

**ACTION PLAN FOR THE CONSERVATION
OF MIGRATORY BIRDS OF PREY IN MADAGASCAR**

**SOOTY FALCON *Falco concolor*
and
ELEONORA'S FALCON *Falco eleonora***



Adult Sooty Falcon



CONTENT

I. Introduction	1
II. Overview of the two falcon species	2
II.1. Taxonomie et description	2
II.1.a. Taxonomy	2
II.1.b. Physical description	3
II.2. Geographic distribution	5
II.3. Dietary Habits	5
II.4. Behaviour Synopsis	5
II.5. Conservation status	7
II.6. Conservation legal framework in Madagascar	7
II.6.a. National legal framework	7
II.6.b. International conventions ratified by Madagascar	8
III. Brief outline of migratory birds of prey species	9
IV. Geographical scope/impact of the plan	9
V. Overview of threats	12
VII. Objectives of the Action Plan	14
VII. 1. General Objective	14
VII. 2. Specific objectives	14
VIII. Strategic Approach	14
IX. Actions to achieve the objectives of the plan	16
X. Implementation framework	19
XI. Bibliography	26

I. INTRODUCTION

Madagascar, an island country located in the Indian Ocean, separated from the South-East coast of Africa by the Mozambique Channel, is a wintering ground for several migratory bird species. Considering that migratory birds account for a significant part of global biodiversity and that migratory raptors, part of the former category of birds, are located high up the food chain; the main island of Madagascar (the limit of wintering grounds in the Southern Hemisphere) committed itself to take the necessary steps in order to halt the decline of these species, and secure their conservation by integrating in the diverse international conventions such as the Convention on Biological Diversity, the Convention on Migratory Species and the Convention on the Migratory Raptors.

In view of the fact that birds have no geographical boundaries and are also good environmental health indicators, the current Action Plan ensues from the implementation of programs adopted at the conference on migratory raptors that was held in Abu Dhabi in October 2008.

The current Action Plan will primarily aim to restore or maintain raptors wintering in Madagascar during periods of migration (the Sooty Falcon and the Eleonora's Falcon in particular) in a favorable conservation status. It then sets forth the priorities and activities to be conducted on site. In their capacity of migratory species, both falcons depend on the protection efforts, especially on the improvement of their living conditions outside the nesting area. The impact of climate change as well as that of changes brought to habitats along the migration routes may have adverse effects on these species, such as delayed migration, scarcity of food along the journey (lack or decline in insect quantities.).

In addition, this Action Plan outlines the general framework (objectives, strategies, measures) to protect these two species of migratory falcons in order to plan ahead for long-term conservation.

The development of the present Action Plan was based on data collected during the migration period 2010-2011 and more specifically before its return to its breeding area (before May 2011). The site visits made for collection of source data were held around the Malagasy highlands, in the vicinity of the capital such as in the regions of Analamanga, Itasy, Vakinankaratra, Bongolava, and in part of the Alaotra-Mangoro.

II. OVERVIEW OF THE TWO FALCON SPECIES

II.1. Taxonomy and description

II.1.a. Taxonomy

The Sooty Falcon (*Falco concolor*) and the Eleonora's Falcon (*Falco eleonora*) are diurnal raptors species belonging to the family Falconidae.

Classification :

Kingdom : Animalia
Phylum: Chordata
Sub-Phylum : Vertebrata
Class : Aves
Order : Falconiformes
Family : Falconidae

Genus : *Falco*
Species : *Concolor* Temminck, 1825

Vernacular name :

Faucon concolore (in French)
Sooty Falcon (in English)

Genus : *Falco*
Species : *Eleonora* Gené, 1939

Vernacular name :

Faucon d'Eléonore (in French)
Eleonora's Falcon (in English)

