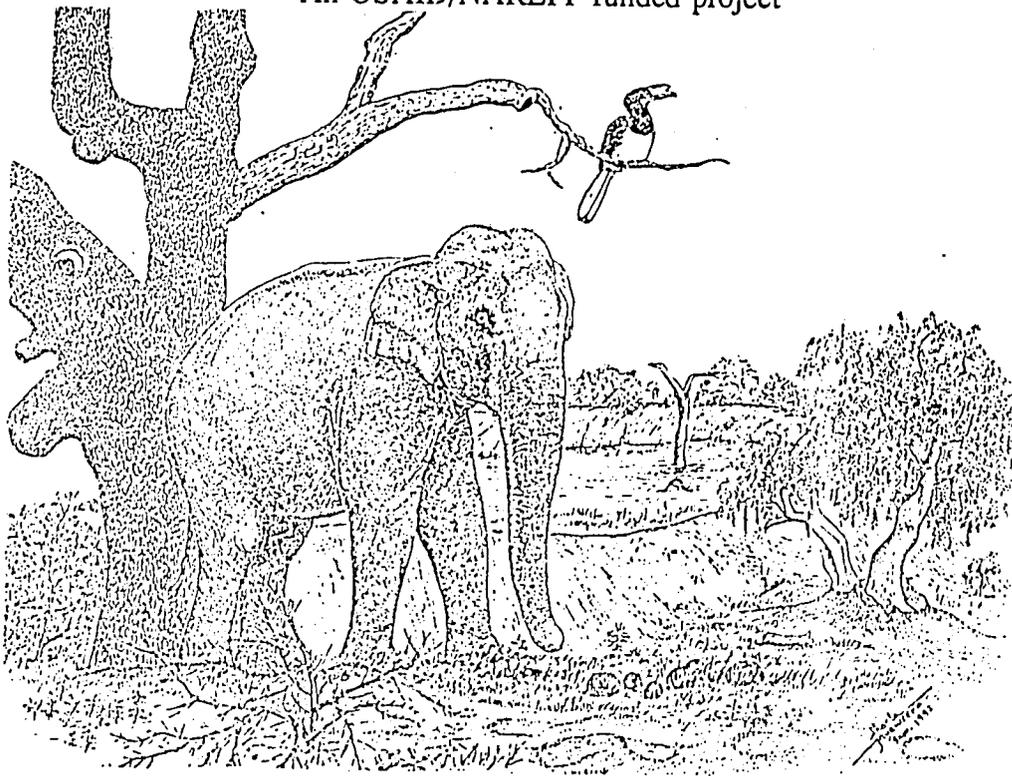


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Report on Workshop on
Protected Area Survey Techniques

held for the
Sri Lanka Department of Wildlife Conservation /
U.S. Fish and Wildlife Service Collaborative Project
(September 1992)

An USAID/NAREPP funded project



Report submitted in December 1992 by

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This report covers a workshop on "Protected Area Survey Techniques" (PAST) held for the Sri Lanka Department of Wildlife Conservation (DWLC) in September 1992 at Randenigala Training Center and Ruhuna National Park, Sri Lanka. Essential supplemental information to this report is given in the attached "Proceedings" of this workshop. All appendices referred to in the report are contained in the "Proceedings" (Proc. App.).

The report summarizes the experiences and observations of an international team of participants in the Sri Lankan Department of Wildlife Conservation / Fish and Wildlife Service (FWS) Collaborative Project. It contains a frank discussion of the needs of the Department as perceived by the authors, and is intended to assist the Department in achieving excellence in the field of wildlife management. The intended audience is the DWLC staff, other U.S. project participants, and all those involved in furthering the progress of the Department. It is not meant for wide distribution or scrutiny by those not associated with the work of the Department.

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Abbreviations used

DWLC	Sri Lanka Department of Wildlife Conservation
FAO	United Nations Food and Agricultural Organization
GEF	Global Environmental Facility
NAREPP	Natural Resources and Environmental Protection Program
PAST	this workshop on Protected Area Survey Techniques
USFWS	United States Fish and Wildlife Service (also FWS)
USAID	United States Agency for International Development
VRR	Victoria, Randenigala, Rantambe Sanctuary

Introduction

From 1992 through 1995, the U.S. Fish and Wildlife Service is to provide technical assistance to DWLC under the DWLC/FWS Collaborative Project. This project receives funding from USAID/NAREPP as well as USFWS. It is administered by Mr. Fred Bagley of USFWS's Office of International Affairs and Mr. Avanthi Jayatilake of USAID Sri Lanka.

The workshop on "Protected Area Survey Techniques" (PAST) was the first of this series of training exercises which will ultimately lead to the writing of management plans for three representative protected areas identified by the project: Yala National Park (dry zone), Horton Plains National Park (wet zone), and Randenigala Sanctuary (water catchment area). The exact definition of the protected areas remains unclear. Yala National Park is actually only one small part (Block I) of Ruhuna National Park, while Randenigala Sanctuary is only one part of VRR or Victoria-Randenigala-Rantambe Sanctuary. We will use the names Ruhuna National Park and VRR Sanctuary throughout this report to denote Yala and Randenigala respectively. The objectives of this workshop were:

1. to provide in-depth training for DWLC officers and personnel associated with DWLC in designing and conducting surveys in protected areas in Sri Lanka.
2. to design, for future implementation, biological surveys in Ruhuna National Park.

The workshop outline and schedule were finalized during Dr. Stüwe's visit to DWLC and USAID in May 1992. A list of equipment to be procured by DWLC, USAID and USFWS and a schedule outlining the pre-workshop planning process were also prepared. The workshop was conducted in August/September 1992 since that was the only time at which Ruhuna National Park Block I (Yala) was closed to tourists. Therefore the surveys were not disturbed by tourist traffic and vice versa, and bungalows were available for accommodation of the workshop participants.

In the original schedule, the PAST workshop was to be preceded by a Park Planning workshop in which surveys necessary for the park planners were to be identified. The appropriate techniques for the surveys were then to be taught in the PAST workshop. After that, DWLC was to initiate nationwide surveys of Sri Lanka's protected areas. In 1993 and 1994, additional PAST workshops are planned to be held in the remaining target areas, Horton Plains and VRR, which will review the ongoing surveys, modify them if necessary, and train participants in the required techniques. Results of the surveys are to be integrated in a national database.

Originally, the survey component of the DWLC/FWS Collaborative Project was intended by former DWLC director Dr. S. Kotagama to be closely linked with the activities planned under DWLC's GEF-funded "Five Year Development Plan". It was envisioned that the latter would provide funding and positions to conduct surveys in protected areas, while the former project would provide some of the necessary training. Teams were to be hired by DWLC from one prominent university in each administrative district of the country prior to a series of workshops on Protected Area Survey Techniques. The team leaders and the survey coordinating DWLC officers from each district were then to participate in these workshops to receive the training and initiate surveys in the target areas. However, the sudden departure of then DWLC director Dr. Kotagama in July 1992 interrupted the preparations for the workshop and the important synchronization of the DWLC/FWS Collaborative

Project with the GEF Project. It also led to the postponement of the planning workshop to November 1992, and the postponement of the nationwide surveys to an as yet undetermined date.

Activities

The instructors' activities between 31 August and 2 October 1992 are listed in detail in App. A. The first four days were spent in Colombo to prepare the workshop, purchase equipment, and meet with Mr. Avanthi Jayatilake - USAID Sri Lanka, Mr. Medawewe - the acting director of DWLC, Mr. Vattala - AD Planning DWLC, and Mr. Dissanayake - AD Research DWLC. DWLC was informed by the park staff that Ruhuna National Park was suffering a very severe drought, that water for course participants was likely to be very scarce, and that the large mammals in the park were in very poor condition. As a result the park authorities requested that all surveys should be conducted from the vehicles. However, permission was received from the DWLC director to conduct surveys from outside the vehicles provided the animals were not unduly disturbed. Based on this information, it was decided to shorten the Ruhuna session and lengthen the VRR and Horton Plains sessions. The administrative and logistic course preparations in Colombo were completed in time only with great difficulty as there was no separate vehicle available for the instructors. On 3 September, the instructors, accompanied by Mr. Dissanayake, arrived at Ruhuna National Park to prepare the field session there. The Park Warden Mr. Mutubanda and AD Southern Region Mr. Fernando were met, facilities inspected, and sites for the field surveys determined. On 5 September the team transferred to DWLC's TREE Conservation Center to prepare the theory session there. From 7 to 13 September, the theory session and some field exercises were held at Randenigala. On 13 September the instructors transferred to the Southern District to prepare the schedule for the Ruhuna National Park field session. From 16 to 26 September, field exercises and theory sessions were held in Ruhuna National Park Blocks I, II, and III. On 26 September, the instructors, Mr. Dissanayake and some course participants with past experience or future interest in the park drove to Horton Plains National Park to discuss ongoing and future surveys. On 28 September, the instructors returned to Colombo, and until 2 October worked on the workshop report. During this time, several meetings with Dr. Richard Brown, Mr. Stan Stella, and Mr. Avanthi Jayatilake from USAID, and with Mr. Dissanayake and Mr. Vattala from DWLC were held to discuss the ongoing DWLC/USFWS Collaborative Project, and the future of USAID's involvement with DWLC. The people involved in these meetings were provided with some preliminary recommendations for the upcoming workshops, the task force reports for the three target areas, and a set of proposals prepared by the participants.

During the workshop lectures on a variety of protected area survey objectives and techniques were held (Tab. 1). Summaries of the lectures are provided in the schedule in Appendix A, while lecture outlines are attached as Proc. App. 3. Field data sheets were prepared for most field exercises (Proc. App. 4). While a few field techniques were demonstrated in Randenigala, most surveys were

taught in Ruhuna (Tab. 2). The surveys concentrated on, but were not limited to, a comparison of the three different habitat types within easy reach of the accommodation in Yala and Talgasmangada Bungalows in Ruhuna National Park: the scrub forest of Block I, the open plains of Block II, and the dry deciduous forest of Block III. A detailed schedule of the surveys is listed in Proc. App. 2. The results of the surveys were discussed at the end of the VRR and Ruhuna sessions respectively, and are attached in Proc. App. 5. Some survey equipment was purchased specifically for this workshop and was left with USAID for future projects and workshops. Two survey techniques manuals were distributed to all participants (Rodgers 1991, Sale 1988).

