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Managing Fire to Avoid Wildfires in Fire-prone Ecosystems

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Fire-prone ecosystems evolved and have been managed by humans with fire for millennia. Ignoring these socioecological realities, zero-fire policies have been implemented in fire-prone ecosystems across the world. These inappropriate policies are mainly originated from a forest-centered perception that fire is an essentially negative and anthropogenic disturbance. The attempts to exclude fires have generated deleterious ecological impacts, high fire-fighting costs, damage to properties and human lives in grasslands, savannas and Mediterranean-type ecosystems. These zero-fire policies also generate conflicts between governments and local communities who use fire to manage the landscape, food production and livestock raising. Excluding fires from fire-prone ecosystems may lead to changes ecosystem functioning and biodiversity due to woody encroachment and/or fuel load accumulation. In regions where soil conditions allow grasslands can be invaded by trees, changing vegetation structure and their ability to provide ecosystem services, especially water production. In most fire-prone ecosystems, fuel load accumulates, and the long-time unburned areas become time bombs waiting for the next ignition source to cause disastrous wildfires. Fire bans disrupt traditional fire management practices and commonly lead to more irresponsible uses of fire, since local communities continue to depend on fire for their productive areas but use fire in furtive ways to avoid criminalization. In combination with large areas with high and homogeneous fuel loads, this leads to large, hard to control and highly impacting wildfires, especially during late-dry season, when fires tend cause more severe impacts. After decades under these scenarios, zero-fire policies have been substituted by active fire management policies in fire-prone ecosystems in many countries in Africa, Latin America, in the US and Australia, among other countries. Fire management policies should be adapted for each regional socioecological context and allow for the active use of fires for landscape management, biodiversity conservation and/or productive activities. The Brazilian savanna (Cerrado) is the most biodiverse and threaten savanna in the world and has been managed under zero-fire policy for decades. It is a tropical humid savanna (1,500mm mean annual precipitation) where large (>10,000 hectares), frequent (2-4 years fire interval) late-dry season wildfires are common, including in Protect Areas (PA) dedicated to biodiversity conservation and traditional communities' livelihoods. In 2014, a pilot Integrated Fire Management (IFM) program has been implemented in three Cerrado PAs. The program considers local uses of fire, implements prescribed burns and landscape management planning aiming to (i) change

the main season of burnings (from late- to early- and mid-dry season); (ii) protect fire-sensitive vegetation, such as riparian forests, from fires; (iii) decrease firefighting costs; (iv) reduce conflicts with local communities and (v) lower greenhouse gases emissions. The IFM program has since been implemented in more than 30 federal PA, including Indigenous Territories., where this approach has successfully achieved its main objectives. The present challenge is to expand IFM actions to the state and especially private -owned lands, which will allow for a significant change in wildfire patterns across the whole 2 million km² of the Brazilian savanna.