# Action Plan for the Macaronesian Sparrowhawk

## *Accipiter nisus granti* in the European Union (2017-2022)

**Revised and Prepared by**

spea
Sociedade Portuguesa para o Estudo das Aves

SEO BirdLife

BirdLife INTERNATIONAL

**On behalf of the European Commission**

**ACTION PLAN FOR THE MACARONESIAN SPARROWHAWK *ACCIPITER NISUS GRANTI* IN THE EUROPEAN UNION**

The present action plan was prepared by the Portuguese Society for the Study of Birds (SPEA), Spanish Society of Ornithology (SEO/BirdLife) and BirdLife International within the framework of EU funded project *Life+ Fura-bardos - Conservation of Macaronesian Sparrowhawk and the Laurissilva habitat in Madeira Island* (LIFE12 NAT/PT/000402; from 2013 to 2017).


**Compilers**

Cátia Gouveia (SPEA)
Domingos Leitão (SPEA)
Juan Antonio Lorenzo (SEO/BirdLife)
Marta Nunes (SPEA)

**List of Contributors**

Abel Martins (IFCN)[1]
Beneharo Rodríguez (SEO/BirdLife – GOHNIC[2])
Cristina González González (SEO/BirdLife)
Cristina Medeiros (IFCN)
Dília Menezes (IFCN)
Domingo Trujillo González (SEO/BirdLife)
Duarte Barreto (IFCN)
Eduardo González Melián (SEO/BirdLife)
Elizabete Marchante (University of Coimbra)
Francisco Fernandes (IFCN)
Francisco Moreira (CIBIO/InBIO)[3]
Gorete Freitas (IFCN)
Juan Luis Rodriguez (SB/Gobierno de Canarias)[4]
Laura Castelló (SPEA)
Luís Palma (CIBIO/InBIO)
Miguel Sequeira (University of Madeira)
Nádia Coelho (IFCN)
Nicolás López-Jiménez (SEO/BirdLife)
Nuno Serralha (IFCN)
Pedro Sepúlveda (DROTA)[5]
Ricardo Ceia (SPEA)
Rui Botelho (SPEA)
Sara Freitas (IFCN)

[1] Instituto das Florestas e Conservação da Natureza
[2] Grupo de Ornitología e Historia Natural de las islas Canarias
[3] Research Centre in Biodiversity and Genetic Resources
[4] Servicio de Biodiversidad del Gobierno de Canarias
[5]Direção Regional do Ordenamento do Território e Ambiente


**Milestones in the Production of the Plan**

First Management Statement (MS) (BirdLife International, 1999) was adopted by the EU in 1999
05th – 06th October 2016, Workshop *Life+ Fura-bardos*, Funchal, Madeira
15th – 17th May 2017, Final Workshop *Life+ Fura-bardos*, Funchal, Madeira
First draft submitted to EC: __th of _____of 2017

**International Species Working Group**

n/a

**Reviews**

This Action Plan should be reviewed and updated every five years (next review in 2022) unless sudden change of the population trend requires urgent revision.

**Photo Credits**

Nuno Rodrigues

**Recommended citation**

Gouveia, C., Leitão, D., Lorenzo, J.A & M. Nunes (2017). Action Plan for the Macaronesian Sparrowhawk *Accipiter nisus granti* in the European Union (2017-2022), 26 pp. SPEA, SEO/BirdLife and BirdLife International for the European Commission.

**Geographical scope**

Macaronesian Sparrowhawk *(Accipiter nisus granti)* distribution: Madeira Island and Canary Islands (El Hierro, La Palma, La Gomera, Tenerife and Gran Canaria).


**Figure 1.** Distribution of the Macaronesian Sparrowhawk.

**Table of contents**

## *0 - EXECUTIVE SUMMARY*


The Macaronesian Sparrowhawk (*Accipiter nisus granti*), known in Madeira Island as *Fura-bardos* and in the Canary Islands as *Gavilán común canario* is an endemic subspecies of Macaronesia (Meyburg *et al.*, 2017). This subspecies is listed in Annex I of the Birds Directive and its conservation is a priority, being the subspecies of the Eurasian Sparrowhawk (*A. nisus*) with the smallest distribution.

In the last Management Statement adopted in 1999 (BirdLife International, 1999) the population of Macaronesian Sparrowhawk was considered probably abundant in Madeira as supported by experts' references (Oliveira, 1999). For the Canary archipelago, the census of raptors back in 1980 was the reference with an estimate of a minimum of 200 pairs. Data about distribution, population, habitat, reproductive biology and threats was collected within the project *Life+ Fura-bardos - Conservation of Macaronesian Sparrowhawk and the Laurissilva habitat in Madeira Island* (LIFE12 NAT/PT/000402; from 2013 to 2017), which is the most recent conservation action on this subspecies.

Currently, given the known habitat requirements and the fact that Macaronesian Sparrowhawk has territorial behaviour and exists exclusively in Madeira Island and Canary Islands, the most eminent threats identified are related to the habitat changes observed in recent years. Recent forest fires in different areas of Madeira Island, including Special Protection Areas (SPAs) of Laurissilva combined with the impact of forest management on breeding territories are the main threats to this subspecies in the Madeira Island. Additionally, the non-natural mortality caused by shooting, poisoning and collisions against structures. Disturbance caused by human outdoor recreation and tourism activities in the Canary Islands is also increasingly recognised as a major threat to this subspecies.

The **goal** of this plan is to set priorities for the conservation of the Macaronesian Sparrowhawk in the Madeira and Canary Islands, ensuring these threats do not increase in the future, and stimulating conservation efforts to prevent species from declining further in their species' conservation status evaluated by the IUCN Red List.

The **objective** of the plan is to guarantee a positive population trend of the breeding populations of the subspecies in the Macaronesia archipelagos for the next 5 years.

To achieve this objective, conservation actions are needed to reach the following expected **results**:

Result A: Management and regulation measures to recover and maintain the habitat of Macaronesian Sparrowhawk (nesting and availability of food).

Result B: Regulation and mitigation measures to reduce non-natural mortality of Macaronesian Sparrowhawk.

Result C: Public recognition and valorisation of Macaronesian Sparrowhawk and its habitat.

Result D: Monitoring and relevant research of Macaronesian Sparrowhawk in the archipelagos.

## *1 - BIOLOGICAL ASSESSMENT*

### Taxonomy and biogeographic populations

- Phylum: Chordata
- Class: Aves
- Order: Accipitriformes
- Family: Accipitridae
- Genus: *Accipiter*
- Species: *Accipiter nisus* (Linnaeus, 1758)
- Subspecies: *Accipiter nisus granti* (Sharpe, 1890)

The Macaronesian Sparrowhawk (*Accipiter nisus granti*) is one of the six recognised subspecies of the Eurasian Sparrowhawk (*A. nisus*), from which it is separated on the basis of morphological differences. This subspecies has the smallest distribution range, only breeding in Madeira Island and Canary Islands, where it is endemic (Meyburg *et al.*, 2017).