During the VRR session "task force reports" were compiled on the three target areas Ruhuna National Park, Horton Plains National Park, and VRR Sanctuary. They outline present status, management problems, and suggested surveys (Proc. App. 6-8) based on the current knowledge of the workshop participants. This had become a necessity as no such information was available to determine the necessary surveys.

Tab. 1.-- Lectures held during PAST workshop

Introduction to Workshop and its Objectives Conservation and Management Objectives for Protected Areas Biological Surveys: who, what, why, when, and where? Habitat Survey Techniques Bird Survey Techniques Amphibian and Reptile Survey Techniques Habitat Profiles Mammal Survey Techniques Line Transect Surveys Human Impact Surveys
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Tab. 2.-- Surveys taught during PAST workshop

Vegetation and Habitat Survey Habitat Profile Villager Interview Human Impact Survey Amphibian Drift Fence Array Turtle Hatching Survey Dipnetting Frog Survey Crocodile Total Counts	Small Mammal Trapping Roadside Mammal Survey Spotlight Mammal Survey Mammal Line Transect Waterhole Mammal Scan Counts Elephant Dung Count Bird Spot Counts Waterbird Total Count
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During the Ruhuna session all participants were asked to prepare a project proposal. The proposals were ideally to outline surveys to be conducted in the target areas. As many participants had never been to or were unlikely to ever work in some of the target areas, had no experience with biological surveys, or were unlikely to be in a position to conduct such surveys in the near future, the scope of the proposal-writing was widened to include any important management problems in the respective protected areas of the participants. The objective of the proposal writing was not only to provide DWLC with outlines for necessary surveys and ways to conduct them, but also to teach all participants to identify management problems, develop an idea, formulate it in a scientific manner, outline a solution to the problem, prepare a budget and justify it. The proposals, most still in rough draft form, are attached as App. B.

During the Horton Plains session, past and ongoing surveys were discussed with the field team of the March for Conservation who were present there. In addition, past, present, and potential future survey sites and some sites of forest die-backs were visited and survey techniques were discussed with the team.

Participants

Dr. Michael Stüwe (mammals), Dr. Sejal Worah (vegetation and human impact), and Dr. Douglas Runde (birds, amphibians, and reptiles) taught the workshop in their respective areas of expertise.

Mr. S.R.B. Dissanayake prepared and coordinated the workshop in Sri Lanka as DWLC liaison officer.

Fourteen trainees attended the workshop, nine were employees of DWLC and five were members of universities and NGOs. Ten of the trainees attended full-time, although some arrived one or two days late. One trainee attended only the VRR session, two trainees attended only the Ruhuna session, one trainee attended parts of both. A list of the addresses of all trainees is attached in Appendix 1.

Mr. D.S.A. Wijesundara (vegetation), and Mr. H.D.V.S. Vattala (birds), and Dr. Charles Santiapilai (mammals) were asked by DWLC to join the workshop as resource persons. DWLC had invited them to support the instructors in identification of the local fauna and flora. Unfortunately the resource persons, due to other commitments, were available for the workshop only during a limited number of days. The mammal resource person was unable to attend at all. However, we could fully rely on Mr. Dissanayake's mammal expertise. In addition, we were fortunate that Ms. V.P. Renuka was able to help out with small mammal trapping and identification. The bird resource person was able to attend only one full day of the Ruhuna National Park session when most of the field work was done. However, we were fortunate that Mr. Upali Ekanayake and Mr. Ravi Serasingha were exceptional ornithologists and more than made up for the unavailability of the official bird resource person. The vegetation resource person was an invaluable asset during the VRR and Horton Plains

sessions of the workshop, but was unfortunately not available during the Ruhuna session.

Achievement of Objectives

The primary objective of the PAST workshop was to teach protected area survey techniques to the members of survey teams from universities in five districts, and to the DWLC officers who would supervise the surveys in their respective districts. Former DWLC director Dr. S. Kotagama had intended to use funds from the GEF "Five Year Development Plan" to hire the members of the survey teams and have them conduct protected area surveys throughout the country. Their training would be arranged under the DWLC/FWS Collaborative Project.

The teaching responsibilities outlined for the workshop were met. A series of techniques to conduct mammal, bird, amphibian, reptile, vegetation, and human impact surveys were taught in theory (Tab. 1) and practice (Tab. 2), survey manuals were distributed, lecture hand-outs were provided (Proc. App. 3), and field data forms were developed (Proc. App. 4). However, the primary objective cannot be considered achieved as the attending trainees were not the intended target audience. Probably due to delays caused by Dr. Kotagama's departure, DWLC had not formulated any survey plans, had not hired any survey teams or their supervising officers, and in only a few cases had selected workshop trainees who would ultimately fit this role. The few trainees from universities and non-governmental organizations (5 instead of an initially planned 15) were either inexperienced and/or in non-influential positions, while several of the DWLC trainees (9 instead of an originally planned 5) at this time seem unlikely to become survey supervisors in their respective districts. Of the participating DWLC officers, Mr. Jayasinghe and Mr. Weerasingha might be the most likely to be selected for the role of survey supervising officers, because of their experience and present positions. One potential future supervisor, Mr. Pathmasiri, who appeared to have the greatest research experience among present DWLC ranger staff was assigned other duties midway through the PAST workshop, and could not attend the crucial Ruhuna session. No regional Assistant Directors (AD) attended, even though they or their assistants would seem to be the most logical coordinators of surveys in their respective districts. Of the three technical ADs who were signed up for the workshop, and might play some role in future surveys, only the AD Research, Dissanayake, who was the official workshop coordinator, attended full-time whenever his logistical responsibilities allowed it. The AD Training, Wasantha, missed several days, especially during the important Ruhuna session. The AD Planning, Vattala, was able to attend only a few days of the workshop. *The DWLC/USFWS/USAID workshops are designed to have long-term impact by providing training for trainers. For this to happen and for the primary objective of the workshop to be fully achieved: 1. survey teams have to be assembled, 2. DWLC survey supervisors have to be named, and 3. trainees of the PAST workshop have to train the above in the necessary techniques, or the PAST workshop has to be repeated.*

The secondary objective of the PAST workshop was to design and initiate surveys in Ruhuna National park to aid in the development of management plans. This objective was partially achieved by the workshop, but only after the scope of the workshop was greatly extended. Design and initiation of efficient biological surveys require clear management objectives of the areas to be surveyed. These were to be provided by a preceding DWLC/USFWS workshop on park planning. This workshop had been canceled. As a result no park planning information was available for the PAST workshop. Initially it was attempted to get information on management objectives and necessary biological surveys from the respective park authorities prior to the workshop. This proved almost impossible. Therefore "task forces" were formed among the workshop trainees, based in part on their respective experiences in the target areas, to provide the possible management objectives for the three areas (see Proc. App. 6-8). The actual survey techniques taught during the workshop were based in part on the survey necessities outlined in the task force reports but were limited by the logistical possibilities of the workshop. Some surveys to be conducted in the three target areas in the future are listed in the task force reports (Proc. App. 6-8). *Total fulfillment of the secondary objective can only be achieved once: 1. the park planners decide which surveys are necessary to achieve the park management objectives, 2. survey teams are assembled to conduct the surveys, and 3. permission is granted to establish regular surveys.*

General Conclusions and Recommendations

The series of workshops planned under the DWLC/USFWS Collaborative Project is an integrated program in which many components depend on preceding ones. As stated above the full objectives of the PAST workshop could not be achieved fully because the structure of the whole training program was interrupted by administrative changes in DWLC.

In case of the PAST workshop, we believe the benefits for the participants and for DWLC (especially if some of the proposals are followed up) were large enough to have justified its operation. However, its impact would have been much larger, had the PAST workshop indeed been the beginning of a large-scale protected area survey effort throughout Sri Lanka. A second survey techniques workshop is on the Collaborative Project's agenda for summer 1993. The best cause of action would be to begin the planning for that workshop now. Preparation would have to be fully synchronized with DWLC's efforts to set up a survey program. The participants' selection and confirmation should be completed at least two months prior to the workshop. The planning for the workshop would have to include DWLC's Protected Area Management Advisor employed under the GEF program. Mr. Avanthi Jayatilake from USAID, Sri Lanka will have to take a leading role organizing the preparation of the next workshop. The schedule could be as follows:

- present identification of current status of survey plans
- February 93 decision on location of workshop and best season to conduct it
- March 93 identification of survey teams
- March 93 notification of participants and instructors

booking of accommodation
 preparation of equipment list
 purchase of equipment

The Department of Wildlife Conservation is currently involved in at least two major collaborative conservation projects: the DWLC/USFWS Collaborative Project and the GEF Five-Year-Development Plan. Both began in 1992 and both provide outside expertise to DWLC in wildlife conservation and protected area management. Part of the DWLC/USFWS project will be to train and guide DWLC employees in the writing of protected area management plans for three target areas: Ruhuna National Park, Horton Plains National Park, and VRR Sanctuary. One component of the GEF project is to hire for 3.5 years a senior technical advisor to develop DWLC's protected area management expertise. Both projects are administered by separate international agencies, USFWS/USAID and FAO. They pursue different strategies: short-term workshop-oriented training (USFWS) versus long-term resident consultancies (FAO), but essentially deal with the same issues. Dr. Kotagama, who initiated both projects and would have coordinated them, has since left DWLC. He left no or little information on how he intended to integrate the projects. There is a strong possibility that both projects might not be synchronized, might duplicate efforts, compete with each other, or even propagate opposing views or implement contradictory conservation strategies. Since Michael Stüwe mentioned this possibility in a previous report to USFWS/USAID, USAID and FAO have communicated with each other about their respective projects and will attempt to coordinate efforts. As a first important step Ms. JoAnn Lestemaker, FAO Program Officer for the GEF project, upon invitation by Mr. Avanthi Jayatilake (USAID), participated in the Randenigala session of the PAST workshop. This was a very fruitful visit as it led to an understanding of the objectives of the three agencies involved.

