



FREMONTIA

A JOURNAL OF THE CALIFORNIA NATIVE PLANT SOCIETY



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California Native Plant Society

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CALIFORNIA NATIVE PLANT SOCIETY

Dedicated to the Preservation of the California Native Flora

The California Native Plant Society (CNPS) is an organization of laymen and professionals united by an interest in the native plants of California, open to all. Its principal aims are to preserve the native flora and to add to the knowledge of members and the public at large by monitoring rare and endangered plants throughout the state; by acting to save endangered areas through publicity, persuasion, and on occasion, legal action; by providing expert testimony to government bodies; and by supporting financially and otherwise the establishment of native plant preserves. Much of this work is done by volunteers through CNPS Chapters throughout the state. The Society's educational work includes: publication of a quarterly journal, *Fremontia*, and a quarterly *Bulletin* which gives news and announcements of Society events and conservation issues. Chapters hold meetings, field trips, and plant and poster sales. Non-members are welcome to attend.

Money is provided through member dues and funds raised by chapter plant and poster sales. Additional donations, bequests, and memorial gifts from friends of the Society can assist greatly in carrying forward the work of the Society. Dues and donations are tax-deductible.

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THE COVER: Santa Cruz tarplant (*Holocarpus macradenia*) is state-listed as Endangered and federally-listed as Threatened. Photograph by J. Game.

CALIFORNIA NATIVE PLANT SOCIETY

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PREFACE

by Susan Britting

California—a hotspot of biodiversity, a rich and diverse landscape ranging from coastal shores to desert washes to alpine meadows, a plant lover's paradise. California—the most populous state in the nation, a land of opportunity, a place where many people wish to live. Where these two aspects of California intersect lies the threat to the natural features that define this glorious state. So then, how do we support human communities while protecting native plants and their habitats?

Providing information to investigate this question has been at the heart of the Society's programs for over 30 years. In 1974, the first edition of the *Inventory of Rare and Endangered Plants of California* assembled all we knew at the time about the distribution, abundance, and threats to rare plant species in the state. Subsequent editions of the *Inventory* and publication of *A Manual of California Vegetation* have added to our knowledge about the status of California's flora. In turn, the Society's Conservation Program was developed to use this and other information to seek increased protection for native plants based on principles of conservation biology.

Ten years ago, when I set my sights on living in the Sierra Nevada foothills, I knew little about plant conservation in California. Until that time, I was myopically focused on questions of plant physiology and biochemistry. Yet not long after moving to my new habitat in the foothills, I realized that this was a troubled place. A new dam threatened miles of unique canyonlands and chaparral. Housing projects proposed to pave over many acres of rare plant habitat. The very landscape that I moved

into due to its beauty was being degraded and lost.

It was through the Society's various programs that I learned what could be done to protect the native plants and habitat around me. Knitting together information provided by the Society on species conservation, public policy, and laws, I was able to present a reasoned view in support of plant conservation. This issue of *Fremontia*

presents such information and more, creating a "toolkit" for conserving rare plants. The following articles characterize the challenges before us today, and I invite you to join me in using this issue to support native plant conservation in California.

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Lemon lily (*Lilium parryi*). Illustration by L.A. Vorobik.



INTRODUCTION

by David P. Tibor

California's native plants, and those who work to conserve them, are facing unprecedented challenges. CNPS recently released the sixth edition of its compendium of information on rare plants, the *Inventory of Rare and Endangered Plants of California*. This edition documents 2,045 imperiled vascular plants in California, which constitute nearly a third of an estimated total of 6,300 natives. Of these imperiled taxa, over 1,000 are placed in our highest endangerment ranking (CNPS List 1B). Clearly, an alarming percentage of California's flora is at risk. This is the challenge that faces us.

We can rise to this challenge, however, and this issue of *Fremontia* provides the tools and inspiration to do so. Knowledgeable authors have assembled a number of valuable, informative, and hopefully "user-friendly" articles on many aspects of rare plant law, policy, and management. It is our hope that this information can help individuals to effectively advocate for native plant conservation in their local areas.

The laws and policies regarding rare plants can be complex and sometimes vague, but they can provide important protection to our

endangered flora when properly implemented. Emily Roberson provides an overview of the state and federal Endangered Species Acts, as well as the lesser known Native Plant Protection Act.

Regional conservation planning via Natural Communities Conservation Plans and Habitat Conservation Plans is spreading rapidly across the developing areas of our state. Allison Rolfe provides a cautionary discussion of the political realities of this type of broad scale planning, including informative details on the San Diego Multiple Species Conservation Plan. Carol Witham discusses the future of regional conservation planning and how individuals and groups can get involved in this critical process. An overview of changes to the Natural Communities Conservation Planning Act and guidelines for plan development are also included. The California Environmental Quality Act is one of the most important laws for rare plant conservation, giving the public the opportunity to review the impacts of development projects that might harm native plants and habitat. Taylor Peterson provides a detailed overview of this environmental review process to empower citizens to get involved in their local areas. Timber harvesting involves similar environmental review. Gregory Jirak discusses the impacts of logging on rare plants, and outlines the protections afforded to them under the law. Jennifer Kalt addresses the impacts on rare plants of widespread herbicide use in the wake of logging activities.

The laws, policies, and regulations would be much less effective if not based on sound scientific knowledge about the distribution and abundance of rare plants throughout the state. Monitoring is

a key component in the assembly of this knowledge base. Roy Woodward discusses the monitoring process, including the designing of monitoring projects and marking of plant populations. Data accumulated from monitoring need to be made widely available to support conservation planning decisions. The Department of Fish and Game's Natural Diversity Database provides this service for data on rare plants, animals, and natural communities, and Roxanne Bittman explains this valuable program.

Lastly, CNPS has developed a number of important policies and guidelines regarding rare plant conservation, and two key documents are included in this issue. The CNPS *Botanical Survey Guidelines* outline our standards for appropriate botanical surveys. The *Statement Opposing Transplantation as Mitigation for Impacts to Rare Plants* is signed by CNPS and the Botanical Society of America. A list of additional resources for rare plant conservation and a detailed glossary of terminology and acronyms round out the issue.

We hope this issue of *Fremontia* will demonstrate that it is easy and rewarding to become a successful conservation advocate. Our environmental laws only work with vigorous public involvement and oversight, and opportunities to participate abound. More information on the topics in this issue is available at www.cnps.org, from the CNPS state office, and from your local CNPS chapter. California's outstanding flora is at great risk, and needs all of our help. Each of us can make a difference, so let's get started!

David P. Tibor, CNPS, 1722 J Street, Suite 17, Sacramento, CA 95814. dtibor@cnps.org

Featured on the cover, the Santa Cruz tarplant (*Holocarpha macradenia*) is extant in Monterey and Santa Cruz counties, where threatened by development, agriculture, non-native plants, and lack of appropriate ecological disturbance. It previously occurred as far north as Marin County, but the last native San Francisco Bay Area occurrence was extirpated by development in 1993. Experimental reintroductions in the East Bay have mostly failed. Illustration by L.A. Vorobik.





Tiburon mariposa lily (*Calochortus tiburonensis*) is listed by both the state and federal government as Threatened. It is known from only one occurrence in serpentine grasslands on Ring Mountain, Marin County, where it can be quite abundant. This lily was the first state-listed plant to be downgraded from Endangered to Threatened, after The Nature Conservancy established a preserve and banned off-road vehicles from its habitat. Photograph by R. York.

MANAGEMENT OF RARE PLANTS UNDER STATE AND FEDERAL ENDANGERED SPECIES LAW: A CNPS PERSPECTIVE

by *Emily Brin Roberson*

California's rare plants are managed under a tangled web of laws, regulations, policies, and agencies. On lands under federal management or for projects under federal control, these laws include the Federal Clean Water Act, National Forest Management Act, the National Environmental Policy Act, and the Federal Endangered Species Act (FESA). In other circumstances, rare plants are managed under the California Environmental Quality Act (CEQA), the California Forest Practices Act, the Natural Communities Conservation

Planning Act, and the California Endangered Species Act (CESA).

This article focuses on two laws that regulate management of some of our rarest plants: the California and Federal Endangered Species Acts. These laws are complex, sometimes unclear, and many portions are the subjects of heated ongoing policy debates. Though these laws are both flawed, they can provide important protections for listed plants when properly implemented. This article will present CNPS analysis of these laws and their proper implementation.

LISTING

Plants may be listed as "threatened" or "endangered" under CESA, FESA, or both. Endangered plants are generally perceived to be more imperiled than threatened plants, but both groups receive essentially the same treatment under both CESA and FESA. Under an older California law, the Native Plant Protection Act (NPPA), some plants are also listed as "rare" (see below for discussion of NPPA). Plants may be recommended for listing under either CESA or FESA

by the responsible wildlife agencies or by members of the public.

CNPS has led the effort to list rare plants in California. Many chapters and individuals have prepared successful state and federal listing petitions. When the petition process has failed, CNPS has used litigation to protect imperiled plants. Altogether CNPS has helped list more than 150 plants under FESA and many under CESA as well.

Despite CNPS efforts, appallingly few of California's rare plants are listed under the federal or state acts. The CNPS *Inventory of Rare and Endangered Plants of California* (CNPS 2001) places 1,467 plants on CNPS Lists 1A, 1B, and 2, the "at-



ACRONYMS

CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
FESA	Federal Endangered Species Act
FWS	United States Fish and Wildlife Service
HCP	Habitat Conservation Plan
NPPA	Native Plant Protection Act

CNPS LIST DEFINITIONS (CNPS 2001)

- List 1A** Plants presumed extinct in California
- List 1B** Plants rare, threatened, or endangered in California and elsewhere
- List 2** Plants rare, threatened, or endangered in California, but more common elsewhere
- List 3** Plants about which we need more information—a "review" list
- List 4** Plants of limited distribution—a "watch" list

risk" categories for the state. Of these, only 217 are listed under state law and only 184 California plants are federally listed. The unfortunate consequence is that most of our rarest plants must rely on other laws, primarily CEQA, for protection. (See "How to Comment on a CEQA Document" on page 27 of this issue for a discussion of plant conservation under that law.)

Under state and federal law it is generally illegal to destroy or "take" a species once it is listed. However, both laws include numerous exceptions and loopholes that allow listed species and their habitats to be le-

gally destroyed in a wide variety of circumstances. Note that because both state and federal law use the term "taking" to mean killing a listed species, this article will also use the term "take" to mean to kill a listed species.

THE FEDERAL ENDANGERED SPECIES ACT

Federally-listed plants are under the jurisdiction of the US Fish and Wildlife Service (FWS) under several sections of the FESA, most

Baker's larkspur (*Delphinium bakeri*), top, is known from fewer than 100 plants along Salmon Creek, Marin County. A 1999 lawsuit by CNPS and the Center for Biological Diversity compelled the FWS to list the plant as Endangered. The Marin Department of Public Works accidentally cut the plants back to the ground (prior to seed-set) during roadside maintenance in 2002. Photograph by D. Smith. • Sodaville milk-vetch (*Astragalus lentiginosus* var. *sesquimetralsis*), bottom, is known in California only from Big Sand Springs, Inyo County, and from two occurrences on private lands in Nevada. This plant is state-listed as Endangered and listed by Nevada as Critically Endangered, but was inexplicably withdrawn from the federal listing process after FWS determined it was not sufficiently threatened. Photograph by M. Williams.

importantly Sections 4, 7, and 10. Section 7 addresses consultation between the FWS and other agencies regarding federal projects that may jeopardize the continued existence of listed plant species, or adversely affect critical habitat designated for listed species. Section 4 deals with recovery planning and critical habitat designation, and Section 10 allows issuance of “incidental take permits” to destroy or harm listed animals and their habitat via habitat conservation planning.

Jeopardy Consultation Section

7(a)(2) of FESA requires that all actions “authorized, funded, or carried out” by a federal agency be reviewed by the FWS to ensure that the actions are not likely to 1) jeopardize the survival and recovery of any listed plant species, or 2) destroy or adversely modify any critical habitat that has been designated for the species (see section on Critical Habitat below). For example, suppose a National Forest wishes to log an area that is habitat to a listed species. Before proceeding, it must consult with FWS to deter-

mine if logging would put the existence of the species at risk or would destroy or adversely affect any designated critical habitat. If FWS finds this likely, it must propose “reasonable and prudent alternatives” to the proposed project which would eliminate the risk to the species. But even if a project is determined to be unlikely to jeopardize the species as a whole, the FWS must still propose “reasonable and prudent measures” which would mitigate, avoid, or minimize adverse impacts of any taking of the species.

Santa Cruz wallflower (*Erysimum teretifolium*) is state- and federally-listed as Endangered, and known only from Santa Cruz County. A recovery plan was prepared in 1999 by FWS, but the plant remains threatened by sand mining and development. Photograph by R. York.



RECOVERY PLANNING

Section 4 of FESA directs the FWS to develop recovery plans for all listed species. Recovery plans often provide excellent investigations of the biology and ecology of listed species and useful insights into their conservation needs. A major drawback, however, is that there is no legal requirement that the plans be implemented. Indeed, there is rarely funding or staffing to implement them. This is particularly true for plants, which tend to fall to the bottom of conservation priority lists.

Section 7 of FESA also includes an important recovery mandate, though it is little known and rarely used. FESA Section 7(a)(1) obligates every federal agency to “carry out programs for the conservation” of listed species. FESA defines “conservation” as recovery of a species so that it no longer warrants federal listing. This means that all federal agencies (the Forest Service, Park Service, Bureau of Land Management, Army, Navy, Air Force, Bureau of Reclamation, Environmental Protection Agency, Army Corps of Engineers, and all others) have a mandatory duty to take active measures to promote the recovery—and not merely the survival—of listed species affected by their actions. Regrettably, political and budgetary constraints tend to prevent full compliance with this far-reaching mandate and opportunity to promote recovery. Instead, agencies are generally only provided with minimal resources to prevent the extinction of species, so recovery plans often gather dust.

HABITAT CONSERVATION PLANNING

In general, under Section 9 of FESA, it is illegal to kill federally-listed animals or destroy their habi-

tat. However, in 1982, FESA was amended to allow FWS to issue “incidental take permits” for projects that destroy listed animals or their habitat, such as housing developments, mines, dams, golf courses, and so on. These permits contain terms and conditions that are meant to mitigate any damage done by a project, and promote overall conservation of affected species and their habitats. The mitigation measures are set forth in so-called “habitat conservation plans” (HCPs) that are reviewed and approved by FWS and are part of the incidental take permit process.

HCPs have been the subject of furious controversy since they came into wide use under the Clinton Administration. Several studies (Harding et al. 2001, Noss et al. 1997, American Institute of Biological Sciences 1999) have found that although the HCP program has great potential as a conservation tool, the scientific information used to develop HCPs has often been inadequate, resulting in flaws in the HCPs. (See “The Future of Regional Conservation Planning” on p. 19 of this issue for more information on HCPs.)

PLANTS AS SECOND-CLASS CITIZENS

Astonishingly, although killing listed *animals* is prohibited everywhere, FESA does not prohibit destruction of federally-listed *plants* on lands outside federal management. So HCPs do not directly affect listed plants unless they happen to be located in the same area as a listed animal for which an incidental take permit is being issued, or unless the permit applicant voluntarily includes listed plants in the HCP.

Furthermore, Section 7 consultation occurs only when the federal government is carrying out, permitting, authorizing, or funding a

project which will impact a listed species or its critical habitat. Thus many federally-listed plants are not protected by either the Section 10 HCP or Section 7 consultation programs, and so essentially are not protected by FESA at all.

These problems are due to an enormous flaw in Section 9(a)(2)(B) of FESA, which only prohibits the destruction of federally-listed plant species in “areas under federal jurisdiction.” Consequently, the law *allows destruction of most listed plants outside of federal lands*, where more than 70% of federally-listed plants live (and more than 80% in California). Thus, in areas not under federal control, or for projects not funded, authorized, or permitted by a federal agency, federally-listed plants can be knowingly extirpated without penalty.

Another stipulation of the law is that state-listed plants cannot be killed in *knowing* violation of state law or regulation, including CESA. Thus, federally-listed plants that do not occur on federal land, and are not also state listed, are forced to rely on state laws such as CEQA for protection. Because these laws are relatively weak, a great many of

Despite its listing status as Endangered under FESA, Braunton's milk-vetch (*Astragalus brauntonii*) has been subjected to deliberate bulldozing, herbicide application, and other methods of removal from a development site on private land near Los Angeles. Photograph by J. Dice.





Peirson's milk-vetch (*Astragalus magdalenae* var. *peirsonii*) is a state-listed Endangered and federally-listed Threatened plant. It occurs in the Algodones Dunes in Imperial County, and is seriously threatened by off-road vehicle recreation. This milk-vetch is the subject of a federal delisting petition submitted by off-road enthusiasts, and a lawsuit by the Center for Biological Diversity and CNPS regarding critical habitat determination. A management plan for the area is under development by the Bureau of Land Management. Photographs by J. Dice.

California's rarest plants are destroyed each year, despite being federally listed.

Because this aspect of the law is obviously inconsistent with effective biological diversity conservation, CNPS has launched the Equal Protection For Plants Campaign. Our goal is to change federal law so that plants and animals receive equal protection under FESA. We are also seeking equal funding and staffing for plant and animal management

within resource management agencies such as the FWS and the Forest Service. Our open letter calling for equal treatment of plants under Section 9 of FESA has already been signed by over 35 local, regional, and national groups, including the Botanical Society of America, the Society for Conservation Biology, the California Botanical Society, the Sierra Club, the Center for Biological Diversity, and the Natural Resources Defense Council. See the CNPS website (www.cnps.org) for more on the Equal Protection for Plants Campaign.

CRITICAL HABITAT

Critical habitat is one of the most biologically important sections of FESA, but it is also one of the most underused. Most people instinctively understand that wild plants and animals depend for their survival on specific habitats for shelter, nutrition, water, and reproduction. This principle is captured in Sections 4 and 7 of FESA, which requires FWS to designate and protect critical habitat for listed species.

Unfortunately, as noted above, FESA only requires federal agencies to protect critical habitat from actions that they themselves fund,

permit, or implement. Therefore, critical habitat designation only benefits taxa if they live on federal land or on land which is impacted by projects that are funded or permitted by the federal government, such as highway construction, wetlands management, or incidental take permit issuance.

Even with these limitations, critical habitat can be a useful conservation tool. For example, critical habitat designation requires thorough scientific investigation of the habitat requirements of the species, and provides valuable information for recovery efforts. Another benefit is that critical habitat designation is intended to promote recovery of listed species, not merely to prevent their extinction. So suitable habitat outside of areas currently occupied by the species may be designated as critical and protected to allow future range expansion and promote recovery. Critical habitat may also be designated to protect the integrity of geologic or hydrologic processes that species require for survival, such as periodic flooding of vernal pools or washes.

Regrettably, only approximately 4% of California's more than 180 federally-listed plants have designated critical habitat. There is tremendous political pressure on FWS and on Congress to weaken or remove FESA's critical habitat requirements. Several bills to change or eliminate these rules have been proposed in Congress in recent years, and policies for critical habitat implementation change frequently.

So far the scientific and environmental communities have been successful in preventing Congress from eliminating this important feature of FESA. Furthermore, recent successful litigation by CNPS and affiliated groups may lead to critical habitat designation for as many as 25 plants in the San Bernardino Mountains, in the vernal pools of

CESA STANDARDS FOR INCIDENTAL TAKE PERMIT ISSUANCE

Applicants must meet the following standards before CDFG can issue an incidental take permit:

1. Impacts from taking listed species must be “minimized and fully mitigated.”

Full mitigation means that no net impacts to listed species may occur under CESA. This standard (CESA § 2081(b)) is significantly stronger than the species conservation standards for unlisted species under the California Environmental Quality Act (CEQA). CEQA merely requires agencies to “avoid or minimize environmental damage *where feasible*” (CEQA Guidelines § 15021 (a), emphasis added). CESA defines “impacts” that must be minimized and fully mitigated as “all impacts on the species that result from any act that would cause the proposed taking” (CESA § 2081(b)(2)). This broad definition can be read to include indirect and cumulative impacts, as well as impacts to habitat. However, some state policies imply that impacts to listed habitat of species are not covered under CESA and that only “direct” destruction of listed species requires a permit. It is the desire of CNPS that this significant issue be clarified in the near future by the Legislature or CDFG.

2. No exceptions are permitted to the full mitigation requirement. Overriding considerations are not allowed.

CESA does not allow CDFG or any other public agency to permit “unavoidable” or unmitigated impacts to listed species. This is a critical benefit conferred by state listing. For unlisted rare species covered only by CEQA, any lead agency may allow significant impacts to the species if it finds that socioeconomic and other “benefits” of a project outweigh its adverse environmental impacts (CEQA Guidelines § 15093).

3. The applicant must fund both the implementation and monitoring of mitigation.

CESA § 2081(b)(4) requires that the project sponsor fund both the implementation of required mitigation measures *and* compliance and effectiveness monitoring for the mitigation. The effectiveness monitoring requirement allows CDFG—and the public—to ensure that mitigation is functioning properly and that CESA’s full mitigation requirement is met.

4. The jeopardy standard must be based on science and cumulative impacts.

Section 2081(c) requires CDFG to find that permitted projects will not jeopardize the *continued existence* of listed species. This finding must be based on “best

scientific and other information that is reasonably available” regarding “1) known population trends; 2) known threats to the species; and 3) reasonably foreseeable impacts on the species from other related projects and activities.” This section sets a high standard for the scientific analysis that must underlie a finding of “no jeopardy” and forces CDFG to consider cumulative impacts when issuing permits.

5. A California Environmental Quality Act (CEQA) review is required.

All incidental take permits must undergo a public review process under CEQA prior to approval. This usually occurs as part of a larger CEQA review process undertaken on the project as a whole by a lead agency other than CDFG. Occasionally it takes place through a process “functionally equivalent” to the CEQA process, if the incidental take permit is the only permit at issue and CDFG is acting as the lead agency. Either way, interested parties can use the CEQA process to ensure that applicants, lead agencies, and CDFG meet the new CESA standards, including full mitigation, scientifically-based jeopardy findings, adequate monitoring, and funding.

the northern Central Valley, and elsewhere. Political opposition continues, however. CNPS and other conservation organizations must maintain vigilance to prevent this and other key features of FESA from being eliminated.

THE CALIFORNIA ENDANGERED SPECIES ACT

The California Endangered Species Act (CESA) provides greater protection for plants than FESA

does. Unlike FESA, take of listed plants is prohibited under CESA. Additionally, in 1997, CESA was substantially amended to provide stronger conservation standards and greater scientific and public input into listed species management.

Many people are still not aware of the strict protections CESA now requires for California-listed species.

CESA prohibits the take of California-listed animals and plants in most circumstances. Like the FWS, the California Department of Fish and Game (CDFG) may issue “incidental take permits,” similar to federal HCPs, which allow destruction of listed species under limited conditions and which require full mitigation for impacts to species and their habitat. (See sidebar on p. 10.)

THE NATIVE PLANT PROTECTION ACT

Unfortunately, powerful political forces and misinterpretation of the law are threatening to keep the conservation benefits of CESA from many state-listed plants. The so-called “regulated community” (developers, timber companies, and others who destroy listed species during commercial activities) claims that California’s state-listed plants can be destroyed without a permit, without mitigation, and without limit. This claim is based on an outdated and little-known law called the Native Plant Protection Act.

The Native Plant Protection Act (NPPA) of 1977 was one of the first plant conservation laws in the United States. Although historic, it was quite weak. It provided only



Baker’s meadowfoam (*Limnanthes bakeri*) in a field north of Willits, Mendocino County. It is state-listed Rare under NPPA, and threatened by development, grazing, and road construction. Photograph by J. Guggolz.

limited protection for plants, primarily requiring that landowners who have been notified of state-listed plants on their property—and who wish to destroy those plants and their habitats—must provide CDFG ten days notice to salvage (remove for transplant) the plants before the destruction occurs.

In June 1998, then-Attorney General Dan Lungren issued an opinion asserting that take of listed plants is governed primarily by NPPA instead of CESA. The opinion reached the illogical conclusion that state law protects listed animals—but not listed plants—from destruction during a wide range of land use and land clearing activities. Though not binding on a court, the Lungren opinion’s interpretation of the law could virtually eliminate protection for state-listed

plants from destruction during development, mining, and logging. The publication of the Lungren opinion stimulated the regulated community to step up efforts to use NPPA to exempt projects affecting listed plants from CESA. A widely circulated 1999 article in the *California Land Use Law and Policy Reporter* (Thornton et al. 1999) added fuel to the fire, essentially repeating and amplifying the Lungren opinion. A CNPS rebuttal was published several months later (Roberson and Mueller 1999), and the policy debate continues at the state and local level.

