Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project Ref. Number	162/12/019
Project Title	Sustainable management of the Rupununi: linking biodiversity, environment and people
Country(ies)	Guyana
UK Contractor	Royal Holloway University of London and The Wildfowl & Wetlands Trust
Partner Organisation(s)	Iwokrama International Centre for Rain Forest Conservation and Development, Georgetown, Guyana
Darwin Grant Value	£132520.05
Start/End dates	1st September 2003 to 31st August 2006
Reporting period and report number	1st April 2004 to 31st March 2004 Annual Report Number 2
Project website	http://www.gg.rhul.ac.uk/Rupununi
Author(s), date	Matthew Simpson and Jayalaxshmi Mistry, 23rd April 2005

2. Project Background

The Iwokrama Forest and North Rupununi Wetlands and Savannas, SW Guyana represents a unique assemblage of ecosystems. The area represents a significant geographical component of three eco-regions: the Guyana Shield forest, the Rio Branco savannas and the Amazon Basin. The World Bank identifies the region as an ecological 'hot-spot' and the International Union for Conservation of Nature (IUCN) has highlighted this region as being a 'major tropical wilderness area' requiring immediate protection. The area is a mosaic of savanna, wetland, forest and mountain habitats with high biodiversity and is the homeland of the Makushi people who depend on the natural resources for their livelihoods.

The region is becoming internationally recognised for high species richness (88 bat, over 400 fish and 500 bird species) and numbers of endangered species (Black Caiman, Giant Otter, Jaguar, Harpy Eagle, and Giant River Turtles). Unfortunately, the area is also becoming a focus for development through road improvements and national economic pressures to increase extractive activities such as mining and logging.

The project aims to significantly contribute to the effective management of this important sub-region and assist Guyana in fulfilling its commitment to the Convention on Biological Diversity (CBD) by building capacity through training, technology transfer and research. Guyana's response to the CBD's Conference of Parties (1999) identified severe

weaknesses in institutional, professional and technical capacity to meet the long-term commitments of its biodiversity management strategy. The same report identified capacity building through partnerships with foreign institutions as a top priority to address these issues.

To assist Guyana in fulfilling its commitments to the CBD in the North Rupununi Region the Research Department of The Wildfowl & Wetlands Trust, the Geography Department of Royal Holloway, University of London and the Open University have joined together with the following key Guyanese organisations:

- *Iwokrama International Centre for Rain Forest Conservation and Development (conservation and sustainable development interests);*
- *North Rupununi District Development Board (local Amerindian interests);*
- *Environmental Protection Agency and Fisheries Department (jurisdictional responsibility for natural resource management);*
- *University of Guyana (education and research interests).*

These organisations themselves have identified needs for capacity building in: savanna, wetland and riverine eco-hydrogeomorphic classification; biodiversity monitoring and assessment; GIS and remote sensing interpretation; and monitoring and management planning.

3. Project Purpose and Outputs

· ***Project Purpose***

  - To help build capacity for effective biodiversity management in Guyana through training and the development of ecosystem management plans and associated monitoring systems for the North Rupununi Region, Guyana.

- ***Project Outputs***

  - Trained local community members and staff within the partner organisations
  - North Rupununi Field Manual (NRFM)
  - North Rupununi Ecosystems Management Plan (NREMP)
  - Publications and presentations

· The major project outputs and proposed operational plan have not been modified over the last year.

4. Progress

- In the project stages preceding this reporting period all the milestones, set out in the original proposal, were achieved as follows:

  - Dec 2003 The initial eco-hydrogeomorphic classification of habitats was developed
  - Dec 2003 An initial list of potential land-uses within the North Rupununi region was developed
  - Dec 2003 Mapping of habitat types and land uses using remote sensed data was completed ahead of the timetable
  - Jan 2004 Start-up workshop completed and project tasks for each of the partner organisations identified with appropriate timetables

