



***Darwin Initiative for the Survival of Species***  
***Annual Report***

***Conservation of Critically Endangered Gyps spp.***  
***Vultures in India***

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## 1. Darwin Project Information

Project title	Conservation of Critically Endangered <i>Gyps</i> spp. Vultures in India
Country(ies)	India
Contractor	Institute of Zoology, Zoological Society of London
Project Reference No.	162/10/013
Grant Value	£148,411
Start/Finishing dates	01-Apr-01 to 31-Mar-04
Reporting period	01-Apr-01 to 31-Mar-02

## 2. Project Background

Over the past 10 years, two species of vulture within the genus *Gyps* have declined by > 90% throughout their ranges in India. Once regarded as abundant, both species are now classified as critically endangered by the IUCN. The declines are due to abnormally high mortality rates of all age classes and abnormally low reproductive success rates, the cause of which is thought to be an infectious disease epidemic. Birds exhibit evidence of disease prior to death; namely progressively increasing lethargy with periods of abnormal neck-drooping behaviour. Vultures with similar illness have been seen throughout India and, recently, in Nepal and Pakistan – where high death rates are now also occurring.

Identifying the cause(s) of the population declines of *Gyps* spp. vultures in India is one of the most urgent priorities facing the research and conservation community today. The potential impacts of vulture extinctions within India, and potentially across Asia, Europe and Africa, should the disease spread, would severely disrupt ecosystems in which vultures are the main scavengers and could have devastating effects on associated human populations.

## 3. Project Objectives

To produce a Recovery Plan for the critically endangered *Gyps* spp. vultures (*Gyps bengalensis* and *Gyps indicus*) in India and to develop the capacity within India to implement the plan.

### Outputs:

1. Cause of vulture decline identified.
2. Geographical extent and rate of vulture decline confirmed.
3. Options for remedial measures identified and evaluated.
4. Capacity to implement and monitor species recovery plan developed.
5. Constituency in support of vulture conservation in India developed in India and internationally.

## **Activities:**

### **1.1 Establish collaborative relationships with appropriate institutions within and outside India**

Within India, collaborative relationships have been established with the Chief Wildlife Wardens and Forest Departments of the following State Governments: Haryana, Himachel Pradesh, Maharashtra, Delhi, Rajasthan & Punjab. The relationship with Govt. of Haryana is particularly well established, with the Chief Secretary initiating a Darwin Workshop in January and the Chief Wildlife Warden providing land and expediting permissions for the building of the Vulture Care Centre (comprising vulture aviaries and a field diagnostic laboratory).

Outside India, a collaborative relationship has been established with Bird Conservation Nepal. This organisation will conduct monitoring and surveillance of vultures in Nepal in 2002 with funding from the RSPB. Similar relationships are currently being developed with the Royal Society for the Protection of Nature, Bhutan and with the National Wildlife Research Center, Saudi Arabia.

Also, a collaborative relationship has been established with the CSIRO Australian Animal Health Laboratory (AAHL) in Geelong, Victoria, Australia. This is one of the most sophisticated veterinary diagnostic laboratories in the world. A “Collaborative Research Agreement” has been signed between the BNHS, PDRC & AAHL for AAHL to assist with the diagnosis and characterisation of the vulture disease. Work conducted at AAHL is being funded by the RSPB, IoZ and AAHL.

### **1.2 Provide training in sample collection**

Dr Andrew Cunningham has trained PDRC staff in post mortem sample collection during his visits to this laboratory. Training in carcass collection and submission was given to delegates of the Monitoring Workshop held in January 2002. Further training on sample collection is to be given to BNHS staff during Year 2, following the completion of the Vulture Care Centre (which includes a field diagnostic laboratory) in Pinjore, Haryana.

### **1.3 Provide specialist consultations in disease investigations at PDRC.**

Five weeks of consultative training were given to PDRC staff during the period under review. This, along with equipment purchased with the current grant, has enabled a designated area of the PDRC to be established as a “Vulture Disease Investigation Laboratory”.

### **1.4 Collect vulture carcasses from at least 3 states**

Eight vulture carcasses from two states (Rajasthan and Maharashtra) have been collected and submitted to the PDRC for pathological examination. These are in addition to twenty carcasses collected prior to the initiation of the current grant period.

### **1.5 Conduct pathological investigations including: post mortem, bacteriology, histopathology, virology, etc.**

Pathological investigations are being undertaken on all carcasses collected to date. In addition, advanced virology studies are being conducted at the PDRC and at AAHL.

#### 1.6 Establish pathology database

An Excel database has been established for recording and analysing the findings from the pathological investigations. This currently contains information on twenty-eight vultures. For each vulture examined, the database includes: reference number; species; age; sex; date collected; location collected; information on carcass preservation and condition; date and place of post mortem examination; samples collected and how they are preserved and stored; significant pathological findings, including results of further investigations.

#### 2.1 Run training workshops for vulture surveyors (IBCN partners and BNHS staff)

A one-week training workshop was held in January 2002 on vulture monitoring and surveillance techniques.