The Lungren opinion has not yet been tested in court. If it is formally adopted by the courts or by CDFG, destruction of California’s listed plants and their habitats could increase dramatically. Fortunately,

Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*) is listed by FWS as Endangered, and is threatened by mining activities. CNPS is currently in litigation against FWS regarding critical habitat designation for this plant and four other carbonate endemics in the San Bernardino Mountains. Photograph by J. Dice.

both law and science are on our side. The California Legislature has repeatedly made it clear that state-listed threatened and endangered plants are to be managed and protected under CESA just as animals are. This only makes sense. The broad allowances for killing endangered and threatened plants with impunity under the Lungren interpretation would be contrary to many laws and policies of the state of California, as well as popular opinion, which provide a strong and consistent mandate for conservation of rare species. CNPS is working hard with CDFG, the courts, and the State Legislature to make sure that the Lungren opinion does not become California law.

WHAT YOU CAN DO

Both FESA and CESA can be powerful tools for conservation of rare species and their habitats. But these laws, and the agencies that implement them, are constantly under attack and cannot remain effective without active support from the scientific community and the public. There are many ways to become involved in implementation of endangered species laws in your area or at the state or federal level.

The public can submit petitions for listing and protecting imperiled species under the state and federal acts. The CNPS Rare Plant Science Program provides assistance with preparation of state and federal listing petitions. Information on how to list species can also be found on the CNPS web site. The Rare Plant Science Program also maintains information on rarity and distribution of listed species, published periodically as the *CNPS Inventory of Rare and Endangered Plants of California* (CNPS 2001).

If a project impacts listed species in your area, call your local CDFG or FWS office and ask them how they plan to implement the

mitigation, consultation, jeopardy, recovery planning, public input, and other requirements of CESA and FESA. Then review the project plans and environmental documents for consistency with endangered species law and provide comments to the agencies. You can contact the CNPS State Office for legal analyses, scientific information, white papers, brochures, and other technical assistance. The CNPS Conservation Program has information packets on federal critical habitat policies, habitat conservation planning, and key conservation provisions of CESA, NPPA, and other aspects of endangered species law. Many of these are posted on the CNPS website (www.cnps.org) as well.

We also need help with our programs to increase public understanding of the values of and threats to rare plants and biological diversity in general. We are working to educate the public, policymakers, and the media about these issues through projects such as the Equal Protection for Plants Campaign. We have prepared informational brochures and other materials on plant conservation and the values of native plants that are available for use with local Planning Departments, City Councils, Boards of Supervisors, land use planning agencies, and others. Contact CNPS for copies of informational materials and to find out how to get involved.

Because inadequate staffing and funding are among the primary factors preventing full implementation of endangered species laws, CNPS devotes considerable effort to increasing funding and staffing for FWS and CDFG through our legislation and conservation programs. Contact CNPS to become involved in these efforts.

Finally, keep up-to-date and get involved by subscribing to the CNPS Action Alerts electronic listserver (sign up at www.cnps.org/alerts/alerts.htm). The alerts provide

subscribers with conservation news and up-to-the-minute information on opportunities for public input into plant conservation law, budgeting, policy, and planning.

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UNDERSTANDING THE POLITICAL REALITIES OF REGIONAL CONSERVATION PLANNING

by Allison Rolfe

In the last decade there has been an increasing emphasis placed on habitat conservation planning as provided for in the Federal Endangered Species Act (FESA). In the mid-1980s and early 1990s, small-scale Habitat Conservation Plans (HCPs) prepared by individual landowners seeking endangered species permits were the most common type of conservation plan. In the last few years, however, the habitat planning concept has been elevated to a new level.

Region-wide, multi-landowner, multi-jurisdictional habitat plans are becoming the standard. The increase in scope, complexity, and duration of HCPs has been met with increased controversy surrounding their conception, development, and implementation. As this article will discuss, regional habitat conservation planning—while a promising and intriguing concept—is also a potentially problematic political process with significant implications for our nation’s most imperiled plants and wildlife.



Coastal sage scrub habitat was the original focus of NCCP planning in San Diego County, and is home to the coastal California gnatcatcher and a wide array of other plant and animal species. Photograph by FWS, used with permission of J. Fairbanks.

ACRONYMS

CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
FESA	Federal Endangered Species Act
FWS	US Fish and Wildlife Service
HCP	Habitat Conservation Plan
ITP	Incidental Take Permit
MSCP	Multiple Species Conservation Program (in San Diego)
NCCP	Natural Community Conservation Planning
NCCPs	Natural Community Conservation Plans
NMFS	National Marine Fisheries Service

WHAT THE LAW SAYS ABOUT TAKE

Habitat conservation planning was first authorized under FESA in 1982, nearly ten years after the law was initially enacted. The authorization was granted through a Congressional amendment that allows the United States Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS) to permit private persons and local and state government entities to “take” threatened or endangered fish and wildlife species. Previously,

the law required such entities to strictly avoid any take.

Those unfamiliar with the legal meaning of “take” may find the term somewhat misleading, since its common usage implies obtaining possession of something. Legally, however, take is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” (FESA § 3(19)). Take also includes significant habitat modification or destruction that actually kills or injures threatened or endangered species by significantly interfering with their essential behavioral patterns, such as breeding, feeding, and sheltering.

Take of federally-listed plants and animals is regulated under separate provisions of FESA (Sections 9(a)(1) and 9(a)(2)). These offer much less protection for federally-listed plants than is given to federally-listed animals. (For more information, see “Management of Rare Plants under State and Federal Endangered Species Law—A CNPS Perspective” on page 5 of this issue.)

HABITAT CONSERVATION PLANS

In order to obtain federal authorization to take listed fish and wildlife, the landowner or local land-use authority must prepare an HCP. The plan must discuss the impacts of the proposed take and set forth mitigation measures designed to offset the impacts of the take.

Mitigation measures in an HCP may include one or more of the following:

- preserving species habitat via acquisition such as preserving the land via purchasing it or purchasing a conservation easement;
- enhancing or restoring degraded or former habitat;

FESA REQUIREMENTS FOR ISSUANCE OF AN INCIDENTAL TAKE PERMIT UNDER AN HCP

- 1) The impacts of the take must be minimized and mitigated “to the maximum extent practicable.”
- 2) The permit applicant must ensure that adequate funding for the plan will be provided.
- 3) The amount of authorized take must not appreciably reduce the likelihood of survival and recovery of the species in the wild.
- 4) The ITP must not jeopardize the continued existence of any federally-listed species (including listed plant species).
- 5) The ITP must not destroy or adversely modify designated critical habitat areas for listed plants or animals.

- creating new habitat or establishing buffer zones around existing habitat;
- managing habitat for the protection and restoration of listed species; or
- modifying land-use practices or restrictions on public access and recreational activities.

Section 10(a)(1)(B) of FESA describes the requirements an HCP must meet in order for the FWS or NMFS to issue a permit authorizing take (referred to as an “Incidental Take Permit” or ITP). In addition, Section 7 of FESA requires the FWS and NMFS to make certain findings regarding the ITP, including the requirements as listed in the sidebar above.

When the Clinton administration came into office, HCPs under Section 10 of FESA began to be applied more widely. A series of policy reforms meant to provide broader “regulatory assurances” to landowners instigated the creation of more private HCPs, as well as larger multi-party HCPs covering entire regions, multiple governmental jurisdictions, and dozens of species (Pollak 2001). This was particularly true in California, where the expanded HCP program was showcased as a model for this new approach.

NATURAL COMMUNITY CONSERVATION PLANNING

Working closely with the Clinton administration, former California Governor Pete Wilson signed the state Natural Community Conservation Planning (NCCP) Act into law in 1991 (California Department of Fish and Game 1995). Meant to promote *regional* habitat conservation planning throughout the state, the law was crafted to provide even broader and more flexible landowner and local government participation than its federal counterpart, Section 10 (Pollak 2001).

The NCCP Act encouraged voluntary participation in the development of plans meant to be larger than seen previously and to conserve any species, including unlisted species, that might become listed. And yet, the NCCP Act contained no standards for the development or approval of a natural community conservation plan.

In theory, planning under this act was intended to create a process that resulted in a “win-win” situation for developers and environmentalists. The idea was to achieve this outcome through the promo-

tion of “local control” and collaborative multi-species planning.

In theory, planning under the NCCP Act was intended to:

- 1) improve upon the existing project-by-project regulatory system by creating a regional preserve network of large, intact blocks of viable habitat connected by wildlife corridors to other such habitat areas;
- 2) allow for more local control of land use planning, including conservation planning;
- 3) streamline land-use permitting related to endangered species; and
- 4) reduce the need to list species in the future.

Despite the NCCP program’s apparent benefits, it is important to understand the political flipside of regional habitat plans prepared pursuant to the NCCP program. Many environmentalists and scientists working on HCPs and NCCPs have been concerned with how the NCCP program has actually been implemented to date. Although relatively simple in concept, these programs are extremely complex, with far-reaching environmental, economic, and political implications. Understanding the political realities of regional habitat planning can aid in understanding its inherent problems and limitations.

Because NCCPs generally cover at least some federally-listed species, most require a take permit (i.e., HCP) under Section 10 of FESA. For that reason, this article will refer to the plans as NCCP/HCPs.

THE PRACTICAL PROBLEMS

Unfortunately, it is often nearly impossible to persuade local policymakers to conduct long-term resource conservation planning as a matter of good governance. There-



The coastal California gnatcatcher (*Poliophtila californica californica*) is a small songbird of coastal sage scrub in southern California. It is listed as Threatened by FWS, and is declining due to the conversion of its habitat to urban and agricultural uses. Photographs by FWS, used with permission of J. Fairbanks.

fore, the NCCP/HCP program can be viewed as a “hammer” that forces policymakers to do this. The program wields this power because without an NCCP/HCP in areas with numerous state- or federally-listed species, individual landowners would be required to apply to the FWS for take permits under Section 10 of FESA or under Section 2081 of the California Endangered Species Act (CESA). Project-by-project permitting can be expensive and time-consuming for landowners and often leads to multiple, small, and isolated patches of *protected* habitat. The NCCP/HCP program gives local governments control over streamlined endangered species permitting in exchange for developing a long-term habitat preserve system.

Reliance on the California Endangered Species Act (CESA) and

the Federal Endangered Species Act (FESA) as the driving force behind habitat and species preservation through NCCP/HCPs has a very significant downside. CESA and FESA are each designed to be a safety net for species on the brink of extinction. An “endangered” species is defined as “any species which is in danger of extinction throughout all or a significant portion of its range . . .” (FESA § 3(6)). Thus CESA and FESA place less emphasis on providing for long-term management of rare species than on responding to species in jeopardy of extinction. Regional plans, on the other hand, are designed to prevent the decline of species in the first place. There is an inherent incongruity between the reactive safety net of CESA and FESA and the proactive mission of the NCCP program.

The voluntary and collabora-

tive emphasis of the NCCP program tends to produce plans that are vague and discretionary. In development of NCCP/HCPs, disparate interests or “stakeholders”—such as large corporate developers, small property owners, environmentalists, farmers, regulatory agency representatives, and local policymakers—are brought to the table to develop the program for their region. Stakeholders with such varying needs and expectations are unlikely to reach consensus on the important details of habitat and species protection. As a result, there is a tendency for the group process to produce consensus-based policy that is vague and general. These policies give local governments an excessive amount of discretion in implementation. Many local activists have observed that vague and general policies typically work against effective habitat and species conservation.

THE CASE OF SAN DIEGO

A case in point is the City of San Diego’s NCCP/HCP, called the Multiple Species Conservation Program (MSCP). The first test of the conservation effectiveness of the City’s MSCP came in the form of a project called Carmel Mountain. The MSCP habitat evaluation maps approved by the City of San Diego identified Carmel Mountain as an environmental hot spot with important wildlife connections and high biological diversity. Given the environmental significance of the area, the environmental representatives believed that every effort would be made to preserve this property. They were told that, in keeping with the intentions of the MSCP, the city’s policymakers would require *and direct* the purchase of high-quality habitat on Carmel Mountain to offset development impacts to less important

habitat elsewhere. However, to the surprise and dismay of many MSCP stakeholders, the opposite occurred. The City Council allowed one of the developers to destroy important habitat on Carmel Mountain, and to offset these impacts by purchasing habitat as far away as 20 miles south.

Other significant problems have arisen from vague and discretionary MSCP policies that were developed in the collaborative process. Perhaps the best example is the MSCP’s statement that “vernal pools will be avoided to the maximum extent practicable” (Final MSCP Plan § 3(27)). This policy language can be interpreted as a very positive statement of intention. However, the phrase “to the maximum extent practicable” is not defined in the plan, and nowhere does the plan supply any description of the *specific* circumstances under which vernal pools may be destroyed.

Because the plan is essentially a take permit, it should clearly specify the conditions under which take may be authorized, as well as conditions under which it will be prohibited. Without this information, it is reasonable to assume that implementation will vary from project to project. A document filled with statements of good intentions is largely meaningless if it does not provide the details to ensure consistent and predictable implementation.

The vague standards in the San Diego MSCP mean that the legal requirements of FESA to provide species-specific details are not always met. This has particularly significant implications for the most imperiled species. As noted above, Section 10(a)(2)(A)(i) of FESA requires that all HCPs must specify the impacts that will result from permitted taking of listed species. Also, Section 10(a)(2)(b) requires that adequate funding to implement the HCP must be ensured at permit

issuance. It is not uncommon for plans to lack species-specific permitting standards and species-specific management actions that will be required after land is preserved. Another common pitfall is funding. Some plans fail to specify the ways in which adequate funding will be ensured, making it difficult to know whether the conservation goals will actually be implemented over the life of the plan.

To remedy these problems, NCCP/HCPs should meet all legal requirements to specify funding sources, probable impacts to species and habitats, and under what circumstances endangered species take will be authorized. If these key aspects of the plan are not defined or are poorly defined, local policymakers may use their discretion to approve projects based on economics or politics rather than biology (Molotch 1987). The vague nature of many large-scale plans can work against the environment. Politics, rather than science, often sets both the floor and ceiling of what these plans can achieve.

COMPATIBILITY WITH OTHER LAND-USE LAWS

Another category of concern relates to the overall scope of these large-scale plans. NCCPs were originally intended as a planning tool to supplement the requirements of other environmental laws including CESA and FESA, the Coastal Act, the Clean Water Act, the California Environmental Quality Act (CEQA), and local land use regulations (California Department of Fish and Game 1995). HCPs and NCCPs have a limited scope because they focus only on species and habitats. For example, the NCCP/HCP does not provide for other permits that may be required, such as those to fill wetlands. In addition, they don’t address a whole



Carmel Mountain in San Diego County was identified by the San Diego Multiple Species Conservation Plan as an area of high biological diversity. In spite of this, the San Diego City Council allowed some developers to build on Carmel Mountain and locate their project mitigation elsewhere, destroying important habitat for plants and animals. Photograph by B. Archer.

host of basic planning issues that local governments need to address, such as open space, floodplain protection, coastal access, and the like. However, some landowners and developers are touting the NCCP program as a cure-all to satisfy many, if not all, of the region's land-use planning issues. Contrary to some political perceptions, these plans are not a "one-stop shop" for meeting all applicable regulatory requirements. Regardless, land-use authorities have attempted to impose additional regulations to protect other public resources, such as

California's coastal areas, water quality, or wetlands. In doing so, they have been accused of breaking the deal or hitting the developers twice.

THE CONTROVERSY OF REGULATORY ASSURANCES

A source of great controversy surrounding the HCP and NCCP programs has been the broad regulatory assurances associated with these plans. Under the Clinton

Administration's "no surprises" policy (now codified as a federal regulation and applied by the Bush Administration), HCP permit applicants—including landowners and local governments—are assured that once an HCP is approved, "a deal is a deal." Specifically, the federal government may not, under any circumstances, require the permittee to provide additional land, water, or money, or to implement further restrictions on the use of any land or water resources (other than those already covered under the HCP) without the permittee's consent.



Willow monardella (*Monardella linoides* ssp. *viminea*) is a covered species under San Diego County's MSCP program. Shortly after the HCP was adopted, however, it was learned a critical population of the monardella at Carroll Canyon was not within preserve lands despite official analysis that suggested it was. The population is within the footprint of a development project, and is likely to be destroyed. Photograph by J. Dice.

An analogous policy has been applied to NCCPs at the state level. Thus, under the "no surprises" approach, if species populations continue to decline in the future, the federal and state governments (i.e., the taxpayer) must pick up the tab for any needed adjustments to the plan. The implications of this policy for long-term successes of these plans in conserving species are all the more significant when one considers that there is currently no statutory limit on how long an

HCP/NCCP may be in effect. In fact, HCPs and NCCPs approved in California to date will be in effect for 30–75 years, and thus the unforeseen costs to the public could be very significant.

SUMMARY

Despite significant problems, the HCP/NCCP concept is a step in the right direction in the sense that it acknowledges the need to protect large, intact, and connected habitats. On the positive side, these programs help to publicize the idea of protecting ecosystems rather than individual species, and also promote much needed long-term conservation planning.

At their most basic level, however, NCCP/HCPs are simply endangered species permitting programs. They are not long-term plans that can address the complex and difficult issues we face today, such as water quality, transportation, or affordable housing.

What, then, must be done to get all stakeholders to take a long-term view toward environmental protection? First, we must advocate that these plans be strengthened. Second, we must simultaneously be honest about their limitations. Only then can we move past the question of "How much habitat is enough?" to the more critical questions of "How much development is too much?" and "Where do we draw the line?"

In the meantime, it is important for local activists to remember that many laws—including the state and federal Endangered Species Acts, the Clean Water Act, the California Environmental Quality Act, and the National Environmental Policy Act—set strong standards for public involvement, scientific analysis, and conservation achievements that are required in NCCPs/HCPs. (See "The Future of Regional Conservation Planning" on

page 19 of this issue for more information.)

We can and should use the law and our scientific knowledge to make sure that these plans effectively provide for the survival and recovery of all covered species. Because environmental laws are often complex, the first step toward becoming an effective advocate for species and habitat is to familiarize oneself with these laws. Then, by working together with others equally concerned about habitat conservation, each of us can make a difference.

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Flying M Ranch in eastern Merced County. Vernal pool grassland will be one of the habitats considered in the Eastern Merced NCCP/HCP planning process. CNPS members are currently participating in numerous regional planning processes that will determine the long-term fate of this and other unique areas of California. Photograph by J. Game.

THE FUTURE OF REGIONAL CONSERVATION PLANNING

by Carol W. Witham

Natural Community Conservation Plans (NCCPs) and Habitat Conservation Plans (HCPs) are rapidly becoming the preferred regulatory replacement for the more traditional project-by-project environmental review and permitting process. These programs are essentially streamlined endangered species take permitting processes, but they do allow for a landscape-scale, ecosystem perspective to conservation planning. Unfortunately, the permits are very long-term (often in excess of 50 years) and grant

ACRONYMS

AB	Assembly Bill
BMPs	Best Management Practices
CDFG	California Department of Fish and Game
CESA	California Endangered Species Act
FESA	Federal Endangered Species Act
FWS	United States Fish and Wildlife Service
HCP	Habitat Conservation Plan
NCCP	Natural Community Conservation Planning or Natural Community Conservation Plan
SB	Senate Bill

EVOLUTION OF THE NCCP ACT

1991 Natural Community Conservation Planning Act (AB 2172 Kelley)

Key provisions:

- Defined a natural community conservation plan as identifying and providing for regional or areawide protection and perpetuation of natural wildlife diversity, while allowing compatible and appropriate development and growth.
- Required a planning agreement between the parties and CDFG outlining the planning process.
- Required that the plan be consistent with the planning agreement in order for CDFG to approve it.
- Allowed CDFG to prepare nonregulatory guidelines for the development and implementation of plans.
- Authorized the take of any identified species whose conservation and management was provided for in the plan.

The nonregulatory guidelines could have included defining regional scope; determining conservation standards; appointing of advisory committees; incorporating public input; implementing, monitoring, and reporting provisions; and amending the plan. However, because the guidelines were nonregulatory, standards for species and habitat coverage were not enforceable.

2000 Natural Community Conservation Planning Act (SB 1679 Sher)

Key provisions (amended to the 1991 NCCP Act):

- Added findings to better outline the intent of the legislature regarding NCCPs, including the intent to sustain and restore species and habitats impacted by growth and development.
- Refined the planning agreement requirement to include a process for collection of data, incorporation of scientific analysis, and designation of independent scientists to propose conservation criteria and guidelines.
- Added a provision requiring CDFG to establish a process for public participation throughout plan development and review to ensure that interested parties have an adequate opportunity to provide input.

While SB 1679 addressed the concerns of the scientific and environmental communities regarding scientific input and public participation, the criteria for species and habitat coverage were still determined by nonregulatory guidelines developed by CDFG. Additionally, regional planning processes with planning agreements signed before July 2000 are not subject to these amendments.

2002 Natural Community Conservation Planning Act (SB 107 Sher)

Key provisions (repeals previous NCCP Act and enacts the following):

- Establishes conservation (recovery) as the standard for an NCCP.
- Defines numerous terms including conservation, covered spe-

cies, monitoring plan, adaptive management, changed circumstances, and unforeseen circumstances.

- Requires a planning agreement between the participants and CDFG which establishes the geographic scope of the plan, a preliminary list of species and habitats to be considered, preliminary conservation strategies and preserve design principles, and identifies data gaps so that risk factors can be evaluated.
- Requires the planning agreement to establish an interim process during plan development by which projects can be reviewed for potential conflict with the conservation goals of the plan.
- Reestablishes the requirement that CDFG establish a process for public participation throughout plan development and review to ensure that interested parties have an adequate opportunity to provide input.
- Outlines minimum standards for an NCCP plan to include: specific measures for protection of habitat and species on a landscape scale including connectivity of habitat, use of best available science, incorporation of a monitoring plan and adaptive management program, an estimated timeframe for establishing preserves and other conservation measures, provisions to ensure adequate funding, and an implementation agreement.
- Requires CDFG to make specific findings regarding the content of the plan and implementation agreement before approving the plan and issuing permits.
- Sets standards for species and

habitat coverage and requires CDFG to make specific findings to support whether a species is covered under the plan before issuing a take permit.

- Allows CDFG to issue regulatory assurances (“no surprises”) commensurate with long-term conservation assurances and associated implementation measures of the approved plan.
- Requires CDFG to suspend or revoke the permit, in whole or in part, if continued take of a species would result in jeopardy or if take exceeds conservation according to a rough proportionality schedule established in the implementation agreement.

Because SB 107 contains specific standards that CDFG must adhere to, citizens can now challenge approval of inadequate plans or the failure to suspend or revoke a permit for cause. While SB 107 addresses many of the concerns about the NCCP process that have been raised by the scientific and environmental communities, it also contains problematic provisions which may eventually require additional legislation to correct or litigation to resolve. For example, SB 107 authorizes “other measures that provide equivalent conservation” in lieu of land preserves protected in perpetuity, but provides no standards for those measures other than that they must provide for conservation. And finally, regional planning processes with a planning agreement signed before January 2002 are not subject to all of the provisions of SB 107.



Solano grass (*Tuctoria mucronata*) is listed as Endangered under both the state and federal Endangered Species Acts. It is known from only three occurrences in Solano and Yolo counties and occupies large, highly turbid, playa-like vernal pools on the Pescadero soil series. Solano grass is one of the species being considered in two separate regional conservation planning efforts currently underway—the Yolo County HCP and the Solano County Water Agency NCCP/HCP. The Yolo County HCP has had several draft iterations—all of which have failed to pass public review—and is now being considered for rewrite as a joint NCCP/HCP. The Solano County Water Agency HCP/NCCP is still in the early planning phase.



Habit of Solano grass (*Tuctoria mucronata*), above, Yolo County Grasslands Park. • Inflorescence of Solano grass (*Tuctoria mucronata*), right, Yolo County Grasslands Park. Photographs by J. Game.

regulatory assurances to the plan participants that preclude additional fees or mitigation once the plan is approved.

While the plan participants and developers get assurances that they

will not have to contribute more money or mitigation once the plan has been approved, the only assurances available to the environmental community and protection to the resources is the use of the best

available science. To that extent, it is imperative that scientists and environmental advocates become involved in the planning process in order to negotiate on behalf of the environmental resources and lobby for use of the best available science.

THE NCCP PROGRAM IS IN FLUX

The original NCCP Act (AB 2172 Kelley 1991) was simple and flexible and contained very few substantive provisions. It was conceived

as a voluntary alternative to an existing regulatory framework. Many hoped that it would provide species conservation through incentives, as opposed to the more traditional regulatory approach. The statute's flexibility allowed the NCCP process to evolve, but lack of substantive provisions allowed critical conservation issues to be neglected or deferred (Jasny 1997).

In response to criticisms of the NCCP program by the scientific community, environmentalists, developers, and policymakers have sponsored a host of bills to shape or change the NCCP program (Pollak 2001a). Between 1992 and 2000, 13 bills were introduced but only two have become law. The most significant was SB 1679 (Sher 2000) which added sections to the statute that require early independent scientific input into the plan and a process for public participation.

