

Madagascar Fish-Eagle *Haliaeetus vociferoides* and Community-based Wetland Conservation

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The Madagascar Fish-Eagle is one of the world's most endangered birds of prey, with a known population of about 75 breeding pairs, and an estimated total of 100-120 pairs. Ten pairs breed on three adjacent lakes in western Madagascar. The lakes were fished by an autochthonous population of about 30 fishermen until 1993 when seasonal migrant fishermen arrived for the first time and began fishing in disobedience of local traditional rules, taboos, and sanctions. By 1996 fish stocks were so depleted that fishermen gave up trying to fish. In 1997 fish-eagle breeding success was significantly reduced. A central problem is a lack of resolve among community authorities to organize and implement sanctions against those who abuse natural resources. The Peregrine Fund's Community-based Wetland Conservation Project aims to reinstate traditional authority by empowering the local community to manage their natural resources, including fishing and tree cutting in surrounding forest. This approach to conservation has potential for long-term sustainability, but short-term results are slow to be realized. Public education to reduce direct persecution of eagles and management of the fish-eagle population are additional interventions necessary to secure the future of the species.

INTRODUCTION

The known breeding population of the Madagascar Fish-Eagle *Haliaeetus vociferoides* in 1998 was 75 pairs and the total breeding population was estimated in 1995 to be around 100-120 pairs (Rabarisoa *et al.* 1997). The fish-eagle was considered abundant when first discovered (Owen 1833) but today it is rare and among the most endangered eagles in the world (Langrand & Meyburg 1989). Habitat degradation and human persecution are the most likely causes for the species' decline (Watson 1997, Watson & Rabarisoa in press).

Most wetlands have been turned into rice fields to provide the Malagasy staple food. Remaining lakes and rivers are often over-fished or turbid from high rates of soil erosion from deforested land. Deforestation has destroyed much nesting habitat and selective use of the largest trees adjacent to rivers or lakes for dug-out canoe construction has degraded what forest remains (Watson *et al.* 1997, Berkelman *et al.* in press). In some parts of Madagascar the nestlings of the Madagascar Fish-Eagle are eaten by local people who sometimes fell the nest tree to obtain the birds. Others capture adult

eagles to remove a foot for use by “*ombiasy*” or “*moasy*” (traditional healers). The foot of a living eagle is said to increase the strength of the healer’s “treatment” (Razandrianakanirina & Kalavaha 1997).

Conservation of the Madagascar Fish-Eagle requires three simultaneous actions: conservation of remaining suitable habitat and possibly habitat restoration, control of human persecution, and management of the species in the wild to slow population loss and eventually speed its recovery (Watson 1997). This paper describes our efforts to conserve important fish-eagle habitat by empowering the local community around lakes Befotaka, Soamalipo and Ankerika, western Madagascar, to sustainably manage and harvest the lakes and forest on which they depend and which they share with about 10% of the Madagascar Fish-Eagle breeding population.

METHODS

The Peregrine Fund first proposed the idea of a community-based conservation project to protect important wetland habitat shared by local *Sakalava* people and endangered Madagascar Fish-Eagles in 1993 by enhancing existing traditional laws and sanctions (Watson 1995). In 1996, the government of Madagascar passed a law to empower local communities to manage their own natural resources by creating a Gestion Locale Securisée (GELOSE). A GELOSE is a “management contract” or “promise” between the local community and the stake-holders that have an interest in natural resource use, such as migrant fishermen, non-governmental organizations, businesses, local authorities, and representatives of the Direction des Eaux et Forêts. Since 1996 we have worked as a “catalyst for action” to help the local community implement a GELOSE project. First, we had to learn more about the social, cultural, political and economic life of local people, as well as the ecology of natural resources and biodiversity of the area, so that our role as catalysts in the process of developing the community-based conservation project could be founded on a thorough understanding of local needs.

