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EURASIAN LYNX AS KEYSTONE PREDATOR SUPPORTING FOREST ECOSYSTEM SERVICES

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Eurasian Lynx: Keystone Predator Supporting Forest Ecosystem Services

Ecosystem - Temperate and Boreal Forests
Temperate and boreal forests span across Europe and Asia, providing essential ecosystem services including carbon sequestration, water regulation, and biodiversity support (López-Bao *et al*., 2017). These forests store vast amounts of carbon in both biomass and soil, regulate water cycles, prevent soil erosion, and provide habitats for diverse species (Burgos *et al*., 2024). This biodiversity-rich environment supports cultural services such as ecotourism, and local communities benefit from sustainable forest products (Ripple *et al*., 2014).

Species - Eurasian Lynx
The Eurasian lynx (*Lynx lynx*) is the largest wild cat in Europe. It is an apex predator throughout temperate and boreal forests across Europe and Asia, maintaining the balance of forest ecosystems. This species is listed on CMS Appendix II and contributes to the regulation of prey populations, promoting biodiversity and ecosystem stability (CMS, 2020). The Eurasian Lynx faces threats from habitat loss due to logging, land conversion, and human encroachment, alongside poaching and climate change impacts that alter its forest habitats (Schmidt *et al*., 2021).

Ecosystem services - herbivore population regulation and biodiversity maintenance
The lynx's presence in these forests supports a variety of ecosystem services directly and indirectly. This includes pest and disease control, maintaining balanced herbivore populations, and nutrient cycling, which benefit other species and the overall health of the habitat (Ripple & Beschta, 2012; Lennox *et al*., 2022). By regulating herbivore populations, lynx prevent overgrazing, which can lead to habitat degradation and loss of biodiversity (Wolf & Ripple, 2016). With regards to nutrient cycling, lynx kills provide food for scavenger species such as ravens (*Corvus corax*) and other mesopredators. Healthy and diverse plant communities are crucial for carbon sequestration, as they enhance the forest's capacity to absorb atmospheric CO_2. Lynx habitats often overlap with areas rich in biodiversity, making them essential for the conservation of various flora and fauna. Their presence indicates a well-functioning ecosystem that can better withstand climate-induced stressors such as extreme weather events, invasive species, and habitat fragmentation.

Conservation Actions
Conservation strategies for the Eurasian lynx focus on restoring degraded landscapes and creating wildlife corridors to connect fragmented populations, enhancing genetic diversity and movement (López-Bao *et al*., 2017). Key efforts also include reducing human-wildlife conflict and raising awareness of the lynx’s ecological role. Research on lynx behaviour, habitat use, and their ecological role is ongoing, aiming to inform conservation policies that enhance forest ecosystem resilience and adaptability, supporting these ecosystems as effective nature-based solutions to climate change.

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