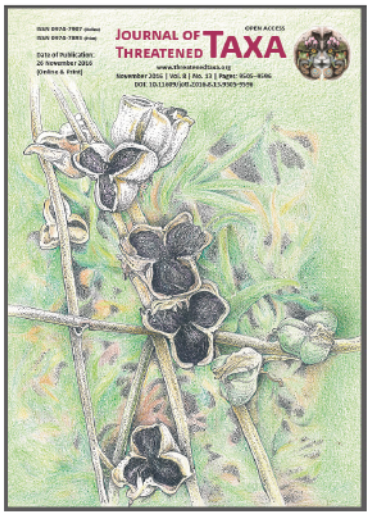

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COMMUNICATION

PREVENTING PHILIPPINE EAGLE HUNTING: WHAT ARE WE MISSING?

Jayson Ibañez, Anna Mae Sumaya, Giovanne Tampos & Dennis Salvador

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Preventing Philippine Eagle hunting: what are we missing?

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Abstract: Two pieces of information are minimally required to conserve endangered raptor species — (i) an estimate of its remaining global population, and (ii) the main factors responsible for its decline. Data suggest that no more than 400 adult pairs of the Critically Endangered Philippine Eagle could remain in the wild. As to what is causing population decline, shooting and hunting continue to be the primary factor while forest habitat loss is another. This paper reflects on the growing incident of human-caused deaths in Philippine Eagles, prominently on Mindanao Island where estimates suggest more than half of the eagle's wild population exists. By analyzing data from eagle rescues, surveys, and field monitoring through radio and satellite tracking techniques, this paper shows that shooting and trapping is a "clear and present" danger which may potentially drive the population to extinction even when suitable forest habitats still exist. Cases of death within the last decade show that the nature and/or extent of law enforcement, conservation education, and population and habitat monitoring fall short of being effective deterrents to eagle persecution in the wild. We review emerging theories on wildlife crime and cases of community-based species conservation to justify a holistic and grounded approach to preventing eagle poaching as an alternative to the conservation status quo.

Keywords: Community-based conservation, eagle poaching, Philippine Wildlife Act, situational crime prevention, the Philippine Eagle, wildlife law enforcement.

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Author Details & Author Contribution: JAYSON IBANEZ, Director - Research and Conservation. Holds a PhD Degree in Natural Resource Management. Wrote most of the paper. ANNA MAE SUMAYA, Curator - Conservation Breeding Program. Holds a BS Biology degree. Collated the data for eagle rescues and rehabilitation at the Philippine Eagle Center, Davao City. GIOVANNE TAMPOS, Senior Biologist - Research and Conservation Program. Holds a BS Biology degree. Collated the data for release of rehabilitated eagles and radio and satellite tracking of free-living birds. DENNIS SALVADOR, Executive Director. Holds BS Agribusiness and BS Economics degrees. Helped analyze the data and improved the manuscript.

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INTRODUCTION

The late Dr. William Burnham, raptor biologist and former President of the Peregrine Fund, presented during a global raptor conference that to conserve endangered species at least two pieces of information are required: (i) an estimate of the species' remaining global population, and (ii) the main factors responsible for its decline (Burnham & Cade 1995). Nearly three decades of work by the Philippine Eagle Foundation (PEF), a private non-profit conservation organization based in Mindanao, Philippines, has amassed data which supports the notion that the population of this IUCN Critically Endangered species (Birdlife International 2013) remains imperiled.

THE PHILIPPINE EAGLE: CONSERVATION STATUS

The Philippine Eagle *Pithecophaga jefferyi,* is one of the rarest and largest eagles in the world. The species is endemic to the Philippines where it inhabits the forests of only four islands of the archipelago - Luzon, Leyte, Samar and Mindanao. As a heavily persecuted predator of Philippine tropical forests, which has been reduced to less than a quarter of country's land area (Posa et al. 2008), the Philippine Eagle has earned the reputation of being one of the rarest and most "Critically Endangered" birds on the planet.

The Philippine Eagle is an evolutionary novelty. Apart from being the only species in its genus (Brown & Amadon 1968), recent genetic studies also showed that it is unrelated to any other large forest eagles that were originally thought to be its kin, such as the Harpy Eagle *Harpia harpyja* of South and Central America, Crowned Eagles *Stephanoaetus coronatus* of Africa, and the New Guinea Harpy Eagle *Harpyopsis novaeguineae* of Papua New Guinea (Lerner & Mindel 2005). The great similarity in their appearances is more a product of convergent evolution as a result of occupying a similar ecological niche. As evidence of its evolutionary uniqueness yet precarious conservation status, the Philippine Eagle ranks number eight in the world's top 10 list of Evolutionarily Distinct and Globally Endangered (EDGE) bird species (Jetz et al. 2014).

