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via electronic and US mail*

DOCKET

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December 23, 2009

Alan Solomon, Project Manager,
Siting, Transmission and Environmental
Protection Division,
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, California 95814

Holly L. Roberts, Project
Manager, Palm Springs-South Coast Field
Office
Bureau of Land Management
1201 Bird Center Drive
Palm Springs, California 92262

RE: Comments on the Notice of Intent ("NOI") to prepare an Environmental Impact Statement (EIS) for the Proposed Chevron Energy Solutions/Solar Millennium Palen and Blythe Solar Power Plants, Riverside County, CA and Possible Land Use Plan Amendment and Staff Assessment (SA). 74 FR 61169.

Dear Mr. Solomon and Ms. Roberts,

Please accept the following comments on the Notice of Intent ("NOI") to prepare an Environmental Impact Statement (EIS) for the Proposed Chevron Energy Solutions/Solar Millennium Palen and Blythe Solar Power Plants, Riverside County, and Possible Land Use Plan Amendment and Staff Assessment (SA) in compliance with the National Environmental Policy Act of 1969 (NEPA), as amended, and the California Environmental Quality Act (CEQA), on the impacts of the Proposed Chevron Energy Solutions/Solar Millennium Palen and Blythe Solar Power Plants, on behalf of the Center for Biological Diversity (the "Center"). This project is proposed by the Department of the Interior, Bureau of Land Management ("BLM"), together with the California Energy Commission ("CEC"),

The Center is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. These scoping comments are submitted on behalf of the Center's 240,000 staff, members and online activists throughout California and the western United States.

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The development of renewable energy is a critical component of efforts to reduce greenhouse gas emissions, avoid the worst consequences of global warming, and to assist

California in meeting emission reductions set by AB 32 and Executive Orders S-03-05 and S-21-03. Arizona • California • Nevada • New Mexico • Alaska • Oregon • Montana • Illinois • Minnesota • Vermont • Washington, DC

Ileene Anderson, Staff Biologist

PMB 447, 8033 Sunset Blvd. • Los Angeles, CA 90046-2401

tel: (323) 654.5943 fax: (323) 650.4620 email: ianderson@biologicaldiversity.org

www.BiologicalDiversity.org

09. The Center for Biological Diversity strongly supports the development of renewable energy production, and the generation of electricity from solar power, in particular. However, like any project, proposed solar power projects should be thoughtfully planned to minimize impacts to the environment. In particular, renewable energy projects should avoid impacts to sensitive species and habitat, and should be sited in proximity to the areas of electricity end-use in order to reduce the need for extensive new transmission corridors and the efficiency loss associated with extended energy transmission. Only by maintaining the highest environmental standards with regard to local impacts, and effects on species and habitat, can renewable energy production be truly sustainable.

The Chevron Energy Solutions/Solar Millennium Blythe Solar Power is proposed to consist of four identical and independent 250 MW units and related facilities covering 7,030 acres of desert landscape. The Chevron Energy Solutions/Solar Millennium Palen Solar Power is proposed to consist of two adjacent, identical and independent 250 MW units and related facilities covering 3,871 acres of desert landscape. Each project requires a proposed land use plan amendment to the 1980 California Desert Conservation Area (CDCA) Plan, as amended.

The Energy Production and Utility Corridors section of the California Desert Conservation Area Plan (1980) as amended requires at minimum that the following resource issues be addressed:

- 1) Consistency with the Desert Plan, including designated and proposed planning corridors;
- 2) Protection of air quality;
- 3) Impact on adjacent wilderness and sensitive resources;
- 4) Visual quality;
- 5) Cooling-water source(s);
- 6) Waste disposal;
- 7) Seismic hazards; and
- 8) Regional equity.

Additionally, a number of other resources are of concern to us and need to be addressed in detail as follow below:

Biological Resources

Based on the preliminary finding in the biological sections of the application, it appears that both sites are ecologically functional desert landscape and hosts a suite of rare species currently on the site. Careful documentation of the current site resources is imperative in order to analyze how best to site the project to avoid and minimize impacts and then to mitigate any unavoidable impacts.

Biological Surveys and Mapping

The Center requests that thorough, seasonal surveys be performed for sensitive plant species and vegetation communities, and animal species under the direction and supervision of the BLM and CEC and resource agencies such as the US Fish and Wildlife Service and the California Department of Fish and Game. Full disclosure of survey methods and results to the public and other agencies without limitations imposed by the applicant must be implemented to assure full NEPA/CEQA compliance.

Confidentiality agreements should not be allowed for the surveys in support of the proposed project. Surveys for the plants and plant communities should follow California Native Plant Society (CNPS) and California Department of Fish and Game (CDFG) floristic survey guidelines (see Exhibits CNPS Botanical Survey Guidelines; CDFG Survey Guidelines) and should be documented as recommended by CNPS (Exhibit CNPS Documentation Guidelines) and California Botanical Society policy guidelines. A full floral inventory of all species encountered needs to be documented and included in the EIS/SAs. Surveys for animals should include an evaluation of the California Wildlife Habitat Relationship System's (CWHR) Habitat Classification Scheme. All rare species (plants or animals) need to be documented with a California Natural Diversity Data Base form and submitted to the California Department of Fish and Game (Exhibit CNDDDB Form) as per the State's instructions (Exhibits Ex. CNDDDB Instructions; CNDDDB GIS Instructions).

