

ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

Botanical name: *Lamium album* L.

Common name: white deadnettle

Assessors:

Timm Nawrocki Research Technician Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska 99501 (907) 257-2798	Helen I. Klein Research Technician Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska 99501 (907) 257-2798
Lindsey A. Flagstad Research Technician Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska 99501 (907) 257-2786	Matthew L. Carlson, Ph.D. Associate Professor Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska 99501 (907) 257-2790

Reviewers:

Ashley Grant Invasive Plant Program Instructor Cooperative Extension Service, University of Alaska Fairbanks 1675 C Street, Anchorage, Alaska 99501 (907) 786-6315	Bonnie M. Million. Alaska Exotic Plant Management Team Liaison Alaska Regional Office, National Park Service, U.S. Department of the Interior 240 West 5 th Avenue Anchorage, Alaska, 99501 (907) 644-3452
Gino Graziano Natural Resource Specialist Plant Materials Center, Division of Agriculture, Department of Natural Resources, State of Alaska 5310 S. Bodenburg Spur, Palmer, Alaska, 99645 (907) 745-4469	Whitney Rapp Katmai, Lake Clark, Alagnak, and Aniakchak Planning, Research Permitting, GIS/GPS, and Invasive Species National Park Service, U.S. Department of the Interior P.O. Box 7 King Salmon, Alaska, 99613 (907) 246-2145

Date: 2/9/2011

Date of previous ranking, if any: 4T

OUTCOME SCORE:

CLIMATIC COMPARISON

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

Pacific Maritime	<u>Yes</u>
Interior-Boreal	<u>Yes</u>
Arctic-Alpine	<u>Yes</u>

INVASIVENESS RANKING

	Total (total answered points possible ¹)	Total
Ecological impact	40 (40)	<u>10</u>
Biological characteristics and dispersal ability	25 (22)	<u>9</u>
Ecological amplitude and distribution	25 (25)	<u>13</u>
Feasibility of control	10 (10)	<u>7</u>
Outcome score	100 (97) ^b	<u>39^a</u>
Relative maximum score ²		<u>40</u>

¹ For questions answered “unknown” do not include point value for the question in parentheses for “total answered points possible.”

² Calculated as $a/b \times 100$

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. INVASIVENESS RANKING

- Pacific Maritime
 Interior-Boreal
 Arctic-Alpine

- Pacific Maritime
□ Interior-Boreal
▨ Arctic-Alpine
● Collection Site



Documentation: *Lamium album* has been documented from Juneau and Glacier Bay National Park in the Pacific Maritime ecogeographic region of Alaska and Anchorage in the Interior-Boreal ecogeographic region (Hultén 1968, 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: *Lamium album* has been documented from Lærdalsøyri, Norway, and Uppsala, Sweden, which have 45% and 47% climatic similarities with Nome, respectively (CLIMEX 1999, Herbarium of Oskarshamn 2010, Vascular Plant Herbarium Oslo 2011). It is also known to occur in several areas in Finland that have 40% or greater climatic similarities with Nome (CLIMEX 1999, NatureGate 2011).

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 3

Documentation: *Lamium album* is rhizomatous and forms clumps (Aniško 2008), likely reducing the availability of soil moisture and nutrients.

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 3

Documentation: *Lamium album* is rhizomatous and forms clumps (Aniško 2008); it may therefore increase the density of forb/graminoid layers.

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 1

Documentation: *Lamium album* has been observed growing in vegetated areas around Glacier Bay Lodge (Rapp 2009). It does not form monocultures. The population near Glacier Bay Lodge was persistent but did not spread from its original location (Rapp pers. obs.).

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 7

- in habitat connectivity, interferes with native pollinators, or introduces injurious 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

3

Documentation: The leaves provide a food source for mollusks. Flowers are visited by mason bees (Bramley 2011) and bumblebees (Fussell and Corbet 1992, Bramley 2011); the presence of this species may therefore alter native plant-pollinator interactions.