#### 2.2 Monitor vulture numbers, adult/juvenile ratios, and proportions of sick birds annually

Difficulties in transferring monies to the BNHS at the start of the project resulted in a delay to the arrival of initial funds to the BNHS. This money was required for the payment of staff to conduct vulture surveys. As these surveys must be carried out at the same time of year (April to June) to be comparable with previous work, we had to cancel this aspect of the first year's work. However, the money thus saved will now be transferred to the following year (permission has been given by the Darwin office to do this) to enable vulture surveys and population monitoring to be carried out in a more in-depth and detailed way than would otherwise have been possible. The lack of survey data in the first year is regrettable, but over the three-year period of this project, the extra detail of information obtained will enhance our ability to develop a recovery plan for the *Gyps* spp. vultures.

#### 2.3 Establish vulture population database

This is in the early stages of development. Participants at the Monitoring Workshop were tasked with finding and surveying their local vulture colonies. This has provided base-line data and allowed further colonies to be identified and mapped. The database will be further developed once data becomes available from additional surveys and colony monitoring during the course of this project.

#### 3.1 Carry out literature review and consultations with experts inside and outside India

This process is currently underway.

#### 3.2 Run recovery planning workshop with appropriate Indian and international expertise

To be conducted in Year 3.

### 3.3 Write species recovery plan

To be conducted in Year 3.

### 4.1 Wildlife laboratory established and equipped at Bharatpur and

### 4.2 Establish Vulture aviaries at Bharatpur.

Changes of personnel in the positions of Chief Wildlife Warden and Deputy Wildlife Warden of Rajasthan meant that the permission to build vulture aviaries and a diagnostic laboratory in Rajasthan was no longer automatic and required re-negotiation. This can be a lengthy process, but fortunately Mr Jakati, the Chief Wildlife Warden of the neighbouring State of Haryana, intervened and offered the required permission enabling construction to proceed almost without delay. Both the vulture aviaries and the field diagnostic laboratory have now been constructed and form a "Vulture Care Centre". This is sited in a forest clearing near Pinjore in northern Haryana. The laboratory is partially equipped, and this will be completed in Year 2.

### 4.3 One BNHS scientist trained in the UK to a high level in captive care techniques, and diagnostic and health monitoring techniques

Dr Vibhu Prakash, Principal Scientist of the BNHS visited the UK in September to December 2001. During this period he was trained to a high international standard in captive husbandry, management and handling of captive vultures and other birds of prey at the National Birds of Prey Centre, Gloucestershire. In addition, he visited other institutions holding birds of prey in order to experience alternative husbandry methods. Dr Prakash will return to the UK in Years 2 & 3 of this project for training in diagnostic and health monitoring techniques.

### 5.1 Provide annual newsletter for participating/interested organisations

A newsletter was produced at the end of Year 1, in which the objectives and methods of the Darwin project were presented. A brief report of the progress of the project was given and a report on the Monitoring Workshop was included. Networking amongst the Monitoring Workshop delegates was promoted and their continued active participation in the vulture monitoring and surveillance project was encouraged. Protocols for vulture monitoring and surveillance and for carcase collection and submission were also included.

### 5.2 provide up-dated information to the public through mass-media and popular scientific articles

A large number of media outputs have resulted from the project. These have primarily been newspaper articles in local and national publications in India (27), but have also included television and radio interviews within India (2), the U.K. (1), North America (1) and globally (*e.g.* BBC World Service) (4). Popular scientific articles have been published in *New Scientist* magazine (international) and in membership magazines of the ZSL, RSPB and NBPC (UK), of the BNHS (India) and of BirdLife International (international). Popular scientific articles have also been published on web sites, including those of the BBC, National

Geographic & ProMed. In all cases the Darwin Initiative name was promoted at the time of interview and in most cases it was mentioned in the media output.

### 5.3 up-date BNHS and RSPB website

A project web site ([www.vulturedeclines.org](http://www.vulturedeclines.org)) has been developed, which contains background information about the vulture declines and details about the project, including links to the web sites of partner and associated organisations and to that of the Darwin Initiative. On this web site we actively promote and guide the setting up of vulture monitoring and surveillance within other *Gyps* spp. range states.

Protocols for monitoring and surveillance of vultures and for sample collection and submission are posted on the project web site. Also available are downloadable files containing the proceedings of the Monitoring Workshop and the proceedings of a conference workshop on vulture declines at which the work of the current project was presented.

Links from the BNHS and RSPB web sites (and other web sites) to the Project web site have superseded the need to specifically up-date the BNHS and RSPB web sites.

### 5.4 submit five papers to peer-reviewed journals

One paper has been submitted and accepted for publication in a peer-reviewed journal (*Biological Conservation*). A second paper is in preparation.

### 5.5 submit articles to journals of other key institutions

An article has been submitted to (and published by) BirdLife International's newsletter, "World BirdWatch".