The Center requests that the vegetation maps be at a large enough scale to be useful for evaluating the impacts. Vegetation/wetland habitat mapping should be at such a scale to provide an accurate accounting of wetland and adjacent habitat types that will be directly or indirectly affected by the proposed activities. A half-acre minimum mapping unit size is recommended, such as has been used for other development projects. Habitat classification should follow CNPS' Manual of California Vegetation.

Adequate surveys must be implemented, not just a single season of surveys, in order to evaluate the existing on-site conditions. Due to unpredictable precipitation, desert organisms have evolved to survive in these harsh conditions and if surveys are performed at inappropriate times or year or in particularly dry years many plants that are in fact on-site may not be apparent during surveys (ex. annual and herbaceous perennial plants).

Impact Analysis

The EIS/SAs must evaluate all direct, indirect, and cumulative impacts to sensitive habitats, including impacts associated with the establishment of unpermitted recreational activities, the introduction of non-native plants, the introduction of lighting, noise, and the loss and disruption of essential habitat due to edge effects.

A number of rare resources are known to occur or have high potential to occur on the Blythe site including;

<i>Common Name</i>	<i>Scientific Name</i>	<i>State/Federal/Other Status</i>
Desert Tortoise	<i>Gopherus agassizii</i>	CT/FT
Burrowing owl	<i>Athene cunicularia hypugaea</i>	CSC/BLM SS
Swainson's hawk	<i>Buteo swainsoni</i>	CT/MB
Ferruginous hawk	<i>Buteo regalis</i>	MB
Loggerhead shrike	<i>Lanius ludovicianus</i>	CSC/FSC/MB
Yellow warbler	<i>Dendroica petechia sonorana</i>	CSC
American badger	<i>Taxidea taxus</i>	CSC
Las Animas colubrine	<i>Colubrina californica</i>	CNPS 2.3
Dwarf germander	<i>Teucrium cubense</i> ssp. <i>depressum</i>	CNPS List 2.2

Harwood's milkvetch	<i>Astragalus insularis</i> var. <i>harwoodii</i>	<i>CNPS List 2.2</i>
Coachella Valley Milkvetch	<i>Astragalus lentiginosus</i> var. <i>coachellae</i>	<i>FE/CNPS 1.2/BLM SS</i>
State Designation CE State listed as endangered. Species whose continued existence in California is jeopardized. CT State listed as threatened. Species that although not presently threatened in California with extinction are likely to become endangered in the foreseeable future. CSC California Department of Fish and Game "Species of Special Concern." Species with declining populations in California. FP Fully protected against take pursuant to the Fish and Game Code Sections 3503.5, 3511, 4700, 5050, 5515. Federal Designation FE Federally listed as endangered. FT Federally listed as threatened. MB Migratory Bird Treaty Act. of 1918. Protects native birds, eggs, and their nests. BCC U.S. Fish and Wildlife Service Bird of Conservation Concern. BLM SS BLM Sensitive Species. Other California Native Plant Society (CNPS) 2.2 Plant rare, threatened or endangered in California, but more common elsewhere, and fairly threatened in CA. 2.3 Plant rare, threatened or endangered in California, but more common elsewhere, and not very threatened in CA. 4.3 Plants of a limited distribution, and not very threatened in CA.		

A number of rare resources are known to occur or have high potential to occur on the Palen site including:

<i>Common Name</i>	<i>Scientific Name</i>	<i>State/Federal/Other Status</i>
Desert Tortoise	<i>Gopherus agassizii</i>	<i>CT/FT</i>
Mojave fringe-toed lizard	<i>Uma scoparia</i>	<i>CSC/BLM SS</i>
Northern harrier	<i>Circus cyaneus</i>	<i>CSC/</i>
Burrowing owl	<i>Athene cunicularia hypugaea</i>	<i>CSC/BLM SS</i>
Swainson's hawk	<i>Buteo swainsoni</i>	<i>CT/MB</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>	<i>CSC/FSC/MB</i>
Vaux's swift	<i>Chaetura vauxi</i>	<i>CSC</i>
Purple martin	<i>Progne subis</i>	<i>CSC</i>
American badger	<i>Taxidea taxus</i>	<i>CSC</i>
Dwarf germander	<i>Teucrium cubense</i> ssp. <i>depressum</i>	<i>CNPS List 2.2</i>
Harwood's milkvetch	<i>Astragalus insularis</i> var. <i>harwoodii</i>	<i>CNPS List 2.2</i>
Jackass clover	<i>Wislizenia refracta</i> ssp. <i>refracta</i>	<i>CNPS List 2.2</i>
Coachella Valley Milkvetch	<i>Astragalus lentiginosus</i> var. <i>coachellae</i>	<i>FE/CNPS 1.2/BLM SS</i>
State Designation CE State listed as endangered. Species whose continued existence in California is jeopardized. CT State listed as threatened. Species that although not presently threatened in California with extinction are likely to become endangered in the foreseeable future. CSC California Department of Fish and Game "Species of Special Concern." Species with declining populations in California. FP Fully protected against take pursuant to the Fish and Game Code Sections 3503.5, 3511, 4700, 5050, 5515. Federal Designation FE Federally listed as endangered. FT Federally listed as threatened. MB Migratory Bird Treaty Act. of 1918. Protects native birds, eggs, and their nests. BCC U.S. Fish and Wildlife Service Bird of Conservation Concern. BLM SS BLM Sensitive Species. Other California Native Plant Society (CNPS) 2.2 Plant rare, threatened or endangered in California, but more common elsewhere, and fairly threatened in CA.		

