



Monitoring Problematic Plants in Herbert Hoover National Historical Park - 2013

The National Park Service's management policies distinguish between native and exotic (i.e., non-native) plant species (NPS 2006). Exotic plant species are typically characterized by their introduction due to human actions, whether intentional or not. Invasive plants, following the definition used in Executive Order 13112, are those plants that are exotic and cause ecological or economic harm. Finally, pest plants are defined less by their biology and more by their context in the same way that the term "weed" is defined (NPS 2006). Pest plants, which include native species, interfere with a specific management objective, including protecting human health. We refer to the collection of exotic, invasive, and pest plants as "potentially problematic".

Park managers, however, are only required to control any problematic plant that leads to "resource impairment". For plant populations causing effects that fall short of the impairment threshold, park managers wield a high level of discretion in judging whether the population should be controlled or not. The standard for making this decision rests on five criteria: the origin of the species, prudence, feasibility, the harm (i.e., impact) that the plant causes to park resources, and the harm that removal causes (NPS 2006). As with impairment determinations, these decisions are based on professional judgment, environmental assessment, consultation with regulating agencies, evidence-based scholarship, subject matter expertise, and civic engagement with the public (NPS 2006).

Methods:

For details on the survey, see Young et al. (2007a).

- In 2006, 2009, and 2013, we sought plant species on two watch lists: early detection and park-established.
- Observers used handheld GPS units to make three approximately equidistant passes through each search unit (Figure 1).
- During each pass, observers estimated plant cover in a belt at least 3 m-wide, but used a larger belt width if conditions allowed. In 2006, the widest belt possible was observed. In 2009 and 2013, this maximum distance was capped at 12 m.
- Coarse cover values (0=0, 1=0.1-0.9 m², 2=1-9.9 m², 3=10-49.9 m², 4= 50-99.9 m², 5=100-499.9 m², 6= 500-999.9 m², 7= 1,000-4,999 m²) were attributed to each species per search unit.
- To calculate the minimum end of the estimated cover range for each species, the lower endpoints associated with the assigned cover class values for that species were summed and then divided by the reference frame fraction observed assuming the widest possible survey belt (i.e., maximum fraction observed).

- Maximum cover for each species was calculated similarly, using the upper endpoints of the cover values in each occupied search unit and assuming that a 3-m belt was surveyed (i.e., minimum fraction of area observed).
- To provide additional information on the ecological impact and feasibility of control, the ecological impact and general management difficulty sub-ranks that constitute the invasiveness rank (I-rank), as determined by NatureServe (Morse et al. 2004), were listed when available.

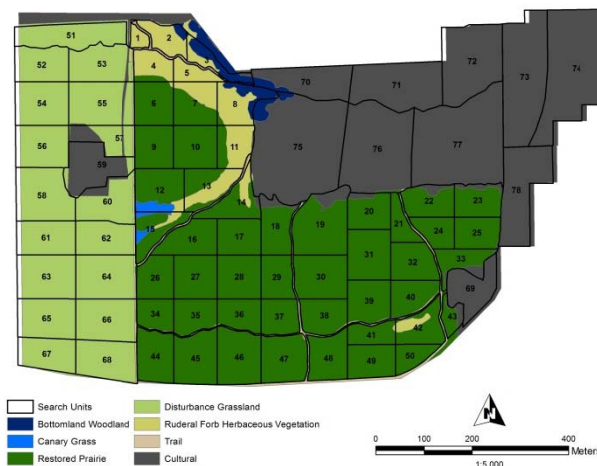


Figure 1. Vegetation cover (Diamond et al. 2014) and search units for invasive plant monitoring at Herbert Hoover National Historical Site.

Summary of Findings:

Two tables summarize the results of this study. Table 1 summarizes frequency and abundance estimates during 2006, 2009, and 2013. Observations are summarized with respect to data quality. In Table 2, we group our observations according to current or recommended management actions. These management recommendations are judgments based on our experience controlling problematic plants and are not binding on park staff.

