

WEED RISK ASSESSMENT FORM

Botanical name: *Impatiens glandulifera* Royle

Common name: ornamental jewelweed, policemen's helmet, Himalayan balsam, Washington orchid

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Outcome score:

A. Climatic Comparison		
This species is present or may potentially establish in the following eco-geographic regions:		
1	South Coastal	Yes
2	Interior-Boreal	Yes
3	Arctic-Alpine	No

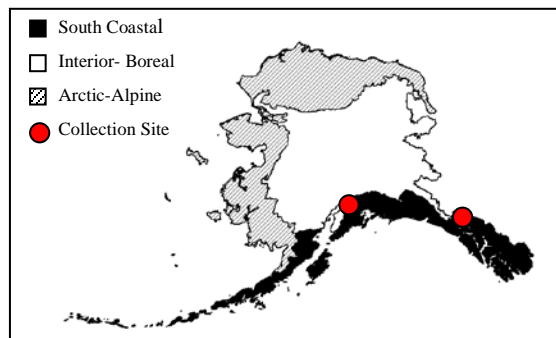
B. Invasiveness Ranking	Total (Total Answered*) Possible	Total
1 Ecological impact	40 (40)	29
2 Biological characteristic and dispersal ability	25 (23)	22
3 Ecological amplitude and distribution	25 (25)	22
4 Feasibility of control	10 (10)	7
Outcome score	100 (98) ^b	80 ^a
Relative maximum score†		0.82

* For questions answered "unknown" do not include point value for the question in parentheses for "Total Answered Points Possible."

† Calculated as ^a/_b.

A. CLIMATIC COMPARISON:

1.1. Has this species ever been collected or documented in Alaska?	
Yes	Yes – continue to 1.2
	No – continue to 2.1
1.2. Which eco-geographic region has it been collected or documented (see inset map)? <i>Proceed to Section B. Invasiveness Ranking.</i>	
Yes	South Coastal
Yes	Interior-Boreal
	Arctic-Alpine



Documentation: Ornamental jewelweed has been recorded in Haines (Weeds of Alaska Database 2004) and Wrangell (M. Shephard – pers. com.). It is widely planted as ornamental in Anchorage (I. Lapina – pers. obs.).

Sources of information:

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

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. com.

Weeds of Alaska Database. 2004. AKEPIC Mapping Project Inventory Field Data. Alaska Natural Heritage Program, University of Alaska – US Forest Service – National Park Service. Available: <http://akweeds.uaa.alaska.edu/>

2.1. Is there a 40% or higher similarity (based on CLIMEX climate matching) between climates any where the species currently occurs and

a. Juneau (South Coastal Region)?

Yes – record locations and similarity; proceed to Section B.
Invasiveness Ranking

No

b. Fairbanks (Interior-Boreal)?

Yes – record locations and similarity; proceed to Section B.
Invasiveness Ranking

No

c. Nome (Arctic-Alpine)?

Yes – record locations and similarity; proceed to Section B.
Invasiveness Ranking

No

No
– If “No” is answered for all regions, reject species from consideration

Documentation: Length of the growing season may be a limiting factor in its northern distribution, while absolute minimum temperatures appear to be not significantly limiting. Beerling (1993) calculated a minimum required value of 2195 day-degrees from its present distribution in Europe and used this to predict the northward spread. The growing season in Arctic-Alpine Alaska is less than 2195 day-degrees: 1112 day-degrees in Nome, 1564 in Dillingham, 313 in Barrow (WRCC 2001). This suggests that *Impatiens glandulifera* cannot extend its distribution into Arctic-Alpine Alaska.

Sources of information:

Beerling, D.J. 1993. The impact of temperature on the northern distribution limits of the introduced species *Fallopia japonica* and *Impatiens glandulifera* in North-West Europe. *Journal of Biogeography*. 20 (1): 45-53.

WRCC - Western Regional Climate Center 2001. Desert Research Institute. <http://www.wrcc.dri.edu> [16 April 2001].