- | |
|---|
| 2.3 Plant rare, threatened or endangered in California, but more common elsewhere, and not very threatened in CA.
4.3 Plants of a limited distribution, and not very threatened in CA. |
|---|

All of these species have been identified as either occurring on the site from the surveys performed in 2009¹ or having a high probability to occur on the site.² Therefore, the EIS/SAs must adequately address the impacts and propose effective ways to avoid, minimize, and mitigate the impacts to these resources through alternatives including alternative siting and alternative on-site configurations.

Desert Tortoise

The desert tortoise is continuing to decline throughout its range despite being under federal and state Endangered Species Acts protection as threatened³. The proposed Palen project will impact 183 acres of federally designated critical habitat for the desert tortoise in the southwest portion of the disturbance area. Both projects, despite being outside desert wildlife management areas (DWMAs) as identified in the Northern and Eastern Colorado Plan⁴, still have desert tortoise occurring on site⁵. The documents must clearly address alternative proposals for avoiding, minimizing and mitigating the impacts to the desert tortoise and its occupied habitat, as well as the federally designated critical habitat on the Palen site.

The BLM must first look at ways to avoid impacts to the desert tortoise, for example, by identifying and analyzing *alternative sites* outside of desert tortoise occupied habitat or in areas that have already been severely disturbed by other prior land use as well as alternative project configurations that would avoid or significantly reduce impacts. The BLM and CEC must also look at ways to minimize any impacts that it finds are unavoidable, for example, by limiting the ground disturbing activities from the project and limiting access roads to the project. Acquisition of lands that will be managed in perpetuity for conservation must be included as part of the strategy to mitigate impacts to the tortoise, mitigation lands should also be high-quality habitat and, at minimum 5:1 mitigation should be provided of all acres of desert tortoise habitat destroyed. Set-aside conservation lands are particularly important because the project as proposed appears to have little or no compatibility with on-site conservation for desert tortoise.

Translocation as a long-term strategy for minimizing and mitigating impacts to desert tortoise may be a tool for augmenting conservation of the desert tortoise⁶, but it cannot substitute for other mitigation such as preservation of habitat. Moreover, to date, translocation does not have a proven track record of success. If translocation is to be a part of the mitigation strategy, a detailed plan must be included as apart of the EIS/SA, and include methodologies for determining appropriate conservation area where tortoises may be translocated, impacts to existing "host" tortoise populations that occur on the translocation site, when/how the tortoise are to be translocated, how tortoise diseases will be addressed, and requisite monitoring of host and

¹ Solar Millenium 2009

² Ibid

³ USFWS 2009

⁴ BLM 2006

⁵ Solar Millennium 2009

⁶ Field et al 2007

translocated tortoises, etc.. Monitoring of the translocated and existing “host” tortoises needs to occur for a long enough time period that is realistic to evaluate success of the translocation – definitely longer than a single year – 10 years may be a more realistic minimum for tracking impacts to this long lived species. Success criteria for translocation must also be clearly identified. The temporary project site needs to be fenced with tortoise proof fencing during construction and the permanent project sites need to be fenced to prevent tortoise mortality. All associated roads also need to be fenced.

An aggressive raven prevention plan also needs to be developed as part of the EIS/SA and followed during project development and implementation.

Burrowing Owl

Two burrowing owls were identified on the Blythe site along with over 1,000 potentially suitable burrows, indicating the site may be excellent habitat for this declining species⁷. At least one alternative should evaluate the reduction of impacts to this rare species by moving the project away from the nesting burrows.

If the project remains on the proposed site, acquisition lands will be required as part of the mitigation and will need to be managed in perpetuity for conservation. Mitigation lands should be high-quality habitat and, at minimum 5:1 mitigation should be provided of all acres of burrowing owl habitat destroyed. Additional measures for avoidance and minimization should also be incorporated into the evaluation of impacts to this species.

Other Rare Species

The diversity of rare species found on the 7,030 acres of the Blythe site as well as the 3,871 acres on the Palen site is impressive and suggests that the sites are ecologically intact and functioning⁸. The BLM and CEC must clearly address proposals for avoiding, minimizing and mitigating the impacts to all of the rare species that utilize the sites for part or all of their lifecycle.

Acquisition of lands that will be managed in perpetuity for conservation must be included as part of the strategy to avoid, minimize and mitigate impacts to the other species found on site as well. Acquisition is particularly important for these species because the proposed project appears to have no compatibility with any type of on-site conservation of plant communities or wildlife.