- Jan 2004 Stakeholder fora held with follow up meetings to identify possible collaboration and involvement within the project and possible linkages with other work within the region
- Jan 2004 Ground-truthing of habitat types and land uses identified using the remote sensed data
- Feb 2004 30 reference sites for monthly habitat and species surveys was completed ahead of schedule
- Feb 2004 3 weeks of formal training in habitat and species survey techniques and land-use type and impact survey techniques and GPS mapping. This contributes to the 1st major output of the project which is: Trained local community members and staff within the partner organisations
- Feb 2004 Finalisation of the eco-hydrogeomorphic classification of habitats and types of land use within the North Rupununi region
- Mar 2004 Monthly monitoring of the 30 reference sites commenced
- Mar 2004 Methods refined during the training programme were written up to form the North Rupununi Field Manual

- Although at this stage the project was in its initial stages the following were achieved:
  - Production of an eco-hydrogeomorphic classification for all water body types within the North Rupununi Region. This classification combines the different geomorphic features found within the region that result in the presence of waterbodies such as rivers, ox-bow lakes, basins etc. with the hydrological characteristics such as inputs, outputs or regime and habitat types such as savanna or rainforest.
  - Production of a map of habitat and land use types for the whole of the North Rupununi Region. Remote sensed data were analysed to determine different land cover types based on their specific spectral signature. These types were then ground-truthed to assign a particular habitat type or land use type.
  - User-friendly monitoring recording sheets were developed so that all surveys of habitat, species and environmental characteristics could be completed within one form. All data points were coded to allow simple input into the project database.
  - Training of 10 local community members and staff within the partner organisations occurred in habitat and species survey techniques, land-use type and impact survey techniques and GPS mapping. Training took the form of formal classroom sessions, where concepts and theory were introduced, and practical sessions, in the field, to demonstrate the survey and monitoring techniques in practice.

- During this reporting period the following key project milestones have been achieved as set out in the original project proposal:
  - 2 weeks formal training in data and GIS analysis techniques and management plan development training (see Appendix I for training schedule and topics).
  - Project mid-term workshop with project staff to review how the project is commencing and how it can be improved in the following year (see

Appendix I for workshop schedule and topics) Outputs from this workshop included:

- refining the monitoring methodology (see later section for details of improvements to the North Rupununi Methods Manual)
- a strategy to engage with stakeholders in a more targeted way (all project members were tasked with engaging with specific stakeholders)
- more detailed specific tasks and terms of reference for each project member (The project team felt that not all project members were clear of their roles and that some project members were taking on too many of the tasks so this was an attempt to share the workload among the project team and clarify roles. This allocation of tasks was done as a group task within the workshop)
- improved method of communication among all project members by instigating an individual monthly project reporting programme (see Appendix II for reporting form)

- Appendix III contains the training and workshop report compiled by one of the project partners

- The following key project milestones were not achieved during the reporting period:
  - Due to severe flooding in Georgetown in January and February 2005, where over 200,000 people had to be evacuated from their homes, the stakeholder forum had to be cancelled as the whole city was underwater. The forum has now been rearranged for 4th May 2005 as most of the clean up operations from the flooding have now been completed.

- Additional activities that occurred within the project during the reporting period:
  - Ongoing monthly monitoring of 33 reference sites within the Rupununi. This has involved site visits by members of the project team to undertake species, habitat and land use surveys. In general this has proceeded with few problems however during the January workshop methods were refined to ease the process of data collection.
  - The development and use of a user-friendly Access database for storage and manipulation of project data.
  - The production of a working draft of the North Rupununi Field Manual. This has already been refined as a result of the January 2005 workshop but will continue to be improved during the next reporting period (see Appendix IV for copy of the manual).
  - Launch of a new project website with more comprehensive information related to the project – http://www.gg.rhul.ac.uk/Rupununi
  - As a result of feedback from the project team and stakeholders over the reporting period it was felt that the whole project needed to become more participatory in its approach and engage more with stakeholders. As a result workshop and training sessions were particularly focused on techniques on how to achieve this. It was decided amongst the project team that active engagement with the communities at the start of the year was required. Visits to all communities within the Rupununi are to be undertaken in April 2005 to discuss the project, learn more about land and water management within the communities and discuss

the refinement of project outputs to meet the direct need of the communities. One such refinement is the production of a non-technical, as well as a technical, North Rupununi Methods Manual to fulfil the requirements of both the communities and project partners such as the Environmental Protection Agency.

