

P.O. Box 944246
SACRAMENTO, CA 94244-2460
(916) 653-8007
(916) 653-0989 FAX
[BOF Website \(www.bof.fire.ca.gov\)](http://www.bof.fire.ca.gov)



Draft Problem Statement on Botanical Resources Assessment in Timber Harvest Documents

Board staff have developed the following draft problem statements based upon the comments received both in writing and verbally at the July and August Joint Committee meetings. The commentary relied upon is summarized in Appendix A of this document. Appendix B contains the existing guidance documents relied upon during consideration of this item. For more detailed background information on any of the topics discussed below, please review the Botanical Resources Staff Report (available in the August, 2020 meeting materials for the Joint Committee Workshop).

The problems are that:

- 1) The scoping process for botanical resources in preparation of Plans, the minimum information required within the Plan, and what protection measures are appropriate in a given situation are unclear and can lead to delays in Plan review.
 - a. The contents of current guidance in the Shintaku memo and the two guidance documents by CDFW (2005, 2018) should be reviewed for accuracy, applicability, and to determine whether guidance is sufficiently clear for stakeholders and Review Teams.
 - b. The application of 14 CCR § 15380 to plant species in scoping requirements is unclear.
 - c. Which documents, lists, or other sources are appropriate for the scoping process should be more clear.
 - d. Sensitive Natural Communities and Global Rankings are at times requested to be included within scoping and survey efforts, which may not be appropriate for the preparation of a Plan.
- 2) Findings associated with survey efforts, both positive and negative detections of occurrences, are not consistently submitted to CNDDDB. These data are valuable as it relates to review of listing status or ranking.
- 3) Cost thresholds are potentially a barrier to forest management activities for small landowners, particularly the costs of scoping and surveying, the cost of access to scoping tools such as CNDDDB and BIOS, and the 5-year requirement for additional surveying on NTMPs.
- 4) Monitoring is needed to assist in determining the effectiveness of protection and conservation of botanical resources during and after forest management activities. ** While this item does not reside well within this discussion as it does not relate directly to the Forest Practice Rules or a Rule change, it is considered important by the Committee Members and can potentially be discussed in the

future as part of the Research Plan under development by Board Staff or within the scope of the Effectiveness Monitoring Committee.

- 5) There currently no minimum qualifications as they relate to the persons able to perform scoping, habitat assessment and surveys for botanical resources during Plan preparation and implementation.

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APPENDIX A: Commentary Relied Upon in Problem Statement Development

August Joint Committee Meeting

- Hopes to achieve consistency in expectations for plan submitters and reviewers while protecting botanical resources. This will include addressing expectations for scoping, who is qualified to perform surveys, the timing and extent of surveys, and the timeframe for the submittal of survey results.
- We need to leave the door open for a variety of ways to conduct botanical surveys to develop innovative processes amongst industry and private landowners and not lock them into one type of survey protocol. This issue may be a good candidate for a Technical Rule Addendum. The rules should be the basis for the minimum information necessary for the review team to make a decision. Private landowners have done a good job of surveying their properties and have engaged with botanists. There is some confusion about the process and what's expected and what guiding statutes and regulations need to be enforced when CAL FIRE conducts inspections.
- Consistency between the three review team offices and ensuring that all regions of the State are treated the same is the highest concern. There is interest in the differences between how smaller landowners are treated vs. larger industrial owners. This may be a good opportunity to revise Technical Rule Addendum #2 to add additional clarity on this matter.
- It would be beneficial for CDFW to better frame what the problem is.
- Don't discount the route of formal regulations too early; regulatory uncertainty is an important issue here and resolving that issue will yield a faster plan review process. The CNPS CRPR list is not a central issue, it is simply a scientific list that helps inform decisions by CDFW. It would be helpful for CNPS to come talk about their ranking process to the Joint Committee.
- An outline of where there's documented adverse environmental effects requiring mitigation on timberlands related to botanical resources would be helpful. A more rigid, formalized, and public process for the CNPS rankings would be better so that anyone looking at a ranking can determine what evidence supported the decisions for the ranking. The Board should carefully consider whether the CNPS process as a third party process warrants being elevated to regulation.
- CDFW is asking for a 5-year review of botanical resource survey data and additional surveys for NTMPs which is potentially overly burdensome for small landowners as the THP process is for 7 years.

