

Inventory & Monitoring Protocols – Plant Communities
 One time use of any of these levels is inventory, monitoring requires multi-time use.

Survey Level	Questions	Methods	Products
Preliminary (office-oriented)	<ul style="list-style-type: none"> What plant communities are documented at the unit? 	<ul style="list-style-type: none"> Conduct literature and database searches (1, 4, 5) Consult with knowledgeable persons and agencies (4) Review any existing documents for the site (4) 	<ul style="list-style-type: none"> A list of plant communities that are known to occur at the unit from past site visits and studies.
Reconnaissance (field-oriented)	<ul style="list-style-type: none"> What are the plant communities that exist at the unit and what is their condition? Is the plant community new to, or absent from, the unit compared to previous years? 	<ul style="list-style-type: none"> Methods outlined in the Preliminary Level plus: Walk-through, drive-by, fly-over, and look at photos of the site List plant communities observed and their condition (2) Have experts verify communities in question Take general photos of the site (3) 	<ul style="list-style-type: none"> Completed annual inspection & questionnaire Rapid assessment of plant communities present and their condition
Baseline (field-oriented)	<ul style="list-style-type: none"> What is the species composition of the plant communities at the unit? Is there a change in species composition of the plant communities? 	<ul style="list-style-type: none"> Methods outlined in the Preliminary Level plus: Conduct site visits to all suitable habitat types during the appropriate blooming period for proper identification Take photos, make general observations of the site, note associated taxa. (3) Have experts verify the identification of taxa that are in question. Use the Sawyer-Keeler-Wolf plant communities classification system to identify plant communities at the unit. (2) Determine species composition by using the releve sampling method** (2, 5) Repeat the above periodically and compare results to previous years (Monitoring). 	<ul style="list-style-type: none"> Products of the Preliminary Level plus: Plant community descriptions and species composition lists for each plant community type. Detection of trends and changes
	<ul style="list-style-type: none"> Where are the plant communities located in the unit and in relation to each other (i.e., what is the spatial distribution pattern)? Is there a change in areal extent, total vegetation cover, density, patch size or shape, or % canopy cover of the plant communities compared to previous years? 	<ul style="list-style-type: none"> Methods outlined in the Preliminary Level plus: Visit the unit with aerial photographs and topographic maps. Establish photo stations. (3) Use digital imagery to digitize the plant community polygons or use GPS to map polygons in the field to create GIS maps. Use the ArcView or ArcInfo software to create maps. Repeat the above periodically and compare results to previous years (Monitoring). 	<ul style="list-style-type: none"> Products of the Preliminary Level plus: A GIS map with plant community site locations mapped as polygons Calculation of acreage of each plant community type using GIS. Photos of plant communities at the unit. Detection of changes and trends in spatial distribution patterns.

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Survey Level	Questions	Methods	Products
<p>Comprehensive (field-oriented)</p>	<ul style="list-style-type: none"> • What plant species associations exist within the various plant communities (Alliances) at the unit? • Is there a change in: species composition, stand composition, species richness, plant community structure, height or age class distributions, mortality or disease, dominant taxa, condition of the community, % cover, relative abundance, distribution of taxa, reproduction/recruitment, type or severity of impacts, timing of phenological changes of taxa within the community, number of snags, or duff and litter accumulation compared to previous years? 	<ul style="list-style-type: none"> • Methods outlined in the Preliminary Level plus: • Use releve sampling protocol to obtain data on species composition, stand composition, and/or species richness. (5) • Collect data along transects and in quadrats to determine community structure, height or age classes, mortality, disease, %cover, density. (4) • Use the Sawyer-Keeler-Wolf “Manual of California Vegetation” to determine what plant community association has been described. (2) • Use statistics to analyze transect and quadrat data. (4) • Classify vegetation associations using TWINSpan, CANOCO, or other multivariate statistical program. (1) • Repeat the above periodically and compare results to previous years (Monitoring). 	<ul style="list-style-type: none"> • Products of the Preliminary Level plus: • A list of plant communities at the Association*** (a subcategory of the Alliance Level) Level. • Detailed species composition lists for each plant association and each plant community. • Detect changes and trends. • Data on various components of the community.
<p>Intensive (field & laboratory-oriented)</p>	<ul style="list-style-type: none"> • Questions related to the ecology of the plant community type and relationships between organisms. • Is the ecology of the plant community type changing? 	<ul style="list-style-type: none"> • Methods will be dependent upon the nature of the question and the plant community type. Standard protocols, when available and applicable, should be employed. • Repeat the above periodically and compare results to previous years (Monitoring). 	<ul style="list-style-type: none"> • Detailed and intensive studies and reports on an attribute of interest with regard to a plant community type at the unit or specific interactions between components within the community. • Detect changes and trends.

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References:

- 1) Barry J. 2000. *Handbook for Vegetation Inventory Monitoring and Assessment of the California State Park System*. (unpublished report). Obtain from the California State Parks Headquarters IMAP team, Sacramento
- 2) Sawyer, John O. and Todd Keeler-Wolf. 1995. *A Manual of California Vegetation*. Published by the California Native Plant Society. 471pp. ISBN (softcover) 0-943460-26-2; ISBN (hardcover) 0-943460-25-5. Obtain a copy by ordering from the California Native Plant Society, 1722 J Street, Suite 17, Sacramento, CA 95814. Phone 916-447-2677. Or order on the California Native Plant Society Bookstore website at: www.CNPS.org/bookstore/sellers.htm
- 3) Magil, A.W. 1989. *Monitoring Environmental Change with Color Slides*. General Technical Report PSW-117. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Dept. of Agriculture. 55pp. To obtain contact: Pacific Southwest Forest and Range Experiment Station, P.O. Box 245, Berkeley, CA 94701 or online at the USDA Forest Service Pacific Southwest Research Station Publications website at: www.psw.fs.fed.us/techpub.html
- 4) Elzinga, C.L., D.W. Salzer, J.W. Willoughby, & J.P. Gibbs. 2001. *Monitoring Plant and Animal Populations*. Blackwell Science, Inc., Massachusetts. 360 pp. ISBN (softcover) 0-632-04442-X. Obtain copy from on-line bookstores.
- 5) California Native Plant Society, Vegetation Program website at: www.cnps.org/vegetation/protocol.htm for releve sampling protocols.

** The releve sampling method is used to classify vegetation. The releve plot is positioned to be within a homogeneous patch of vegetation. Percent cover is noted for all observed taxa. Details on releve plot sampling methodology can be obtained from the CNPS website address listed in Reference #5 above.

***The Association Level from “A Manual of California Vegetation” (1995) by Sawyer-Keeler-Wolf is not well-defined for all Series (i.e., not all Series are further broken down into Associations).