The species' biological and ecological characteristics makes it very sensitive to human interference (Ibanez 2008). It is a slow breeder—a monogamous eagle pair rears only one chick every other year. It is also late maturing—it takes at least six years before each hatchling becomes sexually mature and starts breeding. As a result, the species naturally occurs in relatively low numbers. If human persecution like shooting (using mostly air guns and improvised firearms like marble guns and shotguns) and trapping (using traditional noose traps intended for deer and wild pigs) becomes excessive, the species can spiral to extinction. When more eagles are dying than being born, it would be very difficult, if not impossible, for the population to recover on its own.

Being very dependent on natural forests makes the species even more vulnerable. The Philippines has lost more than three quarters of its pre-colonial forest cover (Posa et al. 2008). Such massive historical loss of forest habitat certainly led to the demise of several hundred eagles as many hunting areas, shelters and breeding places were lost in the deforestation process.

Eagles are highly territorial and loyal to their nest sites (i.e., the same nesting site is used across generations). Deforestation and degradation of nest sites, therefore, adversely impacts their reproductive potential. Meanwhile, the country continues to lose what little natural forest it has left mainly to logging—both illegal and legal, agricultural expansion, and mining. According to the latest global forest change study published in the journal Science, the Philippines has been losing its natural forest cover at an estimated rate of nearly 50,000 hectares/year since 2000 (Hansen et al. 2013).

As a result, the population status of the Philippines' national bird and the country's conservation flagship clearly remains precarious. On Mindanao Island, which appears to be its stronghold, between 82 to 233 pairs are estimated to exist, depending on how the estimates are derived (Bueser et al. 2001).

CONSERVATION

Partly in response to the growing global attention to its plight, the Philippine Eagle was declared the country's national bird in 1995 (Proclamation No. 615, s. 1995). Thereafter, research and conservation programs began to accelerate, which included conservation breeding; rescue, rehabilitation and release; test releases of captive-bred birds; conservation education; habitat conservation; population surveys and monitoring; and ecological research on the wild population (Salvador & Ibanez 2006).

The Philippine Eagle is legally protected by the Wildlife Resources Conservation and Protection Act (Republic Act 9147, s. 2001). Killing eagles can result

in maximum of 12 years imprisonment and/or a Php 1 million peso fine. Eagle habitats are also protected and impacting their ecological integrity can be penalized.

But more than a decade after the Philippine Wildlife Act was legislated, successful wildlife law enforcement remains elusive. For Philippine eagles, we know of only three cases filed on Mindanao Island within the last decade.

The first case was in 2006 and resulted to a fine of mere Php 1,000.00 (US$ 21.00) for a person who shot and injured a bird (People of the Philippines vs. Juniel Jadraque 2007). The second case was in 2008; it involved the same bird shot in 2006. Called "Kagsabua", the bird was successfully rehabilitated and was released inside a protected area in 2008. Four months after the release, the eagle was killed. The perpetrator who shot and made bird stew out of Kagsabua was imprisoned for six-months, but only because he failed to pay the Php 100,000.00 (US$ 2,131.00) minimum fine. The conviction also came after nearly four years of court trial (People of the Philippines vs. Bryan Balaon 2012). Finally, the last case filed against a suspected eagle killer in 2013 was dismissed for "lack of probable cause". In contrast, we have on our records at least 24 cases of rescued eagles that were (i) shot, (ii) trapped, and/or (iii) have died post-RA 9147.

INSIGHTS FROM EAGLE RESCUE, REHABILITATION AND POPULATION MONITORING

Because population numbers are generally a balance between birth and death rates, analyzing data for breeding success and mortality provide critical insights on the over-all status of the species' wild population.

We monitor the outcome of nesting on Mindanao Island through our "Protect-A-Nest" program, a modest reward system that incentivizes community protection of nesting eagles, their young and the nesting habitat. At present, we know of 35 nesting territories on the island since the program began in 1987. Our eagle mortality data, on the other hand, is derived from two conservation activities: (i) eagle rescues and (ii) monitoring of eagle pairs nesting in the wild and their young. Recently, use of radio and satellite telemetry have optimized location, observation and field monitoring of wild birds.