For the rare plants, avoidance is preferable because of the general lack of success in transplanting rare plants⁹. If transplantation is to be a part of the mitigation strategy, a detailed plan must be included as part of the EIS/SA on the methodology for determination of appropriate conservation area where plants may be transplanted, when/how plant are to be transplanted and identification of success criteria for transplantation. Monitoring of the transplanted plants needs to occur for a time period that is realistic to evaluate long-term success of the plants.

⁷ IBP 2008

⁸ Solar Millennium 2009

⁹ Fiedler 1991

Locally Rare Species

The Center requests that the EIS/SA evaluate the impact of the proposed permitted activities on locally rare species (not merely federal- and state-listed threatened and endangered species). The preservation of regional and local scales of genetic diversity is very important to maintaining species. Therefore, we request that all species found at the edge of their ranges or that occur as disjunct locations be evaluated for impacts by the proposed permitted activities.

Water Resources

The project appears to impact on-site drainages on both project sites. The EIS/SAs document must clarify the impacts to the jurisdictional Waters of U.S. and the Water of the State of California, and avoid, minimize and mitigate any impacts. While the Application indicates that 128.8 acres of state waters will be affected by the Blythe project and 256.7 acres of state waters will be affected by the Palen project, these impacts should be avoided to the greatest extent possible and if impacts remain they must be mitigated. In doing so, any reroute of waters and drainage on the site must assure that downstream processes are not impacted.

An evaluation of the effect of additional groundwater pumping (in conjunction with other groundwater issues [pumping, nitrate plume etc.] in the basin) on the water quality in the basin and surface water resources, and its effect on the native plant and animal species and their habitats need to be included in the EIS/SAs.

Alternatives

The EIS/SAs must include a robust analysis of alternatives, including a private lands alternative and alternatives using other technologies including distributed generation. The stated objectives of the project must not unreasonably constrain the range of feasible alternatives evaluated in the EIS/SAs. The BLM and CEC must establish an independent set of objectives that does not unreasonably limit the EIS/SAs' analysis of feasible alternatives including alternative sites. At a minimum alternatives including the no-action alternative, an environmentally preferred alternative and an alternative where power generation is sited adjacent to power consumption need to be included.

Other Issues

The construction and operation of the proposed facilities will also increase greenhouse gas emissions and those emissions should be quantified and off-set. This would include the manufacture and shipping of components of the project and the car and truck trips associated with construction and operations. Similarly, such activities will also impact air quality and traffic in the area and these impacts should be disclosed, minimized and mitigated as well. For mobile sources, since consistency with the AQMP will not necessarily achieve the maximum feasible reduction in mobile source greenhouse emissions, the EIS/SAs should evaluate specific mitigation measures to reduce greenhouse emissions from mobile sources.

Fire Impacts

Because the project will be creating high temperature liquids, fire prevention including best management practices must be addressed and clearly identified in the EIS/SAs. Not only on-site protection of resources, but also preventing fire from moving into the adjacent lands. Fire is incredibly detrimental to desert ecosystems, resulting in degradation of the habitat and if frequently reburned results in a type conversion to non-native vegetation¹⁰.

Non-Native Plants

The EIS/SAs must identify and evaluate impacts to species and ecosystems from invasive exotics species. Many of these species invade disturbed areas, and then spread into wildlands. Fragmentation of intact, ecologically functioning communities further aides the spread and degradation of plant communities¹¹. Additionally, landscaping with exotic species is often the vector for introducing invasive exotics into adjacent habitats. Invasive landscape species displace native vegetation, degrade functioning ecosystems, provide little or no habitat for native animals, and increase fire danger and carrying capacity¹². All of these factors for wildland weeds are present in the project, and their affect must be evaluated in the EIS/SAs.

Wildlife Movement

A thorough and independent evaluation of the projects' impacts on wildlife movement is essential. The EIS/SAs must evaluate all direct, indirect, and cumulative impacts to wildlife movement corridors. The analysis should cover movement of large mammals, as well as other taxonomic groups, including small mammals, birds, reptiles, amphibians, invertebrates, and vegetation communities. The EIS/SAs should first evaluate habitat suitability within the analysis window for multiple species, including all listed and sensitive species. The habitat suitability maps generated for each species should then be used to evaluate the size of suitable habitat patches in relation to the species average territory size to determine whether the linkages provide both live-in and move-through habitat. The analyses should also evaluate if suitable habitat patches are within the dispersal distance of each species. The EIS/SAs should address both individual and intergenerational movement (i.e., will the linkages support metapopulations of smaller, less vagile species). The EIS/SAs should identify which species would potentially utilize the proposed wildlife movement corridors under baseline conditions and after build out, and for which species they would not. In addition, the EIS/SAs should consider how wildlife movement will be affected by other planned approved, planned, and proposed development in the region as part of the cumulative impacts.