July Joint Committee Meeting

- There are historical differences in how botanical resources are handled in the interior vs. on the coast including additional restrictions and data requests on the coast. Sometimes these requirements are close to becoming underground regulations. Additionally, a CNPS identification of a plant as "rare" is not the same as identification under CESA and ESA and the protections are different, but the two often get conflated during the Plan process, particularly on the coast. Long-time botanists and their products are sometimes being questioned on the coast. The overall goal is consistency between the regions and policy that is science-based.
- The current requirements for small landowners may be excessive and in opposition to increasing the pace and scale of fuel treatments. The frequency of surveys for

small landowners is important because they may only be harvesting once every 15-20 years, but are required to conduct surveys much more frequently to satisfy the guidelines.

- The use of the CNPS ranking process without a public state process is problematic.
- Being able to plan and predict what is going to be expected of foresters is important.
- Scoping for botanical resources should be a repeatable process. However, requests for additional information outside the scope of available guidance have been made on several Plans. CEQA Guidelines section 15380 forms the basis for the determination of what constitutes a “sensitive” plant species. Specifically, 15380(d) states that species that “can be shown to meet the criteria in subdivision (b)” shall be considered to be rare, threatened, or endangered. There is a lack of transparency in the process that DFW uses to determine that a plant species can be shown to meet the criteria. Rather, DFW appears to rely on designations by the California Native Plant Society (CNPS) to fulfill the requirements of subsection (d). Our concern is that DFW relies on CNPS to implement subsection (d) —which effectively means that forest landowners become regulated by a process which does not have public input both at the initial sensitive determination stage as well as potential determinations that plants are no longer sensitive.
- Plant surveys should focus on unique habitats with less focus on the broader landscape so resources are more available to conserve habitats.
- There should be acknowledgement that some habitats such as wet areas, watercourse and lake protection zones, and rock outcrops are inherently protected and surveys for plants that rely on these habitats are generally not necessary unless disturbance activities beyond tree falling and removal are proposed in these habitats.
- It would be worthwhile for the BOF to look at the interactions between CEQA and the Native Plant Protection Act.
- Any BOF actions should be based on the reality that timber harvest poses a relatively de minimus impact to botanical resources especially relative to other land uses such as development.
- It would be worthwhile to explore ways to use previous botanical surveys in current harvest proposals. For example, surveys for species which have general habitat requirements such as mixed conifer forest could be determined to not be necessary if the species has been surveyed for in the vicinity with negative results.
- Any BOF action with regard to ministerial permits should be based on evidence showing actual significant adverse impacts associated with such permits rather than speculation that the permits are resulting in impacts.

APPENDIX B: Guidance Documents Relied Upon in Problem Statement Development

- 1) CAL Fire Botanical Resources Memo, 2009
- 2) CDFW Botanical Resource Guidelines for Timber Harvest, 2005
- 3) CDFW Protocols for Surveying and Evaluating Impacts to special Status Native Plant Populations and Sensitive Natural Communities, 2018

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although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by CESA (Fish & G. Code, § 2067). “Candidate species” means a native species or subspecies of plant that the California Fish and Game Commission has formally noticed as being under review by CDFW for addition to either the list of endangered species or the list of threatened species, or a species for which the California Fish and Game Commission has published a notice of proposed regulation to add the species to either list (Fish & G. Code, § 2068).