The objectives of this project have not been modified over the last year. The proposed operational plan has been slightly modified to increase the amount and degree of monitoring and surveillance of vultures at breeding and roosting colonies across their ranges in India. As described in the 6-monthly report, financial and timing constraints precluded the carrying out of the nation-wide population surveys planned for Year 1 of this project. The money not spent as a result of this cancellation has been carried forward into Year 2, where it will be used to pay for more-intensive colony monitoring than had originally been envisaged. This change, which has been approved by the Darwin Secretariat, will provide valuable data on the spread and impact of disease on vulture populations, which will inform the drafting of the Recovery Plan.

#### 4. Progress

Indian white-backed (*Gyps bengalensis*) and long-billed (*G. indicus*) vultures, common and widespread in the 1980s, are now classified as critically endangered by the IUCN. In 1998, data published from Keoladeo National Park World Heritage Site (KNP) showed that populations of *Gyps* spp. vultures there had declined by > 95% over a 10 year period. In 2000, nation-wide surveys showed similar severe declines throughout India and there are recent reports of declines of *Gyps* spp. in neighbouring Nepal and Pakistan. Abnormally high rates of nest failure and of adult, juvenile and nestling mortality have been noted in areas of declines. Work by BNHS has shown that the declines are not related to food shortage, and toxicological examinations indicated that pesticide poisoning is unlikely. Preliminary epidemiological, clinical and pathological data (IoZ and PDRC) point to an infectious disease as the cause of the declines. The situation was reviewed by Indian and international experts at an 'International Meeting on the Vulture Situation in India' held in Delhi, 18-20 September 2000, organised by BNHS and supported by RSPB and the Ministry of Environment and Forests, Government of India. The participants produced a statement expressing concern about the problem and calling for support to establish the cause of the declines and to develop a vulture recovery plan.

Apart from the nationwide surveys, which did not take part – as planned – during the first year of the project (see Part 4, "Difficulties Encountered During the Year"), the project kept more or less to the agreed baseline timetable for the period. A Vulture Disease Investigation Laboratory was established at the PDRC and a Vulture Care Centre (aviaries and field laboratory) were built in Pinjore, Haryana. Training in wildlife disease investigations and pathology was given to PDRC staff in India by Andrew Cunningham, and Dr Prakash received training in vulture captive care and husbandry in the UK. In addition, a highly successful workshop in vulture monitoring and surveillance techniques was conducted in India, as planned.

During the first year of the project, research activities have been focussed on diagnostic work to identify the cause of the vulture declines in India. This work has mainly involved the collection (by the BNHS) of fresh carcasses for post mortem examination (at the PDRC), and follow-up pathological examinations. A large amount of work, such as histopathology, bacteriology, parasitology, attempted virus culture in tissue culture and in embryonated hens' eggs, and electron microscopy has been conducted on the tissues collected during the course of the project. So far, significant post mortem findings include visceral gout, enteritis, perivascular plasmalymphocytic cuffing and gliosis, all of which continue to indicate an infectious, probably viral, aetiology. Virological tests conducted so far have failed to identify the agent involved, suggesting that the vultures are being infected by a novel pathogen and not one that is readily identifiable.

The identification of novel pathogens is not an easy task at the best of times and can take many years. Due to the urgency of the vulture situation in the Indian subcontinent, and the limited availability of advanced research infrastructure in India, help has been sought – and provided – by the CSIRO Australian Animal Health Laboratory, which is one of the leading veterinary diagnostic laboratories in the world. In order to take advantage of this, permission for the export of a limited number of diagnostic samples to Australia has now been obtained from the relevant Indian authorities.

Training in vulture diagnostics was provided to two veterinary and one molecular biologist staff members at the PDRC through five visits by Dr Andrew Cunningham, IoZ. Each visit was of one week duration and these visits were spread throughout the year. The staff trained were chosen by the General Manager of the PDRC on the

criteria that they were his most capable staff members who would be conducting vulture diagnostic work in his laboratory. Initially, training was given on post mortem technique, and the more-rigorous approach required for pathological examination and sample taking for wildlife disease investigations compared to routine poultry diagnostics. Training was also given on the interpretation of histological sections and the interpretation of the results from diagnostic tests, such as histopathology, bacteriology, virology and toxicology. Some training in toxicology (technique and interpretation) was also provided to PDRC staff during a visit by Dr Debbie Pain, RSPB.

Dr Vibhu Prakash, Principle Scientist, BNHS visited the UK for three months (September to December 2001) to be trained in captive care, husbandry and handling of vultures. This training was mostly provided by Ms Jemima Parry-Jones and her staff at the National Birds of Prey Centre, Newent, Gloucestershire. During this period, Dr Prakash participated in a formal falconry training course in order to learn more about handling captive birds of prey in general. Dr Prakash also visited other institutions in the UK where captive birds of prey are kept in order to gain further experience of their husbandry. This included a two-week training visit to the Hawk Conservancy, Andover, Hampshire where Indian white-backed vultures are kept (this is one of the species that will be housed in the Vulture Care Centre, Pinjore).

