

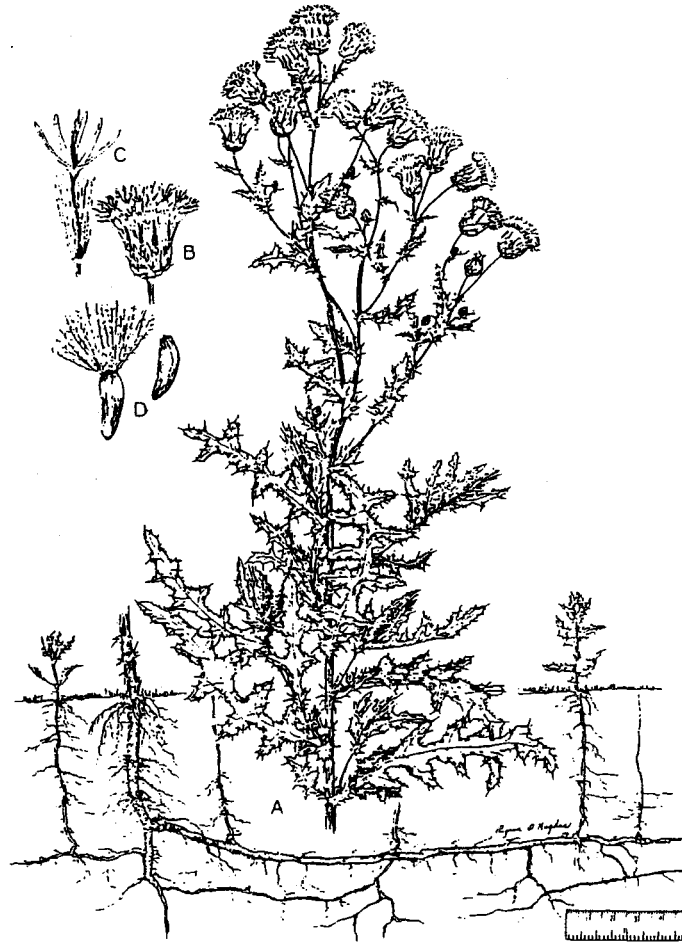
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# NATIONAL PARK SERVICE

## RESEARCH/RESOURCES MANAGEMENT REPORT MWR-6

### Problem Exotic Plants in Selected Parks of the Midwest Region and a Bibliography on their Management



Canada thistle (*Cirsium arvense* (L.) Scop.),  
a problem exotic plant in Midwest Region parks



United States Department of the Interior

National Park Service  
Midwest Region

ISRO  
(1)

PROBLEM EXOTIC PLANTS IN SELECTED PARKS OF THE MIDWEST REGION  
AND A BIBLIOGRAPHY ON THEIR MANAGEMENT

by Karen E. Pestana

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NATIONAL PARK SERVICE - Midwest Region  
Research/Resources Management Report MWR-6

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Table 1. Numbers of native and exotic plant species in selected Midwest Region parks and percentage of exotics in each park.

| PARK* | TOTAL TAXA | NATIVE TAXA | EXOTIC TAXA | % EXOTIC |
|-------|------------|-------------|-------------|----------|
| MOCI  | 78         | 50          | 28          | 36       |
| WICR  | 283        | 209         | 74          | 26       |
| FOLS  | 206        | 158         | 48          | 23       |
| SLBE  | 478        | 368         | 110         | 23       |
| HOME  | 171        | 134         | 37          | 22       |
| GWCA  | 581        | 472         | 109         | 19       |
| EFMO  | 357        | 297         | 60          | 17       |
| PIPE  | 447        | 374         | 73          | 16       |
| GRPO  | 82         | 70          | 12          | 15       |
| APIS  | 510        | 440         | 70          | 14       |
| INDU  | 1164       | 1003        | 161         | 14       |
| ISRO  | 700        | 611         | 89          | 13       |
| AGFO  | 113        | 100         | 13          | 12       |
| SACN  | 428        | 378         | 50          | 12       |
| SCBL  | 74         | 64          | 10          | 12       |
| CUVA  | 944        | 844         | 100         | 11       |
| OZAR  | 675        | 604         | 71          | 11       |
| PIRO  | 574        | 510         | 64          | 11       |
| VOYA  | 603        | 559         | 44          | 7        |

note: Floristic data was taken from current plant checklists listed in Appendix II.