B. INVASIVENESS RANKING

1. ECOLOGICAL IMPACT

1.1. Impact on Natural Ecosystem Processes

- | | | |
|----|---|----|
| A. | No perceivable impact on ecosystem processes | 0 |
| B. | Influences ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability) | 3 |
| C. | Significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coastlines, reduces open water that are important to waterfowl) | 7 |
| D. | Major, possibly irreversible, alteration or disruption of ecosystem processes (e.g., the species alters geomorphology; hydrology; or affects fire frequency, 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 |
| U. | Unknown | |

Score

7

Documentation:

Identify ecosystem processes impacted:

This plant can alter water flow and increase erosion and flooding at high densities (King County 2004). Additionally, as it suppresses the growth of co-occurring species it likely reduces resources (light, nutrients, moisture) for other species (Prots and Klotz 2004)

Rational:

Sources of information:

King County. 2004. Policemen's helmet *Impatiens glandulifera*. Department of Natural Resources and Parks, Water, and Land Resources Division Noxious Weed Control Program. 206296-0290 TTY Relay: 711. Available: <http://dnr.metrokc.gov/wlr/LANDS/Weeds/impatiens.htm> [November 2, 2004].

1.2. Impact on Natural Community Structure

- A. No perceived impact; establishes in an existing layer without influencing its structure 0
- B. Influences structure in one layer (e.g., changes the density of one layer) 3
- C. Significant impact in at least one layer (e.g., creation of a new layer or elimination of an existing layer) 7
- D. Major alteration of structure (e.g., covers canopy, eradicating most or all layers below) 10
- U. Unknown

Score

8

Documentation:

Identify type of impact or alteration:

This plant creates a dense canopy, eliminating most layers below. Despite being an annual, its dry stems persist as a layer the following spring (Beerling and Perrins 1993, King County 2004).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

King County. 2004. Policemen's helmet *Impatiens glandulifera*. Department of Natural Resources and Parks, Water, and Land Resources Division Noxious Weed Control Program. 206296-0290 TTY Relay: 711. Available: <http://dnr.metrokc.gov/wlr/LANDS/Weeds/impatiens.htm> [November 2, 2004].

1.3. Impact on Natural Community Composition

- A. No perceived impact; causes no apparent change in native populations 0
- B. Influences community composition (e.g., reduces the number of individuals in one or more native species in the community) 3
- C. Significantly alters community composition (e.g., produces a significant reduction in the population size of one or more native species in the community) 7
- D. Causes major alteration in community composition (e.g., results in the extirpation of one or several native species, reducing biodiversity or change the community composition towards species exotic to the natural community) 10
- U. Unknown

Score

7

Documentation:

Identify type of impact or alteration:

This aggressive plant is able to reduce the growth of native species, eventually replacing them at sites where it gets established (King County 2004, Prots and Klotz 2004). In studies in Great Britain very few species were found co-occurring with ornamental jewelweed (Beerling and Perrins 1993,).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens*

glandulifera Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

King County. 2004. Policemen's helmet *Impatiens glandulifera*. Department of Natural Resources and Parks, Water, and Land Resources Division Noxious Weed Control Program. 206296-0290 TTY Relay: 711. Available: <http://dnr.metrokc.gov/wlr/LANDS/Weeds/impatiens.htm> [November 2, 2004].

Prots, B. and S. Klotz. 2004. The invasion ecology of Himalayan Balsam (*Impatiens glandulifera* Royle). UFZ Centre for Environmental Research. Leipzig. Available: <http://www.hdg.ufz.de/index.php?en=1094> [November 2, 2004].

1.4. Impact on higher 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. Minor alteration 3
- C. Moderate alteration (minor reduction in nesting/foraging sites, reduction in habitat connectivity, interference with native pollinators, injurious components such as spines, toxins) 7
- D. Severe alteration of higher trophic populations (extirpation or endangerment of an existing native species/population, or significant reduction in nesting or foraging sites) 10
- U. Unknown

Score

7

Documentation:

Identify type of impact or alteration:

This plant competes with native plants for pollinators reducing seed set in native plants. Pollinators include several species of bumblebees, honeybees, moths, and wasps (Beerling and Perrins 1993, Chittka and Schürkens 2001, King County 2004). It alters habitats for wildlife species. Because of high holocellulose content in its stems, it persists as a litter the following spring, suppressing competing seedlings of other species (Beerling and Perrins 1993).

Rational:

Nectar of *Impatiens glandulifera* is rich and more rewarding than that of any known native plant in central Europe (Chittka and Schürkens 2001).

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

Chittka L. and S. Schürkens. 2001. Successful invasion of a floral market. Nature 411: 653.