### Distribution

In the archipelago of Madeira, the Macaronesian Sparrowhawk is resident and restricted to the Madeira Island. *Life+ Fura-bardos* project revealed that the Macaronesian Sparrowhawk is dispersed throughout the island (with confirmed presence in 125 squares 2x2 km during the breeding period) (SPEA, 2017), as already suggested in the Atlas of the Breeding Birds of Madeira Archipelago in 2009-2012 (where presence was confirmed in 25 squares 2x2 km; Equipa Atlas, 2013).

In the Canarian archipelago, this raptor is considered resident in the islands of El Hierro, La Palma, La Gomera, Tenerife and Gran Canaria. In El Hierro and Gran Canaria, breeding had gone unnoticed in the past, but was confirmed in the decades of 1980 and 1990, respectively. In the Atlas of the Breeding Birds of Canarian Archipelago, the species occupied a total of 122 squares 5x5 km, distributed among the five islands (Lorenzo, 2007). Currently, breeding is confirmed for the five islands (306 squares 2x2 km or 114 squares 5x5 km during the breeding period) (SPEA, 2017). In addition, the Canarian archipelago receives continental migratory sparrowhawks, especially during the winter season on the easternmost islands of Lanzarote and Fuerteventura, the closest to the African coast (Martín & Lorenzo, 2001).

### Habitat requirements

Macaronesian Sparrowhawk, as other raptors, exhibit territorial behaviour, often using the same nesting area over the years, and usually building a new nest each year, close to the previous one (Newton, 1986). In the Canary Islands, fidelity to the breeding territory and the nest site has been confirmed by different studies in the different islands. Also, these aspects make the Macaronesian Sparrowhawk vulnerable to habitat degradation, which can reduce their nesting area and therefore their reproductive capacity.

Most literature refers the Laurissilva as the breeding habitat of the Macaronesian Sparrowhawk on Madeira Island. However, this species can explore different habitats predominantly mixed forest areas (native and exotic tree species), with preference for native species such as *Laurus novocanariensis* and *Morella faya* as nest trees (SPEA, 2017).

In the Canary Islands, it is also eminently a forest species present in different forest habitats. However, the species shows preference for areas of "Monteverde" (different stages of Laurissilva and *Erica* shrub forest) and of Canary pine forest (*Pinus canariensis*) woods, as well as

reforestation stands with species like *Pinus radiate*. Occasionally, the species even breeds in avocado (*Persea americana*) orchards.

Whereas breeding territories are mainly located in forest patches in valleys with some slope, with nearby streams and open areas (mostly agricultural fields, either in use or abandoned) they were detected in different forest habitats throughout the islands. Farm fields and urban areas are mainly used for hunting.

**Diet**

Macaronesian Sparrowhawk diet comprises mainly small to medium-sized birds. Prey collected and identified during the project *Life+ Fura-bardos* suggest a broad diet (18 spp. in Madeira / 29 spp. in Canaries), but some species stood out: *Turdus merula, Serinus canaria* and *Columba trocaz*, in Madeira Island; *Turdus merula, Serinus canaria*, *Fringilla coelebs* and *Phylloscopus canariensis*, in Canary Islands (SPEA, 2017). In Madeira Island, the diet diversity of the Macaronesian Sparrowhawk depends on prey availability, which seems to be dependent on several environmental factors, breeding season and individual feeding behaviour (González, 2016). These diet and feeding practices are similar to the ones that take place in the Canary Islands, particularly in the island of Tenerife.

**Survival and productivity**

The latest monitoring actions within the *Life+ Fura-bardos* project were based in the estimation of the subspecies' phenology and reproductive rates. The breeding season occurs from mid-February till the end of August, according to four phases (mating starting in February; incubation between mid-April and mid-June; hatching and nestling periods from late May until mid-July; and fledging from late June to late August). Habitat, nests' altitude and different years showed minor variations in this dates. In fact, during 2015, in the island of Madeira, it was verified that altitude influences the breeding phenology of Macaronesian Sparrowhawk, with the breeding season starting earlier at lower altitudes, a fact probably related to the increase of rainfall and decrease of temperature with altitude (Hervías *et al.*, 2017).

For Madeira Island, the mean ± SD breeding success (percentage or proportion of breeding pairs that produce at least one fledgling) of the Macaronesian Sparrowhawk was 0.73 ± 0.01 (n = 18) and 0.78 ± 0.34 (n = 16) in 2015 and 2016, respectively (Hervías *et al.*, 2017; SPEA, 2017), with most of the breeding failures in 2015 being associated with forest exploitation (Hervías *et al*., 2017).

The mean ± SD number of fledglings/active nest in Madeira was 2.27 ± 0.04 (0-3) in 2015 (n = 18; Hervías *et al.*, 2017), and 2.06 ± 1.12 (0-4) in 2016 (n = 16). Nests were located between 4.5 and 16 m high (mean ± SD = 10.9 ± 3.12 m), and mainly in native species, such as *Laurus novocanariensis*, but also in exotic like *Pinus* sp., *Acacia* sp. and *Quercus* sp. (Hervías *et al.*, 2017; SPEA, 2017).

Up-to-date information in the Canary Islands is still being analysed, however previous studies showed that clutch size varies from 2 to 5 eggs (mean = 3.2), and nests are generally located on trees between 6 and 10 m high (min 5 - max 16 m) in Laurissilva trees, but *Pinus radiata*, *Pinus canariensis* and *Cupressus macrocarpa* are also used (Delgado *et al.*, 1987; Martín & Lorenzo, 2001; Barone & Atienza, 2004).

In the Canary Islands, pair density is not the same in all habitats as in other regions (Newton, 1986). In Tenerife, with the better known and surveyed areas, the scarce data indicates that, in the southern pine forests, pair density is much lower than in areas of Laurissilva and/or mixed pine forest (Delgado, 1986; Martín & Lorenzo, 2001). This is surely related to the density of potential prey in each of these habitats (Carrascal & Palomino, 2005). It was found that, in some

relatively well studied areas of Tenerife (Los Rodeos-Anaga and La Esperanza), the average distances between neighbouring pairs were about 800 m and 1000 m, respectively (SPEA, 2017).

### Population size and trend

In the last Management Statement adopted in 1999 (BirdLife International, 1999), the Madeiran population of Macaronesian Sparrowhawk was considered "probably abundant" according by experts' references (Oliveira, 1999). However, in the Atlas of the Breeding Birds of Madeira Archipelago, the population was considered "less abundant" or "rare", and estimated at 100-500 pairs (Equipa Atlas, 2013; see Table 1). It is important to consider that this was a poor-quality estimate because of the inadequacy of the methodology applied. According to BirdLife International (2015), the population trend of the subspecies was unknown in Madeira Island.

