Progress report to California LCC from California Invasive Plant Council

Name of Recipient:	California Invasive Plant Council (Cal-IPC)
Project Title:	Developing an Online Invasive Species Risk-Mapping Tool: Climate Change Adaptation through Strategic Management of a Top Ecological Stressor
FWS Agreement Number:	80250-B-J122
Date of Report:	July 20, 2012
Period Covered by Report:	April 1- June 30, 2012
Report Submitted By:	Dr. Elizabeth Brusati, Science Program Manager, edbrusati@cal-ipc.org

Overall Results Expected

The results of this project will include: (1) a public online tool that natural resource managers can use to generate risk maps combining conservation layers with invasive plant distribution and suitability information and showing areas most vulnerable to spread; (2) a dataset accessible through the tool with statewide data for at least 100 invasive plant species; (3) invasive plant management recommendations based on the tool for a set of National Parks within the CA LCC region.

A modification to this agreement provided support for a meeting hosted by Cal-IPC in October 2011 to disseminate information on landscape scale conservation.

This report summarizes progress made toward accomplishing these results.

Progress on Products

Products for meeting: On October 4-7, 2011, the Cal-IPC Symposium in Tahoe City included 33 talks and 20 posters on topics related to invasive plant planning, design, research, inventory, and monitoring. Two hundred eighty-eight people attended from government agencies, conservation organizations, universities, and private firms. Cal-IPC staff presented our initial research findings, including a talk describing our mapping and modeling results and a poster describing our online tool. Presentations are available at www.cal-ipc.org/symposia/archive/2011_presentations.php. The conference proceedings will be completed in January.

Dec. 31, 2011: *Post test version of online tool for NPS ecologist advisory group to test, with statewide distribution data mapped for 100 invasive plant species and suitability mapped for 50. Convene modeling advisory group to guide improved modeling approach.*

[Updated June 2012]: We have met these goals, using partner contributions to support expenses for salaries and consulting. We posted a beta version of the online tool, named CalWeedMapper, in October

2011 at http://calweedmapper.calflora.org. CalWeedMapper includes distribution maps by USGS quad for 200 species from the Cal-IPC Invasive Plant Inventory (more than the 100 planned) as well as projected suitable range for some species under climate conditions for 2010 and 2050 (see below).

Quad maps were developed by meeting with land managers around the state to collect their knowledge of each species' distribution, whether it is spreading, and whether it is under management. CalWeedMapper also includes data from GIS datasets contributed to Cal-IPC by partner organizations and agencies. We are continuing to add functions and test the tool. Users can see maps and management opportunities for specific national parks, national forests, state parks, USFWS refuges and watersheds.

We are demonstrating CalWeedMapper at Weed Management Area meetings and conferences in order to obtain feedback and encourage use by stakeholders. NPS staff from Golden Gate National Recreation Area, Pinnacles National Monument, Sequoia-Kings Canyon National Park, and Yosemite National Park have also tested the tool. Sequoia-Kings Canyon and Yosemite are using it to help them determine priorities for their invasive plant management program.

[See below for update on climate models 6/30/12.)

In June 2011, we convened a modeling advisory group that includes representatives from the California Academy of Sciences, Climate Central, the Carnegie Institution at Stanford University, PRBO Conservation Science, and UC Berkeley. They have advised us on which climate models to use and how best to address modeling invasive species. Climate Central also provided us with additional climate change data based on PRISM.

Mar. 31, 2012: *Complete adding the first conservation layers to the tool with support from Cal DFG.*

We have met this goal. The Statewide Biological Richness Overview layer of ACE II (CDFG Areas of Conservation Emphasis) has been added. To view: Go to http://calweedmapper.calflora.org/maps/, click on Advanced (upper left), click on Manage Map Layers arrow to expand legend, scroll to bottom and click the box next to the conservation layer to make it visible.

Jun. 30, 2012: *Increase the number of suitability maps to cover 100 invasive plant species, and add data addressing the level of uncertainty.*

We have run models for 140 species; 60 are currently (July 2012) posted on CalWeedMapper. The models for the remaining species are under review. We are only displaying results for species in which we have a high level of confidence based on the data available and review by invasive plant experts. To improve the results, we have done significant unanticipated work to collect new data points for regions that are under-represented in the model for a given species. We compared our acquired GIS data to expert knowledge data on CalWeedMapper to identify data gaps, then encouraged experts in specific

regions to fill in data gaps by adding locations to Calflora. For particularly high priority data gaps, we hired botanical consultants on the North Coast and in the Mojave Desert to collect data points. Filling these data gaps and obtaining expert review delayed our timeline but will improve the quality of the models. The level of data collection necessary to develop the models has required additional time-consuming effort to meet our standards for displaying results.

CalWeedMapper will display three model layers by the end of July: 2010, 2050 and change. Models for 2010 are based on monthly averages from 1971-2009, with climate data from the PRISM climate group at Oregon State University. We have improved our methods for midcentury projections by adding an ensemble of 17 downscaled (to 800 m) GCMs, instead of displaying a single GCM. This ensemble method addresses uncertainty among models by showing how much agreement exists in projections. The 2050 layer displays areas where at least four GCMs show the species has suitable range. We added a new Change layer to show where suitable range is projected to expand or contract. (An example map for Russian knapweed, *Acroptilon repens*, is below.) Finally, we will display statistics for each modeled species.

Models may be viewed on CalWeedMapper (http://calweedmapper.calflora.org/maps/) by selecting the Advanced tab in the upper left, then selecting a species in the drop-down list with a globe next to the name. To turn on model layers, click the arrow on Legend/Manage Layers and scroll down to the check boxes for suitable range.

~~Sep. 30, 2012~~ December 31, 2012: *Complete online tool and promote it to the state's community of natural resource managers. Complete invasive plant management recommendations using the tool for a set of National Park units in the CA LCC region.*

The ending date of this grant has been moved to December 31, 2012 so the deadline for this task has been adjusted accordingly.

[6/30/12] The final six months of this grant will focus on this task. NPS ecologists have asked to wait until the summer field season ends to address recommendations for NPS. In the meantime, we are continuing to move the process forward with several regions: Central Sierra, Central Coast, Shasta-Siskiyou, and Humboldt-Del Norte-Trinity. The LCC amendment signed in July 2012 will fund the continuation and expansion of this work.

We solicited feedback on the information available in CalWeedMapper's reports through a survey of land managers, including National Park personnel, in August 2011. We have held two meetings with key stakeholder representatives from a five-county central Sierra region to develop a plan for coordinated projects and funding CalWeedMapper. We have met twice to assist the Cache Creek Watershed Forum (Yolo and Lake counties) in developing a strategic plan. The meetings focused on identifying regional eradication targets as well as species that are most critical to be on the watch for as surveillance targets. A strategic plan is in progress for Monterey-Santa Cruz-San Benito counties. We have attended 16 local Weed Management Area meetings covering 22 counties to demonstrate CalWeedMapper. We held two

webinars with a total 13 participants from around the state to expand our outreach, presented a talk on CalWeedMapper at the California Society for Ecological Restoration conference in May, and a poster at North American Congress for Conservation Biology in July.

Suitable Range Change Layer for Russian knapweed (*Acroptilon repens*). Green = suitable range unchanged between 2010 and 2050; orange = suitable range expands 2010-2050, yellow = suitable range contracts 2010-2050.