The Peregrine Fund team has worked with the local community since 1991 (Strzalkowska *et al.* 1995, Watson & Rabarisoa in press). In 1996 we placed the sociological side of this conservation project entirely in the hands of a Malagasy sociologist (D.R.) to bridge the cultural gap between local residents and The Peregrine Fund team. We have come to be accepted as part of the community and have developed the trust and respect essential for success of a community-based conservation project. Field work has been led by our Malagasy sociologist (D.R.) and our field manager (L.K.), a knowledgeable local resident who has been trained by The Peregrine Fund for several years. Together, this team planned each day’s objectives and activities. Methods involved discussions and interviews, although sometimes observation was used when feasible and more reliable.

The ultimate goal of our work in 1996 and 1997 was to create the GELOSE, but the process required sensitivity and understanding on our part. Therefore, initial objectives in 1996 were (1) to understand the geography of the site and to meet local people and seek their acceptance, (2) to write down existing traditional laws and taboos and seek to have them recognized by local official authorities, and (3) to learn about the way of life of local residents, migrant fishermen, and others to better understand the sociological, cultural and economic forces at work in the region. These were followed in 1997 by (1) improving public awareness and involvement, and (2) forming the local association that would be responsible for creating a GELOSE and the management of the natural resources once a GELOSE is in place.

RESULTS & DISCUSSION

The team visited and involved most community leaders several times during 1996. They interviewed many villagers and fishermen, and met with government officials and leaders of other non-governmental organizations (NGOs) operating in the region (Razandrianakanirina & Kalavaha 1997). Significant results included (1) integration and acceptance of our sociologist and The Peregrine Fund team by most local people, (2) understanding the local socio-economic forces (Razandrianakanirina & Kalavaha 1997), (3) documenting local traditional laws and their official

recognition (Appendix 1), and (4) understanding the causes of economic problems, social strife, and cultural breakdown that leading to over-fishing and degradation of forest around the lakes.

Integration and acceptance of our sociologist and The Peregrine Fund team by local people was an important step needed to ensure that we would be taken seriously by the community, and that our intervention would be accepted. This process, which involved multiple meetings with community leaders and members and participation in a variety of cultural rites, took many months, results were difficult to measure, and it seemed to even slow progress in the early stages of the project. Although frustrating at the time, it was an important step for long-term success (Razandrianakanirina & Kalavaha 1997).

Our sociologist and her team collected information about the economic and social factors at work in the region, travelling on foot as far as Antsalova 60 km to the northeast, Trangahy village 20 km east, Masoarivo village 15 km west and Ambereny village 15 km northwest from Ankivahivahy camp (The Peregrine Fund's base camp) to meet with villagers, business owners and authorities (Razandrianakanirina & Kalavaha 1997). The understanding gained from this study covered the history of the region, including its settlement in time and space; the population's demography including distribution, socio-professional groups, and migration; the local social structure including organization, relational system, lineages, territorial organization, traditional beliefs and religion, habitation, social relations, social conventions, village community strategy and administration; agricultural production, including land use, food production, stock breeding, fishing, and harvest of wild produce; and lastly, human impacts on the environment (Razandrianakanirina & Kalavaha 1997).

An important step in the process of developing the community conservation project was to hold meetings with key members of the community at which existing traditional laws and taboos were discussed, agreed upon and formalized by writing them down as edicts. In addition to existing laws and taboos, the participants were encouraged to consider new rules that were relevant to the current situation and new knowledge about the state of the environment and endangered species. The final meeting took place during June 1996, and included traditional authorities such as the *Tompondrano* (traditional "keeper of the lakes"), official authorities such as the Mayor of Masoarivo township, the Sub-Prefect, and the representative for the Direction des Eaux et Forêts, as well as The Peregrine Fund's staff who took responsibility for writing the laws and taboos and, later, presenting them to the meeting participants. Having been translated from the original Malagasy Sakalava dialect to French and thence to English, the subtleties of the rules may have been lost but the meaning is generally clear (Appendix 1). Traditional rules were officially recognized at the traditional opening of the fishing season ceremony in 1996, but were largely ignored by resident and migrant fishermen alike.