King County. 2004. Policemen's helmet *Impatiens glandulifera*. Department of Natural Resources and Parks, Water, and Land Resources Division Noxious Weed Control Program. 206296-0290 TTY Relay: 711. Available: <http://dnr.metrokc.gov/wlr/LANDS/Weeds/impatiens.htm> [November 2, 2004].

Total Possible

40

Total

29

2. BIOLOGICAL CHARACTERISTICS AND DISPERSAL ABILITY

2.1. Mode of reproduction

- A. Not aggressive reproduction (few [0-10] seeds per plant and no vegetative reproduction) 0
- B. Somewhat aggressive (reproduces only by seeds (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 reproduction (extensive vegetative spread and/or many seeded, >1,000/m²) 3
- U. Unknown

Score

3

Documentation:

Describe key reproductive characteristics (including seeds per plant):

Jewelweed reproduces entirely by seeds. Medium-sized plants growing at a density of 20 per square meter produce between 700 and 800 seeds (Beerling and Perrins 1993). Large plants can produce up to 2500 seeds, (Chittka and Schürkens 2001, King County 2004).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

Chittka L. and S. Schürkens. 2001. Successful invasion of a floral market. Nature 411: 653.

King County. 2004. Policemen’s helmet *Impatiens glandulifera*. Department of Natural Resources and Parks, Water, and Land Resources Division Noxious Weed Control Program. 206296-0290 TTY Relay: 711. Available: <http://dnr.metrokc.gov/wlr/LANDS/Weeds/impatiens.htm> [November 2, 2004].

2.2. Innate potential for long-distance dispersal (bird dispersal, sticks to animal hair, buoyant fruits, wind-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
- U. Unknown

Score 3

Documentation:

Identify dispersal mechanisms:

Seeds can be transported long distance by both water and small mammals (Beerling and Perrins 1993, King County 2004). The rate of spread in the U.K. was estimated as 2-5 km per year (Beerling and Perrins 1993).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

King County. 2004. Policemen’s helmet *Impatiens glandulifera*. Department of Natural Resources and Parks, Water, and Land Resources Division Noxious Weed Control Program. 206296-0290 TTY Relay: 711. Available: <http://dnr.metrokc.gov/wlr/LANDS/Weeds/impatiens.htm> [November 2, 2004].

2.3. Potential to be spread by human activities (both directly and indirectly – possible mechanisms include: commercial sales, use as forage/revegetation, spread along highways, transport on boats, contamination, etc.)

- A. Does not occur 0
- B. Low (human dispersal is infrequent or inefficient) 1
- C. Moderate (human dispersal occurs) 2
- D. High (there are numerous opportunities for dispersal to new areas) 3
- U. Unknown

Score 3

Documentation:

Identify dispersal mechanisms:

Ornamental jewelweed is a garden plant. It has been escaped cultivation. It is frequently sold at nurseries (King County 2004), and commonly planted in southern

Alaska.

Rational:

Sources of information:

King County. 2004. Policemen's helmet *Impatiens glandulifera*. Department of Natural Resources and Parks, Water, and Land Resources Division Noxious Weed Control Program. 206296-0290 TTY Relay: 711. Available: <http://dnr.metrokc.gov/wlr/LANDS/Weeds/impatiens.htm> [November 2, 2004].

2.4. Allelopathic

- A. No 0
- B. Yes 2
- U. Unknown

Score

Documentation:

Describe effect on adjacent plants:

There is no record of allelopathy.

Rational:

Sources of information:

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 nitrogen fixing ability 3
- U. Unknown

Score

Documentation:

Evidence of competitive ability:

This species is an aggressive competitor, overtopping and suppressing the growth of neighboring species (Beerling and Perrins 1993).

Rational:

Impatiens glandulifera tolerates of many types of soil, it occurs on fine and coarse alluvium, maritime shingle, free-draining mineral soils and peats. It can grow in full sun as well as partial shade. It has been found along industrial rivers, suggesting it is tolerant or resistant to aquatic and/or atmospheric pollution (Beerling and Perrins 1993, King County 2004).

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

King County. 2004. Policemen's helmet *Impatiens glandulifera*. Department of Natural Resources and Parks, Water, and Land Resources Division Noxious Weed Control Program. 206296-0290 TTY Relay: 711. Available: <http://dnr.metrokc.gov/wlr/LANDS/Weeds/impatiens.htm> [November 2, 2004].

