



Research Brief for Resource Managers

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Contact:

Jon E. Keeley
Marti Witter
Liz van Mantgem

Phone:

(559) 565-3170
(805) 370-2333

Email:

jon_keeley@usgs.gov
marti_witter@nps.gov
evanmantgem@usgs.gov

Central and Southern California Team, USGS Sequoia and Kings Canyon Field Station, Three Rivers, CA 93271

Why Call Wildfire A Beneficial Ecosystem Service?

Pausas, J.G., and J.E. Keeley. 2019. Wildfires as an ecosystem service. Frontiers in Ecology and the Environment 17:289-295 doi: 10.1002/fee.2044

Because fire is necessary for the upkeep and health of many ecosystems and human well-being, these authors suggest we refer to it as an **Ecosystem Service** and discard negative stereotypes whenever possible. For the people who must live with fire, this semantic change might encourage better understanding and accommodation of its effects, especially in light of how much humans have benefitted from fire on an evolutionary scale (Fig.1 green box), as well as on a socioecological scale (Fig.1 yellow box).

Fire's foundational Ecosystem Service is the **Supporting Service** of opening habitat gaps (Fig.1 smaller yellow box; e.g., Fig. 2) which help to generate and maintain biodiversity. When fire creates new, open niches, it lowers competition and increases resources that favor shade-intolerant species. The new conditions also nurture species to adapt to the new conditions. And because fire shortens generation times and reduces the overlap between generations of obligate seeding species, fire even promotes evolutionary novelties.

Such fire induced biodiversity renders valuable **Provisioning Services** in the form of raw materials. These are the huge varieties of foods, drinks, medicines, and building materials that only exist because of fire. Such fire-supported biodiversity also offers us irreplaceable spiritual and recreational **Cultural Services**. These include

Management Implications

- **The Ecosystem Services** of fire that come from properly functioning, fire-adapted ecosystems include:
 - 1 *Supporting services*: habitat gaps, increased biodiversity, evolutionary change.
 - 2 *Provisioning services*: foods, medicines, and building materials.
 - 3 *Regulating services*: fire intensity control, water quality and quantity control, carbon cycling control, species replacement acceleration.
 - 4 *Cultural services*: ecotourism, hunting, spiritual support, physical and emotional health, cultural diversity.

ecotourism, hunting, and emotional or aesthetic support. Although the modern **Cultural Services** of fire now include recreation and ecotourism, it was once involved in the evolution of human bipedalism itself, a defining evolutionary development in our own socioecology.

Last of all, fire furnishes **Regulation Services** by helping to control pests like fleas, controlling catastrophic fires by periodically reducing biomass, regulating water, and regulating carbon. Further, fire also accelerates species replacement in changing environmental conditions, lending resiliency to fire-adapted ecosystems.

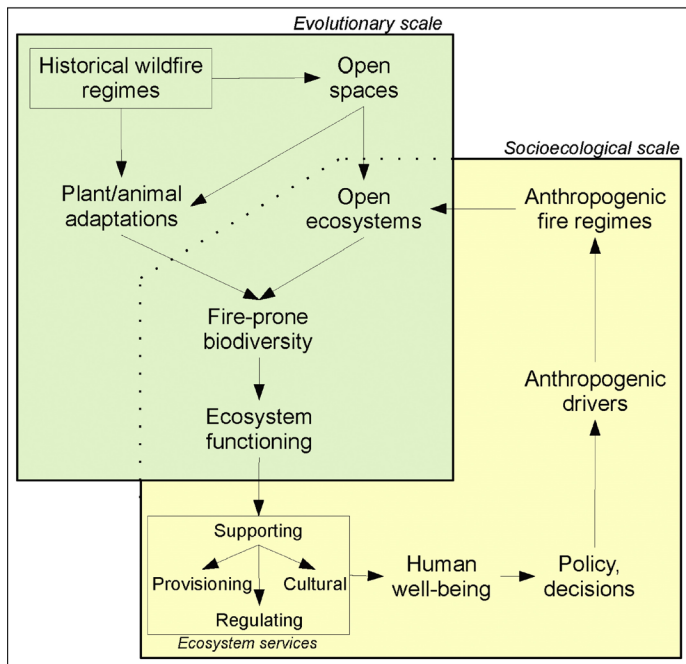


Fig 1. Schematic representation linking factors occurring at the evolutionary (green square) and at the socioecological (yellow square) scale associated with fire regimes and ecosystem services. Natural (historical) wildfire regimes create open habitats that can promote specific adaptations, biodiversity, and overall functioning in fire - prone ecosystems; these are the supporting services necessary for the production of all other services. Decisions and policies may modify fire regimes (anthropogenic fire regimes) modulating ecosystem functioning and services (socioecological feedback); that is, policy decisions may switch between maintaining ecosystem services (stabilizing feedback) and generating unsustainable fire regimes (disruption of the feedback). Decisions and policies (bottom - right corner) include fire and landscape management decisions but also socioeconomic changes that have implications for fire regimes (e.g. rural abandonment; Pausas and Fernández - Muñoz 2012).



Fig 2. Fire - prone ecosystems are rich in geophytes that flower very quickly after a fire event (fire - stimulated flowering). These species are the first to enhance pollination activity; their underground organs were also an important source of carbohydrates for early humans, and they are the ancestral species of many common contemporary garden plants. Pictured here are geophytes native to Spain that flower quickly after a wildfire: (a) *Narcissus triandrus pallidulus*, (b) *Asphodelus cerasiferus*, (c) *Gladiolus illyricus*, and (d) *Iris lutescens*