National Park Service
U.S. Department of the Interior
Inventory and Monitoring Program
Research Project Summary November 2008

Early Detection of Invasive Plant Species

Importance: *Invasive plants dramatically alter ecosystems and reduce the amount of habitat available for native plant and animal species.*

National Parks in the San Francisco Bay area act as a crucial refuge for native species under pressure from urban development. Invasive species threaten these sanctuaries by dominating the landscape, altering ecosystem functions, and reducing the amount of available habitat. For example, invasion by Portuguese broom (Figure 1, third column from the left) changes nutrient cycling and alters fire regimes. Invasive plants can also negatively impact views, trails, and structures, diminishing the visitor experience and increasing maintenance costs.

Monitoring Program: *The National Park Service (NPS) has developed a protocol to help find and map the most invasive plant species as they are just entering sensitive areas of the park, allowing NPS to dedicate precious resources to protect the most critical places.*

The early detection protocol ranks areas of the park and known invasive plant species based on a number of factors that reflect the risk of invasion and ease of control.

The Golden Gate National Recreation Area (GOGA) has 38 sites (subwatersheds) that are considered high-priority due to the threat to rare plants or animals, the site's vulnerability to invasion, and low current levels of infestation. Higher-priority sites are searched more often and infestations are recorded in greater detail.

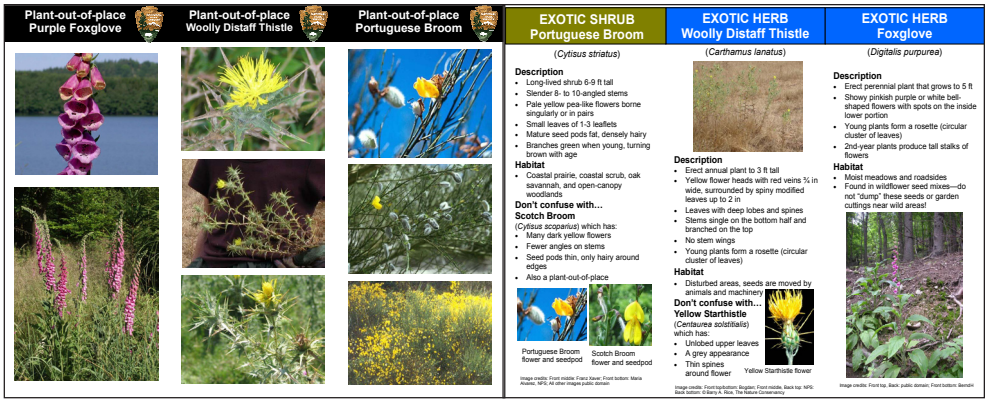


Figure 1. Plant identification cards like the three shown here (front and back) are used by volunteers to identify priority invasive species in the field.

List 1 - highly invasive but not widespread;
List 2 - highly invasive but more widespread, or moderately invasive and not widespread;
List 3 - highly invasive and widespread;
List 4 - low to moderate invasiveness.

Figure 2. Known invasive plant species are ranked based on how widespread they are in the park and how aggressively they invade. List 1 species are the highest priority and List 4 the lowest.

The over 300 species on the GOGA exotic plant list were ranked based on how quickly they spread, how much they alter ecosystems or endanger rare plants, the number of acres infested, and removal costs. This process yielded a list of 166 invasive plant species, half of which fell under the top three priority categories for early detection (Lists 1-3, Figure 2).

Monitoring takes place at the most likely routes of invasion: along roads and trails. Populations of the top-priority plant species are mapped and details about habitat and distribution are also noted. This information is then sent directly to park-based eradication teams who are responsible for removal.

Because of the abundance of priority areas and invasive plants in GOGA, the volunteer-based Weed Watchers program is a critical part of early detection. Volunteers are first trained in weed identification and mapping. They can then attend NPS staff-led hikes, or adopt an area of the park to survey themselves.

Status and Trends: *In the first three years of the early detection program, staff and volunteers spent approximately 1,500 hours collecting data on invasive plant populations in GOGA, allowing for a more efficient and coordinated management response.*