The EIS/SAs should analyze whether any proposed wildlife movement corridors are wide enough to minimize edge effects and allow natural processes of disturbance and subsequent recruitment to function. The EIS/SAs should also evaluate whether the proposed wildlife movement corridors would provide key resources for species, such as host plants, pollinators, or other elements. For example, many species commonly found in riparian areas and washes depend on upland habitats during some portion of their cycle. Therefore, in areas with intermittent or perennial streams, upland habitat protection is needed for these species. Upland habitat protection is also necessary to prevent the degradation of aquatic habitat quality.

¹⁰ Brooks and Draper 2006

¹¹ Bossard et al 2000

¹² Brooks 2000

Cumulative Impacts

Because of the number of projects that are proposed in the projects' vicinity and the region, a thorough analysis of the cumulative impacts from all of these projects on the resources needs to be included.

Thank you for your consideration of these comments. Please add us to the distribution list for the EIS/SAs and all notices associated with these projects.

Sincerely,



Ilene Anderson
Biologist/Public Lands Desert Director
Center for Biological Diversity

References

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Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities

State of California
THE RESOURCES AGENCY
Department of Fish and Game
December 9, 1983
Revised May 8, 2000

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** field surveys should be conducted, and **what** information should be contained in the survey report. The Department may recommend that lead agencies not accept the results of surveys that are not conducted according to these guidelines.

1. Botanical surveys are conducted in order to determine the environmental effects of proposed projects on all rare, threatened, and endangered plants and plant communities. Rare, threatened, and endangered plants are not necessarily limited to those species which have been "listed" by state and federal agencies but should include any species that, based on all available data, can be shown to be rare, threatened, and/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.

Rare natural communities are those communities that are of highly limited distribution. These communities may or may not contain rare, threatened, or endangered species. The most current version of the California Natural Diversity Database's List of California Terrestrial Natural Communities may be used as a guide to the names and status of communities.

2. It is appropriate to conduct a botanical field survey to determine if, or to the extent that, rare, threatened, or endangered plants will be affected by a proposed project when:

- a. Natural vegetation occurs on the site, it is unknown if rare, threatened, or endangered plants or habitats occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
- b. Rare plants have historically been identified on the project site, but adequate information for impact assessment is lacking.

3. Botanical consultants should possess the following qualifications:

- a. Experience conducting floristic field surveys;
- b. Knowledge of plant taxonomy and plant community ecology;
- c. Familiarity with the plants of the area, including rare, threatened, and endangered species;
- d. Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
- e. Experience with analyzing impacts of development on native plant species and communities.

4. Field surveys should be conducted in a manner that will locate any rare, threatened, or endangered species that may be present. Specifically, rare, threatened, or endangered plant surveys should be:

- a. Conducted in the field at the proper time of year when rare, threatened, or endangered species are both evident and identifiable. Usually, this is when the plants are flowering.

When rare, threatened, or endangered 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 species are identifiable at the time of the survey.

b. Floristic in nature. A floristic survey requires that every plant observed be identified to the extent necessary to determine its rarity and listing status. In addition, a sufficient number of visits spaced throughout the growing season are necessary to accurately determine what plants exist on the site. In order to properly characterize the site and document the completeness of the survey, a complete list of plants observed on the site should be included in every botanical survey report.

c. Conducted in a manner that is consistent with conservation ethics. Collections (voucher specimens) of rare, threatened, or endangered species, or suspected rare, threatened, or endangered species should be made only when such actions would not jeopardize the continued existence of the population and in accordance with applicable state and federal permit requirements. A collecting permit from the Habitat Conservation Planning Branch of DFG is required for collection of state-listed plant species. Voucher specimens should be deposited at recognized public herbaria for future reference. Photography should be used to document plant identification and habitat whenever possible, but especially 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.

e. Well documented. When a rare, threatened, or endangered 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, should be completed and submitted to the Natural Diversity Database. Locations may be best documented using global positioning systems (GPS) and presented in map and digital forms as these tools become more accessible.

5. Reports of botanical field surveys should be included in or with environmental assessments, negative declarations and mitigated negative declarations, Timber Harvesting Plans (THPs), EIR's, and EIS's, and should contain the following information:

- a. Project description, including a detailed map of the project location and study area.
- b. A written description of biological setting referencing the community nomenclature used and a vegetation map.
- c. Detailed description of survey methodology.
- d. Dates of field surveys and total person-hours spent on field surveys.
- e. Results of field survey including detailed maps and specific location data for each plant population found. Investigators are encouraged to provide GPS data and maps documenting population boundaries.
- f. An assessment of potential impacts. This should include a map showing the distribution of plants in relation to proposed activities.
- g. Discussion of the significance of rare, threatened, or endangered plant populations in the project area considering nearby populations and total species distribution.
- h. Recommended measures to avoid impacts.
- i. A list of all plants observed on the project area. Plants should be identified to the taxonomic level necessary to determine whether or not they are rare, threatened or endangered.
- j. Description of reference site(s) visited and phenological development of rare, threatened, or endangered plant(s).
- k. Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms.
- l. Name of field investigator(s).
- m. References cited, persons contacted, herbaria visited, and the location of voucher specimens.

For Office Use Only

Source Code _____ Quad Code _____

Elm Code _____ Occ. No. _____

EO Index No. _____ Map Index No. _____

Date of Field Work (mm/dd/yyyy): _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: _____

Common Name: _____

Species Found? ☐ Yes ☐ No

If not, why?