For the Canarian archipelago, the 1980 census of raptors estimated a minimum of 200 pairs of Macaronesian Sparrowhawk, but according to the last census in the European Red List of Birds (BirdLife International, 2015), the population was estimated between 250-1000 pairs (Martín & Lorenzo, 2001; Palomino & Valls, 2011). These estimations were judged to have medium quality and the population trend is now reported as increasing (BirdLife International, 2015). This increase is related to an improvement of the forest area in the islands in the last decades (Barone & Atienza, 2004; Lorenzo, 2007).

Within the scope of the project *Life+ Fura-bardos*, Macaronesian Sparrowhawk population in Madeira Island was estimated to be 43-99 pairs and in Canary Islands 460-795 pairs (SPEA, 2017) (see Table 1). For both archipelagos numbers are now updated and present higher quality since methodologies used were improved and adapted for the specific survey of this species.

**Table 1.** Breeding population estimates of the Macaronesian Sparrowhawk.

| Archipelago | Management Statement 1999 population estimate (pairs) | After census population estimate (pairs) | Current population estimate (pairs) |
|---|---|---|---|
| Canary Islands | 200[1] (1988) | 250-1000[3] (1997-2003) | 460-795[4] (2014-2016) |
| Madeira | Abundant[2] (1999) | 100-500[3] (2009-2012) | 43-99[4] (2014-2016) |

[1] Several authors, 1988.
[2] Oliveira, P., 1999.
[3] BirdLife International, 2015.
[4] SPEA, 2017.

## *2 - THREATS*

### General overview

In the past, Bannerman & Bannerman (1965) indicated human persecution as one of the greatest threats to the Macaronesian Sparrowhawk. Over time, due to the subspecies' discrete characteristics as well as the lack of studies, no other threats were identified in Madeira. Nowadays, given habitat requirements, the fact of having territorial behaviour and being endemic to Madeira and the Canaries, the most eminent threats are related to habitat changes observed in recent years.

Recent wildfires in Madeira that ravaged several forested areas, including Laurissilva SPA areas, and the impact of forest management on breeding areas, are the main threats to Macaronesian Sparrowhawk in the island. Also in Canaries, important forest fires in the last decades had an effect on their populations, especially in *Pinus canariensis* forests.

In addition, the destruction and fragmentation of the natural forest, and non-natural mortality, such as illegal shooting and poisoning (Barone & Atienza, 2004) or collisions with power lines and other structures are also threats in the Canary Islands. Data collected at wildlife recovery centres in the archipelago allowed identifying this threats (Rodríguez *et al*., 2010; Medina, 2014; Montesdeoca *et al*., 2016) which, although there is no data to confirm it, presumably also takes place in Madeira.

Finally, disturbance in the breeding area by tourism and recreational activities, and plundering of nests, even if localized and not so important, are potential threats to the Macaronesian Sparrowhawk.

### List of critical and important threats

### A - Habitat degradation - causes:

1. Forest fires

*High intensity in Madeira and Canary Islands*

This type of habitat destruction affects breeding territories and the availability of prey in a long perspective, due to the number of years that the natural habitat takes to recover. In Canaries, during the fires of August of 2016, 11% of the total forest area of La Palma burned, affecting, at least, two confirmed territories of Macaronesian Sparrowhawk (6,4% of the population of the island). However, it is now known that Macaronesian Sparrowhawk can still occupy the area, if the forest fire is not severe, leaving forest patches or small unburned areas.

In Madeira Island, fires were responsible for the annual destruction of 1698 ± 1855 ha (mean ± SD) of forest between 2010 and 2015, contributing to the degradation of the areas and changing habitat structure. In 2016, the total burned area was 6270 ha corresponding to 65% of the forest area, and affected seven confirmed territories of Macaronesian Sparrowhawk (16% of the known population). Juveniles had already started flights in burned territories, however it is not known if they survived to fire. During the last field work since 2014, it was found that some nesting areas were located in forest patches under after fire regeneration (SPEA, 2017), but the actual response to fire is still unknown.

It is also important to mention that invasive plants are a threat associated with the fires in Madeira, as they can facilitate new forest fires, increasing fire risk in the breeding territories of the Macaronesian Sparrowhawk.

2. Forest management

*High intensity in Madeira and Canary Islands*

In the Canaries, the Laurissilva, the third largest potential plant formation (86,624 ha or 11.7% of the islands' surface), with outstanding floristic and biogeographical value, suffered a dramatic retreat that left only 12% of its potential extent (10,181 ha). This biggest destruction was on Gran Canaria, where it barely reached 1% of its primitive distribution, while La Gomera and La Palma host to the best reserves (Del Arco *et al*., 2010).

The Laurissilva has been partially destroyed to provide carbon and agricultural areas, although this is now decreasing since it has been better controlled by the regional and island administrations. In fact, in recent years the effort to recover the Laurissilva ("Monteverde") in Gran Canaria has increased considerably, as well as in Tenerife in the last decades, where the recovery of different forests have been carried out with better forest management.

These forest measures have also controlled the collection of pine needles accumulated in the soil ("pinocha") inside the pine forests. It is also noteworthy the work of naturalization of the pine forest, carried out by the islands administrations, especially in Tenerife, consisting in the removal of exotic species (*Pinus radiata*) and their replacing with Laurissilva species or Canary Pine (*Pinus canariensis*). Actions are also being carried out to clarify or naturalize old repopulations of Canary Pine.

Presumably all these actions are assumed to have a relatively significant positive impact on the Macaronesian Sparrowhawk and are part of the Canarian Forest Plan[1]. Nevertheless, such optimal habitat changes are a threat to birds, especially in the breeding season and on territories of Macaronesian Sparrowhawk. It is necessary to reconcile the conservation of the species with the forest practices managed by the regional, island and local administration, in order to avoid disturbance and /or direct damage on the nesting territories.

In Madeira, forest exploitation is one of the most important economic activities in the island, with all types of forest logging controlled and licensed by the IFCN (Institute for Forestry and Nature Conservation). During the monitoring of the breeding areas, in 2015, the main cause of breeding failure in the Macaronesian Sparrowhawk was forest logging in areas of exotic forest (Hervías *et al.*, 2017). In 2016, the local administration already considered the location of known nests and territories, but it cannot be discarded the possibility of logging in unknown breeding area that can likely affect nest-site availability.

The threat of invasive plants in native forest is increasing, which lead to the implementation of control programs with punctual monitoring efforts combined with a rapid response to treat/ eradicate invasive species. These programs have been carried out by the IFCN mainly in protected areas habitats, such as Laurissilva.

The lack of awareness within the forest management sector about the Macaronesian Sparrowhawk and its habitat should be considered in management actions, as one of the causes of this threat.