II.1.b. *Physical description*

Eleonora's Falcon is a medium-sized falcon (33 to 38 cm long), slender with narrow wings and a long rounded tail. The adult male has two colour variations/ morphs. The light morph is the most common and has a blackish slate-grey top, a cream area behind the blackish “moustache” and a cream buff throat with dark stripes. The underside is reddish buff with heavy blackish streaks and with a plain abdomen. The cere and the circle around the eye are yellow. The dark morph of the male is dark brown to slate black all over, often with a cream throat and sometimes with a reddish tinge on the lower underside. The cere and circle around the eye are yellow. The female resembles the dark morph of the male, but is usually slightly darker. The cere and circle around the eye are clear pale blue. Like the male, juveniles have the two morphs, but with the top fringed with cream and red, and buff and red underside with brownish traits. The pectoral streaks are thick but thinner on the belly and underside. The cere is bluish and the feet are green.

The Sooty Falcon: The falcon has a medium-size body and length ranges from 31 to 33 cm. The species does not demonstrate any sexual dimorphism. However, the plumage is highly variable with age. In general, the adult plumage is dark grey to ashen-grey uniform. The chest, belly and back are discreetly striped in black. We noticed that the medium-sized adults have a dark grey plumage with black vertical streaks in the chest, as well as on the belly and the back. The observed juveniles accounted for two morphological types, one of which has a lighter plumage at the ventral part and the other has a closer morphology to the adult with the exception of the white part at the throat, which is very visible.



Juvenile of a Falco concolor

II.2. Geographic distribution

As the two species of falcons are migratory species, they cover a wide range of geographic distribution.

In fact, the Eleonora's Falcon meets and nests in the islands of the Mediterranean Sea, on the East of the Canary Islands, on the West coast of Morocco, on the northeast coasts of Algeria and Tunisia. In October, it migrates to Madagascar and the islands along the African coast.

As for the Sooty Falcon, it breeds in North Africa, in the Middle East, in the Red Sea region and in the south-western part of Pakistan. The species spends the winter in the southeast of Africa, mainly in Madagascar but also in the adjacent African coasts. In Madagascar, the Sooty Falcon spreads throughout the island, although it is rather common in the South and in the West, especially in the highlands of Madagascar.

II.3. Dietary Habits

The diet of Eleonora's Falcon consists of insects from the orders Odonata, Orthoptera and Coleoptera during its migration journey to Madagascar.

The Sooty Falcon hunts alone or in pairs. It hunts insects, birds, and occasionally bats skillfully and mostly while flying.

II.4. Behaviour Synopsis

The two species of falcons are migratory birds of prey. These are species with flock behaviour. The Sooty Falcon, for example, has been observed in small groups, usually ranging from four to twelve individuals, but also in large groups of up to 25 individuals sometimes.

World Map of geographical distribution of *Sooty Falcon* (IUCN, 2010)



Falco concolor

range type

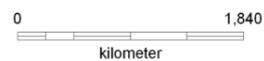
- native (resident)
- native (breeding)
- native (non breeding)
- reintroduced
- introduced
- origin uncertain
- possibly extinct
- extinct
- national boundaries
- subnational boundaries
- lakes, rivers, canals
- salt pans, intermittent rivers

data source:
BirdLife International, 2008



azimuthal equal area central point: 130° E, 0°

map created 10/01/2008



II.5. Conservation status

It is reported that it is difficult to accurately estimate the population size of the *Falco concolor*. Only fragmented and ad-hoc studies have been conducted on the qualitative assessment of the species. Monitoring reproduction and evidence from direct observations outside the breeding season suggest that there would be only several thousand individuals remaining. However, the overall population of *Falco concolor* could be much smaller than this estimate and has a declining trend. The Sooty Falcon is then classified as “**Near Threatened**” by IUCN in 2010, and is listed in **Appendix II** of CITES.

The population of Eleonora's Falcon is estimated to be between 5900 and 6200 couples, around 17700-18600 individuals (IUCN, 2010). This species is classified as "**Least Concern**" in 2010 by IUCN, and listed in Appendix II of the CITES.

