ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

Botanical name: *Tanacetum vulgare* L.
Common name: common tansy
Assessors:

Irina Lapina Botanist Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska 99501 (907) 257-2710	Matthew L. Carlson, Ph.D. Associate Professor Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska 99501 (907) 257-2790
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	

Reviewers:

Michael Shephard Vegetation Ecologist Forest Health Protection, State & Private Forestry, 3301 'C' Street, Suite 202, Anchorage, AK, 99503 (907) 743-9454	Julie Riley Horticulture Agent UAF Cooperative Extension Service, 2221 E. Northern Lights Blvd. #118 Anchorage, AK 99508-4143 tel: (907) 786-6306
Jeff Conn, Ph. D. Research Agronomist Agricultural Research Service, U.S. Department of Agriculture 905 Koyukuk St. – UAF Campus, Fairbanks, Alaska 99775 (907) 474-7652	Jamie M. Snyder UAF Cooperative Extension Service, 2221 E. Northern Lights Blvd. #118, Anchorage, AK, 99508-4143 (907) 786-6310
Page Spencer, Ph.D. Ecologist National Park Service, Alaska Region - Biological Resources Team, 240 W. 5th Ave, #114, Anchorage, AK, 99501 (907) 644-3448	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
Robert L. DeVelice, Ph. D. Vegetation Ecologist Chugach National Forest, Forest Service, U.S. Department of Agriculture 3301 C Street, Suite 300 Anchorage, Alaska 99503 (907) 743-9437	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
Bonnie M. Million. Alaska Exotic Plant Management Team Liaison Alaska Regional Office, National Park Service, U.S. Department of the Interior 240 West 5th Avenue Anchorage, Alaska, 99501 (907) 644-3452	

Date: 3/17/2011
Date of previous ranking, if any: 8/1/2008

OUTCOME SCORE:

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 (40)	20
Biological characteristics and dispersal ability	25 (23)	15
Ecological amplitude and distribution	25 (25)	19
Feasibility of control	10 (10)	5
Outcome score	100 (98)[b]	59[a]
Relative maximum score[2]		**60**

[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

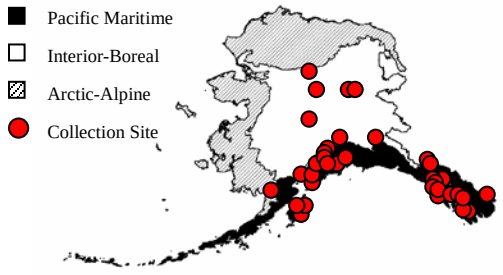
A. CLIMATIC COMPARISON

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: *Tanacetum vulgare* has been documented from all three ecogeographic regions of Alaska (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:

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 **5**

Documentation: *Tanacetum vulgare* restricts the flow of water when growing along stream banks (Gucker 2009). It can form dense clumps (Gucker 2009) and likely reduces 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 **5**

Documentation: In Alaska, 16% of recorded infestations have occurred at or above 50% ground cover (AKEPIC 2011). *Tanacetum vulgare* establishes in the existing herbaceous layer, increasing the density of the layer (Lapina pers. obs.).

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: Dense populations of *Tanacetum vulgare* displace native plant species (Gucker 2009).

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 **5**

Documentation: *Tanacetum vulgare* is unpalatable and poisonous when consumed in large quantities; it therefore can reduce the quality of foraging sites. Birds eat the seeds (Gucker 2009). Flowers are pollinated by a variety of insects (LeCain and Sheley 2006); the presence of *Tanacetum vulgare* may therefore alter native plant-pollinator interactions. This species is associated with several viruses (Royer and Dickinson 1999).

Total Possible	40
Total	**20**

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: *Tanacetum vulgare* reproduces sexually by seeds and vegetatively from long rhizomes (Gucker 2009, Luneva 2009). Each plant is capable of producing over 50,000 seeds, but plants in Montana produced an average of 2,553 seeds each. Plants form large, dense clumps by vegetative spread (Gucker 2009).

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 can float and are spread by the movement of water. They are also transported on the fur and feathers of animals (Gucker 2009).