Total Possible

40

Total

10

2. Biological Characteristics and Dispersal Ability

2.1. Mode of reproduction

- a. Not aggressive (produces few seeds per plant [0-10/m²] and not able to reproduce vegetatively). 0
- b. Somewhat aggressive (reproduces by seed only [11-1,000/m²]) 1
- c. Moderately aggressive (reproduces vegetatively and/or by a moderate amount of seed [<1,000/m²]) 2
- d. Highly aggressive (extensive vegetative spread and/or many seeded [>1,000/m²]) 3
- e. Unknown U
- Score

2

Documentation: *Lamium album* reproduces sexually by seeds and vegetatively from rhizomes (Aniško 2008). It spreads vigorously (Rudy 2004). The number of seeds produced per plant has not been quantified.

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

0

Documentation: Seeds do not have any specialized adaptations for dispersal (eFloras 2008).

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

Documentation: *Lamium album* is grown as a low-maintenance ground cover in gardens (Rudy 2004, Aniško 2008). Plants found near Glacier Bay Lodge were likely escaped ornamentals (Rapp 2009).

2.4. *Allelopathic*

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

Documentation: No evidence suggests that *Lamium album* 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

Documentation: *Lamium album* spreads vigorously (Rudy 2004), but its competitive ability has not been documented.

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

Documentation: *Lamium album* forms rhizomatous clumps (Aniško 2008) but does not appear to form monocultures (AKEPIC 2011) or significantly overtop surrounding vegetation (eFloras 2008).

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

Documentation: *Lamium album* has spread into vegetated areas near Glacier Bay Lodge (Rapp 2009).

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

- | | | | | |
|----|---------|-------|---|---|
| a. | No | 0 | | |
| b. | Yes | 3 | | |
| c. | Unknown | U | | |
| | | Score | <table border="1"><tr><td>3</td></tr></table> | 3 |
| 3 | | | | |

Documentation: *Lamium amplexicaule* is considered a noxious weed in Manitoba and a nuisance weed in Alberta (Invaders 2011). *L. amplexicaule* and *L. purpureum* are known to occur as non-native weeds in the U.S. (DiTomaso and Healy 2007).

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 | <table border="1"><tr><td>1</td></tr></table> | 1 |
| 1 | | | | |

Documentation: *Lamium album* grows along streams in Europe (Rudy 2004, Aniško 2008), suggesting that it could invade riparian communities in Alaska.

Total Possible	<table border="1"><tr><td>22</td></tr></table>	22
22		
Total	<table border="1"><tr><td>9</td></tr></table>	9
9		

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 | <table border="1"><tr><td>2</td></tr></table> | 2 |
| 2 | | | | |

Documentation: *Lamium album* is grown as a low-maintenance ground cover in gardens (Rudy 2004, Aniško 2008), but it is not widely planted in Alaska.

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 | <table border="1"><tr><td>0</td></tr></table> | 0 |
| 0 | | | | |

Documentation: Ecological impacts have not been documented from natural areas outside of Alaska.

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

2

Documentation: *Lamium album* spread into vegetated areas near Glacier Bay Lodge (Rapp 2009), and it is capable of spreading into areas occupied by other perennial plants in gardens (Aniško 2008).

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

5

Documentation: *Lamium album* is native to Europe and Asia, including eastern Turkey, Iran, Iraq, Russia, Mongolia, central Asia, India, China, and Japan (eFloras 2008, Bramley 2011). It has been introduced to Iceland, New Zealand, and North America (Bramley 2011). This species grows as far north as 69.7°N in Norway (Vascular Plant Herbarium Oslo 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

4

Documentation: *Lamium album* grows in Alaska, Maine, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, and Virginia, as well as central and eastern Canada (USDA 2011). It is not considered a noxious weed in any states of the U.S. or provinces of Canada.

Total Possible

25

Total

13

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 2

Documentation: Most seeds germinate within two years of maturation; however, approximately 1% of seeds remain viable in the soil for five years (Roberts and Boddrell 1984).

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: *Lamium album* is rhizomatous (Aniško 2008) and can resprout from rhizome fragments.

