



Invasive Exotic Plant Monitoring at Dinosaur National Monument, 2019



NPS/AMM WASHUTA

Tamarisk along the Green River near Whirlpool Canyon.

What Are Invasive Exotic Plants?

Invasive exotic plants (IEPs) are non-native species whose introduction to an environment causes (or is likely to cause) economic or environmental harm, or harm to human health. IEPs can alter ecosystems at multiple scales—threatening wildlife, natural landscapes, and recreational opportunities. They can reproduce prolifically, rapidly colonize new areas, and displace native species.

Invasive plants fill different ecological roles than the native plants they replace. As a result, the needs of species that depend on the native vegetation may go unmet, potentially creating a cascade of ecological effects.

The good news is that if discovered before they have a chance to take hold, IEP populations can be eradicated from parks. Small populations are cheaper and easier to control than large populations. Therefore, early detection is critical.

What Can Be Done?

To provide early warning of weed invasions and help park managers prioritize control efforts, the Northern

At a Glance

- In 2019, we recorded 2,535 patches of 12 different priority invasive plants on monitoring routes along the Green River.
- The largely unregulated flows of the Yampa River continue to maintain a more native riparian vegetation community than that found along the regulated Green River.
- A rise in fire-prone cheatgrass may be due to a lack of recent high-flow scouring events.

Colorado Plateau Network (NCPN) monitors invasive exotic plants in eight National Park Service units. First, network and park staff create a list of priority IEPs for each park. Then, on a rotating schedule, a field crew looks for those IEPs along established monitoring routes. Along the routes, they stop and set up plots for additional data collection. The plot data allow network ecologists to estimate trends over time.

During data analysis, a Patch Management Index (PMI) helps identify the scale of the problem presented by each patch of exotic plants. PMI multiplies

the size of each patch by the amount of each patch that is covered in weeds to arrive at a composite score. The PMI score is assigned to a class, ranging from very low to very high.

To be useful, PMI must be considered in combination with species and patch numbers. In many cases, targeting patches with very low or low PMI allows managers to keep small patches from growing into bigger problems. On the other hand, a species with many patches of very low or low PMI may be harder to treat than a different species with just a few patches of high or very high PMI.

Recent Monitoring at Dinosaur National Monument

At Dinosaur National Monument, the NCPN monitors IEPs in the Green and Yampa river corridors. During monitoring along 74.4 kilometers of the Green River above and below its confluence with the Yampa from June 26 to July 2, 2019, a total of 14 IEP species were detected on monitoring routes and transects. Of these, 12 were priority species that accounted for 2,535 separate IEP patches (see table). Tamarisk (*Tamarix* sp.), broad-leaf

Priority invasive exotic plant species detected on monitoring routes along the Green River, Dinosaur National Monument, June 26–July 2, 2019.

Scientific name	Common name	Patches
<i>Tamarix</i> sp.	tamarisk	1,547
<i>Lepidium latifolium</i>	broad-leaf pepperwort	331
<i>Melilotus officinalis</i>	yellow sweetclover	235
<i>Cirsium arvense</i>	Canada thistle	201
<i>Centaurea repens</i>	Russian knapweed	89
<i>Carduus nutans</i>	musk thistle	70
<i>Euphorbia esula</i>	leafy spurge	35
<i>Cirsium vulgare</i>	bull thistle	14
<i>Cardaria</i> sp.	whitetop	4
<i>Dipsacus sylvestris</i>	teasel	4
<i>Arctium minus</i>	burdock	3
<i>Elaeagnus angustifolia</i>	Russian-olive	2