[1]http://www.gobcan.es/opencmsweb/export/sites/medioambiente/piac/galerias/descargas/Documentos/Biodiversidad/Forestal/planforestal.pdf

3. Destruction and fragmentation of the natural forest

*Medium/low intensity in Canary Islands*

In the Canaries, illegal tree logging occurs in several areas. If these activities take place within breeding territories of the Macaronesian Sparrowhawk, they can both affect the nesting area or the tree isolated where the nest is located.

In potential forest areas, plantation with native forest species should be prioritized over other uses such as new crops, infrastructures, etc.

**B - Non-natural mortality – causes:**

1. Collisions (windows, vehicles, aerial cables and other structures)

*Unknown intensity in Madeira and Canary Islands*

Collisions are an additional problem during the fledging period in summer and in general, in the movements of birds to agricultural and rural habitats outside the forest to feed.

In the Canary Islands, this is suspected to have a high impact, considering that is one of the main causes of injured individuals in the recovery centres in Tenerife, La Palma and Gran Canaria (Rodríguez *et al*., 2010; Medina, 2014; Montesdeoca *et al*., 2016). The problem would obviously extend to the remaining islands where the Macaronesian Sparrowhawk lives. Most collisions occur with windows, vehicles and aerial cables.

In Madeira, there is no recovery centre where this type of information can be obtained. The existing information comes from rare and non-systematic records of collisions with windows and vehicles. A management entity of roads in Madeira, recorded 767 occurrences with birds in about 70 km of road between 2012 and 2016, mostly due to collisions with vehicles. Although, species identification was not always possible in these records, no Macaronesian Sparrowhawk was identified. Also, a study on the interaction and impact of power lines on birds in Madeira did not record any Macaronesian Sparrowhawk killed by collision or electrocution with power lines (Gouveia & Fagundes, 2012).

2. Secondary poisoning by rodenticide in agricultural areas

*Unknown intensity and localized in Canary Islands*

The poisoning of Macaronesian Sparrowhawk by the use of toxic substances has been verified (Luzardo *et al*., 2014; Ruiz-Suárez *et al*., 2016), probably due to indirect intoxication through the consumption of poisoned rodents or birds. In addition, there are admissions of poisoned individuals in the recovery centers of Tenerife, La Palma and Gran Canaria (Rodríguez *et al.*, 2010; Medina, 2014; Montesdeoca *et al*., 2016)[2]. This problem now has a legal framework with the Orden de 28 de marzo de 2014, which approves the strategy for the eradication of illegal use of poison in the non-urban environment of the Canaries. This strategy is being gradually implemented in the islands by regional and island administrations.

[2] Quantitative data. In Tenerife, 92 injured Macaronesian Sparrowhawks were admitted to the Centro de Recuperación de Fauna Silvestre La Tahonilla in the 1998-2007 period, two were shot by firearms, 51 by collision, three by disease, two by glue, five by starvation, two by others causes, and 27 for unknown causes (Rodríguez *et al*., 2010), while in the period 2000-2012, to Centro de Recuperación de Fauna Silvestre de La Palma there were about 16 cases, eight for shocks, four for firearms and four for unknown causes (Medina, 2014), and in Gran Canaria a total of 63 individuals were admitted to the Centro de Recuperación de Tafira in 2003-2013, most of them by collisions (Montesdeoca *et al.*, 2016).

3. Mortality in rodent traps (glue traps)

*Low intensity and localized in Canary Islands*

This is a major problem, particularly for nocturnal raptors, both, the Canarian Long-eared Owl (*Asio otus canariensis*) and the Barn Owl (*Tyto alba*), and also for the Canarian Common Kestrel (*Falco tinnunculus canariensis*). However, there are records of Macaronesian Sparrowhawk killed in rodent traps on the island of Tenerife and Gran Canaria (Rodríguez *et al*., 2010; Montesdeoca *et al*., 2016), probably when trying to capture trapped rodents or small birds.

4. Illegal hunting (shooting)

*Low intensity and localized in Canary Islands*

This activity has decreased in recent decades, but still occurs occasionally. For example, there are admissions of slaughtered individuals in the recovery centers of Tenerife, La Palma and Gran Canaria (Rodríguez *et al.*, 2010; Medina, 2014; Montesdeoca *et al*., 2016), although the problem is extended to the remaining islands where the Macaronesian Sparrowhawk lives. In addition, there could be some conflict with the activity of the columbiculture and therefore persecution of this species, however presumably the problem is more important with other raptors, especially with the Barbary Falcon (*Falco pelegrinoides*).

5. Other causes

*Unknown intensity and localized in Canary Islands*

Drowned specimens have been found in irrigation ponds, water tanks and reservoirs of water channels and run off drains. Although these cases were reported in El Hierro and Tenerife, such cause of mortality probably occurs in other Canary Islands as also in Madeira. In addition, accidents of specimens trapped in *Setaria adhaerens* plants have also been reported recently (Rodríguez *et al.*, 2010; Montesdeoca *et al*., 2016).

Another problem is the increasing activity of falconry and the possession in captivity of individuals of European Sparrowhawk that can escape or be released and, potentially, can change the genetic purity of the native population. Because of this, the regulation that managed the falconry has hunting modality in Canaries (Reglamento de la práctica de cetrería en la Comunidad Autónoma de Canarias) does not authorize the use of any sparrowhawk, European or Macaronesian, for this activity. However, contradictorily, the regulation allow to keep sparrowhawks in captivity, but it is forbidden that this birds fly in wild areas.

**C – Disturbance of nests and breeding areas – causes:**

1. Disturbance from recreational activities in breeding areas

*Unknown intensity in Madeira Island / High and localized in Canary Islands*

Nest disturbance, mainly by recreational activities such as hiking, motocross, quads (4-wheelers), etc., may cause nest desertion during laying and incubation, as well as the abandonment of territories from one year to another. It must be said that this type of activity is very frequent and booming in the forest areas of the islands. In the Canary archipelago, it is becoming a serious conservation problem at least in some areas close to towns and cities.

In Madeira, activities such as hiking, canyoning, mountain biking, mainly associated to active tourism are also growing. Impacts on the Macaronesian Sparrowhawk, although still not detected,

may also become important in the future. In some territories, nests were found very close to trails used for hiking. However, there is not enough information available to understand the level of threat that this may represent.