A one-week training course in avian monitoring and surveillance techniques was held from 21-25<sup>th</sup> January. This workshop was inaugurated by Mr L. M. Goyal, Chief Secretary, Government of Haryana. The inauguration ceremony was attended by the delegates and trainers, by several Indian dignitaries and by Mr Tom Macan, Deputy British High Commissioner, New Delhi. The first two days of this workshop comprised the teaching of theory interspersed with practical sessions taught by Dr Richard Gregory and Dr Paul Donald from the RSPB. Additional tuition in vulture surveillance was provided by Dr Debbie Pain, RSPB. On the third and fourth day, Dr Vibhu Prakash, BNHS and Dr Andrew Cunningham, IoZ taught Indian vulture identification and carcass collection and submission protocols respectively. Each session was initiated with explanations as to the need for accurate monitoring, identification, etc., or for employing the correct methods for carcass collection. On the fourth and final days, the delegates were taken on field visits for practical exercises in vulture identification, monitoring and surveillance.

Five BNHS staff and 31 non-BNHS Indian biologists attended the course. In addition, one biologist each from Bird Conservation Nepal and from the Royal Society for the Protection of Nature, Bhutan attended, with expenses for these two delegates being paid for by the RSPB. BNHS staff who attended were those who will be actively participating in work for the vulture project. Non-BNHS delegates were selected if they were already working with raptors, were members or State co-ordinators of the Indian Bird Conservation Network, or if they worked for a State Government Forest Department. They also had to meet all of the following criteria: (1) amateur or professional ornithologist, (2) willing and able to carry out monitoring and surveillance of vulture colonies, (3) from disparate parts of India to ensure nationwide coverage.

During the course of the year, a number of presentations have been made at research and popular scientific meetings. These include presentations by Andrew Cunningham at the Institute of Zoology & University of Liverpool, by Debbie Pain at the University of Cambridge and at a Workshop in Nairobi, Kenya, and by Vibhu Prakash at the Oriental Bird Club AGM, London and to the public at the Hawk Conservancy, Hampshire. In September 2001, presentations about the work of the Darwin Vulture Project were given by Dr Vibhu Prakash, Dr Debbie Pain and Dr Andrew



Cunningham at the Raptor Research Foundation's 4<sup>th</sup> Eurasian Congress on Raptors in Seville, Spain. Proceedings of this conference, including abstracts of the talks given on vulture conservation, can be found on the Project's website. The work of the Project was also presented at the Winter Meeting of the British Ecological Society in December 2001.

### **Difficulties Encountered During the Year.**

1. Difficulties in transferring monies to the BNHS resulted in a delay to the arrival of initial funds to the BNHS. This money was required for the payment of staff to conduct vulture surveys. As these surveys must be carried out at the same time of year to be comparable with previous work, we had to cancel this aspect of the first year's work. However, the money thus saved will now be transferred to the following year (permission has been given by the Darwin office to do this) to enable vulture surveys and population monitoring to be carried out in a more in-depth and detailed way than would otherwise have been possible. The lack of survey data in the first year is regrettable, but over the three-year period of this project, the extra detail of information obtained will enhance our ability to develop a recovery plan for the Gyps spp. vultures.

2. Changes of personnel in the positions of Chief Wildlife Warden and Deputy Wildlife Warden of Rajasthan meant that the permission to build vulture aviaries in Rajasthan was no longer automatic and required re-negotiation. This can be a lengthy process, but fortunately Mr Jakati, the Chief Wildlife Warden of the neighbouring State of Haryana, intervened and offered the required permission. This allowed vulture aviary construction to proceed almost without delay. The move from Rajasthan to Haryana has resulted in higher than anticipated costs for the construction of the aviaries as materials and labour are more expensive in Haryana than in Rajasthan. These costs have resulted in modifications to the design and construction of the Vulture Care Centre. Although we have been able to maintain the planned aviary space for circa 20 birds without compromising our high welfare standards, we have had to reduce the number of hospital/quarantine aviaries from 16 to 8. We hope to raise the money (approx. £3,000) required to build the remaining 8 hospital aviaries from other sources during the course of the forthcoming year. Despite this set-back, overall the project will benefit from the move to Haryana as the personal interest of Mr Jakati in the project is very beneficial – for example, in expediting the granting of other permissions required and in the provision of wildlife warden services that would otherwise not be available. Also, Mr Jakati is acting as an advocate for the project to other State and Central Government personnel and departments.

### **Changes in Project Design**

Increasing the quantity and quality of both the disease diagnostic work and the vulture surveys and population monitoring to that originally envisaged has enhanced the project design for the forthcoming year. This has been made possible by the establishment of a collaborative relationship with the CSIRO Australian Animal Health Laboratory and the gaining of permission from the Indian Government to submit vulture tissue samples to AAHL for analyses. The collaboration with AAHL

(which is being financed by the RSPB, IoZ and AAHL) has brought much-needed expertise and facilities to the disease investigation aspect of the current project. Also, this collaboration will provide additional benefit to the PDRC by providing their staff with training and diagnostic access to an international diagnostic laboratory of extremely high repute, thus building capacity within India both for vulture diagnostic work and for poultry disease research work independent of the vulture project. Increased monitoring and surveillance has been enabled by the carry-over of unspent monies from Year 1 (for vulture surveys) and by the re-deployment of a small amount of money (£1,000) from the diagnostic budget to vulture monitoring, allowing field researchers to be employed for a full year on this aspect of the work instead of the initially proposed period of three months. The extra quality and quantity of results gained from this change will enhance the data available for informing the recovery plan development process in Year 3.