- Listed as rare under the California Native Plant Protection Act (Fish & G. Code, § 1900 et seq.). 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 (Fish & G. Code, § 1901).
- Meet the definition of rare or endangered under CEQA Guidelines section 15380, subdivisions (b) and (d), including:
 - Plants considered by CDFW to be “rare, threatened or endangered in California.” This includes plants tracked by the California Natural Diversity Database (CNDDDB) and the California Native Plant Society (CNPS) as California Rare Plant Rank (CRPR) 1 or 2⁵;
 - Plants that may warrant consideration on the basis of declining trends, recent taxonomic information, or other factors. This may include plants tracked by the CNDDDB and CNPS as CRPR 3 or 4⁶.
- Considered locally significant plants, that is, plants that are not rare from a statewide perspective but are rare or uncommon in a local context such as within a county or region (CEQA Guidelines, § 15125, subd. (c)), or as designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include plants that are at the outer limits of their known geographic range or plants occurring on an atypical soil type.

Sensitive natural communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. These communities may or may not contain special status plants or their

⁵ See CNDDDB’s Special Vascular Plants, Bryophytes, and Lichens List for plant taxa with a CRPR of 1 or 2: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383&inline>

⁶ CRPR 3 plants (plants about which more information is needed) and CRPR 4 plants (plants of limited distribution) may warrant consideration under CEQA Guidelines section 15380. Impacts to CRPR 3 plants may warrant consideration under CEQA if sufficient information is available to assess potential impacts to such plants. Impacts to CRPR 4 plants may warrant consideration under CEQA if cumulative impacts to such plants are significant enough to affect their overall rarity. Data on CRPR 3 and 4 plants should be submitted to CNDDDB. Such data aids in determining and revising the CRPR of plants. See CNDDDB’s Special Vascular Plants, Bryophytes, and Lichens List for plant taxa with a CRPR of 3 or 4: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383&inline>

habitat. CDFW's *List of California Terrestrial Natural Communities*⁷ is based on the best available information, and indicates which natural communities are considered sensitive at the current stage of the California vegetation classification effort. See the Vegetation Classification and Mapping Program (VegCAMP) website for additional information on natural communities and vegetation classification⁸.

2. BOTANICAL FIELD SURVEYS

Evaluate the need for botanical field surveys prior to the commencement of any activities that may modify vegetation, such as clearing, mowing, or ground-breaking activities. It is appropriate to conduct a botanical field survey when:

- Natural (or naturalized) vegetation occurs in an area that may be directly or indirectly affected by a project (project area), and it is unknown whether or not special status plants or sensitive natural communities occur in the project area;
- Special status plants or sensitive natural communities have historically been identified in a project area; or
- Special status plants or sensitive natural communities occur in areas with similar physical and biological properties as a project area.

Survey Objectives

Conduct botanical field surveys in a manner which maximizes the likelihood of locating special status plants and sensitive natural communities that may be present. Botanical field surveys should be floristic in nature, meaning that every plant taxon that occurs in the project area is identified to the taxonomic level necessary to determine rarity and listing status. "Focused surveys" that are limited to habitats known to support special status plants or that are restricted to lists of likely potential special status plants are not considered floristic in nature and are not adequate to identify all plants in a project area to the level necessary to determine if they are special status plants.

For each botanical field survey conducted, include a list of all plants and natural communities detected in the project area. More than one field visit is usually necessary to adequately capture the floristic diversity of a project area. An indication of the prevalence (estimated total numbers, percent cover, density, etc.) of the special status plants and sensitive natural communities in the project area is also useful to assess the significance of a particular plant population or natural community.

