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FYS, Museum Project Essay
24 November 2023

The European Roller: A Hopeful Example

When up against what feels like impossible odds, finding comfort can sometimes be the difference between succumbing to hopelessness and continuing to hold out for another day. Comfort is a lighthouse in a turbulent storm, it is the warmth of the stars against the encroaching dark, it is safety after escaping the jaws of your demons, and it can take multiple forms. It can stem from a ritual, the consistency of a habit engrained, trusted and stalwart amid uncontrollable insanity, it can come from a person, a shoulder to cry on and the certainty that we are not alone, and it can be found in a concept, immaterial and inexplicable but also unkillable and profoundly powerful: hope. All are necessary and all are meaningful, but the last is often the most enduring, the most far reaching, and the most inspiring. Everybody needs hope—it is the force that motivates people to risk loss and suffering for the chance of a better tomorrow, it is the currency of sacrifice, and it is the engine of dreams. Hope is what empowers people to confront impossible odds, the force that reminds that even in defeat there is victory to be found, and in our world, it is vital. Indeed, in the face of a fast-approaching energy crisis, staggering socio-economic divides, brewing international warfare, a warming climate, political gridlock, and more than can possibly be articulated in a single sentence, hope is what keeps us sane. The only alternative is to bury our heads beneath the sand, but avoidance of the inevitable has never worked out in the long term—just ask Sisyphus. Thus, hope is how we navigate our complex world and how we survive it; it is the force that molds our perspectives within it, the sentiment that colors our future imaginings of it. It is with hope, and for sake of it, that we continue fighting the losing battles previously enumerated, the not least of which is climate change. When

thinking about climate change, you'll find that hope has permeated it from multiple points. Hope reminds of what was, it incites the imaginings of what could be, it underlays and resonates within every speech, every protest, every proposal, every act, and, most poignantly of all, it is carried triumphant on the wings of hard-won success. These successes are significant three-fold—they propagate even more hope, they vindicate the efforts made thus far, and they direct and streamline future action—as such, each one is celebrated greatly and guarded vigilantly. One such success was the story of the European Roller. Having suffered massive decline then slow, grueling recovery, the European Roller is a hopeful example whose success story may yet facilitate and inspire the rescue of other vulnerable species who, like us, are struggling to navigate a changing climate and world.

Before discussing how the European Roller is a model for success and hope in the fight against climate change, it is first necessary to understand who the European Rollers are as a species and what makes them unique. The European Roller, species name *Coracias garrulus* ("Coracias Garrulus." *Arctos*), was first classified in Carolus Linnaeus's original taxonomy in the late 1750's as a "blue crow" with "a knife-edged beak with a curved tip [that was] stripped of feathers." He called it a "raven with a bloody back, [and] black feathers [on its wings]" with a "chatter of silver." (Linné and Salvius). European Rollers have two subspecies, the Western European Roller (*C. g. garrulus*) and the Eastern European or Kashmir Roller (*C. g. semenowi*), with the distinction between the two being that the former breeds more in Western Europe and has brighter plumage and the latter breeds more in Eastern Europe with paler plumage ("European Roller." *BioBD* and "European Roller: Taxonomy and Description."). The European Roller is a migratory species, breeding in Europe then migrating south to winter across Africa—a journey covering almost 10,000 km one way ("EUROPEAN ROLLER" and Platforma SINC).

European Rollers breed between May and July (BirdLife Hungary (MME)), and utilize a variety of strategies, including monogamy, Quasi-parasitism (where females will lay their eggs in the nests of others), and cooperative polygyny (where an additional male or female (both instances have been recorded) help raise fledglings alongside the primary pair) (Sánchez-Tójar et al.). The European Roller is a solitary, secondary-cavity nesting species that prefers open areas with soft wood or hollow trees. Because they rely on pre-formed hollows to nest in, European Rollers form symbiotic relationships with other bird species, including black woodpeckers (*Dryocopus martius*), green woodpeckers (*Picus viridis*), and bee-eaters (*Merops apiaster*) (BirdLife Hungary (MME)), and are sensitive to events that can deprive them of nesting spots.