\* - see Appendix I for definitions of the park codes (page 25).

Table 2. The most pervasive and troublesome exotic plant species in Midwest Region park units.

| SPECIES  | COMMON NAME         | #PARKS | AREA OF CONCERN        |
|--|---------------------|--------|------------------------|
| 1) EXOTIC SPECIES OCCURRING IN 10 OR MORE PARKS: |                     |        |                        |
| <u>Bromus inermis</u>                            | smooth brome        | 10 *   | HOME                   |
| <u>Cirsium arvense</u>                           | Canada thistle      | 10 *   | CUVA; PIPE; SCBL       |
| <u>Cirsium vulgare</u>                           | bull thistle        | 11     | CUVA; GWCA; PIRO; WICR |
| <u>Melilotus alba</u>                            | white sweet clover  | 16 *   | PIPE                   |
| <u>Melilotus officinalis</u>                     | yellow sweet clover | 15 *   | PIPE                   |
| <u>Poa compressa</u>                             | Canada bluegrass    | 10 *   | GWCA                   |
| <u>Verbascum thapsus</u>                         | common mullein      | 15 *   | HOME                   |

2) OTHER PROBLEM EXOTICS

|                             |                      |     |                  |
|-----------------------------|----------------------|-----|------------------|
| <u>Carduus nutans</u>       | musk thistle         | 4 * | HOME; SCBL; WICR |
| <u>Convolvulus arvensis</u> | field bindweed       | 9   | GWCA; SCBL       |
| <u>Daucus carota</u>        | Queen Anne's lace    | 9 * | GWCA             |
| <u>Euphorbia esula</u>      | leafy spurge         | 2 * | PIPE             |
| <u>Lonicera japonica</u>    | Japanese honeysuckle | 4 * | MOCI; PIPE       |
| <u>Lythrum salicaria</u>    | purple loosestrife   | 2 * | INDU             |
| <u>Rosa multiflora</u>      | multiflora rose      | 6 * | GWCA; INDU       |
| <u>Vinca minor</u>          | common periwinkle    | 6 * | PIRO             |

\* - Major pest species identified by the participants in the Tenth Midwest Natural Areas Workshop held in October 1983.

Table 3. The occurrence of the most pervasive and troublesome exotic plant species.