Survey Preparation

Before botanical field surveys are conducted, the botanical field surveyors should compile relevant botanical information in the general project area to provide a regional

⁷ Available at: <https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities#natural%20communities%20lists>

⁸ Available at: <https://www.wildlife.ca.gov/Data/VegCAMP>

context. Consult the CNDDDB⁹ and BIOS¹⁰ for known occurrences of special status plants and sensitive natural communities in the project area prior to botanical field surveys. Generally, identify vegetation and habitat types potentially occurring in the project area based on biological and physical properties (e.g. soils) of the project area and surrounding ecoregion¹¹. Then, develop a list of special status plants and sensitive natural communities with the potential to occur within the vegetation and habitat types identified. The list of special status plants with the potential to occur in the project area can be created with the help of the CNDDDB QuickView Tool¹² which allows the user to generate lists of CNDDDB-tracked elements that occur within a particular U.S. Geological Survey 7.5' topographic quad, surrounding quads, and counties within California. Resulting lists should only be used as a tool to facilitate the use of reference sites, with the understanding that special status plants and sensitive natural communities in a project area may not be limited to those on the list. Botanical field surveys and subsequent reporting should be comprehensive and floristic in nature and not restricted to or focused only on a list. Include in the botanical survey report the list of potential special status plants and sensitive natural communities that was created, and the list of references used to compile the background botanical information for the project area.

Survey Extent

Botanical field surveys should be comprehensive over the entire project area, including areas that will be directly or indirectly impacted by the project. Adjoining properties should also be surveyed where direct or indirect project effects could occur, such as those from fuel modification, herbicide application, invasive species, and altered hydrology. Surveys restricted to known locations of special status plants may not identify all special status plants and sensitive natural communities present, and therefore do not provide a sufficient level of information to determine potential impacts.

Field Survey Method

Conduct botanical field surveys using systematic field techniques in all habitats of the project area to ensure thorough coverage. The level of effort required per given area and habitat is dependent upon the vegetation and its overall diversity and structural complexity, which determines the distance at which plants can be identified. Conduct botanical field surveys by traversing the entire project area to ensure thorough coverage, documenting all plant taxa observed. Parallel survey transects may be necessary to ensure thorough survey coverage in some habitats. The level of effort should be sufficient to provide comprehensive reporting. Additional time should be allocated for plant identification in the field.

⁹ Available at: <https://www.wildlife.ca.gov/Data/CNDDDB>

¹⁰ Available at: <https://www.wildlife.ca.gov/Data/BIOS>

¹¹ Ecological Subregions of the United States, available at: <http://www.fs.fed.us/land/pubs/ecoregions/toc.html>

¹² Available at: <https://www.wildlife.ca.gov/Data/CNDDDB/Maps-and-Data>. When creating a list of special status plants with the potential to occur in a project area, special care should be taken to search all quads with similar geology, habitats, and vegetation to those found in the project area.

Timing and Number of Visits

Conduct botanical field surveys in the field at the times of year when plants will be both evident and identifiable. Usually this is during flowering or fruiting. Space botanical field survey visits throughout the growing season to accurately determine what plants exist in the project area. This usually involves multiple visits to the project area (e.g. in early, mid, and late-season) to capture the floristic diversity at a level necessary to determine if special status plants are present¹³. The timing and number of visits necessary to determine if special status plants are present is determined by geographic location, the natural communities present, and the weather patterns of the year(s) in which botanical field surveys are conducted.

Reference Sites

When special status plants are known to occur in the type(s) of habitat present in a project area, observe reference sites (nearby accessible occurrences of the plants) to determine whether those special status plants are identifiable at the times of year the botanical field surveys take place and to obtain a visual image of the special status plants, associated habitat, and associated natural communities.

Use of Existing Surveys

For some project areas, floristic inventories or botanical survey reports may already exist. Additional botanical field surveys may be necessary for one or more of the following reasons:

- Botanical field surveys are not current¹⁴;
- Botanical field surveys were conducted in natural systems that commonly experience year to year fluctuations such as periods of drought or flooding (e.g. vernal pool habitats or riverine systems);
- Botanical field surveys did not cover the entire project area;
- Botanical field surveys did not occur at the appropriate times of year;
- Botanical field surveys were not conducted for a sufficient number of years to detect plants that are not evident and identifiable every year (e.g. geophytes, annuals and some short-lived plants);