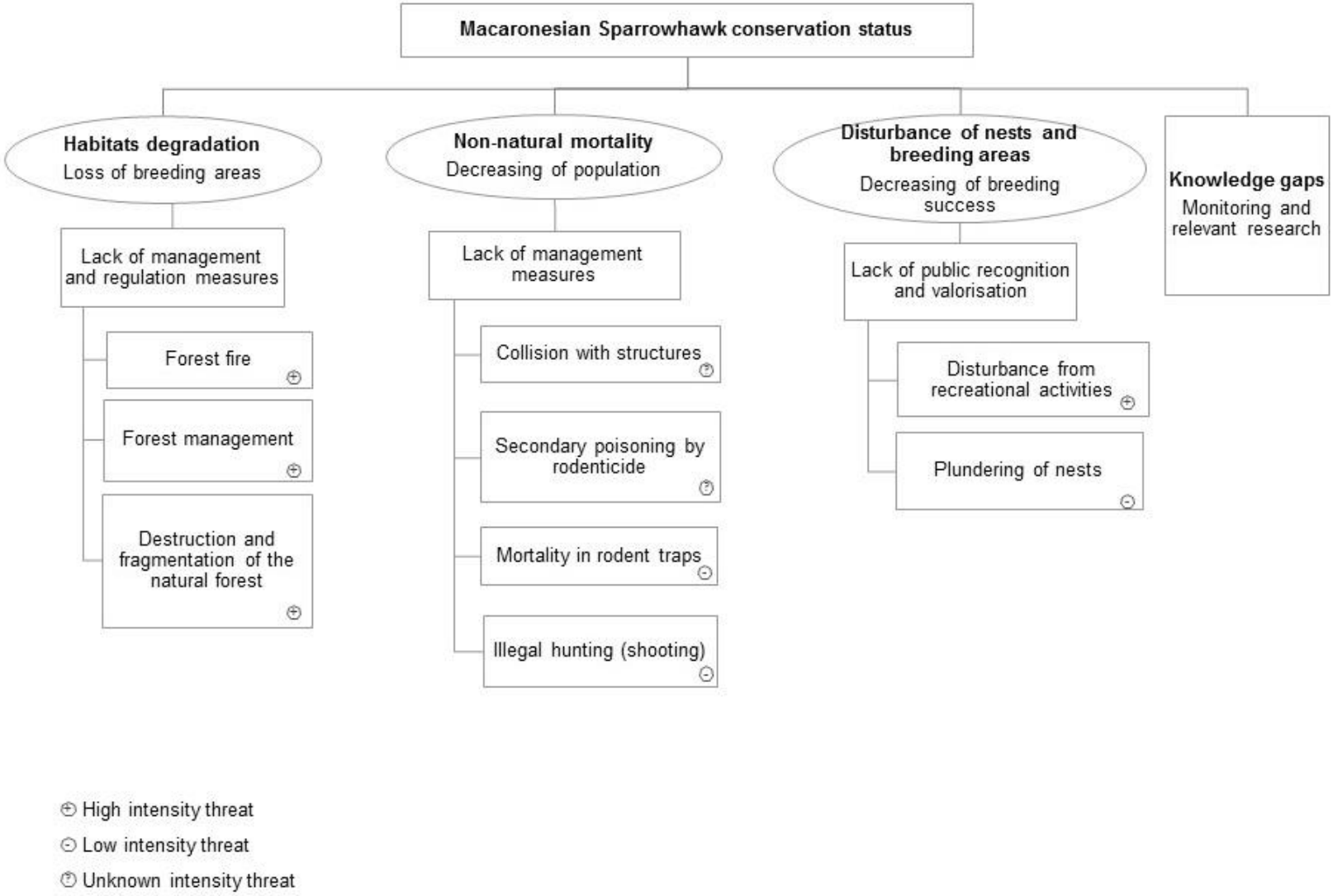
The lack of awareness of the tourism sector about the value of the Macaronesian Sparrowhawk and its habitat, is one of the causes of this potential threat that should be considered. Which can, in some cases, help in obtaining the adequate conditions for the accurate development of the different activities.

2. Plundering of nests for scientific collecting of eggs and nestlings to the falconry

*Low intensity and localized in Canary Islands*

In Tenerife, evidences of this illegal extractive activity in nests and territories were obtained in 2014, although this illegal activity was already suspected from years ago. The true impact on this species and other raptors is unknown, although it is probably more critical for Barbary Falcon.

**Figure 1** - Tree problem



## *3 - POLICIES AND LEGISLATION RELEVANT FOR MANAGEMENT*

### International and national conservation and legal status

**Table 2.** International and national conservation and legal status of the Macaronesian Sparrowhawk.

| ***SP_LAT*** | **Birds Directive** | **IUCN**[1] | **CON_ BERN**[3] | **CON_ BONN**[4] | **CON_ CITES**[5] | **Canary Islands** | | | | **Madeira Island** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **SP_ CAS** | **CEEA and LSPE**[6] | **LR**[8] | **CANA**[10] | **SP_ POR** | **LV**[12] |
| *Accipiter nisus granti* | Annex I | LC[2] | Appendix II | Appendix II | Appendix II | Gavilán común canario | LSPE[7] | VU[9] | Anexo 6[11] | Fura-bardos | LC |

[1] The IUCN Red List of Threatened Species (BirdLife International, 2016)
[2] Least Concern
[3] Bern Convention - Convention on the Conservation of European Wildlife and Natural Habitats
[4] Bonn Convention - The Convention on Migratory Species
[5] CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora
[6] *Catálogo Español de Especies Amenazadas* and *Listado Especies Silvestres en Régimen de Protección Especial*
[7] Included in *Listado Especies Silvestres en Régimen de Protección Especial*
[8] *Libro Rojo de las Aves de España* (Barone & Atienza, 2004)
[9] Vulnerable
[10] *Catálogo Canario de Especies Protegidas*
[11] *Especies de Interés Especial en el catálogo estatal*
[12] *Livro Vermelho dos Vertebrados de Portugal* (Almeida *et al*., 2005)

### National policies and legislation

All the international policies were transposed to national and/or regional legislation. In Madeira the forest breeding habitat, Laurissilva, is classified as SPA and Special Area of Conservation (SAC), and is also included in regional protected area of Madeira Natural Park (*Decreto Legislativo Regional* n. º14/82/M, from 10th November). The use of this territory is regulated by the Plan of Management of the Laurissilva of Madeira (*Resolução* n. º 1412/2009, from 19th November and *Declaração de retificação* n. º 13/2009, from 27th November). The breeding habitat of Macaronesian Sparrowhawk also includes other forest habitats, with a planned management (*Decreto Legislativo Regional* n. º 35/2008/M, from 14th August).

Most of the forest habitats of the Canary Islands are protected areas, within the *Red Canaria de Espacios Naturales Protegidos* (*Ley 12/1994, de 19 de diciembre de Espacios Naturales de Canarias*). Also, most of them are classified as Natura 2000 network as SPA or SAC. The management of the forest habitats where the Macaronesian Sparrowhawk lives is regulated on an island and local scale through the municipalities of each island, but the current *Canarian Forest Plan* is the planning instrument that establishes the necessary guidelines for the correct management of the forest resources in the islands, as well as the *Instrumentos de Gestión de los Espacios de la Red Natura 2000*, which includes the regulation of the use of the site, integrating all sectorial policies with impact on space. On the other hand, *Ley 43/2003, de 21 de noviembre, de Montes (modificada por la Ley 21/2015, de 20 de julio, por la que se modifica la Ley 43/2003, de 21 de noviembre, de Montes*), aims to guarantee the conservation and protection of spanish forests, promoting their recovery, improvement, sustainability and rational use, based on collective solidarity and territorial cohesion and is applicable to all spanish forests.

