



INTERNATIONAL  
CONSERVATION

MADAGASCAR



Humpback Whale breaching

©Matt Leslie

**CETACEAN CONSERVATION AND RESEARCH PROGRAM**

The waters surrounding Madagascar are a primary breeding area for humpback whales in the western Indian Ocean. Historical whaling records from the 19<sup>th</sup> and 20<sup>th</sup> century have indicated that Antongil Bay, located on the northeastern coast of Madagascar, is a particularly important migratory destination. However, the status and recovery of this population from long periods of hunting has remained largely unknown. In 1996, the Cetacean Conservation and Research Program (CCRP), a joint program of WCS and the American Museum of Natural History (AMNH), conducted the first scientific expedition to this region. Since then, the CCRP has conducted conservation and research activities on humpback whales, focusing effort in Antongil Bay, but also extending to other areas of coastal Madagascar. In addition, the status of Madagascar’s small cetacean populations has been of growing concern for conservation.

**The Human Aspect**

Antongil Bay is clearly a critical calving and breeding ground for endangered humpback whales. The CCRP is actively working to ensure that anthropogenic impacts to this species and essential habitat are minimized. This has included the development of the first laws to protect humpback whales in Madagascar’s waters and developing community-based ecotourism (whale-watching) within a conservation-oriented framework.

**Threats**

Cetacean populations around Madagascar are faced with both direct and indirect threats from human activities. Targeted takes of small cetaceans and entanglement in fishing gear threaten dolphin populations such as endangered humpback dolphins. Over-fishing drastically reduces food resources available to small cetaceans, further impacting these populations. Habitat degradation, such as runoff from erosion, is a potential threat to all cetaceans. The possibility of a renewed interest in hunting large whale species exists, and the CCRP works at regional and international levels to ensure that Madagascar’s cetacean populations continue to be afforded the maximum protection.

**CCRP - Madagascar Highlights**

**Habitat types**

Estuaries and coasts

**Objectives**

- Provide scientific information for management
- Assess the status of important marine mammal populations
- Create new models for conservation oriented whale-watching
- Improve marine conservation capacity

**Project Outputs**

- Eleven years of continuous research and monitoring of western Indian Ocean humpback whales
- Created first national legislation regulating whale-watching in Madagascar
- Mitigation of hunting of endangered dolphins in the southwest region

**WCS Involvement**

- Since 1996

**Collaborators**

AMNH, Ministry of the Environment and Water and Forests, ANGAP, University of Antananarivo Cornell University, IHSM, NYU

- Argentina
- Belize
- The Bahamas
- Gabon
- Indonesia, Papua New Guinea, and Fiji
- Kenya
- Madagascar
- Nicaragua
- Panama
- Russia
- South Africa
- Thailand, Myanmar, India, and Bangladesh
- USA





Scarring on Humpback Dolphins caused by net entanglements © Yvette Razafindrakoto

## WCS Activities

The CCRP focuses on three main activities: conservation research on whale and dolphin populations, capacity-building for Malagasy students and scientists, and the development and promotion of safe, regulated, and educational whale-watching in Madagascar.

**Conservation Research** - The CCRP utilizes an integrated approach to study endangered and recovering humpback whales of Antongil Bay. Primary research objectives include the assessment of population abundance and movements of individual whales, study of habitat-use during the breeding season, genetic studies to explore population structure and social organization within Madagascar's waters and throughout Indian Ocean and Southern Hemisphere, and acoustic studies of song and singer distribution. Dolphin research focuses on evaluating distribution patterns of different species, assessments of population status and structure, and determining the extent to which hunting and fisheries pressures threaten these populations.

**Training** - The CCRP assists Malagasy students and researchers in the development of educational opportunities related to marine mammal conservation. Malagasy students have since become more involved in designing cetacean conservation projects that influence environmental protection decision-making processes.

**Promotion of conservation-oriented whale-watching** - Working with the local participating communities to implement whale-watching activities has been a major focus of the CCRP. Workshops, practical training and theoretical courses are provided to the local guides and operators for implementing a safe and responsible whale-watching program in the area. The development of responsible tourism can help ensure protection of vulnerable species, provide important economic benefits, and enhance educational, environmental and cultural programs for local communities.

## Important Next Steps

- Integration of activities on humpback whales and other marine mammals of Antongil Bay into design of an Integrated Coastal Zone Management Plan.
- Development of research and conservation projects on small cetaceans and large whales in the southwestern region with other partners.
- Support and encourage environmentally-sound whale-watching.
- Design and implementation of cetacean conservation education programs.
- Continued marine conservation training for students and scientists.
- Development of effective interpretive materials for marine mammal conservation.

**The CCRP focuses on three main activities: conservation research, capacity building, and development of safe and educational ecotourism spatial analysis technology.**

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## Mission

WCS's Global Conservation Program saves wildlife and wild places by understanding critical issues, crafting science-based solutions, and taking conservation actions that benefit nature and humanity.

## WCS Strategies

- Site-based conservation
- Research
- Training and capacity-building
- New model development
- Informing policy
- Linking zoo-based and field-based conservation

## Support this Project

Contributions to WCS' Cetacean Conservation and Research Program can be sent to WCS Marine Program in NY (address above) or made online at [www.wcs.org/ccrp](http://www.wcs.org/ccrp)

September 2007



Photos left to right: (1) J. Brand – (2) & (4) P. Doukakos – (3) H. Rosenbaum

- Botswana
- Cameroon
- Central African Republic
- Congo
- Democratic Republic of Congo
- Gabon
- Ivory Coast
- Kenya
- Madagascar**
- Namibia
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- Tanzania
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- Zambia
- Zimbabwe

## WCS MARINE PROGRAM IN MADAGASCAR

WCS’s international marine program, launched in 1998, comprises over 60 projects including nine global projects, covering 18 countries and four oceans. WCS’s work includes management of fisheries and marine parks, conservation of large marine fauna, protecting marine species in trade and marine ecosystem research. The large scale of many marine management issues demands an international approach using the latest knowledge and experience but which is tailored to address specific regional and national needs. With its global network of expertise and field-based projects, WCS is uniquely positioned to contribute to national and regional marine conservation initiatives.

### Human dimension to marine conservation issues

Conserving the marine environment is one of humanity’s great challenges for the 21<sup>st</sup> Century. As human communities become ever more dependent on coastal and marine resources for food and economic development, 70% of the world’s fisheries are fully or over-exploited and 90% of the ocean’s largest fish have been removed by industrial fishing. Certain fish stocks may fail ever to recover and many marine species are at risk of extinction. The productive function of marine ecosystems has been damaged, sometimes irreparably, by destructive fishing methods such as intensive trawling. Further deterioration is occurring as a result of climate change, thus causing coral bleaching and loss of other marine life. The net effect of these changes is the widespread loss of human livelihoods, food security and well-being.

### Marine conservation issues in Madagascar

Madagascar lies in the tropical Western Indian Ocean, surrounded by waters of the Southern Equatorial Current (SEC) and forming part of the Agulhas Large Marine Ecosystem (LME). Madagascar’s long coastline (5000 km), east & west facing coasts, large latitudinal range and ‘upstream’ location in relation to eastern and southern Africa, provide suitable environments for most of the marine species and habitat-types of the region and make Madagascar a regional conservation priority. Key marine threats faced by Madagascar, many of which are common to countries around the region, are:

- Uncontrolled industrial fishing, especially by illegal unlicensed unregulated vessels (IUUs)
- Industrial trawling, especially on shallow continental shelf seas and sea mounts
- Degradation of coral reefs through overfishing, climate change effects and sedimentation

### Marine program in brief

#### Basic data

EEZ – 1.15 million km<sup>2</sup>  
 Continental shelf – 117,000 km<sup>2</sup>  
 Small islands – 251  
 Coral reefs – 3000 km  
 Mangroves – 350 km<sup>2</sup>

#### Marine biodiversity

70% of all WIO species (estimate)  
 Cetaceans – 34  
 Dugong (now rare)  
 Marine turtles – 5  
 Sharks – 56 +  
 Bony fish – 1300  
 Hard corals – 300+

#### Program strategy

Supporting development of sustainable fisheries  
 MPA management  
 Designing resilient MPA networks  
 Conservation of large marine fauna  
 Protecting species in trade  
 Strengthening governance, policy & ICZM  
 Training & capacity building  
 Applied marine research

#### Collaborating organisations

International  
 AMNH, CAS, NOAA  
 USFWS, FAO  
 ICRI (International Coral Reef Initiative)  
 Various oceanographic institutes.

