

Engaging Citizen Scientists with Mobile Phones: *What's Invasive!* (select Park = "San Diego County")

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Using Mobile Phones and Citizen Scientists to Map Invasive Species

The Invasive Species Problem

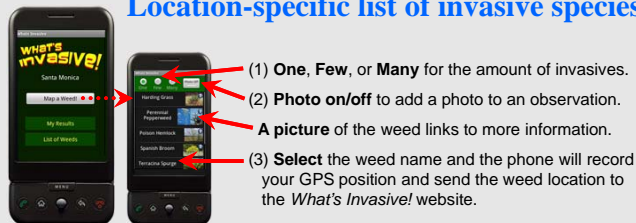
- **Rapid detection and removal** of infestations of invasive species increases the likelihood of treatment success and reduces cost.
- **Weed maps** allow managers to identify the extent of the invasive species problem and identify threats to high priority areas.
- **Drawbacks of standard weed maps** include high cost of producing them (hundreds to thousands of hours in the field) and their "snapshot" quality: they rapidly go out of date due to expansion of invasive species and/or effective control work.

The Mobile Phone + Citizen Scientist Solution

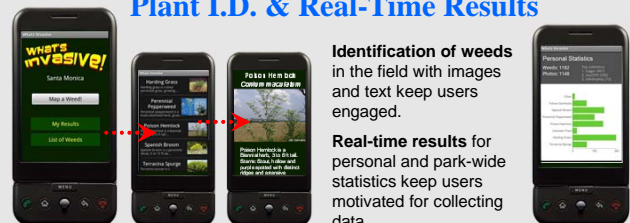
- **Mobile phones** are nearly ubiquitous and can contain sensors (GPS, cameras) to provide data for scientific and management programs.
- **Citizen science** participation has expanded dramatically in the last decade and current concerns about the environmental is driving more people to want to participate in citizen science campaigns.
- **Leveraging the millions** that visit the Santa Monica Mountains and other parks, we have developed a system to help combat the spread of invasive species using mobile phone technology.

The Mobile Phone Applications – Data Flow from the Field to the Database

Location-specific list of invasive species

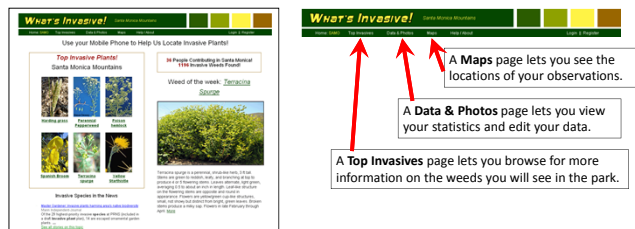


Plant I.D. & Real-Time Results



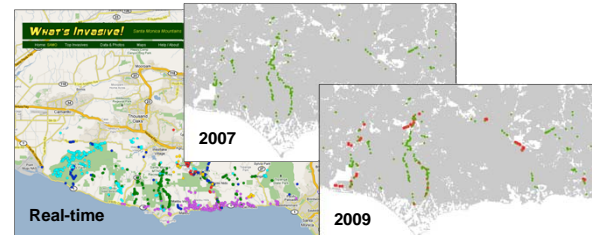
Website Integration & Data Visualizations

Home page for selected park: data access



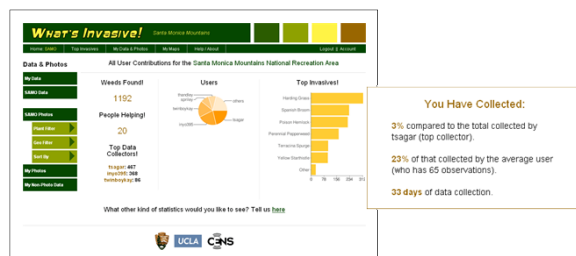
Intuitive menus guide users through the website. The website provides access to weed data, through maps and collections of photo and non-photo data points collected by both the user and the entire group working on the park.

Real-time mapping, data comparisons



Data and GIS layers add functionality to maps. A comparison between data collected by the National Park Service in 2007 during a formal weed survey and the data collected by volunteers in 2009 for the weed Terracina Spurge.

Real-time results and personal statistics



Analysis of user data. Both personal data and group-wide data is summarized and presented in easy-to-understand graphics and statistics. Future work includes flexible analysis of data and user-selected summaries.

Total user control over their data



Data is visible and editable. All images are listed with plant names, times and dates collected. Location data is also editable and users can delete images or entire entries. All non-photo data is also editable. Users may also create new observations from this page.