We recommend that close communication between DWLC, USFWS/USAID, and FAO should be sought throughout the tenure of the projects. All reports should be sent to all agencies involved and all personnel concerned should meet on a regular basis. Similar meetings might also be organized to include other international funding agencies involved with DWLC in some way (GTZ, IUCN, NORAD). Similarly, participants of the DWLC/USFWS project should stay in close communication with the IUCN and ODA projects ongoing in collaboration with the Sri Lankan Forest Department. Many of the data and maps generated there will be of great value to DWLC projects. It should also be considered to communicate NORAD officials of projects ongoing in Ruhuna National park, as they are financing the development of Ruhuna's Block IV.

Specific Recommendations for Future Workshops

Following is a set of recommendations for future workshops under the DWLC/USFWS Collaborative Project. We recommend that in future workshops:

- *the DWLC workshop coordinator should be selected* such that the ongoing workshop is the topmost priority for her/him, and she/he is given full cooperation of the head office and no other assignments. We believe, Mr. Dissanayake, the coordinator of the survey workshop, did an outstanding job preparing the workshop and handling the many logistical problems occurring throughout the sessions while at the same time being an active and enthusiastic participant. His example should be followed by all coordinators of future workshops.
- *DWLC, in collaboration with the senior instructor of the workshop, should prepare a one-page summary outlining the contents of the workshop and its objectives.* This summary should be sent to all participants more than four weeks in advance so they know what to expect and can prepare themselves. Most of the PAST participants were not clear about the objectives and agenda of the workshop they had been invited to.
- *trainees should be notified several months in advance.* For the survey workshop initial invitations by DWLC went out well in advance. However, there seemed to be little interest at the university level as invitees did not attend, information about the workshop was not passed on within the universities, or final nominations were only made at very short notice. DWLC should possibly develop a network of interested universities and NGOs and inform them well in advance of upcoming training opportunities. Ideally, nominations should be made so far in advance that instructors can be given a brief summary of each trainee's biodata before the workshop commences.
- *trainees should be chosen such that there is not a major disparity in their experience with the topic, in their level of understanding the issues taught, and their ability to understand English.* In the survey workshop very senior park wardens were mixed with relatively inexperienced NGO/university trainees. This led to problems for the instructors in determining at what level the course should be taught, as well as problems for some trainees in understanding the issues taught.
- *resource persons should be selected so they can stay with the workshop throughout the training period.* A firm commitment should be obtained in this regard. During the survey workshop the selected mammalogist did not attend, the ornithologist only attend very few days and the botanist was available only for the VRR and Horton Plains sessions. This seemed to be largely due to commitments which were made previously or came up during the workshop.
- *an interpreter should be provided for all workshops.* Although it was repeatedly confirmed before this and previous workshops that English-language capabilities of all trainees would not be a problem, some trainees clearly could not follow all the lectures and explanations. When lectures were

translated trainees became immediately involved in much more lively discussions. It seems to be worth the extra effort and time to arrange for translation of all lectures, and possibly have discussions conducted in Sinhala with major points translated for the instructors.

- *vehicles should be rented to meet all transportation needs throughout the workshop and its preparation.* Reliance on DWLC vehicles during the survey workshop caused unnecessary logistical problems due to unavailability or break-down, and led to loss of valuable training time.
- *all trainees and instructors should be accommodated in the same building or in facilities directly adjacent to each other.* Separation of the survey workshop group in two separate bungalows in Ruhuna National Park resulted in logistical and communication problems as well as a social break-up of the group. As a result teaching effectiveness was reduced and valuable training time was lost.
- *DWLC may want to consider publishing a short newsletter outlining the training opportunities DWLC offers its employees and members of associated institutions through their collaboration with USAID and USFWS, and possibly as part of their new Five-Year-Development Plan.* The poor response to invitations for the PAST workshop from the universities and NGOs contacted, suggests that a climate should be created in which associated institutions compete for slots in the workshops. Certificates received for the workshops should be considered as stepping stones in the trainees' career development.

Appendix A

Detailed Schedule

COURSE PREPARATION

Aug 31-Sep 3		Arrival in Colombo Preparation of course Meeting with Avanthi Jayatilake, USAID Meeting with Acting Director, S.R.B. Dissanayake, and H.D.V.S Vattala, DWLC Meeting with Michael Green and P.B. Karunaratna, IUCN Purchasing of equipment Departure from Colombo
Sep 4	Ruhuna:	Preparation of course session in Ruhuna
Sep 5	Ruhuna:	Preparation of course session in Ruhuna Transfer to Randenigala
Sep 6	Kandy:	Preparation of course session in Randenigala
Sep 7	Randenigala:	Preparation of course session in Randenigala

TRAINING SCHEDULE FOR VRR

Sep 7 (monday)

Arrival of some trainees

Sep 8 (tuesday)

Arrival of more trainees

09:00-10:00 Introduction of trainees and instructors

10:00-10:45 Course schedule and logistics (Michael)

- 11:00-12:00 Building of funnel traps (Doug)
- 15:00-15:15 Welcome (Dissa)
- 15:15-16:00 Overview of Randenigala Training Center (Wasantha)
History and TREE (training, research, education, extension) function of the Wildlife Trust/DWLC training center at Randenigala.
- 16:00-16:30 Lecture on objectives of workshop (Michael)
The Protected Area Survey Techniques Workshop was scheduled by former DWLC director Dr. Kotagama to train DWLC officers and team leaders of universities in all sectors of the country in techniques to develop protected area surveys for all of Sri Lanka's conservation areas. Execution of surveys was planned to be coordinated by the Protected Area Consultant of the DWLC/FAO Five-Year-Development Plan and the survey teams were to be financed out of that budget, thus linking the two existing major sources of funding from USAID and GEF. In addition, the workshop was to design surveys for the three target areas of the DWLC/USFWS Collaborative Project: Ruhuna, Horton Plains, and VRR.
- 16:30-17:00 Lecture on conservation and management objectives for protected areas (Sejal, Proc. App. 3b)
The importance of defining conservation objectives for Protected areas and relating them to management practices. How to determine conservation and management objectives for a particular Protected area. Broad classification of surveys and how surveys are defined based on the management objectives.
- 17:00-17:15 Establishment of Conservation Area Task Forces for Ruhuna, Horton Plains, and VRR
Trainees with experience in one of the areas were asked to join the respective group to contribute their experience to a position paper outlining the present management and research status of the area and develop an action plan for the coming three years.
- 17:30-19:00 Task Force discussions
- 21:00-21:45 Lecture: Biological surveys: who, what, why, when, and where? (Doug, Proc. App. 3d)
How do surveys fit into planned conservation management systems of protected areas? Who needs to be involved in surveys? How to select species to be surveyed? What are the different aspects of a full-scale biological survey? Different scales and levels of surveys: inventory to population densities.

Sep 9 (wednesday)

- Arrival of more trainees
- 06:30-08:30 Voluntary bird walk and drift fence site selection
- 09:15-12:30 Task force discussions
- 12:30-13:15 VRR task force presentation (Vattala, Proc. App. 8).
- 14:00-16:30 Selection of bird and habitat field survey sites
- 16:45-18:45 Extended Ruhuna task force mapping and report writing

- Preparation of field data collection sheets
 21:00-21:45 Slide presentation: Conservation of ibex in the European Alps and the Negev Desert (Michael)

Sep 10 (thursday)

- 05:00-08:00 Installation of drift fence (Doug)
 09:00-09:15 Review of workshop literature (Doug)
 09:15-09:30 Workshop logistics
 09:30-10:15 Lecture on habitat survey techniques (Sejal, Proc. App. 3c)
How to design habitat surveys. The importance of sampling design. Different techniques of vegetation sampling based on the types of habitats being surveyed. Habitat mapping using low-cost aerial surveys and GIS as a tool for wildlife management.
 10:30-12:30 Demonstration of habitat survey techniques, (Sejal)
 Demonstration of aerial photo interpretation and GIS (Asoka and Michael)
 14:00-15:00 Lecture on bird survey techniques (Doug, Proc. App. 3e)
Different objectives for surveys of avian populations. Which objectives are relevant for conservation management: inventories and relative abundance in time and space. Design of point count surveys and ways to adapt them to specific species and habitats.
 15:00-17:00 Demonstration of habitat survey techniques, (Sejal)
 15:00-17:00 Demonstration of aerial photo interpretation and GIS (Asoka and Michael)
 17:15-18:00 Horton Plains task force discussion
 17:15-18:45 Marking of bird survey sites in non-degraded forest (Doug)
 21:00-21:45 Slide presentation: May 1992 trip to Ruhuna, and some Sri Lankan freshwater fish (Shantha)

Sep 11 (friday)

- 06:00-08:30 Bird roadside spotcounts (Doug)
 09:15-10:00 Checking of drift fence traps (Doug)
 10:15-11:15 Lecture on amphibian and reptile survey techniques (Doug, Proc. App. 3f)
Importance of conducting long-term surveys for amphibians and reptiles because of their unpredictable and irregular activity patterns. Design of drift fence trap arrays.
 11:15-13:00 Task force discussions
 13:00 Assignment of proposal development to:
 Renu for small mammal surveys in VRR and Ruhuna (Renu has finished small mammal study in Horton Plains)
 Ravi for amphibian and reptile surveys utilizing drift fences for VRR, Ruhuna, and Horton Plains (Ravi will join March for Conservation amphibian survey of Horton

Plains)

Shantha for freshwater fish surveys in VRR, Ruhuna, and Horton Plains (Shanta heads freshwater fish group of the Young Zoologists Association)