### **Timetable (workplan) for the Next Reporting Period.**

May - Training by NBPC specialist of Vulture Centre staff in India in care, husbandry and management of captive vultures. Training workshop completed with participants trained in captive care and basic disease investigations.

July - 2002 nation-wide surveys of *Gyps* spp. vulture populations conducted.

July - Initiation of study of captive vultures at the Vulture Captive Care Centre

September – Cause of vulture declines determined. It is hoped that by this time the cause of the declines will have been identified. Although this first-year goal was not achieved, during the first year of the project substantial progress was made in substantiating the cause as most likely to be an infectious disease, in collecting samples for advanced diagnostic work, and in setting up infrastructure and collaborations to conduct such diagnostic work.

December – One paper published in peer reviewed journal.

February – UK press release issued.

February – One TV feature completed.

March - Training of BNHS scientists in the UK in laboratory diagnostic techniques and to gain experience in wildlife disease investigations. Techniques learned will be passed on to field staff and other staff at the Vulture Care Centre.

March – Three periods of consultative training in wildlife pathology given to PDRC staff by Andrew Cunningham. Three PDRC staff trained in avian diagnostics and wildlife disease investigations.

March – training in captive care of vultures cascaded to two local staff by BMHS staff.

March – Two conferences/seminars attended by Vibhu Prakash and one other.

March – 2 National and 4 local radio features completed.

March – Newsletter produced (circulation 200)

March – Dissemination network via IBCN enhanced.

March – 2 papers submitted to peer reviewed journals.

## **5. Partnerships**

The project has established a new, close and mutually-beneficial link with the Department of Forest and Wildlife, Government of Haryana. Less close links have been established with similar Forest and Wildlife Departments in other States, namely Himachel Pradesh, Maharashtra, Delhi, Rajasthan & Punjab. Also, new collaborative links for vulture conservation have been established with Bird Conservation Nepal, the Royal Society for the Protection of Nature, Bhutan and with the National Wildlife Research Center, Saudi Arabia.

Finally, a new collaborative relationship has been established with the CSIRO Australian Animal Health Laboratory. Although AAHL is not a biodiversity conservation organisation, it is currently developing an interest in disease threats to wildlife – an area predicted to be of increasing concern to biodiversity conservation in future years. This collaboration has the potential to be mutually beneficial to all organisations involved; for the vulture declines project, for future conservation projects within India, and possibly also for conservation projects within Australia (by encouraging the development of a wildlife disease programme at AAHL). Also, there is the potential for the routine work of the PDRC to gain from this collaboration (see above).

## **6. Impact and Sustainability**

The project has a high profile amongst the scientific and conservation communities within India, and also with the Haryana State Government and a small number of other State governments (e.g. Himachel Pradesh, Punjab, Maharashtra). Also, the large number of media reports of the project has resulted in a high awareness and concern amongst the general public (particularly villagers) of the vulture declines and the need to address these. The same level of interest and concern has not yet permeated the Central Government of India or many of the State Governments. In order to raise awareness, and in addition to press releases, the project has been promoted at several meetings and conferences, including the India Agriculture Exhibition, Delhi. At the latter, a pamphlet describing the work of the project (and highlighting the role of the Darwin Initiative) was widely distributed. The inauguration of the training workshop in January by the Chief Secretary of Haryana and the attendance at this inauguration of the British Deputy High Commissioner was also used to promote the project, both within Haryana and to a broader audience, including the Central Government.

In addition to a greater general awareness of the work of the project in India, the Haryana State Government has undertaken to continue running the Vulture Captive Care Centre in partnership with the BNHS, should other funding for BNHS staff at the Centre not be forthcoming following the end of the period of funding by the Darwin Initiative. Although this provides an exit strategy for the Centre, and although the IoZ, RSPB & BNHS are committed to continued input into vulture conservation in India, further funds are required to provide for a satisfactory exit strategy for the Darwin Initiative project as a whole. A fundraising strategy is, therefore, being developed with plans to launch this during the course of the second year of the project.