More recently, SB 107 (Sher 2001) was introduced as a complete rewrite of the NCCP Act. While still a voluntary program, the bill makes several important changes to the NCCP development and approval process. Possibly the most important of these is the establishment of conservation/recovery as the basic objective of a Natural Community Conservation Plan or NCCP. The bill requires the California Department of Fish and Game (CDFG) to make certain findings regarding the adequacy of the plan before issuing permits. It also requires that NCCP permits be revoked or suspended in cases where a species is in jeopardy, or where the applicant fails to maintain a schedule of agreed upon "proportionality" between impacts to and conservation of species and habitats. The bill also sets standards for all NCCP plans, and includes monitoring and adaptive management plans as part of the overall conservation strategy.

On the flip side, SB 107 codifies the "no surprises" or regulatory



Sacramento Orcutt grass (*Orcuttia viscida*) is endemic to old, high-terrace formation vernal pools in Sacramento County. It is known from only seven occurrences and is listed as Endangered under both the state and federal Endangered Species Acts. Urban expansion in the greater metropolitan area of Sacramento poses a serious threat to this species. Sacramento Orcutt grass is one of 51 threatened, endangered, and special-status species being considered under the South Sacramento County HCP, a large-scale regional conservation planning process intended to provide conservation of all covered species and habitats. Sacramento Orcutt grass was also the subject of

a recently approved HCP for expansion of the Sacramento County Landfill.

Habit of Sacramento Orcutt grass (*Orcuttia viscida*), top, Phoenix Field near Sacramento. • Inflorescence of Sacramento Orcutt grass (*Orcuttia viscida*), bottom, Phoenix Field near Sacramento. Photographs by J. Game.

assurances that protect plan participants from having to provide additional money or mitigation after the plan is approved even if species or habitats decline due to unforeseen circumstances. SB 107 exempts several plans currently under development from many of the new requirements. It also contains problematic language that may give local agencies and developers substantial “wiggle room” to undermine or avoid the conservation goals of the law. For example, SB 107 allows for other “measures that provide equivalent conservation” in lieu of habitat preserves. This could conceivably result in plan participants proposing to do “best management practices” (BMPs) instead of preserving habitat in perpetuity if they can show that the BMPs provide equivalent species and habitat conservation.

SB 107 was passed by the legislature and signed by the Governor in early 2002. This new NCCP Act will become law in January 2003, but how it will be interpreted and implemented is still largely unknown. While SB 107 gives CDFG the option of adopting regulations to clarify how the law should be implemented, there is no requirement that they must do so. Additional work in policy development, case law, and new legislation will likely be necessary to assure that implementation meets the legislative intent of the NCCP Act. (See the sidebar “Evolution of the NCCP Act” on pp. 20-21 for more information.)

Regardless of what happens, the NCCP program that began as an experiment in southern California is about to expand into other areas of the state. The CALFED Bay-Delta Program contains a “Multi-Species Conservation Strategy” that CDFG has approved as an NCCP Plan. The County of Merced has entered into a planning agreement with CDFG and FWS to prepare an NCCP/HCP concurrent with development of the proposed UC Merced cam-

Colusa grass (*Neostapfia colusana*) is endemic to large, alkaline, playa-like vernal pools in Merced, Solano, Stanislaus, and Yolo counties. Probably once more common in California before large-scale land reclamation and agricultural conversion, it has been extirpated from its type locality in Colusa County. Colusa grass is state-listed as Endangered and federally-listed as Threatened. This species is being considered under three separate, large-scale regional conservation planning processes occurring in Merced, Solano, and Yolo counties.

Inflorescence of Colusa grass (*Neostapfia colusana*), right, Yolo County Grasslands Park. • Habit of Colusa grass (*Neostapfia colusana*), below, Yolo County Grasslands Park. Photographs by J. Game.



pus and the planned community adjacent to it. The “Placer Legacy” open space plan is now being converted into an NCCP/HCP.

Other areas considering an NCCP, or conversion of an HCP in progress into an NCCP/HCP, include Eastern Contra Costa County, South Sacramento County, the

Lower Colorado River Project, Yolo County, the Solano County Water Agency, and the Mendocino Redwood Company. Local governments are being encouraged to enter into the NCCP planning process by both the state and federal wildlife agencies, and as a result NCCPs will only become more common. (See

GUIDELINES FOR DEVELOPING AN NCCP

Below is a summary of the issues that have been repeatedly raised by the scientific and environmental community regarding planning and implementation of NCCPs or other regional conservation plans (Jasny 1997, Pollak 2001b). Many of these issues have been addressed by SB 107, but ensuring that they are incorporated into the planning process *may still require lobbying* by participating environmental activists and scientists.

- ***The plan must contribute to the conservation and recovery of all covered species, both listed and unlisted.***

Recovery is already the goal of both the California and Federal Endangered Species Acts (California Fish and Game Code § 2052, FESA §§ 2(b), (c), 7(a)(1)). Advocates can use these laws to push for explicit inclusion of recovery goals in NCCP/HCPs. Preserve design and management must balance the needs of the individual covered species within the overall ecosystem approach to habitat conservation.

- ***Data gaps must be identified and considered on a species-by-species basis to determine the risks associated with overall lack of knowledge.***

This risk analysis should help identify some strategic issues

for the adaptive management program. The level of uncertainty in our knowledge about species and habitat must be considered by the wildlife agencies in determining the duration of the plan and the level of regulatory assurances.

- ***The plan must be based on the best science available.***

This is also required under current California and Federal Endangered Species laws (California Fish and Game Code § 2081(c), FESA § 7(a)(2)) and should be rigorously implemented in NCCP/HCP plans. In addition to the Independent Science Advisors providing an overarching framework for species conservation, preserve design, and adaptive management, it is appropriate to solicit information from local experts to supplement that information. In some regional planning processes, CNPS members have gone to great efforts to obtain additional biological information from regional or species experts and occurrence data from local consulting firms or universities.

- ***The plan must provide for protection of habitat, natural communities, and species diversity on a landscape or ecosystem level.***

The preserve design must incorporate a range of environmental gradients, provide connectivity between habitat patches, *and* minimize edge effect in order to

maintain ecological integrity and ecosystem function. It is important that the preserve design incorporate multiple corridors for species movement, and take into account how climate change may affect species movement. Issues pertaining to adjacent land use, such as agricultural spraying, will become important considerations as NCCP/HCP planning moves into more rural areas.

- ***Interim projects approved during plan development must not conflict with the preliminary conservation goals of the plan.***

Individual projects proposed during the development of the plan need to be scrutinized to determine whether or not they impact habitats or species to be conserved under the plan. Throughout CEQA review and any applicable state or federal endangered species take permitting processes, the project proponents, lead agency, and wildlife agencies should be encouraged to consider products and objectives developed by the Independent Science Advisors.

- ***The plan must include a thorough monitoring program.***

The ability to identify when things are going wrong and why they are going wrong is a critical component of NCCP/HCP plan implementation. A strong monitoring program is required to 1) determine if the plan is being imple-

“Understanding the Political Realities of Regional Conservation Planning” on page 13 of this issue for a discussion of the differences between an HCP and an NCCP.)

NCCPS ARE A PLANNING PROCESS

Although NCCPs must meet numerous requirements contained

in the NCCP Act, the state and federal Endangered Species Acts, and other laws, they are primarily proactive planning processes. This sets them apart from the more tradi-

mented as written, 2) determine if impacts and conservation are roughly proportional during plan implementation, 3) detect trends in populations in order to determine if the plan is effectively conserving species, and 4) assess overall ecosystem function.

- ***The plan must include an adaptive management plan.***

An adaptive management program that can respond to species and habitat needs over time requires a thorough analysis of foreseeable changes in circumstances. Foreseeable circumstances that should be considered include but are not limited to the following: likelihood of invasion by exotic pest plants, animals, or disease; catastrophic fire or floods; climate change; changes in hydrologic patterns, air pollution, and foreseeable fragmentation or destruction of habitat outside the planning area. Adaptive management plans should specify what actions will be triggered if foreseeable circumstances such as these result in adverse impacts to covered species and habitats.

- ***Implementation plans must delineate roles and responsibilities, specify measurable biological goals and objectives, and set thresholds of rough proportionality between impact and conservation.***

The implementation plan is an agreement or contract between

the regulatory authorities and the plan participants. While it is difficult for nonsignatories to have direct input into the implementation agreement, it is possible to affect the contents of the agreement through detail and specificity of actions in the plan. Timelines and schedules should be developed as part of the overall planning process and may help to provide clarity to the implementation agreement.

- ***The plan must contain provisions to ensure adequate funding to carry out the conservation, monitoring, and adaptive management actions identified in it.***

This is also a requirement for permit issuance under the state (California Fish and Game Code § 2081) and federal (FESA § 10(a)(1)(B)) Endangered Species Acts. Ideally, local governments should be encouraged to “front-load” conservation to the maximum extent possible through early acquisition of key preserve areas. No take should occur until after conservation and/or mitigation have been implemented, so as to offset impacts to habitat and species. Funding mechanisms and alternatives should be identified early on so that conservation always proceeds in rough proportion with impacts.

tional and reactive regulatory programs. The planning behind an NCCP is a long process that attempts to reach consensus among the often contradictory goals of

multiple stakeholders—including the state and federal wildlife agencies, local governments and jurisdictions, developers, landowners, and environmentalists. CNPS mem-

bers and other environmental groups must be prepared to use law, science, and strategic thinking to negotiate on behalf of the species and habitats to be conserved under a proposed NCCP plan. Special interest groups will be well represented in such negotiations, and will actively lobby for provisions that maximize their own benefits under the plan. Those who seek to protect species and their habitats have no choice but to participate in this necessary and often arduous process.

Planners and project proponents may want to include only general conservation provisions with little detail in NCCPs, because this gives them maximum latitude in how they interpret and implement projects. As we experienced in the southern California experiment (see “Understanding the Political Realities of Regional Conservation Planning” on page 13 of this issue), conservation platitudes may sound nice and make the NCCP look good. But if the implementation lacks specifics, the implied positive actions may never actually occur.

A good regional conservation plan needs to be very specific about all aspects of the plan and its implementation. In particular, it needs to be clear about when and where impacts will be permitted, and where and how they will be restricted or prohibited. The greater the specificity that can be built into the plan, the lesser the chance for errors that might lead to unforeseen circumstances and species or habitat decline. An important part of participating in the planning process is to negotiate for very detailed strategies, with clear timelines attached, so that the conservation measures specified in the plan are actually implemented.

WHAT CNPS IS DOING

The CNPS state organization

is actively committed to participating in the NCCP program and pushing for improved implementation and legislation. We are seeking opportunities to aid CDFG in developing guidelines with respect to 1) Independent Science Advisors, 2) the role of scientists and environmentalists on various planning committees, and 3) general implementation of the NCCP program. During the next year, a conservation task force will be revising the *CNPS Manual on the HCP-NCCP Process* (Chipping 1999) to better reflect recent changes in the law and our collective experiences with regional conservation planning to date. The several members and chapters that have been actively involved in HCP or NCCP planning will serve as resource persons to others just beginning the process. And finally, a special page has been developed for the CNPS website (www.cnps.org) that contains links to the laws, pertinent background documents, literature, and contacts.

WHAT YOU CAN DO

Participating in regional habitat planning is an ongoing learning process. First and foremost, get involved early and remain involved throughout the process. Because this is a long and often time-intensive process, it is best to “team up” with another person. Someone from your team must attend every meeting, and you both will need to stay informed on the issues. Push your local government and CDFG to set up an open public participation process that includes a steering committee, as well as stakeholder groups and special focus groups. Request that the environmental community be well represented on the steering committee, since two or three people can negotiate more effectively than a single individual. Make

sure that the other local scientific and environmental organizations are also involved and partner with them to the maximum extent possible.

As soon as you hear that your local government is considering a regional conservation plan, request additional information and ask to be placed on the mailing list. Review and comment upon the Planning Agreement, which is the first step in the planning process and sets the stage for scientific input, interim permitting, and public participation. Early on, take time to become familiar with the NCCP Act and Guidelines. If listed species are likely to be covered by the plan, also familiarize yourself with the California Endangered Species Act (CESA) and the Federal Endangered Species Act (FESA).

Throughout the planning process, try to stay up-to-date on the literature being published about NCCPs, HCPs, regional conservation planning, umbrella species, monitoring, adaptive management, and the species and habitats proposed to be conserved under the NCCP. CNPS conservation staff and volunteers will help you find the resources and experts you need to learn the process and participate effectively. (For a summary of the essential features of any NCCP, see the sidebar “Guidelines for Developing an NCCP” on pp. 24-25.)

NCCP planning is a tool that can be used to provide balance between habitat conservation and local land use planning. It is also a tool that has been misused in the past. Hopefully, the new statutory requirements provided in SB 107, along with increased public participation, will ultimately result in better NCCPs. CNPS remains committed to working on the environmental issues surrounding the planning process and on the development of individual plans. CNPS members can rest assured that we will continue our efforts to improve

the NCCP Act by working with CDFG and others on interpretation and implementation.

At the same time, we would not be nearly as effective were it not for the dedicated efforts of many individual CNPS members who are actively participating on the NCCP/HCP planning processes currently under way. For only through active member participation will we be able to ensure that the scientific framework and overarching biological goals of species and habitat conservation are consistently considered during the planning and negotiation of regional conservation plans.

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Munz's onion (*Allium munzii*) is state-listed as Threatened and federally-listed as Endangered, and is known from heavy clay soils in western Riverside County. The type locality was known to harbor a population of about 1,000 plants for years. However, consultants for a development project on site only identified about 200 or 300 individuals (CNDDDB and local herbaria were not consulted for further information on the population). Thus it was incorrectly assumed only 75 plants would be lost and this became the basis of translocation plans. In 2001 at least 1,500 plants were observed in only a portion of the site. However the translocation requirements were only doubled and the parent site is anticipated to be eliminated soon. Photograph by R. Bittman.

HOW TO COMMENT ON A CEQA DOCUMENT

by Taylor Peterson

The California Environmental Quality Act (CEQA; Pub. Resources Code, § 21000 et seq.) gives interested citizens an opportunity to address the impacts

of development projects on plants and plant communities. Public input is a critical component of the CEQA environmental review process. While consultants and profes-

sional planners have expertise in their fields, they do not always have familiarity with local ecological issues that members of the community have.

ACRONYMS

CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
DEIR	Draft Environmental Impact Report
EIR	Environmental Impact Report
FEIR	Final Environmental Impact Report
IS	Initial Study
Neg Dec	Negative Declaration
NOD	Notice of Determination
NOP	Notice of Preparation
OPR	Office of Planning and Research (Governor's)

Information provided by citizens who are knowledgeable about the natural resources of a proposed project area can improve the quality of the CEQA review, simplify the job of the public decision-makers, and make an important difference in the quality of protection that natural resources receive. Citizens need to understand the CEQA process in order to make effective use of this important—but hardly fail-safe—tool.

This article depends upon frequently used terminology (refer to the Glossary on pp. 69-71 for definitions) and describes the basic process followed for two CEQA documents: the Negative Declaration (Neg Dec), which is filed for projects not expected to cause significant and unavoidable environmental impacts, and the Environmental Impact Report (EIR), which is required where such impacts are expected. A discussion of exempt projects (i.e., projects not subject to environmental impact analysis) is also provided.

Also offered are specific suggestions for effective public participation in the review process. The California Native Plant Society has often taken official positions on controversial projects and provided expert testimony at hearings. Familiarity with the laws and some acquaintance with the public re-

view process empowers us to participate not only as CNPS members, but also as informed citizens.

THE CEQA PROCESS

It is critically important to be involved throughout the CEQA process in order to retain the right to challenge an EIR in court if it becomes necessary. Members of the public cannot challenge the adequacy of a document without having “exhausted their administrative remedies,” that is, if they have not commented when comments were requested. Sometimes exhausting the administrative remedies requires more than just providing comments when they are requested. It is a good idea to review all of the documents which are part of the legal administrative record of an EIR; requesting access to these documents may be an important step in exhausting the administrative remedies.

Every non-federal public agency in California that undertakes, supports, or approves a project by issuing a permit for land development is required by CEQA to review the potential environmental impacts of the proposed development. Such actions commonly include conditional use permits, variances, planned development permits, subdivision maps, and rezonings.

CEQA applies only to these types of *discretionary actions*. *Ministerial actions*, which generally include issuing building permits and grading permits, are not subject to CEQA. Note that some grading permits are considered discretionary, and not ministerial, by some jurisdictions.

The local planning department usually starts the CEQA review, although sometimes the public works or transportation department or a utility district may perform this function. The first step is to determine if an action is a *project* as defined by CEQA (see figure on p. 29). If it qualifies as a project, the agency then determines whether it is exempt from CEQA.

The definition of *project* in CEQA is broad:

“Project means an activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and which is any of the following: a) An activity directly undertaken by any public agency; b) An activity undertaken by a person which is supported, in whole or in part, through contracts, grants, subsidies, loans, or other forms of assistance from one or more public agencies; c) An activity that involves the issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies.”
(*CEQA Guidelines*, § 21065)

If it is not exempt, the next step is to complete an Initial Study (IS) of potential environmental effect. If, after completing an IS, it is determined that the project either will not result in significant environmental impacts or can be modified to prevent such impacts, a Neg Dec or Mitigated Negative Declaration (Mitigated Neg Dec) can be prepared. If potentially significant

environmental impacts are anticipated and the project cannot be designed to avoid those impacts, the agency should require an EIR.

The agency overseeing these documents is called the *lead agency*. It is important to note that there are numerous circumstances in which the lead agency is also the project proponent. These projects may require particularly diligent scrutiny due to the potential for a conflict of interest.

The EIR, IS, Neg Dec, Mitigated Neg Dec, and any other CEQA documents can be prepared by the lead agency, by a consultant to the lead agency, by the applicant,

or by a consultant to the applicant. Some lead agencies accept documents prepared by the applicant or consultants, while some prefer to prepare them in-house. More often than not, however, the agencies depend on outside preparers because of staff shortages or lack of technical ability.

Regardless of who prepares the document, once the agency has adopted the Neg Dec or certified the EIR, it is the lead agency that must defend the document if it is challenged in court. This hopefully prompts the lead agency to ensure that the document is accurate, complete, and legally adequate. In some

jurisdictions the developer is required to pay all preparation and legal costs of defending the document. If this is the case, the jurisdiction has little vested interest in assuring that the document is complete, and this may also warrant more diligent scrutiny in reviewing the Neg Dec or EIR.

EXEMPTIONS FROM THE CEQA PROCESS

A project under CEQA may fall into one of four categories of exemption under the law: *statutory*, *categorical*, *general rule*, and *disapproved project*. Basically, exemptions apply to types of projects that have been determined by the legislature to have little or no environmental impact.

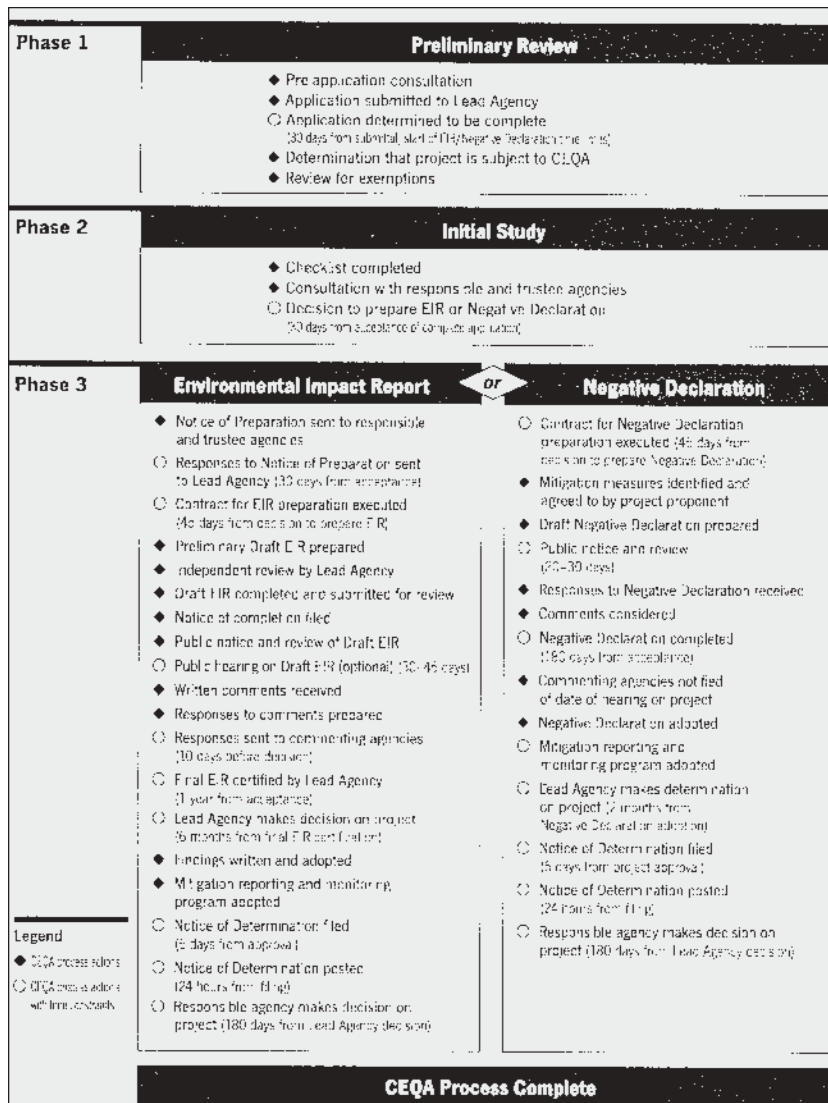
Statutory exemptions include ministerial projects; emergency projects; setting of tolls, fares, rates, or charges; and feasibility or planning studies for possible future action.

Categorical exemptions are classes of projects that the Secretary of Resources has determined will generally not have a significant effect on the environment. The Secretary has established 32 classes of categorical exemptions to date (see the *CEQA Guidelines*, §§ 15301 to 15332). Examples are replacement, repair, maintenance, minor alteration, etc. of an existing structure (Class 1), certain small facilities or structures (Class 3), and minor alterations to land (such as for landscaping) (Class 4). A categorical exemption does not apply if a reasonable possibility exists that a significant environmental effect may occur as a result of the project, including cumulative impacts (*CEQA Guidelines*, § 15300.2).

General rule exemptions are for projects where it is certain that there is no chance the activity could affect the environment.

A *disapproved project* is one where the agency has reviewed the

“Three Phases of the CEQA Process” from the *CEQA Deskbook* (Bass et al. 1999).



project's merits but finds that it warrants a quick disapproval, and thus need not proceed with a CEQA analysis.

Exemptions do not apply if the project is shown to have significant environmental impact, involves a listed hazardous waste site, affects scenic resources within a state scenic highway, or causes significant adverse changes in the significance of an historical resource. If an agency files a Notice of Exemption (NOE), there is a 35-day statute of limitations period on legal challenges to the agency's decision that the project is exempt from CEQA (*CEQA Guidelines*, § 15062(d)).

THE NEGATIVE DECLARATION

A Negative Declaration must be posted for public review for no less than 20 days. At a minimum, it should be posted at the lead agency's offices, most often the city or county planning department. It is best to call the lead agency and ask where such notices are posted. Notices also may be published in a newspaper of wide circulation. Any organization or individual that specifically requests notification is entitled to be notified. Negative Declarations rely upon the information provided in an IS. Thus, if you will be interested in commenting on the IS and Neg Dec, request in advance that the lead agency notify you when the IS is completed.

If the Neg Dec is circulated to state agencies through the State Clearinghouse for comment, the review period is no less than 30 days. State involvement is triggered if the project comes under the jurisdiction of a state agency. Most often this is the California Department of Fish and Game (CDFG), which serves as trustee for California's natural biological resources. CDFG must be consulted whenever those resources, such as sensi-

tive plant or wildlife species or streams, are to be impacted.

CEQA Guidelines § 15063(g) states, "As soon as a lead agency has determined that an initial study will be required for the project, the lead agency shall consult informally with all responsible agencies and all trustee agencies responsible for resources affected by the project to obtain the recommendations of those agencies as to whether an EIR or a Negative Declaration should be prepared." For example, in *Fall River Wild Trout Foundation v. County of Shasta* (1999) 70 Cal. App. 4th 482, the court found that Shasta County's failure to notify the Trustee Agency of a Neg Dec violated CEQA (Bass et al. 1999).

Comments on the Neg Dec can be submitted any time during the review period. The comments are addressed to the lead agency, which is usually the local planning department; the contact person is indicated in the notice.

Prior to adopting a Neg Dec at the end of the review period, the lead agency must consider the comments received. A response to the comments is not required. The administrative body that adopts the Neg Dec varies; it may not always be an elected body such as the city council or county board of supervisors. In each case, it is best to ask the contact person named on the posted Neg Dec for clarification of the process.