- 14:00-15:00 Task force discussion
 15:00-18:30 Vegetation and habitat surveys in degraded forest (Sejal)
 Marking for bird surveys in degraded forest (Doug)
 Marking for total mammal count in degraded forest (Michael)
 21:00-21:45 Slide presentation: Large mammals in Ruhuna (Dissa)

Sep 12 (saturday)

- 06:00-09:15 Bird surveys in degraded and non-degraded habitats (Doug and Sejal)
 10:00-11:00 Checking of drift fence traps (Doug)
 10:00-11:00 Horton Plains task force discussion
 11:15-13:00 Final task force discussion
 14:00-16:15 Horton Plains task force presentation (Cyril and Renu, see Proc. App. 7)
 Ruhuna task force presentation (Dissa and Asoka, see Proc. App. 6)
 16:30-18:30 Vegetation and habitat survey in non-degraded forest (Sejal)
 21:00-21:45 Slide presentation: Aerial survey of Florida wading bird colonies (Doug)

Sep 13 (sunday)

- 06:00-07:30 Bird survey along TREE bird walk (Doug)
 08:15-08:45 Checking of drift fence traps (Doug)
 09:00-13:00 Data analysis and presentation
 afternoon Departure from VRR

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- Sep 14 Preparation of course session in Ruhuna
 Sep 15 Preparation of course session in Ruhuna
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TRAINING SCHEDULE FOR Ruhuna

Sep 15 (tuesday)

afternoon Arrival of instructors and first trainees in Ruhuna

Sep 16 (wednesday)

night Arrival of remaining trainees in Ruhuna
 10:00-11:00 Review of VRR course session (Michael)
 Overview of Ruhuna course session (Michael)
 11:00-12:00 Establishment of drift fence amphibian and reptile array near Talgasmangala Bungalow (Doug)
 12:00-12:45 Summary of encroachment problems in Uda Wallawe Nationalpark (Vattala)
 13:30-15:00 Establishment of small mammal trap line in thorny scrub habitat near Yala Bungalow (Renu)
 15:00-16:30 Visit at headquarters of military training camp to discuss possible conflicts between survey and ongoing military training (Dissa, Vattala, Michael)
 Crocodile total count at Katagamue tank
 16:30-17:30 Aerial view of whole study area of Blocks I, II, and III from Situlpawa temple hill
 17:30-18:45 Roadside mammal surveys by three groups on different routes from Situlpawa to Yala Bungalow (Michael)

Sep 17 (thursday)

05:30-09:00 Unlimited distance bird roadside point counts, 13 km along Block III route and 16 km along Block I route (Doug and Vattala)
 Small mammal checking
 09:30-10:00 Small mammal work-up (Renu)
 10:00-16:30 Elephant dung count along Block III route
 Bird count analysis
 Proposal writing
 Logistics
 12:30-18:30 Mammal scan count at Wilapalawewa tank
 17:00-19:00 Mammal roadside count along Block I and Block II route (Michael and Dissa)
 19:00-20:00 Establishment of small mammal grid, baiting of existing traps (Renu)
 20:30-21:15 Presentation on feeding and roosting sites of Common sandpipers near Colombo

(Ravi)

Sep 18 (friday)

- 06:30-18:30 Mammal scan count at Wilapalawewa tank
- 06:00-09:00 Unlimited distance bird roadside point counts, 12 km along Block II route and 10 km along riverine Block I/II route (Doug and Upali)
- 09:00-09:45 Small mammal work-up (Renu)
- 10:30-11:00 Lecture on standardization of bird counts (Doug)
- 11:00-11:30 Lecture on habitat profiles: relationship of vegetation and animal surveys (Sejal)
Importance of being able to rapidly classify habitat features in order to enhance field observations of wildlife and to relate distribution and abundance of animals to habitats. Discussion of main habitat features in Ruhuna that need to be identified in order to prepare a roadside habitat profile.
- 11:30-12:15 Lecture on mammal surveys (Michael, Proc. App. 3a)
Decision making on complexity of survey and financial resources available. Inventories through literature review, questionnaires, waterhole counts, and roadside surveys. Population trends through roadside counts.
- 14:30-16:30 Elephant dung count along Block II route (Michael)
- 15:00-18:00 Habitat profile Block I route (Sejal)
- 16:30-19:00 Mammal roadside count along Block III route (Michael)
- 19:30-20:00 Crocodile daylight and spotlight total count at Palatupana tank (Sejal)

Sep 19 (saturday)

- 06:00-18:30 Mammal scan count at Wilapalawewa tank
- 06:00-08:00 Voluntary bird walk
Small mammal checking
- 09:30-10:00 Small mammal work-up
- 10:00-10:30 Distance estimates, range finder and tape measurements, and compass bearings for marked trees (Michael)
- 14:00-15:00 Lecture on line transect surveys (Michael, Proc. App. 3a)
Use of roads for line transect surveys. Advantages and disadvantages of method. Explanation of sighting angle, sighting distance, perpendicular distance, and resulting density calculation. Use of field data sheets.
- 15:00-18:00 Habitat profiles Block III route (Sejal)
Elephant dung count along Block I route (Michael)
- 19:00-19:45 Slide presentation on conservation problems in the Himalayas (Sejal)
- 22:00-02:00 Turtle nesting survey along Block I coastline from Patanangala bungalow to Buttawa bungalow and from Safari Beach Hotel to Mahasilawa bungalow

Sep 20 (sunday)

- 10:00-18:00 Proposal writing
Data analysis
- 16:00-18:00 Establishment of drift fence amphibian and reptile array near Yala Bungalow (Doug)
Frog netting in pools in dry river
- 19:00-19:30 Spot light inventory survey
- 19:30-20:30 Slide presentation on raptor marking and mountaineering in Wyoming (Doug)
- 20:30 Spotlight roadside inventory survey

Sep 21 (monday)

- 05:30-18:30 Mammal scan count at Wilapalawewa tank
- 06:30-09:30 Waterbird total count (Doug and Upali)
Small mammal and drift fence array checking
- 09:30-10:00 Small mammal work-up
- 10:45-12:15 Lecture on elephant drive strategy (Weera)
- 12:15-14:00 Road transect exercise (Michael and Upali)
- 17:00-19:00 Habitat profile Block II route (Sejal)
Mammal road transect Block I and III route (Michael and Upali)
- 19:30-20:00 Elephant dung count analysis (Michael)
- 20:00-20:45 Slide presentation on Smithsonian Institution's Conservation and Research Center (Michael)
- 20:45 Spotlight roadside inventory survey

Sep 22 (tuesday)

- 06:00-14:30 Proposal writing on computers at Southern District Office in Kataragama (Michael and Sejal)
Preparation of human impact survey (Sejal)
- 06:30-09:00 Bird survey Block III route (Doug)
- 10:00-12:00 Proposal writing (Doug)
- 16:00-16:45 Lecture on sea cucumbers (Krishna)
- 17:15-18:30 Mammal road transect Block I and II (Michael and Dissa)
- 19:30-20:00 Lecture on human impact surveys (Sejal)
Importance of determining impact of human and livestock use in Protected Areas for making management decisions. Need for using both quantitative and qualitative methods to determine human impact. Effective ways of carrying out villager interviews in order to obtain accurate and adequate information.

- 20:00-20:45 Slide presentation on ecology of the Dangs district in Gujarat, India (Sejal)
 20:45 Spotlight roadside inventory survey

Sep 23 (wednesday)

- 06:00-18:30 Proposal writing on computers at Southern District Office in Kataragama (Michael and Doug)
 Interviews with residents of Nagahaveedi and Gotemagama villages on park boundary near Kataragama to determine forest utilization patterns (Sejal)
 Transect to quantify human impact from Nagahaveedi village through Kataragama sanctuary and from Gotemagama village through Block III (Sejal)
 19:00-19:30 Crocodile total count at Katagamuwa tank (Sejal)

Sep 24 (thursday)

- 08:00-10:30 Elephant dung count along Block I, II, and III route (Michael and Dissa)
 10:30-15:00 Data analysis
 15:00-17:30 Workshop overview (Sejal, Doug, and Michael)
 18:00-19:30 Discussion with Yala N.P. employees on general management problems (Michael)
 19:30-20:00 Slide presentation on Ruhuna fauna (Upali)
 20:00 Farewell Dinner
 23:00 Spotlight roadside inventory survey

Sep 25 (friday)

- morning departure of some trainees
 12:00-19:00 visit to elephant drive sites
 20:00 Spotlight roadside inventory survey

Sep 26 (saturday)

- morning departure of remaining trainees

SITE VISIT TO HORTON PLAINS NATIONAL PARK

Sep 26 (saturday)

evening arrival of instructors and resource persons
 19:30-20:30 discussion on surveys with March for Conservation field personnel

Sep 27 (sunday)

morning discussion of past and ongoing surveys and scientific studies with all trainees
 visit to old potato fields, natural grasslands, and forest islands
 afternoon visit to forest die back patches
 aerial view of Horton Plains from mountain top

Sep 28 (monday)

morning departure
 visit to ODA mapping unit in Kandy to discuss availability of maps for VRR
 Sanctuary and Horton Plains National Park
 visit to Peradeniya Royal Botanical Gardens to discuss future involvement in surveys

COURSE FOLLOW-UP IN COLOMBO

Sep 29 Report writing
 Sep 30 Meeting with Dr. Richard Brown, Mr. Stan Stella, and Mr. Avanthi Jayatilake, USAID
 Report writing
 Discussion with Mr. Fred Bagley, USFWS
 Preparation of information package for upcoming DWLC/USFWS Park Interpretation
 workshop
 Oct 01 Meeting with Mr. Avanthi Jayatilake, USAID, and Mr. S.R.B Dissanayake and Mr.
 H.D.V.S. Vattala, DWLC
 Report writing
 Oct 02 Report writing
 departure

PROPOSAL FOR DEVELOPMENT OF DETAILED MAP OF 1 : 20,000 MAP OF RUHUNU NATIONAL PARK.