Western Indian Ocean  
 WIOMSA, WWF, IUCN, ISACH, CORDIO, KWS, UNEP.

Madagascar  
 Ministry for Agriculture, Livestock & Fisheries (MAEP), Ministry for Environment, Waters & Forests (MINENVEF), National Environment Office (ONE), ANGAP, WWF, SAGE, GAPCM, IHSM, COUT, Antananarivo University, Blue Ventures



Photos left to right: (1) J. Brand – (2) & (3) A. Cooke – (4) P. Doukakakis

- Hunting or incidental capture of large marine fauna (dugong, dolphins, sea turtles, sharks and sawfish)
- Local extirpation of high-value species such as sea cucumbers
- Conflicts between resource users over access to resources
- Insufficient protection for marine environment (MPAs, no-take zones)
- Insufficient capacity and information management

### WCS Marine Program activities in Madagascar

WCS Marine Program activities in Madagascar are built around the following themes:

- Sustainable management and protection of fisheries
- Management and development of marine & coastal protected areas (MCPAs)
- Research for the conservation of cetaceans and promotion of whale-watching
- Promotion of improved marine governance and policy (including ICZM)
- Training and capacity building in marine conservation and management
- Design & development of resilient networks of MCPAs and ‘no-take zones’
- Conservation of other large marine fauna (e.g. dugong, turtles, sharks, sawfish)
- Applied marine biodiversity research

WCS acts through direct field interventions, working through field-based partners and providing technical and advisory support to partner institutions working in marine conservation and management. Key areas where WCS is currently working are Sahamalaza/Radama Marine Biosphere Reserve and the Antongil Bay.

### WCS Marine Program expertise

WCS’s Marine Program in Madagascar is driven by a team of marine scientists and policy specialists who have expertise in fisheries management, coral reef ecology and conservation, protected areas design and management, the marine products trade, law and policy and the conservation of endangered marine wildlife including cetaceans, sharks and turtles. WCS’s permanent local team comprises three post-doctoral biologists, three masters’ graduates and several trainees (generally masters students), supported as needed by WCS international experts and technical and administrative staff. WCS Madagascar staff work closely with WCS experts based in the Western Indian Ocean region who provide additional support in MPA design and management, coral reef research and conservation planning and large marine fauna conservation (dugong, cetaceans & sharks).

### WCS approach and next steps

WCS adopts a collaborative, science-based approach and seeks to contribute to a broadly accepted agenda for the marine environment. Most activities are expressly linked to objectives of the National Environmental Action Plan (NEAP, Phase 3) or to fisheries plans and policies. An underlying aim is to develop the national capacity necessary to manage and conserve the marine environment. Next steps for WCS’s Madagascar marine program include:

- Promote a common vision for the science-based conservation of Madagascar’s marine ecosystems
- Help identify priorities for marine conservation
- Promote synergies between fisheries management and marine conservation
- Promote adoption and implementation of the national ICZM policy and plan
- Continue to support the sustainable management of the Bay of Antongil
- Continue to develop the Sahamalaza/Radama Marine Biosphere Reserve

The global objective of WCS’s marine program in Madagascar is to promote the science-based management and conservation of Madagascar’s marine, coastal, estuarine and associated riverine ecosystems.

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### Program mission

The WCS Marine Program promotes conservation in the world’s seas, oceans and rivers, generating scientific information vital to the maintenance, conservation and recovery of marine wildlife populations and habitats.



Ocean surface currents around Madagascar (J.R.E. Lutjeharms)



Masoala is the last place in Madagascar where the rainforest meets the sea © James MacKinnon 2001

- Botswana
- Cameroon
- Central African Republic
- Congo Republic
- Democratic Republic of Congo (DRC)
- Gabon
- Ivory Coast
- Kenya
- Madagascar**
- Namibia
- Rwanda
- Tanzania
- Uganda
- Zambia
- Zimbabwe
- Regional Africa

## MASOALA NATIONAL PARK, MADAGASCAR

### WCS at Masoala

Masoala National Park is the largest protected area in Madagascar, a country that ranks as one of the world’s top five “hotspots” for biodiversity. Masoala NP consists of seven different units, including three marine parks. The National Park is rich in rare species including a fantastic variety of palms, a recently discovered variety of ancient flowering plant, as well as eight lemur species. WCS first got involved in Masoala by supporting research on butterflies. Since then, WCS has worked with the Malagasy government to create and manage the National Park.

### The Human Aspect

In one of the most cyclone-prone areas in the world, the forests of Masoala provide critical watershed protection to the 45,000 people living downstream. The park helps to assure sustainable management of ecosystems that will provide long-term protection from the soil erosion and flooding that scar many other areas of the country. On a national level, Masoala’s marine and terrestrial ecosystems represent a rich and largely untapped resource for ecotourism.

### Threats

The main threat to Masoala is the forest fragmentation caused by slash-and-burn agriculturalists moving up the river valleys and hillsides from the coasts. The movement inland is driven by the demand for land to grow rice, as well as the overuse of marine resources along the coast. Secondary pressures include the illegal cutting of tropical hardwoods, in particular rosewood and ebony, and the hunting of lemurs.

### Masoala Highlights

**Total area**  
• 2,300 Km<sup>2</sup>

**Biome**  
• Lowland rainforest  
• Montane rainforest  
• Coral reef ecosystems

**Species Present**  
• Serpent eagle  
• Madagascar red owl  
• Eight species of lemur, including the Aye-aye and red ruffed lemur  
• Endemic palms  
• Pitcher plant  
• Sharks  
• Humpback whale  
• Marine turtles

**WCS Strategies**  
• Site-based conservation  
• Research  
• Training and capacity-building  
• New model  
• Development  
• Informing policy

**Main partners**  
• ANGAP  
• Zoo Zurich  
• McArthur  
• USAID





The panther chameleon, one of Masoala's many reptiles © James MacKinnon, 2001

### WCS Activities

WCS is currently providing technical and financial support to the National Parks Service (ANGAP) in all aspects of management. Particular support is provided in the fields of improving park infrastructure and management systems, ecological monitoring, community outreach and education, and protecting ecological links between Masoala and the remaining forests of eastern Madagascar. WCS's complementary work on integrated coastal zone management in neighboring Antongil Bay also provides important support to improved natural resource management efforts on the mainland.

Masoala national park is part of a larger landscape/seascape in and around Antongil Bay. To develop a better understanding of the interrelationships of wild areas in the greater landscape, and identify and secure ecological links between Masoala and the remaining forests of eastern Madagascar, the WCS project will undertake the following:

### Important Next Steps

- Target technical support on specific issues such as sustainable financing, staff and researcher training, ecological monitoring and promoting community-based forest management in the forests surrounding Masoala.
- Protect the fragile forest corridors that link Masoala to the remaining forests of eastern Madagascar. If that corridor lifeline is lost, Masoala will become an ecological island.
- Develop an Antongil Bay integrated coastal zone management program, which includes an effort to reduce some of the pressures that drive people inland from the coast to carry out slash -and-burn agriculture on the Masoala peninsula.
- Gazette and create a new protected area on the Makira plateau to the west of the Masoala National Park.

