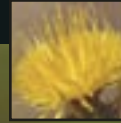
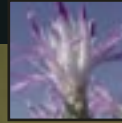
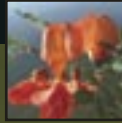


California Noxious & Invasive Weed Action Plan

• September 2005 •



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*Front Cover: Bull Thistle *Cirsium vulgare* — Photographer: David Kratville*

Back Cover: Plumelless Thistle — Photographer: David Kratville

Thumbnail Photographers: Bob Case, David Kratville, Kevin Martyn

*California Noxious & Invasive Weed
Action Plan*

September 2005



Endorsed by:

California Invasive Weed Awareness Committee
California Department of Food and Agriculture
California Interagency Noxious Weed Coordinating Committee
California Resource Agency
California Department of Transportation (CALTRANS)
California Agricultural Commissioners and Sealers Association
California Farm Bureau Federation
California Cattlemen's Association
California Woolgrowers Association
California Native Plant Society
California Native Grasslands Association
California Invasive Plant Council
California Weed Science Society
Audubon Society
The Nature Conservancy
California Forest Pest Council
California Association Of Resource Conservation Districts
Regional Council of Rural Counties



Dear Fellow Californians:

A dynamic partnership is emerging in California to battle the threat of noxious and invasive weeds. This partnership pulls together a diverse team of citizens and professionals to help solve the economic and environmental harm caused by these aggressive "plants-out-of-place." In order to enhance this effort, the California Department of Food and Agriculture, in partnership with the California Invasive Weed Awareness Coalition, has produced this action plan to lay out a blue-print for increased partnership, coordinated response and, most importantly, action. The proposal is based on science, is cost-effective and proposes to utilize the people of California as our best resource to tackle this problem head-on.

The primary purposes of this plan are to:

1. Enhance existing efforts and create new opportunities for protecting agriculture and our natural environment from noxious and invasive weeds.
2. Ensure that weed control activities are coordinated, cost-effective and meet the needs of our economy and environment.
3. Assure that public dollars are spent most efficiently and all attempts are made to secure matching funds from our national partners.

We are asking you, the citizens and land stewards of California, to join together in this coordinated fight against noxious and invasive weeds. California is too rich in its agricultural economy and natural beauty to let it be spoiled by the biological pollution that these weeds represent. Californians enjoy an exceptional lifestyle fostered by teamwork, exceptional people and our natural resources. We ask you to be a partner in making this action-oriented plan a success.

Sincerely,



A.G. Kawamura, Secretary
Department of Food and Agriculture



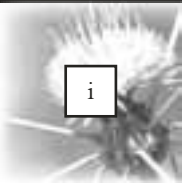
Mike Chrisman, Secretary
Resources Agency

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Executive Summary



Yellow starthistle Centaurea solstitialis

is a highly noxious weed that now occupies 12 million acres of California. It is highly toxic to horses and is reviled for its sharp spines and tendency to form impenetrable thickets. Photographer: David Kratville



California's Weed Problem

California is now home to many non-native plants from around the world. Most of these plants are highly beneficial to our agriculture, economy, and cultivated landscapes. Unfortunately, other non-native plants are not beneficial. Some are actually very harmful and spread rampantly across the landscape. These are called noxious and invasive weeds and are a form of biological pollution. Noxious and invasive weeds spread aggressively and lower agricultural productivity, crowd out native species, increase fire risk and add to the costs of maintaining roads, parks and waterways. Noxious and invasive weeds infest over 20 million acres in the state and result in hundreds of millions of dollars in control costs and lost productivity. Furthermore, as if current infestations were not bad enough, California will be subject to even higher rates of weed introductions as human population and trade globalization continue to increase.

The Need for a Plan

Despite the immense damage from weeds, California's resources to stop the siege are limited. Any organized attempt to lessen their impact on society and the environment must be well coordinated and strategically targeted to ensure that resources are devoted to the most damaging weeds in the most strategic localities. Public monies and effort currently allocated towards the prevention of weed infestation and spread are being used strategically in order to make the wisest use of these limited resources. However, current activities are not sufficient to adequately address the growing problem of noxious and invasive weeds. This plan summarizes and prioritizes the unmet needs within existing weed control programs and the ways in which current actions could be made even more effective.

The Goal of the Weed Action Plan

The ultimate goal of this plan is to protect and enhance the economy, natural environment, and safety of the citizens of California through greater awareness, cooperation, and action in the prevention and control of noxious and invasive weeds.

The Creation of the Weed Action Plan

The California Invasive Weed Awareness Coalition requested that the California Department of Food and Agriculture (CDFA) lead the development of a state weed action plan in 2002. The CDFA organized a steering committee and held a State Weed Summit in 2003. Subsequently, the initial action plan framework, established at the Summit, has been reviewed and refined by weed control workers and interested parties throughout the state.

Comprehensive Needs and Short-Term Actions

Improvements to the current noxious and invasive weed control programs can be divided into two categories: those requiring no new funding and resources and those which do require significant new resources. This plan distinguishes between and creates two categories of enhancement:

Comprehensive Needs – are major items that will need to be in place over the long term for fully successful weed control in the state. These items will require significant development, funding, and in some cases, policy change. Collectively, these items provide a set of high-priority goals for the state's effort to address noxious and invasive weeds in a more active and coordinated fashion.

Selected Actions – are realistic short-term tasks that will be implemented as quickly as possible. Those organizations most likely to take responsibility for a specific action are listed with each action and will endeavor to undertake these actions immediately. Progress will be monitored on an annual basis and will be formally assessed two years from the plan's release date.

Major Sections of the Weed Action Plan

This plan is divided into 10 sections which capture the unique subject areas into which weed control activities can be grouped. Each section has an introduction, an assessment of current resources, and a compilation of the comprehensive needs and selected actions discussed above. The sections of the plan are:

- Leadership and Coordination
- Prevention and Exclusion
- Early Detection and Rapid Response
- Eradication and Management
- Inventory, Monitoring and Evaluation
- Restoration
- Research
- Education and Public Awareness
- Funding and Resources
- Enforcement and Compliance

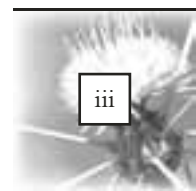
Major Themes in the Weed Action Plan

During the 2003 Weed Summit and subsequent compilation of this document, a number of major themes have emerged. The following are areas in need of particular attention, including further discussion, analysis, and, most importantly, action:

- Early detection and rapid response are needed for new infestations.
- Eradication should be attempted whenever feasible.
- Lack of funding is a significant constraint.
- Weed Management Areas (WMAs) have been successful at local weed control, mapping, and education, and they must be supported and funded.
- Economic analysis of weed impact needs to be researched.
- For weeds not legally recognized as “noxious,” no lead agency or comprehensive program exists.
- Communication needs to improve between regulators and weed biologists to keep environmental compliance from being a barrier to rapid and reasonable treatment.
- The sale of invasive ornamentals through the horticultural trade must be addressed.
- Mapping is a crucial element of a well-planned control effort.
- Weed education programs need to be coordinated and enhanced.

Conclusion

California has a serious weed problem that is getting worse. However, this plan has identified comprehensive needs that, if addressed, will enable some of the most serious impacts from noxious and invasive weeds to be minimized and prevented. Furthermore, selected actions have been identified that will immediately be addressed by agencies, groups and individuals to begin doing more with the resources at hand. Progress in implementing the plan will be evaluated on a yearly basis to ensure its recommendations are fulfilled.



Pampas grass, Cortaderia selloana, is an ornamental plant that can become highly invasive in riparian areas of California. It crowds out native vegetation and destroys wildlife habitat. Photographer: Bob Case.

Introduction



Scarlet wisteria Sesbania punicea

is an example of an escaped ornamental which invades floodplains, impedes water flow, and can lead to flooding. Photographer: Bob Case.

The Need for a Statewide Weed Plan

The spread of noxious and invasive weeds across the landscape has been compared to an explosion in slow motion. Unlike other forms of pollution that dissipate or accumulate, weeds reproduce themselves exponentially. Without sufficient action, the weed infestation problem is rapidly growing worse.

Highly damaging to agriculture, rural landscapes, and the natural environment, these plants are “out of place” and interfere with beneficial uses of the land. This rapidly spreading form of biological pollution is seriously degrading our state’s unique biodiversity. With even more weeds on the way, California will be subject to even higher rates of weed introduction as human population and trade globalization increase.

Despite the immense damage from weeds, California’s resources to stop this siege are limited. Any organized attempt to lessen their impact on society and the environment must be well coordinated and strategically targeted to ensure that resources are devoted to the most damaging weeds in the most strategic localities. Public monies and effort currently put towards the prevention of weed infestation and spread are being used strategically in order to make the wisest use of these limited resources. However, current resources are not sufficient to adequately address the growing problem of noxious and invasive weeds.

These problems and the need for action were discussed by the California Range Management Advisory Committee’s (RMAC) Noxious Weed Subcommittee, and this discussion resulted in the 1999 publication entitled: “Strategic Plan for the Coordinated Management of Noxious Weeds in California” (available at www.cdffa.ca.gov/rmac.pdf). This plan successfully promoted the benefits of cooperative action in weed management and resulted in two pieces of legislation (AB 1168 in 1999 and SB 1740 in 2000), which provided pilot funding for Weed Management Areas in California. (Also, since 1999, the number of county-based weed management

areas has increased from six to 45 in the state). While the RMAC’s plan set a broad strategy for cooperation and increased programs, it was not intended to map out a comprehensive set of actions and needs based on stakeholder input. Thus, in 2002, the California Invasive Weed Awareness Coalition launched the process that has resulted in this current action plan.

Development of the Weed Action Plan

What is the Weed Action Plan?

This document reviews existing strategies for the control of noxious and invasive weeds in California and lists selected actions designed to promote and enhance on-the-ground prevention and control. This plan also lists comprehensive needs, which are future actions that can only be undertaken with a major increase of activity and funding.

Though much of this plan is general in nature and applies to noxious and invasive weeds regardless of habitat, this plan focuses primarily on terrestrial species. A state plan for all aquatic invasive species including plants is currently being written under the direction of the California Department of Fish and Game. These two plans are intended to be complementary. Furthermore, this plan will focus on both of the overlapping weed categories: noxious and invasive. Noxious weeds are defined by inclusion in the California Department of Food and Agriculture (CDFA)’s Noxious Weed List in the California Code of Regulations (see Appendix D). Invasive weeds are not legally defined. They are commonly categorized based on: (1) their proven ability to invade and dominate natural or working landscapes, and (2) the economic or ecological damage they cause. (See, for instance, the California Invasive Plant Council’s criteria at www.cal-ipc.org.) All noxious weeds are invasive, but the reverse is not true. Many invasive weeds have not been added to California’s Noxious Weed List because they do not impact agriculture or because they are a low priority for regulatory action. (Further aspects of weed lists are covered in Appendix D.)

Common weeds of highly disturbed or intensively managed areas (urban landscapes and row-crop agriculture, for instance) are not the focus of this plan.

Who developed the Weed Action Plan?

The need for this plan was conceived by the California Invasive Weed Awareness Coalition (CALIWAC), a consortium of businesses and nongovernmental organizations that endeavors to increase awareness of noxious and invasive weeds and to increase resources for their prevention and control. CALIWAC formally requested that the CDFA take a lead role in the formulation and production of the plan. The CDFA assembled a steering committee representing key agencies and interests and developed a process for soliciting broad input from a cross section of those working on weed issues in California. The CDFA reviewed state weed plans from other western states, using these plans to generate a framework centered on 10 key topics. On April 3, 2003, the CDFA invited 100 weed experts and organizational representatives to Sacramento for a State Weed Summit. At the meeting, attendees divided into working groups to develop lists of selected actions and comprehensive needs for each of the 10 key topics. These lists form the basis of this current Weed Action Plan.

Objectives of the Weed Action Plan

The Weed Action Plan Steering Committee, in advance of the summit, identified a number of objectives for the production of this planning effort. Each one of the following objectives was chosen for its potential to ultimately enhance weed prevention and control:

- Emphasize early detection and rapid response.
- Prioritize important issues and identify strategies for addressing these issues.
- Increase coordination and cooperation among existing weed programs.
- Analyze and address gaps in authority, implementation, and funding.
- Create a blueprint for funding priorities and enhancements.
- Promote innovation, prevention, and partnerships.
- Highlight goals that are realistically achievable.
- Identify regulatory issues and obstacles.
- Promote clear performance measures for weed management projects.
- Secure federal funding.



Education and outreach plays a crucial role in enlisting the participation of land owners and professional land stewards.

Photographer: Bob Case

Regulatory Framework and the Pest Prevention System



Diffuse Knapweed

Centaurea diffusa is a highly damaging weed of rangelands and grasslands. Although very prevalent in other western states, California has had an aggressive eradication program to keep most knapweeds out. Photographer: Kevin Martyn

This section provides a working knowledge of how weeds are defined in California, both legally and scientifically. The definitions, and their relationship to management priorities, will continue to evolve. A full discussion of the regulatory system is detailed in Appendix D.

Noxious Weeds

California's Pest Prevention System (PPS) is a coordinated program of the CDFA, County Departments of Agriculture (CDA), and the United States Department of Agriculture (USDA). There are five components to the system:

- Exclusion
- Detection
- Eradication
- Management
- Public education

The PPS is supported by a set of laws, regulations, and policies and was designed to protect agriculture from damaging agricultural pests. However, many other sectors of society and the natural environment have benefited also from the PPS. For example, there are many pests that have been eradicated or controlled under the PPS, such as gypsy moth, ash whitefly, red imported fire ant and spotted knapweed, which can have major impacts in non-agricultural settings as well.

Aspects of the PPS that the public may become aware of might be derived from a law, a regulation, a policy, or an established practice. For instance, the legal definitions of a pest and a noxious weed are found in law, the list of noxious weeds is found in regulations, and the familiar pest rating system (A, B, C, Q) is a policy statement on management approaches to a species.

The CDFA's and the CDA's legal basis for weed control comes from laws passed by the California State Legislature and found in the California Food and Agricultural Code (FAC). The FAC is one of 29 codes that embody California law. Appendix D provides a digest of the laws that pertain to pest prevention in California (a complete listing of all Codes can be found at www.leginfo.ca.gov/calaw.html).

Laws are often general, thereby delegating the details of interpreting and meeting lawmakers' intent to a department or agency. When an agency provides a formal interpretation and enactment of a law, it is termed a regulation. Food and Agriculture regulations are listed in Title 3 of the California Code of Regulations (CCR). Several sections in the FAC, such as Section 5322, allow the CDFA to develop regulations pertaining to pests. One such example is the Noxious Weed List, which is found in Section 4500 of the CCR (the entire CCR can be accessed at ccr.oal.ca.gov/default.htm).

Finally, departments or agencies may have responsibilities for managing various resources and for addressing various problems within the constraints set by laws and regulations, often developing formal or informal internal policies to guide such management. These policies do not in themselves have the weight of law or regulation, though they must be consistent with them, and they may have considerable institutional weight. The CDFA's pest rating system is a good example of an internal policy. In general, neither the laws nor the regulations set specific management goals for different species of pests (few species, such as hydrilla, receive special attention).