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

- A. No 0
- B. Forms dense thickets 1
- C. Has climbing or smothering growth habit, or otherwise taller than the surrounding vegetation 2
- U. Unknown

Score

Documentation:

Describe grow form:

It creates dense thickets up to ten feet tall and it is normally taller than surrounding

herbaceous vegetation (Beerling and Perrins 1988).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

2.7. Germination requirements

- A. Requires open soil and disturbance to germinate 0
- B. Can germinate in vegetated areas but in a narrow range or in special conditions 2
- C. Can germinate in existing vegetation in a wide range of conditions 3
- U. Unknown

Score 2

Documentation:

Describe germination requirements:

This plant requires open soil to germinate and establish (Beerling and Perrins 1993). It will also germinate in tidal wrack (M. Shephard – pers. obs.).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

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.

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

- A. No 0
- B. Yes 3
- U. Unknown

Score 3

Documentation:

Species:

Impatiens walleriana Hook. f. is considered an invasive in Hawaii (USDA 2002). *Impatiens parviflora* DC. is an Asiatic species invasive in northern Europe (Lid and Lid 1994)

Sources of information:

USDA (United States Department of Agriculture), NRCS (Natural Resource Conservation Service). 2002. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Lid, J. and D. T. Lid. 1994. Flora of Norway. The Norske Samlaget, Oslo. Pp. 1014.

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
- U. Unknown

Score 3

Documentation:

Describe type of habitat:

Jewelweed is found in riparian areas, streamsides, lowlands, wet meadows and forests, and roadside ditches. It is planted in gardens and parks (Beerling and Perrins 1993, King County 2004).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

King County. 2004. Policemen's helmet *Impatiens glandulifera*. Department of Natural Resources and Parks, Water, and Land Resources Division Noxious Weed Control Program. 206296-0290 TTY Relay: 711. Available: <http://dnr.metrokc.gov/wlr/LANDS/Weeds/impatiens.htm> [November 2, 2004].

Total Possible	23
Total	22

3. DISTRIBUTION

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

- A. No 0
- B. Is occasionally an agricultural pest 2
- C. Has been grown deliberately, bred, or is known as a significant agricultural pest 4
- U. Unknown

Score

4

Documentation:

Identify reason for selection, or evidence of weedy history:

Ornamental jewelweed is known as 'one of the many desirable hardy plants' for use in flower gardens (Beerling and Perrins 1993).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

3.2. Known level of impact in natural areas

- A. Not known to cause impact in any other natural area 0
- B. Known to cause impacts in natural areas, but in dissimilar habitats and climate zones than exist in regions of Alaska 1
- C. Known to cause low impact in natural areas in similar habitats and climate zones to those present in Alaska 3
- D. Known to cause moderate impact in natural areas in similar habitat and climate zones 4
- E. Known to cause high impact in natural areas in similar habitat and climate zones 6
- U. Unknown

Score

6

Documentation:

Identify type of habitat and states or provinces where it occurs:

Ornamental jewelweed is an aggressive invader of wetlands and streams in Washington state. It has been recorded displacing native plants and altering wildlife habitats (King County 2004, Pojar and MacKinnon 1994). In Great Britain ornamental jewelweed invades river bars, grasslands, and mixed woodland in the early stages of succession. It is considered extremely invasive to moist natural areas and listed in the "top 20" aliens in Great Britain (Beerling and Perrins 1993).

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

King County. 2004. Policemen's helmet *Impatiens glandulifera*. Department of Natural Resources and Parks, Water, and Land Resources Division Noxious Weed Control Program. 206296-0290 TTY Relay: 711. Available: <http://dnr.metrokc.gov/wlr/LANDS/Weeds/impatiens.htm> [November 2, 2004].

Pojar, J., and A. MacKinnon. 1994. Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia, and Alaska. B.C. Ministry of Forests

and Lone Pine Publishing. Redmond, Washington. 527 pp.

3.3. Role of anthropogenic and natural disturbance in establishment

- A. Requires anthropogenic disturbances to establish 0
- B. May occasionally establish in undisturbed areas but can readily establish in areas with natural disturbances 3
- C. Can establish independent of any known natural or anthropogenic disturbances 5
- U. Unknown

Score

3

Documentation:

Identify type of disturbance:

For successful establishment this plant requires a moderate amount of disturbance and bare ground. It can establish on areas locally disturbed by uprooted trees or fallen branches e.g. (Beerling and Perrins 1993).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

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
- U. Unknown

Score

5

Documentation:

Describe distribution:

Native to the western Himalayas, ornamental jewelweed is now naturalized in 31 countries. It is widespread in Europe, North America and Asia between the latitudes of 30° and 64° N (Beerling and Perrins 1993, Prots and Klotz 2004).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

Prots, B. and S. Klotz. 2004. The invasion ecology of Himalayan Balsam (*Impatiens glandulifera* Royle). UFZ Centre for Environmental Research. Leipzig.