- There was also a shift within the project management of the project so that in-country staff felt more ownership of the project. More key decisions are now being made by the project staff in Guyana and a more participatory approach to decision making across the whole project team (both UK and in-country staff) has been put in place.
- Calvin Bernard, the project staff member currently undertaking a the project sponsored masters in global development management with the Open University, received a distinction in one of his completed courses (Environmental Decision-Making) and is now undertaking the final two courses. His success in the studies enabled him to have Guyanese sponsorship to attend a residential school run by the Open University in February 2005.

· The following activities will be undertaken within the next reporting period:

- *o* Postponed stakeholder forum. To be held May 2005.
- *o* On-going monthly monitoring of 33 reference sites. To be completed in May 2006.
- *o* On-going stakeholder analysis and engagement. On-going for remainder of project.
- *o* Updated version of technical North Rupununi Methods Manual. To be produced by June 2005.
- *o* First draft of non-technical North Rupununi Methods Manual. To be produced by June 2005.
- Analysis of first year's data and production of 'State of the Rupununi' report (report reviewing the project findings for the communities and other stakeholders). To be produced by August 2005.
- Completion of Calvin Bernard's MSc in Global Development Management. His masters dissertation will focus on stakeholder participation in natural resource management of the North Rupununi. To be completed by November 2005.

5. Actions taken in response to previous reviews (if applicable)

Responses to the review of last year's annual report have been divided into four sections: Communication, Evaluation, Training and Dissemination. Accompanying information is contained within Appendix V.

Communication

In the review, it was indicated that copies of our e-mail newsletter should be attached with the annual report and included as a project output. Our project 'Bulletins' are used to provide our partners with project news, updates and information. The Bulletins from the last reporting period are attached in Appendix V. There is also more informal project correspondence via e-mail that allows members of the team in the UK to keep up to date with progress in Guyana and vice a versa. Our website has also been improved since the last Darwin report and contains useful information related to the project and its progress

for both our partners and others. The website is located at http://www.gg.rhul.ac.uk/Rupununi

Evaluation

Comments from the reviewer indicated that detailed descriptions of the on-going project evaluation should be included.

This project is faced with two key challenges: the implementation of a scientifically stringent biophysical monitoring plan, while at the same time encouraging the participation of a wide range of stakeholders, from the local Amerindian community to national agencies, in the eventual implementation of the monitoring and management strategy. Our primary concern in the first year of the project has been to train community members to carry out the biophysical monitoring. Thus, the first year's evaluation was specifically concerned with making sure that the trained individuals were able to collect biophysical data to a scientifically acceptable standard. This was done by following their data collection over a 10 day period. Several problems were identified and resolved with one-to-one sessions with the community members. In particular the monitoring documentation and methodologies were amended to make them more user friendly for the community members. Prior to the last training period, the biophysical data collected over the first six months of the project was analysed to identify inconsistencies and errors. Consequently, feedback and further training on data collection, data input and data management was undertaken during the January 2005 training.

While the training programme was undertaken in January 2004, one of the training team members, Dr Jay Mistry, held a series of one-to-one interviews with a wide range of stakeholders to establish the appropriate participatory process for the implementation of a monitoring and management plan for the Rupununi. The ‘List of stakeholders’ table in Appendix V, provides a complete list of all the stakeholders consulted and the nature of the discussions held. Part of the stakeholder consultation process has been the identification of an appropriate participatory evaluation methodology. As we move towards the second-half of this project, we will gradually decrease our "expert-led" approach to project management and implementation, and increase the participatory component, including an open and transparent evaluation process. The three UK project partners have invested a considerable amount of time and effort in establishing the monitoring programme, and now that it is running smoothly, we feel that we can start dedicating more time to the participatory processes, including the establishment of a formal participatory evaluation.