| SPECIES   | PARK |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|   | AGFO | APIS | CUVA | EFMO | FOLS | GRPO | GWCA | HOME | INDU | ISRO | MOCI | OZAR | PIPE | PIRO | SACN | SCBL | SLBE | VOYA | WICR |
| <i>Bromus inermis</i><br>(smooth brome)               |      |      |      | X    | X    |      |      | X    | X    | X    |      |      | X    | X    |      | X    | X    | X    |      |
| <i>Carduus nutans</i><br>(musk thistle)               |      |      |      |      | X    |      |      | X    |      |      |      |      |      |      |      | X    |      |      | X    |
| <i>Cirsium arvense</i><br>(Canada thistle)            |      | X    | X    | X    |      |      |      |      | X    | X    |      |      | X    | X    |      | X    | X    | X    |      |
| <i>Cirsium vulgare</i><br>(bull thistle)              |      | X    | X    |      |      |      | X    |      | X    | X    | X    |      | X    | X    |      |      | X    | X    | X    |
| <i>Convolvulus arvensis</i><br>(field bindweed)       |      |      | X    |      | X    |      | X    | X    | X    |      | X    |      |      |      |      | X    | X    |      | X    |
| <i>Daucus carota</i><br>(Queen Anne's lace)           |      |      | X    | X    |      |      | X    |      | X    |      | X    | X    |      | X    |      |      | X    |      | X    |
| <i>Euphorbia esula</i><br>(leafy spurge)              |      |      |      |      |      |      |      |      |      |      |      |      | X    |      |      | X    |      |      |      |
| <i>Lonicera japonica</i><br>(Japanese honeysuckle)    |      |      | X    |      |      |      | X    |      |      |      | X    |      | X    |      |      |      |      |      |      |
| <i>Lythrum salicaria</i><br>(purple loosestrife)      |      |      | X    |      |      |      |      |      | X    |      |      |      |      |      |      |      |      |      |      |
| <i>Melilotus alba</i><br>(white sweet clover)         | X    | X    | X    | X    | X    |      | X    | X    | X    | X    | X    | X    | X    | X    |      |      | X    | X    | X    |
| <i>Melilotus officinalis</i><br>(yellow sweet clover) | X    |      | X    | X    | X    |      | X    | X    | X    | X    | X    | X    | X    | X    |      | X    | X    |      | X    |
| <i>Poa compressa</i><br>(Canada bluegrass)            |      | X    | X    |      |      |      | X    |      | X    | X    |      |      | X    | X    |      | X    | X    | X    |      |
| <i>Rosa multiflora</i><br>(multiflora rose)           |      |      | X    |      |      |      | X    |      | X    |      |      | X    |      |      | X    |      |      |      | X    |
| <i>Verbascum thapsus</i><br>(common mullein)          |      | X    | X    | X    |      |      | X    | X    | X    | X    | X    | X    | X    | X    | X    |      | X    | X    | X    |
| <i>Vinca minor</i><br>(common periwinkle)             |      | X    | X    | X    |      |      |      |      | X    |      |      |      |      | X    |      |      | X    |      |      |
| TOTAL:  | 2    | 6    | 12   | 7    | 5    | 0    | 9    | 6    | 12   | 7    | 7    | 5    | 8    | 9    | 2    | 7    | 10   | 6    | 8    |

Table 4. Current management techniques for Bromus inermis and Cirsium arvense.

Bromus inermis - smooth brome

| PARK | MANAGEMENT TECHNIQUE |                    |                    |                   |            |
|------|----------------------|--------------------|--------------------|-------------------|------------|
|      | HERBICIDES           | CUTTING/<br>MOWING | PRESCRIBED<br>BURN | MANUAL<br>REMOVAL | BIOLOGICAL |
| EFMO |                      |                    |                    |                   |            |
| FOLS | 1                    |                    |                    |                   |            |
| HOME |                      |                    |                    | X                 |            |
| INDU |                      |                    |                    |                   |            |
| ISRO |                      |                    |                    |                   |            |
| PIPE |                      |                    | X                  |                   |            |
| PIRO |                      |                    |                    |                   |            |
| SCBL | 6                    |                    |                    |                   |            |
| SLBE |                      |                    |                    |                   |            |
| VOYA |                      |                    |                    |                   |            |

Cirsium arvense - Canada thistle

|      |   |   |   |  |  |
|------|---|---|---|--|--|
| APIS |   |   |   |  |  |
| CUVA | 7 |   |   |  |  |
| EFMO |   |   |   |  |  |
| INDU |   |   |   |  |  |
| ISRO |   |   |   |  |  |
| PIPE |   | X | X |  |  |
| PIRO |   | X |   |  |  |
| SCBL | 6 |   |   |  |  |
| SLBE |   |   |   |  |  |
| VOYA |   |   |   |  |  |

HERBICIDES: 1) AAtrex 4L; 6) Dacamine 4-D; 7) Lo V Ester 33 Weed Killer

Table 5. Current management techniques for Cirsium vulgare and Melilotus alba.

