Does fire influence wolf distribution and breeding-site selection?

Wildfires are projected to become an increasingly common occurrence and are a major driver of habitat disturbance, yet little research to date has examined how the relationship between fire and landscape attributes affects large carnivores, such as the grey wolf (Canis lupus). The results of this study suggest that wolves are remarkably resilient to fire, persisting and breeding in a human-dominated landscape even under intensive fire regimes. However, burnt landscapes may induce higher exposure to human disturbance and persecution due to limited refuge conditions.

Fire has the power to severely modify ecosystem structure and functioning. Large-carnivore populations may be especially vulnerable to these effects, with fire potentially reducing the availability of prey and suitable refuge for breeding, as well as increasing the risk of exposure to humans. However, relatively little research has been conducted to assess these effects, particularly in the case of the grey wolf (Canis lupus).

Wolf populations are fragile and protected in many parts of southern Europe, where they frequently live in fire-prone and human-dominated areas. This is the case in Portugal, which is home to a small and locally endangered wolf population and is also the most fire-prone country in Europe. It is predicted that Portugal will experience increased fire risk and burnt areas by the end of the century. There are concerns that this, combined with increasing development of human infrastructures within wolf range, may lead to a decrease in suitable habitats for wolves to find food, refuge, and breeding-sites.

A study was conducted to assess the effects of fire in determining wolf occurrence at different spatial scales. At the regional scale, researchers explored how fire relates to wolf persistence and contributes to local extinctions by comparing national wolf population data from the 1970s and 2003. At the local level, researchers looked at how fire relates to wolf breeding-site selection and reuse in the year following a fire, using data from 11 packs collected between 1996 and 2013. Various factors, including landscape and human influence, were taken into account.

Overall, the results suggest that wolf distribution trends and breeding-site selection are not affected by fire. Wolves were able to persist and maintain regular breeding sites, even in areas with intensive fire regimes. However, the findings did demonstrate that fire descriptors (such as burnt extent and number of fires), together with other landscape attributes, such as land use/cover and elevation, are linked to areas of wolf persistence and breeding-site selection. This suggests an interplay between fire regimes, land use, altitude, and human activities in determining wolf occurrence.

These findings have implications for wildlife-management policy and fire-protection policies, particularly for the conservation of wolf populations in human-dominated and fire-prone landscapes, such as those found in southern Europe. It is possible that the cumulative effects of fire, together with other sources of disturbance (such as persecution, infrastructure development, and logging) could have a negative effect on the long-term viability of wolf populations. Considering that wildfires and human development are both on the rise in many parts of the world, further research on the interplay of fire regimes with other environmental and human factors is required.

In the meantime, the researchers recommend that guidelines for wildlife conservation and landscape planning should consider wolf persistence under land-use management activities using fire, in order to promote landscape sharing by humans and large carnivores in regions subjected to human-induced disturbances and habitat changes.