

Theme 12 Resilience to Disturbance in a Changing Climate

Resilience is “the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks” (Walker et al. 2004⁶). Recent studies have also examined how to promote wildfire resilience or reduce wildfire hazard as a management objective (North et al. 2022⁷). The FPRs and associated regulations (e.g., California Environmental Quality Act, Timberland Productivity Act, Fish and Game Code, Porter-Cologne Water Quality Control Act, etc.) are intended to promote and encourage sustainable forest management and restoration practices and therefore also improve forest resilience to stress factors such as fire, pests, drought, and disease. Understanding how the FPRs affect forest ecosystem function and state will help determine whether the management objective is achieved and help gauge the extent of the forest ecosystem resilience to disturbance.

Are the FPRs and associated regulations effective in ...

- (a) improving overall forest wildfire resilience and the ability of forests to respond to climate change (e.g., in response to drought or bark beetle; reducing plant water stress) and variability, and extreme weather events (evaluate ecosystem functional response to fuel reduction and forest health treatments)?
- (b) maintaining conifer and broadleaf stands which are well adapted to climate in order facilitate riparian functions (e.g., shade, temperatures, primary productivity, stream flow)?
- (c) meeting ecological objectives and adaptation to future climate (e.g., resilience of wildlife habitats; variable retention silviculture as it relates to wildlife habitat structures)?
- (d) maintaining or recruiting adequate amounts of early- and mid-seral wildlife habitats which are well adapted to future climate?

⁶ Walker, B.H, C.S. Holling, S.R. Carpenter, and A. Kinzig. 2004. Resilience, adaptability and transformability in social–ecological systems. *Ecology and Society* 9(2):5. <http://www.ecologyandsociety.org/vol9/iss2/art5>

⁷ North, M.P., R.E. Tompkins, A.A. Bernal, B.M. Collins, S.L. Stephens, and R.A. York. 2022. Operational resilience in western US frequent-fire forests. *Forest Ecology and Management* 507:120004.