Another important result was understanding the causes of economic problems, social strife, and cultural breakdown that was leading to over-fishing and degradation of forest around the lakes. Migrant fishermen had begun arriving at the lakes in 1993 and were rapidly over-fishing the lakes and degrading the surrounding forest by cutting trees for firewood and dug-out canoe construction (Watson *et al.* 1998). They began arriving at the lakes due partly to the death of an important traditional leader in the local community, but also due to strong economic incentives at the time related to devaluation of the currency and a lack of fish elsewhere (Razandrianakanirina & Kalavaha 1997). The migrants violated many traditional rules, such as camping on the lakes' shores, using nets of a small mesh size, fishing out of season and using trawl net methods instead of passive gill nets (Watson *et al.* 1998).

Local residents feared the exploitation of fish by migrant fishermen would leave them economically disadvantaged. Rather than try to control their competitors by enforcing traditional laws, the residents joined them and began violating their own rules in order to be competitive, a classic case of the "tragedy of the commons," in which people compete harder for a limited resource in order to gain the most for themselves before it is gone. Possible future consequences are ignored. A lack of action by local authorities contributed substantially to this situation. With inaction by authorities, came lack of respect for the authorities by migrants and residents alike (Razandrianakanirina & Kalavaha 1997).

By the end of 1996 it was obvious to us that public education, helping develop social cohesion and creating a natural resource management association from among local leaders were urgent priorities for 1997.

Conservation awareness fêtes

In a subsistence community, little happens of such great importance that it draws people from their fields and subsistence labour. Our objective was to create an event that was of historic proportions among the community, to attract people to the event and to instill its significance in their minds. At the beginning of the 1997 dry season (May and June) we involved local traditional and official leaders in two public awareness events conducted at the nearest major villages of Soatana and Ambalakazaha. These were conducted in partnership with two other non-governmental organizations (NGOs) working in the area.

Events began with an official opening by a senior official with speeches by important delegates, a youth parade through the village and a flag raising ceremony. Educational slide shows were given in the evening to cover themes on the environment in general, the different elements that form the environment, and the causes and consequences of forest degradation. We also covered the goals and activities of the three NGOs, worldwide, in Madagascar and in the local region. The following day we quizzed pupils of the Primary Public School about the themes of the slide show from the previous evening, focusing on their region, its vegetation, animals, protected species, and the local activities of the three NGO projects. Other activities, such as a soccer game between neighbouring villages, traditional dances and music, and a feast, helped to attract attention, draw people to the event, and increase its importance.

Surveys conducted in the weeks following the fêtes indicated that almost 100% of the village residents participated, and they drew people from neighbouring villages. Because of the importance of these events the fêtes became known by word of mouth, and the main messages were conveyed to people up to 20 km away. The fêtes served to inform communities immediately involved, inform people further from the affected area, and elevated the importance of the need to conserve the lakes' resources among the local officials, who vowed to support the effort to protect endangered species and control resource use.

Creating the natural resources management association, FIZAMI

After the fêtes, we helped the local traditional and official authorities create the natural resources management association, FIZAMI, a Malagasy acronym for "Association of Indigenous People of Andranobe". We believed our biggest obstacle in this task was the lack of social cohesion among traditional and official authorities and local fishermen. We were unsure if they could organize themselves into any kind of association, so we enlisted the help of the Deputy of Antsalova, an elected member of the Government's National Assembly.

Although this measure risked alienation of fishermen (especially migrants) its effect was immediate and positive. The Deputy encouraged the township's Mayor to seek police support from the main town, about 90 km away along a foot trail, to evict illegal fishermen on Lakes Befotaka and Soamalipo. The previously reluctant Mayor accompanied the police on their tour of the lakes four days later (having covered 180 km round-trip on foot) and personally helped evict illegal fishermen.

