



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.*



Figure 1. A map of subwatersheds of varying priority in Marin County.

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 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 has developed a protocol to prioritize, find and map invasive plants so they can be more efficiently controlled.*

The National Park Service’s (NPS) early detection protocol ranks park sites and known exotic plant species based on a number of factors. Sites, or subwatersheds, are considered high-priority when invasive plants pose a threat to rare species, the site is vulnerable to invasion, and the current levels of infestation are low (Figure 1). Higher-priority sites are searched more often than lower priority sites.

The exotic plant species in the Golden Gate National Recreation Area (GOGA), Point Reyes National Seashore (PORE), Pinnacles National Monument (PINN), and John Muir National Historic Site (JOMU) 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. The rankings are represented by four different lists (Figure 2). List 1 contains the highest priority plants.

Monitoring takes place along roads and trails (stream corridors and fences are the exception at PINN). Populations of priority plant species are mapped and measured in varying amounts of detail based on which priority list the species belongs to. 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 and PORE, the volunteer-based Weed Watcher program is a critical part of early detection. Volunteers are trained in weed identification and mapping. They can then attend NPS staff-led hikes, or adopt part of the park to survey themselves. At GOGA, volunteers can use a new smartphone app (www.whatsinvasive.com) to more accurately map plants.

	Example	Explanation
List 1 (Highest Priority Plants)	Fertile Capeweed 	Highly invasive and typically not widespread. Control or even eradication is often feasible.
List 2 (High Priority Plants)	Cape Ivy 	Highly invasive and usually more common than List 1 species, but still feasible to control in many places.
List 3 (Medium Priority Plants)	Sweet fennel 	Usually widespread and difficult to control at the park scale, or species of concern that remain scarce.
List 4 (Lower Priority Plants)	Rattlesnake grass 	All other exotic plants not in Lists 1 – 3. Typically, these are ubiquitous and beyond control, or they are rare or displaced.

Figure 2. This table explains early detection priority lists for invasive plants in the Bay Area National Parks.

Status and Trends: *Since early detection began in 2008, NPS staff, interns and Weed Watcher volunteers have mapped more than 5,000 priority invasive plant populations over more than 1,000 miles of roads and trails.*

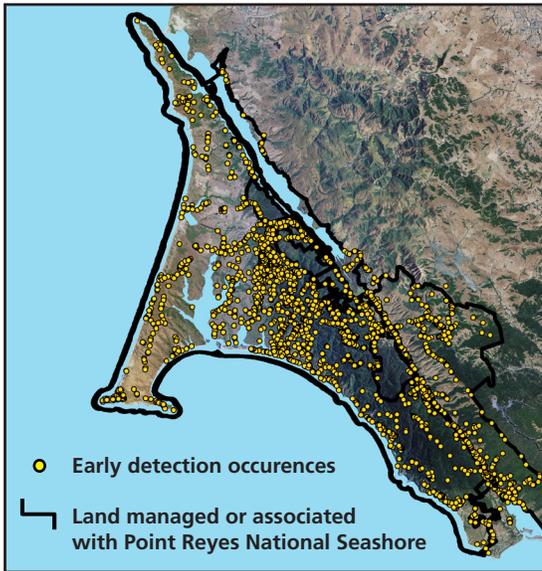


Figure 3. A map showing invasive plant occurrences (yellow dots) detected at Point Reyes National Seashore.

and volunteer time is being spent looking for the species that actually pose the greatest threat. These revised lists have allowed the Weed Watcher program to work much more efficiently.

In addition to accurate documentation of invasive plant populations, rapid response to invasions is also necessary for invasive plant management to succeed. Hundreds of infestations are removed at the time of detection. For the rest, the NPS Early Detection Program and its partner organizations work closely to coordinate monitoring and eradication efforts.

A Bay Area Early Detection Network (BAEDN, <http://www.baedn.org>) has been developed 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, including NPS. This organizational structure is helping to improve regional collaboration.

Additional Resources:

Williams A., and Others. 2009. Early detection of invasive plant species in the San Francisco Bay Area Network: A volunteer-based approach. http://www.sfnp.org/invasive_plants/detection_protocol

For more information about invasive plants or on becoming a Weed Watcher, please contact Natural Resource Specialist Eric Wrubel at Eric_Wrubel@nps.gov. Also: <http://www.weedwatcher.org> and http://www.sfnp.org/invasive_plants. Summary written by Michelle O'Herron. 2011 update by Jessica Weinberg.

Between 2008 and 2011:

- 3,227 populations (or occurrences) of at least 68 priority invasive plant species were detected along more than 325 miles of roads and trails at GOGA,
- 1,898 occurrences of at least 46 species were detected along 652 miles of roads and trails at PORE (Figure 3), and
- 168 occurrences of at least 16 species were detected along 56 miles of roads, trails, fence lines and stream corridors at PINN.

At JOMU, pilot surveys were conducted according to the early detection protocol in 2010 and 2011. So far, 42 priority invasive plant occurrences have been detected along just over 5 miles of roads and trails.

These data have given NPS staff a clearer picture of the actual on-the-ground status of invasive plant populations at GOGA, PORE, PINN and JOMU. 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

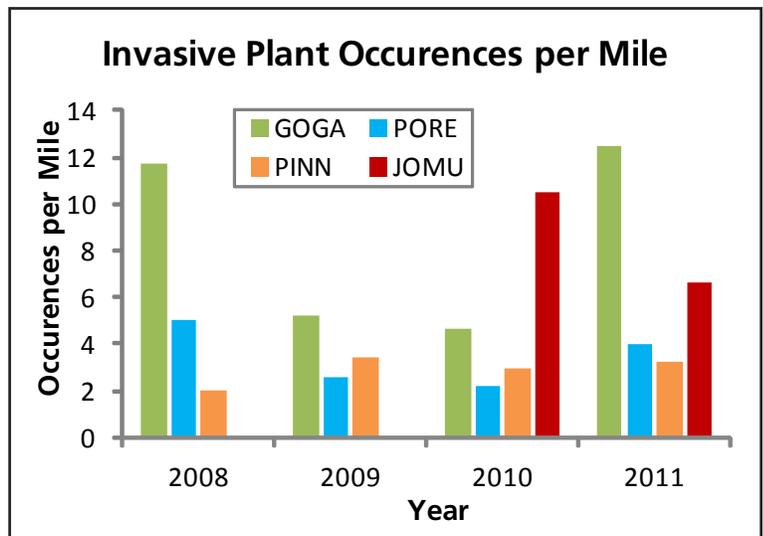


Figure 4. Invasive plant occurrences per mile by year. Occurrences have been higher at GOGA and JOMU than at PORE and PINN. The jump in occurrences detected at GOGA in 2011 is due to the addition of a skilled early detection staff person.