

Rare Riparian Plant Communities

2011 RESOURCE BRIEF

National Park Service · Northeast Region
U.S. Department of the Interior

Eastern Rivers and Mountains Network
Inventory & Monitoring Program



Delaware Water Gap National Recreation Area

THE BIG PICTURE

National parks in the Eastern Rivers and Mountains Network (ERMN) contain more than 211 miles of river. The riparian zone adjacent to these rivers supports many different kinds of plant communities, from floodplain forests to small patches of open prairie. While some of these communities are common throughout the eastern United States, 14 communities in the ERMN parks are globally rare, which means that they occur in very few places in the world. Different types of bedrock, the shape of the river channel, the timing of floods, and scouring by winter ice create unique environmental settings where these rare plant communities occur. In addition to being rare themselves, these communities also provide critical habitat for nearly 50 state rare plant species within the parks.

Monitoring the changes in the rare riparian plant communities provides park managers with information necessary to manage and protect these unique sites. Several important threats to these communities are: exotic invasive species, human recreational activities, alteration of the rivers' flow regime and sediment transport by dams, modification of the riparian zone by roads and railroads, and water pollution.

RARE COMMUNITIES AT DINGMANS FERRY

Calcareous Riverside Outcrop and Calcareous Riverside Seep are two globally rare riparian communities that co-occur together at Dingmans Ferry and two other sites within Delaware Water Gap National Recreation Area (DEWA). Calcareous Riverside Outcrops occur on limestone bedrock outcrops along the shoreline of the Delaware River where plants persist in the rock crevices or sediments accumulated over the rocks.



The Dingmans Ferry site. Photo: K. Callahan.

The Calcareous Riverside Seeps occur where groundwater flows over the cobbled bedrock, supporting many rare plants that are dependent on groundwater. Together, these communities provide habitat for 26 state-rare plant species.

WHAT WE ARE DOING

Due to the globally rare nature of these communities and the large number of state-rare plants that they contain, an intensive study was conducted of the three Calcareous Riverside Outcrop / Calcareous Riverside Seep sites in DEWA in 1997 and 1998 by the New Jersey Natural Heritage Program. That study collected baseline data on the composition of the rare communities and the status of the rare plant species. In 2010, ERMN ecologists resampled the 150 plots established in 1998 and collected data on plant species abundance. Our objective was to document changes in community composition, including plant biodiversity and the abundance of non-native versus native species.



Collecting data at a Calcareous Riverside Outcrop. Photo: S. Perles.

WHAT WE FOUND

Increase in Woody Species

The cover of shrubs at the Dingmans Ferry site has increased significantly between 1998 and 2010. Our data suggest that native species such as willows (*Salix* spp.) and common ninebark (*Physocarpus opulifolius*) are being replaced by aggressive invasive exotic shrubs such as Autumn olive (*Elaeagnus umbellata*), Morrow's honeysuckle (*Lonicera morrowii*), and multiflora rose (*Rosa multiflora*).

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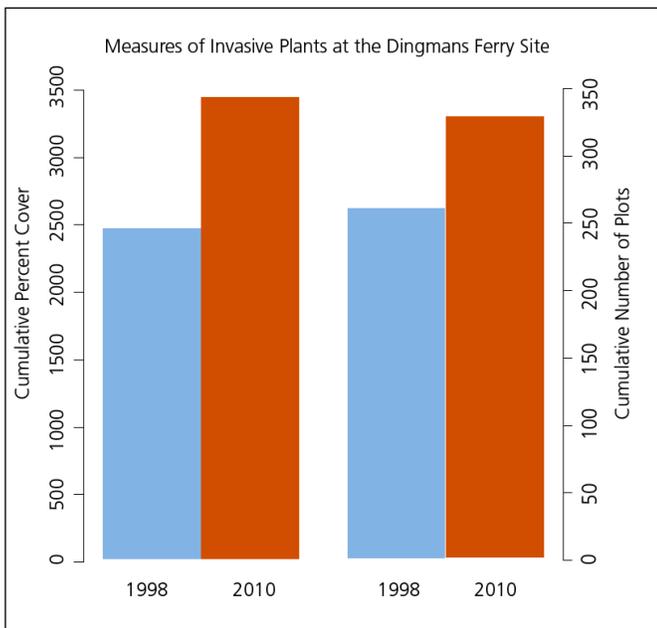
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Increase in Exotic Invasive Species

Three new exotic invasive plant species have established at the Dingmans Ferry site since 1998 and eight other invasive species have spread significantly since that time. Cumulative percent cover and frequency of occurrences of invasive species in plots increased over the 12 years (see Figure below). As shown by these findings, the management of invasive exotic species is critical to the protection the rare riparian communities and the rare plants that live there.



Cumulative percent cover and frequency of invasive exotic plants in 1998 and 2010 at the Dingmas Ferry site. Note the increase in exotic invasive plant species between 1998 and 2010.

Dynamic Rivershore: Where change is constant

Our monitoring highlighted the dynamic nature of riparian plant communities. Plants that thrive in these habitats are adapted to surviving frequent floods, winter ice scour, and extremes in moisture availability. For example, the Dingmans Ferry site is often under water in spring, but has drought conditions by mid-summer. To deal with their constantly changing habitat, many rivershore plants rely on seed dispersal to move from year to year in response to the dynamic environmental conditions. We documented plant species migration between the Dingmans Ferry site and the other two Calcareous Riverside Outcrop / Calcareous Riverside Seep sites in the park. It is therefore important to protect all three sites within the park to allow plants to migrate among them. Maintaining multiple populations of rare plants helps maintain genetic diversity and provides refugia for species when sites are disturbed. This is especially important in the dynamic riparian environment where disturbance is common.

PURPLE LOOSESTRIFE: A beautiful awful weed

A lush wetland packed with bright purple flowers waving in the breeze... Though this scene may be aesthetically pleasing to some, it is actually an ecological nightmare for native plants and animals! Those beautiful flowers are purple loosestrife (*Lythrum salicaria*), an aggressive invasive plant brought to the United States from Europe in the nineteenth century. Purple loosestrife invades wetlands and riparian areas, outcompeting and replacing the native grasses, sedges, and other flowering plants. In some wetlands, purple loosestrife forms dense, homogeneous stands, which degrades the habitat for numerous birds, amphibians, and rare plants.



Purple loosestrife. Photo: L. Wilson, University of Idaho, Bugwood.org



Galerucella beetles eating purple loosestrife leaves. Photo: J. Shreiner

As part of an integrated pest management approach to controlling purple loosestrife in DEWA, three different species of purple loosestrife-eating beetles were released in the park between 1996 and 2007. These biocontrol beetles were effective at reducing purple loosestrife in many of the park's wetlands, allowing a diverse array of native plants to re-establish.

At the Dingmans Ferry site, purple loosestrife cover did not measurably change between 1998 and 2010; however, the number of purple loosestrife stems decreased significantly. Signs of feeding by the *Galerucella* beetle, one of the biocontrol species, were observed widely throughout the site. It is likely that the biocontrol beetles are helping to keep purple loosestrife from expanding even though they have not eliminated loosestrife from the site.

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