II.6. Conservation legal framework in Madagascar

II.6.a. National legal framework

The main legislations relating to the conservation, protection and management of migratory birds of prey and their habitats are given below:

- Law No. 90-033 of 21 December 1990 concerning the Environment Charter as amended by Law No. 97-012 of 6 June 1997;
- Law No. 95-013 of 9 August 1995 authorizing the ratification of the Convention on Biological Diversity;
- Law No. 2001-05 of 2005 on the code of protected areas;
- Law No. 2006-002 of 24 July 2006 authorizing the ratification of the Agreement on the Conservation of Migratory Species of Wild Animals known as the Bonn Convention;
- Law No. 2006-003 of 24 July 2006 authorizing the ratification of the African-Eurasian Waterbird Agreement or AEWA;
- Ordinance No. 75-014 of 5 August 1975 on the ratification of the Convention on International Trade of Endangered Species - Decree No. 99-954 of 15 December 1999 on the

MECIE as amended by Decree No. 2004-167 of 03 February 2004;

- Decree No. 2006-541 of 24 July 2006 on the ratification of the Agreement on the Conservation of Migratory Species of Wild Animals known as the Bonn Convention;
- Decree No. 2006-543 of 24 July 2006 authorizing the ratification of the African-Eurasian Waterbird Agreement or AEWA;
- Decree/Order No. 6830/2001 laying down detailed rules and procedures for public participation in environmental assessment;
- Interministerial Order No. 4355/97 on the definition and demarcations of sensitive zones.
- Memorandum of October 2008 on the conservation of migratory birds of prey or raptors.

II.6.b. International conventions ratified by Madagascar

Madagascar has ratified several international conventions on the environment. The issues are about water resources, forest resources, wildlife and fisheries, pollution and nuisances caused by human activities, which will be affected or influenced by this Action Plan project for the conservation of migratory raptors. The most related conventions to this issue are listed below:

- Convention on International Trade of Endangered Species (CITES);
- Convention on Biological Diversity;
- Convention on Migratory Species;
- Convention on Migratory Birds of Prey.

III. BRIEF OUTLINE OF MIGRATORY BIRDS OF PREY SPECIES

Many birds of prey travel back and forth between two different regions of the world: this is migration. Generally, one of these regions is a breeding and rearing area, while the other is considered a wintering zone. The duration and the length of migration travels are highly variable: some raptors travel only a few dozens of kilometres, others travel several thousands. Migration is an adaptation to the annual climate changes and determines the biological rhythm of these species during different seasons. Indeed, in temperate regions during the winter, living conditions are harsh and food is scarce. This is also true in the tropical regions during the dry season. A number of birds of prey breed in an environment totally different from where the adults live.

Among those migratory birds, the Sooty Falcon *Falco concolor* and the Eleonora's Falcon *F. eleonora* are part of migratory birds coming every year in the main island of Madagascar near the end of September and do not leave the country until the end of April of the following year. But this period varies according to the climate. Madagascar is one of the most favoured zones of migrations, and especially the most southern place, for these two raptor species. Langrand, 1990, mentioned that this species has spread throughout the island where they are fairly common.

IV. GEOGRAPHICAL SCOPE/IMPACT OF THE PLAN

After analyzing the results obtained during the first period of observation in some areas especially around the highlands of Madagascar, a few hundred kilometers from the capital (Analamanga, Itasy, and Vakinankaratra and Bongolava) starting from February to April 2011, we have located the Sooty Falcon in seven different sites and have counted 101 individuals (including adults and juveniles). However, the Eleonora's Falcon has not been seen during our expedition in the Malagasy highlands.