Total No. Individuals _____

Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? ☐ no ☐ unk.

Yes, Occ. # _____

Collection? If yes: _____

Number _____

Museum / Herbarium _____

Reporter: _____

Address: _____

E-mail Address: _____

Phone: _____

Plant Information

Phenology: _____%

vegetative

_____%

flowering

_____%

fruiting

Animal Information

adults

☐

breeding

juveniles

☐

wintering

larvae

☐

burrow site

egg masses

☐

rookery

unknown

☐

other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: _____ Landowner / Mgr.: _____

Quad Name: _____ Elevation: _____

T _____ R _____ Sec _____, _____ ¼ of _____ ¼, Meridian: H ☐ M ☐ S ☐

Source of Coordinates (GPS, topo. map & type): _____

T _____ R _____ Sec _____, _____ ¼ of _____ ¼, Meridian: H ☐ M ☐ S ☐

GPS Make & Model _____

DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐

Horizontal Accuracy _____ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ OR Geographic (Latitude & Longitude) ☐

Coordinates: _____

Habitat Description (plant communities, dominants, associates, substrates/soils, aspects/slope):

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats:

Comments:

Determination: (check one or more, and fill in blanks)

☐ Keyed (cite reference): _____

☐ Compared with specimen housed at: _____

☐ Compared with photo / drawing in: _____

☐ By another person (name): _____

☐ Other: _____

Photographs: (check one or more) Slide Print Digital

Plant / animal ☐ ☐ ☐

Habitat ☐ ☐ ☐

Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes ☐ no ☐



General Instructions for Filling Out California Natural Diversity Database Field Survey Forms

The California Natural Diversity Database (CNDDDB) is the largest, most comprehensive database of its type in the world. It presently contains almost 40,000 site specific records on California's rarest plants, animals, and natural communities. The majority of the data collection effort for this has been provided by an exceptional assemblage of biologists throughout the state and the west. The backbone of this effort is the field survey form.

Although the future lies in the digitally submissible field form and map, this system is not yet in place. Enclosed are copies of CNDDDB paper field survey forms for species and natural communities. The CNDDDB would appreciate your field observations on rare, threatened, endangered, or sensitive species and natural communities (elements) submitted to us on these forms.

To determine what species and natural communities are of concern to us, refer to our free publications for lists of which elements these include: *Special Vascular Plants, Bryophytes, and Lichens List*, *Special Animals List*, and *Natural Communities List*. Reports on multiple visits to sites that already exist in the CNDDDB are as important as new site information as is it helps us track trends in population/stand size and condition. Naturally, new site information is also welcomed.

Enclosed is an example of a field survey form that includes the information we like to see. Note that you may either submit a copied portion of a USGS topographic quad map with the population/stand outlined or marked (see back of enclosed example), or provide a set of coordinates (GPS coordinates, TRS information, or other). You do not have to submit all of this information; just one will suffice, and generally the best choice is to submit a map. Furthermore, you do not have to fill out every box on the form; just fill out what seems relevant to your site visit. Remember that your name and telephone number and/or email are very important in case we have any questions about the form.

If you are concerned about the sensitivity of the site, remember that the CNDDDB can label your element occurrence "Sensitive" in the database, thus restricting access to that information.

The CNDDDB is only as good as the information in it, and we depend on people like you as the source of that information. Thank you for your help in improving the CNDDDB.

Please see also, **Instructions for Collecting Information with Global Positioning Systems for the California Natural Diversity Database.**

Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Date of Field Work: 8 - 10 - 2000

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Lupinus padre-crowleyi*

Common Name: Father Crowley's lupine

Species Found? ☒ Yes ☐ No If not, why? _____
Total No. Individuals *10 Subsequent Visit? ☐ yes ☒ no
Is this an existing NDDDB occurrence? 8 ☐ no ☐ unk.
Yes, Occ. # _____
Collection? If yes: _____
Number _____ Museum / Herbarium _____

Reporter: Your Name Here
Address: Your Organization and Address Here
Your Town, State Zipcode Here
E-mail Address: youremail@here
Phone: (000) 000-0000

Plant Information

Phenology: _____ % vegetative 100 % flowering _____ % fruiting

Animal Information

adults # juveniles # larvae # egg masses # unknown
☐ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

Along Shepherd Pass trail, between the first and second saddles above the main switchbacks from Symmes Creek to the top of the ridge, as the trail levels out and begins to drop down towards Shepherd Creek drainage. **See Comments, below.

County: Inyo Landowner / Mgr.: USDA, Inyo National Forest
Quad Name: Mount Williamson, CA Elevation: 9081 ft.
T 14S R 34E Sec 20, NW 1/4 of NE 1/4, Meridian: H ☐ M ☒ S ☐ Source of Coordinates (GPS, topo. map & type): GPS
T _____ R _____ Sec _____, 1/4 of _____, Meridian: H ☐ M ☐ S ☐ GPS Make & Model Garmin 12
Datum: NAD27 ☒ NAD83 ☐ WGS84 ☐ Horizontal Accuracy 3-5 meters _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☒ OR Geographic (Latitude & Longitude) ☐
Coordinates: Easting/Longitude E383883.83 Northing/Latitude N4063216.65

Habitat Description (plant communities, dominants, associates, substrates/soils, aspects/slope):

Moderately steep, east facing slope; sandy granitic soil; sagebrush scrub: *Artemisia tridentata*, *Eriogonum umbellatum*, *Arctostaphylos patula*, *Symphoricarpos* sp., *Angelica lineariloba*

Other rare species? None seen.

