# ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

*Botanical name:* *Prunus virginiana* L.
*Common name*: chokecherry
*Assessors:*


| | |
|---|---|
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*Date:* 2/16/2011
*Date of previous ranking, if any:* 5T

**OUTCOME SCORE:**

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**CLIMATIC COMPARISON**
*This species is present or may potentially establish in the following eco-geographic regions:*

| | |
|---|---|
| Pacific Maritime | Yes |
| Interior-Boreal | Yes |
| Arctic-Alpine | Yes |

| **INVASIVENESS RANKING** | **Total** (total answered points possible[1]) | **Total** |
|---|---|---|
| Ecological impact | 40 (30) | 19 |
| Biological characteristics and dispersal ability | 25 (23) | 21 |
| Ecological amplitude and distribution | 25 (25) | 18 |
| Feasibility of control | 10 (7) | 5 |
| Outcome score | 100 (85)[b] | 63[a] |
| Relative maximum score[2] | | **74** |

[1] For questions answered "unknown" do not include point value for the question in parentheses for "total answered points possible."
[2] Calculated as a/b × 100

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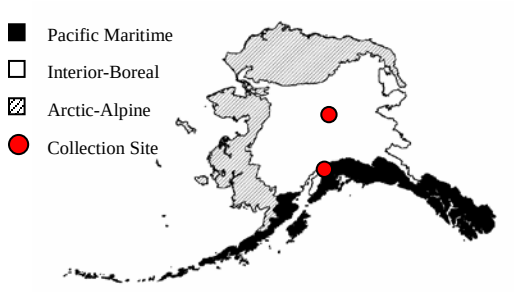
A. CLIMATIC COMPARISON

*1.1. Has this species ever been collected or documented in Alaska?*

☒ Yes - continue to 1.2
☐ No - continue to 2.1

*1.2. From which eco-geographic region has it been collected or documented (see inset map)? Proceed to* Section B. INVASIVNESS RANKING

☐ Pacific Maritime
☒ Interior-Boreal
☐ Arctic-Alpine




**Documentation**: *Prunus virginiana* has been documented from Anchorage and Fairbanks in the Interior-Boreal ecogeographic region of Alaska (AKEPIC 2011, UAM 2011).

*2.1. Is there a 40 percent or higher similarity (based on CLIMEX climate matching, see references) between climates where this species currently occurs and:*

a. Juneau (Pacific Maritime region)?
☒ Yes – record locations and percent similarity; proceed to Section B.
☐ No

b. Fairbanks (Interior-Boreal region)?
☐ Yes – record locations and percent similarity; proceed to Section B.
☐ No

c. Nome (Arctic-Alpine region)?
☒ Yes – record locations and percent similarity; proceed to Section B.
☐ No

*If "No" is answered for all regions; reject species from consideration*

**Documentation:** *Prunus virginiana* has been documented from sites near Portland, Oregon, and Hope, British Columbia, which have 41% and 42% climatic similarities with Juneau, respectively (CLIMEX 1999, Klinkenberg 2010, USDA 2011). It has also been documented from Prince George, British Columbia, and from a site near Fort Nelson, British Columbia, which both have 56% climatic similarities with Nome (CLIMEX 1999, Klinkenberg 2010). This species is known to grow in regions in Canada where temperatures drop to -40°C (Mulligan and Munro 1981).

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B. INVASIVENESS RANKING

**1. Ecological Impact**

*1.1. Impact on Natural Ecosystem Processes*

| | | |
|---|---|---|
| a. | No perceivable impact on ecosystem processes | 0 |
| b. | Has the potential to influence ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability) | 3 |
| c. | Has the potential to cause significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coastlines, degrades habitat important to waterfowl) | 7 |
| d. | Has the potential to cause major, possibly irreversible, alteration or disruption | 10 |

of ecosystem processes (e.g., the species alters geomorphology, hydrology, or affects fire frequency thereby altering community composition; species fixes substantial levels of nitrogen in the soil making soil unlikely to support certain native plants or more likely to favor non-native species)

e. Unknown U

Score **U**

**Documentation:** The impacts of *Prunus virginiana* on ecosystem processes are unknown.

*1.2. Impact on Natural Community Structure*

a. No perceived impact; establishes in an existing layer without influencing its structure 0

b. Has the potential to influence structure in one layer (e.g., changes the density of one layer) 3

c. Has the potential to cause significant impact in at least one layer (e.g., creation of a new layer or elimination of an existing layer) 7

d. Likely to cause major alteration of structure (e.g., covers canopy, eliminating most or all lower layers) 10

e. Unknown U

Score **7**

**Documentation:** *Prunus virginiana* is capable of forming tall, dense thickets on forest edges (Johnson 2000). It grows up to 6 m tall in British Columbia (Klinkenberg 2010), is tolerant of partial shade (Mulligan and Munro 1981, Johnson 2000), and grows in wooded areas throughout its range (Buell and Cantlon 1951, Vilkitis 1974), suggesting that this species has the potential to form new tall shrub layers in forests. This species can contribute to tall shrub layers that reduce the survival of native tree seedlings (Lorimer et al. 1994).