## 7. Outputs, Outcomes and Dissemination

**Table 1. Project Outputs (According to Standard Output Measures)**

Code No.	Quantity	Description
6A	42	1 BNHS staff member visited the UK for training in captive care and management of vultures; 38 BNHS & IBCN surveyors trained in monitoring and survey techniques and in ecological data collection; consultative training to 3 PDRC staff
6B	18	12 weeks training in the UK (at NBPC, IoZ and other institutes) for BNHS staff member; 1 week workshop in monitoring techniques and ecological data collection was held in India; 5 weeks consultative training given to PDRC staff
7	1	1 set of training materials produced (carcase collection and submission protocol, post mortem and diagnostic investigations protocol at PDRC)
8	9	4 x 1 week for workshop, 5 weeks for consultative training
10	1	Census and survey guide produced as output from workshop
11A	1	Paper accepted for publication in Biological Conservation
11B	1	Paper almost ready for submission to Animal Conservation
12A	2	Vulture pathology database; Vulture populations database
14B	11	4 <sup>th</sup> Eurasian Congress on Raptors at which Vibhu Prakash, Debbie Pain & Andrew Cunningham gave presentations. Presentations were also made at the following conferences/meeting: Vulture Crisis Workshop, Nairobi, Kenya; Seminar at Cambridge University Zoology Dept.; Institute of Zoology Annual Conference; RSPB Annual Staff Conference; Oriental Bird Club AGM, London; Members' Talk at the Hawk Conservancy, Andover, Hampshire; Seminar at the University of Liverpool Veterinary School; British Ecological Society 2001 Winter Meeting, Warwick University.
15A	1	Press release issued detailing the inauguration of the Darwin Vulture Project
15B	2	Press releases about the inauguration of the Vulture Disease Investigation Laboratory, Pune, and about the inauguration of the training workshop in Pinjore & Parwanoo
15C	1	Press release issued detailing the inauguration of the

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Darwin Vulture Project		
16A	1	Annual newsletter produced for the project
16B	200	circulation 200 plus website
17B	1	Dissemination network of the IBCN enhanced
18A	1	One national news item broadcast in India by Zee TV on the setting up of the Vulture Care Centre
18B	2	Two documentaries in planning stage
19A	1	One national radio broadcast in India on the project in general
19B	1	Project and Darwin Initiative mentioned on Radio 4
	4	4 international radio broadcasts on BBC World Service and Canadian Radio
	4	3 website news broadcasts (2 BBC, 1 ProMed & 1 National Geographic)
	2	2 press articles in the UK
	27	27 press articles in India
	4	4 articles in periodicals in the UK (Cage & Aviary Birds, 2 x Birds Magazine, Lifewatch Magazine)
	3	3 articles in international periodicals (World Birdwatch, Indian Airlines Magazine "SWAGAT", New Scientist)

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**Table 2: Publications**

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
Workshop proceedings	Proceedings of a Gyps spp. vulture monitoring workshop, 21-25 January 2002	Bombay Natural History Society	www.vulturedeclines.org	
Newsletter	Jatayu, the newsletter of the project: Conservation of Critically Endangered Gyps species vultures in India	Bombay Natural History Society	Project Manager, Conservation of Gyps Vulture Project, B-2 Forest Complex, Pinjore – 134102, Dist. Panchkula, Haryana, India  www.vulturedeclines.org	
Pamphlet	Conservation of critically endangered Gyps Vultures in India	Bombay Natural History Society	Project Manager, Conservation of Gyps Vulture Project, B-2 Forest Complex, Pinjore – 134102, Dist. Panchkula, Haryana, India	

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Scientific paper	Prakash, V., Pain, D.J., Cunningham, A.A., Donald, P.F., Prakash, N., Verma, A., Gargi, R., Sivakumar, S. & Rahmani, A (in press) Catastrophic collapse of Indian white-backed <i>Gyps</i> <i>bengalensis</i> and long- billed <i>Gyps indicus</i> vulture populations	Biological Conservation
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## 8. Project Expenditure

Expenditure of the monies granted by the Darwin Initiative for the year 2001/2002 are detailed in Table 3.

**Table 3: Project expenditure during the reporting period**

Item	Budget	Expenditure
Salaries (specify)		
Rent ,rates heating lighting etc		
Office administration costs		
Capital items/equipment		
Others		
Total		

Agreed changes to the budget are as follows:

- £500 for Biochemistry Analyser: It has been agreed that the purchase of a Biochemistry Analyser be deferred from Year 1 to Year 2.
- £4,000 for vulture surveys: These surveys were not carried out during Year 1 (see Part 4, “Difficulties Encountered During the Year”), and it has been agreed that this money now be spent on increased quantity and quality of vulture monitoring and surveillance during Year 2.
- £880 for one training visit to India: It has been agreed that one training visit by Andrew Cunningham to the PDRC be deferred from Year 1 to Year 2.

## 9. Monitoring, Evaluation and Lessons

The establishment of a collaborative relationship between the IoZ, RSPB, BNHS & PDRC is evidenced by an MoU between these organisations, which is kept on file by each organisation. In addition, a collaborative research agreement has been drawn up between the BNHS, the PDRC and the AAHL to enable more-advanced pathological investigations to proceed.

Diagnostic work at the PDRC has been closely monitored and evaluated throughout the year by frequent visits to the PDRC laboratory by Andrew Cunningham. In addition to these visits and to interim email and telephone reports, the PDRC has produced a detailed annual report, in which materials, methods and results have been presented for all of the vulture-related work conducted during the first year of the project. A computer database of the results of the pathological investigations conducted so far has been established. This database is maintained by the IoZ, with additional copies held by the BNHS & PDRC. Copies of the interim and annual reports of the PDRC are kept on file at the IoZ, PDRC & BNHS. Similar procedures will be implemented during the second year of the project.