If factual evidence of significant environmental impacts is presented in comments on the Neg Dec, then either the project has to be modified to avoid the impacts or an EIR must be prepared. Public controversy alone cannot trigger the requirement for an EIR; the requirement must be substantiated with factual evidence of potential significant impact. If there is conflicting evidence from experts, the agency is still required to prepare an EIR. This is known as the "fair argument standard."

After a Neg Dec is adopted, the agency must file a Notice of Determination (NOD) with the county clerk (when a local agency is the lead agency) or with the Governor's Office of Planning and Research (when a state agency is the lead agency). The NOD must also be sent to anyone who has previously requested in writing to be notified. Once the NOD is filed, there is a 30-day period in which the Neg Dec can be legally challenged. If it is not challenged during that period, the CEQA process is then complete for that project.

SIGNIFICANT ENVIRONMENTAL IMPACTS

Comments on the adequacy of a Neg Dec should focus on whether the project would result in *significant* environmental impacts not anticipated in the Initial Study. It is essential that the substantive comments be submitted in writing during the public comment period in order to become part of the administrative record upon which land-use decisions are made. Again, general public dissatisfaction is insufficient to document significant impacts.

How do you know what is significant? CEQA does not describe specific thresholds of significance, but § 15065 and Appendix G of the *CEQA Guidelines* (the Initial Study Checklist), provide some guidance, as shown in the sidebar on p. 31.

The *CEQA Guidelines* state, "The decision as to whether a project may have one or more significant effects shall be based on substantial evidence in the record of the lead agency." (*CEQA Guidelines*, § 15064 (f)).

In addition, an agency can adopt quantitative or qualitative thresholds that are appropriate to the environmental setting of its community. The Governor's Office of Planning and Research (OPR) has a

publication called *Thresholds of Significance: Criteria for Defining Environmental Significance* (OPR 1994) to help agencies with this task. It is also included as an appendix in the *CEQA Deskbook* (Bass et al. 1999).

STRATEGIES FOR REVIEWING A NEG DEC

When reviewing a Neg Dec, first determine if the project description seems to include a clear description of all project features and activities that could result in a physical change to the environment. Some of the less obvious project activities that may be overlooked in the project description for a Neg Dec are related to project phasing, relationship to other projects or facilities, and infrastructure systems

FINDINGS OF SIGNIFICANCE

A finding of significance is mandatory where a project would . . .

- substantially degrade the environmental quality of or reduce fish or wildlife habitat.
- cause a fish or wildlife population to drop below a self-sustaining level.
- threaten to eliminate a plant or animal community.
- reduce the numbers or range of a rare, threatened, or endangered species.
- eliminate important examples of the major periods of California history or prehistory.
- achieve short-term goals to the disadvantage of long-term goals.
- have environmental effects that are individually limited—but cumulatively substantial—when viewed in the context of past, current, and reasonably anticipated future projects.

required to support the project, such as access roads, septic systems, sewer lines, and power lines. These could result in impacts outside the building area. Try to picture what will be

necessary to build and operate the project, and check the project description to see that it includes all of the pieces. If necessary, ask the lead agency for clarification.

Bakersfield cactus (*Opuntia basilaris* var. *treleasei*) is state- and federally-listed as Endangered, and known only from Kern County. Once abundant on the bluffs and low hills around Bakersfield, many occurrences have been extirpated by agriculture and development. Photograph by J. Carnal.





Previously included in the genus *Hemizonia*, the Southern tarplant (*Centromadia parryi* ssp. *australis*), left, is a CNPS List 1B plant from mesic areas in southern California. Its habitat has been heavily fragmented by urbanization and many populations have been extirpated. Photograph by A. Brinkman-Busi. • Small-leaved rose (*Rosa minutifolia*), right, is state-listed as Endangered, and is known in California from only one occurrence on Otay Mesa in San Diego County. Despite its listing status, the population was transplanted in 1997 as mitigation for a development project. Photograph by CNPS.

The analysis of impacts in a Neg Dec is based on the Initial Study (IS). A Neg Dec does not have to be as exhaustive in its analysis of impacts as an EIR, but it should be well documented. If the IS includes only a checklist without additional text explaining the responses (including the “No” responses), or at least referencing other documents or maps, then it is *not complete*.

The IS in support of the Neg Dec should demonstrate that each potential impact, including cumulative impacts, has been carefully considered before determining that the effects would not be significant. Strong documentation is encouraged by the *CEQA Guidelines* and the outcome of CEQA case law (*CEQA Guidelines* § 15063(d); *Sundstrom v. Mendocino* (1988) 202 Cal.App.3d 296; *Leonoff v. Monterey*

County Board of Supervisors (1990) 222 Cal.App.3d 1337). With regard to natural resources, and rare species in particular, the documentation should include the results of a biological assessment.

The commenter should review this documentation to verify that all of the potential impacts have been considered. If they have not, then a *written comment* should be made to the lead agency indicating what impact has not been addressed. The commenter should request a response from the lead agency if he or she wants to know the lead agency’s specific response to the comment.

The comments on a Neg Dec are usually included verbatim or in summary in the packets provided to the council or board of supervisors. The decision-making body needs

to know of these comments in order to be fully informed. If you have any doubts whether or not this has been done, either contact your council members or supervisors personally, or get your comments into the public record by speaking at a council or supervisor meeting.

THE EIR: NOTICE OF PREPARATION

After a lead agency determines that an EIR is required, the first step is a Notice of Preparation (NOP). The NOP is intended to elicit early comments on the potential impacts of a project so that those impacts will be addressed in the EIR. The NOP is directed primarily to state and local agencies that may be affected by the project or that serve

as trustee agencies for natural resources, but it can be provided to individuals or organizations on request.

The NOP must provide enough information for agencies to prepare a meaningful response. It usually includes a brief description of the project, its location, and a list of environmental impacts expected to be analyzed. The agencies have 30 days to respond to the NOP, and the EIR cannot be released as a public document until after the end of the NOP response period. While it may be important for CNPS to respond to NOPs, the comments should be relatively general in nature. Citing the *CNPS Botanical Survey Guidelines* (CNPS 2001) and referencing pertinent literature should be sufficient.

THE DRAFT EIR

When a Draft EIR (DEIR) has been completed, the lead agency must notify the public that the DEIR is available for review. The notice must include general information about the project; the comment period; the date, time, and location of public hearings on the project; and the location where the DEIR and all of the supplemental information referenced in the DEIR is available for review. The lead agency must also solicit comments from other agencies during this review period.

The shortest review period for an EIR is 30 days, when no state agency is involved, or by special request to the OPR. A 45-day review period is most common, while periods of up to 60 days are acceptable for more complex projects. When a state agency is involved, a 45-day review period is required. The review period should not extend beyond 90 days, according to the *CEQA Guidelines*.

It is important for commenters to be aware of the CEQA schedule.

If the lead agency legally follows the *CEQA Guidelines* schedule, the argument that there was not enough time to review a document will be weakened and generally will not result in additional time for review.

PUBLIC HEARINGS ON EIRS

Although it is common practice for the lead agency to hold a hearing on the EIR, a public hearing is not mandatory, and public comments can be restricted to written comments only. Hearings held on projects in which the lead agency is a city or county are usually held before the planning commission. The lead agency will provide public notice (according to *CEQA Guidelines* § 15087) about the time and place of the public hearing.

It is important to provide the comments on an EIR in writing, although they can also be presented verbally at a hearing. Written comments are generally more complete and articulate, and have a better chance of eliciting a complete response in the final EIR (FEIR).

However, it is wise to also present your comments verbally at a public hearing, because sometimes the decision makers have not had enough time themselves to fully review all of the documents, and their decisions may be swayed by the type and amount of comments that are received at the public hearing (which may or may not reflect both sides of the story).

Be aware that the lead agency holds two hearings: one on the adequacy of the EIR, and one on the merits of the project. The fact that these hearings are sometimes held at the same meeting or are even combined can be confusing. Before a project can be approved, however, the agency must certify the EIR, so even if the two hearings are held at the same meeting, action on the EIR must be taken before a

vote is taken on the project. If comments on the EIR are requested, it is to the commenter's advantage to focus those comments on factual content as it relates to the adequacy of the EIR. While it is certainly permissible to make comments on the merits of the project during the EIR hearing, they may have no relevance to the factual content of the EIR, and may not be considered later at the project hearing.

The best time to comment on the merits of the project is at the project hearing, when the city council, board of supervisors, or other group is deciding whether or not to approve the project. Since this decision is made on the project as it is described in the EIR, it is appropriate to refer to this document when commenting on the merits or problems of the proposed project. While an emotional appeal is out of place at the EIR hearing, it may be appropriate and effective at the project hearing. If you are unclear about the process when you are at a hearing, do not be afraid to ask. The purpose of the hearings, after all, is to receive public input.

THE FINAL EIR

At the end of the DEIR comment period, the lead agency must respond in writing to comments received. The responses are provided in a final EIR which indicates who commented, what the comments are, what the responses are, and any changes required in the text of the DEIR to fill omissions or correct errors of fact. Sometimes the FEIR is published as an addendum to the DEIR, and sometimes the entire DEIR and the response to comments are published together. There is no comment period on the FEIR.

When the lead agency is a local jurisdiction, the EIR (Draft and Final) is often presented to the county planning commission. The planning



San Diego mesa mint (*Pogogyne abramsii*) is restricted to vernal pool areas in northern San Diego County. It is state- and federally-listed as Endangered, and is seriously threatened by urbanization, trash dumping, and off-road vehicles on San Diego mesas. Photograph by C. Martz.

commission will forward a recommendation as to whether or not to certify the EIR to the board of supervisors or the city council. The supervisors or the council certify the EIR at another public hearing.

By certifying the EIR, the lead agency is acknowledging that it is aware of all of the reasonably foreseeable environmental impacts of a project. This contributes to the

body of knowledge used in deciding whether or not to approve a project. If there are significant unavoidable impacts expected from the project—that is, impacts that cannot be mitigated to a less than significant level—a “statement of overriding considerations” must also be adopted. This statement explains the justification for allowing these impacts to occur.

Once an EIR is certified, there is a 30-day period during which the EIR can be challenged in court. This period is the statute of limitations. CEQA also provides for statutes of limitations in other situations. For instance, if an agency does not perform a CEQA review when it should have, aggrieved parties have 180 days from the date of project approval to file a legal challenge.

STRATEGIES FOR PROVIDING CEQA INPUT

Each local CNPS chapter can comment with its collective voice by appointing a representative to remain involved with the CEQA process on a regular or case-by-case basis. A recognized organization may have more influence with decision makers than private individuals.

In making comments, individuals should consider whether their input would be most effective in supporting a unified group statement, or whether it should be used to make an independent contribution as a private citizen. A variety of comments from individuals on the factual content of an EIR should not be a cause for confusion, but contradictory statements from individuals and groups on the merits of a project may work at cross purposes.

The *CEQA Guidelines* (see the sidebar on p. 35) are an important resource to use when commenting on an EIR, but it is important to remember that the *Guidelines* are, in fact, just that. The Courts, however, have often deferred to them in determining compliance with the law. They are updated by the legislature every two years in order to reflect the outcomes of case law. Court cases involving CEQA are also reported on the California Environmental Resources Evaluation System (CERES) website at ceres.ca.gov.

INSIGHTS FROM CEQA GUIDELINES (§ 15204) FOR COMMENTING ON A CEQA DOCUMENT

“In reviewing draft EIRs, people should focus on the sufficiency of the document in identifying and analyzing the possible impacts on the environment and ways which the significant effects of the project might be avoided or mitigated. Comments are most helpful when they suggest additional specific alternatives or mitigation measures that would provide better ways to avoid or mitigate the significant environmental effects.” (§ 15204(a)).

“In reviewing Negative Declarations, persons and public agencies should focus on the proposed finding that the project will not have a significant effect on the environment. If persons and public agencies believe that the project would have a significant effect, they should:

- 1) Identify the specific effect,
- 2) Explain why they believe the effect would occur, and
- 3) Explain why they believe the effect would be significant.”
(§ 15204(b)).

“Reviewers should explain the basis for their comments, and whenever possible should submit data or references offering facts, reasonable assumptions based on facts, or expert opinion supported by facts in support of the comments.” (§ 15204(c)).

“Reviewing agencies or organizations should include with their comments the name of a contact person who would be available for later consultation if necessary.” (§ 15204(d)).

It is helpful to have a copy of the *CEQA Guidelines* when determining if an EIR is adequate. The *Guidelines* can be obtained from the State Department of General Services, Publication Section, P.O. Box 1015, North Highlands, CA 95660, or online at ceres.ca.gov/ceqa.

There are also two excellent references to CEQA: *Guide to the California Environmental Quality Act* (Remy et al. 1999, \$70) and *CEQA Deskbook* (Bass et al. 1999 with 2001 update, \$60). These references are updated and published annually by Solano Press Books. The *Deskbook* is described as a “handy, illustrated approach to CEQA” whereas the *Guide* is more in-depth. Both include a copy of the *CEQA Guidelines*. These references are highly recommended because they are

thorough, clear, and provide an update of changes to CEQA and the outcome of case law. (Solano Press Books contact information: (800) 931-9373, www.solano.com, or P.O. Box 773, Point Arena, CA 95468.)

REVIEWING EIRS: THE BASICS

When reviewing an EIR, first read the project description and determine if it seems complete. If

there is an obvious omission, then the physical impacts may not have been addressed in the chapter on environmental impacts. If the project description is not complete, then the EIR probably is not thorough enough to be legally adequate. The EIR must disclose all of the reasonably foreseeable impacts and provide an impartial factual assessment of whether they would be significant.

Also review the mitigation measures and determine if they require changes in the project design that would result in additional environmental impacts, and whether those impacts have been addressed. For instance, if the fire department requires a secondary access road as mitigation for impacts to public safety, have the impacts of that road been addressed?

Review the mitigation measures for obvious infeasibility or a lack of specificity. CEQA requires mitigation measures in an EIR for all potentially significant impacts. A project may gain approval because it appears that all of the potentially significant impacts can be reduced to nonsignificance via appropriate mitigation. Of course the impacts will be reduced only if the mitiga-

Many-stemmed dudleya (*Dudleya multicaulis*) is a List 1B plant from southern California. Though it is relatively widespread, it is clustered in distribution and seriously threatened by development and large transportation projects. Photograph by R. Bittman.



POINTS TO CONSIDER WHEN COMMENTING ON A CEQA DOCUMENT

- Be aware of the lead agency, its process, and the deadline dates. Do not hesitate to call the contact person at the lead agency and ask questions.
- Gain some familiarity with the *CEQA Guidelines*.
- Visit the project site. If it is inaccessible, contact the lead agency to arrange for a site visit.
- Check the project description for completeness. Does it include everything that might cause a physical impact?
- Have all of the required CEQA components been addressed? An EIR should include: Summary, Project Description, Environmental Setting, Environmental Impacts, Mitigation Measures, Alternatives, Cumulative Impacts, Growth-Inducing Impacts, and Organizations and Persons Consulted.
- Do any of the mitigation measures require a change in the project design that would cause an impact, and has the impact been addressed?
- Do the mitigation measures seem feasible and likely to be effective?
- Provide comments in writing.
- Support your comments with facts whenever possible. This helps to make the comments specific and will garner a more complete response in the final EIR. Broad statements usually receive short responses. Focus comments on the adequacy of the EIR as opposed to the merits of the project.
- Use a professional tone. Constructive criticism is important. Adopt the attitude that the lead agency needs your information and that your input will help in making the best decision.

tion is feasible, measurable, and specific.

Mitigation measures that rely on further study have been found not to be adequate in case law. Look for terms such as “consult with,” “study further,” “strive to,” and “facilitate” in the mitigation measure and consider whether the mitigation measure will be effective when couched in this way, or if a more definitive measure is needed. Terms such as “shall” and “must” better indicate that a mitigation measure is mandatory.

Mitigation measures should include an objective and describe what the specific measure(s) is, who will implement it, where it will happen,

and when. Depending on the measure, there should also be performance standards (i.e., what needs to be accomplished in order for the mitigation measure to be considered completed) and contingent measures or remediation in the event the mitigation fails.

Read the chapter on environmental impacts, particularly the disciplines of which you have knowledge. Does the EIR seem to provide enough information on which to base the conclusion of whether an impact is significant or not? Next check the reference section. Does it seem that appropriate experts were consulted? Are there any omissions in consideration of the environmen-

tal setting that would change how impacts are viewed? Has the project adequately addressed all indirect impacts, such as the impacts of providing water to the project?

Are any essential disciplines left out of the discussion altogether? An EIR usually addresses impacts to land use, public safety, noise, air quality, traffic, vegetation and wildlife, public services, visual factors, geology and soils, hydrology and water quality, and archaeological, historic, or cultural resources. If no impacts are found, the discipline may be discussed under “Impacts Found Not to be Significant” rather than in the impacts section.

The weakest parts of an EIR often are found at the end of the document in the analysis of alternatives, cumulative impacts, and growth-inducing impacts. Read these sections carefully and comment specifically on any ways in which these sections are not complete. Is there another environmentally superior alternative that should be addressed? Is there a neighboring project that is missing from the cumulative impacts analysis? Is this project causing a particular habitat to be divided into pieces that, from a regional point of view, results in significant biological impacts? Is there a discussion of the potential for growth-inducing impacts, and are those impacts adequately considered?

It is important to present comments in writing, and with a professional tone. The more facts supplied, the less likely a comment will simply be dismissed as “comment noted” in the Final EIR. Above all, don’t be daunted by an EIR. An EIR is supposed to be informative and understandable. If it isn’t, ask for more explanation.

HOW TO MONITOR MITIGATION

After the CEQA process is completed, how can interested in-

dividuals remain involved through project development to insure that mitigation is adequate? The answer is easily the subject of another article, but a short reply is warranted here.

In 1989 CEQA was amended to include a requirement for mitigation monitoring. A program to oversee and evaluate required mitigation activities must be adopted by the lead agency prior to project approval.

The monitoring program does not have to be described in the EIR, although information should be available from the lead agency. If you know that an EIR is under preparation and you want the lead agency to incorporate the mitigation monitoring program in the EIR, make such a request to the lead agency in writing. The best follow-through is difficult, which is to monitor the mitigation monitoring program, and

to call the appropriate agencies when enforcement of the approved mitigation seems necessary.

SUMMARY

This article provides an overview of the usual CEQA process. Be aware that more complex situations sometimes arise that can alter the way the law is implemented. Do not be daunted by the complexities, and do not be afraid to ask questions. Remember, two of the main purposes of this law are to encourage public input and to foster fully-informed land use decisions. Your comments are an essential component of the environmental review process.

Pine Hill ceanothus (*Ceanothus roderickii*) is endemic to gabbroic soils in the Pine Hill area of El Dorado County. It is state-listed as Rare and federally-listed as Endangered, and is threatened by rapidly growing residential development and alteration of fire regimes. Photograph by J. Vale.



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Multiple clear-cuts on private forestlands in western Humboldt County. Photograph by J. Kalt.

IMPACT OF TIMBER HARVESTING ON RARE, THREATENED, AND ENDANGERED NATIVE PLANTS

by Gregory A. Firak

Tree-sitting protesters in old-growth redwood trees have made many Californians more aware of the need to protect the state's remaining old-growth stands. The issue, of course, is much broader than simply protecting old trees. For whenever large forested areas are destroyed, all of the other native plants and animals that depend on them for their existence are also destroyed.

The evidence is widespread that

our state's forests—which comprise roughly 40% of the state's 100 million acres—are in trouble, and this trouble comes from many sources. For example, less than 5% of the forests of coastal redwood (*Sequoia sempervirens*) remain in old growth (Noss 2000). According to a National Research Council study, "reduction of old growth over the past century is a more abrupt change than the forests have undergone since the last ice age" (Christensen 2000).

While humans have managed California's forests for centuries, landscape-scale alteration of these forests through timber harvesting dramatically accelerated some 150 years ago when large numbers of non-indigenous peoples began to arrive in the state. Since that time, almost all of California's forestland has been exposed to some form of timber operation. Early timber operations in California paid little or no attention to their impacts on

ACRONYMS

CDFG	California Department of Fish and Game
CDF	California Department of Forestry
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDDB	California Natural Diversity Database
FPA	Forest Practice Act
FPR	Forest Practice Rules
NCCP	Natural Community Conservation Planning
NFMA	National Forest Management Act
NPPA	Native Plant Protection Act
RPSP	Rare Plant Science Program of CNPS
SOD	Sudden Oak Death syndrome
THP	Timber Harvest Plan
USGS	United States Geological Survey

forest ecosystems. It has only been within the past 50 years that unregulated timber operations have been recognized as having the potential to significantly damage the forests, possibly beyond recovery. As a result, policymakers have established federal and state laws governing timber operations in order to increase protection of forests. However, scientific experts still question whether the current regulations can adequately protect California's forest ecosystems (Thornburgh et al. 2000).

Unfortunately, the commercial tree species that are the object of timber operations are not the only organisms affected by logging. All organisms that live in the forest are affected when a timber operation is conducted, including *sensitive* native plant taxa. (Hereafter, the term *sensitive* will be used to loosely encompass the terms rare and locally significant, as well as state- and federally-listed Threatened and Endangered.) This article will briefly discuss the affected plants and their habitats, how logging is impacting them, and legal protections offered by the regulatory structure of timber operations in California.

PLANTS IMPACTED BY TIMBER OPERATIONS

With only two exceptions, none of the plants listed in the California Native Plant Society's *Inventory of Rare and Endangered Plants of California* (CNPS 2001b) are considered commercial timber species in their native stands. Those two exceptions are Englemann spruce

(*Picea englemannii*) and Monterey pine (*Pinus radiata*). Englemann spruce is known in California from only a few occurrences, and is a CNPS List 2 plant and a Group B commercial species in the Northern Forest District. Monterey pine is known in California from only three native stands located near Año Nuevo, Cambria, and on the Monterey Peninsula. It is a CNPS List 1B plant and a Group A commercial species for the Coast Forest District. The native stands of Monterey pine are primarily endangered by development activities and disease, but the taxon is widely naturalized in California and widely cultivated around the world.

However, many other CNPS listed plants may be directly impacted by timber operations due to physical damage caused by activities associated with the timber operation. These plants may also be indirectly impacted, due to elimination or impairment of the habitat upon which the plants depend.

Some of the sensitive plants affected by timber operations are delicate and easy to overlook when not in bloom, such as swamp harebell (*Campanula californica*). Others hide

SUMMARY OF FORESTLAND AND TIMBERLAND DATA

- *Forestlands* are at least 10% stocked by trees of any size, or formerly had such tree cover.
- *Productive forestlands* are capable of producing at least 20 cubic feet per acre per year of industrial wood products (saw logs and fiber) and are manageable for continuous production of timber.
- *Timberlands* are productive forestlands that are available for commercial production of wood products and are not reserved for other purposes.
- *Productive forest reserves* are timberlands that have been removed from commercial production due to statute, ordinance, or administrative order, or which have been so designated, but not dedicated (Bolsinger 1980).
- Of California's total 100 million acres, about 40% (or 40 million acres) are forestlands, of which about 45% are productive forestlands.
- Of the productive forestlands, over 16 million acres are commercial timberlands, with only 9% in reserves.
- Thus only slightly more than 1.5% of California's total area is in productive forest reserves.



A cone from an Engelman spruce (*Picea engelmannii*), top, a CNPS List 2 plant. It is known in California from only a few occurrences in Shasta, Siskiyou, and Trinity counties, though more widespread into Oregon, Washington, and elsewhere. Photograph by J. Game. • Cones on a Monterey pine (*Pinus radiata*), bottom, a CNPS List 1B plant. Native stands of Monterey pine occur in California only near Año Nuevo, Cambria, and on the Monterey Peninsula; however it is widely naturalized in coastal areas of the state. The native stands are seriously threatened by development, genetic contamination, and pine pitch canker disease. Photograph by R. York.

in the dark forest and are readily apparent for only a brief period each year, such as Indian pipe (*Monotropa uniflora*). Certain sensitive forest plants may be disturbance followers, such as the Humboldt milk-vetch (*Astragalus agnicidus*) and maple-leafed checkerbloom (*Sidalcea malachroides*).

Some plants affected by timber operations are not currently sensitive, but may soon become so. Oaks (*Quercus* spp.) and tan oaks (*Lithocarpus densiflorus*) are rapidly succumbing to sudden oak death syndrome (SOD) in large numbers. If SOD is not controlled, it is conceivable that oaks and tan oaks could become sensitive species in the near future. However, oaks and tan oaks, along with other hardwoods, are often treated as “weed” species in timberlands, and are thus often mechanically removed or killed with herbicides.

Tracking Sensitive Plant Locations

Identifying the plants potentially subject to impact by timber operations is an important but complex task. The CNPS Rare Plant Science Program (RPSP) maintains a database that tracks rare plants in California (which is periodically published as the CNPS *Inventory*) that provides some of the information needed to identify these plants.

