

DEVELOPING A WEED CONTROL STRATEGY FOR CHANNEL ISLANDS NATIONAL PARK

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Recovery of native plant communities of Channel Islands National Park, and survival of certain very rare plant taxa, are gravely threatened by alien plants. Some alien plant species are increasing rapidly in extent and in severity of their effects, while others may expand more slowly but be more permanent in effect. New species are accidentally introduced every year. The Park needs to develop a sustainable weed management program that prioritizes weedy species, identifies areas for monitoring and control, applies the control, and monitors treated and untreated areas. A plan for preventing introductions, and detecting and treating with 'accidents' is critical to this program.

Development of such a program may be best thought of in two stages. Initially, the program should provide basic information on the distribution and abundance of alien plant species throughout the Park, their reproductive strategies and ecology, and known control methods. This information should be used to develop an understanding of the levels of threat each species poses to island ecosystems, and the feasibility of eradication or control. Then weedy species can be prioritized and scheduled for treatment or observation. In the second, long-term and sustained stage of the program, control treatments can be undertaken and monitored for success, and low-intensity tracking of weedy species distribution and abundance can occur, along with periodic surveys of local invasion "hot spots." The monitoring information should feed back into the weed management program, for adjustments in techniques, species or areas of focus.

Objectives of this inter-agency, four-year project, funded by the Natural Resources Preservation Program (NRPP) of the National Park Service (NPS) and the Weeds in the West program of United States Geological Survey-Biological Resources Division (USGS-BRD), are to provide much of the start-up information for program development.

The project will provide several products. Literature reviews are being compiled on species ecology and control techniques for a list of about 100 alien taxa identified by botanists as potential threats. Landscape-level estimates of alien plant distribution and abundance within the Park are being made on the basis of field surveys conducted 1986 through 1999, and on collection information from herbarium

specimens and citations dating from the 1880s through 1999. Data are being collected on control techniques for a selected subset of the species. A priority-ranking of plant species and identified areas for control will be developed in the final year of the project, along with a targeted acceptable level of presence for each alien plant.

The literature reviews are nearly completed, and will be available from the Natural Resources Management Division of Channel Islands National Park. Field surveys for alien plants have been nearly completed on all of the Park-managed islands except for Santa Cruz Island, which has been only partially surveyed by NPS. In 1999, additional field surveys will be done on this island, existing weed distribution information will be sought from other organizations and persons, and this information incorporated into the CINP databases.

Data on distribution, abundance, community affinities and population condition and apparent vigor are being compiled into an Access database, and locations are being digitized into a linked ARC/INFO-coverage, with most user queries made through ArcView. When complete, the GIS-linked database will be used to model weed abundances, levels of current and projected impacts on island plant communities by weedy aliens, levels of weed infestation by watershed, and mechanisms, corridors and hot-spots for weed spread.

The spatially-based information will be combined with information on the ecology and control feasibility to produce a ranking of each alien plant by level of threat. We will use a DOS-based alien species ranking system designed by Hiebert and Stubbendieck (1993) to develop the initial Park-wide ranking. Results of this control-prioritization modeling will be discussed with other scientists, and the ranking may then be adjusted based on additional information gained from peer review. The ranking process will be iterative, ongoing, and responsive to change, with adjustments made to priority order as more information is gained, control efforts take effect, or additional taxa are encountered.

Finally, we already have enough information to have begun control on several alien plants, including fennel (*Foeniculum vulgare*) on some islands/areas, fireweed (*Erechtites glomerata*), perennial iceplant (*Malephora*

crocea), Harding grass (*Phalaris aquatica*), tree tobacco (*Nicotiana glauca*), smilo (rice) grass (*Piptatherum miliaceum* *Oryzopsis miliacea*), pampas grass (*Cortaderia selloana*), tall fescue (*Festuca arundinacea*), hoary cress (*Cardaria draba*), and a variety of 'thistles,' including bull thistle (*Cirsium vulgare*), and milk thistle (*Silybum marianum*).

Experimental control began as early as 1982 on some of these plants. Accelerated efforts commenced in 1992, with the inception of the Park's vegetation restoration program, which added one permanent position to the resources management division that year, and another in 1994.

Further expansion of weed-control efforts on these and a number of other alien plants has been possible in 1997-1999, as part of this project. Periodic evaluation is showing us the level of success achieved using known techniques.

In summary, Channel Islands National Park lacked critical information on the biology and ecological effects of individual species, on their current and historical extent on the islands and the nearby mainland, and on the range of established and experimental control methods possible.

Implementation of this project will 1) identify and fill gaps in our information about alien plant species biology and ecology and about alien plant distributions and associations on the islands; 2) compile this information into an Access database and an ARC/INFO GIS; 3) utilize and

evaluate one or more prioritization models for alien plant control; 4) investigate the effects of certain alien plants on native plants; 5) assist in the development of long-term, landscape-level, vegetation management goals and actions, which will include a system of preventing and monitoring for new introductions, and contingency plans and specific control prescriptions in the case of accidental introductions; and 6) accomplish significant progress in control of the highest-priority weed situations and to therefore directly reduce deleterious effects of alien plants on rare native plants and other Park resources.

All the products and findings of this project will be available to interested land managers and researchers.

LITERATURE CITED

Hiebert, R.D. and J. Stubbendieck. 1993. Handbook for ranking exotic plants for management and control. Natural Resources Report, NPS/NRMWRO/NRR-93/08., USDI, National Park Service, Midwest Regional Office, Omaha, NE. 29pps.

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