The CDFA has a general responsibility to manage noxious species. The Legislature provides some resources to do so, but they are insufficient for intensive management of all, or even most, potential targets. The CDFA in general tries to focus its energies on battles it can win (meaning where there is a hope of eradication or at least preventing spread), with consideration for the threat posed by the pest. The rating that the CDFA gives a pest reflects the weighing of these factors. As there are uncertainties and differing points of view associated with any factor, the rating system often generates significant discussion. The rating system, including how plants are added or removed from the list, was formalized in a CDFA document identified as Quarantine Circular No. 213 of 1989, although in recent years there have been several attempts to revise the policy. Formal definitions of the ratings appear in Appendix D.

County Departments of Agriculture play the primary role in implementing the PPS at the local level. Their staff is the most likely to detect new weed infestations in the county and to implement the laws and regulations that pertain to noxious weeds in California. Much of the eradication and control work is carried out by the counties. A critical weakness in the PPS is the difficulty for the CDAs to obtain and maintain sufficient resources

for early detection of new infestations and subsequent rapid response.

The main laws, regulations, and policies for noxious weeds are summarized in Appendix D.

Non-noxious Invasive Weeds

There is currently no comprehensive framework in state government for regulating invasive plants that are not legally defined as noxious. Although extensive, control efforts by agencies and private parties in non-agricultural landscapes are not supported by statewide laws, regulations, and formal policies.

The nonprofit California Invasive Plant Council (Cal-IPC) maintains a non-regulatory list of invasive plants that have been found to have a significant negative impact on natural ecosystems within the state. The list was first published in 1996, and is increasingly being cited during local governmental decision-making actions. The list is based on an evaluation of scientific literature and field observations. The list includes both the state's noxious weeds that are proven pests in wildlands and additional plants that are documented as a problem only in wildlands. (The list and the criteria on which it is based may be accessed at www.cal-ipc.org.)



Purple loosestrife *Lythrum salicaria*
is being manually removed from a wetland in
Kern County. This plant has been declared one of the
world's 100 worst invaders. Photographer Carri Pirosko.

Existing Situation and Capabilities



Gorse, Ulex europaea,

is a large highly spiny and invasive shrub which is highly flammable. It is listed as one of the 100 most damaging invasive species in the world. Photographer: David Kratville

California currently spends millions of dollars on the control of noxious and invasive weeds. The main intent of this plan is to coordinate and target this activity, as well as to fill gaps in resources. What follows is an overview of current work being done in California by the diverse agencies, businesses, and non-governmental organizations (NGOs) involved. This overview is somewhat preliminary—evaluating the existing situation and capabilities is a major task in itself, and one that will be a vital next step in implementing this weed plan. (More detail on land holding agency profiles can be found in Appendix C.)

Government Agencies

Government agencies at the local, state, and federal level are engaged in work on noxious and invasive plant species. Much of this work is conducted on public lands, although federal programs can also assist weed control projects on private lands as well.

Federal agencies

Federal agencies manage a significant amount of land in California. They can also be key players in stopping importation of new pests. Federal agencies involved in invasive plant management include:

- US Department of Agriculture (USDA)

US Forest Service (USFS) Pacific Southwest Region 5 manages 20 million acres in California. Weed control is an aspect of their land management practices to protect forest resources and services.

Agricultural Research Service (ARS) does not manage land. Their mission is research focused, in part, on weed control (e.g. biological controls and remote sensing technologies are two primary areas of involvement).

Animal and Plant Health Inspection Service (APHIS) regulates the movement of federally listed noxious weeds into the state.

National Resources Conservation Service (NRCS) advises private citizens on land management practices and channels funding to local landowners for improvements.

Economic Research Service (ERS) is beginning to calculate the economic impact of invasive species.

Cooperative State Research Education Extension and Service: CSREES provides funding for weed control research and outreach.

US Department of the Interior (USDOI)

National Park Service (NPS) manages high profile parklands in California. Their mobile Exotic Plant Management Team controls weeds in 12 of the parks. The Golden Gate National Recreation Area has been a leader in developing weed control strategies, especially those using volunteers.

US Bureau of Land Management (BLM) manages 17 million acres in California.

Fish and Wildlife Service (USFWS) manages National Wildlife Reserves in California, with a focus on preserving habitat from threats including invasive plants.

Bureau of Reclamation (BOR) manages water conveyance facilities and supports aquatic plant control and eradication.

Bureau of Indian Affairs (BIA) assists tribes in controlling weeds on tribal lands.

- US Army Corps of Engineers (ACE), South Pacific Division, owns 75,000 acres of land and another 30,000 surface acres of water in California, mostly associated with dams. They do not have a state coordinator for aquatic weeds.
- National Invasive Species Council (NISC) was created in 1999 by Executive Order 13112. The council comprises representatives from eight federal agencies, and is headed by the Secretaries of Agriculture, Interior, and Commerce. The goals of the council include increased interagency coordination and enhanced effectiveness in controlling invasive species. In 2001, NISC released the National Management Plan for invasive species.
- Invasive Species Advisory Committee (ISAC) comprises invasive species researchers and professionals who are appointed to provide expert advice from stakeholders to NISC.

State agencies

California's state agencies serve to protect the state's agricultural and natural resources. They serve as key intermediaries between national and local programs. State agencies involved in invasive plants include:

- The California Department of Food and Agriculture (CDFA) has regulatory power and manages some on-the-ground control programs as well as statewide biocontrol development efforts. The CDFA has been the state's lead agency for noxious weed management. The CDFA manages funds designated for Weed Management Areas (WMAs) by the Legislature.
- The Resources Agency

Department of Parks and Recreation: State Parks manages 1.4 million acres, and has itemized weed control in their budget as part of ongoing natural resources maintenance. In 2004, they completed an inventory of park resources and threats, including weed populations. Approximately 100,000 acres of DPR lands have infestations of invasive weeds.

Department of Fish and Game: DFG manages almost 970,000 acres of fish and wildlife habitat. In 2003, department personnel engaged in control efforts against a reported 68 different exotic invasive weed species on CDFG managed lands.

Department of Boating and Waterways: Manages an invasive aquatic weed control program for Water hyacinth and *Egeria densa* in the Sacramento-San Joaquin Delta and its tributaries.

Coastal Conservancy: The Coastal Conservancy funds the Invasive Spartina Project in San Francisco Bay, and supports educational materials on invasive plant management.

Department of Forestry and Fire Protection (CDF): Implements the Vegetation Management Program. CDF also plays a lead role in many prescribed burns to control invasive plants.

California Bay-Delta Authority: Distributed over \$2.6 million for weed control, management and research activities in 2003 – 2004. Species addressed include arundo, purple loosestrife, *Egeria densa*, and perennial pepperweed.

Wildlife Conservation Board (WCB) was created by legislation in 1947 to administer a capital outlay program for wildlife conservation and related public recreation. While housed in the Department, the WCB is a separate and independent Board with authority and funding to

carry out an acquisition and development program for wildlife conservation. Since 1999, the Wildlife Conservation Board has funded over \$5 million worth of riparian restoration projects that focused on removal of invasive weeds from 11 counties.

- Department of Transportation (CalTrans) manages roadside weeds along California highway right-of-ways.
- Department of Pesticide Regulation (DPR) regulates the use of herbicides and certifies applicators. They do not currently have certification geared specifically toward wildland weed control.
- California Invasive and Noxious Weed Coordinating Committee (CINWCC) brings together representatives from state and federal agencies to discuss matters of coordination in invasive plant control.
- Department of Forestry and Fire Protection implements a Vegetation Management Program. Department crews assist on prescribed burns which are used as a tool in invasive weed control.

Local agencies

- County Agricultural Departments (Agricultural Commissioners) carry out regulatory and other weed control programs in their counties. County Agricultural Departments, under the leadership of the County Agricultural Commissioner, perform the bulk of regulatory noxious weed eradication and control work in California. In addition to controlling high priority noxious weeds, Commissioners have also played a vital role in coordinating and leading many Weed Management Areas.
- Weed Management Areas (WMAs) are diverse stakeholder coalitions that bring together entities working on invasive weeds in a given county. Those involved typically include the local representative from state and federal agencies with land in the county, as well as land managers from local park districts, large private landowners, and concerned citizens from local NGOs. Besides coordinating on-the-ground control projects, WMAs conduct mapping efforts and public awareness campaigns.
- Resource Conservation Districts (RCDs) are established on a county or other regional basis, and serve as on-the-ground advisors for land management practices.
- Water Management Agencies can be involved in controlling noxious and invasive weeds when the weeds interfere with agency objectives.

Non-Governmental Organizations

National NGOs

- The Nature Conservancy (TNC) manages extensive lands in California, and their Wildlands Invasive Species Team is headquartered at U.C. Davis. Invasive species are a top priority for TNC.
- Union of Concerned Scientists (UCS) focuses on major environmental policy issues, and invasive species are one of their top issues.
- The Invasive Weeds Awareness Coalition (IWAC) sponsors a weeklong invasive weed awareness event in Washington, D.C. each year, where weed worker representatives come together to discuss priorities with top agency managers and elected officials.
- National Environmental Coalition on Invasive Species (NECIS) is a group through which major environmental groups advocate for legislation supporting invasive species control.

State NGOs

- California Invasive Plant Council (Cal-IPC) has a statewide membership of 1,000 land managers, researchers, and volunteers. The organization was founded in 1992, and has held an annual conference since then. Cal-IPC maintains a list of invasive plants found in the state.
- California Native Plant Society (CNPS) focuses on conserving native habitat, and weeds are an increasing concern to the group. They have 10,000 members statewide.
- California Society for Ecological Restoration (SERCAL) is a professional organization for land managers and ecological consultants.
- California Invasive Weed Awareness Coalition (CALIWAC) brings together private sector interests (NGOs as well as industry) to plan for better weed control in the state. The group holds regular awareness events and pursues favorable legislation. Active member groups include Cal-IPC, CNPS, California Cattlemen's Association, California Farm Bureau Federation, and Regional Council of Rural Counties. Industry representatives from Monsanto, Dow AgroSciences, Wilbur Ellis Co., DuPont, UAP Timberland, and BASF participate in or support CALIWAC's work.

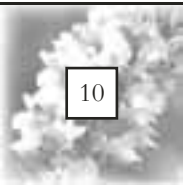
Private Sector

Private landowners

- Ranchers and farmers: Agricultural producers have historically been the primary players in weed control. Agriculture is heavily impacted by weed infestations—and agricultural practices can also play a major role in spreading weeds. Producers remain key as other land managers join the effort. Though many wildland weeds are not of concern on agricultural land (and vice versa), there is significant overlap in species of concern.
- Tribes: Native American tribes manage weeds on their lands. They are also concerned with weed control activities, especially regarding the use of herbicides, on other lands that they use for gathering food and fiber.
- Corporate landowners: Electric utilities, the forest industry, railroads, and other large corporate landowners are facing impacts and challenges from invasive weeds. Corridors managed by such landowners can provide significant vectors for infestation.
- Non-agricultural landowners: Other landowners have important reasons for managing weeds on their property—aesthetics, conservation, recreation, and animal health. Trained landowners can also be valuable players in spotting new infestations.
- Resource Conservation Districts: Local land-owner governed districts which assist private landowners in implementing conservation practices on their lands including the control of weeds.

Industry

- Herbicide manufacturers: Because herbicides are often used in weed control, companies manufacturing herbicides are key players in researching and developing new products and applications that increase effectiveness.
- Pest Control Advisors (PCAs) and Qualified Applicators Licensees (QAL) are certified by the state's Department of Pesticide Regulation to write pesticide recommendations for specific applications. Qualified Applicators are certified to apply pesticides.
- Restoration consultants: A wide range of companies provide land management services, from plan preparation to on-the-ground weed control.
- Nurseries and growers: Horticultural escapes are historically a top cause of invasive plant introductions. Today, major growers and retailers are meeting with invasive species specialists to develop practices to limit future introductions.



State Action

Plan Elements

11



Squarrose knapweed, *Centaurea squarrosa*

is one of the knapweeds which form monocultures in rangelands and grasslands. Confined to a few populations in northern California, this weed would someday cover millions of acres of the state if not contained. Photographer: Kevin Martyn

State Action Plan Elements

This chapter presents 10 key elements in which action is needed to improve the state's response to noxious and invasive weeds. Each of the 10 elements includes a background, description of current programs, and lists of comprehensive needs and selected actions for that key area. These lists outline the plan's long-term and short-term recommendations, and the core of the plan. The set of needs and actions contained herein were condensed, revised and enhanced, starting with those developed by over 100 California experts at the 2003 Weed Summit.

Background - This section discusses the relationship of the key area to the broader discipline of noxious and invasive weed control. Space considerations necessitate that this section be brief and directly relevant to the situation in California at the present time. There is a significant amount of literature available describing each of these areas in more detail.

Current Program - This section highlights current activity, or lack of activity, in this key area occurring in the state. This defines the baseline-condition, which is expected to be expanded in the future.

Comprehensive Needs - This section lists major items that need to be in place over the long-term for fully successful weed control in the state. These items will require significant work, funding, and in some cases, policy change. Collectively, these items provide a set of high-priority goals in the state's effort to address noxious and invasive weeds in a more active and coordinated fashion. In some key areas, the comprehensive needs were selected as the highest priorities from a longer list developed at the summit.

Selected Actions - This section lists realistic short-term tasks that should be undertaken as quickly as possible. Those organizations most likely to take responsibility for a specific action are listed with each action and should endeavor to undertake these actions immediately. Progress will be monitored on an annual basis and will be formally assessed two years from the plan's release date.

Leadership and Coordination

Background

In California, extensive weed control efforts are underway, involving thousands of people in diverse sectors of society. This network of people includes not only on-the-ground weed managers, but also those working to support them. For maximum success, all weed control efforts require coordination and collaboration among the organizations, including many levels of some organizations.

Current Program

The CDFA is designated the state's lead agency in noxious weed control. The CDFA performs the following functions: (1) maintaining the list of officially designated noxious weeds, and regulates the movement and commerce for these weeds; (2) implementing the Pest Prevention System (PPS); (3) coordinates with county eradication efforts for high priority (A-rated) noxious weeds; and (4) provides partial funding, oversight and guidance to county-based Weed Management Areas (WMAs).

For weeds that are not designated noxious, there is no clear lead agency. California however, has many coordination groups that provide leadership, education and advocacy on many different facets of weed control in the state. The major groups are described below.

California Agricultural Commissioners and Sealers Association (CACASA) is the statewide organization of the County Agricultural Commissioners. CACASA has a Weed and Vertebrate Control Committee. CACASA promotes uniformity in the activities of County Departments of Agricultural and provides a uniform voice by passing resolutions, which can address weed policy issues.

California Interagency Noxious Weed Coordinating Committee (CINWCC) was formed in 1995 with a Memorandum of Understanding among 14 federal and state agencies. The group meets quarterly. Its mission is to facilitate, promote, and coordinate the establishment of an Integrated Pest Management partnership between public and private land managers, toward the eradication

and control of noxious and invasive weeds on federal and state lands, and on private lands adjacent to public lands.

California Invasive Weed Awareness Coalition (CALIWAC) was formed in 2001 to increase awareness of the invasive weed issue in California. Its goals are the following:

1. Support the development of a statewide management plan for invasive weeds.
2. Provide a public forum to increase awareness of the environmental and economic impact of invasive weeds.
3. Promote increased funding for management of invasive weeds.
4. Influence state and national policy on invasive weeds.

California Invasive Plant Council (Cal-IPC) is a nonprofit organization whose mission is to “protect California wildlands from invasive plants through research, restoration, and education.” Cal-IPC’s active membership includes public and private land managers, agency and university researchers, ecological consultants, planners, volunteer stewards, and concerned citizens. Cal-IPC is recognized as an authoritative source of information on wildland weed biology and management.

