

Spizaetus isidori

Justin Bales
BES 485
March 20, 2014



Figure 1. An 1849 drawing of a male adult *Spizaetus isidori*. (Temminck and Laugier, 1849).

Naming

Spizaetus isidori [Figure 1] is a large and rare South American raptor, which is commonly known as the Black-and-chestnut Eagle, Isidor's Eagle, Aguila Castaña, Aguila de Copete, and Águila Poma (IUCN, 2013; BirdLife International, 2014; Benito, 2009). The bird was known as *Oroaetus isidori* until the South American Classification Committee changed the genus name to *Spizaetus* in 2006 (SACC, 2014; IUCN, 2013; Helbig, 2004). This change happened because

Oroaetus isidori appeared to be much more related to the *Spizaetus* clade after phylogenetic analysis, than previously thought (Haring et al., 2007;

Helbig, 2004). Due to this recent name change, literature often appears as *Oroaetus isidori* and not the more current *Spizaetus isidori*.

Legal Status

S. isidori classified as Vulnerable C2a(i) (IUCN, 2013). The species was recently assessed by BirdLife International in June of 2012, because it has small vulnerable sub populations numbering less than 1,000 individuals, and it lives in areas of montane forests with large amounts of habitat destruction (BirdLife International, 2014; IUCN, 2013). *S. isidori* is

considered to be highly threatened in Argentina and Bolivia. Additionally, it is considered to be endangered in Colombia (Valdez and Osborn, 2004).

Description

Adult *S. isidori* is 60-80 cm in length with a wingspan of up to 175 cm (Ridgely and Greenfield, 2001; Fjeldså and Krabbe, 1990). It has a large pointed crest at the top of its head.



Figure 2. An adult *S. isidori*, with its glossy black head, neck, and back. *S. isidori* also has a prominent crest on the head (Friedel).

Adults are colored with glossy black on their heads, back, and neck, with chestnut coloration on their chests (Fjeldså and Krabbe, 1990; Ridgely and Greenfield; Ferguson-Lees and Christie, 2001). Additionally, the bird has yellow iris and feet, with feathers extending to the toes (Fjeldså and Krabbe, 1990). Males have grey primary feathers, with a single black tip. Females have a grey primary that has 2-3 black stripes on it (Ferguson-Lees and Christie, 2001).

Juvenile *S. isidori* have a much lighter appearance, with birds having a creamy brown head, and crest. The whole bird appears a marbled or molted whitish grey, with reddish or rust colored streaks on the bird (Ferguson-Lees

and Christie, 2001; Fjeldså and Krabbe, 1990; Ridgely and Greenfield, 2001).

Distribution

S. isidori is found in high elevation tropical rainforests (Fjeldså and Krabbe, 1990; IUCN, 2013). It is found in the Andes mountains from western Venezuela to Northwestern Argentina, and southwards through Colombia and Ecuador to Northwestern Peru (Fjeldså and Krabbe, 1990). Additionally, smaller distributions can be found in the mountains of Northern Venezuela [Figure 3] (Ridgeley and Greenfield, 2001; Fjeldså and Krabbe, 1990).

Elevation ranges vary from 1500-3000 meters (Ridgeley and Greenfield, 2001), or from 1750 meters to 2500 meters, and up to 3500 meters (Fjeldså and Krabbe, 1990). The species has also been found down to sea level (IUCN, 2013). In Colombia, *S. isidori* can be

locally abundant in some places such as Cuchilla de San Lorenzo, at altitudes above 2200 meters, The northern end of the Santa Marta Mountains, the mountains around Florencia Caqueta at altitudes above 1800 meters, and in the west Andes near Cerro Munchique, Cauca (Hilty, 1986). It is reported to nest at 1800-3,500 meters (Ferguson-Lees and Christie, 2001; Lehmann, 1944).



Figure 3. The estimated range of *Spizaetus isidori* in South America (CLO, 2010). The range typically extends throughout the Andes from Venezuela to Northern Argentina. Several small subpopulations exist throughout this range, making the species vulnerable.