By. W.A.R.Ashoka, Planning Unit, Dept. of Wildlife Conservation.

Introduction:

The topo maps presently available for the Ruhunu National Parks are in 1 : 50,000 and 1 inch to 1 mile scales and prepared in 1980 and contains very low information for Researches and Park management decision making. The Ruhuna National Park is experiences the highest visitation and the Wildlife Researches. The total extent of the R.N.P. is 126,787 Ha. and contain 05 blocks and a Strict Natural Reserve area.

Objective:

To develop a map on a scale of 1:20000 to provide information on

- Internal road network (Wildlife observation paths, maintenance roads, Jeepable tracks, etc...
- Rivers and water streams.
- Tanks and Water holes.
- Bungalows and other buildings.
- Different vegetation types.
- Marked boundaries of 05 blocks and, the SNR.

Material:

1. Areal photographs of the area.
2. linch to 1 mile topo sheets.
3. Stereoscopes.
4. Tracing papers.
5. Overlays.
6. Pencils.
7. Binoculars.
8. Clinometer.
9. Supporting documents. (Gazette notifications, Survey plan, etc..)

Method :

- * Interpretation of the areal photographs in the area.
- * Verify the interpretations and the later developments by field checkings. (Locations for the field checking will be done with the area selected to represent at least the 50% of the area.)
- * Data entry to the computer by using a GIS system.
- * Develop the Map using the computerized information by the GIS systems.

Budget :

DWLC will provide Areal photographs, Stereoscopes, Binocular, Clinometer, Topo Sheets, Supporting documents. etc..

Funds requested for:

1. Field Assistants Charges	60 days	@ 150/=	= 9000.00
2. Labor charges	45 days	@ 100/=	= 4500.00
3. Subsistence	45 days	@ 250/=	= 11250.00

4. Transport (from & to Colombo) 02 trips	1200 x 15/=	= 11800.00
(internal travelling)	50 x 45 x 15/==	= 33750.00
5. Cartographer charges		= 5000.00
6. Stationeries		= 10000.00
7. Contingencies add 10%		= <u>8530.00</u>
		<u>93830.00</u>
		=====

The proposed project will be completed within 03 months and the map will be ready for use by the 04th month.

DWLC/USFWS WORKSHOP ON WILDLIFE SURVEY TECHNIQUES

Dissanayake, DWLC

Research Title: Determination of Status of Elephants in the Block III, IV and V of Ruhuna National Park.

Objectives to estimate elephant density, quantify vegetation damage caused by elephants and determine seasonal activity of elephants in the Block III, IV and V of the RNP.

Justification: With the implementation of the accelerated development programmes in the Southern Region of Sri Lanka, the habitat available for many wildlife species has decreased considerably. Elephants are the most affected species since they require large areas of forested land to provide fodder for their daily intake of 150 Kg. of foliage (Van Cullen 1974).

According to the DWLC staff stationed in the region, during the past few years human/elephant conflicts have increased rapidly since more people migrated and settled in the area. To mitigate such problems an elephant drive has been organised from settlement areas to Yala Wildlife Refuge.

The Study Area:

The Block III, IV and V of RNP lies in Monaragala District in the Uva province. This area receives an annual rainfall of 2000 mm. The land is generally flat with isolated small hills. Main vegetation type of the area is dry deciduous forest dominated by *Drypetes sepiaria* and *Manilkara hexandra*. This park provides habitat for many large mammal species including deer, sambhur, wildboar, wild water buffalo and leopard etc. Other fauna includes small mammals, reptiles, amphibians, some fish and avifauna.

Methods:

Using existing roads, elephant dung counts will be done along a belt transect once a month. When dung is encountered their stage of decay will be noted according to Dawson and Dekker. The following description is used to categorise dung.

Stage A : All boli intact, fresh, moist with odour

Stage B : All boli intact, dry no odour.

Stage C1: More than 50% (but less than 100%) of all boli intact, whether moist or dry.

Stage C2: Less than 50% of all boli intact, whether moist or dry.

Stage D : All boli broken up and/or flat mass, whether moist or dry.

Stage E : No dung visible - fully decayed

DWLC/USFWS/NAREPP WORKSHOP ON PROTECTED AREAS SURVEY TECHNIQUES
PROPOSAL FOR

DISTRIBUTION OF ENDEMIC BIRD SPECIES IN THE VICTORIA-RANDENIGALA-
RANTEMBE SANCTUARY

By

Upali Ekanayake, Department of Zoology, University of Peradeniya,
Peradeniya, Sri Lanka.

Introduction:

The VRR sanctuary which was assigned its present state on 30, January 1987 is situated within the administrative districts of Kandy, Nuwara Eliya and Badulla in the Central Province. The sanctuary is comprised of an area of 42,087 ha with an altitude that ranges from 440 m to 1216 m at the highest point. This variation is a very interesting feature for distribution of altitudinal endemic species etc..

Another very interesting topographical feature of this is the presence of many perennial waterways including the longest river of Sri Lanka, the Mahaweli. Two major hydropower and storage reservoirs namely Victoria (2,400 ha) and Randenigala (2,400 ha) are located on this river in the middle of the sanctuary. Also in the sanctuary are two smaller reservoirs namely Rantembe on the Mahaweli and Lower Uma Oya on a tributary of the Mahaweli. This presence of large waterbodies have some effect on the vegetation and thus effect the avifauna of the sanctuary. The climate of the sanctuary has effects of three different zones namely Wet, Dry and Intermediate. The vegetation is also of varied stature, a transition between Wet and Dry zones. All these factors contribute to the high diversity of habitats that can be utilised by birds.

Though the "IUCN Directory of South Asian Protected Areas" mentions only of three endemics in this sanctuary the preliminary data collected by the author indicates there are atleast 5 endemics in the low altitude areas alone. A thorough study of the area is likely to reveal that the actual number is even higher.

Objectives;

The main objective of this study is to survey all the major habitat types of the VRR sanctuary and map the ditribution of endemic birds in the sanctuary area.

The second objective is to compile a provisional checklist of all bird species found within the VRR sanctuary.

In addition the project will also have an education and awareness component in the form of brochures and teaching aids.

Methodology:

Intensive bird surveys will be carried out by using Point Counts and also Line Transects where possible.

All 4 major habitat types of the sanctuary (Wasantha Perera, Pers. Comm., 1992) namely Degraded Forst

Riverine

Natural Forest and

Scrub will be treated in this manner.

20 point counts will be conducted in each habitat type bimonthly.

Thus the whole sanctuary will be sampled once in two months.

This will be carried out over a period of 2 years.

Materials:

1 Pair of Binoculars

Field Note Books

Proposed Budget:

Per diem for 1 Field Assistant for

DWLC/USFWS/NAREPP Workshop on Protected Area Survey Techniques

Proposal for

PURCHASE OF VEHICLE FOR WILDLIFE RESCUE WORK

by

L.C.B. Ferdinands
Wild Life Ranger
Wilpattu National Park
Department of Wildlife Conservation
Nochchiagama, Sri Lanka

Background

The wild life range at Anuradnapura covers 32 AGA divisions. It includes the famous Wilpattu National Park and plays a major role in elephant conservation. There are weekly instances of elephants being wounded by gun shots, having falling into pits, or carcasses being found. Usually such instances are reported to the park authorities by the public. Many of the animals can be saved if immediate action is taken. In addition, there are occasional cases (about once every three month) where a human being is wounded by an elephant. A severe vehicle shortage exists. There are only two vehicles in the whole administrative district, one of which is often out of commission. Latter prevents DWLC officials to rush to the scene of the report and possibly save an elephant or a human life.

Objective

To establish a fast-acting wildlife rescue unit able to rescue elephant and human lives within hours of incoming reports

Budget

1 Double cap pickup truck	1,000,000.00
12 months * 500 l Diesel @ Rs.15	90,000.00
<hr/>	
Total	1,090,000.00

Proposal for

CONSERVATION OF SEA TURTLE HATCHING SITES
ON THE SEA SHORE OF RUHUNU NATIONAL PARK (BLOCK 1 & 2)

by

B.V.R. Jayarathne
Deputy Park Warden
Ruhunu National Park
Department of Wildlife Conservation
Tissamaharama, Sri Lanka

Background

Ruhunu National Park was declared in 1938. The extent of Block 1 is within the park is 54.82 square miles and Block 2 is 92.78 square miles. Ruhunu N.P. is situated in the southern area of Srilanka in the Hambantota District. The park has different vegetation types such as mangroves, open grass lands, scrub land, dry deciduous forests and riverine vegetation. It also has a very rich and varied wildlife population which includes elephants, spotted deer, sambar, leopard, sloth bear, aquatic birds and endemic birds. This makes the Ruhunu National Park one of the most important Protected Areas in Sri Lanka.

The southern and eastern boundaries of the park are along the coast, providing excellent habitat for sea turtles. Although it is known that several species of sea turtles nest along this coast, there is no detailed information on their numbers, breeding biology or status. Although there is no permanent habitation within the park, seasonal fishermen are a threat to the turtle population. This project aims to collect information on sea turtles in the Ruhunu National Park in order to conserve these threatened species in Sri Lanka.

Objectives

The intended study will identify the sea turtle species using the beach at Ruhunu National Park, study their behavior and nesting patterns, threats to the eggs and breeding grounds along the shore line. Information collected will be used to define protection measures and will be formulated in the form of interpretation materials, which could be used for the visitors, school students, and for other interested groups for the national park.

Methodology

The entire 32 miles of shore line will be visited once a week for one year. This area will be covered during 3 nights by three people each. When turtles are encountered, species name, location, time of arrival, and the approximate size of the animal will be recorded. In addition, indirect signs of turtle activity such as tracks will be recorded. Information on time spent on the beach, digging holes, laying eggs, and distance from water edge will also be recorded.

Expected Results

On completion the study will have provided reliable and accurate data on the behaviour, distribution, status and threats to the turtle population in Ruhunu National Park. This information could then be used to formulate a conservation strategy for the endangered sea turtle populations in the country.