California Partnership for Preventing Invasive Plants Introductions through Horticulture (Cal-PPPIH). Develop and foster implementation of strategies for preventing new and continuing introductions of invasive plants through the horticultural community in order to protect California’s natural resources.

California Bay-Delta Program Non-native Invasive Species Advisory Committee (NISAC) is made up of agency and technical stakeholders that advise the California Bay-Delta Program on non-native invasive species. This group helps California Bay-Delta Program to set priorities and policy. A Memorandum of Understanding will lead to the formation of a more formal advisory and coordination group. This group focuses on watersheds that pass through the Sacramento-San Joaquin River Delta.

County Weed Management Areas (WMAs), and other local weed-specific coordination groups have brought coordination efforts for invasive plant prevention and control to a more local level, and they have increased the sophistication and effectiveness of invasive species management in California. A Weed Management Area (WMA) brings together landowners and managers (private, city, county, state, and federal) in a county, multi-

county, or other geographical area for the purpose of coordinating efforts aimed at controlling invasive weed species locally. The WMA works at a grassroots level where participants in the group are directly controlling weeds or educating those who do.

California Weed Management Area Leadership Council (CWMALC) is a council of WMA leaders that meet and work together to further the missions of WMAs, to articulate a common voice for weed management at the local level, and to link with organizations such as CACASA, CINWCC, CDFA, and CALIWAC.

California Weed Science Society (CWSS) was founded in 1948 to promote environmentally sound proactive research and develop educational programs in weed science, to support undergraduate and graduate students seeking a career in weed science, and encourage and to support educational activities to promote integrated weed management systems. The CWSS has provided leadership over many decades to weed control scientists and practitioners.

California Aquatic Invasive Species Council (CAISC) was established through legislation in 2002. It will be facilitated by the Department of Fish and Game and will endeavor to develop a comprehensive plan to manage invasive aquatic species, including weeds. It is also authorized to develop protocols for responding to infestations not listed for control in any current statute or regulation. The California Performance Review has recommended abolishing this council, which has never been established, funded or staffed.

Range Management Advisory Committee (RMAC) is an appointed committee of the California Board of Forestry, which advises the California Department of Forestry and the California Department of Food and Agriculture on range management issues. It had a noxious weed management subcommittee (not currently active) and issued a strategic plan for the coordinated control of noxious weeds in California. The committee has taken a lead in promoting a framework for integrated vegetation management.

Weed species-specific coalitions such as Team Arundo, Team Arundo del Norte, Invasive Spartina Project, International Broom Initiative, Southern California Caulerpa Action Team, and the Sesbania Working Group focus on coordination for a single specific weed target and bring together workers over large geographical areas.

LEADERSHIP AND COORDINATION — COMPREHENSIVE NEEDS

Leadership	<i>Elevation of weed issues in relative statewide political importance.</i>
	<i>Greater leadership from high-level management in CINWCC agencies.</i>
	<i>A lead agency for invasive weeds not designated as noxious weeds to address regulatory gaps for these weeds.</i>
	<i>More nongovernmental stakeholders in leadership and coordination roles.</i>
Coordination	<i>More coordination among agencies, nongovernmental organizations, professional associations, private businesses, and water associations.</i>
	<i>More participation of relevant agencies in each Weed Management Area through internal agency mandates, incentives, and outreach.</i>

LEADERSHIP AND COORDINATION — SELECTED ACTIONS

Weed Plan	<i>Formally endorse this state Weed Action Plan. (CDEA, CINWCC, CALIWAC, CACASA, SWPSC)</i>
	<i>Designate a lead person at each agency for implementation of this plan. (CINWCC)</i>
	<i>Review and evaluate the progress of this plan biennially. (CDEA, CINWCC, CALIWAC)</i>
Coordination	<i>Increase meeting attendance and general participation by all signatory agencies of CINWCC, and designate one mandatory meeting per year as stated in the Memorandum of Understanding. (CINWCC)</i>
	<i>Schedule CINWCC and CALIWAC meetings on half days during the same day, at least once a year, to facilitate interchange between the two groups. (CINWCC, CALIWAC)</i>
	<i>Expand CINWCC to include other agencies that may be doing state or regional control projects or relevant regulation. (CINWCC, CALIWAC)</i>

Prevention and Exclusion

Background

The first-line of defense, and over the long-term, the most cost-effective strategy against invasive weeds, is preventing them from becoming established. Prevention and exclusion of noxious weed species are the most practical and economical means of weed management. This is accomplished by ensuring that seed or reproductive plant parts of new weed species are prevented from being intentionally or unintentionally introduced to an area. Prevention also involves an understanding of which lands are most susceptible to invasion of noxious and invasive weeds. Prevention efforts are two-pronged because some species are intentionally introduced for a specific purpose, whereas others arrive unintentionally as “hitchhikers” on a commodity, conveyance, or person. Diverse tools and methods are needed to prevent invasive species from becoming established in ecosystems where they do economic and ecological harm.

Current Program

CDEA’s *Pest Prevention System (PPS)* is developed according to national and international plant quarantine laws and standards. One goal of the PPS is to prevent the harm that noxious and invasive weeds can cause to people, commerce, and the environment. The program consists of the following elements:

- Pest exclusion works to prevent the introduction of new pests by analysis of risk and implementation of science-based interception tools. Nursery inspections, border inspection stations, destinations inspections and coordination with neighboring states can prevent noxious weed seeds and propagules from entering the state.
- Detection survey activities find newly introduced weeds before an infestation is well established and while eradication is biologically and economically feasible.
- Early detected weed infestations are managed in a vigorous and systematic program until they are permanently eradicated from the site. This can take a few decades if the seed bank is long-lived.



- Public outreach encourages the public to help keep pests out of California and to spot infestations before they become unmanageable. These programs have been very helpful in locating new infestations of spotted knapweed and purple loosestrife.

US Department of Agriculture USDA-APHIS partners with CDFA to develop and enforce federal quarantines, exclusion, detection, emergency response and export certification activities in the state via cooperative agreements. County agriculture department staff implements many of these federal responsibilities. Most of this activity is directed towards insect and pathogen pests, but federal noxious weeds are banned from commercial traffic.

County Departments of Agriculture (CDAs) perform the prevention activities listed previously. Under the leadership of a County Agricultural Commissioner, they follow a series of guidelines, policies, administrative memoranda, regulations and laws, such as California’s Plant Quarantine Manual, Quarantine Commissioners’ Circulars Manual, and the Quarantine Response Manual. CDAs also work from various eradication action plans,

environmental impact reports, county polices on exclusion, phytosanitary inspections of nurseries, and detection alerts.

Agency practices and rules Many state and federal agencies have begun to establish and implement weed prevention policies for internal practices and the practices of contractors and the public. The federal agencies are considering stricter prevention polices following the Executive Order 13112 of 1999. The US Forest Service released a Guide to Noxious Weed Prevention Practices in 2001, which provides management direction and guidance to national forests throughout the country. Both the Federal Highway Administration and National Park Service have begun to stipulate weed prevention practices in new construction and other site-disturbing activities.

Departments within California state government, such as Pesticide Regulation, Resources Agency, Forestry, Fish and Game, Health Services, and Transportation administer regulatory and/or land management programs, which are part of the comprehensive approach to preventing weed infestations.

PREVENTION AND EXCLUSION — COMPREHENSIVE NEEDS	
Funding	<i>Adequate funding for prevention programs, including incentives.</i>
Analysis and Education	<i>Identification of specific pathways of weed-spread with a focus on prevention and identification of weaknesses in the current exclusion program.</i>
	<i>An analysis of impacts tied to the pathway of new plant species introductions.</i>
	<i>A central clearinghouse for weed prevention measures and a comprehensive list of prevention practices.</i>
	<i>An emphasis on prevention in all awareness and education programs. More pamphlets, brochures, and workshops.</i>
Practices	<i>Incentives for prevention in the forms of rebates and referrals.</i>
	<i>Reduction of noxious weed seeds along canals, ditches, highways, and roads.</i>
	<i>Removal of invasive plants from the nursery trade and compliance with existing regulations.</i>
	<i>A mandate for washing or cleaning of equipment, machinery, and vehicles coming from contaminated areas with proper rinse water and debris disposal.</i>
	<i>Voluntary “cleansing” measures to rid weed seed from domestic animals moving from areas contaminated by noxious weeds.</i>
	<i>Mandatory use of weed-free seed, weed-free hay, and mulch on reforestation and rangeland rehabilitation projects.</i>

PREVENTION AND EXCLUSION — SELECTED ACTIONS

<i>Actions</i>	<i>Restore CDFA and CDA funding to 2002 levels and increase levels further for early detection and response. (CDFA, CALIWAC)</i>
	<i>Compile and endorse a set of general weed prevention strategies for the state. (CINWCC)</i>
	<i>Establish a nursery weed task force with involvement from the industry. (Sustainable Conservation, Cal-IPC, CDFA, CACASA, CANGC)</i>



Early Detection and Rapid Response

Background

Early detection is the single most important element in successful and economical eradication of new weeds before they become permanently established in new localities. Early detection results from the combination of highly trained detection biologists and a large group of more casual “detection partners,” who receive short training sessions in identification of key species. Detection biologists can make systematic surveys of areas deemed high-risk for becoming infested with new invaders. These biologists can work at a district or statewide level to follow weed pathways and discover patterns of movement and spread. The “detection partners” can number in the hundreds or thousands and are trained through workshops, articles, brochures, and other outreach methods. They are a crucial link in early detection because of the vast area of the state they can traverse in their activities on the land.

Rapid response is essential when a new weed species is discovered in an area and the weed displays a high potential for developing into an invasive species. Comprehensive statewide overview is essential to provide authority, establish priorities, and provide adequate funding. However, the actual work will be accomplished by an agency or group, which specializes in on-the-ground projects.

Containment and eradication activities require focus and commitment, and they cannot proceed efficiently in an environment of complex demands and uncertain requirements. The goal is to create a consensus-driven decision process, but one where discussions about general strategies occur before the arrival of a new invader. This provides a framework within which coordination groups and agencies then make decisions as to the specific course of action to take when a new weed arrives. This decision provides the on-the-ground manager with clear goals.

Because each situation tends to include unique conditions related to the species and the environment, the rapid response plan needs to be general in nature, and it should not attempt to address regional or national processes.

Along with adequate coordination and planning in advance of new arrivals, other factors limiting rapid response are in adequate funding for new projects and the need for site-specific environmental compliance.

The following elements need to be addressed in a rapid-response system:

- Well-defined authority, leadership, and organizational roles.
- Coordination and cooperation among parties in the response.
- Funding and resources.
- Quarantine establishment and enforcement.
- Expedient environmental regulatory compliance.
- Effective public awareness and education, especially to affected property owners.
- Delimitation survey and mapping.
- Review of biology and control options.
- Implementation of eradication or other management methods.
- Assessments of treatments and modification if necessary.
- Environmental monitoring.
- Restoration or mitigation.

Current Program

1. County and CDFA detection biologists are highly trained to carry out systematic searches in areas of high-risk and to follow-up with eradication of small populations. These biologists conduct multiple surveys per year in areas where the first infestation of weeds from outside the state or region are likely to occur. They

also give extensive training to land managers to help them recognize A-rated and other locally important weeds and know which agencies to contact if they do find them. Currently, there are not enough trained biologists at the state or county level to adequately cover the entire state. The CDFA employs the State Botanist, who provides official determinations to weed specimens submitted by field biologists.

2. There are a number of other herbaria with botanists who can also identify weeds and alert the correct agencies if priority weeds are discovered.
3. There has been a dramatic increase in “detection partners” – land stewards who are trained in weed recognition and how to report new invaders.
4. Weed Management Areas and agencies have greatly facilitated the training of “detection partners.”

EARLY DETECTION AND RAPID RESPONSE — COMPREHENSIVE NEEDS	
Education and Outreach	<i>A better pest alert system for non-rated weeds.</i>
	<i>A better way for the public to report finds.</i>
	<i>Better information on weeds in areas with similar climates.</i>
	<i>An enhanced plant taxonomist network for weed identification.</i>
Infrastructure	<i>Improved early detection and rapid response.</i>
	<i>Identify agency to take lead authority on unregulated weeds.</i>
Funding	<i>Sufficient and stable funding for high-priority early infestations and setup for immediate response.</i>
	<i>Short-term emergency funds for quick immediate response.</i>
Quick Response	<i>Pre-compliance with environmental regulations before invasion.</i>
	<i>Better detection methods. Trained “passive” detectors.</i>
	<i>Rating system linked to statutory authority.</i>
	<i>Identification of pest experts for assessment and response to potential new introductions.</i>
	<i>An analysis of the economic impact of not responding rapidly to new weeds in wildlands and agricultural lands.</i>
	<i>A streamlined and transparently defined CDFA-system for getting species rated.</i>

EARLY DETECTION AND RAPID RESPONSE — SELECTED ACTIONS	
Coordination	<i>Evaluate and restructure noxious weed rating system if necessary. Deal with Q-ratings promptly. (CDFA)</i>
	<i>Identify and copy successful rapid response programs. (CINWCC)</i>
	<i>Support funding for trained detection biologists at the state and local level. (CALIWAC)</i>
Funding	<i>Encourage future WMA plans to direct a more significant amount of funds to early detection and rapid response programs. (CDFA, CAWMALC)</i>
	<i>Investigate legislation for emergency project money. (CALIWAC)</i>
Planning and Compliance	<i>Develop pre-established response plans for selected high-priority species. (CINWCC)</i>
	<i>Establish an environmental compliance task force and produce a guide to environmental compliance for weed control by holding a meeting of responsible agencies. (CINWCC)</i>
Education and Outreach	<i>Produce a pamphlet with pictures of the Cal-IPC Red Alert weeds and guide to their identification. (Cal-IPC)</i>
	<i>Produce pamphlet with pictures of A-rated weeds and guide to their identification. (CDFA)</i>

Eradication and Management

Background

Eradication and management of noxious weeds in California is divided into three priorities based on the status of the weed in the state. These include the following:

1. New invaders, which are localized and eradicable statewide (A-rated if on noxious list);
2. Relatively new invaders, which are firmly established in one or a few parts of the state but eradicable in most other parts of the state (B-rated if on noxious list);
3. Those which are permanently established and widespread in many areas of the state (only eradicable in small regions) (C-rated if on noxious list).

Weed eradication and management is an effort to wipe out, reduce, or contain a weed infestation in a particular area. Integrated weed management (IWM) is a systematic approach to weed eradication and control that integrates chemical, cultural, physical, and biological control methods. Developing an integrated weed management strategy involves a planned, strategic program that may require all methods appropriate for effective control at a specific location. Factors in developing such a strategic program include control objectives (reduction, containment or eradication), the effectiveness of each control technique for the target species, environmental factors, land use, economics, policy and legal restrictions, practicality, safety, cost, and the geographical extent and biological nature of the weed.

Eradication is a control objective aimed at totally eliminating all individuals of the target weed within a specified area. When aimed at new, incipient infestations, early eradication can be the most cost-effective method of control. For widespread weeds, eradication may not be economically feasible, especially with a weed that has a long-lived seed bank or in situations where sufficient resources are not available. Containment is a weed management objective where an infestation is too large to eradicate and the primary management goal is to prevent infestation expansion by suppression and elimination of spread.