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Supporting Literature:

- Diamond, D. D., L. F. Elliott, M. D. DeBacker, K. M. James, D. L. Pursell, and A. Struckhoff. 2014. Vegetation mapping and classification of Herbert Hoover National Historic Site, Iowa: Project review. Natural Resource Report NPS/HEHO/NRR—2014/794. National Park Service, Fort Collins, Colorado.
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- National Park Service. 2006. Management Policies. Unpublished document. Online. <<http://www.nps.gov/policy/mp2006.pdf>>. Accessed 22 January 2014.
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- Young, C.C., J. L. Haack, L. W. Morrison, and M. D. DeBacker. 2007a. Invasive exotic plant monitoring protocol for the Heartland Inventory and Monitoring Program. Natural Resource Report NPS/HTLN/NRR-2007/018. National Park Service, Fort Collins, Colorado.
- Young, C. C., J. T. Cribbs, J. L. Haack, K. E. Mlekush, and H. J. Etheridge. 2007b. Invasive exotic plant monitoring at Herbert Hoover National Historic Site: Year 1 (2006). Natural Resource Technical Report NPS/HTLN/NRTR—2007/018. National Park Service, Fort Collins, Colorado.
- Young, C. C., M. F. Short, L. W. Morrison, C. S. Gross, and J. L. Haack. 2010. Invasive exotic plant monitoring at Herbert Hoover National Historic Site: Year 2 (2010). Natural Resource Technical Report NPS/HTLN/NRTR—2010/289. National Park Service, Fort Collins, Colorado.

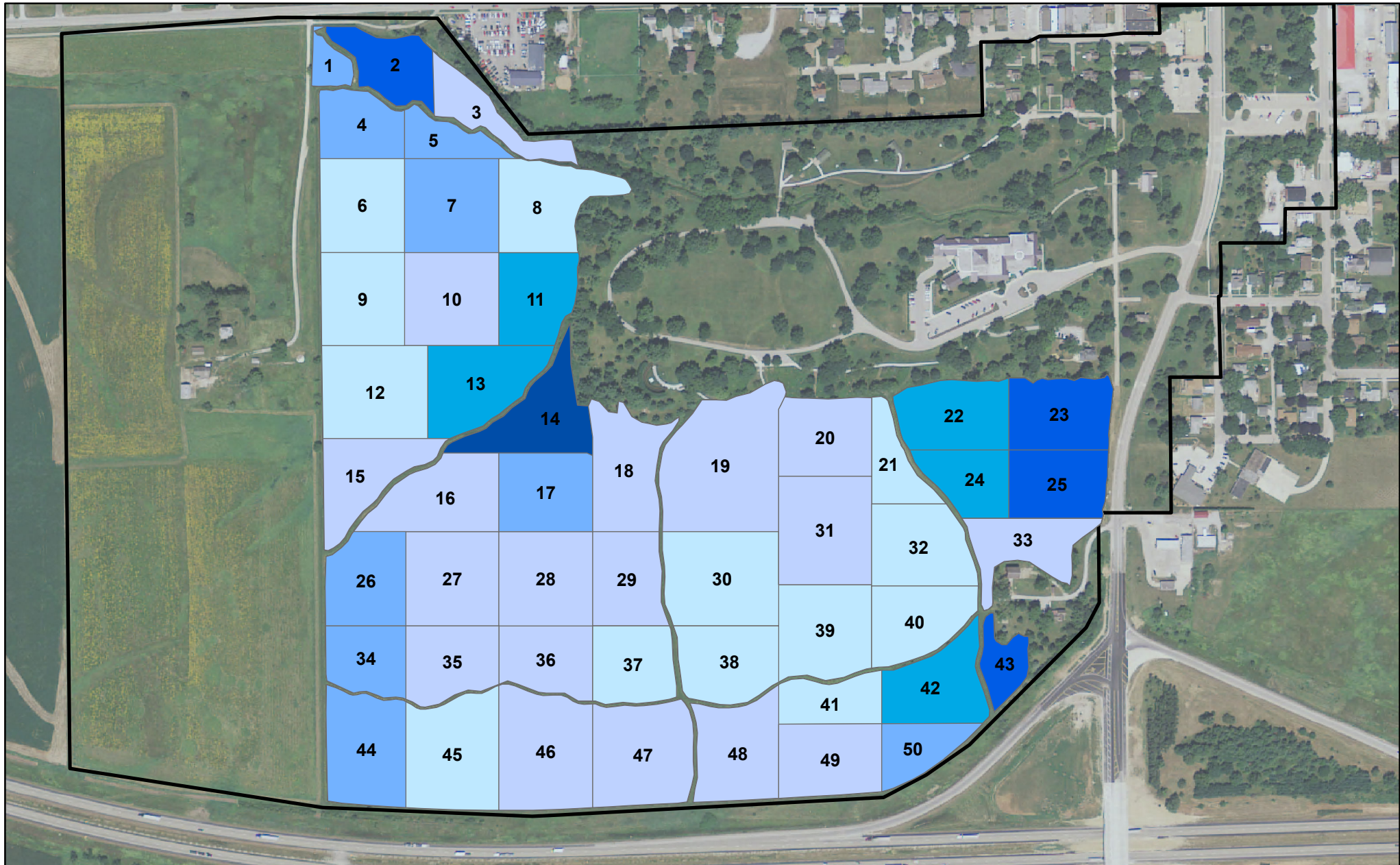
Table 1. Overview of problematic plants found in Herbert Hoover National Historical Site. The first 20 species in the list include no obvious data quality deficiencies. Ecological impact and general management difficulty based on NatureServe I-Rank subranks (Morse et al. 2004). Subranks are given as high (H), medium (M), low (L), insignificant (I), unknown (U), a range of ranks (indicated by /), not available (--), or native.