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: *Tanacetum vulgare* is cultivated as an ornamental plant. It commonly escapes cultivation along the Pacific Coast of the U.S. and Canada (Watson 2006). This species has been associated with the soil of container-grown ornamental plants (Conn et al. 2008). Seeds can likely be spread by maintenance and construction equipment and on shoes (Gucker 2009).

2.4. Allelopathic

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

Score **U**

Documentation: Extracts from *Tanacetum vulgare* reduce the germination of some plant species but do not appear to reduce the growth of established plants (Gucker 2009).

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 **1**

Documentation: *Tanacetum vulgare* is likely moderately competitive for soil nutrients in disturbed sites (Rebele 2000). In Alaska, 16% of recorded infestations have occurred at or above 50% ground cover (AKEPIC 2011).

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: *Tanacetum vulgare* forms dense stands by spreading from the rhizomes (Luneva 2009, Gucker 2009, Klinkenberg 2010). Plants do not grow taller than 1.5 m (DiTomaso and Healy 2007, Klinkenberg 2010).

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 **0**

Documentation: *Tanacetum vulgare* colonizes disturbed areas, including disturbed forest understories. Seeds germinate in open soil, especially after large disturbances. This species does not establish in vegetated areas or in soil covered with litter (Gucker 2009).

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

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

Score **3**

Documentation: *Tanacetum parthenium* is known to occur as a non-native weed in California (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 **1**

Documentation: *Tanacetum vulgare* can form dense populations along riverbanks and lake shores (Gucker 2009, AKEPIC 2011).

Total Possible 23
Total **15**

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: *Tanacetum vulgare* was introduced to North America from Europe in the 17th century as an ornamental and medicinal plant (Whitson et al. 2000, Gucker 2009). This species is a frequent agricultural weed in Russia (Luneva 2009). It commonly grows in rangelands and pastures in North America (Gucker 2009).

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 **2**

Documentation: *Tanacetum vulgare* invades disturbed prairies in Wisconsin (Wisconsin DNR 2003) and forms dense, monotypic stands in Idaho (DiTomaso and Healy 2007). It reduces the quality of rangelands and pastures (Gucker 2009).

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: *Tanacetum vulgare* is generally restricted to disturbed sites (Gucker 2009). Most recorded infestations in Alaska are associated with anthropogenically disturbed areas. However, some infestations have been documented from areas that are naturally disturbed by coastal processes or river action (AKEPIC 2011, UAM 2011). However, it has been observed invading beach meadows in Haines, Alaska (Shephard pers. obs.).

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: *Tanacetum vulgare* is native to Siberia and parts of Europe (Gucker 2009, NatureGate 2011). It has been introduced throughout much of the world, including parts of Eurasia, North America, Australia, and New Zealand (Rebele 2000, Watson 2006, Gucker 2009, Landcare Research 2011). This species grows in arctic regions across Russia (Luneva and Budrevskaya 2006).

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: *Tanacetum vulgare* grows in 45 states of the U.S. and most of Canada (USDA 2011). It is considered a noxious weed in Alberta, British Columbia, Colorado, Manitoba, Minnesota, Montana, Washington, and Wyoming (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 **0**

Documentation: Field studies in the Czech Republic suggest *Tanacetum vulgare* seeds are viable for just one season (Prach and Wade 1992).

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 resprout from rhizome fragments (Gucker 2009).

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: Small populations of *Tanacetum vulgare* can be removed by hand pulling or digging as long as rhizome fragments are removed. Gloves should be worn when pulling plants, as this species can cause dermatitis. Plants should be bagged and removed from the site. Mowing multiple times per year before seed set can contain populations (Gucker 2009, King County 2010). Dicamba, picloram, and chlorsulfuron control this species (Parchoma 2002, King County 2010). Metsulfuron applied at a rate of at least 21 grams per hectare with a non-ionic surfactant effectively controls populations. Glyphosate and 2, 4-D can also be used when wiped onto the foliage, but they do not provide complete control (LeCain and Sheley 2006). Herbicides are most effective when applied in spring. Controlled areas should be monitored for several years (King County 2010).