The CNPS *Inventory* contains US Geological Survey (USGS) quadrangle location data for CNPS *Inventory* List 1A, 1B, 2, and 3 plants (see the sidebar on p. 41). (A “quad” is approximately 36,000 acres.) The data can be used to find reported occurrences of sensitive species near timber operations.

However, the broad location information provided in the CNPS *Inventory* is difficult to apply to the scale of a timber harvest plan. Latitude, elevation zone, vegetation type, and microhabitats all combine to make it difficult to predict potential plant occurrence directly from the CNPS *Inventory*. Furthermore, in northwestern California there are large tracts of land that have been in private timber ownership for a very long time. These tracts can encompass all or most of a quad, and in some instances may encompass more than one quad. Since these private landowners seldom allow independent botanical surveys of their lands, occurrence information for such quadrangles is typically nonexistent. One useful ap-

Swamp harebell (*Campanula californica*) at Jughandle Reserve, Mendocino County. It also occurs in mesic coastal areas of Marin and Sonoma counties. The swamp harebell is on CNPS List 1B, and is threatened by grazing, development, and logging. Photograph by R. York.



CNPS INVENTORY LIST CATEGORIES (CNPS 2001B)

- List 1A** Plants presumed extinct in California
- List 1B** Plants rare, threatened, or endangered in California and elsewhere
- List 2** Plants rare, threatened, or endangered in California, but more common elsewhere
- List 3** Plants about which we need more information—a “review” list
- List 4** Plants of limited distribution—a “watch” list

proach is to use occurrence data for the surrounding quads to infer possible species location information for quads lacking this data.

Another obvious concern with occurrence databases, such as the CNPS *Inventory* and the State of California’s Natural Diversity Database (CNDDDB), is that they are *positive sighting databases*, and thus, by definition, contain only reported observations. Lack of observations in such databases does not necessarily imply that individuals or populations do not exist in a given area. Furthermore, all databases have a lag time between data submission and data availability. Raw data must be validated to verify authenticity and credibility, and then must be entered into a database. Typically the database is then converted into a more user-friendly product suitable for general use.

Historically the CNPS *Inventory* has gone through a cycle of approximately five or six years duration, in which data are accumulated, validated, processed, and finally published. This means that there is as much as a six-year delay between an occurrence being reported, and that occurrence being made available in printed form. The situation is somewhat better for the CNPS *Electronic Inventory* and the *Online Inventory* (accessible from www.cnps.org), which provide access to the data underlying the CNPS *Inventory* and are updated more frequently.

The CNDDDB typically issues updates on roughly a six-month cycle, but due to lack of funding, a significant backlog of data has accumulated that does not appear in the released products. This means that the CNDDDB has had a multi-year delay between occurrence data being submitted and occurrence data being made available to the end user. Increased funding of the CNDDDB is crucial so that this delay can be eliminated and current data made available to its customers on an ongoing basis.

Complicating the situation further, not all occurrences are reported to CNPS or CNDDDB. Private consultants are not obligated to report finding rare, threatened, or endangered plants that are located during field surveys. On non-federal lands, subject to the California Forest Practice Act, such plants are supposed to be reported in the timber harvest plan (THP), but are not necessarily reported to CNPS or CNDDDB.

The uneven training and expertise of the Registered Professional Foresters who prepare THPs exacerbate this problem. Some are highly skilled in botany, but unfortunately this is not always the case. According to a recent report from the University of California’s Wildland Resources Center, “We commonly see individuals with limited training in some specialty conducting field observations outside their

skills and experience, and using cookbook methods while missing important problems” (Standiford and Arcill 2001).

Even with perfect reporting, however, positive sighting occurrence databases cannot include information on plant populations that have yet to be discovered. Instead, however, they can be used to identify locations in which there is reason to suspect that individuals or populations *might* be found. From this perspective, both the CNPS *Inventory* and CNDDDB databases are useful tools because they contain habitat information that can be used to infer such locations, and because they contain information showing the general geographic area in which a taxon occurs. By combining information on the geographic range of a rare plant and its specific habitat requirements with information on the location of, and habitat types within, an area proposed for timber harvest, it is possible to make well supported predictions regarding the likelihood that a rare plant may be impacted by that harvest plan.

For example, within the redwood forest itself, 57 rare and endangered vascular plant species occur in Mendocino, Humboldt, and Del Norte counties, including swamp harebell (*Campanula californica*), coast lily (*Lilium maritimum*), and Hoover’s or North Coast sedge grass (*Pleuropogon hooverianus*). Elsewhere in the redwood region, an additional 134 rare species occur (Sawyer et al. 2000b).

However, expert local information about rare plant occurrences remains a crucial resource when evaluating the impact of timber operations on rare plants. Recent discussions with CDFG personnel in Humboldt County indicate that they are primarily concerned with roughly 20 taxa in the county’s coastal forests. Local experts who know these plants, such as CNPS members, know the types of habitat



Coast lily (*Lilium maritimum*) is a List 1B plant from coastal areas in Marin, Mendocino, and Sonoma counties. It is threatened by roadside maintenance, urbanization, and horticultural collecting. Photograph by G. Snyder.

in which they are likely to occur and know historic populations. Therefore, they can contribute materially to preservation of these taxa by providing this knowledge during the timber planning process.

HABITATS IMPACTED BY TIMBER OPERATIONS

Habitat classification is an active area of research, with many different systems of classification in use and under development (Griffin and Critchfield 1972, Holland 1986, Sawyer and Keeler-Wolf 1995). For the purposes of this discussion, the habitat types described by Holland (1986) will be used, since the CNPS Rare Plant Science Program database uses this habitat classification scheme.

The primary *forest* habitats contained in the RPSP database are:

- North Coast coniferous forest
- Broadleaved upland forest
- Lower montane coniferous forest
- Upper montane coniferous forest

These habitats represent the primary focus for timber harvesting operations in California. It should

be noted that even though most tree species in these habitats are not sensitive species, the mix of species and the genetic state is being altered over time by timber operations. Thus, timber operations impact *all* plant species and the relative proportion of species—not just the special status species.

Located adjacent to, or within, the primary forest habitats are other habitats that can be, and often are, impacted by timber operations. In the RPSP database these include:

- Bogs and fens
- Closed-cone coniferous forest
- Cismontane woodland
- Pinyon and juniper woodland
- Meadows and seeps
- Marshes and swamps
- Vernal pools
- Riparian forest
- Riparian woodland
- Riparian scrub
- Subalpine coniferous forest

These habitats contain a wider range of species, and sensitive species in particular, than the primary forest habitats. Before the advent of modern timber regulations, some of these habitats were routinely devastated as a side-effect of timber operations. For example, prior to the advent of steam power, riparian corridors were used extensively to transport logs out of the forest. Seasonal or dry creek beds were lined with small logs, and oxen or horses were used to pull saw logs down slope to flowing water. Larger watercourses were temporarily dammed to produce floating saw log storage. When the dam was tripped, the logs were flushed to the rivers where they were aggregated into large log rafts for transport downstream to the mills.

With the arrival of steam in the forest, railroad tracks were laid up the canyons in the riparian corridors, and often immediately adjacent to the stream course. When modern logging equipment was developed, the railroad tracks were

replaced with dirt or gravel roads, but still often located in the riparian corridors.

Other botanically important habitats, such as marshes, swamps, bogs, meadows, and scrub were also impacted by historic logging practices. From an economic point of view these areas were considered “wasted” space, and so were used for roads, landings, and other disruptive uses that were convenient to the operation, but damaged the native ecosystems. Other “unproductive” habitats that are often damaged by timber operations, such as unusual soils or rock outcroppings, sometimes support rare species. For example, serpentine outcrops and barrens are well-known for hosting rare taxa, yet may conveniently be used for roads or landings due to the paucity of trees.

Modern timber harvesting regulations have improved the situation somewhat. In California, riparian corridors now receive better protection than in the past, though protection remains inadequate in the opinion of many observers and scientific experts (Thornburgh et al. 2000). However, other important rare plant habitats, such as serpentine outcrops, do not receive special protection at all.

IMPACTS OF LOGGING

In any discussion of logging impacts, it is important to recognize that California’s forests are significantly different than they were prior to the European incursion. This difference is due not only to extensive logging, but also to fire suppression.

The Role of Fire

In forests that had short fire-return intervals in the past—and particularly among the drier inland forests—fire suppression has drastically changed the habitat. In these places, fires created openings in the

forest canopy, encouraging taxa that require more light and bare soil. However, fire suppression has eliminated the opportunity for these taxa to flourish. Consequently, today most forest habitats we manage and attempt to conserve are somewhat artificial, because the historic processes that led to succession of species following fire have been greatly altered or eliminated.

This situation is further complicated by the fact that the indigenous peoples sometimes created their own fire regimes, which were different than those which preceded human occupation of California. Native Americans set fires to clear the understory, to promote habitat for deer, and to otherwise promote vegetation of benefit to them. Because of these practices, the natural fire regime has not been present since before the last ice age.

From this perspective, forest disturbance, such as logging, has been cited (often anecdotally) as having a beneficial effect on some taxa. Species that require canopy openings to flourish and can tolerate the mechanical disruption caused by logging, may actually increase following logging operations. However, logging impacts are not identical to those of natural fire. Consequently, one cannot simply assume that the net effect of logging operations will be equivalent to the historic fire regime.

For example, a natural fire does not compact and mechanically disrupt the soil, as happens during a logging operation. Fire changes soil chemistry in ways that logging does not (Christensen 2000). Some plant species require heat or even specific chemicals in smoke or ash to germinate (Christensen 2000). Thus, not all species that depend upon fire to return to the forest will necessarily benefit from the impacts of timber operations.

Furthermore, natural fires often create a patchwork through the forest, leading to a more complex

overall forest structure. Fires do not burn with equal intensity in all areas of the forest, and are attenuated in locally wet or damp areas. Some experts feel that forests with structural complexity encourage biodiversity and are more resilient to natural impacts such as disease and pests (Christensen 2000). In contrast, timber operations tend to have a uniform level of impact. Indeed, uniform impact is the goal of even-aged silvicultural techniques.

Other Natural Disturbances

Fire is not the only natural impact to forested areas. Landslides and falling trees both contribute natural disturbance to the forest and create openings in the canopy. Natural landslides are not infrequent in the northwest portion of California, and range from minor shallow landslides to major deep-seated landslides that can radically change local topography. However, the natural landslide process can be accelerated and increased in scope by timber operations because "collapse of soil as landslides and debris flows commonly results from some combination of removal of vegetation canopies and root reinforcement from soil, and reshaping of the land through cutting and filling along roads." (Standiford and Arcill 2001) Tree fall can also produce significant canopy openings since a large, mature tree will often take out additional trees as it falls. The root balls of fallen trees also provide habitat for early colonization by light-tolerant species.

Direct Impacts of Logging

Physical Damage: Most direct impacts of timber operations are fairly clear. Individual plants may be killed or damaged due to direct physical damage from logging equipment, falling timber, or timber in transit. Road and landing construction can directly destroy plants

that were previously living in the affected areas. Plants growing in skid trails may be killed or damaged due to crushing by heavy equipment or by logs being skidded over the ground.

Soil Compaction: Soil compaction reduces the loft of the soil, eliminating gases and impairing drainage. Roots, rootlets, fungi, and macro invertebrates can all be killed during, or as a consequence of, soil compaction. Soil compaction is caused primarily by the operation of heavy logging equipment. In many cases, the first pass of a piece of heavy equipment causes the greatest percentage of soil compaction. Thus, even one pass with a tractor can cause significant soil compaction, particularly during the rainy season when soil is wet and more subject to compaction.

Other studies have shown that skid trails lose over 90% of their permeability, and that 80% of the permeability is lost with just four passes over dry soil by a logging tractor. When wet, the same type of soil experienced a similar amount of compaction after only one pass (Steinbrenner and Gessel 1955). Unless an equipment exclusion or limitation zone is put in place, or seasonal or slope restrictions are imposed, operation of heavy equipment in logging areas is usually unrestricted. (Slope restrictions prohibit the use of heavy equipment on slopes that exceed a prescribed gradient.) As a result, most of the ground in a timber harvest operation may experience some form of soil compaction.

Herbicides: Herbicide application is another direct negative impact from timber operations (see the sidebar on pp. 46-47). Aerial or broadcast spraying of herbicides frequently follows logging operations, particularly after an area has been clear-cut. The targets of these applications are often native species (such as *Ceanothus*) that forest managers often consider to be in com-



A clear-cut on private forestlands in western Humboldt County. Trees on or near the edge of clear-cuts are particularly susceptible to windthrow. Photograph by J. Kalt.

petition with the timber species being harvested. (See the sidebar “Impacts of Forestry Herbicides on Rare Plants of Northwestern California” on pp. 46-47.)

However, other native species that do not compete directly with economic species may also be killed by the non-selective application of herbicides. Improperly trained herbicide applicators have been known to inadvertently spray properly flagged rare plant areas following

logging operations. Spray drift may also contribute to mortality among plants not located within the treatment area.

Indirect Impacts of Logging

The indirect impacts on native species are due to modification or elimination of their preferred or required habitats.

Removal of Canopy Cover: Species that depend upon shade or

high moisture will be adversely impacted when canopy cover is reduced or eliminated due to timber operations. Under these circumstances, soil moisture is reduced and soil temperature is increased. Species that cannot tolerate these environmental changes will perish. Even if seeps, springs, and other wetlands are protected from direct impacts, they may still experience adverse impact if no, or insufficient, buffer zones are left around them to protect them from the drying and heating effects of being exposed to increased solar irradiation and circulating air.

Reduction of Fog-Drip: For sensitive plants that depend on a cool, humid environment, even-aged forest management techniques (e.g., clear-cutting, shelter-wood, seed-tree treatments) can be damaging because they eliminate fog drip. Some studies estimate that fog drip from each redwood tree can generate as much as 100 mm of water per day during the summer (when most needed), and that fog drip contributes 25–50% of total water input each year (Sawyer et al. 2000a). When most of the trees are removed, this substantial water source is removed as well.

Increase in Windthrow: The windthrow that results from even-aged management can also cause significant problems for rare plants. Trees left standing on, or near the edge of, clear-cut areas may be blown down by windstorms because they are no longer protected from wind impact by the trees that were removed. If the buffer of trees left around a rare plant population is not large enough, the buffer can be reduced in size by windthrow, potentially impacting the population of the forest-dependent rare plant.

Habitat Fragmentation: It has also been shown that plant-eating insects are minimally affected by the degree to which a plant population is isolated. However, the number of predators and parasites that

feed on these herbivorous insects appears to be significantly reduced by habitat fragmentation. This means that sensitive taxa remaining in isolated buffers may experience significant damage from herbivorous insect populations that can no longer be controlled by diminished populations of their predators and parasites (Christensen 2000). Furthermore, rodent populations also increase after clear-cutting. Since rodents are often seed predators, their increase can have a detrimental effect on seed availability. One study showed that the impact of increased rodent populations following clear-cutting drastically reduced the number of western trillium (*Trillium ovatum*), so that almost none escaped predation (Jules 1998, Jules and Ratcke 1999).

Cumulative Impacts of Logging

Cumulative effects, including habitat fragmentation due to extensive timber operations on a landscape scale, can also have a negative impact on rare taxa (Christensen 2000). Habitat fragmentation can lead to isolation of populations and reduce the size of remaining populations. Isolating populations can reduce crossbreeding and gene flow, producing successively inbred populations that may exhibit reduced vigor. Small populations are more susceptible to extinction than are large populations (Christensen 2000).

As the cumulative effect of reduced habitat increases, and as habitat fragmentation progresses, the impacts on pollinators and seed dispersers also increase (Christensen 2000). A sensitive taxon which is insect-pollinated may experience a non-obvious, but significant, negative impact over time due to the reduction or elimination of its pollinator population. This process can adversely affect rare species far outside of the timber harvest zone.

Another cumulative impact is

the non-linear increased risk of extinction as the proportion of disturbed or eliminated habitat increases. An increase in destroyed or impaired habitat will lead to more extinctions when the habitat is already cumulatively degraded, than when the habitat is in relatively good shape (Christensen 2000). This means that repeated forest logging activities, on short rotation periods, over watershed and landscape scales are likely to lead to increased extinctions in those watersheds and landscapes, particularly for those species that are susceptible to such disturbance.

Beneficial Impacts of Logging

As usual, when examining natural systems, the consequences of forest disturbance can be quite complex, and in some cases can be beneficial. Openings created in a dense forest may provide opportunities for certain species to flourish that were unable to live under the prior canopy cover. Unfortunately, invasive exotic plants are often the first to colonize these new openings. However, some sensitive species *may* respond positively to the disturbance caused by timber operations. In such instances, this is due to reduced competition, requirements for mineral soil for germination, or dispersal by animals, such as deer, that frequent openings in the forest.

Because many timber regions experienced severe disturbance due to logging operations for well over 100 years, some disturbance-following species may have been eliminated before we even knew of their existence or their location. Therefore, it is possible that some sensitive taxa that persist in heavily logged lands *may* be at least tolerant of timber operations.

However, most of the information regarding beneficial effects of timber operations on sensitive plants is anecdotal, and is not based on solid science. The situation is

complicated by the fact that private landowners do not typically allow third parties to perform botanical

Maple-leaved checkerbloom (*Sidalcea malachroides*), top, is a List 1B plant from northern California, and is often found in disturbed forest areas. Photograph by G. Snyder. • Humboldt milk-vetch (*Astragalus agnicidus*), bottom, is known from Humboldt and Mendocino counties, and is state-listed Endangered. It was thought extinct until rediscovered in 1987, and is often found in disturbed forest areas. Photograph by D. Imper.



IMPACTS OF FORESTRY HERBICIDES ON RARE PLANTS OF NORTHWESTERN CALIFORNIA by Jennifer Kalt

California's pesticide use, notification, and reporting system is often touted as the most stringent in the nation. The actual implementation of this system, however, is far less effective than a glance at the laws would suggest. Most pesticide applications do not require permits, public notice, or public review. Adherence to label requirements as approved by the US Environmental Protection Agency is regarded as equivalent to permits.

In the redwood region of northwestern California, the

timber industry is the primary user of herbicides. In 1999 and 2000, Humboldt County's four largest timber companies sprayed 20,463 acres with forestry herbicides. These chemicals are used after clear-cutting to kill broadleaved trees and shrubs. Clear-cutting, one of several silvicultural practices referred to as "even-aged management," involves the removal of all or most trees, often followed by burning of the debris and spraying with herbicides to kill plants that compete with conifer seedlings. Herbicides are sometimes used to reduce the spread of

invasive exotics, but native vegetation is the focus of timber companies' spray plans. Many of the targeted species are ecologically important pioneer plants such as tan oak, madrone, manzanita, alder, and ceanothus, which stabilize and replenish disturbed and depleted soils.

The vast majority of forestry herbicide applications do not require permits under California law. According to the Department of Pesticide Regulation, adherence to label instruction substitutes for permits, because the pesticide registration process by definition meets

Dead tan oaks (*Lithocarpus densiflorus*) in a clear-cut on private industrial timberlands in Humboldt County. Tan oaks are capable of resprouting from stumps after clear-cut logging, but are often the target of herbicide spray plans since their wood is not commercially valuable. However, tan oaks are ecologically important to a wide array of birds and mammals, and yield the acorns preferred by Native Americans of the region. Their long-term survival is also of concern due to the spread of Sudden Oak Death. Photographs by J. Kalt.





Private industrial timberland, Humboldt County. Dead blueblossom (*Ceanothus thyrsiflorus*) above a logging road is the result of herbicide spray plans that target “pioneer” species. Blueblossom is a nitrogen-fixing plant that is a valuable source of food and cover for wildlife, including deer, birds, and pollinators. Plants that compete with conifer seedlings are targeted for spraying following clear-cut logging, resulting in a landscape-level decimation of native vegetation, including rare taxa. To the right is a thriving patch of the noxious invasive jubata grass (*Cortaderia jubata*), which is resistant to some herbicides.

environmental review standards. Although permits are required for restricted materials such as 2,4-D, the use of non-restricted herbicides such as Garlon (triclopyr), Roundup (glyphosate), and Oust (sulfometuron) is governed only by pesticide use reporting laws. These laws only require applicators to file reports of amounts used and acres sprayed with county agricultural departments *after* spraying is completed.

Projects that may have significant impacts to the environment typically require potential impacts to be addressed in an Environmental Impact Report (EIR). However, public input procedures are complicated by the fact that the pesticide regulation system is certified as a *functional equivalent* under the California Environmental Quality Act (CEQA), with the County Agricultural Commissioners as lead agencies. (Under CEQA § 21080.5, certain state regulatory programs are exempted from the requirement to prepare an EIR because they have been certified as meeting certain criteria designed to ensure they meet the basic goals of CEQA.)

For a regulatory program to be CEQA-certified, certain requirements must be met, including public notification, public review, and response to public comment. Notification and review, as required under normal CEQA procedures, do not currently cover pesticide use on private timberlands. This is unfortunate, because these are important CEQA requirements that allow concerned individuals to submit comments on herbicide impacts to sensitive plant and animal species, drinking water sources, and other resources.

CNPS has been unable to find a regulatory agency that is willing to take responsibility for addressing the impacts of herbicides on rare, threatened, and endangered plants on and adjacent to private industrial timberlands in California. The Department of Pesticide Regulation, which oversees pesticide use in California, has told local conservationists that the California Department of Forestry (CDF) is responsible for addressing cumulative effects of forestry herbicide use. However, CDF claims that herbicide use does not have to be addressed in timber har-

vest plans, since it is not a “reasonably foreseeable” part of logging operations. This is difficult to understand, because, for example, nearly every clear-cut is treated with at least one or more herbicide applications.

CDF’s reluctance to include herbicide impacts in timber harvest plan analyses means that known rare plant occurrences are not addressed in timber-related herbicide application planning processes, even when protections are required during logging operations.

In recent years, implementation of CEQA disclosure and mitigation measures that protect sensitive plants on private timberlands have improved substantially, resulting in pre-disturbance field surveys. When sensitive species are found, mitigation measures typically call for buffer zones intended to protect the plants during logging operations. But after the logging is completed, the slash is scraped into piles and burned, commercial tree seedlings are planted, and herbicides are sprayed to eliminate plants that compete with the conifer seedlings.

It is unfortunate that the buffer zones erected to protect rare plants during logging operations are not also enforced during herbicide applications. Until processes for public notification, public review, response to public comments, and consultation with appropriate regulatory agencies regarding impacts of herbicides are incorporated into timber harvest planning, rare plants on millions of acres of private timberlands will remain unprotected from herbicide impacts.

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surveys or participate in management of sensitive species on their land. Voucher specimens are often lacking, CNDDDB forms are not submitted uniformly, and occurrence information may be reported by those lacking sufficient botanical knowledge to make positive identification of sensitive species. Much more work needs to be done in the field, under carefully controlled conditions, to understand the impact of timber operations on sensitive plants.

LEGAL PROTECTIONS

Federal timber management is controlled primarily through the National Forest Management Act (NFMA), in combination with other federal environmental laws. In recent years, there have been significant changes in the NFMA, and in National Forest management policy, in general. The Clinton administration completely rewrote the regulations implementing the NFMA. However, the Bush administration has created new uncertainty regarding federal timber management policy, as important Clinton-era policy changes, such as new NFMA regulations and new protections for roadless areas, are reviewed or repealed.

The Law and Non-Federal Land

In California, timber operations on non-federal land are governed by the California Forest Practice Act of 1973 (FPA), which attempts to protect timber productivity and public resources. The Timberland Productivity Act of 1982 added provisions for sustainable timber harvesting. Additional protection of public resources motivated enactment of the Porter Cologne Water Quality Act of 1969, the California Environmental Quality Act of 1970 (CEQA), the Native Plant Protec-

tion Act of 1977 (NPPA), the California Endangered Species Act of 1984 (CESA), and the Natural Community Conservation Planning Act (NCCP) of 1991.

Collectively, for timber operations, these pieces of legislation are interpreted and administered by the California Department of Forestry (CDF) through the Forest Practice Rules (FPR) (CDF 2001), which are established by the California Board of Forestry. Most timber operations are governed by Timber Harvest Plans (THPs). The THP program is a Certified Regulatory Program under CEQA. Thus, each THP serves as a functional equivalent of an Environmental Impact Report. CDF acts as the lead agency for THPs along with the California Department of Fish and Game (CDFG), Regional Water Quality Control Boards, and other state agencies acting as trustee agencies.

Some timber operations are *exempted* from the THP process. These include: Christmas tree harvest; harvest of dead, dying, or diseased trees; harvesting to create fuel breaks; and harvesting on parcels less than three acres in size for conversion to non-timber uses such as dwellings. The three-acre exemption has created controversy as the value of redwood timber has gone up. Operators have profitably harvested trees from small parcels, apparently in violation of the requirements for *bona fide* conversion.