For widespread weeds beyond eradication, biological control generally provides the best and most economical long-term means of reduction. This control method involves establishing self-sustaining populations of control organisms (herbivorous insects and pathogens). Imported from the foreign country of weed origin (after safety is scientifically established), their populations are expected to build-up and move throughout the infested region.

Current Program

The CDFA operates a program to eradicate A-rated weeds. This program, although diminished by recent funding reductions, is still attempting a statewide approach to eradicating potentially destructive weeds that are still not widely established in the state. The County Departments of Agriculture have traditionally been the lead agencies at the local level in implementing and coordinating noxious weed eradication and management programs. This leadership has been complemented by the formation of Weed Management Areas (WMAs) that bring together agencies and important partners to prioritize and coordinate a regional approach to weed management. In most counties, the Agricultural Commissioner or other biologists take the lead role in the formation and administration of the WMA.

Agencies and private landowners contain, control, and eradicate weeds on their lands either as independent projects or as part of a coordinated regional partnership. Private industry is involved in much of the control work on private lands. Research and education projects for new weed control methods are primarily conducted by University of California Cooperative Extension and by private industry.

Development of weed biological controls relies on the teamwork of the USDA-ARS, the CDFA and the CDAs. Again, challenged by budget and staff cuts, CDFA has been able to maintain its core program, but with reduced capacity. The University of California, while not currently involved in classical weed biological control, is involved in integrated control studies and has the potential to add significantly to the existing collaboration.

Management of widespread weed species within a WMA is based on county priorities and distribution of the weed in the county. An integrated weed management approach should be encouraged in all weed management programs.

ERADICATION AND MANAGEMENT — COMPREHENSIVE NEEDS	
Education and Outreach	<i>Information and education regarding efficacy of techniques.</i>
	<i>More application tools and methods.</i>
Funding	<i>Expanded resources for WMAs and expanded participation in WMAs.</i>
	<i>Funding for regional WMA coordinators to expand administrative capacity, write grants, and foster joint projects.</i>
Policy and Coordination	<i>Clarification and streamlining of the environmental regulatory processes, including NEPA, CEQA, ESA, NPDES, Air Quality, etc.</i>
	<i>More coordination and cooperative control programs. These regional approaches will be more likely to achieve long-lasting results and prevent rapid re-infestation.</i>
	<i>Eradication and management of all A-rated weed infestations and encourage more local eradication of B- and C-rated weeds by setting criteria for prioritizing programs and efforts.</i>
	<i>Implement weed management, mapping, and planning on a watershed scale to support control priorities. (WMAs, RCDs, CDEFA)</i>
	<i>Expand linkages among field practitioners; federal, state and county agencies; private and public land-managers; non-governmental organizations; local governments; tribes; and WMAs.</i>

ERADICATION AND MANAGEMENT — SELECTED ACTIONS	
Funding	<i>Increase the number of field biologists and other resources at the CDFA and the CDAs to detect and control A-rated weeds. (CALIWAC)</i>
Education	<i>Develop a weed management handbook. (Cal-IPC, UCCE)</i>
	<i>Develop a web-based technical resource clearinghouse for private landowners. (NRCS, UCCE, RCDs)</i>
Information	<i>Complete inventory of all public and coordinated weed control projects in the state. (CDEFA, CINWCC, Cal-IPC)</i>
Policy	<i>Create a committee to address regulatory coordination and streamlining. (CINWCC, CALIWAC)</i>
	<i>Establish guidelines to evaluate the progress and success of WMA operations. (WMAs, CDEFA)</i>

Inventory, Monitoring and Evaluation

Background

Over the past century, agencies and local departments have been inventorying and mapping priority weed species, usually in connection with specific control projects. This data has been stored on paper maps and in non-digital reports. Over the past decade, there has been an increasing trend for the adoption of Geographical Information Systems (GIS) to house, organize, and analyze weed location and control data.

With limited budgets for weed management, it is difficult to justify spending time and money on weed inventories or maps. The best justification can be found

in Steve Dewey’s brochure, *Noxious Weeds: A Biological Wildfire*. Dewey applies wildfire management principles to invasive weed management. When fighting fires, the first priority is to contain the fire and extinguish spot fires outside the perimeter of the fire. Trying to fight a wildfire without understanding its size, direction of spread, rate of spread, and other relevant information would be much less effective.

Likewise, trying to manage an invasive weed infestation without relevant information reduces the effectiveness of control efforts and does not optimally utilize time and money. Armed with maps and inventory information, weed managers can develop strategies focused on removing new and isolated infestations while containing the principal infestation—the same strategy used for wildfires. In addition

to enabling weed managers to prioritize which part of an infestation to treat first, the use of invasive weed inventories can increase the efficiency of almost any method of weed management. For instance, weed managers might combine weed inventories with information on soil type and water table depth to select the safest and most effective herbicide for a given location. Or they might keep inventory information to help plan and track volunteer weed pulling efforts. Inventories and maps will not control weeds by themselves, but they are invaluable planning tools that help get the most out of limited weed management dollars. Likewise, follow-up monitoring is essential for evaluating the effectiveness of the efforts and for ensuring that the area has not been reinfested.

Most people know from personal experience where weed infestations are in their counties. Failure to capture this information in formal databases jeopardizes future access to the information. By capturing this information on paper maps or in computer databases, weed management efforts can continue past the duration of a particular person's career or be effectively shared among a team working in coordination.

One of the most important benefits of weed inventories lies in their use as a tool for generating awareness. Whether the audience comprises county commissioners, state and federal legislators, special interest groups, or the general public, being able to tie the problem back to their geographic area of interest dramatically increases their receptiveness and interest in the problem. Invasive weed inventories also provide data necessary to quantify impacts of invasive weeds on native ecosystems. A key need for weed management programs is to quantify the impact of invasive weeds so that funding can be prioritized for weed control programs.

Monitoring and evaluation are two very important activities that are tied to weed control programs. Any control program should collect the following types of data: 1) efficacy of the treatments; 2) status of the target weed; and 3) for which attributes of the site is it being managed (e.g. forage quality, endangered species status). The paradigm of "adaptive management" (www.for.gov.bc.ca/hfp/amhome/introgd/toc.htm) is built upon the principle of using monitoring data to reevaluate program methods and goals on a cyclic basis. In order for monitoring to be

directed and cost-effective, program goals must be very specific and measurable. The metrics for assessing program success are termed "program measures."

Current Program

Some geographic information for certain noxious and invasive weeds or geographic areas is currently available on the Internet. Websites with pertinent content are linked on the mapping links page at the CDFA Weed Information Project (www.cdfa.ca.gov/weedhome).

Mapping is important at many scales. On a regional scale, local groups might share their maps and inventory data to inform coordinated control efforts. And on a state level scale, the collective data from all local groups can help assess the extent of particular weed problems and progress toward eradication.

Weed mapping is being coordinated within the state by two efforts:

- The ad hoc California Weed Mapping Steering Committee;
- Cal-IPC Mapping Committee (www.cal-ipc.org).

Mapping is coordinated on a national basis by the following organization:

- North American Weed Management Association Mapping Committee (www.nawma.org).

To facilitate interaction between different data sets and projects, weed mappers need "shared data standards." These are general formatting and content guidelines that make sure everyone collects at least a certain basic set of data, and records it in a way that will be easy for others to use as needed. This effort is not intended to create a single master database, but rather to create many databases throughout the state with minimum standards so that all information being collected is compatible. There will be many ongoing needs and opportunities to bring together local data for statewide, national, or even global maps.

Monitoring standards specifically for noxious and invasive weed projects have not been established. Measuring the response of the target weeds is fairly straightforward, but measuring the response of the natural community or agricultural system in which the weed occurs is much more complex and costly.

INVENTORY, MONITORING AND EVALUATION — COMPREHENSIVE NEEDS	
Funding	<i>Funding for on-the-ground local weed inventories.</i>
Inventory	<i>An inventory of all high priority weed infestations in the state stored in a digitalized form.</i>
	<i>Identify gaps in data and mapping frequency and in data collection and quality.</i>
	<i>Direct focus of information to early detection, tracking and inventory for regulatory planning and permitting.</i>
Monitoring	<i>Tracking of all weed control projects.</i>
	<i>A central, widely available clearinghouse for GIS, monitoring, and WMA information.</i>
	<i>Minimum standards for monitoring projects on public and private property.</i>

INVENTORY, MONITORING AND EVALUATION — SELECTED ACTIONS	
Inventory	<i>Finalize and then update the A-rated noxious weed inventory statewide on an annual basis. (CDFA, CDAs, WMAs)</i>
	<i>Hold annual Weed Mapping Steering Committee meetings to coordinate existing weed information projects between WMAs, watershed groups, and all agencies. (CDFA, CINWCC, Cal-IPC)</i>
	<i>Develop statewide distribution maps for important species. (CDFA, Cal-IPC)</i>
	<i>Encourage each WMA to maintain a weed inventory of priority weeds for its geographical region that is accessible through GIS. (CDFA, WMAs, CalWMALC)</i>
Monitoring	<i>Form a weed monitoring work group to issue straightforward project monitoring guidelines. (UCCE, CDFa, CINWCC, Cal-IPC)</i>

Restoration

Background

Restoration is the process of repairing damaged or degraded ecosystems and agricultural land. Since invasive plants are a primary cause of such degradation, restoration and the control of invasive plant species go hand in hand, particularly in terrestrial ecosystems. It is increasingly understood that you cannot restore native species and revegetate native habitats unless you successfully control invasive weeds.

The development of ecological restoration methods has grown tremendously in recent years. As the public becomes more environmentally informed and concerned, they have been increasingly willing to mandate the repair of damaged landscapes. Large-scale projects like California Bay-Delta Program and the Tahoe Regional Planning Process are some of the more ambitious restoration projects in the state. At the same time, citizens are getting involved in local volunteer efforts as watershed stewards. Restoration expertise and funding for restoration have grown rapidly in recent years.

Restoration consists of several tiers of activity:

1. The first step is determining the goals of the restoration process. These goals may be limited to particular ecosystem services, such as erosion control or improved livestock forage, or they may be as ambitious as the faithful re-creation of the “original” ecosystem in a preserve. The latter requires determination of what species—or even what genotypes of species—are native, what elements comprised the original ecosystem, and what range of conditions was within the ecosystem. These tasks can be very difficult.
2. Second, it is often necessary to prepare the site. This may include removal of degrading forces, remediation of the soil, and controlling invasive plants. In many western ecosystems, invasive plants remain one of the most daunting impediments to successful ecological or agricultural restoration.
3. Next, enrichment seeding and the planting of desired plant stock may be necessary (native or noninvasive exotics). Sometimes appropriate site preparation is sufficient for the natural regeneration of a native ecosystem. More often, however, restoration projects assist this process through active reseeding and planting



from local seed sources. These plantings may be accompanied by related activities such as irrigation, fertilization, protection from herbivory or competition, and soil inoculation.

4. Finally, successful restoration requires ongoing monitoring and appropriate maintenance of the site.

Management of invasive plants is often an integral part of each of these four stages of restoration. Ongoing progress in ecological restoration will be closely related to advances made in weed science, practitioner skill, and land manager coordination.

Current Program

Restoring sites to predominantly native or beneficial cover can be expensive and labor intensive. There are a number of restoration projects ongoing throughout the state, many of which are at sites where the main disturbance and ecosystem stressor were noxious and invasive weeds. Large amounts of public money is being spent to rehabilitate and revegetate areas back to a primarily native and natural plant community assemblage.

This in turn will restore natural ecosystem function and provide quality habitat for native flora and fauna.

Restoration science is still at an early stage of maturity. The following questions are pertinent to determining a statewide restoration strategy:

- How often do restoration projects attain their desired outcomes (percent success)?
- How do you measure success (species composition, ecosystem function, stability over time)?
- Have restored sites demonstrated resistance to subsequent reinvasion?
- Is restoration more successful in certain habitats?
- What are the time frames over which restorations projects need to be monitored?
- How much money (dollars/acre, inclusive of labor) does successful restoration cost? If variable, what does cost correlate with?
- What is the availability of local seed and plant stock? How local does local have to be?

RESTORATION — COMPREHENSIVE NEEDS	
<i>Funding</i>	<i>Resource guide for funding restoration activities.</i>
	<i>List of mitigation banking resources.</i>
<i>Planning</i>	<i>Niche-specific information for habitat restoration. Documentation and tracking of sources for local genetic stock.</i>
	<i>Incorporate revegetation into planning from the start; identify native species to use.</i>
<i>Monitoring and Maintenance</i>	<i>Prevent weeds from reinvading revegetation and restoration projects.</i>
<i>Coordination</i>	<i>A statewide restoration coordinator.</i>

RESTORATION — SELECTED ACTIONS	
<i>Resources</i>	<i>Develop site-specific list of genetically appropriate native stock for revegetation projects. (NRCS, CNGA, SERCAL, CNPS)</i>
	<i>Develop a guide for weed control issues in restoration projects and develop a guide to habitat restoration following weed control projects. (Cal-IPC, SERCAL, CINWCC, UCCE)</i>

Research

Background

In order to assess and prioritize the risks posed by a given invasive plant, it is important to know as much as possible about its biology and ecology. Research provides the scientific foundation for sustainable weed management. Though weed control has a long history, many areas are evolving rapidly. Those researchers evaluating the impact and behavior of wildland weeds (and projects aimed at controlling them), for example, are asking new questions about the ecological roles of plants and the effects of restoration. Research is required on a number of fronts.

If it is difficult to find adequate scientific studies of many existing weed problems in the state, it is doubly difficult to find such information for screening new plant introductions. This is particularly important with cultivars of known invasive plants that are developed by the horticultural industry to be less invasive. Full assessment of these plants requires independent testing.

Those working to control weeds also need good information on control methods. Some of this information can come from the experience of practitioners themselves. To make that information useful to others requires a good network of communications. Much of the information, however, requires the resources and expertise of agency and university scientists. The effectiveness and safety of weed control methods, like horticultural introductions, are best tested independently.

Another area of weed control where research is crucial is the development of biological control agents. Such research involves international cooperation in order to investigate potential agents in the home region of an invasive plant as well as specialized quarantine facilities and trained scientists. When successful, these programs can provide excellent long-term control for widespread weeds.

There is a dearth of well-quantified information on the economic costs of weeds. This information would be helpful for funding entities in weighing the severity of the problem, and it is potentially helpful in obtaining more funding to address invasive plants.

Current Program

California is especially rich in research institutions, which have scientists capable of conducting practical on-the-ground research. Listed below are some of the major institutions conducting research on weed control:

University of California

California State University

California Community College System

California Department of Food and Agriculture

Natural Resource Conservation Service

Private colleges and institutes

USDA-ARS and NRCS

US Geological Survey, Biological Resources Division

Other federal and state agencies

Private industry

The California weed community has not produced a formal set of research needs or priorities in a coordinated fashion. Most weed researchers form their own research priorities through stakeholder meetings, requests from practitioners, discussion with colleagues, and their own observations.

Montana has set an instructive example of what can be done with a coordinated approach to identifying a global set of weed research priorities and assessing the funding needed to conduct studies. The Montana Weed Research Task Force, which included on-the-ground land managers, developed the list of high-priority research projects that should be undertaken cooperatively by scientists from varied disciplines and agencies in the state. The priorities were divided into six research categories to meet management needs: impacts, prevention, weed biology and plant community dynamics, integrated weed management, revegetation and restoration, and effects of natural disasters (e.g. fire, flood, and drought) on noxious weeds. The amount requested to fund these extensive research projects was \$12.6 million. This figure represents the total cost of conducting various research projects, not an annual budget.