**The overall objective for WCS activities at Masoala over the next three years is to develop Masoala NP as a model for protected area management in Madagascar .**

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### Vision

WCS envisions a world in which people value and embrace the diversity of life, live sustainably with wildlife, and ensure the integrity of the natural world.

### Mission

WCS's Global Conservation Program saves wildlife and wild places by understanding critical issues, crafting science-based solutions, and taking conservation actions that benefit nature and humanity.

April 2006



- Botswana
- Cameroon
- Central African Republic
- Republic of Congo
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- Gabon
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- Kenya
- Madagascar**
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- Zimbabwe

## **BIODIVERSITY NETWORK OF MADAGASCAR** (REBIOMA - RÉSEAU POUR LA BIODIVERSITÉ DE MADAGASCAR)

### **Context**

Madagascar is known as a priority area for biodiversity conservation as it has an exceptional biodiversity and has a very high level of endemic species. Since the 1980s, a concerted effort by Malagasy and international conservation professionals has been under way to address threats from deforestation and fragmentation. With the John D. and Catherine T. MacArthur Foundation's grant and the Critical Ecosystem Partnership Fund (CEPF) to the Wildlife Conservation Society (WCS) from 2005 to 2007 for REBIOMA (Réseau de la Biodiversité de Madagascar), WCS and the University of California, Berkeley (UC Berkeley) have significantly narrowed the time lag between data collection in the field in Madagascar and its use in species distribution modeling and conservation planning for terrestrial ecosystems.

### **Aim**

The goal of the REBIOMA project is to improve biodiversity conservation in Madagascar by developing an information system that provides ready access to the conservation tools and biodiversity data necessary to allow conservation planners/managers to set conservation targets in a systematic manner for species, site, and regional-scale (eg. landscape, corridor, ecoregion) objectives.

This goal includes two principle objectives:

- to serve up-to-date, validated biodiversity occurrence data for the conservation community in Madagascar ,
- working towards establishment of a distributed network system providing broad access to hitherto scattered biodiversity data for conservation indicator taxa, as well as other geographic layers.

### **REBIOMA In brief**

#### **Tools**

- Databases
- Modeling software for species distributions prediction
- Conservation planning tools

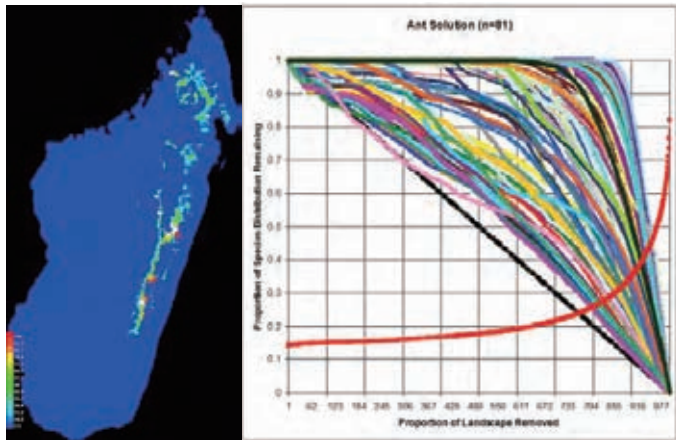
#### **Conservation Applications**

- Prediction and survey of species distributions
- A map of the species representations and gap analysis.
- Environmental Impact Assessment
- Research organization
- Environmental management planning
- Protected Area Design
- Planning for Climate Change
- Monitoring Biodiversity
- Ecotourism
- Development Plans
- Environmental Impact Statement
- Biogeographic Analyses
- Identifying New Survey Areas

#### **Partners**

- Government and part-government organizations
- Executive agencies
- Non-governmental organizations
- Universities
- Museums and centers





## Conservation accomplishments

- REBIOMA has become central to the Durban Vision conservation planning exercise which has recently expanded the protected area network from ~2million to ~4 million hectares.
- REBIOMA staffs have provided leadership and technical support to the Système des Aires Protégées de Madagascar (SAPM) group who are charged with the quantitative conservation analyses for the Durban Vision Process.
- The map of the newly temporary Protected Area and the potential sites for Conservation was establish and annexed to the "Arrêté Inter-Ministeriel Mines-Forêt".

## The next steps

- Continue to support the process of the Durban Vision on the terrestrial protected area network and expanding to the marine realm.
- Continue to build the terrestrial database with newly collected biodiversity data, as it becomes available.
- Implement our proposed networking technology to link other databases, species distribution modeling tools, and conservation planning software (REBIOMA Web Portal).
- Expand application of the database and tools to address the newly emerging demands of the marine component of the Durban Vision.
- Identifying optimum dispersal corridors for climate change using network flow models
- Modeling human response to climate change in Madagascar based on changes in water availability and predicted agricultural consequences
- Continue training of technicians in the key institutions in Madagascar and partner organizations that collect data for conservation planning and project monitoring.
- Establish an institutional framework for REBIOMA.

The global objective of REBIOMA is to create an environmental management decision-making process by providing access to data on biodiversity and by providing access to leading spatial analysis technology.

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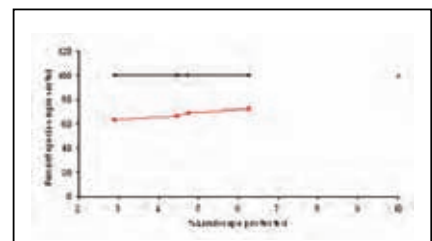
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## RESEARCH AND TRAINING

### WCS in Madagascar

In order to ensure sustainable conservation of natural resources and to gain a better understanding of Madagascar's biodiversity and its threats, WCS has implemented a research and training program for national conservationists. WCS has been involved in research and training on the Masoala peninsula since 1993. At the beginning of 1996 the organization started an observation and study program on Humpback Whales as well as Ichthyology Research in Antongil Bay. In 1998, its actions were extended in the south and the northwest of the island, when research programs on radiated tortoises at Cap Sainte Marie and on *Eulemur macaco flavifrons* on the Sahamalaza peninsula were started. In 2001 WCS initiated a still ongoing research and inventory program in the forests of the Makira Plateau in order to establish the Makira Protected Area, which adjoins to the Masoala National Park creating the largest protected land mass in Madagascar. Data and information directly collected have served to improve the REBIOMA database, a WCS platform of biodiversity sharing data. REBIOMA is being used to help systematic conservation planning in Madagascar for the purpose of tripling Madagascar protected areas with next five year.

### Human Domain

Thanks to the professional training program, WCS prepares students for research and conservation work, creating a group of qualified conservation researchers. Nineteen students have been trained since 1993, twelve got their DEA, two their CAPEN and five are currently preparing their papers. Five of the 19 presently work for WCS while the others work for other conservation organizations. Through its training program, WCS has helped build the capacity of the national and local staff of Madagascar's National Park Services.