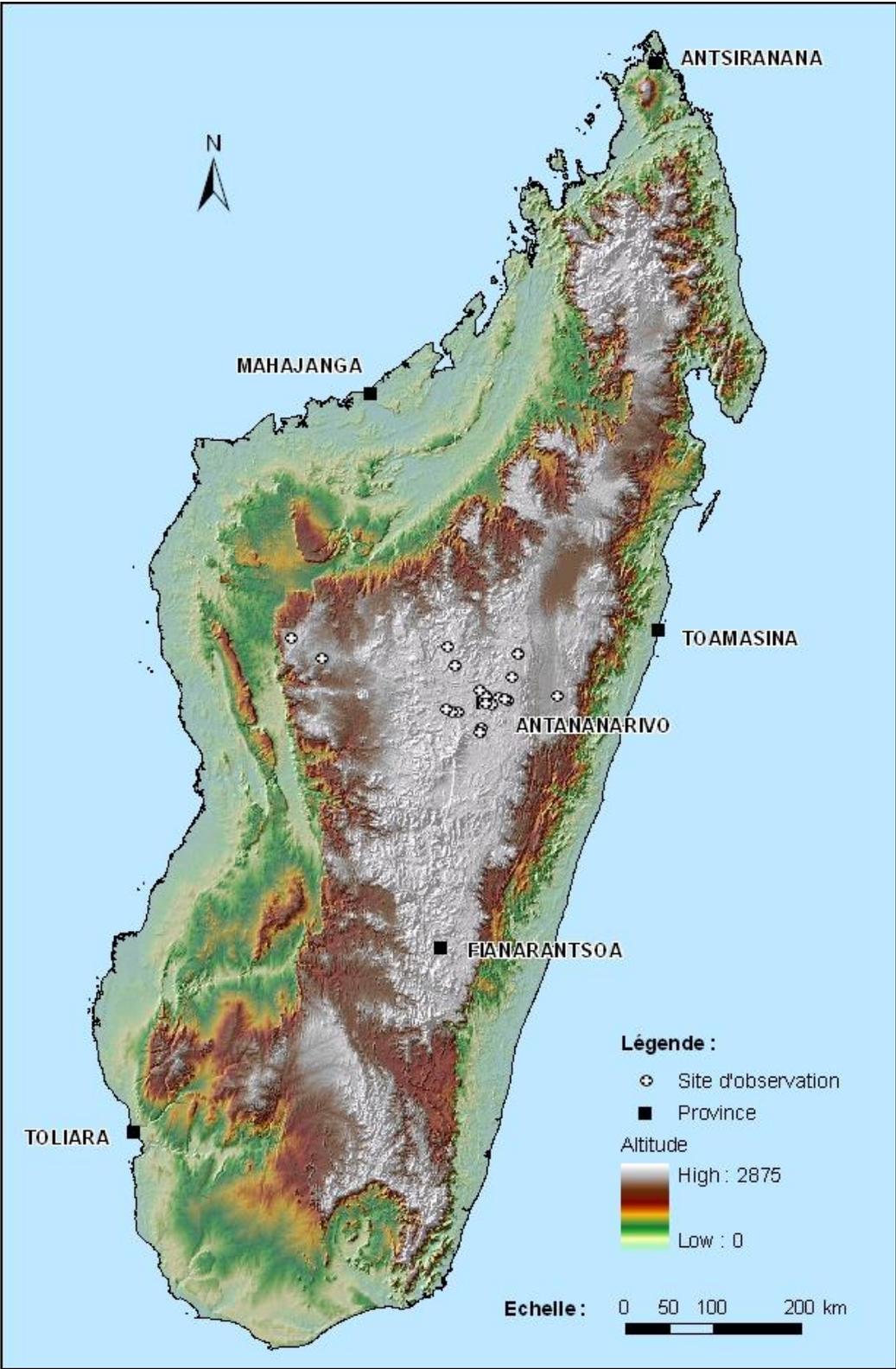
According to our experience, this species *Falco eleonora* is more common in the north-east, east and north-west of Madagascar. Indeed, some twenty individuals of this species and two individuals of the Sooty Falcon have been seen in an open area of the eastern forest at an elevation of 1100 meters, located 85 km east of Antananarivo as the crow flies, which is the reason behind the Eleonora's Falcon *F. eleonora*'s preference of areas bordering forests as

compared with the Sooty Falcon *F. concolor*, which is observed more often in open wooded areas or even near villages.

For the coming years, our main plan for activities will be primarily focused on the monitoring of these species in the whole territory of the main island of Madagascar, during the usual migration period of the migratory birds of prey between the months of September and April of the following year. This activity will be reinforced by an awareness program in different sectors concerned with the conservation of this species.