Research should be a cooperative effort, with the expectation that a portion of the funding and support will come from partner in-kind contributions of time, facilities, and other resources. Working together, the scientific community can make significant advances in weed management and the application of knowledge to invasive plant problems in the field. With extensive research capabilities, California is well positioned for pursuing such an ambitious research program.

RESEARCH — COMPREHENSIVE NEEDS AND RESEARCH TOPICS

Impacts	<i>Economic impact studies of invasive weeds.</i>
	<i>Cost-benefit analysis of eradication projects.</i>
Restoration	<i>Research on environmental characteristics that promote desirable vegetation.</i>
	<i>Lists of desirable or native species for restoration (grassland, riparian, etc).</i>
	<i>Identification of long-term landscape-scale impacts and approaches identified.</i>
	<i>Integrated control and restoration efforts to optimize ecological values from infested areas.</i>
Control and Management	<i>Basic biology and ecology of target weeds.</i>
	<i>Expanded exploratory efforts in foreign countries for biological control agents.</i>
	<i>Herbicide evaluation programs.</i>
	<i>Increased funding for development of new eradication tools for high-priority weeds.</i>
	<i>Methods to measure success of control projects.</i>
	<i>Research mapping techniques.</i>
Detection and Rapid Response	<i>New weed detection methods (remote sensing).</i>
	<i>Systematics through morphological and DNA studies.</i>
	<i>Develop risk assessment models for predicting potential invasions.</i>
	<i>Study pathways of introduction.</i>
	<i>Identify plants overseas that may be invasive to California.</i>
Resources for Research	<i>Broad involvement of invasive weed research from many disciplines, including economists, hydrologists, plant pathologists, fish and wildlife biologists, entomologists, ecologists and land managers, particularly with respect to impacts of invasive species and impacts of management programs.</i>
	<i>Competitive grant program for invasive weeds, especially for coordinated research on various aspects of invasive plant impacts.</i>
	<i>More research funding and more researchers (including students).</i>

RESEARCH — SELECTED ACTIONS

General	<i>Include and expand weed systematics in University of California's proposed biosystematics center and other universities. (UC)</i>
	<i>Establish a weed research working group that will identify areas of research, current resources, and new funding sources. The group should comprise resource managers, agency representatives, and researchers. (CINWCC, UCCE)</i>
	<i>Organize workshops that bring multi-disciplinary research interests together to establish links and facilitate interaction. (CWSS, UC, USDA)</i>
	<i>Promote inclusion of the University of California in research on biological control for invasive plants. (UC, CDFA, USDA-ARS)</i>
Resources for Research	<i>Develop and maintain a database to identify current research projects directed at noxious and invasive weeds. (CWSS, UCCE, USDA-ARS)</i>
	<i>Pursue legislation for state or federal weed research funding programs where researchers could submit proposals for needs-based funding. (CALIWAC)</i>

Education and Public Awareness

Background

Education is one of our best tools in preventing new noxious and invasive species from being introduced and in eliminating further spread. Public outreach in California is a challenge however, due to the state’s diverse human communities and its geographically unique areas and population centers. The education of primary land managers across the state is an immense task in of itself. With proper marketing techniques and the development of several unified education products, we could greatly improve the public’s recognition of the threat of invasive weeds.

In general, citizens and landowners in the state have little to no understanding of how the spread of noxious and invasive weeds negatively impact the environment, economy, and natural resources so important to them. Weed management still tends to be viewed as an issue tied to more traditional farm agriculture and urban lawn dandelions rather than an integral part of natural

resource management activities: outdoor recreation, fire, wildlife, wilderness, grazing, timber, maintenance of transportation corridors, and urban area management. Increased actions from local, state, and national officials in making noxious and invasive species a priority requires greater awareness and understanding from California citizens and landowners.

Current Program

Many, if not most, noxious and invasive species programs have included an element of public outreach in their projects. These efforts have been beneficial, but they are not often in conjunction with county, statewide, regional or national campaigns. There have been some successful statewide projects focusing specifically on education and awareness about noxious and invasive weeds. Such efforts could be expanded into a statewide program if a coordination group was established to create a California weed education campaign.

EDUCATION AND PUBLIC AWARENESS — COMPREHENSIVE NEEDS	
Funding	<i>Funding sources for awareness projects identified and developed.</i>
	<i>A statewide education coordinator with a grant-making budget (follow models in Montana and Idaho).</i>
Target Audience	<i>Target-audience specific messages and materials.</i>
	<i>Field personnel trained in communicating clearly about weed issues.</i>
	<i>Work with the plant industries (e.g. landscapers, nurserymen, pest control) to get the word out.</i>
	<i>Education of regulators so they understand the issue thoroughly.</i>
	<i>Inclusion of information on weed issues in continuing education for licensing and certification.</i>
Message Content	<i>A statewide campaign, identification logo, and mascot. Develop templates and example materials using the templates that include logo and mascot.</i>
	<i>A set of standards for evaluating the efficacy of education projects.</i>
	<i>Review and copy successful educational materials and programs.</i>
	<i>A guide explaining how to run an awareness campaign at the local level for WMAs, RCDs and watershed groups.</i>
	<i>Weed awareness incorporated into appropriate events (farm shows, Earth Day).</i>
Coordination	<i>Centralized education material website.</i>
	<i>More coordination among the current efforts in public awareness.</i>
	<i>List of all education cooperators, including higher education.</i>
	<i>More expertise and activity at the local WMA level.</i>

EDUCATION AND PUBLIC AWARENESS — SELECTED ACTIONS

Increase Activity	<i>Promote California Weed Awareness Week and other statewide weed awareness campaigns. (CALIWAC, All)</i>
	<i>Make a list of target audiences and engage them, including traditional and nontraditional groups. (CALIWAC)</i>
	<i>Write grants for educational outreach infrastructure. (Cal-IPC, CDFa, WMAs)</i>
	<i>Hold a yearly weed education coordination meeting. Prioritize top outreach messages and educational needs. (CALIWAC, CINWCC, resource agencies)</i>
	<i>Make a list of outreach cooperators and engage them. (CALIWAC)</i>
Create Resources	<i>Develop more centralized and comprehensive websites. (CALIWAC, Cal-IPC, CDFa, UCCE)</i>
	<i>Develop standardized training tools and presentations for educators, resource management personnel, and weed control practitioners, (CINWCC, CALIWAC, UCCE, Cal-IPC, CWSS, Resource Agencies)</i>
	<i>Strengthen participation in the education and awareness efforts of CALIWAC. (CALIWAC, All)</i>
	<i>Develop and expand accessible photo libraries of noxious and invasive weeds. (CDFa, Cal-IPC, UCCE)</i>



Funding and Resources

Background

Weed control projects are a complex, labor-intensive and material-intensive undertaking. They require significant ongoing program support for inventorying, monitoring, education, and regulatory compliance. Funding is crucial to the success of all phases of noxious and invasive weed management, and the current funding is chronically inadequate to address invasive plants. This is in main part due to the nature of the problem and our slowly evolving awareness of it. As trade and travel have increased, so has the spread of invasive species. As we recognize the dire impacts, we try to find financial support from budgets already stretched thin. The current rate of spread of major weeds and the introduction of new weed species is far outstripping our capacity to contain them, let alone eradicate them in all but a few circumstances. The problem is most acute at the local level, especially in counties with sparse populations and small private land holdings resulting in a low local tax base. Federal funding is still far from sufficient to deal with the extent and scope of the problem on the nearly 45 million acres of federal land in California, and weed programs on state lands could benefit from additional sources of funding.

Current Program

Weed programs have demonstrated success at bringing in significant matching and in-kind funds. County Departments of Agriculture have various cost-share programs with public and private land managers and to-date, California’s WMAs have leveraged four dollars of in-kind participation for every state dollar spent on their projects. Some funding is available to land managers through regular budget line-items, but major control and research efforts require either special legislation for funding or acquiring a special grant. Some of the support activities described in this plan are performed by nongovernmental organizations that are dependent on private foundations for their funds—this is another source that needs to be developed.

Not only do weed programs need funding—they need steady funding. Controlling weeds intermittently is not effective. Biological control especially needs long-term funding, since the needed research process can take a decade or longer, and much of the investment will be lost if the program is interrupted.

Most of the work described in this plan, whether existing work or proposed work, will require significant new financial support to be successful. CALIWAC has taken on increasing funding as one of its top goals. This Weed Action Plan is one part of the effort to clearly identify needs for additional resources.

FUNDING AND RESOURCES — COMPREHENSIVE NEEDS	
Outreach and Education	<i>Economic analyses of ecological and agricultural impacts and cost/benefit analyses of prevention and control programs.</i>
	<i>Guidelines for local cost-benefit analysis by species and method.</i>
	<i>Web-based clearinghouse for funding information.</i>
	<i>A comprehensive budget with current funding gaps identified.</i>
	<i>Grant-making foundations and agencies more informed on invasive plant issues.</i>
Legislative	<i>Legislation to continue base funding for WMAs.</i>
	<i>Funding for rapid response to emergency infestations.</i>
	<i>A multi-agency “crosscut” budget.</i>
	<i>Relationships with critical legislative members and staff at all levels.</i>
	<i>Advocacy efforts to support needed funding.</i>
	<i>Position to acquire federal funds for state projects.</i>
	<i>Steady funding for development of biological control agents.</i>
	<i>Analysis of local assessment districts.</i>
Coordination	<i>Staff positions (local and statewide) for WMA coordination, including fundraising.</i>
	<i>Local partnerships to obtain federal funds.</i>
	<i>Integration between regulatory agency compliance requirements.</i>

FUNDING AND RESOURCES — SELECTED ACTIONS	
Outreach and Education	<i>Create a web-based clearinghouse for information on granting agencies. (CDFA, CALIWAC, Cal-IPC)</i>
	<i>Develop grant application templates. (CDFA, WMAs, CALIWAC)</i>
	<i>Encourage WMAs to have desired project goals, methods, and budgets written up in a generic fashion and ready to go. (CDFA, WMAs)</i>
Legislative	<i>Conduct field tours for legislators. (CALIWAC, WMAs)</i>
	<i>Seek renewed funding for WMAs by supporting state and federal bills and seek funding for formal WMA coordinator(s). (CALIWAC)</i>
	<i>Formulate a request for establishing a rapid-response emergency fund. (CINWCC, CALIWAC)</i>
	<i>Advocate for “buy-in” by California executive branch government for budget needs. (CALIWAC)</i>
	<i>Coordinate grassroots advocacy for weed program funding. (CALIWAC)</i>
	<i>Analyze potential effectiveness of a mill tax assessment on herbicide sales or a vehicle tax that can be used to fund early detection programs. (CALIWAC)</i>
Coordination	<i>Coordinate with NRCS to obtain significant Farm Bill EQUIP/WHIP—funds for WMA private partners. (NRCS, RCDs, WMAs)</i>
	<i>Strengthen participation and activity of the Funding and Resources Committee of CALIWAC and build a more active support base for seeking funds. (CALIWAC)</i>
	<i>Coordinate with other states on support at the national level for federal funding. (CALIWAC)</i>
	<i>Promote cost-share programs that encourage private landowners to participate in weed control activities. (NRCS, CDFa, WMAs)</i>

Enforcement and Compliance

Background

California has extensive regulations for the prevention and control of noxious weed species. These regulations have provided the legal structure for the successful prevention and control of many highly deleterious weeds in California. The California Food and Agricultural Code is the foundation of our weed laws. Further regulations are created and developed through the rulemaking protocol. Procedures and policies are developed at the CDFA level to make procedures and activities transparent and uniform. The County Departments of Agriculture carry out much of the inspection and enforcement work at the county level and play a large role in helping to develop standard enforcement procedures and activities.

The problems involving the control of non-noxious invasive weeds have grown larger in the past five years. There is no clear agency leadership or authority

concerning non-noxious invasive weeds. An especially concerning problem is the sale and planting of weeds that are known to be invasive and damaging to natural ecosystems. There is a widespread desire for voluntary and non-regulatory approaches to be used to stop these activities; however, programs are only now being formed to coordinate the necessary education and outreach.

While the preferred method of encouraging people to control weeds is through education and incentives, there are limits to the effectiveness of these methods. California does not have a weed law that outlaws the presence of certain weeds on private property. There are abatement authorities, however, which can be used to enforce the removal of weeds under certain specific situations.

Current Program

The current regulatory structure for noxious weeds is summarized in Appendix D.



ENFORCEMENT AND COMPLIANCE — COMPREHENSIVE NEEDS	
<i>Non-Noxious Weeds</i>	<i>Clear authority for regulation and control of weeds that are not primarily agricultural.</i>
	<i>An official governmental list of invasive weeds that may not be primarily agricultural problems.</i>
	<i>Reduction in the sale and promotion of invasive ornamentals through local outlets, mail order, and web sales.</i>
	<i>More awareness of invasive weeds by growers, nurseries, and gardeners.</i>
<i>Awareness of Regulations</i>	<i>More awareness of the need for non-noxious weed regulations.</i>
	<i>Collaboration with fire safety councils to promote noxious weed control.</i>
<i>Improved Regulations</i>	<i>Adequate personnel and funding for enforcement.</i>
	<i>Incentives for voluntary compliance.</i>
	<i>Improved quarantine and control programs for proposed introduction of new plants into California.</i>
	<i>Collaboration between the CDFA and outside organizations to develop weed ratings.</i>
	<i>Reasonable, but not burdensome, regulatory process.</i>

ENFORCEMENT AND COMPLIANCE — SELECTED ACTIONS	
Non-Noxious Weeds	<i>Promote creation of the authority to regulate and control non-agricultural weeds. (CALIWAC)</i>
	<i>Create an inclusive nursery task force to develop voluntary guidelines on safe practices. (Cal-IPC, CACASA, CANGC)</i>
	<i>Publish alternative plant lists of desirable and benign replacements for invasive ornamentals. (Cal-IPC, CACASA, CDFCA)</i>
	<i>Identify incentives for nurseries selling only safe species (for instance, some type of green certification program). (Cal-IPC, CANGC, CACASA)</i>
	<i>Distribute a county-level model ordinance for banning particular weed species locally. (CDFCA, CACASA)</i>
	<i>Encourage local boards of supervisors to pass resolutions against local problem weeds. (CALIWAC)</i>
	<i>Develop a list of speakers and a poster on ornamental weed issues. (Cal-IPC)</i>
	<i>Encourage a nursery industry representative to participate in CALIWAC. (CALIWAC)</i>
	<i>Finalize a list of non-agricultural weeds detrimental to California and prioritize them. (Cal-IPC)</i>
Noxious Weeds	<i>Create an informational guide on the authorities and options in California to regulate and abate weeds. (CDFCA, CACASA)</i>
	<i>Review existing state laws and codes for weed management and suggest new laws if appropriate. (CALIWAC)</i>
	<i>Study the authority, implementation and public response to mandatory fire fuel abatement programs in Southern California as a potential model for noxious and invasive weeds. (CALIWAC)</i>
	<i>Publish a guide for the public explaining the process for listing a species on the noxious weed list. (CDFCA, CACASA)</i>



*Tamarisk, **Tamarix parviflora**, is a highly invasive shrub which dominates riverbeds. Each plant removes 325,000 gallons of water per year through transpiration. Photographer: Craig Thomsen*

Appendices



French Broom Genista monspessulanus

is a highly flammable shrub that is spreading rapidly through California. It impacts wildlife and native vegetation in addition to raising fire risk. Photographer: Bob Case

Appendix A

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AGENCY SUMMARY TABLE					
Agency Name	Total Acres Managed in CA	Total Acres of Noxious Weeds	Management Plan Status	Current Weed Budget in \$	Estimated \$ Needed to Meet Priorities
USDA - USFS (Forest Service)	20 million	300,000	Similar to National Weed Strategy	600,000	1,800,000
USDA-ARS (Agricultural Research Service)	N/A	N/A	National Plan	N/A	N/A
USDA- APHIS	N/A	N/A	National Weed Plan/ Coordinator	15,000	Unknown
US Fish & Wildlife	356,389	42,495	No data	755,578	2,901,000
US National Park Service	8,199,293	N/A	Regional and Park Plans	N/A	Not Identified
US Bureau of Land Management	17 million	1.8 million	Specific Weed Management Plan	350,000	Not Identified
US Army Corps of Engineers	Unknown	1,005,000	No Plan	130,000	Not Identified
CDFA (Department Food and Agriculture)	100 million	8-12 million	Individual Program Plans	2 million	Not Identified
CDPR Parks and Recreation	1.4 million	100,000	Ongoing Maintenance and Restoration Program	17-18% Annual Budget	Not Identified
CalTrans	230,000	12,000	Vegetation Management Plan	1 million	Not Identified
CA Boating and Waterways	No Data	No Data	Program Plan and EIR	7,000,000	Not Identified
CA Coastal Conservancy	200,000	500 of 5,000 acres surveyed	Invasive Spartina Control Plan / EIR	900,000	Not Identified
County Agricultural Departments	100 million	N/A	Specific to Individual Counties	4,000,000	8,000,000

Appendix B

Glossary of Weed Control Related Organizations in California

Cal-IPC – California Invasive Plant Council – A professional and volunteer educational organization dedicated to the control of invasive exotic plants in California, especially those invading wildland settings.