### Justification

Madagascar is known to be a priority area for conservation. WCS research efforts are supplying the essential information to allow for the identification of conservation requirements and for the sustainable use of Madagascar's natural resources. WCS contributes by means of publications and technical, material and financial support to facilitate the distribution of and access

### The research and training program

#### In brief

##### Research areas

- Mammalogy
- Primatology
- Entomology
- Herpetology
- Ichthyology
- Ecology
- Forestry
- GIS

##### Research sites

- Masoala National Park
- Antongil Bay
- Sahamalaza Peninsula
- Makira Plateau
- Southern Madagascar

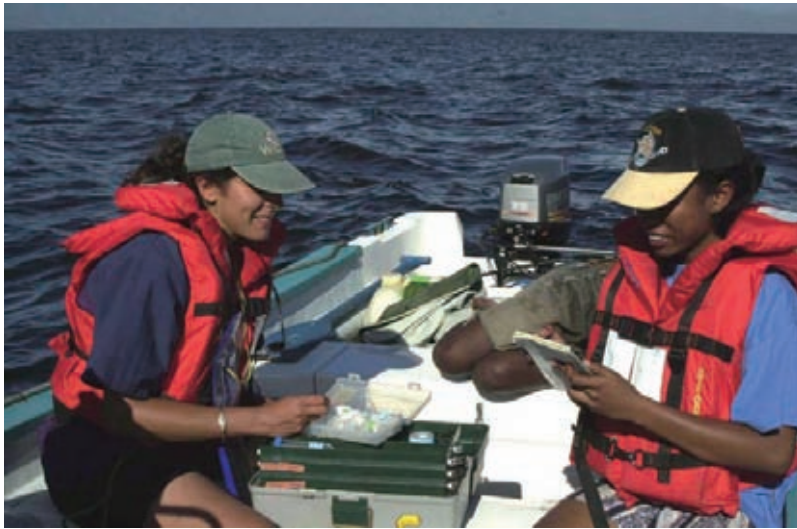
##### WCS Strategies

- Research
- Training
- Capacity Reinforcement

##### Partners

- University of Antananarivo (Science Faculty DBA, DBV, ESSAgro, ENS)
- University of Tuléar (IHSM)
- Foreign Institutions (British Museum of Natural History, American Museum of Natural History, California Academic of Sciences, AEECL, Missouri Botanical Gardens, KEW Gardens, Zoo Zurich, Stanford University, University of Princeton, University of Kent DICE)





## WCS Activities

WCS participates in different aspects of scientific research such as biological inventories, ecological surveys and environmental impact assessments. WCS are also involved in environmental education and offer special training to wardens and tourism guides in practical conservation issues and in ecotourism.

WCS offer special technical, logistical and financial support to leading research in their sites of operation. WCS give support to the training of students with the collaboration of national and international institutions. Within this framework two students are trained every year, through integration into different research and conservation projects by a well-defined program.

Current targeted WCS research includes studies to understand the biology and ecological needs of the rare, area sensitive Black lemur *Eulemur macaco flavifrons*, as well as the highly threatened Madagascar Sacred Ibis, *Threskiornis bernieri*: ongoing in the newly established Sahamalaza National Park. In addition, WCS are engaged in ecological monitoring of human impacts on biodiversity and natural resources in order to better understand the nature of these threats and thus derive appropriate interventions. Examples include the ongoing monitoring of bush meat, a first ever study in Madagascar, conducted within Makira/Masoala landscape, and monitoring of the highly threatened terrestrial tortoise *Geochelone radiata* in Madagascar's southwest.

One of the WCS niches in Madagascar is to use data to improve and let biodiversity conservation happen more efficiently. After the creation of Masoala National Park, two important areas as far as biodiversity value where our team undertaken researches and investigations receive last in 2005 and 2006 a "national status of temporary protection", an obligatory step before the definite. These sites are, respectively, Makira, the second largest remaining forest track in north-eastern Madagascar, and the forest of Ambatotsirongorongo in the South-est Madagascar.

## The next steps

Within the training framework, WCS will continue to strive to improve the existing systems of conservation oriented research and monitoring, and to support young scientists in more diverse research areas. WCS research efforts will continue to focus both on threatened endemic species and community-level dynamic within their natural habitats. Among threatened taxa, carnivore research that pilots innovative techniques will be high priority.

**Through its research program WCS works to conserve and develop natural resources in a sustainable manner by creating a framework for national conservation research and by applying this research and the scientific knowledge gained in the field.**

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September 2007



**Ambatotsirongorongo  
Protected Area**

**Highlights**

**Surface area**

1.054 ha

**Habitat types**

Transitional zone between eastern and western forest

**Species Present**

- 93% of the flower species are endemic such as *Humbertia madagascariensis* (Convolvulaceae).

- Nine lemur species including *Eulemur fulvus collaris*, a species endemic to the southeast of Madagascar

- 3 carnivore species

- 2 potentially new rodent species (identification underway)

- 41 reptile species including *Phelsuma antanos* which is endemic to the region

- 11 amphibian species

- 59 bird species

**Goal of project**

Maintain the biodiversity and ensure the integrity of the ecological systems of the region

**Objectives**

- Promote sustainable resource use

- Effective conservation of threatened and endangered species through the development of a comprehensive management plan

- Maintain the ecosystem services (protection of regional watersheds)

Argentina

Belize

The Bahamas

Gabon

Indonesia,  
Papua New  
Guinea, and  
Fiji

Kenya

Madagascar

Nicaragua

Panama

Russia

South Africa

Thailand,  
Myanmar,  
India,  
and  
Bangladesh

USA

**AMBATOTSIRONGORONGO**

As part of the transition zone between the Humid forests of Eastern Madagascar and the dry Western forests, Ambatotsirongorongo, in spite of its limited surface area, 1,054 Ha, is characterized by its remarkable biodiversity.

Its three forest blocks (Ambatotsirongorongo, Vohisampa and Lavasoa) shelter about 235 species of plants of which 93% are endemic. Included among these species are the very rare, and range restricted *Humbertia madagascariensis* (Convolvulaceae). The forest blocks of Ambatotsirongorongo also shelter of 9 species of Lemur, 3 species of Carnivores, 2 species of Rodents of which one remains to be identified (possibly a new species for the science) and 3 species of Lipotyphla, 59 species of birds, and locally endemic species of Gecko including the *Phelsuma antanosy* (CR), *Paragehyra gabriellae* (EN), *Uroplatus malahelo* (EN), *Pseudoxyropus kely* (EN).

In addition to its biodiversity importance, the forests of Ambatotsirongorongo also serve to protect the watersheds for the commune of Sarisambo.

In 2004, it was decided to establish Ambatotsirongorongo as a IUCN recognized protected area. The creation of the Ambatotsirongorongo Protected Area represents a part of the Government of Madagascar's efforts to expand the country's system of protected areas from 1,7 millions of ha to 6 millions ha.

**The Human Aspect**

Adjoining five communes in the District of Taolagnaro, Region of Anosy, a total of 64,170 local inhabitants depend on the resource of the forests of Ambatotsirongorongo. This population, composed essentially of the Antanosy and Antandroy ethnic groups, is characterized by a high poverty, high population growth and an elevated illiteracy rate. The principal source of income for this population is from subsistence agriculture complimented by livestock rearing, artesanal fishing and handcrafts.



The human populations of the region commonly experience annual food shortages. They are also confronted with the problem of insufficient water for consumption and irrigation. There is an additional problem of insufficient health and educational infrastructures, as well as technical assistance for improved agricultural practices.

### Threats

The principal threats to biodiversity include deforestation agriculture, fire used to clear land for cattle grazing, the exploitation of wood for building and fuel (firewood as well as charcoal), and the Vahimpiky (*Flagellaria indica*) for the production of handicrafts.

### WCS Activities

Solicited by the Qit Mineral Madagascar (QMM) and the USAID funded PACT program in 2005, WCS accepted the role of overseeing the establishment of the future Ambatotsirongorongo Protected Area.

Specific activities directed by WCS include:

- Creation of the Management Committee for the future protected area; a committee that will consist largely of the representatives of the local communities. The Management Committee is directed by an Oversight Committee;
- Technical support to the Management Committee;
- Development of an Environmental Education program targeting the area schools;
- Development of an ecotourism business plan;
- Technical support to community associations so as to promote sustainable resource use and reforestation efforts.