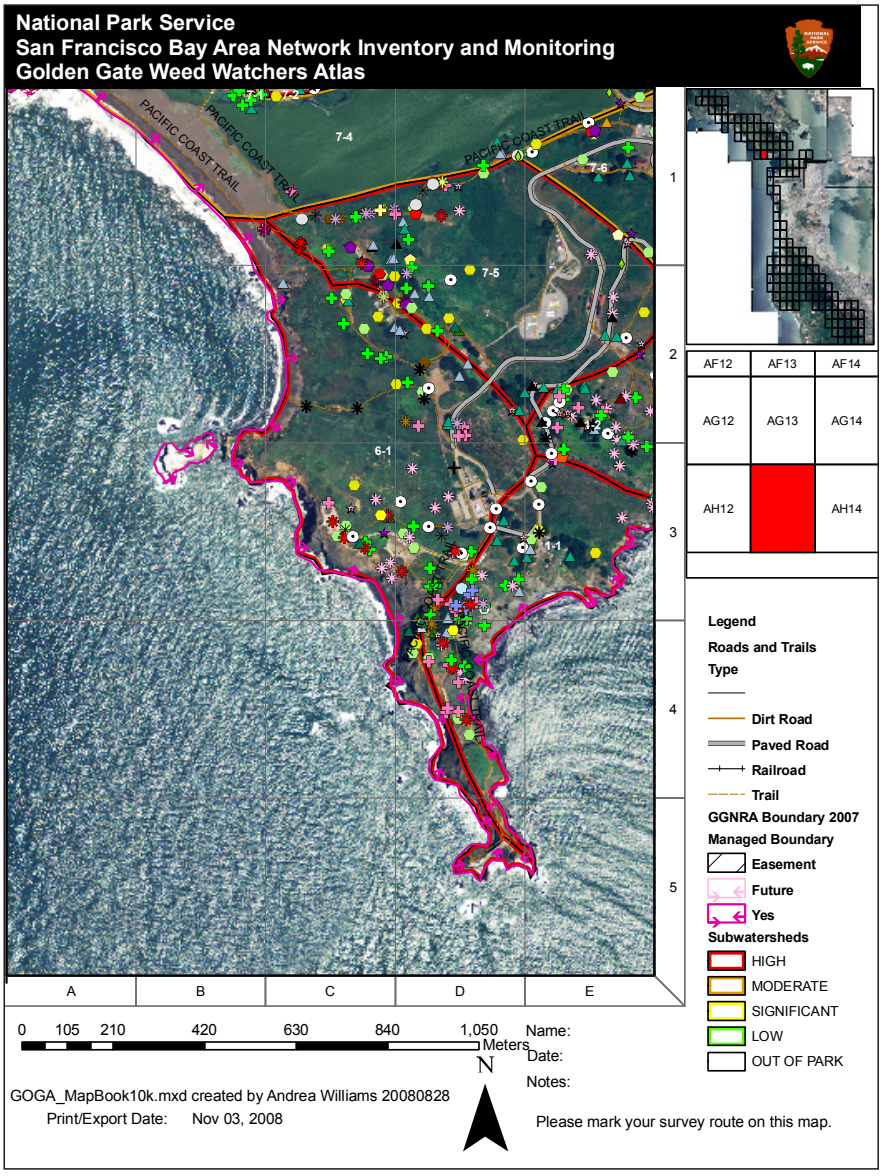
Volunteers contributed 543 of the 700 hours spent surveying 62 miles of priority trails and roads in 2006 and 2007.

Teams searched for as many as 83 high-priority plant species (Lists 1-3). They found and mapped a total of 947 populations of these plants.

These data have given NPS staff a clearer picture of the actual on-the-ground status of invasive plant populations in GOGA. Some species that were thought to be rare within the park were really widespread, while others were not found at all. Priority lists have been adjusted accordingly to ensure that staff and volunteer time is being spent looking for the species that actually pose the greatest threat.

In 2008, these revised lists—along with a growing volunteer base and the addition of three interns—allowed the Weed Watcher program to efficiently cover more ground than ever before. These interns, along with 30 volunteers logged nearly 800 hours, and completed surveys for all priority roads and trails.

In addition to accurate documentation of invasive plant populations, rapid response to invasions is also necessary for an early detection program to succeed. The San Francisco Bay Area Network Inventory and Monitoring Program, and the many invasive plant management teams of its partner organizations, work closely to coordinate monitoring and eradication efforts.



Colored symbols indicate the location of invasive plant populations in the Marin Headlands based on surveys conducted by NPS staff and volunteers.

A Bay Area Early Detection Network (BAEDN) is also under development for the nine-county San Francisco Bay area. BAEDN represents a coalition of over 50 organizations representing national, state and local agencies, non-profits, and individuals. This organizational structure will help codify the early detection process and improve regional collaboration.

Additional Resources:

A. E. Williams and E. Speith. 2008. Invasive Plant Species Early Detection in the San Francisco Bay Area Network: 2007 Annual Report. Natural Resource Report NPS/PWR/SFAN/NRTR—2008/00N. National Park Service, Fort Collins, Colorado.

Summary written by Michelle O'Herron. For more information about becoming a Weed Watcher, please contact Andrea Williams, Natural Resource Specialist, 415-331-0639. Also: http://science.nature.nps.gov/im/units/sfan/vital_signs/Invasives/weed_watchers.cfm.