ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

Botanical name: *Persicaria wallichii* Greuter & Burdet (*Polygonum polystachyum* Meissner)
Common name: Himalayan knotweed
Assessors:

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Date: 2/25/2011
Date of previous ranking, if any: 5T

OUTCOME SCORE:

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

Pacific Maritime	Yes
Interior-Boreal	No
Arctic-Alpine	No

INVASIVENESS RANKING	**Total** (total answered points possible[1])	**Total**
Ecological impact	40 (40)	31
Biological characteristics and dispersal ability	25 (22)	18
Ecological amplitude and distribution	25 (25)	19
Feasibility of control	10 (7)	7
Outcome score	100 (94)[b]	75[a]
Relative maximum score[2]		**80**

[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

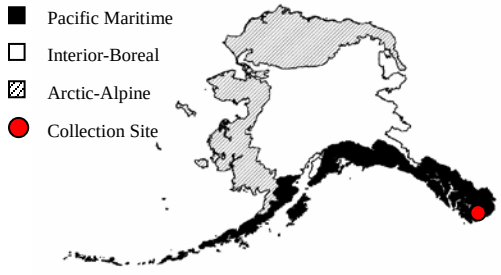
A. CLIMATIC COMPARISON

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: *Persicaria wallichii* has been documented from Ketchikan and Metlakatla in the Pacific Maritime ecogeographic region of Alaska (AKEPIC 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: *Persicaria wallichii* is not known to grow in locations that have 40% or greater climatic similarities with Fairbanks or Nome (CLIMEX 1999).

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 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)	10

e. Unknown U

Score **7**

Documentation: *Persicaria wallichii* reduces the availability of nutrients in the soil. It competes with trees and can reduce shade along rivers and streams by displacing native, woody species (WSDA 2008). Infestations produce dense mats of leaf litter that prevent the germination of native species (Wilson 2007).

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 **9**

Documentation: *Persicaria wallichii* forms dense stands and grows up to 2 m tall (DiTomaso and Healy 2007, Klinkenberg 2010), indicating that it can create new tall forb layers and reduce the density of or eliminate underlying layers. This species can limit the establishment of trees (WSDA 2008).

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 **8**

Documentation: Dense populations of *Persicaria wallichii* displace native species (DiTomaso and Healy 2007). This species has large leaves and produces thick foliage, which outshades underlying vegetation (WSDA 2008) and displaces native species (DiTomaso and Healy 2007).

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 7

components such as spines, toxins)

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: *Persicaria wallichii* can reduce the quality of fish and wildlife habitat in riparian areas. Infestations may reduce insect populations that provide food sources to salmon (WSDA 2008).

Total Possible 40

Total **31**

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: *Persicaria wallichii* reproduces sexually by seeds and vegetatively from extensive rhizomes. However, seed production is rare in California, and populations in British Columbia appear to be sterile (DiTomaso and Healy 2007, Klinkenberg 2010).

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 **2**

Documentation: Seeds are dispersed by wind. Rhizome and stem fragments are dispersed in waterways or by flooding (DiTomaso and Healy 2007).

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	**2**

Documentation: *Persicaria wallichii* is grown as an ornamental plant in gardens, and it escapes cultivation (DiTomaso and Healy 2007). Alaskan populations have been associated with roadsides in Ketchikan and current and historic residences on Annette Island (AKEPIC 2011).

2.4. Allelopathic

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

Documentation: No evidence suggests that *Persicaria wallichii* is allelopathic.

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: *Persicaria wallichii* emerges early in the growing season and can outshade and displace native vegetation (WSDA 2005, DiTomaso and Healy 2007).

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: *Persicaria wallichii* forms dense stands that exclude native species (DiTomaso and Healy 2007). Plants can grow up to 2 m tall (Klinkenberg 2010) and may therefore overtop 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	**U**

Documentation: *Persicaria wallichii* grows best in unshaded areas (WSDA 2008) and seedlings may not survive in shaded areas. However, the germination requirements of *Persicaria wallichii* are largely unknown.

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

a.	No	0
b.	Yes	3
c.	Unknown	U
	Score	**3**

Documentation: *Persicaria maculosa* and *P. lapathifolia* are known to occur as non-native weeds in Alaska with invasiveness ranks of 47 (AKEPIC 2011). *P. maculosa* is considered a noxious weed in Alberta, Manitoba, and Minnesota, and both species are considered noxious weeds in Quebec (Invaders 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	**3**

Documentation: *Persicaria wallichii* grows in moist, disturbed areas, marshes, and riparian communities in North America (Hinds and Freeman 2005, DiTomaso and Healy 2007).

Total Possible	22
Total	**18**

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: *Persicaria wallichii* is grown as an ornamental plant in gardens (Hinds and Freeman 2005) and has been found growing on roadsides and in residential areas in Southeast Alaska (AKEPIC 2011).

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	6

similar to those in Alaska

f. Unknown U

Score **4**

Documentation: *Persicaria wallichii* is known to grow in riparian and wetland communities in the Pacific Northwest, where it produces dense stands that exclude native species (Washington NWCB 2004, DiTomaso and Healy 2007).

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 **3**

Documentation: *Persicaria wallichii* grows in moist, disturbed sites, roadsides, fields, and waste areas in North America (Hinds and Freeman 2005, DiTomaso and Healy 2010, Klinkenberg 2010). In Poland, it has established only in anthropogenically disturbed areas (Bartoszek 2006). However, it can also establish in areas disturbed by river action or flooding in the Pacific Northwest (Washington NWCB 2004).

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 **3**

Documentation: *Persicaria wallichii* is native to central and eastern Asia (DiTomaso and Healy 2007, eFloras 2008). It has been introduced to North America, Europe, and New Zealand (Hinds and Freeman 2005, Bartoszek et al. 2006, Landcare Research 2011).

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: *Persicaria wallichii* grows in California, British Columbia, Massachusetts, Montana, Nova Scotia, Oregon, and Washington (USDA 2011). It is considered a noxious weed in California, Oregon, and Washington (Invaders 2011, USDA 2011).

Total Possible 25

Total **19**

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: The amount of time seeds remain viable in the soil is unknown.

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 **3**

Documentation: Plants can regenerate from rhizome fragments as short as 2 cm and from stem fragments (Washington NWCB 2004, DiTomaso and Healy 2007, Wilson 2007).

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 **4**

Documentation: Small populations of young plants can be removed by hand pulling or digging as long as all rhizomes are removed from the soil (DiTomaso and Healy 2007). Regularly repeated cutting can eventually eliminate small populations. Plants should be cut close to the ground twice per month from April to August and once per month from August until frost for at least two or three years (WSDA 2005). Populations can be covered with opaque material. The material should extend at least 8 m beyond the boundaries of the population and must remain in place for one year or more. Herbicide application is often the most effective method for long-term control (DiTomaso and Healy 2007). Foliar applications of glyphosate, imazapyr, glyphosate-imazapyr mixtures, or triclopyr applied in spring can efficiently control large populations. Glyphosate and triclopyr should be applied at 2% concentration. The addition of 0.5% non-ionic surfactant increases herbicide uptake. Applying 25% glyphosate or triclopyr to cut stems results in high plant mortality and largely avoids killing non-target species. Plants should be cut within three nodes of their bases in summer or fall, and herbicides should be

applied directly to the cut portion. Stem injections have also proven effective (Washington NWCB 2004, WSDA 2005). *Persicaria wallichii* is intolerant of saline conditions and repeated watering with seawater can reduce or eliminate populations near coastal areas (Cheney 2007).

Total Possible	7
Total	**7**

Total for four sections possible	94
Total for four sections	**75**

References:

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