### Partners

- Department of Water and Forest, District of Taolagnaro
- Community authorities from the 5 communes bordering Ambatotsirongorongo ;
- The Management Committee of Ambatotsirongorongo
- The USAID funded MIARO Program, which includes ANGAP, WWF et WCS.
- Qit Minerals Madagascar (QMM)
- The local NGO FAnentanana FAmbolena FIompiana (FAFAFI)

### Vision

WCS envisions a world in which people value and embrace the diversity of life, live sustainably with wildlife, and ensure the integrity of the natural world.

### Mission

WCS's Global Conservation Program saves wildlife and wild places by understanding critical issues, crafting science-based solutions, and taking conservation actions that benefit nature and humanity.

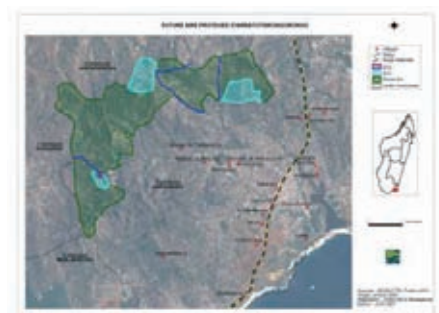
### WCS Strategies

- Site-based conservation
- Research
- Training and capacity-building

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September 2007





Spiny forest and two endemic tortoises

**Conservation of  
Tortoises and  
their Natural  
Habitat:**

**Special Reserve  
at Cap Sainte  
Marie in brief**

**Total Surface Area**  
• 2.900 Ha

- Ecosystems**
- Spiny Forests
  - Stunted Vegetation
  - Dwarf Vegetation

- Species Present**
- One species of mouse lemur
  - Several dozens of birds, including egg remnants of the *Aepyornis*
  - Several dozens of reptiles and amphibians, including radiated tortoise and spider tortoise, iguanas and chameleons

- WCS Strategies**
- Nature Conservation
  - Research
  - Training and capacity reinforcement
  - Development of a new model
  - Political Influences



Botswana

Cameroon

Central African  
Republic

Republic of  
Congo

Democratic  
Republic of  
Congo

Gabon

Ivory Coast

Kenya

Madagascar

Namibia

Rwanda

Tanzania

Uganda

Zambia

Zimbabwe

Afrique Régionale

**CONSERVATION OF ENDEMIC TORTOISES IN  
THE SOUTH OF MADAGASCAR**

**WCS in the south of Madagascar**

In late 90's, WCS has focused its activities in the south of Madagascar on biological and ecological data gathering of endemic tortoises to evaluate their status within the natural habitat.

In 2000, after detailed analysis of existing information, WCS involvement was mostly to promote tortoise conservation in the Special Reserve of Cap Sainte Marie, in collaboration with the national park services (ANGAP). This protected area harbors a viable population of radiated tortoise, but threats on this iconic and vulnerable species are becoming more important.

In 2003, ANGAP capacity to address tortoise conservation has improved significantly and WCS shifted its interventions by acting at village level in collaboration with local communities throughout the natural habitat range. A regional office was created in Toliara to improve communication with other stakeholders. Supports to national institutions on CITES issues are among our priorities.

**Human Domain**

In the south, the arid and harsh environmental conditions, together with a cactus invasion cause a famine almost every year. Agricultural activities depend too much on rainfall and climate change may worsen the situation.

There was a time; traditional values were enough to preserve tortoises in Tandroy, Mahafaly regions. A partial breakdown of these traditional values has driven tortoises in a vulnerable situation. Illegal harvesting takes place everywhere and national laws in favor of tortoise protection are not respected.

**Threats**

For Tandroy and Mahafaly tribes, the respect of the taboo remains more or less the same as they used to be. But unfortunately, the taboo can't do anything to stop the collect and the consumption of tortoises by immigrant tribes. The respect of traditional values might be a useful tool to improve tortoise conservation.

In addition, Antanosy tribes believe that tortoises are a special gift to fight food shortage and they will continue to harvest as long as there are tortoises left within their reach. Tortoise conservation could face a food security issue in this case. It is simply a "bush meat" trade for Vezo tribes living along the coastal area.



Dwarf vegetation at Cap Sainte Marie Special Reserve

## Achievements

- Biological and social studies carried out by two PhD students and four MSc students had received supports from this tortoise conservation contributing significantly to the improvement of our knowledge on these two threatened tortoise species.
- Awareness campaign and supports to villages and public services were provided in Mahafaly and Tandroy regions in order to reduce illegal harvesting of tortoises.
- A legal facility known as “Le Village des Tortues” at Ifaty was created by SOPTOM and the Ministère de l’Environnement et des Eaux et Forêts to host confiscated tortoises.
- WCS provided supports to the management of protected areas where healthy and viable tortoise populations exist : Cap Sainte Marie Special Reserve and Tsimanampetsotsa National Park.
- A population habitat viability assessment (PHVA) workshop was carried out in August 2005 at Ifaty, Toliara for the radiated tortoise and spider tortoise.
- Among 35 actions defined by the workshop, priorities were given to the community-based conservation approach through empowering local people.
- Ecological and socio-economic studies were carried out at priority intervention sites in March 2007.
- An environmental education program based on traditional values and law enforcement is being developed for villages around priority intervention sites.

## Current Activities

- Formalize the ongoing collaboration with the seven priority intervention sites of WCS.
- Establish a conservation action plan and a sustainable development interest list for each village involved.
- Perform a participative ecological monitoring to serve as a tool to assess the effectiveness of the community-based tortoise conservation.
- Continue our environmental education program by focusing at local talented animators to strengthen traditional values in favor of tortoise conservation.

## Next Steps

- Targeting development agencies to act in collaboration with conservation initiatives is one of our current strategies.
- Supporting the local communities by introducing new agricultural techniques to sustainably exploit the natural resources.

**The objective of the project is to develop and implement a conservation strategy for endemic turtles and for their habitats in the south of Madagascar.**

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## Vision

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## Mission

WCS envisions a world in which people value and embrace the diversity of life, live sustainably with wildlife, and ensure the integrity of the natural world.

September 2007



« Protect the environment, for us and for the future »

© WCS/Nirina oliva

- Argentina
- Belize
- The Bahamas
- Gabon
- Indonesia, Papua New Guinea, and Fiji
- Kenya
- Madagascar
- Nicaragua
- Panama
- Russia
- South Africa
- Thailand, Myanmar, India, and Bangladesh
- USA

### WCS Madagascar, Environmental Education Program

Human dependence on the use of natural resources to satisfy subsistence needs produces major threats to the environment. It is important to shape attitudes toward the environment so as to change human resource use practices. This can be most effectively realized by providing structured educational outreach that informs individuals of their relationship with the local environment. This is the impetus of the WCS Environmental Education Program.

The WCS Environmental Education Program (EEP) is a cross-cutting program with the principal objective of supporting conservation projects in the realization of long term natural resources conservation.

### Interventions

The EE Program is being implemented at WCS intervention sites including the MAMABaie landscape/seascape (Masoala NP, Makira PA, Antongil Bay), the Sahamalaza Iles-Radama National Park, the newly created Ambatotsirongorongo Protected Area, as well as the long term Radiated tortoise conservation site at Cap Sainte Marie and the Andavadoka coastal and marine management site.

Schools, youth conservation clubs, local management committee, and local authorities are the main targets of the WCS EE program. The WCS agents in the field work in close collaboration with the existing institutions including the regional School Circonscription (CISCO) and local community associations. A series of actions are being carried out in the field including trainings of school teachers, creation and support to conservation clubs, environmental awareness campaigns, radio broadcasts, promotion of environmental curriculum in schools, and creation of educational materials.

### EE Program Challenge

An EE program is measured according to the level of integration and participation of the surrounding local communities in the environmental actions.