Budget

Training on turtle behavior (2 people for 2 months at turtle hatchery in Kosgoda)	10,000.00
6 flash lights plus charger	4,500.00
3 binoculars	7,500.00
1 camera	20,000.00
Tools	5,000.00
Camping equipment and tent	25,000.00
1 slide projector	75,000.00
3 haversacks	3,000.00
3 raincoats	3,000.00
stationary	10,000.00
2 field motorcycles	180,000.00
petrol (250 @ Rs.40)	10,000.00
Subsistence (3 people x 12 days x 12 months @ Rs.200)	86,400.00
Technical Assistance (1 consultant x 2 days x 12 months @ Rs.500)	12,000.00
Preparation of reports and publication	12,000.00
contingencies	46,340.00
<hr/> <u>Total Estimate</u>	<hr/> <u>509,740.00</u>

Shantha Jayaweera, The Young Zoologists' Assoc. of Sri Lanka,
Zoological Gardens, Deliwala

A Proposal to Survey the Fresh Water Fish fauna of VRR Sanctuary, Wasgomuwa National Park and Ruhuna National Park

Introduction

About 70 indigenous species of freshwater fishes occur in Sri Lanka. These include 29 endemic species and about 12 introduced species. In general the status and distribution of freshwater fishes in Sri Lanka is well known. Most species occur in the mid-hills of the wet zone, the Knuckles region, and Mahaweli River basin. However the occurrence of fishes within protected natural areas of Sri Lanka is poorly known and conservation measures are not possible at this time. Fishes within the dry zone are poorly studied, in particular the seasonal changes in abundance and distribution are unknown. This study will document the fresh water fish fauna of 3 dry zone protected areas; VRR Sanctuary, Wasgomuwa National Park and Ruhuna National Park.

Objectives

To determine the population status and distribution of fresh water fish in the VRR Sanctuary, Wasgomuwa National Park and Ruhuna National Park.

To characterize aquatic habitats and describe general habitat associations of fresh water fishes within the 3 protected areas.

To produce illustrations suitable for use in an educational booklet or color poster showing the freshwater fishes and their habitats.

To document changes in the seasonal distribution and abundance of fishes in the dry zone to determine how fish populations persist through drought conditions.

To initiate studies of the interactions between introduced and indigenous species of fish by examining patterns of co-occurrence.

Methodologies

To determine status and distribution we will sample each aquatic habitat in each protected area using a variety of nets and fish traps to capture and identify. In cases where field identification is difficult, collecting and preserving specimens may be needed.

Aquatic habitat will be described by measuring water depth, area of open water, condition of the bottom, local precipitation, duration of open water, Ph, and salinity. Depth gauges will be installed at large tanks and rain gauges placed in each catchment basin of each park.

Fish will be captured, held in ornamental fish tanks and sketched from life for inclusion in an educational brochure or poster.

By netting fish during three seasons (wet, dry, and intermediate) we will compare distribution and relative abundances of fish in the various habitats. Sampling during the dry season will be extended to include sampling the mud of dry tanks for eggs and adult fishes, and searching small pools along drying streams. Changes in the aquatic habitats will be documented by collecting habitat data concurrently with netting of fish. Patterns of species occurrence will be examined for suggestions of interspecific interactions.

Expected Benefits

Species lists accumulated from this work will serve as valuable baseline inventory data for park management. Patterns of species co-occurrence will be examined for patterns suggestive of predation, competition, or coexistence of introduced and native fish species. This will serve as a basis for further study of inter-specific interactions.

Many new locations of freshwater fishes are expected because these 3 parks have not been surveyed for freshwater fishes. Knowledge of new locations of endemic and rare species within parks will be basic to any efforts to conserve these species, but are lacking now.

The preparation of conservation education materials focusing on Sri Lanka's unique fish fauna and its habitats will foster an appreciation for the need to conserve these valuable resources. In addition, the detailed sketches made from life will be valuable as an aid to identification for use in field survey and research and training.

<u>Field Materials</u>	<u>Number</u>	<u>Estimated Cost</u>
Seine net	1	2,000
Purse net	1	500
Casting net	1	1,500
Hand nets	2	300
Plastic bags	1 roll 700gm	700
Plastic buckets	2	250
Reference materials	1	2,600
50m Measuring tape	1	1,500
Photo film	8	3,000
Film developing	8	1,000
Traveling bag	1	8,000
for field supplies		
Torch	2	500

Batteries	20	220
Art materials		1,800
Specimen preparation and preservation		1,000
<u>Subtotal</u>		49,740
<u>Travel expenses</u>		
Honda 125 Motorcycle (Used)	1	85,000
Petrol, oil	135 days	27,000
per diem	270 man/days	67,500
<u>Subtotal</u>		129,760
<u>Salaries</u>		
Principal Investigator (300 RS/day)	135 field days 16 lab days	45,300
2 Field assistants (200 RS/day each)	135 field days	54,000
<u>Subtotal</u>		<u>99,300</u> 278,800
10% Contingency expenses		27,880
<u>GRAND TOTAL</u>		306,680

DWLC/USFWS/NAREPP Workshop on Protected Area Survey Techniques

Proposal for

ESTABLISHMENT OF WILDLIFE MUSEUM AND INFORMATION CENTER
AT MADURU OYA NATIONAL PARK, SRI LANKA

by

Ranjit Jaysinghe
Park Warden
Maduru Oya National Park
Department of Wildlife Conservation
Piburattaw, Sri Lanka

Background

Maduru Oya National Park was built under the USAID Mahaweli Environment Project. As part of the project, visitor center facilities were constructed at the headquarters side. The visitor center is equipped with basic furniture only. No educational activities, museum, or research facilities exist. At present, due to the security situation, the whole park is not open to the general public. However, the local public, and any other visitors have free access to the headquarters without any security risk. Headquarters are located near historical sites of general interest.

Objectives

To provide educational and extension facilities to the local population, DWLC personnel, and the academic community.

The Maduru Oya National Park is not open to the public at present. However, a well-run educational and extension facility at its headquarters could provide valuable information which is not accessible at present.

1. To provide information on efficient and sustainable use of resources inside and outside the park to the people living in its vicinity.
2. To establish a good relationship with the local people through guided tours with explanations on wildlife and its role in nature, and through video, film, and slide shows on park management and protected areas in other parts of the country and the world.
3. To have complete records of fauna and flora in the target area.
4. To provide research facilities for interested DWLC personnel, students of schools and universities, and the members of museums and botanical gardens throughout the country.
5. To attract visitors by giving complete information on management, conservation strategies, and habitat assessment in the form of exhibits, catalogued specimen, and detailed brochures.
6. To train interested DWLC personnel in the management of museum and herbarium collections, data collection, and database management.
7. To assist scientists in their specific field of work on species identification, their local distribution, and their natural history.

Methodology

1. Cataloguing all specimen like skulls, skeletons, skins, eggs, birds, and

- plants collected by Madura Oya park employees for personal interest in the past.
2. Developing a cataloging system for all future specimen collections.
 3. Training of one employee in taxodermic techniques to work-up specimen collected in the park in the future.
 4. Preparing signs with natural history information on all exhibited specimen.
 5. Collecting ecto-parasites from captured or dead animals and preserving them in the collection for further biological studies.
 6. Collecting small mammals, reptiles, amphibians, and fish, and preserving them with true colors, and adding them to the museum collection.
 7. Survey large mammal and forest bird populations in relation to environmental changes.
 8. Building an information center to exhibit the collection, and exchange ideas and information from people regarding the problems such as poaching, elephant damages, and disposal of carcasses found in the park and its surrounding areas.

Schedule

Budget for Personnel and Materials

Rs. 160,000	3 months international technical training in taxodermym and collection of specimen and management for 1 park personnel
Rs. 20,000	Chemicals for creation of collection.
Rs. 100,000	Collection glassware
Rs. 300,000	Furniture and show cases for collection.
Rs. 20,000	Taxodermist equipment
Rs. 50,000	1 Microscope
Rs. 50,000	1 camera with wide-angle and tele zoom
Rs. 10,000	2 pairs of binoculars
Rs. 20,000	1 Typewriter
Rs. 50,000	1 Color TV
Rs. 40,000	1 Video Recorder
Rs. 100,000	1 16mm film projector

Rs. 920,000 Total Estimate

Budget Justification

This budget is preliminary. At the time of preparation no detailed information on exact prices of any of the items are available.

Presently no park staff has knowledge in taxodermym and museum collection management. One park personnel should be trained in these techniques, probably internationally as to my knowledge no such facilities exist in Sri Lanka at the present. No exhibit furniture, glassware, and technical equipment are available at present. All would have to be purchased new for the initial establishment of the exhibit. No binoculars and cameras are available for natural history studies and tours. No projection devices are available at present for educational and extension programs to be provided by the center.

Appendix 1

Text for brochure developed by Mr. Ranjit Jaysinghe during the USFWS/USAID Interpretation Workshop in 1991

DWLC/USFWS/NAREPP WORKSHOP ON PROTECTED AREA SURVEY TECHNIQUES

PROPOSAL FOR

INDIGENOUS MEDICINAL PLANT CONSERVATION IN
NILGALA RANGE, SRI LANKA

BY

N.M.R. PADMATILAKE
WILDLIFE RANGER
NILGALA RANGE
SIBILE

BACKGROUND AND JUSTIFICATION: Nilgala Plain lies in the Monaragala District in the Uva Province in the dry zone of S.E. Sri Lanka. It is approximately 200 sq km in size of which approximately 40 sq km lies within the Gal Oya National Park which has an important elephant population. The forests of the Nilgala area have always been known for the large number of medicinal plants found there for several centuries. They are believed to have been maintained as a medicinal garden during ancient times. Even today, several medicinally important species are known to occur in this area. These include species such as Aralu, Bulu, Nelli, Gamaalu, Kohomb, Binkohomba, Rasakinda, etc. These species are used locally as well as sold in Colombo to treat ailments such as fever, muscle pain, headaches, snake bite, etc. Since the forest area outside the Gal Oya National Park is not controlled by DWLC, there is little control over collection of these species by the local people in the Nilgala Range. Villagers from about 15 villages adjoining the northern and eastern borders of the Nilgala Range collect large numbers of many medicinal plant products each year. As the collection activities are presently indiscriminate and largely uncontrolled, they are believed to be detrimental to the long term conservation of the area. Often entire trees are felled to collect seeds, debarking of trees for incense production is common and ground cover is set on fire to facilitate seed collection. These activities, combined with the large amounts of seeds (which run into several tons) collected every year affect natural regeneration of the forests. As most of the medicinal products collected by the villagers are sold to local shopkeepers at very low prices, the villagers do not earn as much revenue from medicinal plant products as they could if they were able to market these products themselves. This project aims to implement a forest conservation programme in the Nilgala range to decrease utilisation pressures on the forests in order to ensure sustainable extraction of medicinal plants as well as provide better economic returns to local people from the sale of these medicinal plants.