The initial success of the training workshop in vulture monitoring and surveillance was evaluated by practical and theoretical exercises during the workshop. Further evaluation will be conducted during the second year of the project, when monitoring and surveillance reports will be received from the workshop attendees for their local vulture populations. Such reports will contribute significantly to the purpose of the project and to the development of a database of vulture populations in India. During the workshop, protocols were developed for the monitoring and surveillance of vulture populations at different sites (breeding/roosting colonies, carcass dumps) and for the collection and submission of carcasses for pathological investigation. The proceedings of the workshop, which include the protocols developed, have been published and are available from the project website.

Visits by Andrew Cunningham and Debbie Pain to the Vulture Care Centre have been used both for training and for monitoring the progress of construction of the Centre. These visits have proved invaluable in ensuring the correct siting and design of the Centre. In addition to the visits, frequent email and telephone conversations between Andrew Cunningham and Dr Vibhu Prakash (BNHS) have been held throughout the year, usually on a weekly basis. Invaluable input from Jemima Parry-Jones (NBPC) was received on the design of the aviaries for the Centre.

Finally, the outputs of the project so far have produced a great deal of public and media interest and this has been used to develop a constituency within India, and beyond, for vulture conservation. It has been difficult to keep track of all of the media outputs relating to the project, but details of many of these can be found listed on the project website. A file of media reports and of correspondence with State and Central governments and others is maintained by the BNHS.

Two main lessons have been learned during the first year of the project: (1) Contracted staff for the project in India are able to work more effectively if the PI makes regular and frequent visits to oversee and discuss the work. Therefore, one of the visits from Year 1 was held over to Year 2 to increase the number of visits made in Year 2. (2) There is a high turnover in the posts of lower government officials, therefore it is advisable to always obtain permissions and guarantees from as high up the political hierarchy as possible. In Haryana, we have been fortunate to obtain the backing of both the Chief Secretary and the Chief Minister of this State.

10. **Author(s) / Date**

Andrew A. Cunningham 15<sup>th</sup> April 2002



## Appendix – Logical Framework for Project

19. Logical framework. Please enter the details of your project onto the matrix using the note at Annex B of the Guidance Note.

<b>Project summary</b>	<b>Measurable indicators</b>	<b>Means of verification</b>	<b>Important assumptions</b>
<p><b>Goal</b></p> <p>To assist countries rich in biodiversity but poor in resources with the conservation of biological diversity and implementation of the Biodiversity Convention.</p>	<p>Gyps vulture populations removed from the Red Data Book</p> <p>Indian government and other agencies adopt this model of consensus building and recovery-planning for implementation of the NBSAP</p>	<p>Long term monitoring (post-project) and status review by IUCN/BirdLife</p> <p>Indian National reports to the CBD</p>	
<p><b>Purpose</b></p> <p>Recovery Plan for the critically endangered Gyps spp. vultures (Gyps indicus and Gyps bengalensis) in India produced and capacity to implement it developed.</p>	<p>PP1: Recovery Plan produced and endorsed by government and key Indian institutions</p> <p>PP2: Implementation of lab work, captive population management and field research judged to be self-supporting by the end of the project</p>	<p>PP1: Recovery Plan document and correspondence</p> <p>PP2: End of project report</p>	
<p><b>Outputs</b></p> <p>1. Cause of vulture decline identified</p> <p>2. Geographical extent and rate of vulture decline confirmed</p> <p>3. Options for remedial measures identified and evaluated.</p> <p>4. Capacity to implement</p>	<p>1. International scientific community endorses the results of the project investigation</p> <p>2. Three years of comparable data available from 50% of Indian Gyps range states</p> <p>3. Consensus amongst key experts on possible remedial measures</p> <p>4. Training needs fulfilled and facilities operational</p>	<p>1. Publication of results in peer-reviewed international scientific journals.</p> <p>2. Annual survey reports and publication of results in peer-reviewed international scientific journals.</p> <p>3. Meeting reports</p> <p>4. Pre-project training needs</p>	<p>Continued State and Federal government support for the collection of vulture samples.*</p> <p>It is possible to identify the cause of the decline before vultures become extinct.*</p> <p>That remedial measures are possible.*</p>