### Environmental Education Program

*“We can never have any sustainable and successful impacts of conservation without the integration of the population around the protected areas in the conservation”*

### Objectives:

- Attitudinal change to shape conservationist behavior
- Integration of local populations into conservation projects

### Intervention Sites:

- MAMABaie
- Andavadoka
- Sahamalaza
- Andavadoka
- Radiated tortoise conservation program at Cap Sainte Marie

### Partners:

- CISCO
- ANGAP
- ONN
- Blueventure
- local radio stations

### Intervention Structure:

Crosscutting program for all the projects within WCS Madagascar





Maroantsetra conservation club

Environment Definition

© WCS

There are 20 ethnic groups in Madagascar and each has unique traditional beliefs about the environment. As the WCS EE Program is involved in a diversity of conservation projects throughout the country, this diversity introduces exciting challenges to the program as a method of intervention adapts to local cultural nuances.

### Current Activities

**Masoala NP, Makira PA, Antongil Bay:** creation of several conservation clubs, a series of training workshops for school teachers, nature visits organized four times a year for clubs and local authorities, a weekly radio broadcast program in partnership with the local radio station in Maroantsetra, quarterly news bulletins for Makira and Masoala, and the active participation in several conservation and education festivals.

**Andavadoaka:** local community environmental awareness campaigns through the use of a mobile cinema.

**Sahamalaza:** an awareness campaign on the protection of the Sacred Ibis of Madagascar (*Fitilibengy*) has been carried out during 2007. The campaign included the production and distribution of 200 posters and 04 information panels on *Fitilibengy* conservation around the Sahamalaza/Iles Radama National Park. A radio program broadcasted twice a week further promotes the importance of conservation in the area.

**Ambatotsirongorongo:** a series of training workshops for better than 50 school teachers around the area. In 2007, a contest has been organized with the participation of all the primary and secondary schools around the Protected Area on the « School, Protector of the Environment ». The contest focused on the improvement of school-based conservation educational modules through the application of techniques learned and materials distributed during the training.

### Next Activities

- Development of the « Outreach program » at the Radiated tortoise conservation program site and in Andavadoaka.
- Creation of new conservation clubs in Ambatotsirongorongo and at the Radiated tortoise conservation site.
- Translation and adaptation of the Elly Jelly series (New York Aquarium) for the curriculum of the primary schools along the coastal zones of Madagascar.
- Integration of health and nutrition into the environmental education activities developed for the MAMABaie.

### The Knowledge steps of environmental education:

- To know
- To love
- To Protect

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### WCS Mission:

WCS's Global Conservation Program saves wildlife and wild places by understanding critical issues, crafting science-based solutions, and taking conservation actions that benefit nature and humanity.

September 2007







Vue d'Ankirindro vers Ambinanitelo et la baie d'Antongil (Davi Meyrs, 2003)

## MAKIRA PROTECTED AREA, MADAGASCAR

Botswana

Cameroon

Central African  
Republic

Republic of  
Congo

Democratic  
Republic of  
Congo

Gabon

Côte d'Ivoire

Kenya

**Madagascar**

Namibia

Rwanda

Tanzania

Uganda

Zambia

Zimbabwe

### WCS at Makira

The forests of Makira, located in the northeast of Madagascar, represent one of the largest remaining continuous areas of Tropical Rainforest in Madagascar. They are a tremendously valuable site for biodiversity conservation, carbon retention, and other critical ecosystem services. The biodiversity level of the Makira-system is expected to be among the highest in the country and, by extension in the world. Among its various terrains and diverse bioclimatic, Makira hosts critically endangered animal species such as the Madagascar serpent eagle, Fossa, and Silky Sifaka. Further, these forests maintain connectivity between several Protected Areas in the north of Madagascar, providing an important genetic corridor and ensuring the ecological integrity of one of the most diverse and intact areas of Madagascar. In collaboration with the Ministry of the Environment, Water and Forests WCS efforts in and around the Makira Protected Area exemplify the commitment of the Madagascar Government and the Wildlife Conservation Society to protect the biodiversity in this great wilderness while assuring the sustainable use of the system's natural resources through partnerships with local communities, the de facto land stewards.

### Human Aspect

The protection of Makira's ecological integrity is also crucial to the well-being of the + 150,000 people existing in the landscape. The forests protect principal watersheds vital to local and regional economies, regulating water levels in the plains, and preventing erosion into Antongil Bay. The forests also provide many benefits to the local communities through sustainable extraction of natural resource on which these communities depend. WCS has put great emphasis on conservation and sustainable resource use of Makira's peripheral forests through a program of community-based resource management transfers. In the context of very high pressure on the forest resources, and a growing human population, these resource management transfers represent an opportunity to assure the long-term conservation of a belt of productive forest around the Makira Protected Area.

### Makira Protected Area

#### In brief

#### Total Surface Area:

- 400.943 Ha

#### Habitats

- Tropical Rainforest
- Stunted Forest
- Lakes

#### Protected Species

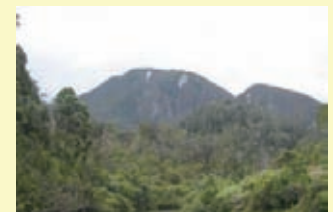
- 20 lemur species, including Indri and Silky sifaka
- +100 bird species, including Serpent Eagle, Brenier's Vanga, Bernier Oriole
- +140 species of reptiles and amphibians, including Tomato Frog

#### WCS Strategies

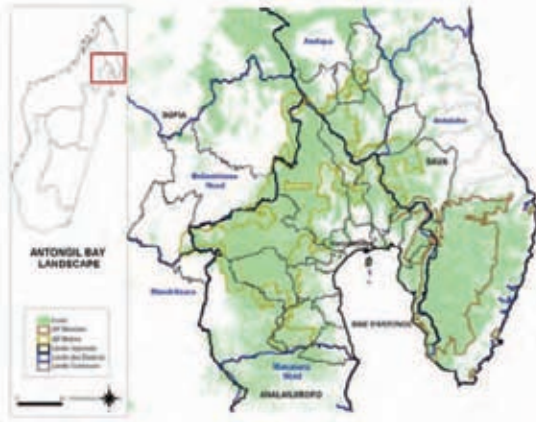
- Nature Conservation
- Research
- Training and capacity building of local partners
- Development of a new model of community integrative conservation based on sustainable financing

#### Partners

- MINENVEF (Ministry of Environment, Water and Forest)
- CI-GCF
- CI-CELB
- McArthur Foundation
- Tany Meva Foundation
- Imperial Tobacco
- CARE International
- PSI Madagascar
- Antongil Conservation



## Project Objectives and Activities



To achieve its conservation objectives in the Makira system WCS has adopted an integrative approach to address the anthropogenic threats acting upon the region's forests, while at the same time considering the needs of the local communities and working to integrate these communities into the management of the protected area.

The principle objectives of the WCS Makira Project are to work with MINENVEF to:

- Stabilize land use, reduce deforestation, and ensure the biodiversity integrity in the greater Makira landscape
- Monitor the impacts of the protected area on area on local communities, and the physical and biological environments
- Collaborate with the local communities to establish conservation and rural development activities based on the Contracted Forest Management (GCF) approach to reduce deforestation.
- Identify sustainable financing mechanisms for the protected area, particularly through carbon offset funds

## Economic Value

**Water** – The irrigated valleys in the Maroantsetra plain are the third most important rice production area in Madagascar. A Large part of the lowland irrigated rice culture depends entirely on good water management in the forested slopes of Makira. From an economic point of view, the negative impact from the continuing deforestation of the watershed and the valley slopes is very important as it causes sand sedimentation and the loss of money during the production period.

**Forests** – The economic value of the Makira forests is evident and includes the following aspects:

- High value traditional products exploited in a sustainable manner
- Subsistence need timber and non timber forest products, used in almost every aspect of local community life.