Cirsium vulgare - bull thistle

| PARK | MANAGEMENT TECHNIQUE |                    |                    |                   |            |
|------|----------------------|--------------------|--------------------|-------------------|------------|
|      | HERBICIDES           | CUTTING/<br>MOWING | PRESCRIBED<br>BURN | MANUAL<br>REMOVAL | BIOLOGICAL |
| APIS |                      |                    |                    |                   |            |
| CUVA | 7                    |                    |                    |                   |            |
| GWCA | 9                    | X                  |                    | X                 |            |
| INDU |                      |                    |                    |                   |            |
| ISRO |                      |                    |                    |                   |            |
| MOCI |                      |                    |                    |                   |            |
| PIPE |                      |                    | X                  |                   |            |
| PIRO |                      | X                  |                    |                   |            |
| SLBE |                      |                    |                    |                   |            |
| VOYA |                      |                    |                    |                   |            |
| WICR | 9                    |                    |                    |                   |            |

Melilotus alba - white sweet clover

|      |     |   |   |  |  |
|------|-----|---|---|--|--|
| AGFO |     |   |   |  |  |
| APIS |     |   |   |  |  |
| CUVA |     |   |   |  |  |
| EFMO |     |   |   |  |  |
| FOLS |     |   |   |  |  |
| GWCA |     |   |   |  |  |
| HOME |     |   |   |  |  |
| INDU |     |   |   |  |  |
| ISRO |     |   |   |  |  |
| MOCI |     |   |   |  |  |
| OZAR |     |   |   |  |  |
| PIPE |     | X | X |  |  |
| PIRO |     |   |   |  |  |
| SLBE | 10* |   |   |  |  |
| WICR |     |   |   |  |  |
| VOYA |     |   |   |  |  |

HERBICIDES: 7) Lo V Ester 33 Weed Killer; 9) Roundup (Monsanto);  
10) Clean Crop 4 power MCPP

\* - used on a limited area of lawn



Table 6. Current management techniques for Melilotus officinalis and Poa compressa.

Melilotus officinalis - yellow sweet clover

| PARK | MANAGEMENT TECHNIQUE |                    |                    |                   |            |
|------|----------------------|--------------------|--------------------|-------------------|------------|
|      | HERBICIDES           | CUTTING/<br>MOWING | PRESCRIBED<br>BURN | MANUAL<br>REMOVAL | BIOLOGICAL |
| AGFO |                      |                    |                    |                   |            |
| CUVA |                      |                    |                    |                   |            |
| EFMO |                      |                    |                    |                   |            |
| FOLS |                      |                    |                    |                   |            |
| GWCA |                      |                    |                    |                   |            |
| HOME |                      |                    |                    |                   |            |
| INDU |                      |                    |                    |                   |            |
| ISRO |                      |                    |                    |                   |            |
| MOCI |                      |                    |                    |                   |            |
| OZAR |                      |                    |                    |                   |            |
| PIPE |                      | X                  | X                  |                   |            |
| PIRO |                      |                    |                    |                   |            |
| SLBE |                      |                    |                    |                   |            |
| WICR |                      |                    |                    |                   |            |

Poa compressa - Canada bluegrass

|      |   |  |   |  |  |
|------|---|--|---|--|--|
| APIS |   |  |   |  |  |
| CUVA |   |  |   |  |  |
| GWCA | 9 |  |   |  |  |
| INDU |   |  |   |  |  |
| ISRO |   |  |   |  |  |
| PIPE |   |  | X |  |  |
| PIRO |   |  |   |  |  |
| SLBE |   |  |   |  |  |
| VOYA |   |  |   |  |  |

HERBICIDES: 9) Roundup (Monsanto)

Table 7. Current management techniques for Verbascum thapsus,  
Carduus nutans and Convolvulus arvensis.

Verbascum thapsus - common mullein

| PARK | MANAGEMENT TECHNIQUE |                    |                    |                   |            |
|------|----------------------|--------------------|--------------------|-------------------|------------|
|      | HERBICIDES           | CUTTING/<br>MOWING | PRESCRIBED<br>BURN | MANUAL<br>REMOVAL | BIOLOGICAL |
| APIS |                      |                    |                    |                   |            |
| CUVA |                      |                    |                    |                   |            |
| EFMO |                      |                    |                    |                   |            |
| GWCA |                      |                    |                    |                   |            |
| HOME |                      |                    |                    | X                 |            |
| INDU |                      |                    |                    |                   |            |
| ISRO |                      |                    |                    |                   |            |
| MOCI |                      |                    |                    |                   |            |
| OZAR |                      |                    |                    |                   |            |
| PIPE |                      |                    | X                  |                   |            |
| PIRO |                      |                    |                    |                   |            |
| SACN |                      |                    |                    |                   |            |
| SLBE |                      |                    |                    |                   |            |
| VOYA |                      |                    |                    |                   |            |
| WICR |                      |                    |                    |                   |            |