Admission data at the Philippine Eagle Center (PEC), Davao City shows strong evidence for human-related mortalities. Out of 45 cases of eagles brought in for treatment at the PEC from 1987 to 2015, 16 birds (36 %) have died within a few months after admission despite receiving medical treatment (Fig. 1). In these cases, the birds were either too injured or mishandled by their captors to be saved, or too sick and malnourished to be cured.

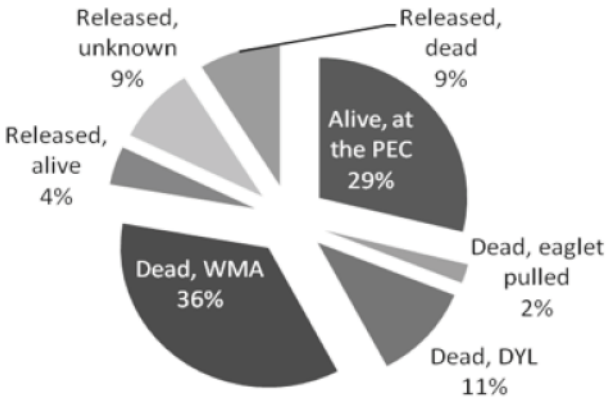

Figure 1. Outcomes of eagle admissions at the Philippine Eagle Center, Davao City from 1987–2015

We can deduce a speculative mortality rate from these admission outcomes. If we treat all cases of disabled eagles that have remained under captive care also as "mortalities" in the sense that they have been permanently removed from the wild population[1], mortality rate due to direct human interference is at two eagles per year (a total of 38 eagles died or been removed permanently from the wild in 19 years). This is admittedly biased; however, it can also be an underestimate due to unreported cases of human-caused deaths. Additional losses could easily have occurred in very remote forests of the country where the killing of an eagle or eagles could easily go unnoticed.

We have a stronger evidence for eagle mortality with radio and satellite tags. For example, out of eight rescued wild birds released after rehabilitation, three were shot dead while one died of injury and infection days after it was trapped by a local resident. One captive-bred eagle experimentally released inside a protected area in 2009 was also beaten to death while roosting close to a farm. The fact that the eagle was killed inside a protected area where it was presumed to be safe is suggestive of the extent of anthropogenic threats to the remaining population. If birds are still vulnerable inside protected areas, even more so for birds living outside protected areas.

Data for free-ranging, wild eagles that were also

[1] Number of technically "dead" birds include (i) surviving birds housed at the PEC permanently, (ii) those dying within a few months after admission (WMA), and (iii) admitted birds that died years later (DYL).

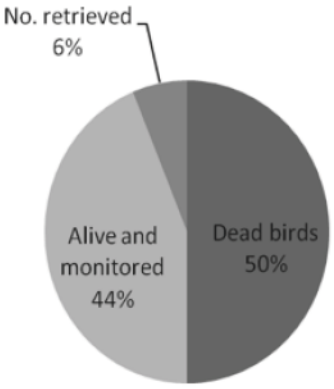

Figure 2. Outcomes of monitoring free-living and rehabilitated eagles through radio and satellite tracking

instrumented showed the same trend. Out of eight wild-caught birds with transmitters, four died from human-related causes—two were shot, one was probably shot or trapped, and one died of accidental capture in a trap. If we consider our data for all instrumented birds (n = 16, rehabilitated plus free living), it appears that all eight cases of deaths were human-caused, six were due to shooting while two were because of trapping.

Meanwhile, monitoring of 50 breeding attempts by 29 eagle pairs on Mindanao Island from 1978 until 1998 shows 58 % over-all success (i.e., 6 out of 10 young fledged successfully). Such productivity is considered high and not indicative of a population suffering from breeding failures (Miranda et al. 2000). This nesting success rate is also within the normal levels expected for large raptors (Newton 1979).

All these mortality and nesting success data lead to a single conclusion - eagle poaching remains a very serious threat to the Philippine Eagle's long-term survival.

CONSERVATION IMPLICATIONS

It is clear that poaching is having a significant impact on the Philippine Eagle population. Addressing this issue is even made more urgent by the fact that eagle populations appear to be declining not because of reproductive failure, but because of high eagle death rates primarily brought about by shooting and trapping (Miranda et al. 2000).