OBJECTIVES

1. To determine the extent of medicinal plant collection and utilisation by the local people in Nilagala Range.
2. To quantify the long term impact of collection of medicinal plant products on the forests.
3. To undertake a survey on the market potential of the various medicinal plant products obtained from the area and to carry out research on underutilised products.
4. To create awareness among the local people about the need to conserve the forests and the medicinal plants found within them.
5. To explore the possibility of setting up a co-operative among the local people to control overcollection of medicinal plants, set up nurseries of commercially important plants and to market the products directly themselves.
6. To try and have the Nilagala Range upgraded to a Sanctuary status.

ACTIVITIES

The first phase of this project will be undertaken for a period of one year and will involve the following activities:

1. Surveys will be undertaken by trained local staff to determine current levels of medicinal plant resource utilisation by the villagers. Surveys will also be conducted to find out how much money the local people get from the sale of medicinal plants and if these returns can be increased.
2. The impact and long term threats to the forest because of this collection in terms of species loss, regeneration, etc. will be determined by a botanist from a University/NGO.
3. NGOs and Universities will also be involved in an education/awareness campaign that will be carried out in the surrounding areas. The message of this campaign will focus on the importance of medicinal plants and the economic benefits of conserving them by protecting the Nilagala Forests from overexploitation.

The second phase of the project will be initiated after some information has been obtained from the activities carried out above. This phase will take one more year and will have the following activities:

4. A medicinal plant co-operative will be formed by the local people in order to control collection and marketing of the medicinal plant products. It is believed that the villagers will be receptive to the idea of forming such a co-op as Phase I of this project will have made them aware of the greater economic benefits that could be obtained by proper management of the medicinal plants found in their area. A prominent member of the village community will be recruited to implement this activity with the help of other interested individuals from the village.
5. The co-op will also establish a nursery of medicinal plant species under the guidance of a professional who will also train a few local people in maintaining the nursery. These species will then be planted in home gardens as well as in degraded areas around the forest.
6. Negotiations with the relevant government agencies will be initiated in order to upgrade the Nilagala Range to a Sanctuary. This will also help to control the increasing amounts of illegal gemming that are going on in the forest as well as help to act as a buffer zone for the Gal Oya National Park.

OUTPUTS

The successful implementation of this project will result in the long-term protection of an important forest area in the country which is currently under threat from a variety of reasons. The multiple-use nature of the forest, which will include sustainable exploitation of medicinal plants can act as a model for similar projects in the future. Increased awareness of the economic importance of forests among the local people will have a long-term impact on future conservation activities. Finally, the project will lead to preserving and improving traditional knowledge about the medicinal plant resources of Sri Lanka.

PROPOSED BUDGET

Salaries

1. Training for Project Executant at Navina Ayurvedic Research Centre.....Rs. 6,500
2. Per diem and travel allowances for project executant.....Rs. 36,000
3. Stipend for botanical student for four months.....Rs. 20,000

4. Salary for local field assistant for 24 months.....Rs. 72,000
5. Salary for local consultants for 2 months.....Rs. 10,000
6. Daily wages for casual workers.....Rs. 30,000

Equipment

7. 125 cc. motorcycle.....Rs. 100,000
8. Vehicle use and maintenance..... Rs. 48,000
9. Kerosene water pump and accessories.....Rs. 40,000
10. Water pump use and maintenance.....Rs. 10,000
11. Nursery supplies and equipment.....Rs. 50,000

Other

12. Construction of bore well.....Rs. 40,000
13. Construction of guard and storage house.....Rs. 40,000
14. Design and production of educational material..... Rs. 30,000
15. Contingency..... Rs. 50,000

Total

Rs. 5,82,500

DWLC/USFWS/NAREPP Workshop on Protected Area Survey Techniques

Proposal for

RESEARCH AND CONSERVATION OF THE AMPHIBIAN FAUNA OF
VRR SANCTUARY, AND RUHUNU NATIONAL PARK

by

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Background

VRR Sanctuary, Ruhunu National Park, and Horton Plains National Park were selected as target areas for a DWLC/USFWS/NAREPP collaborative project to develop protected area management plans. Such plans would need to be based on as accurate information as possible on the resident fauna and flora. At present, little if any knowledge is available on the amphibian fauna of the three areas. Only for Horton Plains National Park a study by the March for Conservation is about to commence. The proposed study will attempt to improve the existing knowledge for the remaining areas: VRR Sanctuary, and Ruhunu National Park. It will result in management recommendations, the publication of illustrated guides to the amphibian fauna of the three target areas, and possibly the development of an audio-guide to aid large-scale surveys.

Objectives

To study species composition, distribution patterns, and habitat characteristics of the amphibian fauna in VRR Sanctuary, and Ruhunu National Park, and develop visual and audio guides

Methodology

1. Select two study plots per habitat type
 - 1.1 Ruhunu National Park: riverain forest, dry mixed deciduous forest, scrub forest, open plains, and rocky areas
 - 1.2 VRR Sanctuary: riverain forest, dry mixed deciduous forest, scrub forest, fire savannah, degraded areas, sub-montane forest
2. Describe the habitat characteristics of all study plots
 - 2.1 Aquatic: Ph, flow-rate, temperature, clarity, depth, conductivity
 - 2.2 Terrestrial and fossorial: soil types, ground cover, humidity,

moisture, litter-fall

2.3 Arboreal (vegetation, canopy cover, light conditions)

2.4 Predator distribution

2.5 Occurrence and sources of pollution

3. Survey pre-selected study plots

3.1 Set up drift fence arrays with funnel and pit fall traps to check species composition, relative abundance, seasonal movements (monsoon, and dry season), peak activity hours, time of activity (diurnal, nocturnal, or crepuscular)

3.2 Random searches to check species composition and relative abundance

3.3 Collect live tadpoles with nets to keep in captivity and observe growth and metamorphosis

3.4 Audio-record vocalization of observed species

3.5 Collect specimens of non-endangered species for drawings and photos for guide development, national museum collections, and reference collections at the target sites

4. Develop management recommendations to ensure the protection of good existing habitats and determine areas with human-influenced poor amphibian fauna and make recommendations for enrichment of the habitats to increase amphibian diversity

5. Create library of photos and illustrations of amphibian fauna of both study areas to produce illustrated field guides for both study areas. Develop an audio guide of resident species to be used for large-scale spot count audio-surveys.

Schedule and Budget

Salary and subsistence chief investigator (1 person * 16 months @ Rs.5000)	80,000.00
Subsistence field assistant (1 person * 150 days @ Rs.200)	30,000.00
Salary local guide (1 person * 15 days @ Rs.100)	1,500.00
Travel (4000 miles @ Rs.15)	30,000.00
Array material (22 arrays @ Rs.3,000.00)	66,000.00
Tools (flash light, shovel, mamoty, etc.)	5,000.00
Scientific equipment (caliper, scales, jars, bags, formalin, etc.)	15,000.00
1 Tape recorder	40,000.00
1 Directional microphone	20,000.00
1 Headphone	10,000.00
20 Tapes @ Rs.200	4,000.00
1 camera with macro lens	25,000.00
100 rolls slide film @ Rs.550	55,000.00

Production and printing of illustrated guide	200,000.00
Production of audio guide	10,000.00
Literature survey	10,000.00
Contingency	50,000.00

Total 651,500.00

Budget Justification

The study is designed to run over 2 years. No scientific equipment is available at present and all would need to be purchased. The principal investigator will be accompanied by a assistant during the field session, and will need to hire local guides to establish the permanent plots. The production of illustrated and audio guides will require most of the funds but are thought to be essential as nothing presently exists for Sri Lanka. Especially the audio guide would provide a new tool for amphibian biodiversity studies.

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Proposal for

EVALUATION OF HUMAN IMPACT AND ENVIRONMENTAL DAMAGE
ON THE NATURAL RESOURCES OF THE VRR SANCTUARY

by

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Department of Wildlife Conservation
Minipe-Ambagahapelassa, Sri Lanka

Background

The VRR Sanctuary was declared in 1987 for the conservation of the three catchment areas of the Victoria, Randenigala, and Rantambe reservoirs and to provide habitats for displaced wildlife. The sanctuary covers an area of 40160 ha and has a diverse fauna and flora, consisting of secondary forest, scrublands, grasslands, and four large reservoirs. The topography includes steep hills and plains.

Before the sanctuary was declared the area was used for tobacco, paddy, and vegetables cultivation and cattle farming. About 800 villages exist around the sanctuary, mostly practicing some form of agriculture. There are also approximately 40 villages within the sanctuary currently. In addition, there is a large amount of encroachment and unauthorised settlements within the sanctuary. This creates a lot of conflict with the conservation objectives of the newly founded sanctuary. This conflict needs to be studied and evaluated to provide management solutions.