<p><i>and monitor species recovery plan developed.</i></p> <p>5. Constituency in support of vulture conservation in India developed in India and Internationally</p>	<p>5. Media and government interest in the issue sustained</p>	<p><i>assessment and analysis of equipment needs, annual reports and training reports</i></p> <p>5. Media reports file at BNHS, correspondence with state and national governments and international bodies</p>	
<p><b>Activities</b></p> <p>1.1 Establish collaborative relationships with appropriate institutions within and outside India</p> <p>1.2 Provide training in sample collection</p> <p>1.3 Provide specialist consultations in disease investigations at PDRC.</p> <p>1.4 Collect vulture carcasses from at least 3 states</p> <p>1.5 Conduct pathological investigations including: post mortem, bacteriology, histopathology, virology, etc.</p> <p>1.6 Establish pathology database</p> <p>2.1 Run training workshops for vulture surveyors (IBCN partners and BNHS staff)</p> <p>2.2 Monitor vulture numbers, adult/juvenile ratios, and proportions of sick birds annually</p> <p>2.3 Establish vulture</p>	<p>1.1 MoU between BNHS, IoZ, RSPB, PDRC and other relevant institutions</p> <p>1.2 20 BNHS staff trained (1 week)</p> <p>1.3 3 PDRC staff trained (10 weeks)</p> <p>1.4 at least 30 carcasses received by PDRC from at least three states in west, central and east India</p> <p>1.5 results of each p.m. and investigations included in weekly work reports</p> <p>1.6 database with records of all known analysis of vulture carcasses established at BNHS</p> <p>2.1 20 IBCN partners/BNHS staff trained to act as focal points for census and survey</p> <p>2.2 information on vulture populations, food availability, signs of sickness etc. collected using standard repeatable methods</p>	<p>1.1 MoU on file at BNHS</p> <p>1.2 training reports</p> <p>1.3 PDRC Lab reports</p> <p>1.4 PDRC Lab reports</p> <p>1.5 Weekly PDRC work reports, reports from other labs</p> <p>1.6 electronic and hard copy versions of database at BNHS</p> <p>2.1 training reports, correspondence with focal points</p> <p>2.2 annual survey reports, website and database</p>	<p>Land available from government for captive holding facility/laboratory*</p>

<p><i>population database</i></p> <p><i>3.1 Carry out literature review and consultations with experts inside and outside India</i></p> <p><i>3.2 Run recovery planning workshop with appropriate Indian and international expertise</i></p> <p><i>3.3 Write species recovery plan</i></p>	<p><i>2.3 database with records of all available vulture counts</i></p> <p><i>3.1 relevant experiences with other wild populations evaluated</i></p> <p><i>3.2 Recovery plan approach agreed and all necessary information available to write it</i></p> <p><i>3.3 Plan produced under auspices of BNHS and Govt of India</i></p>	<p><i>2.3 electronic and hard copy records, maps, at BNHS</i></p> <p><i>3.1 review papers and discussion document</i></p> <p><i>3.2 workshop document and communiqué</i></p> <p><i>3.3 Plan document</i></p>	
<p><b>Activities (continued)</b></p> <p><i>4.1 Wildlife laboratory established and equipped at Bharatpur</i></p> <p><i>4.2 Establish Vulture aviaries at Bharatpur.</i></p> <p><i>4.3 One BNHS scientist trained in the UK to a high level in captive care techniques, and diagnostic and health monitoring techniques</i></p> <p><i>5.1 Produce annual newsletter for participating/interested organisations</i></p> <p><i>5.2 provide up-dated information to the public through mass-media and popular scientific articles</i></p> <p><i>5.3 up-date BNHS and RSPB website</i></p> <p><i>5.4 submit five papers to peer-reviewed journals</i></p>	<p><i>4.1 Lab equipped to carry out analyses including haematology, veterinary care, etc.</i></p> <p><i>4.2 Facility for the maintenance of 20 captive vultures established</i></p> <p><i>4.3 One BNHS scientist spends 9 months over 3 years in UK at IoZ, NBPC and other specialist institutions</i></p> <p><i>5.1 4 newsletters produced and 200 hard copies circulated in India, 50 UK/other, email circulation</i></p> <p><i>5.2 6 press releases in India, 4 national and 4 local in UK</i></p> <p><i>5.3 newsletters available on BNHS and RSPB websites</i></p> <p><i>5.4 at least 5 submitted of which 3 accepted for publication by the end of project</i></p> <p><i>5.5 at least 10 articles</i></p>	<p><i>4.1 Final report</i></p> <p><i>4.2 Final report</i></p> <p><i>4.3 Final report</i></p> <p><i>5.1 newsletters, distribution lists</i></p> <p><i>5.2 newspaper clipping files at BNHS</i></p> <p><i>5.3 website</i></p>	

<p>5.5 submit articles to journals of other key institutions</p> <p>5.6 present results/lessons of the project at seminars/conferences/workshops</p>	<p>published in relevant journals/newsletters/magazines</p> <p>5.6 presentations at 9 gatherings during the project</p>	<p>5.4 journal reprints, correspondence with publishers</p> <p>5.5 copies of articles in BNHS files</p> <p>5.6 Conference proceedings, workshops reports</p>	
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**\*Notes on Assumptions:**

- (1) Continued State and Federal government support for the collection of vulture samples. Permission has already been granted for vulture collection and this is unlikely to be rescinded.
- (2) It is possible to identify the cause of the decline before vultures become extinct. It is anticipated that the cause of the decline will be identified within the first year of the project, and unlikely that these species will become extinct within this period.
- (3) That remedial measures are possible. The type of remedial measures possible will depend upon the origin and nature of any disease, or other factors, identified. However, remedial measures of some type will be possible. These may include taking measures to prevent the spread of disease to other vulture populations, taking measures to limit the ecological and human impacts that reduced vulture populations are likely to have, captive breeding of disease free birds, development of vaccines or identification of immune individuals etc.
- (4) Land available from government for captive holding facility. Land has already been promised for the captive holding facility.