The high death is alarming rate because a small change in the survival of adults and sub-adults can have disastrous impacts to a long-lived, late maturing and slow breeding raptor like the Philippine Eagle (Newton 1979; Hiraldo et al. 1996). Excessive hunting of individuals across all age groups can wipe out (extirpate) wild populations even though suitable habitats exist, particularly in very remote regions where natural immigration can be difficult. Such "empty forests" have occurred in some parts of the world where excessive hunting resulted in tropical forest defaunation (Redford 1992; Wilkie et al. 2011). Wide scale local extirpations could put this species deep into the extinction vortex[1].

There is also evidence that many young birds, once they leave the nest and disperse, are also dying at abnormal rates. At an old nesting territory in Mt. Apo, Davao City, for example, there were five instances where the resident pair nested annually rather than at the normal rate of once every two years. This means that each of these young died within the first few months of post-fledging[2]. Radio telemetry of four young eagles from 1999–2000 also showed that many young birds could be dying within two years of post-fledging (Ibanez et al. 2003).

This is alarming. If more young are dying than surviving to breeding age, the population can collapse as there are not enough young individuals that would replace those very old adults that die (Miranda et al. 2000). That is, the population can be in demographic peril.

The "business as usual" scenario for conservation of the Philippine Eagle is apparently not obtaining desired results. It is clear that there is ample opportunity for improving wildlife law enforcement, especially in circumstances where there is a clear violation.

Law enforcement appears to be failing as a deterrent to eagle hunting. Reforms in this arena can benefit from the predictions of contemporary theories of crime. Among the common frameworks engaged in modern criminal justice policies, the Deterrence Theory of Crime (DTC) appears to be the most popular, and, probably the most useful approach for our purposes.

Accordingly, deterrence theorists claim that if punishment is severe, certain, and swift, a rational person will measure the gains and losses before engaging in crime and will be deterred from violating the law if the loss is greater than the gain (Onwudiwe et al. 2005). Said in a different way, potential offenders will have second thoughts about carrying out (wildlife) crime only if they

[1] Process declining populations undergo when "a mutual reinforcement occurs among biotic and abiotic processes that drives population size downward to extinction" (Brook et al. 2008).

[2] That period of a young eagle's life stage that begins once they fly out of the nest up until they become independent from their parents. This stage typically lasts up to 14–16 months.

know that apprehension and punishment is guaranteed whenever it is committed, and that the execution of punishments are reasonably swift and severe enough to offer a deterrent. Put another way, a "slap on the wrist" may not be enough to deter future criminal activity.

The current "status quo" for wildlife law enforcement in the Philippines fails to meet the severity, certainty, and swiftness test demanded from law enforcement by the DTC. First, in nearly all the recorded cases of eagles being killed or harmed by people, enforcing the provisions of the Wildlife Resources Conservation Act was virtually absent. This undoubtedly fails the certainty test. Second, in the very few cases where laws were enforced, the punishment resembles a mere "slap on the wrist". This, again, clearly fails the severity test. Lastly, in the single case where the perpetrator was jailed, it took the court nearly four years to reach a verdict - an undeniable failure of the swiftness test.

In many eagle habitats, there remains a huge gap in creating environments that pro-actively prevent wildlife crime from happening altogether. In designing such wildlife offense-deterring environments, the Situational Crime Prevention (SCP) framework is very instructive. An emerging theory in contemporary criminology, the SCP is seen to supplement the many limitations of formal social control, especially in developing countries where law enforcement resources are very limited (Pires & Moreto 2011).

SCP is regarded as a unique and viable approach that limits or halts wildlife-related crimes by implementing solutions that are locally targeted or specifically tailored to issues and concerns at the community level (Pires & Moreto 2011). It is a practical approach to addressing specific types of crimes and settings with an explicit focus on establishing or implementing changes to the contextual environment and/or management of such an environment to block opportunities for criminal activity (Clarke 2009). SCP pays attention to the immediate environment (for example, Philippine Eagle nesting territories) and acts to reduce elements of that environment which may stimulate an offender to offend.

SCP prescribes techniques based on principles that seek to (i) increase the effort, (ii) increase the risks, (iii) reduce the rewards, (iv) reduce provocations, and (v) remove excuses in any presented opportunity to an offender (Pires & Moreto 2011). In simple terms, a SCP-based program's solution to (eagle) crimes is to prevent them from happening in the first place.