The European Rollers' vulnerabilities ultimately led to a severe decline in population, which resulted in a change in species status and inspired conservation efforts across Europe. The European Rollers' dependence on natural or pre-made hollows presented resulted in a sharp population decline in the latter half of the 20th century as agricultural and industrial ventures began to pervade traditional nesting and foraging lands that the species depended on. The issue, left unaddressed, became so severe that the European population of European Rollers declined by approximately 30% across a scant 15 years in the late 80's through the 90's until the year 2000, with the Baltic nations especially seeing severe declines as both Latvia and Lithuania went from several thousand breeding pairs to less than 50 each between the late 1900's and 2010's. This extraordinary loss culminated in the shifting of the species' status on the ICUN Red List from Low Risk/Least Concern to Near Threatened in 2004 ("European Roller Coracias garrulus") as the species became regionally extinct in traditional breeding areas like those in Germany, Sweden, and Estonia (BirdLife Hungary (MME)). To combat the population loss,

conservation programs began to be introduced across Europe, with efforts especially gaining traction in Southern European nations like Hungary and France.

Conservation efforts, bolstered by the European Rollers' natural adaptability, proved fruitful, resulting in yet another change in the species' ICUN Red List status. Hungary led the charge in European Roller conservation, as it declared the species nationally protected and endorsed various studies and conservation initiatives that proved wildly successful, as the 150-300 pairs of the 1990's increased to and have since held steady at 1300-1500 pairs in the country since 2014 ("Conservation of the European Roller"). The secret to this extraordinary revitalization was nesting boxes. What was hurting the species most was loss of breeding grounds, or more specifically, nesting spots, as deforestation, agricultural development that leveled and stirred up the land, and general industrialization deprived the species of its traditional nesting modes while providing no other options. By introducing an alternative (thereby increasing nest availability), the birds were able to bounce back—in some cases even seeing a 50% population increase across five years (Václav et al.) The provision of nesting boxes, and the subsequent recoveries in population, inspired a study to be done in 2014 on the bird's success in different contexts, including agricultural, and found that "[European] Rollers showed an even higher reproductive output [in the agricultural habitat] than in their traditional habitat of natural grassland" because the birds "can reproduce well where good quality resources are available, even outside of their typical habitat" (Kiss et al.). The realization and application of findings like these have invigorated conservation efforts and ultimately led to national recoveries in Hungary, France, Bulgaria, and Spain ("European Roller Coracias garrulus"). In this way, the species, though vulnerable in some respects, is extraordinarily adaptable, and this adaptability has lead to the slowing of decline wholesale and the allowance of ample recovery in select areas such that,

in 2015, the bird went from Near Threatened to Least Concern once again ("European Roller" *ICUN*).

Despite the victory in the recovery of the European Roller, its success story is still ongoing, and continual and diversified efforts will be necessary if the trend is to continue. The global population as of 2017 was 200,00-600,000 mature individuals (BirdLife Hungary (MME)), and is currently still declining at a rate of 5-20% across three generations (15 years) ("European Roller Coracias garrulus). Though this rate is much slowed since the breakneck declines seen decades prior, they still pose a concern about the stability of the species should conservation efforts be ceased. The international community recognizes that there is work yet to be done, and multiple new players in European Roller conservation have begun drafting resolutions pledging national protection and conservation of the species, including Slovakia and Catalonia ("European Roller Coracias garrulus"), and, a major victory, the UNEP adopted the Flyway Action Plan for Coracias garrulus in 2017, which effectively acknowledges the vulnerability of the species and the necessity for its conservation, and commits its members to the protection its protection (BirdLife Hungary (MME)). Further vital conservation actions that can be taken in addition to nestbox installment are conservation of foraging grounds and protection and planting of solitary stands or avenues of trees ("European Roller: Conservation Status"). Such initiatives are equally necessary as it has been found that "nestbox provisioning is a sufficient short-term conservation solution [where] foraging resources are typically abundant, but [in places where they are not,] the restoration of foraging habitat may be more important" which basically means that both nesting and feeding needs of the bird must be taken care of in order for it to thrive—what good is a nesting box when there is nothing to feed the chicks and vice versa (Finch et al.)?

In this way, the European Roller serves as an example of hope in humanity's continuing struggle against the climate crisis. By looking at the European Roller's example, we know that it is possible to help save a species that is close to endangerment. This vindicates our hope for the revitalization of damaged species, while also propagating hope for other species. Moreover, if we can apply similar efforts to other Near Threatened, Threatened, Endangered, or Near Extinct species, then perhaps we can replicate this success and help mitigate the consequences of our changing climate. The way forward has been cleared—it is not pretty, not paved or landscaped or well-traveled. There may be pitfalls, blind corners, and unexpected interlopers that will try to draw us away from it, but we have already overcome the hard part, the fear of our own powerlessness against climate change. We have the means, the blueprint, the vision; we just have to be bold enough to continue fighting, to continue hoping.

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