**Carbon** – The forests of Makira harbor significant 'conservation carbon' potential. Over 30 years, total GHG emissions avoidance attributable to the Makira Forest Protected Area is at least 2,589,898 t C, or 9,496,294 t CO<sub>2</sub> equivalent. The marketing of this sequestered CO<sub>2</sub> through voluntary GHG emissions reductions will provide long-term sustainable financing to the Makira Protected Area and serve as a conservation finance model for Madagascar's protected area system.



*Propithecus candidus*, (Ratelolahy, 2007)

**The objective of the Makira project is to create a community integrative protected area that is financially sustainable, hence ensuring sustainable use of natural resources and the conservation of biodiversity in the forests in the northeast of Madagascar**

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## WCS Mission

WCS's Global Conservation Program saves wildlife and wild places by understanding critical issues, crafting science-based solutions, and taking conservation actions that benefit nature and humanity.

September 2007





- Argentina
- Belize
- The Bahamas
- Gabon
- Indonesia, Papua New Guinea, and Fiji
- Kenya
- Madagascar
- Nicaragua
- Panama
- Russia
- South Africa
- Thailand, Myanmar, India, and Bangladesh
- USA

## NETWORK OF CONSERVATION EDUCATORS AND PRACTITIONERS

### Context

In many countries around the world, lack of access to educational and training resources is one of the greatest obstacles to building capacity in biodiversity conservation. NCEP is a global project, currently active several countries, that seeks to create opportunities for the broad exchange of information and strategies among conservation educators and practitioners so that results from the field directly inform training for the future. NCEP is an ambitious program, designed to have a profound impact on the conservation of biodiversity worldwide by generating cohorts of well-trained conservation educators and practitioners in countries where much of the world's biota resides.

### Project highlights

Educators and conservation practitioners within NCEP are collaborating to produce a series of multi-component modules tailored to the appropriate context and encourage the development of the skills needed to decide when, how, and why a tool is the best choice for a particular conservation application. NCEP modules contain both technical and theoretical background, as well as examples of practical application. Each module includes an expert synthesis of a key topic, an easily modified classroom presentation, practical problem-solving exercises for the field and classroom, and a teacher's guide to module use. NCEP Modules are distributed free of cost and are available in printed form, in electronic form via the Internet, and on CD-ROM. NCEP is putting a lot of effort in training university teachers and trainers to improve the content of courses and programs related to biodiversity conservation. The use of NCEP modules, as well as the application of active teaching techniques, is highly encouraged during these training events to foster in-depth learning, and to develop critical thinking and other skills needed by current and future conservation technicians.

### NCEP Objectives

- Connect teachers of biodiversity conservation with conservation practitioners;
- Create and make widely available a variety of teaching and training modules in biodiversity conservation;
- Develop resource centers to increase mentoring and training opportunities in biodiversity conservation.

### Project Outputs

- 19 modules in French developed and disseminated
- Six resource centers doted with printed modules and training materials such as projectors, laptops
- 90 university teachers and more than 100 conservation practitioners benefited from training events organized by NCEP in Madagascar
- Over 800 individuals from more than 150 institutions, projects and associations joined the network and participated in national and regional NCEP workshops

### Collaborators

American Museum of Natural History,  
Conservation International Madagascar Program, Durrell Wildlife Madagascar Program





University teachers and trainers getting copies of NCEP modules ©Kevin Frey/2004

## WCS Activities

WCS and its collaborators in Madagascar have organized many workshops which bring educators and conservation practitioners together for a variety of purposes.

Several workshops were held to review and adapt existing modules to the Malagasy context. These workshops also facilitated the production of new modules, or presented new modules for discussion and evaluation by faculty peers. To date, 19 modules have been developed for the use in Madagascar, covering various topics related to basic understanding of biodiversity and its threats, spatial planning of conservation, management of endangered species, marine conservation, and sustainable management of natural resources.

NCEP also organizes training workshops, particularly to train the teachers and trainers. Some workshops focused on usage of modules, and in particular how the principles of active teaching and learning embedded in module structure and content can be effectively used in the classroom to improve how we teach about conservation. Most training workshops focus on selected topics related to biodiversity conservation and gather university teachers and trainers, as well as conservation technicians and managers from various regions of Madagascar. All these workshops offer great opportunities to exchange ideas and experiences between educators and conservation practitioners.

## Important Next Steps

For the next three year phase, WCS and its partners will be focusing on the following activities:

- The development of modules will continue, especially on topics related to the Global climate change. More modules from other NCEP countries will also be translated into French and disseminated in Madagascar.
- A pilot group of university teachers and conservation trainers will be formed to promote the use of NCEP modules in their institutions and to recruit new NCEP module users
- An increased use of NCEP modules and training for trainers will be conducted in selected institutions, such as the National Association for the Management of Protected Areas (ANGAP) and the Directorate-General of Environment, Water and Forests (DGEEF) through expanded collaboration.
- Formulation of a national strategy for conservation of Madagascar's marine mammals and their critical habitats.
- Influence and guide regional (western Indian Ocean) and international marine mammal conservation initiatives.

**NCEP aims to improve biodiversity conservation by developing training materials for the use of teachers and trainers and by organizing training opportunities for capacity building.**

### Contacts

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<http://ncep.amnh.org/>

### Mission

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### WCS Strategies

- Site-based conservation
- Research
- Training and capacity-building
- New model development

Aug 2007

**WILDLIFE  
CONSERVATION  
SOCIETY**

# WCS MADAGASCAR

## GLOBAL CONSERVATION PROGRAM

### MISSION

Le Programme Mondial de Conservation de WCS a pour mission de sauvegarder la faune et la flore ainsi que les paysages naturels à travers la compréhension des problèmes critiques, l'élaboration des solutions basées sur des connaissances scientifiques et l'entreprise des actions de conservation auxquelles profitent la nature et l'humanité.

### VISION

WCS envisage un monde dans lequel l'homme estime et respecte la diversité de vie, vit en harmonie avec la nature et assure l'intégrité du monde naturel.

### STRATEGIE DE CONSERVATION MONDIALE 2007-2016

En 2016, WCS conservera un grand nombre d'espèces emblématiques et vulnérables à travers ses 60 réserves étendues naturelles restées sur Terre hébergeant dans l'ensemble 25 % de la faune et flore et de la biodiversité marine du monde. Nous étendons notre portée en forgeant des alliances stratégiques et en relevant quatre défis de conservation au niveau mondial : l'extraction des ressources naturelles, l'interaction de conservation, développement durable et revenu de l'homme, la santé de la faune et la flore sauvages, et le changement climatique.

## CONSERVATION DES ETENDUES NATURELLES

Gestion Intégrée des Zones Côtières dans la Baie d'Antongil pour freiner la réduction des stocks naturels d'espèces protégées à cause de l'utilisation de matériels et méthodes de pêche destructives et la dégradation des écosystèmes par l'envasement causé par la culture sur brûlis incontrôlée.

Développement de modèle efficace de gestion du Parc National Masoala dont les forêts protègent les bassins versants pour les habitants répartis sur la plaine littorale afin de réduire les dangers d'érosion et d'inondation, la défragmentation causée par la culture itinérante sur brûlis, la coupe des bois précieux ainsi que la chasse aux lémuriers.

Mise en place de la nouvelle Aire Protégée de Makira dotée d'un mécanisme de financement durable pour la gestion de l'aire protégée, pour réduire les risques de fragmentation et dégradation de la forêt et pour assurer l'utilisation durable des ressources naturelles par la communauté à travers la vente de carbone de la forêt de Makira.