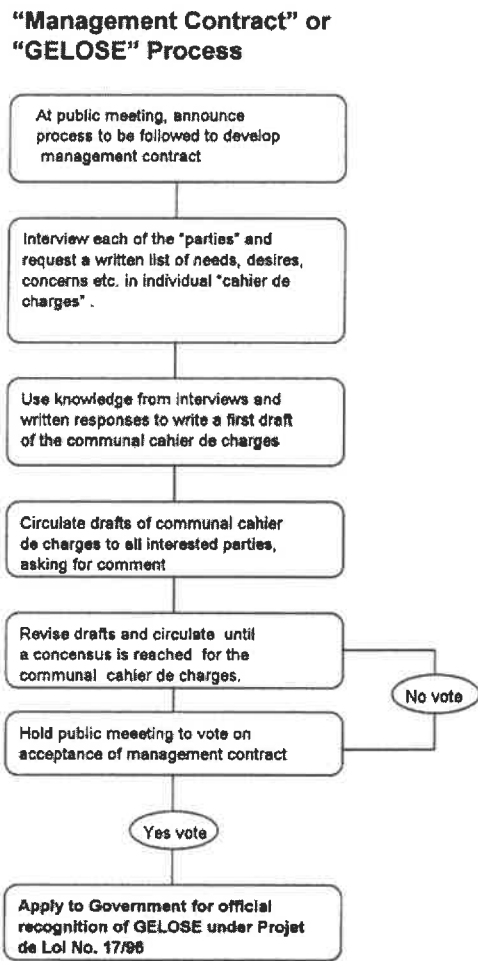
This impressive show of speed and commitment was all that was needed to galvanize the local traditional and official authorities to work together towards a common cause. We used the opportunity to further the work towards the "community management association" by visiting all the authorities over a large area and inviting them to meet. Of 36 people invited, 31 attended the meeting on November 9, 1997. The FIZAMI association was discussed, its goals, objectives and statutes defined, and a founding Board was elected that same day.

Work in 1998

The next step is to help FIZAMI mediate ways in which stake holders can manage natural resources sustainably. Once these "cahiers de charges" have been lodged with the mediator we will begin a series of debates on how they can be melded into one management contract, the GELOSE

(Figure 1). Ultimately, a single consensus will be reached and agreed upon by the FIZAMI who will then take responsibility for seeking authority from the government to become the local natural resource management authority for applying the GELOSE. We also need to repeat this whole process for the neighbouring Lake Ankerika, which, even though it is within 1 km of Lakes Befotaka and Soamalipo, lies in a different community jurisdiction.

Figure 1. Process followed by the environmental mediator for development of a “Community Contract for Management of Natural Resources” or “GELOSE”.



Ramsar Convention

The Peregrine Fund has also been instrumental in helping Madagascar sign the Ramsar Convention on Wetlands of International Importance. Lakes Befotaka, Soamalipo and Ankerika are listed as the first Ramsar site. International recognition of this site has helped elevate the importance of the area at government level, and is perceived by local communities as a positive step towards improving their livelihood.

Madagascar Fish-Eagle management

Despite the progress with the community-based wetland conservation project, the Madagascar Fish-Eagle remains threatened with extinction. The species is still subject to persecution and the effects of habitat degradation. Breeding success in 1997 on the all but fished-out Lakes Befotaka, Soamalipo and Ankerika was less than replacement level at two fledglings from ten pairs. Management of this population in the wild is necessary to ensure that it remains stable while habitat conservation and public awareness improve. In 1993, 1995 and 1996 we trained our Malagasy technicians to apply the "sibling rescue" (thwarting the inevitable death of one sibling in two-egg clutches) technique to increase annual production (Table 1, Watson *et al.* 1996). In 1997 we successfully applied sibling rescue with "hacking" (release to the wild) to increase the species' density in unoccupied areas of its present range (Table 1). Two young birds were successfully released at Lake Mangily, about 60 km northeast of their natal Lakes Befotaka and Ankerika. The technique will be used again in 1998 at the same site, with the objective of eventually establishing a new breeding pair. A full scale management program will begin only once we can be sure that sufficient suitable habitat remains to be colonized by sibling rescued birds. We have begun a satellite imagery and GIS project that should answer this question, but anticipate about two years of work before a conclusive answer is obtained.

Table 1. Results of sibling rescue trials for Madagascar Fish-Eagles breeding on Lakes Befotaka, Soamalipo, and Ankerika, western Madagascar. *First hacking attempt.