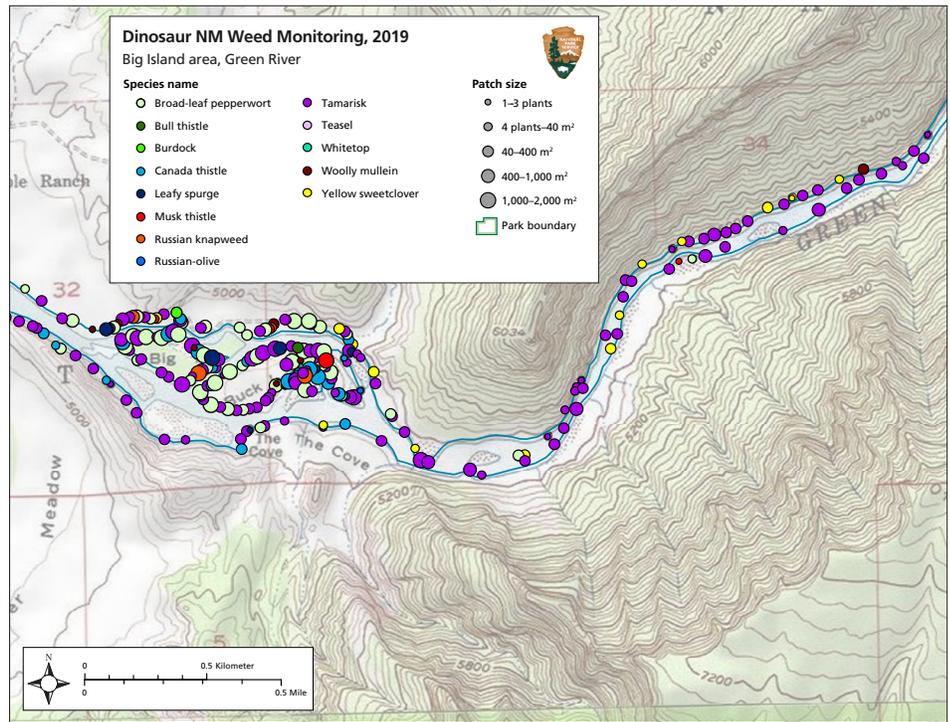
pepperwort (*Lepidium latifolium*), and yellow sweetclover (*Melilotus officinalis*) were the most widespread species.

Cheatgrass (*Bromus tectorum*) increased substantially in cover and frequency on all three river sections from 2010–2011 to 2017–2019. This increase may be due to a lack of recent high-flow scouring events. When higher covers occur, this fire-prone species can increase wildfire risk.

As the NCPN has [documented in the past](#), the largely unregulated flows of the Yampa River continue to maintain a more native riparian vegetation community than that found along the regulated Green River. The Yampa River has lower numbers of IEP patches, lower percent cover, and lower percent frequency of IEPs. The lower Green River, which is partially restored (i.e., less regulated) below its confluence with the Yampa, has moderate numbers of IEPs. The highly regulated upper Green River has the highest numbers of IEPs—more than twice as many patches per kilometer as the Yampa River.

Management Recommendations

Together with monitoring done on the



Invasive plants detected on monitoring routes around Big Island on the Green River at Dinosaur National Monument, June 26 to July 2, 2019.

Yampa River in 2017, the 2019 season represents the completion of the third monitoring rotation of the entire river corridor at Dinosaur National Monument (2003–2004, 2010–2011, 2017–2019). Several IEPs with rising or steady populations are potential candidates for control (or are already being treated):

- Yellow sweetclover has increased on all three river reaches.
- Musk thistle (*Carduus nutans*) was found at considerably lower levels than yellow sweetclover but has also increased on all three river reaches.
- Leafy spurge (*Euphorbia esula*) is increasing on the lower Green River and Yampa River.
- Teasel (*Dipsacus sylvestris*) was recorded for the first time in NCPN monitoring in 2019, with four patches on the upper Green River.

In 2019, the patch management index (PMI) was low or very low for 95.7% of patches on the upper Green River, and 90.9% of patches on the lower Green River, indicating small and/or sparse patches where control is generally still feasible. The Yampa has lots of small

(<40 m²) tamarisk patches with the potential to be removed by the next round of scouring floods. The Green River has more patches with higher PMI than the Yampa does, and a larger percentage of tamarisk patches classified as mature trees. Patches that are larger, higher in PMI, and more mature all represent older, more established patches.

The tamarisk beetle (*Diorhabda elongata*) was released as a biocontrol in the monument in 2006 and 2007. It is also likely that removal efforts by monument staff and volunteers between 2010 and 2019 have affected tamarisk populations, particularly in the more dense patches on the Green River. However, increases on the Yampa River should be continued to be monitored and controlled where possible.

Network staff will return to the monument in 2022 to begin the fourth monitoring rotation.

Information in this brief was summarized from D.W. Perkins, *Invasive Exotic Plant Monitoring at Dinosaur National Monument: 2019 Field Season*