Ecology

S. isidori is a secretive bird, that is typically found in undisturbed and impenetrable montane forest (Fjeldså and Krabbe, 1990). *S. isidori*'s preferred habitat is montane cloud forests or montane tropical forests (Ridgely and Greenfield, 2001; Fjeldså and Krabbe, 1990). These areas have a mean annual temperature of 8°-18°C, and average annual precipitation of 4510 to 5470mm. There is also an abundance of low clouds and fog throughout the year (Valdez and Osborn, 2004). *S. isidori* requires a large home range, and prefers an environment with large valleys (Ridgely and Greenfield, 2001; Fjeldså and Krabbe, 1990). *S. isidori* lives in an environment with dense vegetation, and heavy canopy densities (Ferguson-Lees and Christie, 2001; Valdez and Osborn, 2004). *S. isidori* ranges from rare to locally uncommon in montane forests, and can sometimes be found in subtropical and temperate areas on either side of the Andes Mountains. It can also be found in clearings occasionally (Ridgely and Greenfield, 2001).

Although secretive, it is sporadically found soaring above the forest, and has massive horizontal wings that it glides with (Fjeldså and Krabbe, 1990; Salaman et al., 1999). Although it does prefer to soar regularly, the bird is still rarely encountered (Ridgely and Greenfield, 2001). For example, in a ten-month study, *S. isidori* was observed for 25.8 hours out of 1370 hours spent searching for the bird in the Cosñipa river drainage (Valdez and Osborn, 2004). It is reported as having a heavy flight, and it prefers to soar at high altitudes (Ferguson-Lees and Christie, 2001). The bird has sometimes been observed flying in pairs. It can sometimes be observed sitting on exposed perches within the forest, but more often than not it is found in leafy canopies (Fjeldså and Krabbe, 1990; Ridgely and Greenfield, 2001). In a breakdown of viewing time, soaring behaviors were observed 53% of the time, perching was 27%, no soaring flight 16%, and hunting 4% (Valdez and Osborn, 2004). This is important because while viewing time

does not reflect the overall habits of *S. isidori*, they do indicate the most likely ways to find the bird. While there is no specific information regarding the range of *S. isidori*, there is evidence supporting its need for a large range. Most importantly, large raptors such as *S. isidori* typically have large ranges and predatory birds typically have even larger ranges than non-predatory birds (Peery, 1998; Gaston et. al 2005).

Food sources typically include arboreal mammals that navigate tree canopies, and larger birds with similar habitat areas. Rodents appear to be the most commonly consumed prey animal (Fjeldså and Krabbe, 1990; Valdez and Osborn, 2004). Sizes of prey animals typically range from squirrels to guans (Hilty, 1986). Additionally, some farmers have seen the eagles prey on, or consume their poultry, however this is currently a rather uncommon occurrence because *S. isidori* prefers to hunt animals in the canopy, and not on the ground (Lehmann, 1944; Valdez and Osborn, 2004). There have been observations of *S. isidori* successfully taking small birds, *Sciuridae* sp. rodents, woolly monkeys (*Lagothrix lagotricha*). There are additionally several unsuccessful observed attempts at prey, including *Columbide* sp. birds, and parrots (*Amazona mercenaria*). Attempts on prey were made in two ways, with prey close to the canopy being attacked straight from overhead, and prey farther in from the canopy being attacked from strategic perches (Valdez and Osborn, 2004).

Interactions between *S. isidori* and other animals seem to be rather tame if they are not deemed prey. For example, *S. isidori* has been observed soaring with Solitary eagles (*Harpyhaliaetus solitaries*) on 20 occasions, with no visible aggression or competition (Valdez and Osborn, 2004). Additionally, *S. isidori* shared similar peaceful interactions with other raptor species, including the black and white hawk-eagle (*Spizastur melanoleucus*), grey headed kite (*Leptodon cayanensis*), roadside hawk (*Buteo magnirostris*), and white-rumped hawks (*Buteo*

leucorrhous) Valdez and Osborn, 2004). There do seem to be some conflict interactions with Turkey vultures (*Carthartes aura*), with *S. isidori* being aggressive towards the birds (Valdez and Osborn, 2004). Based on these minimal observed interactions, the species does not appear to be regularly aggressive or territorial towards other similar raptor species, however it may be more aggressive towards other birds, such as the turkey vulture.

Breeding takes place in a large tree top nest. *S. isidori* has been seen building these nests in emergent trees in Huila, Colombia (Valdez and Osborn, 2004). *S. isidori* is reported to nest at 1800-3,500 meters (Ferguson-Lees and Christie, 2001; Lehmann, 1944). Observed breeding has occurred during the month of August in Bolivia, and the months of March to July in Venezuela (Fjeldså and Krabbe, 1990). There have only been five observed nesting sites, with three in Colombia, one in Venezuela, and one in Bolivia (Valdez and Osborn, 2004). Pair bonding interactions often take place, with the male bird flying synchronously above a female bird, seemingly following her movements. Additionally, the male occasionally stoops on the female during these flights, and she in turn presents her talons to the male (Valdez and Osborn, 2004). Young birds remain with their parents for several months during fledging, where they are fed by the parents. Young birds appear to remain with their parents right up until the beginning of the next breeding season, after which they fly away (Valdez and Osborn, 2004).