Conservation de la biodiversité et de l'écosystème marin de Velondriake : en combinant les efforts et les moyens pour créer une aire protégée marine et pour développer une pêche responsable assurant la pérennisation des activités et la conservation des habitats sensibles et espèces menacées.

Mise en place de la nouvelle Aire Protégée d'Ambatotsirongorongo pour préserver sa richesse en biodiversité et réduire les pratiques destructives causées par les crises alimentaires annuelles, le faible taux de développement

## CONSERVATION DES ESPECES MENACEES

Sauvegarde des tortues terrestres, en particulier les tortues radiées et leur habitat naturel dans la région Sud-Ouest et l'extrême Sud de Madagascar en s'appuyant au renforcement de la valeur des tabous favorables à la biodiversité. Le respect de la croyance sur la sacralité des tortues s'étant affaibli, une attitude plus responsable chez les communautés locales serait à développer pour une meilleure gestion des ressources naturelles et pour une réévaluation culturelle des tortues.

Conservation des mammifères marins (baleine à bosse, dauphin, dugong...) qui font face aux menaces indirectes et directes par les activités anthropiques dans les zones côtières de Madagascar, notamment dans la Baie d'Antongil, destination particulière de migration et zone critique de reproduction et de vêlage de l'espèce en danger, baleine à bosse.

Conservation des mammifères terrestres (carnivores, micromammifères et lémuriers) dans les sites d'intervention de WCS par l'application des recherches et des connaissances scientifiques acquises sur le terrain.

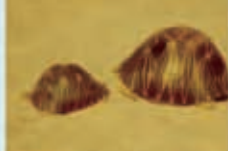
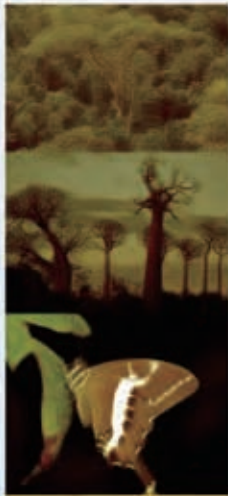
## RENFORCEMENT DE CAPACITE

Encadrement d'étudiants nationaux afin de les préparer à la recherche et à la conservation pour créer un cadre de chercheurs-conservationnistes qualifiés.

Mise en réseau des éducateurs et professionnels de la Conservation pour remédier au manque de ressources mises à jour et à la limitation d'accès aux ressources pour le renforcement de capacité en matière de conservation de la biodiversité.

## PLANIFICATION DE LA CONSERVATION

Valorisation des données sur la biodiversité de Madagascar et des outils de gestion, d'analyse et de restitution, qui seront utilisés dans la planification de la conservation et la gestion de l'environnement à Madagascar.





MARINE PROTECTED AREAS NETWORK  
OF THE IOC COUNTRIES  
M P A N - IOC



CONTEXT SUMMARY

The Western Indian Ocean Marine Ecoregion encompasses the coastal and offshore waters of Madagascar, France (Reunion), Mauritius, Comoros, and Seychelles, which represent the Western Indian Ocean Marine Ecoregion (WIOMER) where ecosystems are of high biological diversity and productivity. However, they are facing significant threats, which are linked to either human activities or natural and global evolution.

To address these threats, the island states of the Western Indian Ocean have created more than 27 Marine Protected Areas (MPAs), but because their identification was not based on a comprehensive scientific analysis at the regional level, the following observations are made:

- Habitats are not well represented, and
- Specific sites for flagship species are not yet protected.

Furthermore, marine protected areas managers remain insufficiently trained and have little opportunity for training and sharing knowledge and experience.

The MPA Network Project is a Programme of the Indian Ocean Commission and implemented by WWF Madagascar and West Indian Ocean Programme Office based in Antananarivo.



THE PROJECT

The Overall Goal of the Project is to contribute to the maintenance of biodiversity and the coastal and marine resources of the Western Indian Ocean Marine Ecoregion through a coherent regional network of effectively managed marine protected areas.

To reach this Goal, the Project has four main components with their respective achievements:

**1. Development of a regional strategy for biodiversity and marine resources management through an ecoregional approach**



To date, a national assessment was carried out in Mauritius, Comoros, Seychelles and Madagascar in order to evaluate the biological, ecological and socio-economical stakes, the legal and institutional framework and to analyze the socio-economic root causes of biodiversity loss. Results will complete key elements for the elaboration of the regional strategy later.

To provide tools for WIOMER, the establishment of a regional geographic information system (GIS) for the entire marine and coastal habitats, the distribution of key species and MPAs, as well as the predominant ecological and physical processes is in progress.

A term of reference for a socio-economic evaluation of MPAs in the region is also elaborated and a call for interest will be carried out to select the service provider. For this, two representative MPA sites in the region will be selected to carry out the study.

**2. Creation of new marine protected areas and support to existing ones**

To reinforce MPA in the region, support is allocated to the Moheli Marine Park (Comoros) through conducting a preliminary diagnosis on the park's functioning and management situation. From this, a support will be provided to the finalization of the Moheli Marine Park Management Plan in order to use it as a promotion and marketing tool also. A support will be also brought to the international designation of the Moheli Marine Park as Biosphere Reserve in the framework of the MAB UNESCO Programme.

The project also supports the creation of the Rivière Banane Marine Reserve in Rodrigues and the demarcation and marine inventory of the Baladava Marine Park in Mauritius. In Seychelles, support is provided for the demonstration project implementing surveillance and controlling



## MARINE PROTECTED AREAS NETWORK OF THE IOC COUNTRIES M P A N – IOC

controlling system of MPAs through the use of radar technology; the establishment of a marine baseline and a monitoring program for Cousin Island Special Reserve (Seychelles) and the improvement of a long-term sustainable management and protection through the use of renewable source of energy and the establishment of an environment management system addressing fresh-water and waste management in Aldabra World Heritage Site (Seychelles.) In Madagascar, the project is supporting the demarcation and the production of management plan for the Velondriake and Saint Augustin – Tariboly MPAs in the southwest.

With regards to the sustainable use of marine resources promoting the development of alternative activities, a sustainable marine ecotourism activity in St Anne Marine Park is supported by the project in Seychelles, as well as a development of alternative livelihoods for fishers in Rivière Banane Marine Reserve in Rodrigues, the development of interpretive center and souvenir shop in Nosy Tanikely, north west Madagascar, and the implementation of whale based ecotourism in villages around MPAs in Comoros.

To strengthen managers capacity in their daily MPA management and operations, a french version of the IUCN Toolkit for management of MPAs in the Western Indian Ocean was produced and the toolkit will be distributed soon.

### 3. Establishment of a regional forum of marine protected areas manager

To reinforce opportunities for training, sharing knowledge and experiences within MPA managers in WIOMER, annual meeting were organized in Rodrigues in May 2007, and in Antsiranana (Madagascar) in May 2008. From these meetings, the objectives and the structure of the network were defined, as well as the priority needs necessitating support from the project. In Antsiranana, opportunities were given to MPA managers in the region to improve their knowledge and experience on sustainable financial mechanism tools and success stories on income generating activities. A web site for MPAs managers in the region is currently in construction.



### 4. Development of an awareness and communication

In order to deliver results, a Communication Plan is established in which the awareness/education and information activities and the development of communication materials (such as posters, booklets, various visual material, website, film) are implemented.

The website is viewable at [www.amp-coi.org](http://www.amp-coi.org).

In order to develop a common education tool to integrate the regional dimension of marine and coastal environment, a creation of a database of environmental education activities, tools and material in the Western Indian Ocean has been initiated.

In order to reach target audiences, support has been given to the national events in the region to deliver key message on the benefits of developing MPAs. An itinerary exhibit has also been organized to get young people familiarized with the ecoregion marine realm, its threats and the necessity to protect and manage it, and the reason for the project implementation.

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