Available: <http://www.hdg.ufz.de/index.php?en=1094> [November 2, 2004].

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

- A. 0-5% of the states 0
- B. 6-20% of the states 2
- C. 21-50%, and/or state listed as a problem weed (e.g., “Noxious,” or “Invasive”) in 1 state or Canadian province 4
- D. Greater than 50%, and/or identified as “Noxious” in 2 or more states or Canadian provinces 5
- U. Unknown

Score

4

Documentation:

Identify states invaded:

Ornamental jewelweed has been recorded in California, Maine, Massachusetts, Michigan, New York, Oregon, Vermont, Washington, and British Columbia (Hitchcock and Cronquist 1973, USDA 2002). Currently, it is rapidly expanding its range in North America (Prots and Klotz 2004). It is considered to be noxious in Washington (Invaders Database System 2003, USDA 2002).

Rational:

Sources of information:

Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest An illustrated manual. University of Washington Press. Seattle and London. 730 pp.
Invaders Database System. The University of Montana. 2003. Montana Noxious Weed Trust Fund. Department of Agricultural. <http://invader.dbs.umt.edu/>
Prots, B. and S. Klotz. 2004. The invasion ecology of Himalayan Balsam (*Impatiens glandulifera* Royle). UFZ Centre for Environmental Research. Leipzig.
Available: <http://www.hdg.ufz.de/index.php?en=1094> [November 2, 2004].
USDA (United States Department of Agriculture), NRCS (Natural Resource Conservation Service). 2002. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Total Possible	25
Total	22

4. FEASIBILITY OF CONTROL

4.1. Seed banks

- A. Seeds remain viable in the soil for less than 3 years 0
- B. Seeds remain viable in the soil for between 3 and 5 years 2
- C. Seeds remain viable in the soil for 5 years and more 3
- U. Unknown

Score

2

Documentation:

Identify longevity of seed bank:

Seeds were viable for at least 18 months in one field experiment and 3 years in another experiment (Beerling and Perrins 1993, King County 2004, Mumford 1988).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

King County. 2004. Policemen's helmet *Impatiens glandulifera*. Department of Natural Resources and Parks, Water, and Land Resources Division Noxious Weed Control Program. 206296-0290 TTY Relay: 711. Available: <http://dnr.metrokc.gov/wlr/LANDS/Weeds/impatiens.htm> [November 2, 2004].

Mumford, P.M. 1988. Alleviation and induction of dormancy by temperature in *Impatiens glandulifera* Royle. Now Phytologist, 109:107-110.

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
- U. Unknown

Score

2

Documentation:

Describe vegetative response:

Impatiens glandulifera may resprout after mowing (Beerling and Perrins 1993).

Rational:

Sources of information:

Beerling, D.J. and J.M. Perrins. 1993. Biological Flora of the British Isles. *Impatiens glandulifera* Royle (*Impatiens roylei* Walp). Journal of Ecology. Vol 81 (2): 367-382.

4.3. Level of effort required

- A. Management is not required (e.g., species does not persist without repeated anthropogenic disturbance) 0
- B. Management is relatively easy and inexpensive; requires a minor investment in human and financial resources 2
- C. Management requires a major short-term investment of human and financial resources, or a moderate long-term investment 3
- D. Management requires a major, long-term investment of human and financial resources 4
- U. Unknown

Score

3

Documentation:

Identify types of control methods and time-term required:

Small population can be hand-pulled or dug up. Sites need to be monitored following years for new seedlings from the seed bank. Mowing is very effective and reduces the risk of erosion compared to hand-pulling. However, mowed or cut plants may re-sprout later in the season. Only specific herbicides can be used in wetlands. No biological control agents have been identified (Beerling and Perrins 1993, King County 2004).

Rational:

Sources of information:

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Total Possible

10

Total

7

Total for 4 sections Possible

98

Total for 4 sections

78

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