Cal-PPPIH – California Partnership for Preventing Invasive Plant Introductions through Horticulture – Develop and foster implementation of strategies for preventing new and continuing introductions of invasive plants through the horticultural community in order to protect California's natural resources.

CACASA – California Agricultural Commissioners and Sealers Association – The statewide organization of the County Agricultural Commissioners. The CACASA has a weed committee.

CAISC – California Aquatic Invasive Species Council – Established through legislation in 2002. It will be facilitated by the Department of Fish and Game and will develop a comprehensive plan to manage invasive aquatic species, including weeds. It is also authorized to develop protocols for responding to infestations not listed for control in any current statute or regulation.

CALIWAC – California Invasive Weed Aware Coalition – A coalition of non-governmental organizations including commodity groups, conservation groups, weed societies, and industry. The main mission is to promote weed awareness and advocate for increased funding and action to lessen the detriment of noxious and invasive weeds.

CANGC – California Association of Nurserymen and Garden Centers – A professional organization dedicated to the promotion and advancement of the nursery industry for its members and the public it serves.

CDA – County Departments of Agriculture – Each County has a Department of Agriculture led by an Agricultural Commissioner. The CDAs carry out many of the functions of regulated noxious weed control and prevention.

CDEA – California Department of Food and Agriculture – The lead agency in California for regulated noxious weed control and prevention.

CINWCC – California Interagency Noxious Weed Coordinating Committee – An interagency working group that meets quarterly to coordinate weed control activities at a statewide level. The list of signatory agencies is as follows:

California Agricultural Commissioners and Sealers Association

California Department of Food and Agriculture

California Department of Transportation

California Resources Agency

Department of the Army, U.S. Corps of Engineers, South Pacific Division

U.S. Department of Agriculture, Natural Resources Conservation Service

U.S. Department of Agriculture, Animal and Plant Health Inspection Service

U.S. Department of Agriculture, Forest Service

U.S. Department of Defense, Air Force

U.S. Department of Interior, Bureau of Indian Affairs

U.S. Department of Interior, Bureau of Land Management

U.S. Department of Interior, Bureau of Reclamation

U.S. Department of Interior, Fish and Wildlife Service

U.S. Department of Interior, National Park Service

The non-signatory stakeholder groups which are integral to CINWCC are: California Association of Nurseries and Garden Centers, California Cattlemen's Association, California Invasive Plant Council, California Native Plant Society, The Nature Conservancy, U. S. Department of Agriculture: Agricultural Research Service, the University of California Cooperative Extension.

CNGA – California Native Grass Association – A professional and volunteer educational organization dedicated to the promotion of native grass restoration and conservation.

CNPS – California Native Plant Society – A professional and volunteer educational organization dedicated to the promotion of native plant conservation.



CWMALC – California Weed Management Area Leadership Council – An ad hoc council of WMA leaders and affiliate coordinators, which meet to discuss issues, needs and collaboration opportunities that pertain to WMA success. The group also supplies statewide coordinators and weed control advocates with prioritized needs and program feedback.

CWSS – California Weed Science Society – Dedicated to enhancement and promotion of science in the profession of weed science.

ISAC – Invasive Species Advisory Committee – A Federal Advisory Committee to provide information and advice for consideration by the National Invasive Species Council. The ISAC is composed of approximately 30 stakeholders from state organizations, industry, conservation groups, scientists, academia and other interests.

IWAC – Invasive Weed Awareness Coalition – A nation-wide coalition of organizations including agencies, commodity groups, conservation groups, weed societies, and industry. The main mission is to promote weed awareness and increased funding. The IWAC organizes the National Invasive Weed Awareness Week which takes place in Washington, D.C.

NISC – National Invasive Species Council – The National Invasive Species Council (Council) is an inter-Departmental council that helps to coordinate and ensure complementary, cost-efficient and effective Federal activities regarding invasive species. The Council was established February 3, 1999 by Executive Order 13112.

RCD – Resource Conservation District – “Special districts” organized under the state Public Resources Code to address a wide variety of conservation issues. Each district has a locally elected or appointed volunteer board of directors made up of landowners in that district.

RMAC – Range Management Advisory Committee – An appointed committee, which advises the California Department of Forestry and the California Department of Food and Agriculture on range management issues.

SERCAL – Society for Ecological Restoration: California – A professional and volunteer educational organization dedicated to the science and policy of ecological restoration.

WMA – Weed Management Areas – This is the basic organization widely recognized as a model for carrying out a regional and comprehensive weed management program. It brings together many landowners and managers (private, county, state and federal) in a watershed or geographical area for the purpose of combining their expertise, energy and resources to deal with a common problem.

Appendix C: Detailed Capacity

Lands Administered by Federal Agencies

United States Department of Agriculture - Forest Service

Overview: The United States Forest Service (USFS), Pacific Southwest Region, manages approximately 20 million acres in California. Approximately 300,000 acres are infested with noxious weeds. Much of this land is covered by yellow starthistle and is being managed to prevent spread. The Pacific Southwest Region developed a weed strategy patterned after the national strategy. There is a weed coordinator at the national and the regional office. Additionally, each forest also has a designated weed coordinator. The Natural Resource Information System (NRIS) Terra project standardizes the inventory and mapping of invasive species across all National Forest System lands. The inventories are entered in an oracle-based form, and the mapping is done via Arcview GIS.

Current budget: around \$600,000

Optimal budget: Approximately \$1.8 million per year to begin with would be helpful to get the necessary inventory and planning on track, manage the databases, coordinate with other agencies and private groups,

control many existing populations, implement prevention programs and identify and eradicate new infestations.

Primary needs and challenges: There are a couple of issues that make weed control difficult. One of them is the need for environmental analysis pursuant to the National Environmental Policy Act (NEPA). A proper NEPA analysis and a decision signed by the appropriate forest officers needs to be completed before weed control projects can be started. For a variety of reasons, this can be an expensive and time-consuming process. Another issue is political. There are many people opposed to the use of any pesticides and will file appeals and lawsuits to prevent the use of herbicides on National Forest Service (NFS) lands. Litigation in particular increases the cost of weed management on NFS lands.

United States Department of Agriculture - Agricultural Research Service

Overview: The Agricultural Research Service (ARS) is a research agency and does not own or manage land in California. The ARS has a National Research Program (#304) that addresses weed management research in the US. It can be found at: http://www.ars.usda.gov/research/programs/programs.htm?NP_CODE=304

In California (Albany and Davis) and Nevada (Reno), the USDA-ARS has a specific research team, the Exotic and Invasive Weeds Research Unit (EIWRU), which is composed of 12 scientists and approximately 50 support personnel.

The USDA-ARS has a weed coordinator in Washington, D.C. Research is conducted on weed biology and control, overall Integrated Vegetation Management (IVM), and the use of remote sensing and GIS technologies for invasive weed assessment and management.

Current budget: \$3,795,157

Optimal budget: N.A.

Primary needs and challenges: That new scientific resources and programs become available to support projected needs in up-coming fiscal years.

United States Department of Agriculture – Animal and Plant Health Inspection Service

Overview: The Animal and Plant Health Inspection Service (APHIS) is a regulatory agency and does not own or directly manage land in California. APHIS operates California statewide domestic programs. The APHIS has a national weed plan and a national weed coordinator in Washington, D.C.

Current budget: Only \$15,000 in California for control.

Optimal budget: Unknown

Primary needs and challenges: The allocation of money by Congress.

United States Bureau of Land Management

Overview: The US Bureau of Land Management (BLM) is responsible for managing 17 million acres of land in California. Of that, 1.8 million acres are estimated to be infested with noxious or priority weeds. There is a BLM management plan specific for weeds and there is an agency weed coordinator. A program to map or inventory the weeds on BLM lands should be completed by the end of 2005 and includes a GIS database.

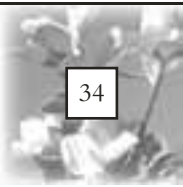
Current budget: \$625,000

Optimal budget: \$1,000,000

Primary needs and challenges: Additional funding and staffing at the local field office level dedicated to weed management are the primary needs of the BLM to make more progress on weed control.

United States National Park Service

Overview: The National Park Service (NPS) is responsible for managing 8,199,293 acres of land in California. There are two Exotic Plant Management Teams (EPMTs) that assist 16 National Parks in California. The NPS has an agency coordinator dedicated to EPMTs Service and there is an action plan that is set up in five-year increments. The National Park Service has an Alien Plant Control and Monitoring Database that is managed by the EPMTs. The five NPS Inventory and Monitoring Networks in California have identified invasion of non-native species as a top priority threat and are focusing energy on early detection of new invasive weeds.



Primary needs and challenges: Additional funding and strategic planning are the primary needs of the National Park Service to make more progress on weed control.

United States Army Corps of Engineers, South Pacific Division

Overview: The U.S. Army Corps of Engineers (Corps) owns approximately 75,000 acres of land and another 30,000 surface acres of water in California. Most of the lands are associated with dams. Lands in Southern California are primarily located at dry dams and are leased to local governments for recreation purposes. It is unknown how many acres of Corps lands are infested with noxious or priority weeds. While the Corps has a national program for aquatic weed management, it has not been funded in California. In addition, there is no overall agency management plan for weed control. While the Corps has a coordinator for aquatic weed management in Washington, there is no coordinator there for weed management in general. In California, there is a point of contact for the South Pacific Division regarding the California Interagency Noxious Weed Coordinating Committee. However, there is no agency weed coordinator position dedicated solely to weed management.

Current budget: The estimated yearly expenditure for targeted noxious or invasive weed control is approximately \$130,000, half of which is for hydrilla eradication at one lake.

Optimal budget: The estimated cost to adequately contain and suppress current levels of infestations, conduct public education and awareness campaigns, and eradicate new invaders is unknown due to the lack of weed inventories on Corps lands. No funds have been specifically provided for weed management.

Primary needs and challenges: The foremost challenge is to acquire additional funding to be able to conduct weed inventories and to educate the local lake staff on weed identification and management. The follow on challenge would be to acquire the funding necessary to eradicate identified noxious or priority weed populations.

United States Fish and Wildlife Service

Overview: The United States Fish and Wildlife Service manages approximately 356,389 acres in California, of which approximately 42,495 acres is estimated to be infested with noxious weeds.

Current budget: \$755,578

Optimal budget: \$2,901,000

Primary needs and challenges: Acquiring adequate funding to implement a comprehensive adaptive management plan and to achieve compliance with environmental regulations.

Programs and Lands Administered by the State of California

California Department of Food and Agriculture

Overview: The California Department of Food and Agriculture (CDFA) has both regulatory programs and also implements weed control programs, which are authorized and mandated by the California Food and Agricultural Code. CDFA is designated the lead agency for noxious weed management and maintains an official list of noxious weeds in the California Code of regulations. Control programs focus on “A”-rated weeds (especially hydrilla), purple loosestrife and other B & C rated weeds that are targets of biological control.

Current budget: The current expenditure for targeted noxious or invasive weed control in California is approximately \$2,000,000 for each year. Regulatory and prevention program expenses are more difficult to partition out as to weed specific costs.

Primary needs and challenges: Increased funding and resources are necessary to expand the programs to ensure rapid achievement of mandated goals. More program resources are now devoted to environmental compliance and monitoring.

California Department of Parks and Recreation

Overview: The California Department of Parks and Recreation (CalParks) manages approximately 1.4 million acres in California. Approximately 100,000 acres are infested with exotic plants of management concern. The Department has an efficient and effective strategy for managing exotic plant infestations based on restoration and ongoing maintenance. Restoration projects are used to remove large infestations and restore the area to a “maintenance” level. Thereafter, routine exotic control efforts conducted under the Ongoing Maintenance Program prevents the spread of existing infestations or establishment of new exotics. There is not a centralized plan for prioritizing which exotic species receive treatment. These priorities are set at the park District level. CalParks can portray the presence of weed species in park units at the system-wide level using GIS. Some Districts have conducted inventories of infestations using GIS. There are efforts currently underway to do system-wide GIS that include the District data.

Current budget: This figure fluctuates based on available funds including base-funding, ongoing maintenance, and special-funded projects. When fully funded, control of exotics requires 17-18 % of the annual natural resources maintenance budget. In years of budget cuts, an even higher proportion of the natural resources maintenance budget is devoted to exotic control because of its urgency.

Optimal budget: There is a documented need for \$2,752,276 per year to conduct ongoing maintenance to contain current infestations and prevent new infestations. This figure does not include project costs to remove large existing infestations.

Primary needs and challenges: Adequate funding. The conceptual framework and institutional structure is present to address the exotics problem, but only 12-15% of the necessary annual funds are currently available. There is currently several million dollars in project funds for park restorations. Some of these funds will be spent on larger-scale removal of exotic plants.

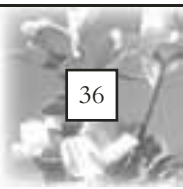
California Department of Boating and Waterways

Overview: The California Department of Boating and Waterways (DBW) is legislatively mandated to control both *Egeria densa* (Brazilian egeria) and Water hyacinth (*Eichhornia crassipes*) in the Sacramento/San Joaquin Delta and its tributaries. These two non-native species have thrived in the Delta, crowding out natives, blocking waterways, destroying natural habitat, impairing agricultural irrigation, and interfering with the pursuit of recreational activities. DBW maintains an extensive monitoring program and reporting schedule to evaluate the effects of the Water Hyacinth Control Program and the *Egeria densa* Control Program on water quality and federally listed threatened and endangered species.