<i>Year</i>	<i>No. of siblings rescued</i>	<i>No. of rescued siblings that fledged</i>	<i>No. of remaining siblings that fledged</i>
1993	3	2	2
1995	3	1	2
1996	2	1	2
1997	3	2*	0
Total	11	6	6

CONCLUSIONS

Essential elements in the model for Madagascar Fish-Eagle conservation included (1) appropriate studies of their ecology and natural history to understand the causes of the species' decline, and (2) implementing conservation interventions that dealt directly with the causes and aimed to slow the rate of species loss. The community-based wetland conservation project addressed habitat degradation and human persecution of eagles, aiming to protect an important breeding site for the fish-eagles. We attempted to create a long-term solution to the problem of habitat degradation by empowering local communities to conserve the natural resources they share with fish-eagles. Important elements in the community-based conservation approach included:

- 1). taking time to develop trust with the local community and involving and training local people as representatives of The Peregrine Fund to the local community;
- 2). taking time to learn about the socio-economic factors at work in the community, to understand why migrant fishermen suddenly converged on these important lakes, and how that caused a breakdown in social-cohesion;
- 3). using and enhancing local traditional laws and taboos rather than creating and imposing an entirely new set of laws;
- 4). not being afraid to use powerful people to help propel the local population into taking action;
- 5). being there to help, organize, cajole or otherwise persuade people, including providing transport and communication in an area that lacks both, without expecting anything in return;
- 6). recognizing that our part was to act as a catalyst in the process of developing the community-based conservation project, and always letting others take credit for achievements;

- 7). and last, more time, recognizing that community-based conservation is not a quick fix, but rather a long-term commitment.

Conceptually, community-based conservation is a very different approach to conservation than the top-down, restrictive approach developed over the last century, in which communities were excluded from areas of biological importance by the creation of protected areas (e.g. National Parks). It is increasingly believed that creation of protected areas, while important for protecting areas rich in biodiversity, will never protect sufficient area for many species, especially far ranging species, such as birds of prey, and that conservation must be addressed on a wider scale if we are to conserve even some of the world's biodiversity. Community-based conservation puts the responsibility and the benefit of conservation outside of protected areas into the hands of the local community. Community-based conservation has been tried with varying degrees of success in many countries worldwide, but is only now being promoted in Madagascar. The government of Madagascar recently recognized the value of empowering local communities to look after their own resources by signing into law the means by which authority for natural resource management can be transferred to communities (Law No. 17/96). The time is ripe for community-based conservation efforts to be developed throughout Madagascar and we believe that the lessons learned from our experience in this Wetland Conservation Project will be important for directing and encouraging new efforts elsewhere.

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Appendix 1. Traditional edicts, laws and *Dina*, translated from Malagasy.

TRADITIONAL EDICTS, LAWS AND *DINA* AGREED BY THE *FOKONTANY* OF AMBALAMANGA WITH RESPECT TO LAKES SOAMALIPO AND BEFOTAKA, AND THEIR SURROUNDING FORESTS. THE FOLLOWING LAWS CONCERN FISHING, THE USE OF NETS, COLLECTION OF FISH AND THE FOREST.

The following laws concern fishing, the use of nets, collection of fish and the forest.

- * Before the currently existing situation concerning the exploitation of fish and the innumerable people who practice it,
- * In consequence of the non-respect of traditional taboos, some existing laws aimed at Lakes Soamalipo and Befotaka and the degradation of their surrounding forest,
- * For the economic expansion of the region, for the conservation and the preservation of the rural world, are:
- * Hereby, *Raiamandreny* and the *Fokonolona* of Ambalamanga in order to apply the corresponding *dina*, under the direction of the Mayor of Masoarivo and the Director of the Forestry Division of Antsalova,
- * Realize and advance the following decisions:

1. TRADITIONAL EDICTS

Article 1:

The decision about the LOA-DRANO, “the opening of the fishing season”, depends on the *Tompondrano* (“keeper of the lakes”) and the *Raiamandreny*.