*1.3. Impact on Natural Community Composition*

a. No perceived impact; causes no apparent change in native populations 0

b. Has the potential to influence community composition (e.g., reduces the population size of one or more native species in the community) 3

c. Has the potential to significantly alter community composition (e.g., significantly reduces the population size of one or more native species in the community) 7

d. Likely to cause major alteration in community composition (e.g., results in the extirpation of one or more native species, thereby reducing local biodiversity and/or shifting the community composition towards exotic species) 10

e. Unknown U

Score **5**

**Documentation:** *Prunus virginiana* is a tall shrub or tree (Klinkenberg 2010), and it therefore likely outshades underlying vegetation. In combination with other tall shrub species, it reduced the survival of native *Quercus* (oak) seedlings in Wisconsin (Lorimer et al. 1994).

*1.4. Impact on associated trophic levels (cumulative impact of this species on the animals, fungi, microbes, and other organisms in the community it invades)*

a. Negligible perceived impact 0

| | | |
|---|---|---|
| b. | Has the potential to cause minor alteration (e.g., causes a minor reduction in nesting or foraging sites) | 3 |
| c. | Has the potential to cause moderate alteration (e.g., causes a moderate reduction in habitat connectivity, interferes with native pollinators, or introduces injurious components such as spines, toxins) | 7 |
| d. | Likely to cause severe alteration of associated trophic populations (e.g., extirpation or endangerment of an existing native species or population, or significant reduction in nesting or foraging sites) | 10 |
| e. | Unknown | U |

Score **7**

**Documentation:** Many mammals, including bears, moose, coyotes, pronghorn, bighorn sheep, elk, and deer, are known to feed on *Prunus virginiana* in North America (Johnson 2000). The fruits provide a food source for many species of birds and small mammals (Vilkitis 1974, Meyer and Witmer 1998). This species contains a cyanogenic glycoside and can be toxic to mammals with segmented stomachs (rumens), including moose, deer, sheep, goats, and cattle (Mulligan and Munro 1981, Johnson 2000, Harms 2011). *Prunus virginiana* has been responsible for poisoning moose calves in Anchorage (Grant pers. obs., Graziano pers. obs.). Poisoning from *Prunus* species usually occurs after the plants freeze (Harms 2011). *Prunus virginiana* is associated with many plant diseases and insect pests in North America (Vilkitis 1974).

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Total Possible 30
Total **19**

**2. Biological Characteristics and Dispersal Ability**

*2.1. Mode of reproduction*

| | | |
|---|---|---|
| a. | Not aggressive (produces few seeds per plant [0-10/$m^2$] and not able to reproduce vegetatively). | 0 |
| b. | Somewhat aggressive (reproduces by seed only [11-1,000/$m^2$]) | 1 |
| c. | Moderately aggressive (reproduces vegetatively and/or by a moderate amount of seed [<1,000/$m^2$]) | 2 |
| d. | Highly aggressive (extensive vegetative spread and/or many seeded [>1,000/$m^2$]) | 3 |
| e. | Unknown | U |

Score **3**

**Documentation:** *Prunus virginiana* reproduces sexually by seeds and vegetatively from suckers on extensive lateral root systems (Mulligan and Munro 1981). Plants in open areas produce more seeds than plants in shaded areas (Johnson 2000). In riparian habitats in western Montana, *Prunus virginiana* produced between 600 and 3,000 seeds per plant (Parciak 2002). Once established, populations grow quickly and form dense thickets by vegetative spread (Vilkitis 1974).

*2.2. Innate potential for long-distance dispersal (wind-, water- or animal-dispersal)*

| | | |
|---|---|---|
| a. | Does not occur (no long-distance dispersal mechanisms) | 0 |
| b. | Infrequent or inefficient long-distance dispersal (occurs occasionally despite lack of adaptations) | 2 |
| c. | Numerous opportunities for long-distance dispersal (species has adaptations such as pappus, hooked fruit coats, etc.) | 3 |

d. Unknown U

Score **3**

**Documentation:** Fruits are attractive to many mammals and birds, and seeds can be dispersed after being ingested (Webb and Wilson 1985, Meyer and Witmer 1998, Johnson 2000). In riparian habitats in western Montana, birds dispersed seeds a substantial distance beyond *Prunus virginiana* populations; approximately 40% of seeds were dispersed 6.4 m to 15 m away from canopies of this species (Parciak 2002). Large volumes of seeds can be dispersed in the scat of black bears (Auger et al. 2002).