Population Status & Trend

Due to the limited amount of information on *S. isidori*, there are varying levels of uncertainty surrounding population size estimates. One evaluation puts the population between 101 and 1000 animals (Ferguson-Lees and Christie, 2001), another indicates 1000-2,499 mature individuals (Bird Life International), and another alternative estimate is 1,500-4,00 (IUCN,

2013). Regardless of total population size, there are certainly several at risk sub populations with less than 1,000 mature birds (Bird Life International; IUCN, 2013). For example, it is estimated that there are only 100 pairs in Ecuador. (Ridgeley and Greenfield, 2001). *S. isidori* populations are declining because several major anthropocentric disturbances, and has a listed population trend of “decreasing” (IUCN, 2013).

Threats to Species

There are several major threats to *S. isidori*. Probably one of the largest negative impacts on *S. isidori* has been the conversion of montane tropical forests to farmland (IUCN, 2013; Ferguson-Lees and Christie, 2001). This has been a huge problem for *S. isidori* because the species does best in undisturbed forest habitats (Fjeldså and Krabbe, 1990). Additionally, habitat loss due to farming is also forcing the eagles onto smaller and more fragmented forested areas (Ridgeley and Greenfield, 2001; Fjeldså and Krabbe, 1990; CLO, 2010).

One potential side effect that has been noted because of the recent influx of farm land in *S. isidori* habitat has been the hunting of *S. isidori* because of its killing of domesticated farm birds. There are eight known cases of *S. isidori* being killed due to such behavior. It isn't know how large of an effect this mortality has on populations of *S. isidori*, however with a small population and decreasing habitable areas due to the recent farming boom in tropical forests, this could be a potentially dangerous situation for exposed *S. isidori* populations (IUCN, 2013). It is very likely that these attacks will increase in frequency as *S. isidori* comes into more frequent interactions with farmers, livestock, and domesticated birds.

Due to the belief that *S. isidori* only lives in sub populations that number 1,000 or less individuals, and the fact that its habitat range of montane tropical forests is quickly being

converted to farmland, there is a potential for the species to be significantly impacted by anthropocentric activities in these areas. However not much is know about *S. isidori*, or how it will adapt to these situations, so it has been advised that more research is needed to fully recognize the impacts of these threats on population size and behavior (IUCN, 2013; Valdez and Osborn, 2004).

Developments in Conservation

There are currently several conservation efforts which have the potential to benefit *S. isidori*. One of the best pre existing factors for conservation efforts is the fact that populations of *S. isidori* already exist in several national parks and reserves, which is advantageous to conservation efforts because the land is already being used for preservation and management efforts (Ridgely and Greenfield, 2001). For example, there are several populations of *S. isidori* reported within national parks in Venezuela, Colombia, Peru, and Ecuador (IUCN, 2013). The 1.7 million hectare Manu Biosphere Reserve in Peru is a prime example of habitat area that is already being conserved and is beneficial to *S. isidori* (Valdez and Osborn, 2004). It is also very likely that there are reproductive activities happening in the Calilegua National Park in Jujuy, Argentina, because of the high observation rate of juvenile, immature, and adult individuals throughout the park (Roesler et al., 2008). There is also a *S. isidori* monitoring project taking place on the eastern slope of the Andes in Colombia, with a goal of finding superior conservation areas for the bird and to minimize conflicts (IUCN, 2013).

There are several proposed conservation actions in addition to those that have already been put in place. First and foremost, research is required to further understand *S. isidori*. There are too many gaps in current data to make any truly accurate conservation moves, and the effects

of habitat fragmentation on *S. isidori* due to farming need to be investigated (IUCN, 2013).

Another beneficial move to help establish *S. isidori* populations would be the creation of preservation areas for cloud forests in southwestern Peru, which is a prime habitat area that could be potentially threatened by human activity (Valdez and Osborn, 2004). Better population analysis efforts are also essential to determine the actual population, and need for concern for this species, since population estimates are widely variable (IUCN, 2013). Finally, there needs to be an effort to help farmers protect their domesticated birds from *S. isidori*, as this is becoming an increasing point of conflict (IUCN, 2013; Lehmann, 1944; Valdez and Osborn, 2004).

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