Inventory & Monitoring Protocols – Vegetation Fire Protocol

One time use of any of these levels is inventory; monitoring requires multi-time use.

Survey Level	Questions	Methods	Products
Preliminary (office-oriented)	• How frequently have fires burned in and around the unit? • How large were these fires? • When did the fires occur? • What key resources could be impacted by fire or other disturbance?	• Conduct literature and database searches **(1, 4, 5, 6, 7)** • Consult with knowledgeable persons and agencies **(4, 5, 6, 7)** • Review any existing documents for the site **(4)** • Have interdisciplinary team identify key resource sensitivity areas.	• A fire history map with fire perimeter and date of all known fires in the area of concern. • A resource sensitivity map.
Reconnaissance (field-oriented)	• What was the qualitative fire behavior observed during the burn events?	• Field observations of fire behavior • Map an estimate of the fire perimeter on a topographic map	• A map with the estimated fire event perimeter, date and fire behavior descriptor for all observed fires in the area of concern.
	• What were the qualitative, or visual, changes/impacts attributable to fire or fire exclusion on plant or wildlife communities, habitats, and special interest species?	• Follow methods outlined in the IMAP vegetation, wildlife, and special interest taxa protocols (e.g., sensitive and invasive alien plant taxa)	• Completed annual inspection & questionnaire • Rapid assessment of fire effects and/or fire exclusion. • Change detection analysis of vegetation alliances and crosswalked fuel models. • Time-stamped map of fuel types.
	• What qualitative changes occurred in fuel complexes throughout the unit?	• Follow methods outlined in the IMAP plant communities and fuels crosswalk protocols.	• Completed annual inspection & questionnaire • Rapid assessment of fire effects and/or fire exclusion.
Baseline (field-oriented)	• What general "fire environments" exist in and around the unit? •	• Find or establish weather stations that record fire weather variables • Obtain USGS digital elevation model (DEM) data and derive slope and aspect layers using ArcView Spatial Analyst. • Crosswalk park vegetation plant community layer to approximate _____ (NFFL) fuel model.	• A fire weather database consisting of daily high/low temperature, wind speed, relative humidity, and precipitation (at minimum). • Slope, aspect, and fuels maps.
	• What potential fire behavior could occur in and around sensitive resources in the unit?	• Use the BEHAVE fire modeling software in combination with the fire environment and resource sensitivity data **(9)**	• BEHAVE outputs for the fire environments in and around high sensitivity zones using average worst case weather.

IMAP – Inventory, Monitoring, and Assessment Program

Inventory & Monitoring Protocols – Vegetation Fire Protocol
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Level	Questions	Methods	Products
Baseline (field-oriented)	• What are the potential impacts of fire or fire exclusion on plant and wildlife communities, habitats, and/or special interest species?	• Methodology outlined in the Preliminary Level plus: • Use products from the IMAP vegetation, wildlife, and sensitive species protocols (Baseline and Comprehensive Levels).	• A document summarizing potential impacts. • Products at the Baseline or Comprehensive Level from the IMAP vegetation, wildlife, and sensitive species protocols.
	• What quantitative changes occurred in fuel complexes throughout the unit?	• Establish fuels photo monitoring stations **(8)** • Consult with local experts, photo series data, and/or fuel transects to quantify fuel characteristics with appropriate fuel model. **(8)**	• Analysis of fuels photo monitoring for elements of interest stratified by burn history product. • Time-stamped map of fuel types.
Comprehensive (field-oriented)	• What specific "fire environments" exist in and around the unit?	• Establish weather stations in the unit that record fire weather variables • Field verify slope and aspect layers from the Primary Level • Field check and revise fuel models layer using input from local experts, photo series and/or fuel transects **(8)**	• A fire weather database consisting of hourly high/low temperature, wind speed, relative humidity, and precipitation (at minimum) • A detailed slope, aspect, and fuels map.
	• What fire risk and hazard exists in the unit?	• Create and run fire behavior and risk assessment models for potential fire start scenarios.	• Fire risk and hazard assessment map for the unit using fire history and fire environment data in combination with FarSite (or equivalent) fire behavior modeling software.
	• Is the fire within the fire prescription? • Did the fire behave as expected? • Did the fire achieve the desired results (i.e., did it meet the management objective)? • Is it necessary to change the fire prescription? • Other questions related to fire effects on plants or wildlife and plant communities.	• Establish transects and/or quadrats to collect data on %cover, relative abundance, recruitment, height classes, mortality or disease, scorch height **(4, 8)**. • Use statistical analysis to analyze data **(4,8)** • Map taxon population or plant community perimeter using GPS unit, aerial photos (with taxa that are discernable from aerial photos) or rectified digital imagery. • Map locations of transects and quadrats using a GPS unit. • Create a GIS map using the ArcView or ArcInfo software.	• Analysis of transect and quadrat data from repeated monitoring of the post-burn site recovery. • Map of the acreage burned and what was intended to burn. • Answers to specific fire-effects questions.
Intensive (field- & laboratory-oriented)	• Questions related to demographics, genetics, pollination biology, burn modeling, etc.	• Methods will be dependent upon the nature of the question and the taxon or plant community. Standard protocols, when available and applicable, should be employed.	• Detailed and intensive studies on an attribute(s) of interest with regard to fire effects on a plant taxon, population, or community specifically.

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. The ISBN (softcover) is 0-943460-26-2. The ISBN (hardcover) is 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) Skinner, M.W., and B.M. Pavlik, eds. 1994. *Inventory of Rare and Endangered Vascular Plants of California*. California Native Plant Society Special Publication No. 1 (Fifth Edition). Sacramento, CA vi+338pp. 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

6) California Natural Diversity Database (CNDDB). California Department of Fish and Game. Sacramento, CA 95814 or visit the California Department of Fish and Game, Wildlife and Habitat Data Analysis Branch website at: www.dfg.ca.gov/whdab/html/cnddb.html

7) The U.S. Fish and Wildlife Service Species Information website at: http://endangered.fws.gov/wildlife.html#Species

8) National Park Service. *National Fire Monitoring Handbook*. 2000. Final Draft. 319 pp. The Handbook can be obtained by contacting Paul Reeberg, Fire Monitoring Program Specialist at 415-427-1372 or by e-mail at: paul_reeberg@nps.gov The 1991 FMH Software Manual is part of the Handbook package. The software can be obtained by downloading it directly from the FMH website at: http://fire.nifc.nps.gov/fmh/

9) BEHAVE……… http://www.huntana.com/tools/html/BEHAVE.detailed.html