Population monitoring and management

Before and after: long term monitoring of birds and bats in a wind farm do not show significative impact

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Careful monitoring of wind farm installation sites is essential to reduce the impacts generated on birds and bats by these plants. A long-term monitoring program was applied in the design and control of a plant of 6 wind turbines with a height of about 80 m at the hub and a rotor with a diameter of 117 m, located on the mountain ridge between the provinces of Parma and Genoa, in the Emilian Apennines. In 2013, the pre-operation monitoring was conducted, which defined the local faunal conditions. After construction in 2018, the monitoring was repeated, with BACI characteristics, extended until 2023. The nesting birds were recorded by singing from points that allowed us to cover the entire extension of the wind farm, and the migratory passages were verified by sight from salient points. The bats were monitored from listening points with classic bioacoustic methods.

The disturbance was significant during the construction phase, but subsequent surveys showed a very rapid recovery of the nesting contingent. The number of nesting species close to the wind farm, considering 1 km of buffer, was 38 in preconstruction phase and 38 in 2018 (i.e., first year post construction), 38 in 2019, 37 in 2020, 43 in 2021, 41 in 2022, and 47 in 2023, respectively. The number of couples slightly increased especially for *Lanius collurio* and *Lullula arborea*, as well as for the forest dwelling species. The migratory passage at the wind farm direction is modest, with a good diversity with 78 species in 2023, 69 in 2022, 75 in 2021, 74 in 2020, 59 in 2019, and 60 in 2018, also including local movements that are not typically migratory. The number of passages for species of conservation interest (i.e., those included in the national and European lists) was 338 individuals in 2023, 332 in 2022, 260 in 2021, 222 in 2020, 198 in 2019, and 230 in 2018, both regarding own migrants and local passage or birds present in the area. The checks in the pitches to verify fatalities were carried out four times a month, without ever finding any carcasses. The potential rate of removal by scavengers (mainly foxes) was tested, showing that bird carcasses remained on the ground for 1 to 3 days before consumption.

As regards bats, 6 species were counted and the average number of passages per hour did not undergo significant variations in the years of observation, increasing progressively from the beginning of spring with a peak in the warm months, with the presence of many insects in open areas, then decreasing and finally interrupting with the cold of October.

For the site under monitoring, it is possible to conclude that at such a choice of area, the spatial arrangement of the towers and the management of open spaces throughout the farm, this wind farm did not have a negative impact on studied taxa; indeed, it seems that it even facilitated some indicator species.