**Recent conservation actions**

In the last twenty years, some census and atlas of birds for the archipelago of Madeira were made, which yielded rough estimates of populations and distribution for the Macaronesian Sparrowhawk. In 1999, as requested of the European Commission, a Management Plan for the subspecies was developed by BirdLife International but, until the beginning of the project *Life+ Fura-bardos - Conservation of Macaronesian Sparrowhawk and the Laurissilva Habitat in Madeira Island* (LIFE12 NAT/PT/000402; from 2013 to 2017) there were no conservation measures targeting the species.

It is important to mention that in Madeira the species has been favoured by other conservation actions on the habitat, mainly on Laurissilva as a SPA area and also with the long-term monitoring of the endemic Madeira Laurel-pigeon (*Columba trocaz*).

In the Canary Islands as well, there were conservation actions on the habitat (protection, repopulations, etc.) and on the species (monitoring, protection, etc.) under the scope of local, regional and *Life* funded projects, especially with endemic pigeons (*Columba bollii* and *C. junoniae*), and with the Blue Chaffinch (*Fringilla* [*teydea*] *polatzeki*) as well as with Great Spotted Woodpecker (*Dendrocopos major canariensis*). Curiously, these four species and Madeira Laurel-pigeon make part of the Macaronesian Sparrowhawk diet.

## *4 - FRAMEWORK FOR ACTION*

### Goal

Set priorities for the conservation of the Macaronesian Sparrowhawk in the Madeira Island and the Canary Islands, ensuring these threats do not increase in the future, stimulating conservation efforts to prevent species from declining further in their species' conservation status evaluated by the IUCN Red List.

### Objective

Ensure positive population trend of the breeding populations of the Macaronesian Sparrowhawk in the Macaronesian archipelagos for the next 5 years.

### Results expected

**Result A:** Management and regulation measures to recover and maintain the habitat of Macaronesian Sparrowhawk (nesting and availability of food).