*2.3. Potential to be spread by human activities (both directly and indirectly – possible mechanisms include: commercial sale of species, use as forage or for revegetation, dispersal along highways, transport on boats, common contaminant of landscape materials, etc.).*

a. Does not occur 0
b. Low (human dispersal is infrequent or inefficient) 1
c. Moderate (human dispersal occurs regularly) 2
d. High (there are numerous opportunities for dispersal to new areas) 3
e. Unknown U

Score **3**

**Documentation:** *Prunus virginiana* is planted as an ornamental shrub or tree in Alaska (Dinstel 2008) and has been documented outside of cultivation (AKEPIC 2011).

*2.4. Allelopathic*

a. No 0
b. Yes 2
c. Unknown U

Score **U**

**Documentation:** The allelopathic potential of *Prunus virginiana* is unknown. However, field observations in the Garhwal Himalaya area, bioassays with plant extracts, and bioassays with isolated compounds suggest that *P. armeniaca* may produce allelopathic chemicals (Rawat et al. 1998). *P. serotina*, *P. cornuta*, and *P. pumila* are also noted as having potential allelopathic effects (Coder 1998).

*2.5. Competitive ability*

a. Poor competitor for limiting factors 0
b. Moderately competitive for limiting factors 1
c. Highly competitive for limiting factors and/or able to fix nitrogen 3
d. Unknown U

Score **3**

**Documentation:** *Prunus virginiana* is highly competitive, and populations grow quickly through prolific vegetative spread (Vilkitis 1974).

*2.6. Forms dense thickets, has a climbing or smothering growth habit, or is otherwise taller than the surrounding vegetation.*

a. Does not grow densely or above surrounding vegetation 0
b. Forms dense thickets 1

| | | |
|---|---|---|
| c. | Has a climbing or smothering growth habit, or is otherwise taller than the surrounding vegetation | 2 |
| d. | Unknown | U |

Score **2**

**Documentation:** *Prunus virginiana* can form thickets and grows up to 6 m tall in British Columbia (Klinkeberg 2010), enabling it to overtop and outshade surrounding vegetation.

*2.7. Germination requirements*

| | | |
|---|---|---|
| a. | Requires sparsely vegetated soil and disturbance to germinate | 0 |
| b. | Can germinate in vegetated areas, but in a narrow range of or in special conditions | 2 |
| c. | Can germinate in existing vegetation in a wide range of conditions | 3 |
| d. | Unknown | U |

Score **3**

**Documentation:** Seeds can germinate under open and closed forest canopies (Johnson 2000).

*2.8. Other species in the genus invasive in Alaska or elsewhere*

| | | |
|---|---|---|
| a. | No | 0 |
| b. | Yes | 3 |
| c. | Unknown | U |

Score **3**

**Documentation:** *Prunus padus* is known to occur as a non-native tree in Alaska with an invasiveness rank of 74 (AKEPIC 2011).

*2.9. Aquatic, wetland, or riparian species*

| | | |
|---|---|---|
| a. | Not invasive in wetland communities | 0 |
| b. | Invasive in riparian communities | 1 |
| c. | Invasive in wetland communities | 3 |
| d. | Unknown | U |

Score **1**

**Documentation:** *Prunus virginiana* has invaded riparian communities along Chester Creek and Campbell Creek in Anchorage (AKEPIC 2011). It is not likely to invade wetland communities because it does not grow well in areas that have poor drainage or are subject to prolonged flooding (Johnson 2000).

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Total Possible 23

Total **21**

**3. Ecological Amplitude and Distribution**

*3.1. Is the species highly domesticated or a weed of agriculture?*

| | | |
|---|---|---|
| a. | Is not associated with agriculture | 0 |
| b. | Is occasionally an agricultural pest | 2 |
| c. | Has been grown deliberately, bred, or is known as a significant agricultural pest | 4 |
| d. | Unknown | U |

Score **4**

**Documentation:** *Prunus virginiana* has been grown deliberately in its native range for revegetation of wildlife habitat and mine spoils and for soil stabilization (Johnson 2000). It is planted as an ornamental shrub or tree in Alaska (Dinstel 2008).

*3.2. Known level of ecological impact in natural areas*

| | | |
|---|---|---|
| a. | Not known to impact other natural areas | 0 |
| b. | Known to impact other natural areas, but in habitats and climate zones dissimilar to those in Alaska | 1 |
| c. | Known to cause low impact in natural areas in habitats and climate zones similar to those in Alaska | 3 |
| d. | Known to cause moderate impact in natural areas in habitat and climate zones similar to those in Alaska | 4 |
| e. | Known to cause high impact in natural areas in habitat and climate zones similar to those in Alaska | 6 |
| f. | Unknown | U |

Score **4**

**Documentation:** *Prunus virginiana* was one of the species comprising a tall shrub layer that reduced the survival of *Quercus* (oak) seedlings in Wisconsin (Lorimer et al. 1994). This species is known to be poisonous to wild ruminants in North America, including areas similar to Alaska, such as British Columbia (Mulligan and Munro 1981, Johnson 2000, Klinkenberg 2010).