Current budget: The current expenditure for these two control programs together, in California, is approximately \$7,000,000 per year.

Optimal budget: If the permit time restrictions on herbicide treatment (see challenges below) remain in effect, the program may need to double staffing levels in order to maintain control of the weeds in the small treatment window. Increasing staff and herbicide applications (thus increased monitoring also) would possibly bring the budget to a \$12,000,000 level.

Primary needs and challenges: Increased funding and resources are necessary to expand the programs to ensure achievement of mandated goals. Endangered species permit time of year restrictions, are limiting the herbicide treatment window to July 1 through October 15. Plants are extremely well established by July 1, and maintaining control at that point in the year is very difficult. Water hyacinth, in particular, doubles every 8-10 days in warm weather. If DBW was allowed to treat earlier in the growth cycle (Spring), control of these plants may be obtained while they are still young, small and more vulnerable to the effects of the herbicide, allowing the program to return to being one of a maintenance program in nature, ultimately using less herbicide per year. Also, more program resources are now devoted to environmental compliance and monitoring, steadily increasing costs.



California Department of Fish and Game

Overview: The California Department of Fish and Game manages approximately 970,000 acres in California. The majority of this land is managed as fish and wildlife habitat. A recent survey revealed that approximately 469 separate infestations involving 68 different invasive weed species affect DFG-managed lands statewide. Approximately 18% of those infestations involve perennial pepperweed, yellow starthistle or tamarisk. DFG has a pesticide use coordinator who provides written recommendations for herbicide uses and administers the DFG herbicide training program. The majority of DFG herbicide uses are made by DFG personnel using a variety of application equipment including backpack sprayers and ground-based vehicles such as boom-mounted sprayers.

Current budget: Undetermined. Invasive weed control efforts are generally funded out of the operating expenses of individual wildlife areas or ecological reserves. A great deal of variability exists with regards to weed control expenditures for the 681 properties currently managed by DFG statewide. In general, however, weed control comprises a relatively minor expenditure for DFG-managed lands. For example, approximately 4% of the operating expenses of the 14 major DFG wildlife areas is spent on herbicide purchases.

Optimal budget: Undetermined.

Primary needs and challenges: There are many challenges to effective invasive weed control on DFG-managed lands. Research and practical experience alike have shown that the most effective invasive weed control projects are those that are initiated when infestations are small in scale. For this reason, a systematic survey and detection program for invasive weeds should be a priority. Unfortunately, no such systematic survey program exists. Further, DFG lacks adequate resources to fund this type of effort. Once infestations are discovered, a rapidly initiated control or eradication program is necessary. While DFG field personnel are often successful in controlling exotic weed infestations, their success is generally limited by the lack of adequate resources.

California Department of Transportation

Overview: The California Department of Transportation (CalTrans) manages approximately 230,000 acres in California, primarily adjacent to state and federal highways. At present, CalTrans is working with other partners to determine how many total highway acres are infested with noxious weeds. If 10% of the highways are found to be infested with noxious weeds, a total of 23,000 acres would be infested; while if more like 25% of the highways are found to be infested with noxious weeds, a total of 57,500 acres would be infested.

Current budget: The expenditure for targeting noxious and invasive weed control is not tracked separately, but is estimated at approximately \$1,000,000 each year.

Optimal budget: It is estimated to cost \$600 per acre, per year to eradicate noxious and invasive weeds from state and federal highways. This results in a cost of \$13.8 million if 10% of CalTrans highways are found to be infested with noxious weeds or a cost of \$34.5 million if 25% of CalTrans highways are found to be infested with noxious weeds. These costs do not include public education and awareness campaigns.

Primary needs and challenges: The primary challenge is to identify the full extent of the issue on our right-of-ways and to determine what levels of control are achievable. The principal need is for increased funding and possibly legislative direction.

California Coastal Conservancy

Overview: The California Coastal Conservancy's invasive weed work focuses on invasive cord grasses, *Spartina* spp., in estuarine habitats. The *Spartina* Project focuses primarily on the approximately 40,000 acres of tidal marsh and 29,000 acres of tidal flats within the San Francisco Estuary. However, they also do control work, as needed in outer shoreline estuaries, such as Bolinas Lagoon and Tomales Bay. Mapping in 2001 identified 500 net acres of non-native *Spartina* species (primarily *S. alterniflora* x *foliosa* hybrids) distributed within 5,000 gross acres of bay lands. They estimate that current acreages may be 300% higher than these values. Therefore, approximately 2,000 net acres are estimated to be infested. The Invasive *Spartina* Control Plan is currently

incorporated as the “Project Description” of the Draft Programmatic EIS/R (available at www.spartina.org). The 2004 Spartina Control Season is underway on 16 sites totaling greater than 400 acres at various locations throughout the San Francisco Estuary.

Current budget: The Spartina Project has expended approximately \$800,000 per year of grant money and an average of approximately \$300,000 per year of Coastal Conservancy money (in-kind/staff and direct expenses) over the last three years getting the control program started.

Optimal budget: It is estimated that a budget of \$1.5 million per year for six years would support total eradication of the invasive non-native Spartina and hybrids within the San Francisco and outer coast estuaries, including all necessary public education.

Primary needs and challenges: (In order of priority)

1. A stable and adequate budget (the 2005 treatment year is currently 30% funded by Calfed grants, and addition sources have not been secured).
2. Mandates or clarified instructions to State and Federal resource and regulatory agencies and their staffs to support timely control of Spartina (e.g., streamlined permitting processes to allow faster review and authorization of specific treatment projects).
3. Registration of aquatic herbicide(s) and surfactants that are more effective and equally or less toxic than those currently approved for estuarine use.
4. Rapid development of alternative control techniques, including non- and reduced-herbicide methods, and methods that can be used during mid- and high tides.
5. Treatment in 2005 of at least four times the acreage treated this year, in order to stay ahead of the exponential spread of non-native Spartina.

County Weed Programs and Weed Management Areas

County Agricultural Departments

Overview: Many County Agricultural Commissioners carry out regulatory and other weed eradication and control programs in their individual counties, generally in coordination with the CDFA and the Weed Management

Area. The Agricultural Commissioner plays a key role in coordination and local responsibility for noxious weed eradication and prevention. County programs typically focus on “A” rated weeds, such as Musk Thistle and Spotted Knapweed. Other “B” and “C” rated weeds may also be subject to local control, especially when they are newly invading the county.

Detection and inventory using GPS and GIS systems has increased in recent years and led to the discovery of new populations of regulated weeds. Counties also manage biological control programs in cooperation with the CDFA. Some counties also have local responsibilities such as participation in Weed Management Areas, roadside weed control and weed control for fire abatement purposes.

Current Budget: Each County establishes its individual level of funding for these activities. Based on information provided by counties, a conservative estimate places the local weed eradication and control expenditures at \$4,000,000 during the 2003-04 fiscal year.

Primary needs and challenges: Increased, stable funding and resources are needed to maintain current programs and to expand them to eliminate the increasing populations of noxious weeds. In Fiscal Year 2003-04 County Agricultural Commissioners estimated that over \$8,000,000 was needed statewide for weed eradication and control programs.

Other County Departments

Overview: In addition to the County Agricultural Commissioner, other county departments can be very active. These departments include: County Roads, Parks and Recreation, Fire Abatement, Flood Control, Public Works. These departments can be an element of the Weed Management Area and sometimes pull in large amounts of money to battle specific weed infestations.

Current budget: No estimates currently available.

Primary needs and challenges: Like the local agricultural departments these other county agencies need increased, stable funding and resources for maintaining current programs and to expand them to eliminate the increasing populations of noxious weeds.

Weed Management Areas

Overview: Weed Management Areas (WMAs) are local (covering roughly one to three counties) multi-entity collaboration groups, which pull together agencies, non-governmental organizations and private landowners. Statewide Weed Management Areas are not simply a set of individual programs, but rather are a linked network of very effective groups, which are working in cooperation to solve a rapidly spreading statewide problem, which does not recognize borders or fences.

Weed Management Areas focus on:

- Weed education and local outreach projects.
- Cooperation and communication among partners.
- Detection, surveying and Geographical Information Systems (GIS = electronic mapping).
- Prioritization and strategic planning.
- Fostering weed eradication of new invaders.
- Fostering cooperative multi-landowner weed control projects.
- Methodology workshops and demonstration sites.
- Writing grants for cooperative projects.

Weed Management Areas are most commonly led by personnel from the County Agricultural Department. However the Resource Conservation Districts (RCDs) and state/federal agency employees also take the primary leadership role in many counties.

Current budget: Each WMA has approximately received a total of \$ 80,000 (per county) in state funding over the past five years (1999–2004). To match this \$4.5 million, the WMAs have raised over \$5 million in grants, matches and in-kind donations. As of June 2004, the state funding program will sunset.

Primary needs and challenges: For Weed Management Areas to succeed, they need a commitment of money and local human involvement. Eventually, hiring paid, dedicated coordinators will allow them to function at a consistently high achievement level and bring regional action and awareness to new heights. The noxious and invasive weed control work needs to be more coordinated and strategic at the WMA regional level. New invaders

are not always quickly identified and eliminated. Great sums of money are allocated for weed control in one place, but not on adjacent lands. Reinvasion will surely occur without geographical coordination.

Cities and Towns

Municipal Weed Control Efforts

Overview: Not many cities have weed control programs that can be thought of as truly dealing with targeted noxious or invasive weeds. While the mandatory abatement programs can be quite strict, they are based on alleviating fire risk and unsightliness. Many new introductions are made in urban centers, in areas where most of the state's population lives. These urban centers, people in mass, can play a big part in preventing the problem.

Current budget: Not available.

Primary needs and challenges: The importance of municipalities is especially key in the rural/urban interface. It is there that invasive horticultural plants gain access to natural or commercial landscapes. Cities can also harbor refuges for noxious and invasive weeds in vacant lots. These refuges will keep region-wide eradication projects from succeeding and need to be addressed.

Private Landowners

Ranchers and Farmers

Overview: The rancher and farmer (and traditional native cultivators) have carried out weed control ever since these agricultural activities have been occurring in California. The effects of noxious and invasive weeds can be so great as to render agricultural production impossible. The rancher and farmer have often been the first to spot trouble. The agriculturist is out on the land and is constantly observant about changes in the farm landscape. This is especially important because the practices of agriculture can also introduce new weeds into a region. Commodity groups are involved in weed control at the statewide and local level.

Current budget: A variety of weed control methodologies have been adopted that can alleviate the impact of weeds with varying degrees of success, but at significant economic costs. The magnitude of economic costs and losses is only now being studied. Through rancher surveys, herbicide use databases and case studies, we may begin to understand the budget and loss to these members of the private sector.

Primary needs and challenges: In general, the costs for agricultural weed control are borne by the operator and should be justified by an economic return on the dollars invested. At times, it makes sense to assist the landowner when there is wider general public good from the weed control or the project is integrated with a region-wide project. Beyond financial support, agricultural operations need the newest and best information in weed identification, control methods and ranch/farm long-term management strategies. Regulations and requirements concerning the use of weed control technologies need to be fair, reasonable and based on scientific studies.

Private Citizens and Individual Landowners

Overview: Those who own land for purposes other than financial gain may have a large variety of important reasons to keep invasive and noxious weed pests off their properties or at tolerable levels. Citizens may have aesthetics, conservation, recreation, and animal health. It should be noted that private citizens play a large role in donating time and money to the control of invasive weeds on public lands. Furthermore, citizens can be trained to be on the lookout for new invaders in their region.

Current budget: A very large amount of money is spent on residential weed control in California. What amount of that is addressed to truly invasive and noxious weeds in the landscape, pasture or other non-garden scales is virtually unknown. Without any requirement for reporting this use, and the proprietary nature of trade sales data this will be very hard to estimate without expensive scientific surveys.

Primary needs and challenges: As with agricultural weed control, the costs should be borne by the landowner and should be justified by improvement of the land, which is worth the dollars invested. At times, it makes sense to assist the landowner when there is wider general public good from the weed control or the project is integrated with a region-wide project. Beyond financial support, individual landowners need the newest and best information in weed identification, control methods and ranch/farm long-term management strategies. Regulations and requirements concerning the use of weed control technologies need to be fair, reasonable, and based on scientific studies.

Corporate Landowners

Overview: Electric utilities, the forest industry, railroads, and other large corporate landowners are facing some of the same impacts and challenges from noxious and invasive weeds.

Current budget: No information is available, but is surely consistent with production agriculture and ranching.

Primary needs and challenges: Again the costs for agricultural weed control should be borne by the operator and should be justified by an economic return on the dollars invested. At times, it makes sense to assist the company when there is wider general public good from the weed control or the project is integrated with a region-wide project. Beyond financial support, individual landowners need the newest and best information in weed identification, control methods and ranch/farm long-term management strategies. Regulations and requirements concerning the use of weed control technologies need to be fair, reasonable and based on scientific studies.

Appendix D

California's Weed Laws

California Weed Laws, Regulations and the Pest Prevention System

Regarding the Movement of Pests: Four areas of law and their related regulations control the movement of weed pests in California:

FAC Division 4 (Plant Quarantine and Pest Control) provides quarantine authority against all weed pests under Sections 6305 (unlawful to transport seed pests), 6341 through 6344 (seed pests in shipments), or 6461 through 6465 (abatement, reshipment, or treatment). These sections allow for the rejection of shipments with "A" and "Q" -rated weed pests whenever found and rejection of "B" or "C"-rated weed pests based on the weed policy of individual counties.



Successful weed control projects involve scientific monitoring methods. Photographer: Bob Case

FAC Division 18, Chapter 2, Sections 52251 through 52515 (California Seed Law) regulate "noxious weed" (FAC Sect. 5004) seed found in agricultural or vegetable seed. The law allows for designation of "prohibited noxious weed seed" and "restricted noxious weed seed" for the adoption of standards and tolerances. Rejection and disposal of shipments, if not justified under quarantine action, may be based on label requirements that specify certain allowed levels or "tolerances" of weed seed contamination.

The Federal Seed Act and Code of Federal Regulations, Title 7, Part 201, Sections 1551-1611, is the federal counterpart to the California Seed Law. It regulates the interstate movement of designated noxious weed seeds. Label requirements are also subject to designated allowances or tolerances for weed seed contamination.

The Federal Noxious Weed Act (7 U.S. Code, Sections 2801 through 2813) and Code of Federal Regulations (Title 7, Part 360) is primarily concerned with the introduction of federally designated noxious weed plants or seeds across our international borders. The act also regulates the interstate movement of designated noxious weeds under USDA's permit system.

For material moving within the State, a State permit is sufficient. Pest Exclusion Form 66-026, Application and Permit, is required in order to legally move and use noxious weeds within California.

Weed Surveys:

The Department and those it directs may enter any premises to inspect the site or any plant, appliance, or thing, which is on the premises. The Department may also conduct surveys or investigations of any nursery, orchard, vineyard, agricultural commodity, agricultural appliance, farm, or other premises within the state that may be infested with pests, including noxious weeds, for the purpose of detecting the presence or determining the status of those pests. The Secretary and the County Agricultural Commissioner consult concerning these surveys and in the implementation of any control or eradication activity, where the FAC provides joint responsibilities for a noxious weed situation (FAC Sect. 461).