Scientific Name	Common Name	Watch List	2006 Park-wide Acres (Freq.)	2009 Park-wide Acres (Freq.)	2013 Park-wide Acres (Freq.)	Ecological Impact	Management Difficulty
<i>Melilotus officinalis</i>	sweetclover	Park established	6.8 – 140.1 (84)	0.8 – 13.4 (88)	0.1 – 1.8 (64)	M	M
<i>Phalaris arundinacea</i>	reed canarygrass	Park established	1.9 – 33.5 (50)	1.3 – 28.4 (48)	0.9 – 14.9 (66)	H	HM
<i>Bromus inermis</i>	smooth brome	Park established	0.7 – 9.4 (80)	1.4 – 18.1 (48)	1.3 – 20.2 (82)	M	ML
<i>Lonicera spp. (bush)</i>	bush honeysuckle	Park established	0.2 – 2.6 (70)	0.4 – 8.1 (74)	0.02 – 0.7 (60)	--	--
<i>Morus alba</i>	white mulberry	Park established	0.1 – 2.3 (68)	0.1 – 2.3 (64)	0.03 – 0.8 (46)	ML	ML
<i>Pastinaca sativa</i>	wild parsnip	Park established	0.1 – 1.9 (70)	0.3 – 4.3 (66)	0.09 – 2.4 (70)	LI	L
<i>Ulmus pumila</i>	Siberian elm	Park established	0.07 – 0.8 (18)	0.03 – 0.4 (12)	0.002 – 0.1 (12)	ML	ML
<i>Lotus corniculatus</i>	bird's-foot trefoil	Park established	0.04 – 0.5 (10)	0.001 – 0.05 (4)	0.07 – 1.5 (6)	ML	ML
<i>Cirsium arvense</i>	Canada thistle	Park established	0.01 – 0.3 (18)	0.02 – 0.4 (10)	0.001 – 0.04 (6)	ML	HM
<i>Sonchus arvensis</i>	field sowthistle	Park established	0.01 – 0.3 (8)	0.0003 – 0.01 (12)	0.0001 – 0.002 (2)	LI	HL
<i>Glechoma hederacea</i>	ground ivy	Park established	0.007 – 0.2 (12)	0.01 – 0.3 (8)	0.007 – 0.2 (10)	MI	U
<i>Cirsium vulgare</i>	bull thistle	Park established	0.006 – 0.2 (12)	0.006 – 0.1 (4)	0.001 – 0.05 (8)	ML	ML
<i>Verbascum thapsus</i>	common mullein	Park established	0.002 – 0.08 (14)	0.0001 – 0.002 (2)	0.001 – 0.05 (6)	ML	L
<i>Rosa multiflora</i>	multiflora rose	Park established	0.002 – 0.06 (18)	0.003 – 0.1 (16)	0.001 – 0.05 (6)	L	L
<i>Daucus carota</i>	Queen Anne's lace	Park established	0.001 – 0.05 (6)	0.06 – 0.9 (22)	0.02 – 0.5 (70)	I	I
<i>Securigera varia</i>	crownvetch	Park established	0.0006 – 0.02 (2)	0.03 – 0.2 (2)	0.001 – 0.05 (4)	H	L
<i>Carduus nutans</i>	nodding plumeless thistle	Park established	0.0006 – 0.02 (2)	0 (0)	0 (0)	MI	HM
<i>Dactylis glomerata</i>	orchardgrass	Park established	0.0003 – 0.01 (12)	0 (0)	0.0007 – 0.03 (6)	LI	ML
<i>Rhamnus cathartica</i>	common buckthorn	Park established	0.0001 – 0.002 (2)	0 (0)	0.0007 – 0.03 (8)	M	M
<i>Arctium minus</i>	lesser burdock	Park established	0 (0)	0.06 – 1.3 (6)	0.006 – 0.1 (4)	LI	MI
<u>Species likely affected by taxonomic issues</u>							
<i>Poa</i> spp.	Bluegrass	Park established	0.04 – 1.2 (90)	0.01 – 0.4 (14)	0.2 – 3.7 (92)	--	--
<i>Poa pratensis</i>	Kentucky bluegrass	Park established	0 (0)	0.2 – 2.9 (68)	0 (0)	M	ML
<i>Elaeagnus</i> spp.	oleaster	Park established	0.02 – 0.6 (36)	0 (0)	0.02 – 0.5 (34)	H	H
<i>Elaeagnus umbellata</i>	autumn olive	Park established	0 (0)	0.06 – 1.3 (28)	0 (0)	H	L
<u>Species likely affected by identification issues</u>							
<i>Schedonorus phoenix</i>	tall fescue	Park established	0 (0)	0 (0)	0.003 – 0.1 (30)	M	HM
<u>Species searched for in 2013 only</u>							
<i>Rumex crispus</i>	curly dock	Park established	0 (0)	0 (0)	0.0003 – 0.01 (12)	--	--
<i>Rhus glabra</i>	smooth sumac	[Native]	0 (0)	0 (0)	0.002 – 0.07 (22)	Native	Native