Site Information Overall site quality: ☒ Excellent ☐ Good ☐ Fair ☐ Poor

Current / surrounding land use: Wilderness; hiker trail passes adjacent to population

Visible disturbances: Trail work could potentially impact population; however, Inyo NF standards call for surveys prior to any ground disturbing activities.

Threats:

Comments: *Population was located late in the day; no count was conducted, but <10 plants were visible from the trail, Further survey work needed.

**Going up the trail towards the pass, the plants are located above the trail, just before the 2 big Jeffrey pines below the trail

Determination: (check one or more, and fill in blanks)

- ☐ Keyed (cite reference): _____
☒ Compared with specimen housed at: UC herbarium
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: (check one or more)

	Slide	Print	Digital
Plant / animal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Diagnostic feature	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

May we obtain duplicates at our expense?

☒ yes ☐ no

Sample map
submitted with
CNDDDB Field
Survey Form

A topographic map of the study area. The map features contour lines indicating elevation. A creek, labeled 'Creek 26', flows from the upper left towards the center. The map is divided into sections by a vertical line. Place names are visible: 'WILDERNESS' at the top, 'ONAL' on the left, and 'FORE' on the right. A small rectangular area is highlighted in the upper left corner, corresponding to the location of the study area.

U L O G I C A 2500 A R E A

8/10/2008
K. Nelson

Wm. W. Williams

14



Instructions for Collecting Information with Global Positioning Systems for the California Natural Diversity Database

Data collected with Global Positioning Systems (GPS) are welcomed, but, cannot be used in our Geographic Information System (GIS) unless the **datum** and **coordinate system** are reported on the Field Survey form.

CNDDDB Preferred Settings

- Coordinate System: UTM (Universal Transverse Mercator) Projection; or if Geographic, Decimal Degrees
- Datum: NAD83 (North American Datum 1983)

Definitions

Datum - defines the origin and orientation of the latitude and longitude lines. Common examples for North America are: NAD27, NAD83 and WGS84

Coordinate system - measurements that describe a position on the surface of the earth. Some examples are: *Universal Transverse Mercator (UTM) Zone, Easting and Northing*

Written Format: UTM Zone 10; 644886E, 4301511N

and *Geographic* - also referred to as Latitude and Longitude

Decimal Degrees (DDD.DDDDD°)

Written Format: Latitude: 32.30642; Longitude: -122.61458

Recording GPS Information on the CNDDDB California Native Species Field Survey Form

Horizontal Accuracy: This will be displayed on your GPS unit and is dependant on the number of satellite signals your unit is detecting.

- Example: 15 meters

GPS Make and Model

- Example: Garmin 12XL

Things to remember

- Record the datum and coordinates on the Field Observation Form.
- Try to obtain a GPS reading from satellites with as evenly distributed placement as possible (see your user manual).
- Acquire 3-Dimensional GPS location, if possible (4+ satellites).
- Receiving four signals in a canyon or under tree canopy may be difficult.
- Record location even if you are unable to acquire four (4) satellites.

References

Indiana Geographic Information Council, Standards and Recommendations. 2001. Projections, Datum, Coordinate Systems, and Units of Measure Standard. <http://www.in.gov/ingisi/metadata/index.html>

Kelly, Maggi. 2002. California Oak Mortality Task Force Sudden Oak Death Monitoring Committee.

http://www.cnr.berkeley.edu/comtf/html/monitoring_committee.html

California Native Plant Society Vegetation Committee 2002. California Native Plant Society Relevé Protocol.

<http://www.cnps.org/archives/forms/releve.pdf>

Carnes, John. 2002. Map Tools. <http://www.maptools.com/>

CNPS Botanical Survey Guidelines

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 criteria³, 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;

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).

- 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:

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.

- 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.

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

California Native Plant Society

COLLECTING GUIDELINES AND DOCUMENTATION TECHNIQUES - CNPS POLICY

Adopted 4 March 1995

Problem Statement: *Little or no botanical data are being gathered or supported by voucher collections on California's flora while more and more of California's botanical heritage is being lost to urban and agricultural development*

Policy

The California Native Plant Society recommends that voucher specimens be collected and stored appropriately to document floristic data included in environmental review projects and scientific studies, and that scientific documentation methods and needs should be included in academic curricula, as outlined in the following 14 recommendations.

Recommendation 1: Environmental review projects (e.g., environmental impact reports [EIRs] and statements [EISs], environmental assessments [EAs], initial studies and negative declarations, natural environmental studies) that are conducted in the State of California and that include botanical field observations should also include voucher specimens, and/or photographic documentation consistent with existing standards, deposited in one or more herbaria listed in *Index Herbariorum*, Ed. 8 (Holmgren et al. 1990) or subsequent editions.

