native species that can't tolerate the deep shade or compete with pear for water, soil and space."

**Reference(s):**

- National Park Service (2010). Callery Pear (*Pyrus calleryana*).
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## Reproductive Strategies (Questions 11 - 17)

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

- 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:

While the tree can sprout from root, this is not the driving force behind its spread. Root sprouts flower and cross pollinate with the scion material and/or other nearby varieties resulting in fertile hybrids that spread by seed.

#### Reference(s):

- [Anonymous] .
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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:

Hybridization and the associated viable seed is the driving factor behind its spread.

#### 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 *screeners* has a **High** confidence in this answer based on the available literature.

#### Answer / Justification:

As many references have stated, most, if not all, *P. calleryana* cultivars are sterile. However, they readily cross with each other as well as their rootstocks if/when the roots sprout. To answer the question, the odds are high that all *calleryana* cultivars will commonly produce seed if given enough time.

#### Reference(s):

- [Anonymous] .
- 

### 14. Does this plant produce copious viable seeds each year (> 1000)?

#### Reference(s):

- [Anonymous] .
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### 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 *screeners* has a **High** confidence in this answer based on the available literature.

#### Answer / Justification:

"Averaged across all cultivars, 56% of seeds were viable. The 'Autumn Blaze', 'Capital', and 'Red Spire' cultivars had a higher percentage of viable seeds (71%, 78%, and 69%, respectively) than other cultivars (mean, 51%). From these data, all cultivars appear to be highly productive as maternal parents..."



**Reference(s):**

- Hardiman, N. A., & Culley T. M. (2010). Reproductive success of cultivated *Pyrus calleryana* (Rosaceae) and establishment ability of invasive, hybrid progeny. *American Journal of Botany*. 97, 1698–1706.
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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 **Very High** confidence in this answer based on the available literature.

**Answer / Justification:**

"Time to Maturity: Can start flowering at 3 years."

**Reference(s):**

- Sheehan, M. (2007). *Pyrus calleryana* Dcne. (1) Weed Risk Assessment -- Wisconsin DNR.
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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?**

- 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:**

*Pyrus calleryana* flowers and sets seed once/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: **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:

"Its success as an invader results from its capacity to produce copious amounts of seed that is dispersed by birds and possibly small mammals..."

#### Reference(s):

- National Park Service (2010). Callery Pear (*Pyrus calleryana*).
- 

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

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

#### Answer / Justification:

No evidence found.

#### Reference(s):

- [Anonymous] .
-



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

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

**Answer / Justification:**

No evidence found.

**Reference(s):**

- [Anonymous] .
- 

**Total PRE Score**

**PRE Score:** 10 -- Accept (low risk of invasiveness)

**Confidence:** 76 / 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:

- Laura Van Riper November 30, 2017
- Tom Buechel November 9, 2017

This evaluation has a total of 2 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](mailto:PlantRight@suscon.org) if additional action is required to resolve open issues.

There are currently no issues associated with this evaluation.



## **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](mailto: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.