¹³ U.S. Fish and Wildlife Service Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants available at: <https://www.fws.gov/sacramento/es/Survey-Protocols-Guidelines/>

¹⁴ Habitats, such as grasslands or desert plant communities that have annual and short-lived perennial plants as major floristic components may require yearly surveys to accurately document baseline conditions for purposes of impact assessment. In forested areas, however, surveys at intervals of five years may adequately represent current conditions. For forested areas, refer to “Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations”, available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=116396&inline>

- Botanical field surveys did not identify all plants in the project area to the taxonomic level necessary to determine rarity and listing status;
- Fire history, land use, or the physical or climatic conditions of the project area have changed since the last botanical field survey was conducted;
- Changes in vegetation or plant distribution have occurred since the last botanical field surveys were conducted, such as those related to habitat alteration, fluctuations in abundance, invasive species, seed bank dynamics, or other factors; or
- Recent taxonomic studies, status reviews or other scientific information has resulted in a revised understanding of the special status plants with potential to occur in the project area.

Negative Surveys

Adverse conditions from yearly weather patterns may prevent botanical field surveyor from determining the presence of, or accurately identifying, some special status plants in the project area. Disease, drought, predation, fire, herbivory or other disturbance may also preclude the presence or identification of special status plants in any given year. Discuss all adverse conditions in the botanical survey report¹⁵.

The failure to locate a known special status plant occurrence during one field season does not constitute evidence that the plant occurrence no longer exists at a location, particularly if adverse conditions are present. For example, botanical field surveys over a number of years may be necessary if the special status plant is an annual or short-lived plant having a persistent, long-lived seed bank and populations of the plant are known to not germinate every year. Visiting the project area in more than one year increases the likelihood of detecting special status plants, particularly if conditions change. To further substantiate negative findings for a known occurrence, a visit to a nearby reference site may help ensure that the timing of botanical field surveys was appropriate.

3. REPORTING AND DATA COLLECTION

Adequate information about special status plants and sensitive natural communities present in a project area will enable reviewing agencies and the public to effectively assess potential impacts to special status plants and sensitive natural communities and will guide the development of avoidance, minimization, and mitigation measures. The information necessary to assess impacts to special status plants and sensitive natural communities is described below. For comprehensive, systematic botanical field surveys where no special status plants or sensitive natural communities were found, reporting

and data collection responsibilities for botanical field surveyor remain as described

¹⁵ U.S. Fish and Wildlife Service Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants available at: <https://www.fws.gov/sacramento/es/Survey-Protocols-Guidelines/>

below, excluding specific occurrence information.

Special Status Plant and Sensitive Natural Community Observations

Record the following information for locations of each special status plant and sensitive natural community detected during a botanical field survey of a project area.

- The specific geographic locations where the special status plants and sensitive natural communities were found. Preferably this will be done by use of global positioning system (GPS) and include the datum¹⁶ in which the spatial data was collected and any uncertainty or error associated with the data. If GPS is not available, a detailed map (1:24,000 or larger) showing locations and boundaries of each special status plant population and sensitive natural community in relation to the project area is acceptable. Mark occurrences and boundaries as accurately as possible;
- The site-specific characteristics of occurrences, such as associated species, habitat and microhabitat, structure of vegetation, topographic features, soil type, texture, and soil parent material. If a special status plant is associated with a wetland, provide a description of the direction of flow and integrity of surface or subsurface hydrology and adjacent off-site hydrological influences as appropriate;
- The number of individuals in each special status plant population as counted (if population is small) or estimated (if population is large);
- If applicable, information about the percentage of each special status plant in each life stage such as seedling, vegetative, flowering and fruiting;
- The density of special status plants, identifying areas of relatively high, medium and low density of each special status plant in the project area; and
- Digital images of special status plants and sensitive natural communities in the project area, with diagnostic features.