*3.3. Role of anthropogenic and natural disturbance in establishment*

| | | |
|---|---|---|
| a. | Requires anthropogenic disturbance to establish | 0 |
| b. | May occasionally establish in undisturbed areas, readily establishes in naturally disturbed areas | 3 |
| c. | Can establish independently of natural or anthropogenic disturbances | 5 |
| e. | Unknown | U |

Score **5**

**Documentation:** *Prunus virginiana* often establishes in early successional habitats, such as logged or burned areas (Johnson 2000). It was a prominent initial colonizer of a clear-cut hardwood forest in Ontario (Brown 1994). However, this species can establish under closed canopies. Seedlings can survive and mature in partially shaded habitats (Mulligan and Munro 1981, Johnson 2000).

*3.4. Current global distribution*

| | | |
|---|---|---|
| a. | Occurs in one or two continents or regions (e.g., Mediterranean region) | 0 |
| b. | Extends over three or more continents | 3 |
| c. | Extends over three or more continents, including successful introductions in arctic or subarctic regions | 5 |
| e. | Unknown | U |

Score **0**

**Documentation:** *Prunus virginiana* is native to much of North America (Johnson 2000, Klinkenberg 2010) and its range extends into subarctic Canada in the Mackenzie District of Northwest Territories as far north as 62°N (Mulligan and Munro 1981).

*3.5. Extent of the species' U.S. range and/or occurrence of formal state or provincial listing*

| | | |
|---|---|---|
| a. | Occurs in 0-5 percent of the states | 0 |
| b. | Occurs in 6-20 percent of the states | 2 |
| c. | Occurs in 21-50 percent of the states and/or listed as a problem weed (e.g., "Noxious," or "Invasive") in one state or Canadian province | 4 |
| d. | Occurs in more than 50 percent of the states and/or listed as a problem weed in two or more states or Canadian provinces | 5 |
| e. | Unknown | U |

Score **5**

**Documentation:** *Prunus virginiana* grows in 44 states of the U.S. and throughout much of Canada (USDA 2011). It is not considered a noxious weed in any states of the U.S. or provinces of Canada as it is native to much of North America.

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Total Possible 25
Total **18**

**4. Feasibility of Control**

*4.1. Seed banks*

| | | |
|---|---|---|
| a. | Seeds remain viable in the soil for less than three years | 0 |
| b. | Seeds remain viable in the soil for three to five years | 2 |
| c. | Seeds remain viable in the soil for five years or longer | 3 |
| e. | Unknown | U |

Score **U**

**Documentation:** *Prunus virginiana* forms persistent seed banks (Johnson 2000); however, the exact amount of time seeds remain viable has not been documented. After 2 years in seed traps in Alaska, only 27% of seeds of a similar species, *Prunus padus*, were viable (Flagstad et al. 2010).

*4.2. Vegetative regeneration*

| | | |
|---|---|---|
| a. | No resprouting following removal of aboveground growth | 0 |
| b. | Resprouting from ground-level meristems | 1 |
| c. | Resprouting from extensive underground system | 2 |
| d. | Any plant part is a viable propagule | 3 |
| e. | Unknown | U |

Score **2**

**Documentation:** Plants can regenerate from root crowns and lateral root fragments (Johnson 2000).

*4.3. Level of effort required*

| | | |
|---|---|---|
| a. | Management is not required (e.g., species does not persist in the absence of repeated anthropogenic disturbance) | 0 |
| b. | Management is relatively easy and inexpensive; requires a minor investment of human and financial resources | 2 |
| c. | Management requires a major short-term or moderate long-term investment of human and financial resources | 3 |

| | | |
|---|---|---|
| d. | Management requires a major, long-term investment of human and financial resources | 4 |
| e. | Unknown | U |

Score **3**

**Documentation:** Seedlings and young saplings can be controlled by digging plants out. Mature plants are difficult to control without the use of herbicides. Plants under 3 m tall are susceptible to foliar applications of 2, 4-, 5-T amine, ammonium sulphamate, 1:1 mixtures of 2, 4-D and 2, 4, 5-T, 1:1 mixtures of 2, 4-D and Dichlorprop, and 2:1 mixtures of 2, 4-D and Dicamba. Plants over 3 m tall can be controlled with herbicide applications on the basal 30 cm of bark, exposed roots, and/or cut stumps (Mulligan and Munro 1981).

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| | |
|---|---|
| Total Possible | 7 |
| Total | **5** |

| | |
|---|---|
| Total for four sections possible | 85 |
| Total for four sections | **63** |

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