Training

The reviewer indicated that it would be useful to see the training material used for training in the earlier part of this year. They were also interested in how the trainees for the courses were chosen. The Iwokrama International Centre for Rain Forest Conservation and Development, the Environmental Protection Agency and the University of Guyana staff were appointed to the project through job application. The specifications for all the jobs were written by the project partnership. The Amerindian Community members were proposed by their villages to the North Rupununi District Development Board who chose the final candidates for the training. Additional persons trained were staff from Iwokrama International Centre for Rain Forest Conservation and Development. Since the initial training, trained staff have continued training others from organizations such as Conservation International and the Karanambo Trust.

The ‘habitat and species survey techniques’ and ‘land-use type and impact survey techniques and GPS mapping’ training was undertaken in January and February 2004. Attached within this document are materials related to this training including: Training and Monitoring Programme; Training Day 1 material; Training Day 2 material and Site Selection Outputs.

Dissemination

The reviewer indicated that more detail be provided regarding the target audiences and the dissemination activities of the project.

As indicated in last years’ Annual Report, the project partnership has strong links with the local community, non-governmental and government organisations both within and external to Guyana. Regular press releases, TV appearances, newspaper articles and radio appearances seek to spread awareness of the project and what its objectives are. The project website and e-mailed ‘Bulletins’ also provide project updates and information for both project partners and external organizations.

Trained staff have already engaged with other organizations, such as Conservation International and the Karanambo Trust, and trained their staff in monitoring techniques. The first draft of the North Rupununi Methods Manual has been widely distributed to project partners and external organizations. Comments received will allow further development of the manual. It is seen as essential to make the manual a useable and useful document so that as many organizations as possible adopt the practice of monitoring and managing biodiversity within the region. The target organizations for the manual and on-going training are: government departments concerned with land management, conservation and water management; NGOs such as Conservation International that are directly related to conservation management and local community groups that undertake land management within their area. Engagement with these organizations has already commenced and efforts are being made to train staff, to secure resources to help support the monitoring and to ensure the monitoring becomes part of the work plan of the organizations. The project team are also working with the partners to promote the importance of the area for biodiversity conservation by assisting efforts to apply for international designations.

Techniques and processes developed within the project are also being disseminated to the wider international scientific community through the production of journal papers and presentations at conferences. Since the last annual report the following have been produced and accepted:

Mistry, J., Simpson, M., Berardi, A. and Sandy, Y. (2004). Exploring the links between natural resource use and biophysical status in the waterways of the North Rupununi, Guyana. Journal of Environmental Management, 72: 117-131.

Simpson, M., Mistry, J. and A. Berardi (2004) Environmental Monitoring of Potential Land Use Change in the North Rupununi, Guyana. Presented at the Intecol International Wetlands Conference, Utrecht University, Netherlands, 25th-30th July 2004.

6. Partnerships

- The project partnership has continued to be strong through this reporting period. The three UK organisations have continued to co-ordinate activities well and, as indicated in an earlier section, started to handover key decision making to host country organisations to improve ownership of the project and ensure continuation post Darwin funding. Linkage between UK partners and the key partner in Guyana (Iwokrama International Centre for Rain Forest Conservation and Development) has also been strong. This has ensured that the project has run smoothly, particularly the organisation and logistics of fieldwork and training sessions. However, engagement with more senior staff of the other project partners has not been so successful by UK partners or the key partner in Guyana. This was recognised during the project workshops in January 2005. Project staff now have specific responsibilities to engage at all levels of partner organisations and the wider stakeholder group. The stakeholder forum is the first step in achieving this but active and on-going engagement will continue throughout the remainder of the project with regular meetings, briefings and reporting.
- Communication between the UK partners and project partners has often been slow due to work commitments and access to the Internet in Guyana. A more formalised monthly communication procedure has been set up to try and overcome these problems. This forms part of the monthly project reporting discussed earlier.
- During this reporting period there has been a change in the project partnership personnel. Dr Graham Watkins who is identified as the main project partner in the host country has left his post and taken up a new job on the Galapagos Islands. His position and responsibilities within the project has been replaced by Dr. David Singh, who is the acting Director of Iwokrama International Centre for Rain Forest Conservation and Development. Although it has been sad to say goodbye to Graham Watkins his departure has not affected the project in terms of completed key milestones and activities.
- The project partnership has continued to have good relationships with a number of organizations such as Conservation International and The Karanambo Trust. Members of staff from both organizations have attended training courses and site monitoring, and the project's monitoring protocol is being adopted within sites managed by these organisations. Discussions have occurred with WWF to link to project activities within the area. It is hoped that data generated by the project can assist in their catchment resource mapping exercises. As indicated previously, a more comprehensive stakeholder engagement strategy is now in place with all project staff having responsibilities to contact, report to and communicate with specific stakeholders. This will aid engagement with other organizations and provide better linkage to other initiatives within Guyana.