Shortcomings of Legal Protections

Despite the laudable goals of this system of regulation, many qualified observers and experts feel that it is too weak to effectively protect public resources. Federal listing of the spotted owl (*Strix occidentalis caurina*) and the marbled murrelet (*Brachyramphus marmoratus marmoratus*) has been followed by listing of anadromous salmo-

nids, such as the Coho salmon (*Oncorhynchus kisutch*) and steelhead (*Oncorhynchus mykiss*). Almost all coastal streams and rivers in the northwest portion of California are now classified as impaired. Indeed, the Scientific Review Panel created pursuant to the memorandum of understanding between the National Marine Fisheries Service and the Resources Agency of the State of California concluded, “. . . the Forest Practice Rules, including their implementation (the “THP process”) *do not ensure protection* [emphasis added] of anadromous salmonid populations” (Ligon et al. 1999). In its critique of the timber harvest planning process, the State of California’s Little Hoover Commission stated, “Despite the hoops that timber operators must jump through and the barriers erected by the planning process, the environment is not being effectively protected . . .” (Little Hoover Commission 1994). Since current law and regulation provide significantly less protection for the native flora than for anadromous salmonids, it is reasonable to conclude that the THP process likely does a poor job of protecting sensitive native plants.

Because of the way the current FPR are written, timber harvesting on non-federal land in California almost always denotes harvesting of coniferous species. For each of its three geographical districts (coastal, northern, and southern) the FPR defines a set of exclusively coniferous species as “Group A Commercial Species.” A second set of species, the “Group B Commercial Species,” is defined as such *only* when they occur within the current or historic range of the Group A Commercial Species. Several non-coniferous species, such as California black oak (*Quercus kelloggii*) and Oregon oak (*Quercus garryana*) are included within the Group B Commercial Species classification.

Since each THP is a CEQA

document, consideration of sensitive species under a THP must conform to Section 15380 of the CEQA Guidelines. Section 15380 mandates that CEQA documents analyze and propose mitigation for impacts to all taxa formally listed by the Federal Endangered Species Act (FESA) and the California Endangered Species Act (CESA), as well as to taxa that are otherwise considered rare, threatened, or endangered. In practice, this means that CNPS Lists 1A, 1B, or List 2 plants (CNPS 2001b) must be considered when developing a THP. Further, although List 3 and 4 plants may not meet the requirements for listing, such plant species may be significant locally, and should be evaluated in THPs in order to comply with CEQA.

To properly determine which taxa may be impacted, each THP should have a botanical survey performed by a qualified expert in accordance with accepted guidelines, such as those published by the California Native Plant Society (CNPS 2001a). Unfortunately, not all THPs have proper surveys performed by experts. Thus, botanical information in THPs may be of poor quality, and some THPs may contain no botanical analysis whatsoever. This problem is exacerbated by the fact that CDFG does not have the resources to complete a detailed review of the biological information in all of the THPs submitted.

The result is that many THPs with substandard botanical analyses—including those which may significantly impact rare plants—are simply approved by CDF without adequate biological review. In fact, for some of the most intensely logged areas, CDFG can only thoroughly review, at most, 25% of the plans submitted. Although far from ideal, this level of review is still better than that of just a few years ago when the figure was less than 2%. The only way to rectify this

problem is to provide CDFG with significantly increased funding to employ additional botanists.

When a sensitive taxon is determined to be present within the boundaries of a THP, mitigation measures must be specified to minimize the impact *where feasible*. Unfortunately, there are few standard management plans for such taxa, and little data is available upon which to base such plans. Typically plans recommend creating a small buffer area to avoid direct impacts.

Public review and comment on THPs is critical. Since CDFG often suffers from botanical understaffing, qualified public review is crucial if botanical resources are to receive the protection due them under CEQA. Unfortunately, the public has only 30 days from the date of THP filing in which to submit written comments to CDF. While this period is often extended for various reasons, its shortness severely handicaps the public's ability to provide competent comment. By the time a member of the public receives notice of a THP, orders a copy, and then receives it, most of the 30-day period has expired.

Opportunities to Protect Our Forests

Cumulatively, past logging operations have had a significant negative impact on biodiversity. Unfortunately, future impact is likely to be even greater. If one-half of the remaining old-growth and late-successional forests are logged, experts predict that the number of species expected to become extinct will quadruple (Christensen 2000).

Individual CNPS members can assist in protecting sensitive plants from the impacts of timber operations. Chapter members often have special localized knowledge about sensitive taxa in their area. This location-specific knowledge is typically missing from the large general



Oregon oak (*Quercus garryana*) is one of several non-coniferous species classified as "Group B Commercial Species" under current Forest Practice Rules. Photograph by CNPS.

databases, but can be critical when evaluating THP sites for occurrence of sensitive taxa. Chapters should continually refresh their knowledge of sensitive taxa occurrence in the local area, and should participate in timber harvest review to make sure that their knowledge is incorporated in the review process. Contact your local CDF and CDFG offices to learn how to get involved in reviewing and improving THPs in your area.

CNPS should consider developing general management plans for the sensitive taxa that may be found during timber operation planning. When timber operators ask for help with management, the Society could then respond with plans based on the best current science. A focused program of research and development of such management plans would be required before CNPS can adequately respond to such requests.

It is also important to remember that impacts on sensitive plants are not the only important impacts. Due both to fire suppression and to timber operations, the suites of plants that occur within the differ-



Bride's bonnet (*Clintonia uniflora*) is a lily of the forest understory that is often absent in young and recovering forests after logging. Photograph by J. Game.

ent forest habitats have often changed over time. For example, members of the lily family seem to be relatively intolerant of timber operations. In northwest California it appears that *Clintonia*, *Disporum*, *Erythronium*, *Smilacina*, and other lilies are much reduced in abundance, or lacking completely, in young, recovering forests. Maintenance of the remaining intact, functional, and original assemblages of plants should also be a priority. Properly conducted timber operations might be able to assist in achieving this goal in certain cases.

One of the exciting developments in the CNPS new strategic direction and chapter focus is the recent formation of an active group to coordinate forestry issues throughout the state. Part of the group's charge is to provide individuals, chapters, and other conservationists with additional support for forestry issues. This group is now hard at work preparing resource materials for use by forest advocates, and is also pursuing an active outreach program to regulatory agencies throughout the state. For more information on state CNPS forestry activities, please send email to forestry@cnps.org and consult www.cnps.org/forestry.

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Robert Boyd counting rare annual legenere (*Legenere limosa*) plants in a vernal pool in Solano County. Photograph by R. Woodward.

MONITORING RARE PLANTS

by Roy A. Woodward

The term *monitoring* may sound a bit off-putting to those who have never taken part in a field trip to survey native plants. But in practice, it offers participants a number of rewards. The first is the opportunity to visit some beautiful spots in nature that are frequently off the beaten track. The second is the chance to closely observe plants that many people never get to see. And the third is the satisfaction that comes from having contributed to something larger than oneself, in this case the effort to preserve native plants and

their habitats so that future generations will also get to enjoy them.

Monitoring forms the basis for any science-based rare plant program, and provides the data that is essential to our conservation efforts at CNPS. Monitoring is the process by which we can answer our most critical rare plant questions, such as “How many individuals and populations of the species are there at this time?”; “What is the condition of the plants?”; and “What is the trend in numbers and condition of the species over time?”

Several terms commonly associ-

ated with surveys of rare species include *inventory*, *evaluation*, and *assessment*. An *inventory* can be thought of as the initial monitoring visit, when the baseline condition of the population—the number of plants, condition of the plants, threats to the plants, etc.—is established at a point in time. At subsequent visits to the site, or *monitoring events*, the condition of the population is again surveyed. The monitoring data can then be used to evaluate or assess the trend and condition of the population.

Monitoring involves the formalized collection and handling of data,

moving beyond casual observations. Systematic monitoring, whereby rare plant populations are visited on a regular basis, has never been formalized for the state. There is much monitoring of individual species, particularly by university scientists conducting research projects, and by private consultants assessing impacts and mitigations of land-disturbing projects. Most project monitoring occurs for only a few years after a rare plant population is impacted by a project or, more commonly, after a rare species is planted or transplanted as mitigation for some disturbance to the population.

While these sorts of monitoring projects have their place, typically they only assess the condition of a single population of a species.

Thus, it is impossible to deduce anything about the long-term trend of the species throughout its range. Most land management agencies (notably the California Department of State Parks, National Park Service, Bureau of Land Management, and US Forest Service)—using either their own botanists or consultants—conduct inventories of the lands they manage for rare plants. However, there are only a few cases of regular long-term monitoring for any species.

On the other hand, CNPS is well-known for its tireless work in long-term monitoring of rare plant species, thanks in large part to the dedicated contributions of its members throughout California. In fact, one could point to numerous examples of monitoring projects that

have been initiated by CNPS members and chapters. Chapter Periodic Plant Watch committees, Rare Plant Coordinators, and others have organized and conducted hundreds of projects, often serving as the only source of information for some rare species in their area. One example of a notable monitoring project began in 1988 when the Sacramento Valley Chapter, working with docents, started annual monitoring of the Colusa grass (*Neostapfia colusana*) population at Jepson Prairie Preserve in Solano County.

The main place where rare plant occurrence data has been stored is in the California Natural Diversity Database (CNDDB). (See “The California Natural Diversity Database: A Natural Heritage Program for Rare Species and Vegetation”

Transects can be used to monitor occurrence and cover of plant species and vegetation types. A tape measure, generally 20-100 meters long, is stretched out and all plants, or just plants that occur at selected points (e.g. every one meter), are recorded. This method is particularly useful for detecting changes in shrub stands. Photograph by R. Woodward.



ADVICE ON MARKING RARE PLANT POPULATIONS

Marking rare plant populations in the field with stakes or ribbons so they can be relocated for future monitoring visits requires careful consideration. The author's program at State Parks often uses 18-inch angled aluminum stakes. The tops of the stakes are painted orange so they are easy to relocate, and they are engraved with site-specific information such as plot number.

Other materials are often used, but each has its drawbacks. Plastic surveyor's ribbon lasts about one year in the field, depending upon local wind and sun. Writing on wooden stakes with

a permanent felt marker also lasts about one year, although metal tags on wooden stakes may last for decades. However, there is always the danger of wooden stakes and plastic ribbon burning in wildfires. Some surveyors use GPS coordinates or metal detectors to find metal stakes such as rebar or large iron nails that have previously been pounded into the ground. This is very time-consuming work, however, and is not successful in many habitats. Hidden stakes can often be found more quickly using records of nearby fixed features—prominent trees or rocks, compass points, and pacing distances—rather than solely by GPS coordinates.

Sometimes it is necessary to mark individual plants for measurement over several years. Stakes and colored flagging allow Carol Witham to assess a population of purple needlegrass (*Nassella pulchra*) at Jepson Prairie in Solano County. Photograph by R. Woodward.

Another consideration to keep in mind is that private landowners may not allow their rare plant populations to be permanently marked. Also, clearly marking rare plant populations may encourage horticultural collection or vandalism, especially for sensitive species such as orchids, lilies, or cacti.



on p. 57 of this issue.) The CNPS Rare Plant Science Program works cooperatively with CNDDDB to classify rare plant taxa, periodically publishing its *Inventory of Rare and Endangered Plants of California* (CNPS 2001). The CNDDDB tracks occurrence data over time by noting it in a comments field in their occurrence records. Where a trend reveals itself, this is noted in the trend field of each record.

The CNDDDB tracks all sources that have contributed to an occurrence record. Each entry includes a source name, date of visit, and type of data document submitted. This information is available in a separate source database, available through their personal computer application *Rarefind*. However, other monitoring metadata such as survey methodology, area searched, negative data (data from areas surveyed where target species were *not* found), and the like are not cap-

tured well by the CNDDDB. In addition, submissions of data to the CNDDDB are voluntary, making it difficult to know if a data set is relatively complete or not. The CNDDDB is working with CNPS to make improvements to this system.

DESIGNING A MONITORING PROJECT

CNPS is well aware of the shortcomings in the existing system for collecting rare plant occurrence data for California. What has been lacking is a systematic program for prioritizing which species to monitor, and standardizing monitoring methods and data management.

Members will likely be pleased to learn, however, that the Society is currently taking the lead in developing a statewide, systematic monitoring program for rare spe-

cies. This program will help prioritize what species and areas to monitor first, and will include standard minimum monitoring data standards, and forms and descriptions of sampling methods. Such a program does not yet exist, but efforts are underway in the Rare Plant Science Committee to develop one. In the meantime, individual members and chapters monitoring even a single population or locale on a regular basis can play an important role in providing quantitative data for conservation efforts.

VOUCHER SPECIMENS

Meticulous collecting of data will do little good if, in the end, it is unclear what has been counted. The author's team at the State Parks department recently learned this lesson when it discovered what were thought to be pure stands of the

MINIMAL COMPONENTS OF INITIAL INVENTORY AND SUBSEQUENT MONITORING OF RARE PLANT POPULATIONS

Initial inventory and subsequent monitoring surveys for rare plants should, at a minimum, consist of the following:

- **Area:** Select the populations to monitor or habitats that will be searched (inventoried) to establish a baseline. Information from the CNDDDB, CNPS *Inventory*, USGS 7.5-minute quadrangle maps and soils maps, and discussions with knowledgeable local persons can help to determine what areas and species to begin to monitor. Air photos, at a scale of at least 1:12,000, can be helpful to identify potential habitats. The survey method used most often involves walking and visually searching for rare plants, and then counting numbers of plants and assessing their condition. It is always necessary to get landowner permission before entering private property.
- **Timing:** The appropriate time to look for and identify rare plants varies from year to year in California, based largely on weather. Many species, particularly annuals, can be absent from an area for many years and then explode to thousands of plants within a single favorable season. Monitoring should be designed around the best time of year for identifying the species. Typically this is when it is flowering (some perennials can be exceptions to this rule), and around the time when most plants will be present, which is generally after seed germination. (Seed germination may occur in any month of the year, depending upon the species and location.)

Thus most species, and particularly annuals, likely won't be monitored at exactly the same time every year. It is best to schedule monitoring based on the yearly condition of the species. For example, May 15 in a La Niña year may not be the same as May 15 in an El Niño year. This makes monitoring more difficult to schedule and necessitates visiting sites prior to conducting the actual monitoring visit.

- **Mapping:** Map both the locations of rare plant populations, and individual patches at each location. The minimum area (mapping unit) around which a polygon can be realistically drawn on a USGS 7.5-minute quadrangle map is one acre. Occurrences smaller than an acre should be shown with a point, and may also be recorded with global positioning system (GPS) units. The GPS coordinates can be used to record a boundary or center-point for a population polygon. Regardless of GPS use, the point or polygon should be noted on a paper map with a description of the monitoring method and the monitoring data. Also, having a written description of how the surveyors got to the sampling location is essential so it can be located again for future monitoring surveys.
- **Counting:** Ideally every individual plant should be counted. However, this is often impractical for large populations, and is unlikely to produce results with a high enough level of confidence to be useful. In such cases, it is best to subsample the site, counting only a portion of the population, and then conduct a statistical analysis of the data to arrive at a projected

population size. If numbers of plants are estimated rather than counted, the method used should be explained in a written account.

One potential pitfall to avoid is having a statistician describe an onerous sampling design that is costly and time consuming to implement. If subsampling of a large population is necessary, consult with a professional ecologist to select a sampling method, such as plots or transects, and design a sampling scheme that provides reliable results. A useful reference for devising a rare plant monitoring program is *Measuring and Monitoring Plant Populations* (Elzinga et al. 1998), which is also available in a version expanded to cover animal populations. While there are myriad sampling schemes and statistical considerations involved in designing a monitoring program, these need not thwart the enthusiasm or efforts of CNPS volunteers and chapters to begin monitoring efforts.

- **Plant and Habitat Condition:** Accurately describe the condition of the plants observed. Include information on flowering, fruiting, the presence of various sizes and ages of plants, if reproduction is occurring, and the condition of the habitat. Additional observations may include notes about pollinators and measurements of the size of plants.
- **Threats:** Provide an accurate account of any direct or indirect threats to the occurrence. Threats may include off-road vehicles or other recreational activities, non-native plants, livestock and exotic animals, insects and disease, logging, mining, and development.

- **Associated Vegetation:** Note the associated vegetation types and plant species occurring in the area, using the CNPS Vegetation Rapid Assessment Protocol (available at www.cnps.org) if possible.
- **Authorship:** Include who performed the survey, when it occurred, and contact information for the surveyor(s).
- **Method of Monitoring:** Describe how the monitoring was conducted. Monitoring fieldwork can simply consist of walking areas of suspected habitat and counting the numbers of plants encountered, but it is always important to indicate what area was surveyed on a map or by narrative. Negative data (i.e., areas where no plants were found) can be just as important as reporting positively on existing populations. The method description should be detailed if quantitative data was collected and subsampling was used.
- **Photographs:** Photographs should be taken of plant populations showing the general setting of the area. Photographs taken at each sampling point to the north, east, south, and west can help to establish a visual frame of reference for the site. Close-ups of individual plants are also useful to confirm their condition and taxonomy.
- **Reporting:** Report findings to the CNDDDB using their standard report form (see p. 63). CNPS will cooperate with state and federal agencies and other non-governmental organizations towards development of better methods to compile and analyze monitoring data.



Locating and monitoring rare plant populations usually requires detailed, on-the-ground field work, such as here in vernal pools at Ione, Amador County. Photograph by R. Woodward.

federally-listed Ben Lomond spineflower (*Chorizanthe pungens* var. *hartwegiana*) near Santa Cruz. The spineflowers were actually mixed with an unlisted species of *Chorizanthe* (although this species may be as rare as var. *hartwegiana*). Fortunately our sampling occurred during the flowering period so the two species could be distinguished by flower color. The earlier assumption had been that surveys later in the season could be performed by counting dried individuals of this annual species, but this would have led to spurious results.

A high degree of confidence in the identity of what is monitored is vital. The best way to achieve this is to collect voucher specimens and key them in a herbarium at a college or natural history museum where the plants can be compared to confirmed mounted specimens and experts can concur with the determinations. Obviously, this approach is not necessary for every species, since experienced amateur or professional botanists can key most species in the field. Nor is this approach all that practical, because collection permits are frequently required, and collecting

specimens may actually impact the numbers of the target species. The alternative is to have reliable identifications performed in the field by qualified botanists who include detailed descriptions and photographic documentation of the species monitored. However, vouchers of newly discovered populations are essential.

WILL BOTANISTS BE REPLACED BY REMOTE SENSING?

Images taken by aircraft or spacecraft are useful for locating potential rare plant habitats, and provide a context for the settings where rare plants occur. However, when it comes to counting numbers or assessing the condition of rare plants and their habitats, remotely sensed images are typically worthless. We are a long way from having the resolution (clarity or sharpness) in aerial photos necessary to count individual plants of most species on the ground. Besides, the images must be taken at the right time of season to identify most species, as well as taken at the right time of day so that

REDISCOVERED PLANTS

Eight plants thought to be extinct have been rediscovered in California since 1994:

- Ventura marsh milk-vetch (*Astragalus pycnostachyus* var. *lanosissimus*)
- San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*)
- diamond-petaled California poppy (*Eschscholzia rhombipetala*)
- Mojave tarplant (*Hemizonia mohavensis*)
- water howellia (*Howellia aquatilis*)
- Howell's montia (*Montia howellii*)
- northern adder's-tongue (*Ophioglossum pusillum*)
- Shasta orthocarpus (*Orthocarpus pachystachyus*)



Ventura marsh milk-vetch (*Astragalus pycnostachyus* var. *lanosissimus*) was thought to be extinct until it was rediscovered in 1997 near Oxnard, Ventura County. It had been last seen in the wild in 1967, and is now seriously threatened by development. Photograph by M. Meyer.

lighting is controlled. Other drawbacks to remote sensing are clouds, fog, and overstory canopy, all of which can make images useless. For the foreseeable future, nothing will replace on-the-ground field surveys performed by capable observers to locate and monitor rare plants.

WHAT DOES IT ALL MEAN?

Assessment is the final phase in a comprehensive monitoring program. During assessment, numerical trends are analyzed, and distribution, threats, and habitat condition are considered to ascertain the status or health of the species. With this information, CNPS and its partners can better determine what needs to be done to protect it. Obviously, year-to-year changes in annual species are interpreted differently than trends in perennial species. Also, the total number of plants found must be weighed against the number of occurrences. For instance, suppose the number of plants increases at a few occurrences while entire occurrences elsewhere become extinct. While there

may be no net change in overall numbers of plants, still, this situation should be a cause for concern.

With respect to numbers of plants, there is no absolute rule regarding when a species should be listed as state or federally protected, when a species should be considered recovered and removed from government lists, or how a species is classified in the CNPS *Inventory*. However, having long-term monitoring data that show trends in population numbers is invaluable in helping to make these determinations.

Several CNPS members have advocated a systematic search for CNPS *Inventory* List 1A species (plants presumed extinct in California). In recent years, eight species that were previously placed on List 1A have been rediscovered (see the above sidebar). Finding and monitoring more of these species, if they exist, and preventing their extinction is one of the most critical conservation goals of the Society.

CNPS, working with land management and regulatory agencies and other non-governmental organizations, can play a leading role in monitoring California's plant populations. The CNPS Rare Plant

Science Committee has set itself three goals for the foreseeable future. They are: 1) to organize systematic monitoring of rare plants by CNPS chapters; 2) to encourage government agencies to implement CNPS's priority list of monitoring projects; and 3) to provide timely, accurate data for the Society's conservation efforts.

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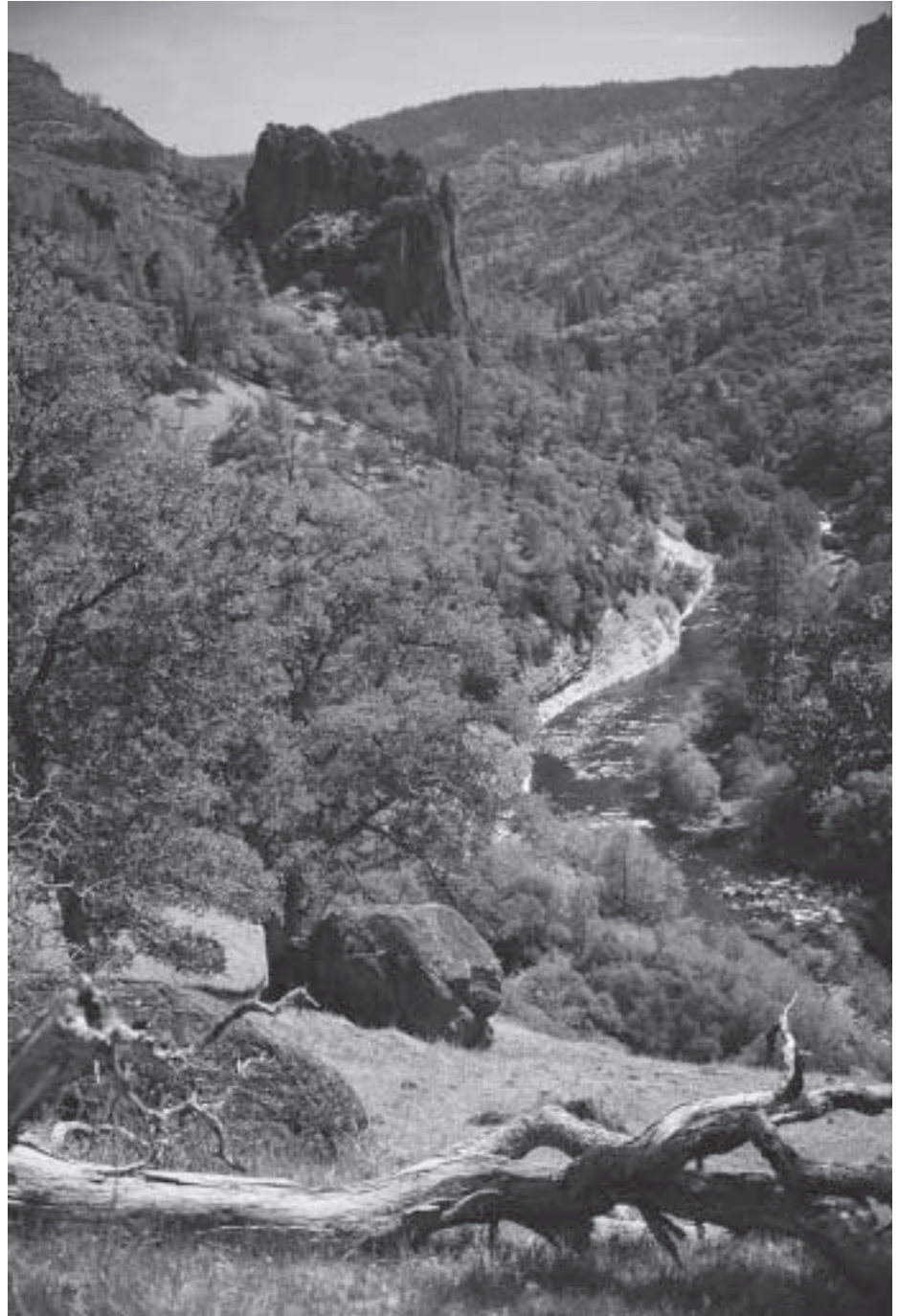
THE CALIFORNIA NATURAL DIVERSITY DATABASE: A NATURAL HERITAGE PROGRAM FOR RARE SPECIES AND VEGETATION

by Roxanne Bittman

The California Natural Diversity Database (CNDDDB), now over 20 years old, is a highly valuable repository of rare plant information maintained by the Habitat Conservation Division of the California Department of Fish and Game (CDFG). The primary function of CNDDDB is to gather and disseminate data on the status and locations of rare and endangered plants, animals, and vegetation types. The goal of the program is to help conserve California's biological diversity by providing government agencies, the private sector, and conservation groups with information to promote better-informed land-use decisions and improved resource management. The California Native Plant Society (CNPS), through its many chapters and members—which conduct surveys of native rare plant populations throughout the year—is a substantial contributor to the database. CNPS's collaboration with CDFG helps to keep the database current so its data can be used to inform policy decisions that may impact native plant habitat.

