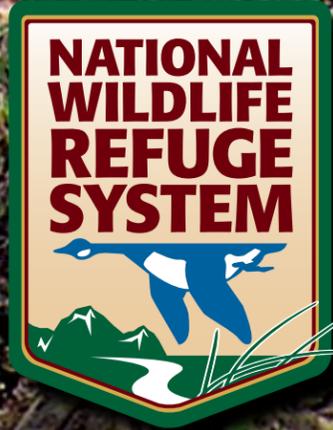
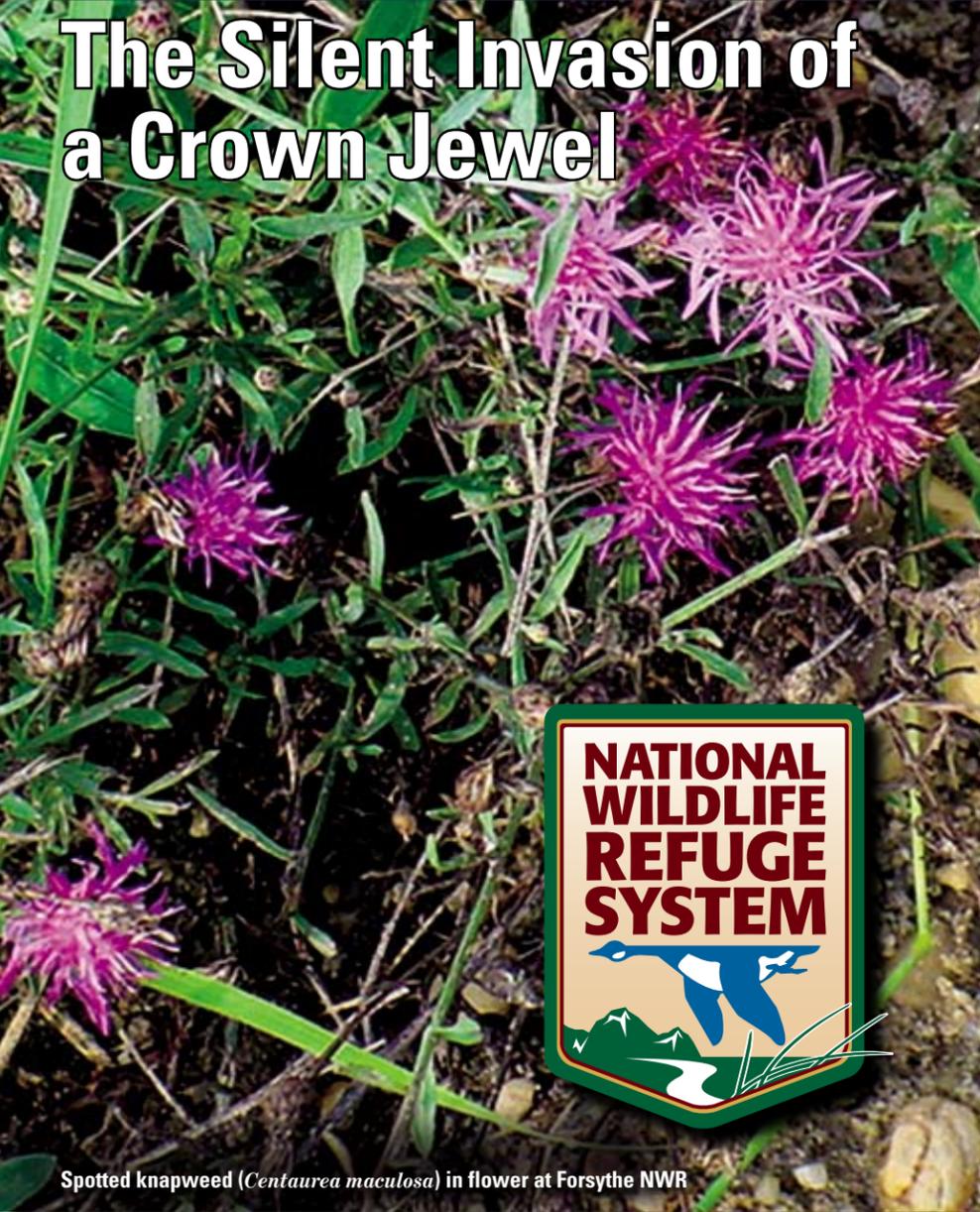