Carduus nutans - musk thistle

|      |   |   |  |   |  |
|------|---|---|--|---|--|
| FOLS | 2 |   |  | X |  |
| HOME |   | X |  |   |  |
| SCBL | 6 |   |  |   |  |
| WICR | 9 |   |  |   |  |

Convolvulus arvensis - field bindweed

|      |            |  |  |  |  |
|------|------------|--|--|--|--|
| CUVA |            |  |  |  |  |
| FOLS |            |  |  |  |  |
| GWCA | 2, 3, 5, 8 |  |  |  |  |
| HOME |            |  |  |  |  |
| INDU |            |  |  |  |  |
| MOCI |            |  |  |  |  |
| SCBL | 6          |  |  |  |  |
| SLBE |            |  |  |  |  |
| WICR |            |  |  |  |  |

HERBICIDES: 2) Amine 4-D; 3) 2-4,D Amine; 5) Banvel; 6) Dacamine  
4-D; 8) 4L Princep/Simazine; 9) Roundup (Monsanto)

Table 8. Current management for Daucus carota, Euphorbia esula, Lonicera japonica and Lythrum salicaria.

Daucus carota - Queen Anne's lace

| PARK | MANAGEMENT TECHNIQUE |                    |                    |                   |            |
|------|----------------------|--------------------|--------------------|-------------------|------------|
|      | HERBICIDES           | CUTTING/<br>MOWING | PRESCRIBED<br>BURN | MANUAL<br>REMOVAL | BIOLOGICAL |
| CUVA |                      |                    |                    |                   |            |
| EFMO |                      |                    |                    |                   |            |
| GWCA |                      |                    | X                  |                   |            |
| INDU |                      |                    |                    |                   |            |
| MOCI |                      |                    |                    |                   |            |
| OZAR |                      |                    |                    |                   |            |
| PIRO |                      |                    |                    |                   |            |
| SLBE |                      |                    |                    |                   |            |
| WICR |                      |                    |                    |                   |            |

Euphorbia esula - leafy spurge

|      |   |  |   |  |  |
|------|---|--|---|--|--|
| PIPE |   |  | X |  |  |
| SCBL | 6 |  |   |  |  |

Lonicera japonica - Japanese honeysuckle

|      |   |  |   |  |  |
|------|---|--|---|--|--|
| CUVA |   |  |   |  |  |
| GWCA |   |  |   |  |  |
| MOCI |   |  |   |  |  |
| PIPE | 4 |  | X |  |  |

Lythrum salicaria - purple loosestrife

|      |  |  |  |  |  |
|------|--|--|--|--|--|
| INDU |  |  |  |  |  |
| CUVA |  |  |  |  |  |

HERBICIDES: 4) Ammate X-NI (Dupont); 6) Dacamine 4-D

Table 9. Current management techniques for Rosa multiflora and Vinca minor.

Rosa multiflora - multiflora rose

| PARK | MANAGEMENT TECHNIQUE |                    |                    |                   |            |
|------|----------------------|--------------------|--------------------|-------------------|------------|
|      | HERBICIDES           | CUTTING/<br>MOWING | PRESCRIBED<br>BURN | MANUAL<br>REMOVAL | BIOLOGICAL |
| CUVA |                      |                    |                    |                   |            |
| GWCA |                      | X                  |                    |                   |            |
| INDU |                      |                    |                    |                   |            |
| SACN |                      |                    |                    |                   |            |
| WICR |                      |                    |                    |                   |            |

Vinca minor - common periwinkle

|      |
|------|
| APIS |
| CUVA |
| EFMO |
| INDU |
| PIRO |
| SLBE |

Table 10. References for management and control of pervasive and troublesome exotic plant species in Midwest Regional parks. Numbers correspond to the references listed in the Bibliography on the following pages.

