



# Invasive Exotic Plant Monitoring

## Importance

Invasive exotic plants are one of the most significant threats to natural resources in the national parks today. Exotic plants are a concern because they are able to reproduce prolifically, rapidly colonize new areas, displace native species, and alter ecosystem processes across multiple scales. If invasive exotic plants are discovered while their populations are still small, control efforts are likely to cost less and achieve higher success rates than after a species has become more widespread. Therefore, early detection of exotic plants is critical.

## Long-term Monitoring

In order to provide early warning of new exotic threats, the Northern Colorado Plateau Network (NCPN) focuses its invasive-plant monitoring efforts on areas where invasive exotics are likely to first establish.

The network has implemented a multi-pronged approach to the early detection of exotic plants. First, NCPN or park staff experienced with a wide range of exotics survey established monitoring routes on a rotational basis to maximize both efficiency and ground coverage. Along those routes, staff establish plots that can be quickly surveyed for data that will enable us to make trend estimates over time. In addition, NCPN staff may dedicate approximately 25% of their time to inventories of areas that are of high management concern. Finally, the network has designed “monitoring lite,” a method by which park staff or volunteers with less knowledge of invasive species may collect data for use in NCPN databases and reporting.

The objectives of NCPN invasive plant monitoring are to:

1. Detect incipient populations and new introductions of invasive plant species; and
2. Determine status and trends of selected populations of invasive plants of management significance.

## Management Applications

Information gathered from this monitoring will support a long-term, ecosystem-wide strategy for controlling invasive plant species and provide park managers with access to systematically collected information that enables them to be well-informed about the status of ecosystems and prioritize dedication of limited resources to invasive-plant control efforts. Staff from both the parks and Exotic Plant Management Teams use NCPN monitoring reports to guide control efforts.



Yellow sweetclover and musk thistle, Curecanti NRA.

## Monitoring Effort

NCPN invasive exotic plant (IEP) monitoring began in 2008, with a pilot field season at Golden Spike NHS and Fossil Butte NM. In 2012, the NCPN sampled in the Cathedral Valley at Capitol Reef NP, re-visited all monitoring routes at Fossil Butte NM and Golden Spike NHS, and returned to Black Canyon of the Gunnison NP and Curecanti NRA for a third year. With the initiation of monitoring at Zion NP, the program reached full implementation. Reports on all previous seasons can be found at the network’s web site; a summary of results from 2011 can be found on page 2 of this brief.

In 2013, invasive exotics will be monitored at Capitol Reef NP, Colorado NM, Dinosaur NM, and Zion NP. The NCPN invasive plant monitoring protocol was submitted for peer review in December 2010.

## Contact

Dustin Perkins, [dustin\\_w\\_perkins@nps.gov](mailto:dustin_w_perkins@nps.gov)

### Network park units where invasive exotic plants are monitored

|                                 |                  |
|---------------------------------|------------------|
| Black Canyon of the Gunnison NP | Dinosaur NM      |
| Capitol Reef NP                 | Fossil Butte NM  |
| Colorado NM                     | Golden Spike NHS |
| Curecanti NRA                   | Zion NP          |

NP = National Park; NM = National Monument;  
NRA = National Recreation Area; NHS = National Historic Site

## Results for 2011

AT BLACK CANYON OF THE GUNNISON NP AND CURECANTI NRA, over 84 km were monitored along the shores of Blue Mesa Reservoir, the South Rim Road, and Deadhorse Trail. Twenty-nine IEP species were detected on monitoring routes and transects. Of these, 15 were priority species, accounting for 704 separate infestations. Canada thistle (*Breca arvensis*), musk thistle (*Carduus nutans*), summer cypress (*Bassia sieversiana*), and Russian thistle (*Salsola australis*) were the most widespread species found along monitoring routes. Among priority species, summer cypress and Canada thistle had the highest percent cover found in transects along Blue Mesa Reservoir. Only one priority species, cheatgrass (*Anisantha tectorum*), was found in transects along the South Rim Road, while none were found along Deadhorse Trail.

AT CAPITOL REEF NP, park staff detected four IEP species on monitoring routes and transects along 7.3 kilometers of Oak Creek. Of the invasive species considered priority species for the park, only tamarisk (*Tamarix chinensis*) and Russian olive (*Elaeagnus angustifolia*) were detected. Tamarisk was by far the most common (68 of 69 infestations) IEP detected along monitoring routes. While infestations were widespread, actual IEP percent cover was low in Oak Creek. Both tamarisk and Russian olive were present in numbers similar to those recorded during surveys in 2003.

AT COLORADO NM, 24 IEP species were detected on monitoring routes and transects. Of these, 11 were priority species accounting for 696 separate infestations. Yellow sweetclover (*Melilotus officinalis*), field bindweed (*Convolvulus arvensis*), Russian olive, and tamarisk were the most widespread species found along monitoring routes. Cheatgrass and yellow sweetclover had the highest percent cover (1.4 and 0.1%) and highest frequency (68% and 18%) of all transects, respectively. Fewer priority IEPs were found in area with lower rates of transportation of livestock and livestock food (hay). Russian olive has generally increased, while tamarisk has decreased in the time since surveys were conducted in 2003 and 2009. Many IEPs were present in small, localized invasions that have a promising chance of successful control and eradication.

AT DINOSAUR NM, NCPN staff detected 14 priority IEP species and 15 additional IEP species on monitoring routes and transects along 171 kilometers (727 hectares) of the Green

and Yampa rivers. Tamarisk, broad-leaf pepperwort (*Lepidium latifolium*), and yellow sweetclover were widespread along all three monitored sections (upper Green, lower Green, and Yampa) of the river corridor. Canada thistle (*Cirsium arvense*) was widespread on the upper Green River, while Russian olive was widespread along the westernmost portion of the lower Green River. Invasive species rates (infestations/100 m) were generally higher along the upper Green River, followed by the lower Green River. They were lowest on the Yampa River, according to mapping of infestations both along monitoring routes and more quantitative plots. Infestation rates of tamarisk were smaller on the Yampa than on the upper and lower Green. However, more analysis is planned to remove areas that have been targeted for control, compare stage discharges during sampling, and make comparisons between alluvial parks and canyon reaches to determine what may be causing these differences. Comparison to results from surveys completed from 2002 to 2005 showed that infestation rates generally increased along the Yampa River, while declining or remaining at similar levels along the upper and lower Green.

Photos from upper left, outer circle: musk thistle (Steve Dewey, Utah State University, Bugwood.org), Russian thistle (R.A. Howard@USDA-NRCS PLANTS Database), summer cypress (Richard Old, XID Services, Inc., Bugwood.org), field bindweed (Patrick J. Alexander). Inner circle: Canada thistle (Richard Old, XID Services, Inc., Bugwood.org), yellow sweetclover (Steve Dewey, Utah State University, Bugwood.org.), cheatgrass (Leslie J. Mehrhoff, University of Connecticut, Bugwood.org), broad-leaf pepperwort (Leslie J. Mehrhoff, University of Connecticut, Bugwood.org). Bullseye top: tamarisk (Patrick J. Alexander). Bullseye bottom: Russian olive (J.S. Peterson@USDA-NRCS PLANTS Database).