Total Possible	10
Total	**5**

Total for four sections possible	98
Total for four sections	**59**

References:

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

Conn, J., C. Stockdale, and J. Morgan. 2008. Characterizing Pathways of Invasive Plant Spread to Alaska: I. Propagules from Container-Grown Ornamentals. Invasive Plant Science and Management. 1(4). 331-336 p.

DiTomaso, J., and E. Healy. 2007. Weeds of California and Other Western States. Vol. 1. University of California Agriculture and Natural Resources Communication Services, Oakland, CA. 834 p.

Gucker, C. 2009. *Tanacetum vulgare*. In: Fire Effects Information System [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. [17 March 2011] Available: http://www.fs.fed.us/database/feis/

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/

King County. 2010. Best Management Practices, Common Tansy, *Tanacetum vulgare*. King County Noxious Weed Control Program, Water and Land Resources Division, Department of Natural Resources. Seattle, WA. [21 March 2011] http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/common-tansy-control.pdf

Klinkenberg, B. (Editor) 2010. *Tanacetum vulgare* L. In: E-Flora BC: Electronic Atlas of the Plants of British Columbia**.** Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia. Vancouver, BC. [17 March 2011] Available: http://www.geog.ubc.ca/biodiversity/eflora/index.shtml

Landcare Research. 2011. *Tanacetum vulgare* L. New Zealand Plants. Landcare Research. Lincoln, New Zealand. [21 March 2011] http://nzflora.landcareresearch.co.nz/

Lapina, L., Botanist, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2710 – Pers. obs.

LeCain, R., and R. Sheley. 2006. Common Tansy (*Tanacetum vulgare*). MT199911AG. MontGuide. Montana State University Extension. Bozeman, MT. [21 March 2011] http://www.ipm.montana.edu/

Luneva, N. 2009. Weeds, *Tanacetum vulgare* L. – Common Tansy. AgroAtlas. Interactive agricultural ecological atlas of Russia and neighboring countries: Economic plants and their diseases, pests, and weeds. [17 March 2011] http://www.agroatlas.ru/en/content/weeds/Tanacetum_vulgare/

Luneva, N., and I. Budrevskaya. 2006. Weeds, Area of distribution and weediness of *Tanacetum vulgare* (L.) Lassen. AgroAtlas. Interactive agricultural ecological atlas of Russia and neighboring countries: Economic plants and their diseases, pests, and weeds. [17 March 2011] http://www.agroatlas.ru/en/content/weeds/Tanacetum_vulgare/map/

NatureGate. 2011. Finland Nature and Species. Helsinki, Finland. [15 March 2011] Available: http://www.luontoportti.com/suomi/en/

Parchoma, G. (ed.). 2002. A Guide to Weeds in British Columbia. British Columbia Ministry of Agriculture, Food, and Fisheries and the Open Learning Agency. Burnaby, BC. [21 March 2011] http://www.weedsbc.ca/pdf/GuidetoWeeds.pdf

Prach, K. and P. Wade. 1992. Population characteristics of expansive perennial herbs. Preslia. 64(1): 45-51.

Rebele, F. 2000. Competition and coexistence of rhizomatous perennial plants along a nutrient gradient. Plant Ecology. 147(1). 77-94 p.

Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

Shephard, M., Vegetation Ecologist, USDA, Forest Service, Forest Health Protection, State and Private Forestry, 3301 C Street, Suite 202, Anchorage, Alaska 99503 Division. Tel: (907) 743-9454 - Pers. comm.

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

Watson, L. 2006. *Tanacetum vulgare* Linnaeus. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 12+ vols. New York and Oxford. Vol. 19, p. 490.

Whitson, T., L. Burrill, S. Dewey, D. Cudney, B. Nelson, R. Lee, and R. Parker. 2000. Weeds of the West. The Western Society of Weed Science in cooperation with the Western United States Land Grant Universities, Cooperative Extension Service, University of Wyoming. Laramie, Wyoming. 630 pp.

Wisconsin Department of Natural Resources: abstract. Non-native plants. 2003. http://www.dnr.state.wi.us