7. Impact and Sustainability

- The profile of the project remains very high within Guyana as regular national newspaper, radio and television items continue to feature the project. The key partner within Guyana is particularly active in promoting the project using internal and external communication systems. As discussed earlier, strong links exist with organizations external to the project partnership and these organizations are adopting the project monitoring protocols for management of their sites. Staff trained within the project have taken and will continue to take training material and practical experience gained through the project into the local communities to help train local community groups and school children. One of the main aims of the stakeholder forum is to discuss with stakeholders how the monitoring protocols and participatory approach to natural resource and conservation management, developed by the project, will be adopted as part of the regular work programmes of both partner and external organisations.

- The project partners, led by the Open University, have secured £45,000 from the ESRC E-Science grant for a one-year pilot project for spatial decision-making for natural resource management in distributed environments. This project is directly linked to the Darwin project and aims to develop more effective natural resource management for the Rupununi, as well as Guyana and beyond. We hope that the tool being developed in the ESRC project will help the long-term sustainability of the Darwin project aims, in particular capacity building and the adaptive management of the Rupununi. Please see section 12 below for more details.

8. **Post-Project Follow up Activities** (max 300 words)

Not applicable at this stage.

9. Outputs, Outcomes and Dissemination

- All project outputs, excluding a national TV item in the UK and the postponed stakeholder forum, have occurred on, or ahead of the project timetable and are listed below in Table 1. Although a series of press releases went out in the UK unfortunately no TV company picked up on them. Andrea Berardi, the Open University project partner, has recently completed a screen test with the BBC, with the objective to represent developments in natural resource management as illustrated by the Guyana Darwin Initiative Project. The BBC is now considering the potential inclusion of Andrea Berardi in natural history documentaries to be filmed in 2006.
- As discussed earlier the stakeholder forum had to be cancelled to severe flooding in Georgetown but it will now be held in May 2005.
- The project partnership has strong links with local community, non-governmental and government organisations and is actively disseminating project outputs to them and will continue to do so. Trained staff are sharing their knowledge and practical skills with these organisations through formal and informal training sessions.

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

Code No.	Quantity	Description
10	1	Development of the North Rupununi Field Manual. The first draft has been completed and reviewed. After review at the workshop it is being refined and will be distributed in June 2005.
23	17	In-kind contributions of staff time and capital items
15A	2	Press releases in Guyana. One linking the project to World Water Day and one regarding the training.
15C	2	Press releases in UK. Two updating project progress.
18A	1	Aiesha Williams from Iwokrama International Centre for Rain Forest Conservation and Development and Calvin Bernard from University of Guyana appeared on Guyanese National TV to promote the project.
19A	1	Aiesha Williams from Iwokrama International Centre for Rain Forest Conservation and Development was interviewed on Guyanese Radio to promote the project
19B	1	Dr. Jay Mistry appeared on Radio 4's Home Planet programme and promoted the project

Code No.	Quantity	Description
19C	1	Aiesha Williams and Dexter Torres from Iwokrama International Centre for Rain Forest Conservation and Development and UK partners were interviewed on local radio in the Rupununi to promote the project
5	10	10 field project staff carried out regular monthly monitoring of 33 key reference sites.
8	3	Three UK staff to spent four weeks training and undertaking fieldwork
6A and 6B	10	10 trainees undertook 2 weeks of formal and practical training