Special Status Plant and Sensitive Natural Community Documentation

When a special status plant is located, data must be submitted to the CNDDDB. Data may be submitted in a variety of formats depending on the amount and type of data that is collected¹⁷. The most common way to submit data is the Online CNDDDB Field Survey Form¹⁸, or equivalent written report, accompanied by geographic locality information (GPS coordinates, GIS shapefiles, KML files, topographic map, etc.). Data submitted in digital form must include the datum¹⁹ in which it was collected.

If a sensitive natural community is found in a project area, document it with a Combined

¹⁶ NAD83, NAD27 or WGS84

¹⁷ See <https://www.wildlife.ca.gov/Data/CNDDDB/Submitting-Data> for information on acceptable data submission formats.

¹⁸ Available at: <https://www.wildlife.ca.gov/Data/CNDDDB/Submitting-Data>

¹⁹ NAD83, NAD27 or WGS84

Vegetation Rapid Assessment and Relevé Field Form²⁰ and submit the form to VegCAMP²¹.

Voucher Collection

Voucher specimens provide verifiable documentation of special status plant presence and identification and a scientific record. This information is vital to conservation efforts and valuable for scientific research. Collection of voucher specimens should be conducted in a manner that is consistent with conservation ethics, and in accordance with applicable state and federal permit requirements (e.g. scientific, educational, or management permits pursuant to Fish & G. Code, § 2081, subd. (a)). Voucher collections of special status plants (or possible special status plants) should only be made when such actions would not jeopardize the continued existence of the population. A plant voucher collecting permit²² is required from CDFW prior to the take or possession of a state-listed plant for voucher collection purposes, and the permittee must comply with all permit conditions.

Voucher specimens should be deposited in herbaria that are members of the Consortium of California Herbaria²³ no later than 120 days after the collections have been made. Digital imagery can be used to supplement plant identification and document habitat. Record all relevant collector names and permit numbers on specimen labels (if applicable).

Botanical Survey Reports

Botanical survey reports provide an important record of botanical field survey results and project area conditions. Botanical survey reports containing the following information should be prepared whenever botanical field surveys take place, and should also be submitted with project environmental documents:

Project and location description

- A description of the proposed project;
- A detailed map of the project area that identifies topographic and landscape features and includes a north arrow and bar scale;
- A vegetation map of the project area using Survey of California Vegetation Classification and Mapping Standards²⁴ at a thematic and spatial scale that allows the display of all sensitive natural communities;
- A soil map of the project area; and

²⁰ Available at: <https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities/Submit>

²¹ Combined Vegetation Rapid Assessment and Releve Field Forms can be emailed to VegCAMP staff. Contact information available at: <https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities/Other-Info>

²² Applications available at: <https://www.wildlife.ca.gov/Conservation/Plants/Permits>

²³ A list of Consortium of California Herbaria participants is available at: <http://ucjeps.berkeley.edu/consortium/participants.html>

²⁴ Available at: <https://www.wildlife.ca.gov/data/vegcamp/publications-and-protocols>

- A written description of the biological setting, including all natural communities; geological and hydrological characteristics; and land use or management history.

Detailed description of survey methodology and results

- Names and qualifications of botanical field surveyor(s);
- Dates of botanical field surveys (indicating the botanical field surveyor(s) that surveyed each area on each survey date), and total person-hours spent;
- A discussion of the survey preparation methodology;
- A list of special status plants and sensitive natural communities with potential to occur in the region;
- Description(s) of reference site(s), if visited, and the phenological development of special status plant(s) at those reference sites;
- A description and map of the area surveyed relative to the project area;
- A list of all plant taxa occurring in the project area, with all taxa identified to the taxonomic level necessary to determine whether or not they are a special status plant;
- Detailed data and maps for all special status plants and sensitive natural communities detected. Information specified above under the headings “Special Status Plant and Sensitive Natural Community Observations,” and “Special Status Plant and Sensitive Natural Community Documentation,” should be provided for the locations of each special status plant and sensitive natural community detected. Copies of all California Native Species Field Survey Forms and Combined Vegetation Rapid Assessment and Relevé Field Forms should be sent to the CNDDDB and VegCAMP, respectively, and included in the project environmental document as an Appendix²⁵;
- A discussion of the potential for a false negative botanical field survey;
- A discussion of how climatic conditions may have affected the botanical field survey results;
- A discussion of how the timing of botanical field surveys may affect the comprehensiveness of botanical field surveys;
- Any use of existing botanical field surveys and a discussion of their applicability to the project;
- The deposition locations of voucher specimens, if collected; and
- A list of references used, including persons contacted and herbaria visited.