Recommendation 2: The thoroughness of documentation for a particular project should be commensurate to the importance of the study, but in any case should include collection of voucher specimens for target species studies and noteworthy botanical observations (e.g., range extensions; state and county records; rediscoveries).

Recommendation 3: Clients (e.g., private or public permit applicants) for whom environmental studies are conducted should be held financially responsible for the collection, identification, and curation of botanical vouchers; otherwise, there is little chance that documentation will improve.

Recommendation 4: Collection of botanical vouchers and the deposition of them in formal herbaria should be a requirement of the CEQA and NEPA processes. CNPS recommends that the responsible agencies and legislative bodies undertake a review of state and federal legislation and make appropriate amendments that will result in the collection and preparation of botanical vouchers becoming a formal part of the environmental review process.

Recommendation 5: Preparation of botanical voucher specimens should be encouraged as an important part of the scientific process. Institutions and departments that support herbaria should develop policies regarding the deposition of vouchers by students, staff, and faculty. Support for herbaria should come not only from the host institution or department, but also from the users who deposit specimens. Agencies or corporations that fund research should be made aware of the importance of voucher specimens and should request that the preparation and curation of vouchers be included as a regular part of proposals and budgets.

Recommendation 6: Academic institutions should include in their curricula opportunities to expose students to the importance of scientific documentation and the need to prepare and preserve botanical and other biological voucher specimens. There is an urgent need to educate students in the importance and functions of systematics collections, whether these students anticipate a future in academic or applied science or want to be well-rounded citizens with understanding of experimental processes or California's natural resources.

Recommendation 7: Herbarium specimen collectors and label preparers should take every opportunity to include a wide range of hierarchical geographic and habitat data on specimen labels, consistent with





COLLECTING GUIDELINES AND DOCUMENTATION TECHNIQUES - CNPS POLICY PAGE 2

existing standards, that will increase the usefulness of specimens and will make access to the information possible through computerization of label data.

Recommendation 8: One category of hierarchical data associated with herbarium specimens should be that which (1) identifies the project for which the specimen serves as a voucher, (2) lists the client, agency, and/or institution associated with the project, and (3) names the report in which the specimen is cited.

Recommendation 9: Investigate the feasibility of integrating voucher specimen label data with computerization efforts such as the Specimen Management System for California Herbaria (SMASCH) to provide mechanisms for biogeographical and floristic studies.

Recommendation 10: CNPS recommends that the Association of California Herbaria (ACH) should take an active role in organizing support for and preservation of California's herbaria.

Recommendation 11: The Association of California Herbaria, CNPS, and CBS should coordinate their activities toward (1) preservation of California's botanical heritage; (2) long-term support for California's botanical education and documentation centers; and (3) improved documentation of California's botanical resources through implementation of statewide policies regarding the collection, preparation, and curation of voucher specimens for academic and applied environmental and experimental botanical studies.

Recommendation 12: Local, state, and federal agencies should strengthen and expand (1) their requirements for documentation of environmental reports, particularly the requirement for voucher specimens; and (2) their relationship with academic institutions and organizations (e.g., ACH, CNPS, CBS) to assist with the professional documentation of environmental work and with the education of future agency staff and consultants; and (3) their support for herbaria that house voucher specimens, which document the botanical resources of public lands and which document the disclosures in reports required by the CEQA and NEPA processes.

Recommendation 13: Regulatory agencies and other responsible parties should consider developing a formal inter-relationship between (1) agencies or their consultants and (2) academic institutions or museums, whereby the institutions would provide for free the botanical documentation portion of environmental reviews. Such an arrangement would reduce or eliminate any burden public agencies or private corporations might anticipate collecting and curating botanical voucher specimens, while insuring the collection and preservation of important specimens.

Recommendation 14: The academic institutions of California with botany programs and herbaria should continue and expand support for those programs and herbaria. The documentation and preservation of California's botanical heritage and the future of botanical research depend upon the education of scientists, resource managers, planners, and consultants who have strong backgrounds in professional botanical training.

Background

At the workshop entitled "The Future of California Floristics and Systematics: Collecting Guidelines and Documentation Techniques" at the Jepson Symposium convened on 4 June 1994, 14 findings and recommendations were approved by the workshop participants (51 in attendance) covering four major areas of concern: (1) documentation of environmental analyses with herbarium voucher specimens, (2) documentation of experimental research with herbarium voucher specimens; (3) presentation of hierarchical data on specimen labels; and (4) what will the future hold for documentation of California's botanical heritage?



COLLECTING GUIDELINES AND DOCUMENTATION TECHNIQUES - CNPS POLICY PAGE 3

To remedy this lack of data collection and providing substantive supporting evidence, the California Native Plant Society (CNPS) Board of Directors adopts the recommendations of the workshop. CNPS actively encourages that data collection methods be improved as recommended in order to protect California's botanical heritage. The full text of the workshop proceedings is published by the California Botanical Society (CBS) in *Madrono* 42(2).

California Native Plant Society
1722 J Street, Suite 17
Sacramento, CA 95814
(916) 447-2677