| SPECIES  | REFERENCE NUMBER                             |
|--|--|
| 1) EXOTIC SPECIES OCCURRING IN 10 OR MORE PARKS: |  |
| <u>Bromus inermis</u> .....                      | 21, 22, 28                                   |
| (smooth brome)                                   |  |
| <u>Cirsium arvense</u> ...                       | 5, ** 7, 10, 20, 21, 22, ** 24, * 25, 28, 29 |
| (Canada thistle)                                 |  |
| <u>Cirsium vulgare</u> .....                     | 21, ** 24, * 25                              |
| (bull thistle)                                   |  |
| <u>Melilotus alba</u> .....                      | 14, 21, 22, 28                               |
| (white sweet clover)                             |  |
| <u>Melilotus officinalis</u> .....               | 21, 22, 28                                   |
| (yellow sweet clover)                            |  |
| <u>Poa compressa</u> .....                       | 21, 28                                       |
| (Canada bluegrass)                               |  |
| <u>Verbascum thapsus</u> .....                   | 17, 21, 28                                   |
| (common mullein)                                 |  |
| 2) OTHER PROBLEM EXOTICS:                        |  |
| <u>Carduus nutans</u> .....                      | 2, 10, 19, ** 24, * 25, 28                   |
| (musk thistle)                                   |  |
| <u>Convolvulus arvensis</u> .....                | 1, 10, 21, ** 23                             |
| (field bindweed)                                 |  |
| <u>Daucus carota</u> .....                       | 5, 10, 21, 28                                |
| (Queen Ann's lace)                               |  |
| <u>Euphorbia esula</u> .....                     | ** 11, ** 12, ** 13, ** 18, 22, 28           |
| (leafy spurge)                                   |  |
| <u>Lonicera japonica</u> .....                   | 5, ** 6, 21, ** 27, 28                       |
| (Japanese honeysuckle)                           |  |
| <u>Lythrum salicaria</u> .....                   | ** 4, 28                                     |
| (purple loosestrife)                             |  |
| <u>Rosa multiflora</u> .....                     | ** 8, 9, 28                                  |
| (multiflora rose)                                |  |
| <u>Vinca minor</u> .....                         | 28   |
| (common periwinkle)                              |  |

\*\* - best references for control of the species  
 \* - general control for many exotics including the species

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\*\* - References that give the most inclusive information for exotic plant management in natural areas.

\* - References for general information on exotic plant control.



APPENDIX I

| PARK CODE | PARK NAME                                  | STATE     |
|-----------|--|-----------|
| AGFO      | Agate Fossile Beds National Monument       | Nebraska  |
| APIS      | Apostle Islands National Lakeshore         | Wisconsin |
| CUVA      | Cuyahoga Valley National Recreation Area   | Ohio      |
| EFMO      | Effigy Mounds National Monument            | Iowa      |
| FOLS      | Fort Larned National Historic Site         | Kansas    |
| GWCA      | George Washington Carver National Monument | Missouri  |
| GRPO      | Grand Portage National Monument            | Minnesota |
| HOME      | Homestead National Monument of America     | Nebraska  |
| INDU      | Indiana Dunes National Lakeshore           | Indiana   |
| ISRO      | Isle Royale National Park                  | Michigan  |
| MOCI      | Mound City Group National Monument         | Ohio      |
| OZAR      | Ozark National Scenic Riverways            | Missouri  |
| PIPE      | Pipestone National Monument                | Minnesota |
| PIRO      | Pictured Rocks National Lakeshore          | Michigan  |
| SACN      | Saint Croix National Scenic Riverway       | Wisconsin |
| SCBL      | Scotts Bluff National Monument             | Nebraska  |
| SLBE      | Sleeping Bear Dunes National Lakeshore     | Michigan  |
| VOYA      | Voyageurs National Park                    | Minnesota |
| WICR      | Wilson's Creek National Battlefield        | Missouri  |

APPENDIX II

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References cited for number and percentage data of exotic plant species on table 1.

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