The Silent Invasion of a Crown Jewel



Spotted knapweed (*Centaurea maculosa*) in flower at Forsythe NWR

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In 1998, I was astonished to read that invasive nonindigenous species had become the number one threat to the National Wildlife Refuge System (NWRS)! Nearly 8 million acres within the NWRS were infested with invasive plants that interfered with crucial habitat management objectives, with invasive plant and animal control costs approaching \$13 million in that year alone. By 2000, that cost had risen to \$120 million. The Refuge System Threats and Conflicts Database identified invasive species as the highest ranking threat affecting refuges, scoring almost double that of “illegal activities” (ranked number

two). With a \$2 billion backlog in refuge funding, the rising cost of invasive species control threatens the future of the entire NWRS.

In response to this problem, the U.S. Fish & Wildlife Service’s Northeast Region began to inventory invasive plants on National Wildlife Refuges (NWR), assess the need for control, and develop a management strategy. The Region is preparing a detailed map of invasive species on its refuges. This information will guide the Region in developing an integrated approach to eradication, control, and/or monitoring.

Between June 17 and September 19, 2002, New Jersey Field Office botanist Carlo Popolizio and biological technician Darren Harris helped conduct a plant inventory at the Edwin B. Forsythe NWR Brigantine Division’s impoundments. Using global positioning satellite technology, Popolizio and Harris documented the abundance and distribution of 36 invasive plant species, delineating four relatively discrete plant communities (roadside community, mixed shrub/herb transition zone, *Phragmites* wetland, and salt marsh community) on an elevation gradient between the shoulder and toe of the dike system. The refuge dikes are so heavily infested with invasive exotic species that a combination of chemical controls followed by prescribed burns, re-seeding to native grasses, and careful monitoring may be required. Several other exotic species occur primarily along roadsides and other disturbed areas on the 44,000 acres which still have not been adequately surveyed.

Phragmites australis stands within the 536-acre East Pool are likely dominated by “Haplotype M,” the most invasive variant of the *Phragmites* species. The application of herbicide followed by prescribed burning has failed to control the *Phragmites*. Therefore, we have opened the East Pool to tidal flow to eradicate the common reed and restore native salt marsh characteristics.

Forsythe NWR’s roadside community, the most troublesome of the zones on the dike, consists primarily of annual weeds. Spotted knapweed (*Centaurea maculosa*) serves as a good illustration of the problems of controlling these annuals. This plant reproduces solely by seed, and each plant averages about 1,000 seeds, which germinate throughout the growing season. Spotted knapweed releases a toxin that causes neighboring plants to self-destruct, thus creating more space for its own reproduction. It often attains high densities in sunny areas and therefore dominates Forsythe’s dikes, reducing plant diversity. The most effective control of spotted knapweed is early detection and removal of pioneering plants.

Some adjustments in current management practices could go a long way to rectifying our invasive species woes. In the roadside community, a mowing regime conducted in April-May rather than later in the season would favor the growth of perennial grasses. Mowing may help to control populations, but it does not successfully eradicate all of them—plants

Photos Carlo Popolizio / USFWS, NJFO



Reed canary grass (*Phalaris arundinacea*) at Forsythe NWR: the nonnative form is invasive; the native is not.
Question: which is this?

merely re-flower at a lower height. Some species such as spotted knapweed may be controlled through an integrated method including prescribed burns followed by careful pulling and digging.

The Service considers the NWRs among the crown jewels of America’s natural heritage. The wildlife habitat value of Forsythe NWR, and of the four other “crown jewels” in New Jersey, is threatened by the invasion of exotic species. We must continue identifying the nature and extent of this invasive species problem and develop and implement a native plant restoration strategy. We must prevent the fiscal drain on the resources of the NWRS by the spread of exotic plants and animals that damage native ecosystems if we are to preserve one of our great national treasures.



Invasive common mullein (*Verbascum thapsus*) in its first-year growth as a basal rosette (insert) and above as second-year flower stalks at Forsythe NWR