



Invasive Exotic Plant Monitoring

2010

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 is implementing 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



Canada thistle.

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-



Invasive exotic plant field survey.

informed about the status of ecosystems and prioritize dedication of limited resources to invasive-plant control efforts.

Status and Trends

In 2008, the NCPN conducted a pilot field season at Golden Spike NHS and Fossil Butte NM. In 2009, network staff revisited Fossil Butte NM and expanded implementation to Colorado NM and Capitol Reef NP. In addition, a group of students from Mesa State College conducted “monitoring lite” at Dinosaur NM. Summary results from these efforts appear on page 2 of this brief; full reports can be found at the network’s web site.

In 2010, the NCPN will re-sample all monitoring routes at Fossil Butte NM and Golden Spike NHS, expand monitoring at Capitol Reef NP, and implement monitoring at Black Canyon of the Gunnison NP, Curecanti NRA, and Dinosaur NM. Network staff will re-sample all monitoring routes at Colorado NM and implement monitoring at Zion NP in 2011. It is anticipated that the NCPN invasive plant monitoring protocol will be submitted for peer review in 2010.

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Network park units where invasive exotic plants will be 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

Full-scale Invasive Exotic Plants Monitoring

The need to detect invasive exotic plants (IEPs) at an early stage is urgent. Therefore, NCPN invasive plants monitoring strives for quick collection of quality data on IEP locations and abundance. By focusing on roads, trails, and waterways, which are major vectors for invasive plants, we capture the greatest amount of information (i.e., benefit) with the least amount of time and effort (i.e., cost). Field crews are trained to develop a focused search image on target plants, instead of looking for every possible invasive plant species. The likelihood of eradicating these target species or containing them within a park is generally high.

Before monitoring begins, NCPN and park staff jointly develop a list of target invasive plants. These high-priority target IEP lists include both existing and potential IEPs of high management concern. Next, we establish a series of co-located monitoring plots and routes along all roads, major drainages, and trails. The plots, sampled in a quantitative manner, allow us to make inference to the percent cover of target IEPs along the monitoring routes, and to estimate trends in percent cover over time. The monitoring routes are used to increase the spatial coverage of mapping, with the goal of maximizing our opportunities to detect IEPs.

Results for 2009

AT CAPITOL REEF NP, staff surveyed 41 kilometers of Utah State Highway 24 in 2009. Fourteen 14 IEP species were detected on monitoring routes and plots, seven of which were Priority 1 species for the park. Tamarisk (*Tamarix* spp.) was the most commonly detected IEP (82% of infestations detected). Of 138 tamarisk infestations, 50% were larger than 40 m², demonstrating the widespread prevalence of this exotic in the park. Comparison with past survey results shows that the park's control efforts targeted at tree-of-heaven (*Ailanthus altissima*) and Russian knapweed (*Centaurea repens*) are meeting with success.

AT COLORADO NM, 16 IEP species were detected on monitoring routes and plots. Of these, 11 were Priority 1 species. IEPs were most prevalent along riparian areas; almost no Priority 1 IEPs were found along trails. Tamarisk, yellow sweetclover (*Melilotus officinalis*), Russian olive (*Elaeagnus angustifolia*), and field bindweed (*Convolvulus arvensis*) were the most commonly detected IEPs. Many IEPs were present in small,



Monitoring site, Fossil Butte NM.

localized invasions that have a promising chance of successful management control and eradication.

We detected 26 IEP species on monitoring routes and plots at Fossil Butte NM in 2008 and 2009. Of these, 11 were Priority 1 species consistently recorded in each year. Canada thistle (*Cirsium arvense*), quackgrass (*Elymus repens*), cheatgrass (*Bromus tectorum*), and yellow sweetclover were the most commonly detected IEPs. IEPs were widespread along the Main Park Road in 2008, but reduced significantly in 2009, after weed-control efforts took place. IEPs were less prevalent elsewhere. Generally, the further a route was from areas of high visitation, the fewer IEPs detected. Many IEPs were present in small, localized invasions that have a promising chance of successful management control and eradication.

Monitoring Lite

In 2009, the network tested its “monitoring lite” method. Under monitoring lite, field crews follow the same procedures for surveying monitoring routes as under the network's full IEP monitoring protocol, but search for only a limited number of target species. Also, no plots are monitored.

Results for 2009

Monitoring lite was tested at Dinosaur NM, by students from Mesa State College's Desert Ecology class. Invasive plants on the search list included Canada thistle, perennial pepperweed (*Lepidium latifolium*), tamarisk, Russian olive, Russian knapweed, leafy spurge (*Euphorbia esula*), and teasel (*Dipsacus fullonum*). All species except teasel and leafy spurge were detected in 326 infestations along 20.8 km of the Green River. Comparisons between these surveys and surveys done in 2002 and 2003 clearly show reduced tamarisk and Russian olive infestations in areas where these species were targeted for management. None of the target species appears to be “filling in behind” the targeted removal of those other IEPs, as can sometimes occur. However, the substantial number of large infestations of perennial pepperweed is a concern.