RECOMMENDED REFORMS

In the light of the evidence, we recommend the following immediate remedial actions:

Law Enforcement

Authorities should make enforcement of wildlife laws certain and swift. This means making sure that punishment takes place whenever a wildlife criminal act is committed. Moreover, such punishment should be reasonably swift and severe enough in order to deter future crimes. These two principles are critical because research shows that increases in certainty of apprehension and offender's conviction and quick punishment have real, positive effects on crime reduction (Onwudiwe et al. 2005).

Situational Prevention of Eagle Poaching

With its increasing reputation of being an effective supplement (if not an alternative) to traditional law enforcement, SCP-based eagle poaching prevention programs should be earnestly pursued in as many Philippine Eagle nesting territories across the archipelago as possible, especially in places where eagle-human conflict is intense.

The above recommendation is being made based on the following:

(i) Nests or nest sites are the basic unit for eagle conservation work. As mentioned previously, eagles are very loyal to the places where they breed. Several generations use the same nesting site repeatedly. Maintaining the health and ecological integrity of nest sites is therefore important for successful reproduction.

(ii) It is during the nesting stage when breeding adults settle and become sedentary and tied to their nest site that eagles become especially vulnerable. If these sites are unsecured, breeding eagles can be vulnerable to human harm such as shooting and trapping. So too are the growing young. Therefore, from the point of view of ensuring survival and reproduction, nesting sites are critical focal areas for conservation action.

(iii) Last but not least, nest sites are charismatic symbols for local conservation of resident eagle pairs. The closer geographically the eagle habitat is to a particular community, the higher is the likelihood of receiving local support. Theory of "place attachment" or "sense of place" predict that locals residing in a particular area have greater attachment to the immediate landscape where they reside than someone living farther away (Morgan 2010). With this, the likelihood of saving the eagle population is therefore higher if managers find

as many nest sites as possible, and build as much local support for eagle and habitat conservation nearest the target communities.

The PEF has been implementing community-based species and habitat conservation programs in several critical nesting sites on Mindanao that resemble the SCP in many respects, and implementation so far is showing promising results (e.g., see Ibanez et al. 2013). The PEF is also expanding the geographic scope of its nest site protection program on Mindanao and in a few places in Luzon, Leyte and Samar where eagle nesting territories were recently found or re-discovered.

COMMUNITY-BASED SPECIES AND FOREST PATROLLING

The PEF supports Indigenous/local forest guards because they are a critical human capital for conservation. Engaging their services to monitor and manage wildlife and habitats on behalf of the nation can lead to three clear development outcomes: (i) biodiversity, (ii) economic, and (iii) socio-cultural - all pillars of sustainable development.

Working with Indigenous forest guards results in clear biodiversity outcomes: (i) forest habitats patrolled against agricultural threats and eagle/wildlife poaching (increased size of habitats protected), (ii) rehabilitation or restoration of degraded areas, (iii) improved survival rate of focal species as a result of anti-poaching patrols (survival rate increased), and (iv) enhanced breeding success, and survival of young as human activities within sensitive breeding sites are regulated due to improved monitoring (breeding success increased). Partly because of these reasons, local participation in biodiversity monitoring in the Philippines has been endorsed in the scientific literature (Danielsen et al. 2003, 2005).

Apart from biodiversity outcomes, engaging forest guards also results in clear socio-economic and cultural benefits. Patrol fees are supplemental income for the community. For poor families, these payments pay for basic commodities and needs. Forest patrols also provide opportunities to practice Indigenous culture. During patrols, forest guards can legally harvest bush foods and non-timber forest products (NTFP). They can also exercise their traditional cultures through prayers and rituals as natural resource uses are often underpinned by a system of deference to and appeasement of spiritual resource owners (Ibanez 2015). Training and engaging local forest guards is also transformative as the new skill set they gain can be used in other political and socio-economic endeavors (Garnett et al. 2009).

CONCLUSION

The Philippine Eagle is undeniably going through a critical survival bottleneck. Hunting and continued deforestation are the apparent major drivers of population loss. Unless the current status quo is reversed, species extinction is imminent within the next two human generations. Pre-dating modern humans, the Philippine Eagle has evolved in isolation; the addition of humans to its habitat has resulted in population loss. However, not all hope is lost. Best practices that employ the right balance between conservation incentives and wildlife crime deterrents can spare the Philippine eagle from being lost forever.

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