**Result B:** Regulation and mitigation measures to reduce non-natural mortality of Macaronesian Sparrowhawk.

**Result C:** Public recognition and valorisation of Macaronesian Sparrowhawk and its habitat.

**Result D:** Monitoring and relevant research of Macaronesian Sparrowhawk in the archipelagos

## Actions

**Table 3.** Actions to be undertaken to achieve the objective of the action plan.

| Actions | Priority | Responsible organisations | Time scale | | | | |
|---|---|---|---|---|---|---|---|
| | | | 2017 | 2018 | 2019 | 2020 | 2021 |
| **Result A:** Management and regulation measures to recover and maintain the habitat of Macaronesian Sparrowhawk (nesting and availability of food). | | | | | | | |
| **A.1 – Reduce the number of breeding territories of the Macaronesian Sparrowhawk affected by fires**<br>Indicators: Number of affected territories \| Number of existing territories | | | | | | | |
| A.1.1 – Include mapping of important areas to Macaronesian Sparrowhawk in the Forest Fire Prevention and Surveillance Plans<br><br>**Applicable to: Madeira and Canary Islands** | High | IFCN<br>Island Councils and Government of Canary Islands | | x | x | x | x |
| A.1.2 – Limit the areas occupied by invasive plants, namely gorse (*Ulex europaeus*), broom (*Cytisus scoparius)* and acacias (*Acacia sp*.) that increase risk of fire in the breeding territories of the Macaronesian Sparrowhawk<br><br>**Applicable to: Madeira Island**<br>**Potential funding: Rural Development Program of the Autonomous Region of Madeira - PRODERAM (investments in at least 500 ha) and Maintenance of recovered areas in the *Life+ Fura-bardos* (about 100ha)** | Medium | IFCN | x | x | x | x | x |
| **A.2 – Reduce the number of breeding territories of the Macaronesian Sparrowhawk destroyed by forest logging**<br>Indicators: Number of affected territories and number of abandoned territories \| Number of existing territories | | | | | | | |
| A.2.1 – Include in the licenses of logging trees, mitigation measures to prevent breeding failure in known Macaronesian Sparrowhawk nests<br><br>**Applicable to: Madeira and Canary Islands** | Medium<br><br>Critical / High | IFCN<br><br>Island Councils and Local Administration | x | x | x | x | x |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A.2.2 – Incorporate protection measures in the Canary Islands and Madeira Forest Management Plans for breeding areas of the Macaronesian Sparrowhawk<br><br>**Applicable to: Madeira and Canary Islands** | Medium | IFCN<br>Island Councils and Government of Canary Islands | x | x | x | x | x |
| A.2.3 – Training courses for workers and managers of the logging companies on techniques how to protect nests and breeding areas of Macaronesian Sparrowhawk<br><br>**Applicable to: Madeira and Canary Islands**<br>**Potential funding: Rural Development Program of the Autonomous Region of Madeira - PRODERAM and European Social Fund** | Medium | IFCN<br>SPEA<br>Island Councils SEO/BirdLife | | x | x | x | |
| A.2.4 – Produce a guide of forest good practices for the conservation of the Macaronesian Sparrowhawk for workers and managers of the logging companies<br><br>**Applicable to: Madeira and Canary Islands**<br>**Potential funding: Rural Development Program of the Autonomous Region of Madeira - PRODERAM and INTERREG** | Medium | SPEA<br>SEO/BirdLife | | x | x | | |
| A.2.5 – Integrate the measures of conservation of the Macaronesian Sparrowhawk in the guide of forest good practices, to be elaborated within the scope of the PROF-RAM and of the Forest Management Plan of the Canary Islands<br><br>**Applicable to: Madeira and Canary Islands** | Medium / High | IFCN<br>Island Councils SEO/BirdLife | | | | x | x |
| **A.3 – Reduce the use of the Laurissilva and pine forest**<br>Indicators: Number of infractions for the use of the Laurissilva and pine forest | | | | | | | |
| A.3.1 - Integrate the measures of conservation of the subspecies in the manual of forest good practices, to be elaborated within the scope of the Forest Management Plan<br><br>**Applicable to: Canary Islands** | Medium / High | Island Councils and Local Administration | | x | x | x | x |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A.3.2 – Campaign to promote the use of alternative materials<br><br>**Applicable to: Canary Islands** | Medium / High | SEO/BirdLife<br>Island Councils and Government of Canary Islands | | x | x | | |
| A.3.3 - Reforestation or recovery of suitable forests in the Canary Islands<br><br>**Applicable to: Canary Islands** | Critical / High | SEO/BirdLife<br>Island Councils and Government of Canary Islands | | x | x | x | x |
| **Result B:** Measures to reduce non-natural mortality of the Macaronesian Sparrowhawk | | | | | | | |
| **B.1. – Reduce the mortality of the Macaronesian Sparrowhawk by collision with structures**<br>Indicators: Number of entries in recovery centres \| Number of recovered birds | | | | | | | |
| B.1.1 – Identify the black spots of this type of mortality and promote mitigating measures<br><br>**Applicable to: Madeira and Canary Islands** | Medium<br><br>Critical / High | IFCN<br>SPEA<br>Government of Canary Islands<br>SEO/BirdLife | x | x | x | x | x |
| B.1.2 – Create a wildlife recovery center in Madeira<br><br>**Applicable to: Madeira Island**<br>**Potential funding: INTERREG – Project LuminAves (30 000€ for infrastructures and 19 785€ for equipment)** | High | IFCN | x | x | | | |
| **B.2 - Reduce the mortality of the Macaronesian Sparrowhawk due to secondary poisoning**<br>Indicators: Number of entries in recovery centres \| Number of recovered birds | | | | | | | |
| B.2.1 – Promote the appropriate use of rodenticides by farmers, with training courses and leaflets<br><br>**Applicable to: Madeira and Canary Islands**<br>**Potential funding: Rural Development Program of the Autonomous Region of Madeira - PRODERAM** | Medium | IFCN<br>Community Houses | | x | x | x | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Critical / High | Farmer's associations<br>Island Councils<br>Local Administration | | | | | |
| B.2.2 – Test poisons in wild birds found dead. Establish a protocol between the IFCN and the University of Gran Canaria to send birds from Madeira for analysis<br><br>**Applicable to: Madeira and Canary Islands** | Medium<br>Critical / High | IFCN<br>SEO/BirdLife<br>Department of Forensic Medicine, University of Gran Canaria | | x | x | x | x |
| **B.3 - Reduce the mortality of the Macaronesian Sparrowhawk in glue traps**<br>Indicators: Number of entries in recovery centres \| Number of recovered birds | | | | | | | |
| B.3.1 – Promote the appropriate use of glue traps<br><br>**Applicable to: Canary Islands** | Medium | SEO/BirdLife<br>Government of Canary Islands<br>Island Councils<br>Local Administration | | x | x | x | |
| **B.4 - Reduce the mortality of the Macaronesian Sparrowhawk by illegal hunting (shooting)**<br>Indicators: Number of entries in recovery centres \| Number of recovered birds | | | | | | | |
| B.4.1 – Carry out awareness campaign on the importance of the Macaronesian Sparrowhawk (include information in the exams for the hunting license)<br><br>**Applicable to: Canary Islands** | Medium | SEO/BirdLife<br>Island Councils and Government of Canary Islands | x | x | x | x | x |
| **Result C:** Recognition and valorisation of the Macaronesian Sparrowhawk and their habitat by citizens. | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **C.1 – Reducing the impact of recreational activities in breeding areas**<br>Indicators: Number of awareness actions \| Number of people reached in the awareness actions | | | | | | | |
| C.1.1 – Carry out awareness campaigns to tourism animation companies in the Canaries and Madeira Island and population that use the territories of the Macaronesian Sparrowhawk<br><br>**Applicable to: Canary Islands and Madeira Island** | Unknown<br><br>Medium | SPEA<br>IFCN<br><br>SEO/BirdLife<br>Island Councils and Government of Canary Islands | | x<br><br>x | x<br><br>x | x | x |
| C.1.2 – Consider the biological requirements of the subspecies in the licensing of animation activities (Canyoning, Mountain biking, Jeep Safari) which use Macaronesian Sparrowhawk habitat<br><br>**Applicable to: Madeira Island** | High (Potential) | IFCN | x | x | x | x | x |
| **C.2 – Increase awareness about the Macaronesian Sparrowhawk in the users of outdoor leisure equipment and the education community**<br>Indicators: Number of activities \| Number of people reached in the awareness actions | | | | | | | |
| C.2.1 – Produce a television documentary about the subspecies<br><br>**Applicable to: Madeira Island** | High | IFCN<br>SPEA | x | x | | | |
| C.2.2 – Introduce panels with QR code with information about the Macaronesian Sparrowhawk on the routes and other places visited in areas with occurrence of the subspecies<br><br>**Applicable to: Madeira Island** | Low | IFCN<br>SPEA | x | x | x | x | x |
| C.2.3 - Keep the Macaronesian Sparrowhawk in IFCN environmental education plan with new and existing materials<br><br>**Applicable to: Madeira Island** | Medium | IFCN<br>SPEA | x | x | x | x | x |
| **Result D:** Monitoring and relevant research on Macaronesian Sparrowhawk in the archipelagos | | | | | | | |
| **D.1 – Develop a monitoring and research plan on Macaronesian Sparrowhawk in the archipelagos** | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Indicators: Number of reports \| Number of scientific publications | | | | | | | |
| D.1.1 - Study the taxonomic status and the degree of genetic divergence between Madeira and the Canary Islands<br>**Applicable to: Madeira and Canary Islands**<br>**Potential funding: FCT project (Funding for Science) for fellowship and analysis costs** | High | IFCN<br>SPEA<br>SEO/BirdLife | | x | x | x | x |
| D.1.2 - Study breeding ecology: preferences of breeding sites and minimum breeding area<br>**Applicable to: Madeira and Canary Islands** | High | IFCN<br>SPEA<br>SEO/BirdLife<br>(Universities) | x | x | x | x | x |
| D.1.3 - Study of trophic ecology, relate diet to food availability and habitat structure of Macaronesian Sparrowhawk<br>(Study the effect of invasive plant / forest fires species on food availability and habitat structure of the Macaronesian Sparrowhawk)<br>**Applicable to: Madeira and Canary Islands** | Medium / Low | IFCN<br>SPEA<br>SEO/BirdLife<br>(Universities) | x | x | x | x | x |
| D.1.4 - Study levels of contamination with pesticides in feathers or other tissues<br>**Applicable to: Madeira and Canary Islands** | Medium | IFCN<br>SEO/BirdLife<br>Department of Forensic Medicine, University of Gran Canaria | x | x | x | x | x |
| D1.5 - To study the impact of outdoor leisure activities on the Macaronesian Sparrowhawk in breeding areas, in relation on the location of known nests<br>**Applicable to: Madeira and Canary Islands** | Medium<br>Low | IFCN<br>Island Councils<br>(Universities) | x | x | x | x | x |
| D.1.6 – Monitoring the breeding areas after fires in order to get the response of the distribution habitats of the Macaronesian Sparrowhawk.<br>**Applicable to: Madeira and Canary Islands** | High | IFCN<br>Island Councils and Government of Canary Islands | x | x | x | x | x |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| D.1.7 – Monitoring the population of Macaronesian Sparrowhawk (every 5 years)<br><br>**Applicable to: Madeira and Canary Islands** | High | IFCN<br>SPEA<br>SEO/BirdLife<br>Government of Canary Islands | | | | | x |

## *5 - REFERENCES*


Almeida, J. (coord.), P. Catry, V. Encarnação, C. Franco, J.P. Granadeiro, R. Lopes, F. Moreira, P. Oliveira, N. Onofre, C. Pacheco, M. Pinto, M.J. Pitta Groz, J. Ramos & L. Silva (2005) *Accipiter nisus* Gavião In: Cabral, M.J. et al. (eds.) *Livro Vermelho dos Vertebrados de Portugal*. Instituto da Conservação da Natureza, Lisboa.