Table 2. Categorization of problematic plants found in Herbert Hoover National Historic Site and categorized as to the action that is currently occurring or needed to manage these species. Ecological impact and general management difficulty based on NatureServe I-Rank subranks (Morse et al. 2004). Subranks are given as high (H), medium (M), low (L), insignificant (I), unknown (U), a range of ranks (indicated by /), not available (--), or native.

Scientific Name	Common Name	Watch List	2006 Park-wide cover (acres)	2009 Park-wide cover (acres)	2013 Park-wide cover (acres)	Ecological Impact	Management Difficulty
<u>Prairie plants (woody) under management</u>							
<i>Lonicera</i> spp. (bush)	bush honeysuckle	Park established	0.2 – 2.6 (70)	0.4 – 8.1 (74)	0.02 – 0.7 (60)	--	--
<i>Morus alba</i>	white mulberry	Park established	0.1 – 2.3 (68)	0.1 – 2.3 (64)	0.03 – 0.8 (46)	ML	ML
<i>Ulmus pumila</i>	Siberian elm	Park established	0.07 – 0.8 (18)	0.03 – 0.4 (12)	0.002 – 0.1 (12)	ML	ML
<i>Elaeagnus</i> spp.	oleaster	Park established	0.02 – 0.6 (36)	0 (0)	0.02 – 0.5 (34)	H	H
<i>Rosa multiflora</i>	multiflora rose	Park established	0.002 – 0.06 (18)	0.003 – 0.1 (16)	0.001 – 0.05 (6)	L	L
<i>Rhamnus cathartica</i>	common buckthorn	Park established	0.0001 – 0.002 (2)	0 (0)	0.0007 – 0.03 (8)	M	M
<i>Elaeagnus umbellata</i>	autumn olive	Park established	0 (0)	0.06 – 1.3 (28)	0 (0)	H	L
<i>Rhus glabra</i>	smooth sumac	[Native]	0 (0)	0 (0)	0.002 – 0.07 (22)	Native	Native
<u>Prairie plants (herbaceous) under management</u>							
<i>Melilotus officinalis</i>	sweetclover	Park established	6.8 – 140.1 (84)	0.8 – 13.4 (88)	0.1 – 1.8 (64)	M	M
<i>Lotus corniculatus</i>	bird's-foot trefoil	Park established	0.04 – 0.5 (10)	0.001 – 0.05 (4)	0.07 – 1.5 (6)	ML	ML
<i>Cirsium arvense</i>	Canada thistle	Park established	0.01 – 0.3 (18)	0.02 – 0.4 (10)	0.001 – 0.04 (6)	ML	HM
<i>Cirsium vulgare</i>	bull thistle	Park established	0.006 – 0.2 (12)	0.006 – 0.1 (4)	0.001 – 0.05 (8)	ML	ML
<i>Securigera varia</i>	crownvetch	Park established	0.0006 – 0.02 (2)	0.03 – 0.2 (2)	0.001 – 0.05 (4)	H	L
<i>Carduus nutans</i>	nodding plumeless thistle	Park established	0.0006 – 0.02 (2)	0 (0)	0 (0)	MI	HM
<u>Cool-season grasses which require further evaluation of control options</u>							
<i>Bromus inermis</i>	smooth brome	Park established	0.7 – 9.4 (80)	1.4 – 18.1 (48)	1.3 – 20.2 (82)	M	ML
<i>Poa</i> spp.	Bluegrass	Park established	0.04 – 1.2 (90)	0.01 – 0.4 (14)	0.2 – 3.7 (92)	--	--
<i>Pastinaca sativa</i>	wild parsnip	Park established	0.1 – 1.9 (70)	0.3 – 4.3 (66)	0.09 – 2.4 (70)	LI	L
<i>Poa pratensis</i>	Kentucky bluegrass	Park established	0 (0)	0.2 – 2.9 (68)	0 (0)	M	ML
<i>Schedonorus phoenix</i>	tall fescue	Park established	0 (0)	0 (0)	0.003 – 0.1 (30)	M	HM
<u>Plant species without immediate management requirements</u>							
<i>Pastinaca sativa</i>	wild parsnip	Park established	0.1 – 1.9 (70)	0.3 – 4.3 (66)	0.09 – 2.4 (70)	LI	L
<i>Sonchus arvensis</i>	field sowthistle	Park established	0.01 – 0.3 (8)	0.0003 – 0.01 (12)	0.0001 – 0.002 (2)	LI	HL
<i>Glechoma hederacea</i>	ground ivy	Park established	0.007 – 0.2 (12)	0.01 – 0.3 (8)	0.007 – 0.2 (10)	MI	U
<i>Verbascum thapsus</i>	common mullein	Park established	0.002 – 0.08 (14)	0.0001 – 0.002 (2)	0.001 – 0.05 (6)	ML	L
<i>Daucus carota</i>	Queen Anne's lace	Park established	0.001 – 0.05 (6)	0.06 – 0.9 (22)	0.02 – 0.5 (70)	I	I
<i>Dactylis glomerata</i>	orchardgrass	Park established	0.0003 – 0.01 (12)	0 (0)	0.0007 – 0.03 (6)	LI	ML
<i>Arctium minus</i>	lesser burdock	Park established	0 (0)	0.06 – 1.3 (6)	0.006 – 0.1 (4)	LI	MI
<i>Rumex crispus</i>	curly dock	Park established	0 (0)	0 (0)	0.0003 – 0.01 (12)	--	--

Herbert Hoover NHS Problematic Plant Monitoring



CoverClass



Search Units Park Boundary