This Action Plan is then designed for a period of three years starting from July 2011. Towards the end of the implementation, i.e. In 2014, there will be an evaluation and an update of the plan for the following period.

Map showing the observation sites in the central highlands of Madagascar



V. OVERVIEW OF THREATS

The causes of the depletion, decline or disappearance of these species are numerous. The species are often are threatened for several reasons at once.

*Over-hunting: the persecution and hunting have caused the depletion of many bird species including birds of prey as many of them were slaughtered by hunters. Around the villages and hamlets, people protect chicks of the poultry-yard against raptors such as sparrowhawks and kites, including falcons, by persecuting them. Artisans also kill them and sell the falcons stuffed.

*Global warming: On account of polluting gases released into the atmosphere by human activities (industries, car exhaust, etc.), the Earth's climate gets warm and thus leads to the decrease and/or loss of food resources for birds in general. This year, their migration is delayed as compared to their usual arrival in the main island of Madagascar.

*Habitat destruction: Several suitable locations for migratory birds have been damaged (used for crops or infrastructure construction). This leads to the depletion of food resources and/or rest areas and increases the risk of disruption or even a change in the bird behaviour.



Photo - Habitat type of Itasy: open wooded area

*Pesticides: Madagascar is classified among the developing countries and depends heavily on agriculture. Many agricultural companies that establish themselves in the main island of Madagascar use insecticides to improve their production. In addition, Madagascar conducts, yearly, an anti-locust campaign of spraying pesticides on a large scale in the South and the South West of the island.

These practices would affect directly or indirectly the Malagasy raptors. On the one hand, pesticides affect directly the falcons breeding. According to the literature, the accumulation of insecticides in birds causes the malformation of the young birds and the weakening of egg shells, and therefore reduces populations of these species, which will have difficulties in reproducing. On the other hand, an important consequence of pesticide utilization is unavoidably a visible decrease in the populations of birds of prey such as falcons vis-à-vis insects, rodents or small insectivorous birds.

In summary, the birds of prey wintering in Madagascar could be in danger because of a number of threats:

- The direct persecution as the illegal hunting;
- The direct and indirect depletion of food resources (Global warming effect);
- The loss and disruption of habitats;
- Pesticides;
- Human disturbance.

VII. OBJECTIVES OF THE ACTION PLAN

VII. 1. General Objective

The main purpose of the Action Plan is to maintain and/or restore existing population levels of raptors and especially to ensure that birds of prey in Madagascar, *Falco eleonora* et *F. concolor*, are kept in a promising conservation status

V. 2. Specific objectives

For the effective period of this plan, the objectives consist of:

- a) Anticipating, reducing and avoiding heavy threats on all species of birds of prey, during their transit in Madagascar.
- b) Ensuring that migratory birds can return to their breeding area at the end of the wintering period.
- c) Enhancing public knowledge of the migratory birds of prey in Madagascar.

VIII. STRATEGIC APPROACH

In the plan, there will be four priority levels:

- The plan should aim to improve knowledge of the species through research and data collection from the field:

- * To identify areas of significant migration in Madagascar, which should be protected;

- * To conduct environmental studies and monitoring of these two species;

- * To identify and assess threats and pressures on these raptors during their transit in Madagascar.

- The plan should cover the protection of target species and their habitat.

- The conservation of these species must consider the integration of all stakeholders as a main priority and strengthen cooperation with different sectors in the implementation of the current action plan.



Adult Sooty Falcon

IX. ACTIONS TO ACHIEVE THE OBJECTIVES OF THE PLAN

Taking into consideration the impacts of threats and the opportunities observed to reduce them, the priority actions to achieve the mentioned objectives are the following (in order of importance):

- Observe, assess and monitor populations during their transit period in Madagascar in order to establish reliable population trends.

- a) Undertake a survey in various locations across the island during the stay of these species in Madagascar;
- b) Develop and implement a monitoring program of the population (1) during the migration period in the different “eco-regions” of Madagascar, and (2) according to the consecutive years;

- Conduct research to assess the threats and their impacts and to identify required measures to reduce them.