Objectives

1. Assessment of human encroachment and practices such as paddy cultivation, illicit felling of trees, tobacco cultivation, cattle grazing, poaching, and fishing inside the sanctuary.
2. Confirmation, re-evaluation, and demarcation of the sanctuary boundaries which are currently undefined and therefore create a lot of socio-economic problems for the local people.
3. Assessment of leopard and elephant damage to individual properties in and around the sanctuary.

Methodology

The project is expected to take one year to be completed. The following activities will be undertaken during this period:

1. The amount and distribution of human encroachment within the sanctuary will be determined by enumerating and mapping the land use patterns as well as the forest utilisation involved. Demographic and socio-economic questionnaire surveys of the families inside the sanctuary will be undertaken.
2. On-site survey of existing sanctuary boundaries will be carried out in order to determine whether areas around the boundaries should legally be included in sanctuary. Clear demarcation of confirmed boundary on maps and on-site with signs and tree markings will also be done.
3. The frequency and amount of damage caused by leopards and elephants outside the sanctuary will be assessed by summarizing official damage reports, verifying and quantifying the damage complaints on-site and interviewing the local people as well as officials.

Results

This study will result in valuable information about the present situation within the VRR sanctuary with regard to human and livestock encroachment. Information will also be generated about the socio-economic problems of the people living in and around the sanctuary. Ecologically fragile areas in the sanctuary such as steep slopes which are degraded by humans can be identified and protected. The assessment of human-wildlife conflicts will provide data on the movement patterns of the animals which can be used for management of the wildlife. All the above information is essential for the preparation of a management plan for the VRR sanctuary. The confirmation and demarcation of the boundaries in a manner that is beneficial to the local population will help to improve protection of the VRR Sanctuary.

Budget

Per diem for Principal Investigator (12 months * 15 days @ Rs.200).....	Rs. 36,000.00
Salary for temporary ranger (retired DWLC employee) (6 months * 24 days @ Rs.200).....	Rs. 28,800.00
Per diem for 2 range assistants (6 months * 10 @ Rs.200).....	Rs. 24,000.00
Salary for 2 casual laborers (12 months * 24 @ Rs.125).....	Rs. 72,000.00
Consultancy fees (30 days @ Rs.500).....	Rs. 15,000.00

Diesel (12 months * 200 @ Rs.15)	36,000.00
Vehicle maintenance (12 months @ Rs.1000)	12,000.00
Driver (12 months * 15 days @ Rs.150)	27,000.00
1 typewriter	15,000.00
Camping Equipment	40,000.00
Camera and films	45,000.00
Stationary and publications	5,000.00
Contingency	40,000.00
Total	395,800.00

Budget Justification

There is presently no equipment for the indicated surveys available at park headquarters, all of which would need to be purchased. Diesel and personnel hours indicated reflect project work to be carried out in addition to the allotments provided by DWLC. The hiring of one consultant for 10 days will be necessary to train project staff in survey techniques. One temporary ranger will need to join the existing DWLC staff in VRR to help conduct the field work. Two laborers, and one clerk need to be hired to support project staff in every-day duties.

Proposal for
IMPROVEMENT OF ELEPHANT FEEDING HABITAT
IN LAHUGALA KITHULANA NATIONAL PARK

by

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Background

The Lahugala Kithulana National Park was declared in 1980. It is located in Ampara district of the Eastern province. The ranges cover about 6 sq.miles. Lahugala National Park is very attractive for elephants because of its abundance of the preferred fodder grass "Beru" growing around the largest reservoir of the park. Observations show that elephants migrate from Galoya National Park and from the Yala East Okanda National Park area to Lahugala. In the early 1980s, about 200 elephants fed around the reservoir. According to observations by villagers and former park employees elephant numbers are presently declining.

The main feeder of the reservoir is the "Hadaoya" river. The reservoir's normal spill level height is about 12 feet. The present spill level is about 9 feet. Silting of the tank and the feeder canal from the Hadaoya is the main reason for the low water levels. The feeder canal is being ruined by silting and no water is fed into the reservoir in the dry season any longer.

Low levels of water, and therefore reduced water surface area, reduce the area where "Beru" grass can grow. As a result, less fodder is available and elephants move into the surrounding agricultural areas. That in turn creates great problems as elephants damage the paddy field and other cultivations around the Lahugala National park.

DWLC officers attempt to control elephant damage by diverting the animals from the fields using thunder flares. However, this method seems not to be successful. Habitat enrichment, by increasing the availability of Beru grass, would be a long-term solution for the problem.

Objective

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To increase the availability of elephant fodder in Lahugala National Park and in turn reduce elephant crop damage surrounding the park.

Methodology

1. Surveys should be conducted on the land use and disturbance of the catchment area of the reservoir and the banks of the feeding streams to determine the reason for the desilting.
2. Restoration of stream banks and reforestation of disturbed areas as found by the surveys should be attempted with suitable plant species.
3. Improvement of community services like wells, schools, health services for the villagers and promoted by DWLC could achieve greater community participation in the conservation of the National Park resources and prevention of future desilting should be obtained.

Schedule and Budget

Desilting of reservoir and canal	2 months	
70 bulldozer hours @ Rs.1500.00		105,000.00
Reforestation of catchment area	12 months	
10 laborors for 60 days @ Rs.125.00		75,000.00
Planting and maintance of 50 acres		150,000.00
Plant purchases		200,000.00
Tractor fuel, 350l @ Rs.15		5250.00
Motorbike fuel, 120l @ Rs.40		4800.00
Tools		6000.00
6 miles barbed wire fence		10,000.00
Camping equipment for laborors		35,000.00
4 masons for 60 days @ Rs.250		6000.00
750 cement bags @ Rs.300		225,000.00
Building materials		100,000.00
Waterpump		30,000.00
Technical assistance for construction		65,000.00
Contingency		50,000.00
Total		1,067,050.00

Budget Justification

The immediate solution to increasing fodder availability is the desilting of reservoir and canal at the present commercial rates. Long-term prevention of desilting can only be achieved by reforestation of about 50 acres of catchment area. Reforestation budget was provided at current commercial rates plus inflation.

Studies on Small Mammals
in Ruhuna National Park and VRR Sanctuary.

V.P.RENUKA WIJESEKARA

Introduction:

Small related to the habitat through their food, micro habitat, climate etc. Small Mammals have been shown as indicator species for degradation of habitats.(Renuka V.P.1991) It is necessary to understand the role of small mammals on environment. Applied conservation actions are mostly dependant on basic data such as these.

Objectives:

The main objectives of the study are to sample small mammalian species and to determine their habitat preferences, population density and home ranges with regard to adaptive behavior patterns.

Materials:

1. Sherman Traps	100
2. Collecting sacks.	02
3. Measuring Tapes.	01
4. Compass	01
5. Small Scissor	01
6. Psola Scale(100 g.)	01
7. Pesola (300 g)	01
8. Steel Ruler	01
9. Divider	01
10. Observation Jar	01
11. Iodine	10 g.
12. Cotton Wool	

Methodology:

A simple method used in the trapping of Small Mammal fauna has been proposed by HAYNE (in GOLLEY,1960).This consists of two 100m long trap lines at right angles to each other and crosses at their mid points.The Sherman traps are spaced 2m apart on each line. The lines are trapped alternate days for a total of six nights.

Animal would be trapped with baits such as burnt coconut chips and dry fish chips.Traps should be baited at the evening between 5.00 - 6.00pm and be checked at the morning of 6.00 - 7.00 am. Trapping would be conducted over a period of 7 days. Sampling would be carried out once every 14 days for 7 or 8 sessions.

The Population Density could be estimate as: BC/AD where
A is the number of animals caught in common to both lines,B

the average number of animals captured in each of the two lines(A & B exclude all animals dying in the traps in the trapping period), C average for the two lines of all captures including deaths due to trapping and D the effective area trapped.

The Home Range in small mammals is usually measured by mark, release and recapture of individuals in live traps.

For a complete sampling of the small mammal fauna I recommend to stratify the different habitat types in each study area.

According to the task force reports of the DWLC/FWS/NAREPP workshop on Protected Area Survey Techniques, the two proposed areas contain the following types of habitats:

Ruhuna National Park:

- | | |
|--------------|------------------|
| 1. Riverine | 4. dry deciduous |
| 2. scrub | 5. coastal |
| 3. grassland | 6. wetlands |

VRR Sanctuary:

1. degraded forests
2. riverine
3. natural forests
4. scrub

Trapping of Small Mammals will be done in all the above listed habitat types & the data obtained thus will be analysed according to the methodology stated above.

Data Collection:

When captured any small mammal should be collected into a sack. Then the following measurements should be taken: tail length, head & body length, head length, ear length (right side), length of right side hind feet. Out of these measurements will have to record another necessary data such as weight, sex, nipple condition, fur and whiskers color etc. Then after toe clipping should be done to mark the animals. Based on identification key on mammals by Jorge Macky & Eisenberg sample will be identified.

Discussion:

Data gathered would contribute to the inventory of small mammals in the two regions. Distribution and Density of small mammal species in different habitats could be related to specific habitat conditions. The study could be correlated with any on going conservation programmes in the region.

Budget:

DWLC will provide Sherman's Traps, Pesola scales & Compass.

Funds requested for VRR Sanctuary:

1. For Field Assistant	49 days	150/=	7350.00 Rs.
2. Subsistence for chief Investigator	49 days	300/=	14700.00 Rs.
3. Transport to & from the Study Area (7 trips)	400*7 km	12/=	33600.00 Rs.
4. Transport inside the Study Area	100*7*7 km	12/=	58800.00 Rs.
5. Stationery etc.			10000.00 Rs.
		Total	<u>124450.00 Rs.</u> =====

Funds requested for Yala National Park:

1. For Field Assistant	98 days	150/=	14700.00 Rs.
2. Transport to & from the Study Area (14 trips)	400*14 km	12/=	67200.00 Rs.
3. Transport inside the Study Area	100*7*14 km	12/=	117600.00 Rs.
4. Stationery etc.			10000.00 Rs.
		Total	<u>209600.00 Rs.</u> =====