Weed Control/Education:

Any premises, plants, vehicles, or items which are infested with any pest, including noxious weeds, or premises where any such pest is found, are defined as a public nuisance and may be prosecuted as such. Without a permit, it is unlawful for any person to maintain such a public nuisance. All legal remedies that apply in general to the prevention and abatement of nuisances also apply to pest-related nuisances. These remedies are in addition to any other remedy by way of abatement (FAC Sects. 5401, 5402). The Department or the County Agricultural Commissioner's Office (CAC) can issue a notification to the owner of infested premises and require the removal of the infestation. If the infestation is not removed within the period specified in the notice, CDFA or the CAC may eradicate, control, or destroy the infestation (FAC 5403). In areas where the Department has declared an eradication program, the Department may summarily destroy any target pest or infested item it finds (Sects. 5762, 5763).

Detecting and eradicating noxious weeds within a county is under the leadership of the CAC. CDFA works in cooperation with the CAC to detect and eradicate "A" and "Q"-rated pests in particular, and CDFA may undertake the task if the CAC cannot.

Detection and Eradication System in Practice:

Anyone who has a noxious weed growing on their property is technically creating a public nuisance. While this fact provides the authority for the Department or the CAC to address the problem, a strictly legalistic abatement approach presumes an adversarial stance that is time-consuming, costly, and can lead to an erosion of public support. More typically, the weed detection and eradication programs depend upon education and cooperation. They work first where their efforts are welcomed or tolerated and only undertake abatement, which requires court actions, when other avenues for progress are exhausted.

Noxious Weed List and Ratings

All ratings are based upon information currently available and are subject to change as new information is developed or new weed species are discovered and

evaluated. The only "C" rated species on the list are those that are designated noxious weeds in the California Code of Regulations, Title 3, Sections 3854, 3855, and 4500. Species rated "Q" are in accordance with the Assistant Director for Plant Industry Memorandum of January 1, 1980, entitled "Action Oriented Rating System", and Plant Industry Policy Letter 89-2, dated May 1, 1989.

The absence of a taxon on this list does not exonerate it as a potential pest plant. Taxa submitted to the CDFA Botany Laboratory/Herbarium for identification are evaluated and given an A, B or C-rating as determined from this list, are determined to be innocuous (D-rated), or are given a Q-rating based on current evidence of potentially aggressive or invasive behavior. Q-rated taxa are to be reviewed by the CDFA Plant Health and Pest Prevention Division and subsequently given a permanent rating, which will appear on future versions of this list.

All 130 plus weeds on California's noxious weed list have a rating. The overall rating system is based primarily on overall distribution and also can be modified based on the severity of threat.

- "A" rated weeds are normally limited in distribution throughout the state. Eradication, containment, rejection or other holding action at the state-county level. Quarantine interceptions to be rejected or treated at any point in the state.
- "B" rated weeds are more wide spread. Eradication, containment, control or other holding action at the discretion of the commissioner. State endorsed holding action and eradication only when found in a nursery.
- "C" rated weeds are generally widespread throughout the state. Action to retard spread outside of nurseries at the discretion of the commissioner. Reject only when found in a crop seed for planting or at the discretion of the commissioner.
- "Q" rated species are treated as temporary "A" weeds. Denoting action outside nurseries at the state-county level pending determination of a permanent rating.
- "D" rated weeds are organisms considered to be of little or no economic importance. No action. Anything not rated as an "A", "B", "C" or "Q" weed is given a "D" rating. In other words, the plant is not considered a significant weed.

The following is a digest of the most important laws affecting noxious weeds in California. For the most part, they are derived from the laws for pests in general. The laws are found in the California Food and Agricultural Code. One link to the complete code is: www.leginfo.ca.gov

403. The department shall prevent the introduction and spread of injurious insect or animal pests, plant diseases, and noxious weeds.

461. The department may conduct surveys or investigations of any nursery, orchard, vineyard, agricultural commodity, agricultural appliance, farm, or other premises within the state liable to be infested or infected with any pest as defined in Section 5006 or disease, including any infectious, transmissible, and contagious diseases of livestock and poultry, for the purpose of detecting the presence of, or determining the status of, the pest or disease. The director and the county agricultural commissioner shall consult concerning these surveys or investigations and in the conduct or implementation of any control or eradication activity when the provisions of this code provide joint responsibilities in connection with the pest or disease.

5004. “Noxious weed” means any species of plant that is, or is liable to be, troublesome, aggressive, intrusive, detrimental, or destructive to agriculture, silviculture, or important native species, and difficult to control or eradicate, which the director, by regulation, designates to be a noxious weed. In determining whether or not a species shall be designated a noxious weed for the purposes of protecting silviculture or important native plant species, the director shall not make that designation if the designation will be detrimental to agriculture.

5021. Unless otherwise provided, any treatment which may be required pursuant to this division is at the risk and at the expense of the owner or person in charge or in possession of the property which is treated at the time of treatment.

5023. The commissioner, whenever necessary, may enter and make an inspection of any premises, plant, conveyance, or thing in his jurisdiction.

5024. (a) The secretary or the commissioner shall, during the maintenance of any quarantine established by the secretary pursuant to Article 1 (commencing with Section 5301) of Chapter 5, inspect any plant or thing that is, or is liable to be, infested or infected by, or which might act as a carrier of, any pest. The person who conducts the inspection shall not permit any of those plants or things to pass over the quarantine line during the quarantine, except pursuant to a certificate of inspection and release that is signed by that person.

5026. (a) The director may overrule a local agency’s ordinance or regulation where that ordinance or regulation would prevent or inhibit an eradication effort. The director may act under this section only when the Governor has declared a state of emergency relating to the eradication effort and the effect of the local ordinance or regulation will be to threaten agriculture on a statewide basis, to materially interfere with the ability of the director or the commissioner to eradicate a pest, or where the pest is of such a nature that it could rapidly spread to other areas beyond the boundaries of the local agency.

5027. Unless otherwise expressly provided, a violation of any provision of this division is a misdemeanor.

5301. The director may establish, maintain, and enforce such quarantine regulations as he deems necessary to protect the agricultural industry of this state from pests. The regulations may establish a quarantine at the boundaries of this state or elsewhere within the state.

5302. The director may make and enforce such regulations as he deems necessary to prevent any plant or thing which is, or is liable to be, infested or infected by, or which might act as a carrier of, any pest, from passing over any quarantine line which is established and proclaimed pursuant to this division.

5306. (a) It is unlawful for any person to refuse to comply with any quarantine regulation which is established by the director pursuant to this division. (b) It is unlawful for any person to possess, propagate, plant, process, sell, or take any other action with regard to a plant or thing subject to a quarantine which has been imported or moved in violation of the quarantine. (c) Notwithstanding Section 5309, any violation of this section is a misdemeanor.

5309. Any violation of this chapter by any person, or an agent of any person, is an infraction, punishable by a fine of not more than one thousand dollars (\$1,000) for the first offense. For a second or subsequent offense within three years of a prior conviction of a violation of this chapter, the violation is punishable as a misdemeanor.

5310. (a) In addition to any other penalties prescribed in this division, any person who violates this division or any regulation adopted pursuant to this division is liable civilly in an amount not exceeding ten thousand dollars (\$10,000) for each violation.

5321. If the director receives information of the existence of any pest which is not generally distributed within this state, he shall thoroughly investigate the existence and probability of its spread, and the feasibility of its control or eradication.

5322. The director may establish, maintain, and enforce quarantine, eradication, and such other regulations as are in his or her opinion necessary to circumscribe and exterminate or prevent the spread of any pest which is described in Section 5321.

5323. This division and the regulations which are established pursuant to this division are of a statewide interest and concern and are intended to occupy the field. No local jurisdiction shall adopt ordinances, laws, or regulations which prevent, hinder, or delay the effect or application of this division or regulations established pursuant to this division.

5401. Any premises, plants, conveyances or things which are infected or infested with any pest, or premises where any pest is found, are a public nuisance, and shall be prosecuted as such in all actions and proceedings. All remedies which are given by law for the prevention and abatement of a nuisance apply to such a public nuisance.

5402. It is unlawful for any person to maintain such a public nuisance. The remedies which are provided by this article are in addition to any other remedy by way of abatement which is provided in this division.

5403. If, after service of notice pursuant to this chapter a public nuisance is not abated within the time which is specified in the notice, the commissioner shall abate the nuisance by eradicating, controlling, or destroying the pest.

5404. (a) If, after service of the notice pursuant to this chapter, the commissioner determines that the nuisance constitutes an immediate hazard to adjoining or nearby property, and that great or irreparable injury would result from delay until expiration of the time required by law for constructive notice, he or she may forthwith abate the nuisance by eradicating, controlling, or destroying the pest.

5421. If the commissioner finds, after inspection, that any premises, plant, conveyance, or thing in his jurisdiction is infected or infested with any pest, he may in writing notify the record owner or person in charge or possession of the premises, plant, conveyance, or thing, that it is infected or infested with a pest. He may, to his satisfaction, require the person to eradicate, destroy, or control, the pest within the time which is specified in the notice.

5430. ...the amount which is incurred or expended by the county in the abatement is a lien on the land against which the expense is chargeable.

5432. If a copy of the notice to abate a public nuisance, as described in Section 5401, is recorded and a copy is served upon or mailed to the holder of any encumbrance of record pursuant to this article, the lien is superior to all encumbrances, existing and future, except liens for taxes and assessments.

5434. Except as provided in Article 3 (commencing with Section 5461) of this chapter, the district attorney of the county which makes payment of the abatement expense shall, within 120 days after the notice which is required by Section 5431 is recorded, commence in the name and for the benefit of such county, an action to foreclose the lien.

5761. The regulations which are adopted pursuant to Article 2 (commencing with Section 5321) of Chapter 5, Part 1 of this division may proclaim any portion of the state to be an eradication area with respect to the pest, prescribe the boundaries of such area, and name the pest and the hosts of the pest which are known to exist within the area, together with the means or methods which are to be used in the eradication or control of such pest.

5762. Any pest with respect to which an eradication area has been proclaimed, and any stages of the pest, its hosts and carriers, and any premises, plants, and things infested or infected or exposed to infestation or infection with such pest or its hosts or carriers, within such area, are public nuisances, which are subject to all laws and remedies which relate to the prevention and abatement of public nuisances.



*Water Hyacinth, **Eichornia crassipes**, a native of the Amazon River basin can quickly cover freshwater surfaces, which impedes navigation, destroys waterfowl habitat, degrades water quality, and displaces native vegetation. Photographer: Bob Case*

5763. The director, or the commissioner acting under the supervision and direction of the director, in a summary manner, may disinfect or take such other action, including removal or destruction, with reference to any such public nuisance, which he thinks is necessary.

7201. The director, after investigation and practical survey, may consult with other state and federal agencies having responsibility for forest management and protection of native species and, by proclamation, declare an area within this state to be practically free from any noxious weed, as defined in Section 5004, which is named in the proclamation.

7206. It is unlawful for any person to sell, distribute, or transport into, or within, any weed-free area any seed of any noxious weed of which the area has been declared to be practically free.

7207. It is unlawful for any person that owns or possesses any land within any weed-free area to knowingly permit any noxious weed of which the area has been declared to be practically free, to mature upon his land and disseminate its seed or to propagate itself by other means upon such land, or on the land of another.

7501. It is unlawful for any person to disseminate the seed of any pest within this state.

7502. The enforcement of this chapter is under the supervision of the director. He shall make such regulations as he may deem necessary to properly carry out the provisions of this chapter.

California Weed Plan Summit Attendees

April 2nd, 2003

Pat Akers, CDEA

Lars Anderson, US Department of Agriculture, ARS

Mike Applegarth, Assemblyman Leslie's Office

Vanessa Arellano, CDEA

Frank Aulgur, Dupont Ag Products

Stephanie Balsdon, CDEA

David Beach, Caltrans Maintenance Division

Carl Bell, University of California, Extension

Lori Bellis, Nevada Dept of Ag

Larry Bezark, CDEA

Mike Boitano, Amador Ag Department

Carla Bossard, St. Mary's College

Dennis Bray, Kings County Ad Dept.

Travis Britton, Bureau of Indian Affairs

Kathy Brunetti, California Department
of Pesticide Regulation

David Bunn, CA Dept, of Fish and Game

Roger Buttermore, Calfed - Bay Delta Program

Stacy Carlsen, Marin Ag Department

David Chang, Santa Barbara WMA

Joanna Clines, US Department of Agriculture,
Forest Service

Nate Dechoretz, CDEA

Deanne DiPietro, CSU Sonoma Geography
Stevenson Hall 3066

Joe DiTomaso, University of California, Extension

Nettie Drake, B & N Enterprises

David Dyer, US Department of Agriculture, NRCS

Sheree Edwards, Caltrans Maintenance Division

Mark Eiswerth, University of Nevada

Susan Ellis, California Department of Fish and Game

Mike Ford, Rocky Mountain Elk Foundation

Andrea Fox, California Farm Bureau Federation

Pamela Geisel, UC Extension / CA Weed Sci Soc

Melanie Gogol-Prokurat, California Department of
Fish and Game

Diana Hershey, Middletown Rancheria

Ranier Hoenicke, CA Resources Agency

Jerry Howard, Calaveras Ag Department

Nelroy Jackson, California Invasive Weed Awareness Coalition

Carrie James, CDEA

Doug Johnson, California Exotic Pest Plant Council

Sam Johnson, USFWS - NWRs/OPR/Biology

Scott Johnson, Wilbur-Ellis Company

Wayne Johnson, Univ, Reno Extension Scientist

Lenora Kirby, LA County WMA

Susan Lagrande, CA Cattlemen's Assoc.

Robert Leavitt, CDEA

Jennifer Malcolm, Caltrans Maintenance Division

Beau Miller, Dow Agro Sciences

Susan Monheit, CDEA

Mark Newhouser, Team Arundo del Norte

Ross O'Connell, CDEA

Kevin O'Neill, Assemblyman Leslie's Office

Mary Pfeiffer, Shasta Co, Ag Department

Bob Pickard, Mariposa County

Bob Pierce, Inyo County

Carri Piroosko, CDEA

Mike Pitcairn, CDEA

Carolyn Pizzo, US Department of Agriculture, APHIS

Barbara Pollock, Caltrans Maintenance Division

Dawn Rafferty, Nevada Dept of Ag

John Randall, The Nature Conservancy

Ken Roberts, Placer RCD

Paul Robins, Yolo RCD

Cheri Rohrer, USDA Forest Service, Region 5

Cynthia Roye, California Department of Parks
and Recreation

Vance Russell, Audubon Society

Steve Schoenig, CDEA

Jim Scullin, US Department of Interior,
Bureau of Reclamation

Lisa Shanks, NRCS - Sonoma

Rebecca Shaw, The Nature Conservancy

Jake Sigg, CA Native Plant Soc.

Bobbi Simpson, US Department of Interior,
National Park Service

John Smith, BASF

Lincoln Smith, US Department of Agriculture, ARS

Harry Spanglet, CA Dept, of Water Resources

Maxine Spellman, Invasive Spartina Project

Jeff Stephens, CA Dept Forestry

Jim Sullin, University of California, Extension

Craig Thomsen, University of California

Phil Turner, US Army Corps of Engineers

Ron Unger, EDAW Inc.

Kirsten Upson, The Nature Conservancy

Baldo Villegas, CDEA

Casey Walsh, CDEA

Dan Webb, CDEA

Tom Wehri, California Association of Resource
Conservation Districts

Wendy West, El Dorado County Ag Dept.

Erin Williams, Calfed - Bay Delta Program

Dale Woods, CDEA

Katy Zaremba, Coastal Conservancy