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: Mechanical control methods will likely need to be repeated to remove plants resprouting from rhizome fragments. Field tests in Germany showed that glyphosate does not provide adequate control for *Lamium* species unless plants are sprayed when young. Glufosinate proved somewhat effective when applied while plants were young. Three applications of glufosinate at 400 grams per hectare or three or four early applications of metamiltrou, phenmedipham, desmedipham, and ethofumesat effectively controlled this species (Bückmann et al. 2000).

Total Possible	10
Total	7

Total for four sections possible	97
Total for four sections	39

References:

AKEPIC database. Alaska Exotic Plant Information Clearinghouse Database. 2011. Available: <http://akweeds.uaa.alaska.edu/>

- Aniško, T. 2008. *When Perennials Bloom: an Almanac for Planting and Planning*. Timber Press, Inc. Portland, OR. 510 p.
- Bramley, G. 2011. *Lamium album* (white deadnettle). *Plants and Fungi*. Royal Botanic Gardens, Kew. Richmond, England. [9 February 2011] <http://www.kew.org/plants-fungi/Lamium-album.htm>
- Büchmann, H., J. Petersen, G. Schlinker, and B. Märländer. 2000. Weed control in genetically modified sugar beet – two year experiences of a field trial series in Germany. *Zeitschrift für Pflanzenkrankheiten und Pflanzenschutz*. 17. 353-362 p.
- CLIMEX. 1999. CLIMEX for Windows, Predicting the effects of climate on plants and animals. Version 1.1a. CISRO Publishing. Collingwood, Australia.
- DiTomaso, J., and E. Healy. 2007. *Weeds of California and Other Western States*. Vol. 2. University of California Agriculture and Natural Resources Communication Services, Oakland, CA. 974 p.
- eFloras. 2008. Published on the Internet <http://www.efloras.org> [accessed 16 February 2011]. Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria, Cambridge, MA.
- Fussell, M., and S. Corbet. 1992. Flower usage by bumble-bees: a basis for forage plant management. *Journal of Applied Ecology*. 29(2). 451-465 p.
- Herbarium of Oskarshamn. 2010. Accessed through GBIF (Global Biodiversity Information Facility) data portal (<http://data.gbif.org/datasets/resource/1024>, 2011-02-09). Oskarshamn, Sweden.
- Hultén, E. 1968. *Flora of Alaska and Neighboring Territories*. Stanford University Press, Stanford, CA. 1008 pp.
- Invaders Database System. 2011. University of Montana. Missoula, MT. <http://invader.dbs.umt.edu/>
- NatureGate. 2011. Finland Nature and Species. Helsinki, Finland. [9 February 2011] Available: <http://www.luontoportti.com/suomi/en/>
- Rapp, W. 2009. *Invasive Plant Management in Glacier Bay National Park and Preserve*. Summer 2009 Field Season Report. Invasive Species Program, Glacier Bay National Park and Preserve, National Park Service, U.S. Department of the Interior. Gustavus, AK. 164 p.
- Rapp, W., Katmai, Lake Clark, Alagnak, and Aniakchak Planning, Research Permitting, GIS/GPS, and Invasive Species, National Park Service, U.S. Department of the Interior, P.O. Box 7, King Salmon, Alaska, 99613. Tel: (907) 246-2145 – pers. obs.
- Roberts, H., and J. Boddrell. 1984. Seed survival and seasonal emergence of seedlings of some ruderal plants. *Journal of Applied Ecology*. 21(2). 617-628 p.
- Rudy, M. 2004. A Comparative Study of Ground Cover *Lamium*. *Plant Evaluation Notes*. Chicago Botanic Garden. 23. 1-4 p.
- UAM. 2011. University of Alaska Museum, University of Alaska Fairbanks. Available: <http://arctos.database.museum/home.cfm>
- USDA. 2011. The PLANTS Database. National Plant Data Center, Natural Resources Conservation Service, United States Department of Agriculture. Baton Rouge, LA. <http://plants.usda.gov>
- Vascular Plant Herbarium, Oslo. 2011. Accessed through GBIF (Global Biodiversity Information Facility) data portal (<http://data.gbif.org/datasets/resource/1078>, 2011-02-09). Natural History Museum, University of Oslo. Oslo, Norway.