

Plan Monitoring Program BASI Fire Frequency

Best available scientific information (BASI): the responsible official shall document in the decision document how BASI was used to inform the plan monitoring program. This document provides additional detail to support the decision document, including how information was determined to be BASI and was determined to be most relevant, accurate, and reliable.

Desired condition in the Forest Plan	<p>Goal 1.2: Restore forest health where alteration of natural fire regimes have put human and natural resource values at risk.</p> <p>Goal 3.2: Retain a natural evolving character within wilderness.</p> <p>Goal 6.2: Provide ecological conditions to sustain viable populations of native and desired nonnative species.</p>
Monitoring Question	Is fire frequency becoming more departed from the natural range of variation?
Monitoring Indicators	Proportion of the landscape with departed fire frequency
Describe how monitoring question and indicators evaluate changes and management effectiveness of the plan.	The proposed question and indicators aim to detect changes in fire frequency through time. Deviations from historical fire frequency can be used to evaluate plan effectiveness as it relates to the specific desired conditions described above. In particular, this monitoring effort will inform deviations from the natural range of variation in southern California habitats and provide direction on valuable resources at risk and help prioritize resources in need of protection or restoration due to altered fire frequency.
How can the effects of management activities on the indicator be differentiated from those due to climate change? (Optional)	
Describe how this monitoring relates to one or more of the eight required items for forest plans.	This monitoring questions informs '(vi) measureable changes on the plan areas related to climate change and other stressors that may be affecting the plan area'.

Best Available Scientific Information

Fire regime in southern California has been altered from pre-European conditions and is likely to become more departed with global change factors, including climate change, non-native species and human population growth. Fire frequency is one component of fire regime where deviations from pre-European settlement to current conditions are better understood (Van de Water & Safford, 2011; Safford & Van de Water, 2013). Many shrubland habitats, especially those in ignition-prone areas in close proximity to the urban-interface, are burning more today than in the

past (Stephenson & Calcarone, 1999; Keeley & Fotheringham, 2001; Safford & Van de Water, 2014), which can affect native species composition and lead to an increase in the abundance of non-native annual species (Zedler et al., 1983; Haidinger & Keeley, 1993). In contrast, mixed conifer forests at higher elevations are experiencing far fewer fires today than before European settlement (Skinner et al., 2006; Safford & Van de Water, 2013) and fire suppression has resulted in changes in stand structure and increased fuel loads in southern California forests (Skinner et al., 2006). Altered fire frequency can lead to changes in fire severity, which can slow post-fire vegetation recovery and lead to type conversion.

Rationale for choice of question and indicators, informed by BASI.	Fire frequency across Southern California National Forests is likely to become more departed from historic conditions in the future, therefore monitoring is needed to identify areas on the landscape that are most departed and in need of management actions.
Monitoring protocol, method, or data source; rationale informed by BASI.	Spatial data from the Fire Return Interval Departure (FRID) assessment generated by the USDA Forest Service, Pacific Southwest Region will be used to inform current departure from pre-European fire return interval. This polygon layer consists of information compiled about fire return intervals for major vegetation types on the National Forests in California and adjacent land jurisdictions. Comparisons are made between pre-Euroamerican settlement and contemporary fire return intervals (FRIs). Current departures from the pre-Euroamerican settlement FRIs are calculated based on mean, median, minimum, and maximum FRI values.

BASI Determination

Relevant – BASI is relevant to the plan area, question and indicators, the desired condition, objective, and required monitoring item.	The National Forest lands in southern California are dominated by shrubland and mixed conifer vegetation types and therefore the fire frequency deviations described in the cited references directly apply across the southern California province. The Fire Return Interval Departure (FRID) developed by USFS, Pacific Southwest Region provides valuable spatial information needed to prioritize management actions to meet the desired conditions described above.
Accurate – BASI describes the true condition. To support monitoring methods, the method has been shown to provide evidence that can answer the question and address the desired condition.	Multiple techniques have been used to estimate pre-European fire return intervals in different vegetation types and the selected references include the best available techniques and information concerning estimates of historic fire return intervals.
Reliable – BASI uses appropriate scientific methods that are consistent with scientific principles (e.g., peer-reviewed articles). To support monitoring methods, BASI reliability also includes methods that produce reliable measurements with statistical rigor.	The FRID uses the best available data from published, peer-reviewed manuscripts to define fire return intervals prior to European settlement across California (see Van de Water & Safford, 2011 for literature review). Articles referenced in this BASI are either peer-reviewed journal articles or USFS General Technical Reports. They represent the current, most widely cited and accepted data describing departures from historic fire return intervals.

Additional documentation of BASI for this monitoring question and indicators.	
Contact person	Nicole Molinari, Province Ecologist 805-961-5732 nmolinari@fs.fed.us

References Cited

- Haidinger, T. L., and J. E. Keeley, 1993, Role of high fire frequency in destruction of mixed chaparral: Madrono, p. 141-147.
- Keeley, J. E., and C. Fotheringham, 2001, Historic fire regime in southern California shrublands: Conservation Biology, v. 15, p. 1536-1548.
- Safford, H. D., and K. M. Van de Water, 2014, Using fire return interval departure (FRID) analysis to map spatial and temporal changes in fire frequency on national forest lands in California, *in* U. F. Service, ed., Research Paper PSW-RP-266, Pacific Southwest Research Station, Albany CA.
- Skinner, C., S. Stephens, R. Everett, M. Borchert, O. R. District, and R. Hawkins, 2006, Fire regimes of forests in the Peninsular and Transverse Ranges of southern California: Joint Fire Sciences Program, v. 22.
- Stephenson, J. R., and G. M. Calcarone, 1999, Southern California mountains and foothills assessment: habitat and species conservation issues.
- Van de Water, K. M., and H. D. Safford, 2011, A summary of fire frequency estimates for California vegetation before Euro-American settlement: Fire Ecology, v. 7, p. 26-58.
- Zedler, P. H., C. R. Gautier, and G. S. McMaster, 1983, Vegetation change in response to extreme events: the effect of a short interval between fires in California chaparral and coastal scrub: Ecology, v. 64, p. 809-818.