²⁵ It is not necessary to submit entire environmental documents to the CNDDDB

Assessment of potential project impacts

- A discussion of the significance of special status plant populations in the project area considering nearby populations and total range and distribution;
- A discussion of the significance of sensitive natural communities in the project area considering nearby occurrences and natural community distribution;
- A discussion of project related direct, indirect, and cumulative impacts to special status plants and sensitive natural communities;
- A discussion of the degree and immediacy of all threats to special status plants and sensitive natural communities, including those from invasive species;
- A discussion of the degree of impact, if any, of the project on unoccupied, potential habitat for special status plants; and
- Recommended measures to avoid, minimize, or mitigate impacts to special status plants and sensitive natural communities.

4. BOTANICAL FIELD SURVEYOR QUALIFICATIONS

Botanical field surveyors should possess the following qualifications:

- Knowledge of plant taxonomy and natural community ecology;
- Familiarity with plants of the region, including special status plants;
- Familiarity with natural communities of the region, including sensitive natural communities;
- Experience with the CNDDDB, BIOS, and Survey of California Vegetation Classification and Mapping Standards;
- Experience conducting floristic botanical field surveys as described in this document, or experience conducting such botanical field surveys under the direction of an experienced botanical field surveyor;
- Familiarity with federal, state, and local statutes and regulations related to plants and plant collecting; and
- Experience analyzing the impacts of projects on native plant species and sensitive natural communities.

5. SUGGESTED REFERENCES

Bonham, C.D. 1988. Measurements for terrestrial vegetation. John Wiley and Sons, Inc., New York, NY.

California Native Plant Society, Rare Plant Program. Most recent version. Inventory of rare and endangered plants (online edition). California Native Plant Society. Sacramento, CA. Available at: <http://www.rareplants.cnps.org/>.

- California Native Plant Society. Most recent version. A manual of California vegetation. California Native Plant Society. Sacramento, CA. Available at: <http://www.cnps.org/cnps/vegetation/manual.php>.
- California Department of Fish and Wildlife, California Natural Diversity Database. Most recent version. Special vascular plants, bryophytes and lichens list. Updated quarterly. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383&inline>.
- Elzinga, C.L., D.W. Salzer, and J. Willoughby. 1998. Measuring and monitoring plant populations. BLM Technical Reference 1730-1. U.S. Dept. of the Interior, Bureau of Land Management. Denver, Colorado. Available at: <https://www.blm.gov/nstc/library/pdf/MeasAndMon.pdf>.
- Jepson Flora Project (eds.) Most recent version. Jepson eFlora. Available at: <http://ucjeps.berkeley.edu/eflora/>.
- Leppig, G. and J.W. White. 2006. Conservation of peripheral plant populations in California. *Madroño*. 53:264-274.
- Mueller-Dombois, D. and H. Ellenberg. 1974. Aims and methods of vegetation ecology. John Wiley and Sons, Inc. New York, NY.
- U.S. Fish and Wildlife Service. 1996. Guidelines for conducting and reporting botanical inventories for federally listed plants on the Santa Rosa Plain. Sacramento, CA.
- U.S. Fish and Wildlife Service. 1996. Guidelines for conducting and reporting botanical inventories for federally listed, proposed and candidate plants. Sacramento, CA.
- Van der Maarel, E. 2005. *Vegetation Ecology*. Blackwell Science Ltd. Malden, MA.

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