Barone, R. & Atienza, J.C. (2004) Gavilán común, *Accipiter nisus granti*. In: Madroño, A., C. González & J.C. Atienza (eds.): *Libro Rojo de las Aves de España*. Dirección General para la Conservación de la Biodiversidad-SEO/BirdLife, Madrid, pp. 142-143.

BirdLife International (on behalf of the European Commission). 1999. *Management Statement Macaronesian Sparrowhawk Accipiter nisus granti.* http://ec.europa.eu/environment/nature/conservation/wildbirds/action_plans/docs/accipiter_n_granti.pdf

BirdLife International (2015) *European Red List of Birds*. Office for Official Publications of the European Communities, Luxembourg.

BirdLife International (2016) *Accipiter nisus*. The IUCN Red List of Threatened Species 2016: e.T22695624A93519953. http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22695624A93519953.en. Downloaded on 04 January 2017.

Carrascal, L.M. & D. Palomino (2005) Preferencias de hábitat, densidad y diversidad de las comunidades de aves en Tenerife (Islas Canarias). *Animal Biodiversity and Conservation.* 28: 101-119.

Del Arco, M.J., R. González-González, V. Garzón-Machado & B. Pizarro (2010). Actual and potential natural vegetation on the Canary Islands and its conservation status. *Biodiversity and Conservation* 19: 3089–3140.

Delgado, G., A. Martín, K. Emmerson & V. Quilis (1987) Biologie de la reproduction de l'Épervier (*Accipiter nisus*) à Ténérife (Iles Canaries). *Alauda* 55 (2): 116-121.

Directive 2009/147/EC (2009) Official Journal of the European Union. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:020:0007:0025:en:PDF

Equipa Atlas - Sepúlveda, P., D. Menezes, I. Fagundes, I. Silva, J. Nunes, J. Ferreira, M. Nunes, N. Coelho, P. Oliveira & S. Freitas - (2013) Atlas das Aves Nidificantes do Arquipélago da Madeira. http://www.atlasdasaves.netmadeira.com

González, Y.G. (2016) Dieta y Ecologia Trófica del Gavilán Común *Accipiter nisus granti* en la Isla de Madeira (Tese de Mestrado). Universidade de La Laguna. Tenerife.

Gouveia, C. & A.I. Fagundes (2012) *Relatório Final do Projeto de Avaliação do Impacte das Linhas Elétricas de Média Tensão em Algumas Espécies de Aves Vulneráveis*. Sociedade Portuguesa para o Estudo das Aves, Funchal (unpublished report).

Hervías, S.P., Y.G. González, E.M. Pereira, A. Vulcano, R.C.S.R. Cabral, N.G. Coelho, I.C. Fagundes, La.B. Castello, M.N. Nunes, C.A. Gouveia & G.C. Delgado (2017) The Eurasian Sparrowhawk of Macaronesia (*Accipiter nisus granti*): Nesting Territories, Phenology, and Breeding Success on Madeira Island, Portugal. *Journal of Raptor Research* 51(1):15-24

Lorenzo, J.A. (ed.) (2007) *Atlas de las aves nidificantes en el archipiélago canario (1997-2003)*. Dirección General de Conservación de la Naturaleza-SEO/BirdLife. Madrid.

Luzardo, O.P., N. Ruiz-Suárez, L.A. Henríquez-Hernández, P.F. Valerón, M. Camacho, M. Zumbado & L.D. Boada (2014) Assessment of the exposure to organochlorine pesticides, PCBs and PAHs in six species of predatory birds of the Canary Islands, Spain. *Science of Total Environment* 472:146-153.

Martín, A. & J.A. Lorenzo (2001) *Aves del Archipiélago Canario*. Francisco Lemus Editor. La Laguna.

Medina, F.M. (2014) Rehabilitación de fauna silvestre en la isla de La Palma durante el periodo 2002-2009. *Revista de Estudios Generales de la Isla de La Palma* 6: 85-98.

Meyburg, B.U., J.S Marks, J.S. & E.J. Garcia (2017) Eurasian Sparrowhawk (*Accipiter nisus*), In: del Hoyo, J., A. Elliot, J. Sargatal, D.A. Christie & E. de Juana (eds.) Handbook of the Birds of the World Alive. Lynx Ediciones, Barcelona.

Montesdeoca, N., Calabuig, P., Corbera, J.A. & J. Orós (2016) Causes of Admission for Raptors to the Tafira Wildlife Rehabilitation Center, Gran Canaria Island, Spain: 2003–2013. *Journal of Wildlife Diseases* 52, 647–652.

Newton, I. (1986) *The Sparrowhawk*. T & A.D. Poyser. London.

Oliveira, P. (1999) *A conservação e gestão das Aves do Arquipélago da Madeira.* Parque Natural da Madeira. Secretaria Regional de Agricultura, Florestas e Pescas. Funchal.

Palomino, D. & J. Valls (2011) *Las rapaces forestales en España. Población reproductora en 2009-2010 y método de censo*. Seguimiento de aves nº 36. SEO/BirdLife. Madrid.

Rodríguez, B., A. Rodríguez, F. Siverio & M. Siverio (2010) Causes of raptor admissions to a wildlife rehabilitation center in Tenerife (Canary Islands). *Journal of Raptor Research* 44:30-39.

Ruiz-Suárez, N., M. Camacho, M. Almeida-González, L. Domínguez, L. Henríquez, M. Zumbado & O. Pérez Luzardo (2016) *Química en el ambiente. Amenaza silenciosa para nuestra fauna*. *InDiferente* 22:26-41.

Several authors (1988) *Censo de las aves rapaces del Archipiélago Canario*. Museo Insular de Ciencias Naturales. Dirección General de Medio Ambiente y Conservación de la Naturaleza. Gobierno de Canarias (unpublished report).

SPEA (2017) *Relatório Final do LIFE+ Fura-bardos - Conservação do Fura-bardos e do habitat de Laurissilva na ilha da Madeira*. Sociedade Portuguesa para o Estudo das Aves. Funchal (unpublished report).