PART OF A CONSERVATION NETWORK

CNDDDB is a rich source of highly accurate, quality-checked data on the locations and status of rare and endangered plants, animals, and natural communities (collectively known as “*elements*”) in California. CNDDDB was originally conceived and developed by The Nature Conservancy (TNC)



Ishi Wilderness, northern Sierra Nevada. CNDDDB updated all of the sensitive taxa in the entire Sierra bioregion in support of the Sierra Framework planning effort. Photograph by M. Hoshovsky.

ACRONYMS

CDFG	California Department of Fish and Game
CNDDDB	California Natural Diversity Database
GIS	Geographic Information System
TNC	The Nature Conservancy
WCB	Wildlife Conservation Board

science staff in 1979. The science branch of TNC is now part of a new organization called NatureServe. CNDDDB is part of a nationwide network of natural heritage programs across the United States, Canada, and Latin America which collaborate with NatureServe.

The function of NatureServe is to manage and distribute information critical to the conservation of the world's biological diversity. It

North Coast semaphore grass (*Pleuropogon hooverianus*) is a rare plant from Marin, Mendocino, and Sonoma counties. CNDDDB recently worked with the local CNPS chapters and the DFG Habitat Conservation Planning Branch to update all known records of this plant in support of a petition to uplist the species from Rare to Endangered under CESA. Photograph by P. But.



provides regional data sets (that cross state lines) to federal agencies, and promotes the mission of conservation nationwide through products, services, decision support tools, publications, and the website NatureServe Explorer (www.natureserve.org/explorer). NatureServe recently published the book *Precious Heritage* (Stein et al. 2000), which discussed the status and trends of the biological diversity of the United States. This volume represented a successful test as to whether heritage data from across all 50 states could be compiled and analyzed to offer a broad scale picture for the entire nation.

NATIONWIDE DATA COMPATABILITY

One of the strengths of the natural heritage network and of the individual programs that comprise it, such as CNDDDB, is that all programs use similar tools and virtually the same methodology to enter and analyze the data on rare species and vegetation types. They use the same element codes, element ranking system, and mapping conventions, as well as very similar data entry forms. (*Element ranking* includes the use of Global (G) and State (S) ranks to reflect an element's relative rarity and endangerment status.)

For consistency, all scientific names are fully cross-referenced in a central database. Data are mapped as precisely as they are received by all participating heritage programs.

For example, if we receive a label from an herbarium specimen with imprecise location data, we map it as a larger, non-specific circle (of varying sizes). If we receive a field survey form (see p. 63) with a map precisely locating the extent of a population, we map the population precisely. Plant populations within one-quarter mile of each other are considered part of one occurrence.

Each occurrence is input by one biologist and quality controlled by another to maximize accuracy. This methodology, with minor variations, is consistent throughout the network. The nationwide data compatibility makes it possible for NatureServe to do cross-state analyses and to produce multistate products, such as *Precious Heritage*.

USES LATEST TECHNOLOGY

As part of the nationwide network of heritage programs, CNDDDB enjoys a special position. The California program is not only well-established, with over 40,000 location records in its database, but it was the first in the country to integrate its program with the use of a Geographic Information System (GIS). GIS makes it possible to map, store, retrieve, and analyze geographic data on a computer.

This migration to new technology initially cost the program valuable data entry time, since the conversion to a digital mapping system was time-consuming and contributed to the accumulation of an unprocessed data backlog. However, the use of GIS allows this and other heritage programs to do analyses that would never be possible with paper maps or more traditional databases alone. In addition, the California program takes great care to fully reference each occurrence in its database. Every mapped location has a full bibliography associated with it and the



CNDDDB digitizes each occurrence into a GIS layer, with some mapped as non-specific circles and others as very precise polygon features. This example shows a portion of the USGS La Jolla 7.5' quadrangle in San Diego County. The multiple polygons on the right represent a mixture of several very rare vernal pool plants, while the long polygon to the left represents southern riparian scrub, a rare vegetation community. Map by CNDDDB.

references are logically filed within the CNDDDB office. Thus, the documentation for each location is readily accessible.

A POSITIVE SIGHTING DATABASE

It is very important to understand that CNDDDB only records actual sightings of rare species and natural communities. If an area is surveyed for a species and it is *not* found, this is not recorded, unless

the species was known previously to be present on that site. This means that no inference can be made regarding lands that have never been surveyed. It is never appropriate to state that an area contains no rare taxa simply because a search of CNDDDB was made and nothing resulted from the query. Large tracts of land in the state have never been surveyed for rare plants and animals and retain the potential to support rare elements; this fact needs to be clearly stated in all environmental documents. Put

simply, a lack of records in CNDDDB does not mean that no rare plants or animals occur in a given area.

DATABASE USES AND FORMATS

Clients of CNDDDB include federal and state agencies, county and local governments, private consulting firms, environmental groups, land protection entities, and academic researchers. We provide data to thousands of clients each year

and this user base is growing. Their activities and needs vary greatly, including environmental document preparation or review, land protection and management activities, state and federal listing processes, plant status review, and research.

CNDDDB provides the data in a variety of formats to accommodate user needs, including our personal computer application *Rarefind*, GIS layers, hardcopy maps and overlays, and reports and descriptive information from our extensive element files.

To support clients' diverse needs CNDDDB provides a variety of levels of detail. Some may only need the US Geological Survey 7.5-minute topographic quadrangle level

of accuracy for mapped information, while others require exact detail at a precise scale. Some users primarily need location information, with minimal text information, whereas many must have more detailed information to support difficult conservation decisions.

It is therefore critical that CNDDDB attempt to collect the highest possible quality data on both population location and distribution, population and habitat condition, threats, land use, and other information related to occurrence rank. (Occurrence ranks range from Excellent, Good, Fair, Poor, Unknown, or None—the latter for extirpated occurrences—and reflect the quality of both the population's

health and the associated habitat at a particular site.) Without this level of detail, conservation groups such as The Nature Conservancy, the state Wildlife Conservation Board (WCB), various land trust agencies, and others would have inadequate information with which to make critical land protection decisions.

RECENT CHANGES AND IMPROVEMENTS

What are areas for improvement at CNDDDB? Concerns expressed in the past include the charge that CNDDDB is too expensive, that data entry is too slow, that there is a large backlog of unprocessed infor-

Jepson Prairie, Solano County. Recently, largely through efforts of the Solano Land Trust, several hundred acres were purchased by WCB as an addition to the larger Jepson Prairie protected area. Documentation by CNDDDB of the diversity of rare species on site helped justify the permanent protection of this important natural area. Photograph by O. Pollak.



mation, that the data are too inaccessible, and that there is not an online field survey form which can be submitted via the internet.

CNDDDB costs approximately \$500,000 per year to run. This pays for 10 permanent and temporary staff, three of which work on plants, along with hardware and software maintenance and materials. This level of staffing is far lower than the per-species staffing levels common in the heritage network. The enabling legislation (California Fish and Game Code § 1932) for CNDDDB required that some cost recovery system be in place to offset program costs.

For many years, CNDDDB charged private industry clients \$2500 per year for a data subscription (and \$1250 per year for not-for-profit clients). Although this fee system provided needed income that helped run the program, it was also a disincentive for small companies, local agencies, many county planning agencies, and others unable or unwilling to afford the cost. Additionally, the legitimate complaint was made that users were expected to contribute data to the system and yet were expected to pay to retrieve their own data as an end product. Although there is some validity to this criticism, it is also true that CNDDDB makes the data substantially more useful and usable, and is not just a simple compendium of observations.

Recent changes have allowed CNDDDB to greatly reduce its charge for subscriptions to \$300 per year for new subscribers and \$200 per year for renewals. This new pricing structure is the same for both for-profit and not-for-profit users and should make the products available to just about anyone. Some groups maintain memoranda of understanding with CNDDDB that provide for data exchange arrangements allowing for free subscriptions. Two examples are the US Forest Service and



Adobe lily (*Fritillaria pluriflora*). WCB succeeded in negotiating a conservation easement for the wildflower-rich Bear Valley in Colusa County, a popular spring botanizing spot. This area has one of the largest known populations of adobe lily, a rare plant from the North Coast Ranges tracked for many years by CNDDDB. Photograph by J. Game.

CNPS. University researchers often qualify for this type of arrangement as well.

Improvements in technology have recently made possible some exciting changes to CNDDDB. CNDDDB now has full digital topographic coverage for the state as well as other useful background coverages. (GIS *background coverages* are geographic data sets or overlays containing features such as roads, towns, soil types, watersheds, or rivers that can be used for reference during data entry.) The resulting increase in speed of data entry and quality control has led to a steady decline of our backlog of unprocessed data over the last year.

We are also beginning to accept digital data sets with companion tabular data, and we are developing expedited ways of handling this increased data flow in an automated fashion. Currently, digital datasets

require more processing time than paper field survey forms, but we expect this to change. A *Windows* version of *Rarefind* is due for release in fall 2002, and will replace the existing DOS version.

As always, data currently housed in CNDDDB files that have not yet been entered into the computerized database are available for review by interested parties. This includes updates to existing occurrences, as well as files on wholly unprocessed plants, which are mostly comprised of CNPS List 3 and 4 species. There are also some as yet unprocessed List 1B and 2 taxa which were newly added to the latest edition of the CNPS *Inventory of Rare and Endangered Plants of California* (CNPS 2001).

In addition to improvements outlined above, CNDDDB anticipates the development of an online field survey form with point and

polygon mapping capability. Currently, data contributors can fill out an online field form from our website. However, they cannot save or submit it over the Internet since online digital mapping is not yet perfected. Contributors should provide precise location information with their survey forms.

APPROPRIATE USE OF SENSITIVE DATA

The question as to how much sensitive locational data should be freely available to the public has been debated since heritage programs first began compiling such data. All heritage programs contacted in a recent survey indicated that their policy on data security was either parallel to that of CNDDDB or was stricter. CNDDDB screens each client to ascertain what they need the data for in order to tailor the product to their needs.

CNDDDB and other heritage programs retain the right to refuse release of the most detailed information under certain circumstances. This stems from the concern that there is still not widespread understanding of the importance of rare species among the general public. Population loss or degradation by deliberate destruction of habitat is a problem, as is over-collection of

certain classes of sensitive plants such as bulbs, orchids, insectivorous plants, and succulents. This list has grown to include plants used in commercial ventures to make craft products containing wood, lichen, branches, leaves, fruit, and the like. These plant materials come from a variety of species, both common and rare.

There is a large amount of information on the basic ecology and aesthetic value of rare plants that could be displayed on the Internet. We also either currently provide or intend to provide online lists of rare plants with their status and location to the county or 7.5-minute quadrangle level. CNPS currently makes this information available on their website (www.cnps.org). However, we do not advocate putting up the most precise location information for sensitive species (which includes all species on CNPS Lists 1-4).

Notwithstanding the approach described above, CNDDDB is committed to providing widespread access to the data it collects and analyzes. As stated, more general information will be provided on the CNDDDB website, through publications such as the upcoming *Atlas of the Biodiversity of California* (in prep 2002), and through links to other sites such as Calflora (www.calflora.org) and the CNPS website. Access

to CNDDDB data is also planned for the future via online, password-protected methods.

HOW TO CONTACT CNDDDB

To learn more about our program, visit our website (www.dfg.ca.gov/whdab). Lists of rare, threatened, and endangered plants are found here, as well as the online field survey form, information on the appropriate way to survey for plants, and more. There is also equivalent information for rare animal taxa and natural community types. A section titled Data Products contains an online order form and product support information, along with commonly used links. To contact CNDDDB directly, use the email addresses listed on the CNDDDB website under Staff.

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HIGHLIGHTS OF CNDDDB

- Contains over 40,000 records on rare plants, animals, and natural communities, including nearly 20,000 records on rare plants alone, covering over 1000 taxa.
- Subscriptions cost \$300 per year, and \$200 to renew, with free six-month updates.
- Our website (www.dfg.ca.gov/whdab) contains an online field survey form for submitting new data, with a link to an online mapping tool for use with coordinate information such as UTM and latitude/longitude.
- For more information, contact CNDDDB using the email addresses listed on the website under Staff.

BOTANICAL SURVEY GUIDELINES OF THE CALIFORNIA NATIVE PLANT SOCIETY

December 9, 1983 / Revised June 2, 2001

The following recommendations are intended to help those who prepare and review environmental documents determine when a botanical survey is needed, who should be considered qualified to conduct such surveys, how surveys should be conducted, and what information should be contained in the survey report. The California Native Plant Society recommends that lead agencies not accept the results of surveys unless they are conducted and reported according to these guidelines.

1. Botanical surveys are conducted in order to determine the environmental effects of proposed projects on all botanical resources, including special status plants (rare, threatened, and endangered plants) and plant (vegetation) communities. Special status plants are not limited to those that have been listed by state and federal agencies but include any plants that, based on all available data, can be shown to be rare, threatened, or endangered under the following definitions:

A species, subspecies, or variety of plant is *endangered* when the prospects of its survival and reproduction are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, or disease. A plant is *threatened* when it is likely to become endangered in the foreseeable future in the absence of protection measures. A plant is *rare* when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.¹

Rare plant (vegetation) communities are those communities that are

of highly limited distribution. These communities may or may not contain special status plants. The most current version of the California Natural Diversity Database's *List of California Terrestrial Natural Communities*² should be used as a guide to the names and status of communities.

Consistent with the California Native Plant Society's goal of preserving plant biodiversity on a regional and local scale, and with California Environmental Quality Act environmental impact assessment criteria,³ surveys should also assess impacts to locally significant plants. Both plants and plant communities can be considered significant if their local occurrence is on the outer limits of known distribution, a range extension, a rediscovery, or rare or uncommon in a local context (such as within a county or region). Lead agencies should address impacts to these locally unique botanical resources regardless of their status elsewhere in the state.

2. Botanical surveys must be conducted to determine if, or to the extent that, special status or locally significant plants and plant communities will be affected by a proposed project when any natural vegetation occurs on the site and the project has the potential for direct or indirect effects on vegetation.

3. Those conducting botanical surveys must possess the following qualifications:

- a. Experience conducting floristic field surveys;
- b. Knowledge of plant taxonomy and plant community ecology and classification;
- c. Familiarity with the plants of the area, including special status and locally significant plants;
- d. Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,

e. Experience with analyzing impacts of a project on native plants and communities.

4. Botanical surveys should be conducted in a manner that will locate any special status or locally significant plants or plant communities that may be present. Specifically, botanical surveys should be:

a. Conducted in the field at the proper times of year when special status and locally significant plants are both evident and identifiable. When special status plants are known to occur in the type(s) of habitat present in the project area, nearby accessible occurrences of the plants (reference sites) should be observed to determine that the plants are identifiable at the time of survey.

b. Floristic in nature. A floristic survey requires that every plant observed be identified to species, subspecies, or variety as applicable. In order to properly characterize the site, a complete list of plants observed on the site shall be included in every botanical survey report. In addition, a sufficient number of visits spaced throughout the growing season is necessary to prepare an accurate inventory of all plants that exist on the site. The number of visits and the timing between visits must be determined by geographic location, the plant communities present, and the weather patterns of the year(s) in which the surveys are conducted.

c. Conducted in a manner that is consistent with conservation ethics and accepted plant collection and documentation techniques.^{4,5} Collections (voucher specimens) of special status and locally significant plants should be made, unless such actions would jeopardize the continued existence of the population. A single sheet should be collected and deposited

at a recognized public herbarium for future reference. All collections shall be made in accordance with applicable state and federal permit requirements. Photography may be used to document plant identification only when the population cannot withstand collection of voucher specimens.

d. Conducted using systematic field techniques in all habitats of the site to ensure a thorough coverage of potential impact areas. All habitats within the project site must be surveyed thoroughly in order to properly inventory and document the plants present. The level of effort required per given area and habitat is dependent upon the vegetation and its overall diversity and structural complexity.

e. Well documented. When a special status plant (or rare plant community) is located, a California Native Species (or Community) Field Survey Form or equivalent written form, accompanied by a copy of the appropriate portion of a 7.5-minute topographic map with the occurrence mapped, shall be completed, included within the survey report, and separately submitted to the California Natural Diversity Database. Population boundaries should be mapped as accurately as possible. The number of individuals in each population should be counted or estimated, as appropriate.

5. Complete reports of botanical surveys shall be included with all environmental assessment documents, including Negative Declarations and Mitigated Negative Declarations, Timber Harvesting Plans, Environmental Impact Reports, and Environmental Impact Statements. Survey reports shall contain the following information:

a. *Project location and description*, including:

- 1) A detailed map of the location and footprint of the proposed project.
- 2) A detailed description of the proposed project, including one-time activities and ongoing activities that may affect botanical resources.

3) A description of the general biological setting of the project area.

b. *Methods*, including:

- 1) Survey methods for each of the habitats present, and rationale for the methods used.
- 2) Description of reference site(s) visited and phenological development of the target special status plants, with an assessment of any conditions differing from the project site that may affect their identification.
- 3) Dates of surveys and rationale for timing and intervals; names of personnel conducting the surveys; and total hours spent in the field for each surveyor on each date.
- 4) Location of deposited voucher specimens and herbaria visited.

c. *Results*, including:

- 1) A description and map of the vegetation communities on the project site. The current standard for vegetation classification, *A Manual of California Vegetation*,⁶ should be used as a basis for the habitat descriptions and the vegetation map. If another vegetation classification system is used, the report must reference the system and provide the reason for its use.
- 2) A description of the phenology of each of the plant communities at the time of each survey date.
- 3) A list of all plants observed on the project site using accepted scientific nomenclature, along with any special status designation. The reference(s) used for scientific nomenclature shall be cited.
- 4) Written description and detailed map(s) showing the location of each special status or locally significant plant found, the size of each population, and method used to estimate or census the population.
- 5) Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms and accompanying maps.

d. *Discussion*, including:

- 1) Any factors that may have affected the results of the surveys (e.g., drought, human disturbance, recent fire).
- 2) Discussion of any special local or range-wide significance of any plant population or community on the site.
- 3) An assessment of potential impacts. This shall include a map showing the distribution of special status and locally significant plants and communities on the site in relation to the proposed activities. Direct, indirect, and cumulative impacts to the plants and communities shall be discussed.
- 4) Recommended measures to avoid and/or minimize direct, indirect, and cumulative impacts.

e. References cited and persons contacted.

f. Qualifications of field personnel including any special experience with the habitats and special status plants present on the site.

FOOTNOTES

¹ California Environmental Quality Act Guidelines, § 15065 and § 15380.

² *List of California Terrestrial Natural Communities*. California Department of Fish and Game Natural Diversity Database. Sacramento, CA.

³ *California Environmental Quality Act Guidelines*, Appendix G (Initial Study Environmental Checklist).

⁴ *Collecting Guidelines and Documentation Techniques*. California Native Plant Society Policy (adopted March 4, 1995).

⁵ Ferren, W.R., Jr., D.L. Magney, and T.A. Sholars. 1995. The future of California floristics and systematics: Collecting guidelines and documentation techniques. *Madroño* 42(2): 197-210.

⁶ Sawyer, J.O. and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. California Native Plant Society. Sacramento, CA. 471 pp.

STATEMENT OPPOSING TRANSPLANTATION AS MITIGATION FOR IMPACTS TO RARE PLANTS

Signed July 9, 1998

The California State Legislature enacted the Native Plant Protection Act (NPPA) in 1977. The NPPA identifies wide-ranging and broad categories of activities on private lands that could result in the take (killing) of state-listed plants. These activities include:

- 1) agricultural operations or management practices including clearing of land,
- 2) land clearing for fire control,
- 3) timber operations in accordance with a legal timber harvesting plan,
- 4) mining assessment work,
- 5) performance by a public agency or public utility of its obligation to provide service to the public,
- 6) removal of listed plants from a) a canal, b) lateral ditch, c) building site, d) road, or e) other right of way by the owner of the land.

Few land use or management activities fall outside of these categories. Under one interpretation of Section 1913 of the NPPA, landowners who wish to engage in any of the aforementioned activities, and who have been informed by the California Department of Fish and Game (Department) of the presence of state-listed plants on their property, need only provide 10-day notice and give the Department the opportunity to salvage the plants before proceeding. This would be the *sole* mitigation required for destruction of listed plants or their habitat in these cases.

Recent regulatory proposals by the Department, statements by the California Attorney General, and activities in the courts and the state legislature, signal that NPPA's provisions on transplantation may soon become the major, possibly the only, form of "protection" from unlimited take for all state-listed plant taxa. For these reasons, it has become necessary to review the reasons why reliance on

transplantation to conserve state-listed plant species is not only unlikely to succeed, but is likely to contribute to further declines of these taxa, possibly to widespread extinctions.

Transplantation is rarely successful in establishing rare plants at new locations. A study by the Department itself (Fiedler 1991) found that, even under optimum conditions with ample time for planning, transplantation was effective in only 15% of cases studied. Other reviews (e.g. Allen 1994; Howald 1996) have found similar problems. There are many reasons for this poor success rate:

- 1) We often know very little about the biology of rare plants. We may not be aware of all the intricate habitat requirements of each listed species. Rare plants are often specialists that exploit a particular and unusual combination of habitat attributes. They may require a particular soil type, set of pollinators, mycorrhizal fungi or other associate species, aspect, hydrological regime, microclimate or some combination of these or other factors for survival.
- 2) Suitable transplantation or propagation sites may not be available, particularly with only 10-days notice.
- 3) Digging up, transporting, and replanting plants, bulbs, rhizomes or seeds imposes a tremendous stress on a plant. They can easily die in the process.
- 4) Scientifically-tested, reliable methods for salvage, propagation, translocation or transplantation are not available for many rare species.
- 5) Areas where the impacted taxon is already present are often at the carrying capacity of the habitat, and the introduction of transplanted individuals into the existing population will disrupt the equilibrium of that population and will not increase the viability of the taxon.
- 6) The 10-day notice provision means

that landowners can require the Department to salvage plants at any time of the year, including times that are inappropriate for physical disruption of the plant. Annual species may not even be visible at some times of the year.

Transplantation can also cause problems at the target site. Genetic contamination can occur if the plant being transplanted can exchange genetic material with local taxa. Disturbance at the target site may facilitate invasion by non-native invasive species.

For all of these reasons, the California Native Plant Society (CNPS) does not recognize off-site compensation as appropriate mitigation for project impacts and opposes the use of salvage and transplantation as mitigation for impacts to rare and listed plants (Rare Plant Scientific Advisory Committee, California Native Plant Society 1991).

The undersigned individuals, botanical societies and organizations oppose the use of transplantation as the primary means of conservation of rare plant species.

Signed,

Lori Hubbart, President,
California Native Plant Society

Barbara Ertter, PhD, Chair,
CNPS Rare Plant
Scientific Advisory Committee

Ann Dennis, PhD, CNPS
Vice President for Rare Plants

Carol C. Baskin, PhD, President,
Botanical Society of America

REFERENCES

- Allen, W.H. 1994. Reintroduction of endangered plants: Biologists worry that mitigation may be considered an easy option in the political and legal frameworks of conservation. *Bioscience* 44(2): 65-68.

Fiedler, P. 1991. *Mitigation Related Transplantation, Translocation and Reintroduction Projects Involving Endangered and Threatened and Rare Plant Species in California*. California Department of Fish and Game. Sacramento, CA. 82 pp.

Howald, A.M. 1996. Translocation as a mitigation strategy: Lessons from California. Pages 293-329 in: D.A. Falk, C.I. Millar, and M. Olwell, eds. *Restoring Diversity: Strategies for Reintroduction of Endangered Plants*. Island Press. Washington, DC.