- a) Establish a program to monitor threats and impacts as factors of population decline for each migration season;
- b) Conduct studies about the effect of climate change on the population of falcons during migration in Madagascar;
- c) Identify suitable measures to maintain a favorable conservation status;
- d) Identify suitable measures to limit and reduce the use of migratory falcons for artisanal and commercial purposes.

- Conduct research on the ecology and migratory behaviour of these species during their transit in the main island of Madagascar.

a) Capitalize on existing information on biology, ecology and migratory behaviour of both species to identify the missing data;

b) Prioritize actions (for example, with respect to key habitats for these species), and conduct research to fill gaps of missing data.

- Raise awareness of all stakeholders concerned with regard to these birds, their current situation, threats they face, and conservation measures to be taken.

a) Develop a program of communication, education and public awareness.

b) Encourage the full engagement of local communities in the implementation of this action plan.

c) Develop a program of communication and awareness of decision makers at various levels such as local authorities ('fokontany' or administrative district chief, mayor), the agricultural, trade and tourism sectors on the current status of birds of prey, related to threats to them and sectoral actions that can be taken to preserve them.

d) Invite the other sectors (agricultural, commercial, NGOs and specialized agencies) to participate in the necessary actions to implement this action plan.

e) Develop a school educational program to inform high school students on migration carried by birds of prey, their current status, threats they face and actions that can be taken to preserve them.

- Strengthen and support the capacity of "conservation actors" (in institutions related to the conservation field and concerned local communities) on the knowledge and the implementation of monitoring birds of prey.

- a) Develop and implement approaches that combine conservation and sustainable use of biodiversity, including migratory birds and their habitats;
- b) Create an exchange network (institutions or individuals) to strengthen the conservation actions about the species.

- Protect the falcons of illegal slaughtering, including poisoning, hunting and selective traditional exploitation (case of artisans who kill to preserve and stuff birds)

- a) Reinforce the implementation of regulations related to the protection of migratory birds of prey;
- b) Identify the occasional, real or potential causes of mortality due to humans;
- c) Reduce and/or eradicate all forms of hunting and capture of individuals.

- Evaluate and revise the Action plan

- a) Proceed to analysis of available data and write progress reports relating to the current conservation action plan ;
- b) Draft and circulate the national report on the conservation of migratory birds of prey, with submission to the Secretariat of the Convention.
- c) Update the action plan and strengthen the various programs

X. IMPLEMENTATION FRAMEWORK

ACTION	ACTIVITES	SUB-ACTIVITES/ SOUS-ACTIVITES	INDICATORS/ INDICATEURS	SCHEDULE/ TIMING
Observe, assess and monitor populations during their migratory period in Madagascar in order to establish reliable trends of populations.				
a)	Undertake a survey in various locations across the island during the stay of falcons.	Methodology Development	Methodology document	Jul. - Aug. 2011
		Site/Field visit for data collection: observation, census	Distribution map, number of individuals observed	Sept. 2011 – Apr. 2012
b)	Develop and implement a monitoring program of the population (1) during the migration period in the different “eco-regions” of Madagascar, and (2) according to the consecutive years.	Development of the monitoring program of the population and identification of monitoring sites.	Document on the monitoring methodology; number and name of the monitoring sites	Jul.-Aug. 2011
		Implementation of the monitoring: data collection	Data Sheets	Sept. 2011 - May 2012; Sept. 2012 - May 2013
		Data analysis and report writing	Monitoring report, quantitative variation of the population	Jun.-Jul. 2012 ; Jun.-Jul. 2013