Article 2:

Until the fishing season is officially opened, it is forbidden to:

- slap the water or
- hit the dug-out canoes (to drive the fish into the nets).

Article 3:

In the daily life, it is taboo since forever to:

- salt the fish catch
- transport live charcoal embers on the water
- relieve ones “needs” in the water
- bring women to the islands, such as *Nosy Sarotsy*, *Rehampy*, *Nosindambo*.

Those who violate these daily taboos will be considered malefactors (of the *Tompondrano* and his family) and will be brought to justice before the people responsible for the administrative hierarchy.

Article 4:

Those that commit an infraction of the traditional edicts must pay (a fine of) a very fat (healthy) cow and 20 litres of rum. Without waiting for the “fatality does not make credit”

2. LAWS

It is stressed that the official laws are set down by the following responsible people:

- The President of the Committee for Local Security (PCLS).
- The Mayor (of Masoarivo)
- The Sub-prefect
- The person responsible for the Direction des Eaux et Forêts, representing the Fishing authority
- The Provincial Director

Article 5:

The opening and closing of the fishing season:

The opening and the closing of the fishing season will be decided by the meeting of:

- the Mayor
- the agent for the Direction des Eaux et Forêts, representing the fishing authority
- the President of the Committee for Local Security (PCLS)
- the *Tompondrano*
- the *Raiamandreny*.

Article 6:

If the opening of the fishing season is not official, only static gill nets (*jonoky*) and fishing lines (*firango*) are allowed.

Article 7:

During the fishing season:

- Every fisherman must have a authorization (permit) to allow him to fish in calm water
- Fees must be paid to the hierarchical authorities (Fokontany, Village, Sub-prefect) for all export of fish from the region.
- Only nets of four-finger (about 8 cm) mesh can be used
- It is forbidden to use trawl nets
- It is forbidden to camp on the lakeshore outside the existing villages or hamlets, according to the decision made during this meeting.

Article 8:

The transgression of the two aforementioned articles:

The transgression or non respect of the fishing season limits or the prohibitions during the open fishing season will result in:

- the immediate application by the *Fokonolona* of sanctions and *corresponding Dina* and will be brought to justice before the hierarchical authorities starting with the *Fokonolona*, then the Mayor and the Forestry Division Director.

3. DINA

Seeing the innumerable people practicing fishing and the complexity of life, we think that it is beneficial to add some *Dina* (rules) to facilitate organization and to anticipate the future.

Article 9:

It is agreed that every fisherman should pay 5000 Fmg (about \$1.25) to participate in the opening of the fishing season. The (sacrificial) zebu cattle comes from Tompondrano.

Article 10:

It is forbidden to destroy the natural environment and the forest around the Lakes Soamalipo and Befotaka.

For that:

- It is forbidden to damage the forest, to make clearings that lead to the destruction of the lakes.
- It is forbidden to kill and to hunt any of the protected animals like the *Ankoay* (Madagascar Fish-Eagle), the lemurs, the *Sifaka* (lemur), the *rere* (turtles), the water birds (except the *Vivy* “White-faced whistling duck”, and the *Angongo* “Knob-billed Duck” which can be hunted during the hunting season).
- It is necessary to move away from the locality where one finds the *Ankoay* so as not to disturb its habitat.

Article 11:

In order to avoid any problems, anyone wishing to fish must join the villages indicated by the decision made during the meeting.

Article 12:

It is forbidden to cut living trees for firewood, especially *Manary*, *Hazomalany* and *Katrafay* in order to provide for the future. Only dry (dead) wood is reserved for this purpose.

Article 13:

For the respect of the lakes and the environment

For the respect of the lakes and the environment, it is necessary to move away from the beaches to clean the fish and bury the scales and garbage in a hole.

Article 14:

Anyone taken in flagrant offense of violating these conventions will be taken in hand by the *Fokonolona* and submitted to the authorities concerned.

These written conventions and corresponding *Dina* concern especially the region of Lakes Soamalipo, Befotaka and surrounding forests, namely *Antsingilo*, *Bemolaky*, *Analabombo*.