Rare Plant Scientific Advisory Committee, California Native Plant Society. 1991. *Mitigation Guidelines Regarding Impacts to Rare, Threatened, and Endangered Plants*. California Native Plant Society. Sacramento, CA. 17 pp.

RESOURCES FOR RARE PLANT CONSERVATION

by David P. Tibor

The following print and online resources are intended to give information on rare plant conservation via science, law and regulation, management, and monitoring. This compilation is not intended to be exhaustive, but instead a “jumping-off point” for interested readers.

RARE PLANTS— GENERAL

CNPS. 2001. *Inventory of Rare and Endangered Plants of California*. 6th ed. Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society. Sacramento, CA. 388 pp.

Fiedler, P.L. 1995. Rarity in the California flora: new thoughts on old ideas. *Madroño* 42(2):127-141.

RARE PLANTS— DATA RESOURCES

Calflora: www.calflora.org (information on California plants for conservation, research, and education)

CalPhotos: elib.cs.berkeley.edu/photos/flora (images of California plants)

CERES—California Environmental Resources Evaluation System: ceres.ca.gov

CNPS Rare Plant Science Program: www.cnps.org/rareplants/rppindex.htm

CNPS Inventory Online: www.cnps.org/inventory (queriable version of the CNPS Inventory)

Jepson Online Interchange: ucjeps.berkeley.edu/interchange.html (resource for California floristics)

Specimen Management System for California Herbaria (SMASCH): www.mip.berkeley.edu/www_apps/smasch (over 340,000 specimens from California herbaria)

CONSERVATION— GENERAL

Elias, T.S. ed. 1987. *Conservation and Management of Rare and Endangered Plants*. California Native Plant Society. Sacramento, CA. 630 pp.

Given, D. 1994. *Principles and Practice of Plant Conservation*. Timber Press. Portland, OR. 292 pp.

Jensen, D.B., M.S. Torn, and J. Harte. 1993. *In Our Own Hands: A Strategy for Conserving California's Biological Diversity*. University of California Press. Berkeley, Los Angeles, and London. 302 pp.

Rolston, H. 1994. *Conserving Natural Value*. Columbia University Press. New York, NY. 259 pp.

Schemske, D.W., B.C. Husband, M.H. Ruckelshaus, C. Goodwillie, I.M. Parker, and J.G. Bishop. 1994. Evaluating approaches to the conservation of rare and endangered plants. *Ecology* 75(3):584-606.

ACTION ALERTS (VIA EMAIL)

Center for Biological Diversity's “Biodiversity Activist”: [\[network.org/BIODIVERSITY/home.html\]\(http://network.org/BIODIVERSITY/home.html\)](http://action</p></div><div data-bbox=)

CNPS “Action Alerts”: www.cnps.org/alerts/alerts.htm

LAW AND POLICY— GENERAL

Reid, T.S. and T. Peterson. 1994. Laws for rare plant conservation. *Fremontia* 22(1):20-26.

Snape, W. 1996. *Biodiversity and the Law*. Defenders of Wildlife and Island Press. Washington, DC. 259 pp.

CERES Law, Regulation, and Policy web site: www.ceres.ca.gov/elaw/

CESA, FESA, AND NPPA

Doremus, H. and J.E. Pagel. 2001. Why listing may be forever: Perspectives on delisting under the US Endangered Species Act. *Conservation Biology* 15(5):1258-1268.

Stanford Environmental Law Society. 2001. *The Endangered Species Act*. Stanford University Press. Stanford, CA. 296 pp.

Overview of listing under CESA: www.dfg.ca.gov/hcpb/species/t_e_spp/list_proced.shtml

CESA listing petition format and instructions: www.cnps.org/archives/forms/state_petition.doc (in Word format)

CESA listed plants: www.dfg.ca.gov/wbdab/assets/docs/teplants.pdf (in PDF format)

CESA in California Fish and Game Code: ceres.ca.gov/topic/env_law/cesa/stat

Introduction to FESA: endangered.fws.gov/pubs/esa_basics.pdf (in PDF format)

Overview of listing under FESA: endangered.fws.gov/listing/listing.pdf (in PDF format)

FESA text: endangered.fws.gov/esa.html

FESA listed plants and animals: endangered.fws.gov/wildlife.html

Federal Register notices: www.epa.gov/fedrgstr/EPA-SPECIES/index.html (queriable site for FESA listings, proposed listings, and critical habitat notices)

CEQA

Bass, R., A. Herson, and K. Bogdan. 1999. *CEQA Deskbook*. 2nd ed. with 2001 supplement. Solano Press Books. Point Arena, CA. 431 pp.

Dennis, N.B. 1994. Does CEQA protect rare plants? *Fremontia* 22(1):3-13.

Remy, M., T. Thomas, J. Moose, and J.W. Yeates. 1999. *Guide to the California Environmental Quality Act*. 10th ed. Solano Press Books. Point Arena, CA. 1023 pp.

Yeates, J.W. 2002. *Community Guide to the California Environmental Quality Act*. Planning and Conservation League. Sacramento, CA. 36 pp.

CEQA process flowchart: ceres.ca.gov/ceqa/flowchart/

LUPIN—The California Land Use Planning Information Network: ceres.ca.gov/planning/ (contains many County General Plans and other information useful in assessing impacts and regulatory compliance)

HCP AND NCCP

American Institute of Biological Sciences. 1999. *Using Science in Habitat Conservation Plans*. American

Institute of Biological Sciences. Washington, DC. 97 pp. Available in PDF format at www.nceas.ucsb.edu/nceas-web/projects/97KAREI2/hcp-1999-01-14.pdf

California Department of Fish and Game and California Resources Agency. 1993. *Southern California Coastal Sage Scrub Natural Communities Conservation Plan: Scientific Review Panel Guidelines and Documentation*. State Printing Office. Sacramento, CA.

Harding, E.K., E.E. Crone, B.D. Elder, J.M. Hoekstra, A.J. McKerrow, J.D. Perrine, J. Regetz, L.J. Rissler, A.G. Stanley, E.L. Walters, and the National Center for Ecological Analysis and Synthesis Working Group. 2001. The scientific foundation of habitat conservation plans: a quantitative assessment. *Conservation Biology* 15(2): 488-500.

Jasny, M. 1997. *Leap of Faith: Southern California's Experiment in Natural Community Conservation Planning*. Natural Resources Defense Council. New York, NY. 41 pp.

Noss, R.F., M.A. O'Connell, and D.D. Murphy. 1997. *The Science of Conservation Planning: Habitat Conservation under the Endangered Species Act*. Island Press. Washington, DC. 246 pp.

Pollak, D. 2001a. *Natural Community Conservation Planning: The Origins of an Ambitious Experiment to Protect Ecosystems*. Part 1 in a series. California Research Bureau, California State Library. Sacramento, CA. 57 pp. Available in PDF format at: www.library.ca.gov/crb/01/02/01-002.pdf

Pollak, D. 2001b. *The Future of Habitat Conservation: The NCCP Experience in Southern California*. Part 2 in a series. California Research Bureau, California State Library. Sacramento, CA. 99 pp. Available in PDF format at: www.library.ca.gov/crb/01/09/01-009.pdf

State of California, California Resources Agency, and California Department of Fish and Game. 1995. *Natural Communities Conservation Program*. Report to the Legislature.

Sacramento, CA. 29 pp.

School of Natural Resources and Environment at the University of Michigan. 1997. *Endangered Species Update—Habitat Conservation Planning*. Vol. 14, No. 7-8 (July-August).

CNPS HCP / NCCP Handbook: www.cnps.org/archives/handbooks/hcp-nccp.pdf (in PDF format)

CNPS HCP / NCCP resources: www.cnps.org/conservation/NCCP-HCPs.htm

US Fish and Wildlife Service HCP Program: endangered.fws.gov/hcp/index.html

Department of Fish and Game NCCP information: www.dfg.ca.gov/nccp

MONITORING

Elzinga, C.L., D.W. Salzer, and J.W. Willoughby. 1998. *Measuring and Monitoring Plant Populations*. BLM Technical Reference 1730-1. BLM/RS/ST-98/005+1730. Bureau of Land Management. Sacramento, CA. 477 pp.

Menges, E.S., and D.R. Gordon. 1996. Three levels of monitoring intensity for rare plant species. *Natural Areas Journal* 16: 227-237.

Sayre R., E. Roca, G. Sedaghatkish, B. Young, S. Keel, R. Roca, and S. Sheppard. 2000. *Nature in Focus: Rapid Ecological Assessment*. Island Press. Covelo, CA. 182 pp. (The Nature Conservancy has developed a process for rapid ecological assessment, with an emphasis on vegetation mapping.)

British Columbia, Canada. An extensive natural resources inventory and monitoring program is found at srmwww.gov.bc.ca/risc/index.htm

US Environmental Protection Agency EMAP—Environmental Monitoring and Assessment Program: www.epa.gov/emap/index.html (useful information about study designs and data management)

USDI National Park Service's natural

resources monitoring programs: www.nature.nps.gov/im/monitor/ and their vegetation monitoring procedure for burned sites (either wild-fire or prescribed fires): www.fire.nps.gov/fmb/default.asp

TIMBER HARVEST

Christensen, N.L. 2000. *Environmental Issues in Pacific Northwest Forest Management*. Committee on Environmental Issues in Pacific Northwest Forest Management. National

Academy Press. Washington, DC. 259 pp.

Little Hoover Commission. 1994. *Timber Harvest Plans: A Flawed Effort to Balance Economic & Environmental Needs*. Milton Marks Commission on California State Government Organization and Economy. Sacramento, CA. 84 pp.

Pollak, D. 2002. *Are Certified Regulatory Programs Functionally Equivalent to CEQA? A Comparison of their Statutes and Regulations*. California Research Bureau, California State

Library. Sacramento, CA. 40 pp. Available in PDF format at: www.library.ca.gov/crb/02/05/02-005.pdf

CNPS Forestry Program: www.cnps.org/forestry

CNPS forestry issues links: www.cnps.org/forestry/misc/ForestryLinks.htm (large number of links to relevant web resources)

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GLOSSARY OF TERMINOLOGY AND ACRONYMS RELATED TO RARE PLANT PROTECTION

AB. Assembly Bill.

ADEIR. Administrative Draft Environmental Impact Report; the version that undergoes internal review prior to being released to the public as a DEIR.

adaptive management. A systematic process for continually improving management policies and practices by learning from the outcomes of operational programs.

administrative remedies. The procedure for allowing a person to assert a right to a relief from an administrative agency. Persons wishing to challenge an EIR in court must show they have exhausted all their administrative remedies for the particular issues in the lawsuit, that is, they have made all possible efforts to ensure an adequate document by commenting on factual errors and omissions concerning the issues during the comment periods. The legal case can only address the adequacy of the EIR in addressing those issues discussed in the comments.

adopted. Term applied to the final action that a lead agency takes on a Neg Dec.

applicant. Individual or company submitting an application to undertake a project.

BOF. California Board of Forestry.

CDF. California Department of Forestry.

CDFG. California Department of Fish and Game.

CEQA. California Environmental Quality Act (California Public Resources Code §§ 21000-21117).

certified. Term applied to the final action

that a lead agency takes on an EIR. An EIR cannot be challenged in court until it is certified.

CESA. California Endangered Species Act (Fish and Game Code §§ 2050-2116).

changed circumstances. Reasonably foreseeable circumstances that could affect a covered species, habitat, or the geographic area covered by a regional conservation plan.

clear-cutting. A method of harvesting timber in which all trees within a given area, regardless of size or age, are cut down at one time.

CNDDDB. California Natural Diversity Database (within CDFG).

CNPS. California Native Plant Society.

corridor. A connection that links separate patches of habitat.

covered species. Species, both listed and nonlisted, that are conserved and managed under an approved NCCP and that may be authorized for take.

critical habitat. Specific geographic areas, whether occupied by listed species or not, that are determined to be essential for the conservation and management of federally listed species, and that have been formally described in the Federal Register.

cumulative impacts. Two or more individual impacts which, when considered together, are considerable, or which compound or increase other environmental impacts.

DEIR. Draft Environmental Impact Report (EIR); the version that is provided for public review.

discretionary action. The exercise of judgment or deliberation when the public agency decides to approve or disapprove a particular activity, as distinguished from situations where the public agency merely has to determine whether there has been conformity with applicable statutes, ordinances, or regulations (CEQA Guidelines § 15357).

DPR. California Department of Pesticide Regulation.

edge effect. The effect on habitat conditions (e.g., degree of humidity, light, wind exposure) found at or near the boundary between different ecosystems or land uses.

EIR. Environmental Impact Report; required when a project may pose a significant environmental effect.

element. A plant, animal, or natural community. An "element" of natural diversity, typically used by natural heritage programs to avoid this longer explanation.

element ranking. Plants, animals, and natural communities can be ranked as to their rarity and threat. Heritage programs across the network utilize the system devised by NatureServe (the science branch of The Nature Conservancy) of Global (G) and State (S) ranks. The G rank reflects the status of the element across its entire distribution. The S rank reflects just the situation in a particular state. There can also be a N (National) rank reflecting the situation in a given country.

endangered. A formal designation under CESA and FESA. Under CESA, a taxon which is "in serious danger of becoming

extinct throughout all, or a significant portion of its range due to one or more causes . . .” (Fish and Game Code § 2062). Under FESA, a taxon which is “in danger of extinction throughout all or a significant portion of its range” (FESA § 3 (6)).

environmental gradient. The range of any environmental factor, such as slope, aspect, elevation, soil type, topography, depth, inundation, or temperature.

even-aged management. Timber management that results in the creation of stands of trees in which relatively small age differences exist between individual trees. Clear-cutting is an example of this type of management.

FEIR. Final Environmental Impact Report. Includes the response to comments on the DEIR, any changes in text required in the DEIR, and the DEIR itself. The response to comments and changes in text may be published as a separate document that supplements the DEIR, or the two documents may be published together. The DEIR plus the response to comments and revisions to text constitute the FEIR.

FESA. Federal Endangered Species Act (16 USC §§ 1531-1544).

fog drip. Water that drips to the ground from objects, such as leaves and branches, on which the water has collected during a fog.

FPA. California Forest Practice Act (California Public Resources Code §§ 4511-4628).

FPR. Forest Practice Rules (CCR §§ 895-1115).

functional equivalent. An environmental document prepared under certain state regulatory programs that are exempted from the requirement to prepare an EIR because they have been certified as meeting certain criteria designed to ensure they meet the basic goals of CEQA (as per Public Resources Code § 21080.5).

FWS. United States Fish and Wildlife Service (also abbreviated USFWS).

GIS. Geographic information system, a system of hardware and software used to store, retrieve, map, and analyze spatial data on a computer.

GPS. Global positioning system, an electronic device that uses satellites to allow a user to determine the location of any site, often accurate to a few meters.

Group A and B Commercial Species. Lists of commercial timber trees from a forest district as designated in FPR.

HCP. Habitat Conservation Plan. A plan developed under FESA to allow take of

listed wildlife during otherwise lawful activity. (FESA § 10(a))

Independent Science Advisors. A panel of scientists convened to make general recommendations on the conservation goals and strategies for an NCCP/HCP; they are independent of the actual planning process.

IS. Initial Study; the first examination of a CEQA project for potentially significant physical environmental effects.

ITP. Incidental Take Permit; a permit issued under FESA to private parties undertaking otherwise lawful projects that might result in the take of an endangered or threatened species. Application for an incidental take permit is subject to certain requirements, including preparation by the permit applicant of a conservation plan, generally known as an HCP (FESA § 10(a)).

landscape level. The scale at which an area includes a full range of environmental gradients and that considers ecological integrity and ecosystem function.

lead agency. The agency that oversees preparation of the CEQA documentation and adopts or certifies the document. It is also the agency that must legally defend a document.

legally adequate. A CEQA document that meets the intent of the law, including a discussion of all reasonably foreseeable physical impacts of the project, cumulative and growth-inducing impacts, and alternatives.

list (a plant). To place on the list of plants protected under CESA or FESA.

List 1A. A CNPS ranking applied to plants presumed extinct in California.

List 1B. A CNPS ranking applied to plants rare, threatened, or endangered in California and elsewhere.

List 2. A CNPS ranking applied to plants rare, threatened, or endangered in California, but more common elsewhere.

List 3. A CNPS ranking applied to plants about which we need more information—a “review” list.

List 4. A CNPS ranking applied to plants of limited distribution—a “watch” list.

locally significant plants. Plants which are not rare from a statewide perspective, but are significant from a more local perspective. Examples might include an occurrence on the outer limits of known distribution, a range extension, a rediscovery, or a plant that is rare or uncommon in a local context (such as within a county or region).

ministerial action. A governmental decision involving little or no personal judg-

ment by the public official as to the wisdom or manner of carrying out the project. The public official merely applies the law to the facts as presented but uses no special discretion or judgment in reaching a decision (CEQA Guidelines § 15369).

Mitigated Neg Dec. A Neg Dec that is prepared when an IS has identified potentially significant environmental effects, but the project has been revised to avoid or reduce to insignificance those effects and there is no evidence that the revised project will have a significant effect on the environment.

mitigation. The act of making an impact less severe. Under CEQA, mitigation may include: avoiding the impact altogether; minimizing impacts by limiting the degree or magnitude of the action; reducing or eliminating the impact by repairing, rehabilitating, or restoring the impacted environment; or compensating for the impact by replacing or providing substitute resources or environments.

MSCP. Multiple Species Conservation Program (in San Diego), a plan under NCCP.

NatureServe. The science branch of TNC; now an independent organization based in Arlington, VA.

NCCP. Natural Community Conservation Planning (Fish and Game Code §§ 2800-2840).

NCCPs. Natural Community Conservation Plans.

Neg Dec. Negative Declaration; the CEQA documentation indicating that a project will not have a significant physical impact on the environment. A Neg Dec incorporates the findings of an IS.

negative data. The absence of plant occurrences are reported as negative data. In botanical surveys, this means areas where specific plants are *not* found.

NFMA. National Forest Management Act (16 U.S.C. § 1601-et seq).

NMFS. National Marine Fisheries Service.

NOD. Notice of Determination; a notice filed by the lead agency after approving a project for which an EIR, Neg Dec, or Mitigated Neg Dec was prepared. The NOD starts the 30-day statute of limitations for legal challenges.

NOE. Notice of Exemption; a notice that may be filed by a lead agency after approval of a project that it has determined is exempt from CEQA. The filing starts a 35-day statute of limitations on legal challenges to the decision that the project is exempt. If the agency chooses not to file an NOE, the statute of limitations

is 180 days from the project approval date.

nonsignatories. Individuals or groups that are not part of (have not signed) a contract such as the implementation plan of an NCCP.

NOP. Notice of Preparation; a notice of intent to prepare an EIR and solicit early comment from concerned agencies and the public on issues to be addressed in the EIR.

NPPA. Native Plant Protection Act, a 1977 law which gave the California Fish and Game Commission the authority to designate native plants as endangered or rare, and to require permits for collecting, transporting, or selling such plants (Fish and Game Code §§ 1900-1913).

occurrence. A location where an element (plant, animal, or natural community) is found. The occurrence can consist of a single population or several colonies in the nearby vicinity. The separation distance between discrete occurrences as per CNDDDB is 0.25 miles in California and Oregon, or 1 km in some other states.

occurrence data. Information about when and where a species occurs, including details such as size, area, viability, and threats.

occurrence ranking. Individual occurrences are ranked by CNDDDB (if enough information is available) to evaluate site condition, quality, land use, disturbances, size of population, viability over time, and the like. Occurrence ranks are either Excellent, Good, Fair, Poor, Unknown, or None (the last used for extirpated occurrences) and reflect the quality of both the population's health and the associated habitat at the site.

OPR. Governor's Office of Planning and Research.

pesticide spray adjuvant. A substance, with or without toxic properties of its own, which is intended to be used with another pesticide as an aid to the application or effect of the other pesticide.

positive sighting database. A database containing records of positive sightings of rare species (e.g., where a plant was seen), and not containing negative survey data (e.g., where a plant wasn't seen). CNDDDB is an example of this type of database.

preserve. Land set aside and managed for the conservation of species and habitats.

rare. A formal designation under NPPA for a taxon which "although not presently threatened with extinction . . . is in such small numbers throughout its range that it may become endangered if its present environment worsens" (Fish and Game Code § 1901).

Rarefind. A computer application that allows querying and reporting capability on CNDDDB data. The application is updated monthly, and subscribers receive data updates every six months.

recovery. The state in which the circumstances of a listed species have been improved to the point that it no longer needs the protection of CESA or FESA.

recovery plan. Under FESA, an advisory document developed by FWS which outlines actions that can be taken by public and private agencies and individuals to help recover federally-listed taxa. Such actions typically include habitat protection and management, threat reduction, trend monitoring, and research. (Under CESA, there is a recovery strategy pilot program that requires a recovery strategy for the greater sandhill crane and up to four other species designated by the Fish and Game Commission. CESA does not currently require recovery strategies for all state listed species.)

Registered Professional Forester. An individual certified by the BOF as qualified to prepare THPs.

RPSP. Rare Plant Science Program of CNPS.

SB. Senate Bill.

SCH. State Clearinghouse.

Section 4. The section of FESA that deals with listing and recovery of species, and designation of critical habitat.

Section 7. The section of FESA that requires all federal agencies, in consultation with FWS, to insure that their actions are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.

Section 9. The section of FESA that deals with prohibited actions, including the import and export, take, possession of illegally taken species, transport, or sale of endangered or threatened species.

Section 10. The section of FESA that lays out the guidelines under which a permit may be issued to authorize activities prohibited by Section 9, such as take of endangered or threatened species.

seed-tree technique. An even-aged timber harvest technique in which the first harvest removes all but a few trees (seed trees), followed by a subsequent harvest which removes only the seed trees.

shelter-wood technique. Similar to seed-tree technique, but more trees are initially left to shelter young trees from windthrow.

silviculture. The theory and practice of controlling the establishment, composition, and growth of forests.

skid trail. An unimproved trail over which logs are dragged from the forest to landings where they are loaded onto trucks.

SOD. Sudden Oak Death syndrome.

State Clearinghouse. State agency that distributes CEQA documents to other state agencies for comment as appropriate. An EIR should have a State Clearinghouse number on the cover or title page.

statute of limitations. The length of time after a NOD has been filed during which a legal challenge can be brought. It is generally 30 days. The statute of limitations on a NOE is 35 days (CEQA Guidelines § 15062(d)), and if an agency performs no CEQA review when it should have, parties have 180 days from the date of project approval to file a legal challenge.

subsample. To sample only a portion of a population. Subsampling is often done for large populations, when attempting to count individuals is impractical.

take. To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Take also includes significant habitat modification or destruction that actually kills or injures threatened or endangered species by significantly interfering with their essential behavioral patterns, such as breeding, feeding, and sheltering (FESA § 3(18)).

threatened. A formal designation under CESA and FESA. Under CESA, a taxon which "although not currently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts . . ." (Fish and Game Code § 2067). Under FESA, a taxon which is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (FESA § 3(19)).

THP. Timber Harvest Plan; a plan outlining timber removal from an area, which serves as the functional equivalent of an EIR.

TNC. The Nature Conservancy.

WCB. Wildlife Conservation Board (State).

windthrow. The uprooting and overthrow of trees by the wind.

USFWS. See FWS.

USGS. United States Geological Survey.

unforeseen circumstances. Changes affecting one or more covered species, habitat, natural community, or the geographic area that could not reasonably have been anticipated at the time the regional conservation plan was developed.

EDITORIAL

One of the most critical elements of the California Native Plant Society's mission is education about and advocacy for rare, threatened, and endangered native plants of our state. This is no small task: almost one third of California's plant species, subspecies, and varieties are in need of advocacy, and the threats to native habitats increase with each and every day. David Tibor, CNPS Rare Plant Botanist, has served as Convening Editor for this special issue of *Fremontia*, which includes articles and other documents that explain the ins and outs of rare plant advocacy in Cali-

fornia. This issue also offers invaluable resources and guidelines to those participating in the legal processes of rare plant protection. Special thanks go to David Tibor, Carol Witham, authors, and photographers for their contributions to what we hope will not only enlighten members about rare plants and their protection, but will provide useful tools for those doing the hard work of rare plant advocacy.

This is the second of a series of *Fremontia* issues that has a focal concept (the first, Vol. 29 #1, presented articles about use of native plants in horticulture). These theme issues will

alternate with mixed issues for the next few years, and will not only educate members about some fascinating native plant topics, but coupled with bimonthly publication, will help *Fremontia* return to its normal quarterly publication schedule by the January 2004 issue. I hope that you will enjoy the following theme issues: modern systematics and changes to plant classification and nomenclature; bryophytes; plants and insects; seaweeds; and stewardship. (For further information on the publication schedule, see www.cnps.org under *Fremontia*.)

Linda Ann Vorobik, Editor

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