Conduct research to assess the threats and their impacts and to identify required measures to reduce them.				
a)	Establish a program to monitor threats and impacts as factors of population decline for each migration season.	Methodology Development	Methodology document	Jul. -Aug. 2011
		Data collection: direct observation and investigation	Type, scope and location of factors	Sept. 2011 - May 2012; Sept. 2012 - May 2013
			Distribution map/ table with regard to spraying of insecticides	Jan. 2012 ; Jan. 2013; Jan. 2014
b)	Conduct studies on the impact of climate change on the population of falcons during migration periods in Madagascar.	cf. population monitoring	Analysis Report	Sept. 2011 - May 2012; Sept. 2012 - May 2013
		Data collection from the Meteorological Service	Meteorological data	May 2012 ; May 2013; May 2014
c)	Identify necessary measures to maintain a favorable conservation status.	Organization of a workshop	Workshop and Validation Report and timecard/ attendance record	Jul. 2012
d)	Identify necessary mitigation measures concerning the exploitation of migratory falcons for artisanal and commercial purposes.	Organization of a workshop	Workshop and Validation Report and timecard/ attendance record	Jul. 2012

Conduct research on the ecology and migratory behavior of these species during their migration in the main island of Madagascar.				
a)	Study on diet and behaviour.	Development of research proposal	Document	Jul.-Aug. 2011
		Site/Field visit for data collection	Data Sheets	Sept. 2011 - May 2012; Sept. 2012 - May 2013
		Data analysis and report writing	Report	Sept. 2011 - May 2012; Sept. 2012 - May 2013
Raise awareness of all stakeholders concerned with regard to these birds, their current situation, threats they face, and conservation measures to be taken.				
a)	Develop a program of Communication, Education and Public Awareness (CEPA).	Development of the CEPA plan	Document	Jun.-Aug. 2011
		Implementation of the CEPA programme	Number of communities and villages sensitized; Number of events (meeting, workshop, radio / TV broadcasting, participation in international days relative to the conservation of nature), poster, brochure, T-shirt)	All year

b)	Encourage the full engagement of local communities in the implementation of this programme.	CEPA, Participatory monitoring	Number and location of communities involved; Number of events	All year
c)	Develop a communication and awareness program of decision makers at various levels such as local authorities (fokontany chief, mayor), the agricultural, trade and tourism sectors, on the current status of birds of prey, related threats and sectorial actions that can be taken to preserve them.	CEPA, Participatory monitoring	Number and location of communities involved; Number of events	All year
d)	Invite other sectors (agricultural, commercial, NGOs and specialized agencies) to participate in the necessary actions for the implementation of this Action Plan.	CEPA, Participatory monitoring	Number and location of communities involved; Number of events	All year

e)	Develop an educational school programme to inform high school students on migration carried by birds of prey, their current status, threats they face and actions that can be taken to preserve them.	CEPA	Booklet on migratory birds of prey, number of schools, number of events involving school children	All year
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Strengthen the capacity of “conservation actors” (in conservation institutions and local communities concerned) on the knowledge and the implementation birds of prey monitoring.

a)	Develop and implement approaches that combine conservation and sustainable use of biodiversity, including migratory birds and their habitats.	Development of support and training programme	Document	Before dec. 2011
		Implementation	Number of training, number of participants and institutions; material	All year

Protect the falcons of illegal slaughtering, including poisoning, hunting and selective traditional exploitation (cases of artisans who kill to preserve and stuff birds).				
a)	Enforcing implementation of regulations relative to the protection of migratory birds of prey.	Site/Field visit made by those in charge of control and repression	Number of control tests, number of infractions	All year
b)	Identify the causes of real or potential occasional mortality caused by humans	Investigation and participatory monitoring	Number and location of cases reported	Sept.-Apr.
c)	Reduce and/or eradicate all forms of hunting and capture of individuals.	Site/Field visit made by those in charge of control and repression	Number of control tests, number of infractions	All year

Evaluate and revise the Action Plan.				
a)	Conduct analysis on available data and write progress reports relating to the current conservation Action Plan.	Data analysis and writing progress reports	Progress Report	Jul.-Aug. 2012; Jul.-Aug. 2013; Jul.-Aug. 2014
b)	Prepare and disseminate the national report on the conservation of migratory birds of prey, with	Writing and validating the national report	Document; Minutes/ <i>Proces verbal</i> (PV) of validation	Year 2014

submission to the Secretariat of the Convention.			
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