Table 2: Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
Manual*	First Draft - North Rupununi Field Manual, Project Partnership, 2004	Unpublished working draft	Freely available through any of the project partnership	Free
Journal	Exploring the links between natural resource use and biophysical status in the waterways of the North Rupununi, Guyana. Mistry, J., Simpson, M., Berardi, A. and Sandy, Y. 2004	Journal of Environmental Management, 72: 117-131	Jay Mistry (j.mistry@rhul.ac.uk)	Free

10. Project Expenditure

Table 3: Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)

Item	Budget (please indicate which document you refer to if other than your project schedule)	Expenditure	Balance

11. Monitoring, Evaluation and Lessons

- Informal communication between Guyanese project partners and project stakeholders, ongoing informal on-line communication between all project partners and formal face-to-face discussions during project workshops and subsequent meetings have been used to monitor and informally evaluate the project. Key sessions in the workshop were used to refine project activities and improve communication. Appendix VI contains evaluation forms from project staff regarding overall project activities. This evaluation process is to extend to all stakeholders during the postponed stakeholder forum. It is clear from the initial review that some of the key messages of the project are not getting through so more effort to engage with staff and organizations is required. This has been addressed by a more focused training schedule and a strategy of wider stakeholder engagement.
- Feedback from trainees was sought each day during the training course via a graffiti board where the trainees could write any comments they desired. See Appendix VI for examples. These were reviewed each evening and if possible comments were addressed in the next day's activities. Overall findings will be used to improve training that occurs later within the project. On-going evaluation of the reference site monitoring will occur from all partners and improvements in methodology, logistics and reporting is an on-going process and will be implemented. This will be demonstrated through the new drafts of the North Rupununi Methods Manual. The key milestones and outputs identified within the original proposal will continue to be used as an indicator of achievements within the project.

12. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum)

¦ **I agree for ECTF and the Darwin Secretariat to publish the content of this section**

The project partners, led by the Open University, have secured £45,000 for a one year pilot project from the ESRC E-Science fund. One of the main problems identified within the Darwin project has been that project partners and other organisations are widely dispersed (particularly between Guyana and UK), have differing skills and competencies, and varying inputs to the management of natural resources. Described as 'innovative' and 'ground-breaking' by the assessors, the aim of the ESRC project is to establish the long-term engagement of stakeholders with varying expertise in natural resource management within a distributed environment. Beginning in June 2005, we will be developing an on-line spatial decision-support tool which combines GIS and computer assisted argumentation. Simultaneously, we will be using data and information collected from the Darwin project to develop an OU short course which will 'test' the on-line tool. The objective of the course will be to make recommendations for a particular biodiversity conservation management 'problem'. This course will be taken by stakeholders in Guyana and the UK, and the success and feedback from the course will be used to evaluate and modify the software tools and interactive process. We hope that the tools and methodologies being developed in the ESRC project will help the long-term sustainability of the Darwin project aims, in particular capacity building and the adaptive management of the Rupununi. We hope to disseminate the tool together with the final Darwin outputs, and use the interest generated as a means to secure further funding for biodiversity conservation in the Rupununi

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2003/2004

Project summary	Measurable Indicators	Progress and Achievements April 2003-Mar 2004	Actions required/planned for next period
Goal*:* To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources			
Purpose To build capacity for effective management of the Iwokrama Forest and Rupununi Wetlands and Savannas of Guyana, through training and the development of sustainable ecosystem management plans	New understanding of the relationships between environmental determinants, key species distributions and impacts of land-use change that will inform management plans Long-term monitoring and management strategies resulting in effective conservation of key habitats and species Evidence of sustainable development and key habitat and species conservation	Monthly monitoring of 33 key sites in the North Rupununi. Active engagement with local communities regarding land and water resource use. Engagement with the wider stakeholder community to encourage adoption of project approach to monitoring and natural resource management.	Monitoring will be on-going within the next reporting period Active engagement with local communities regarding land and water resource use will continue. Engagement with the wider stakeholder community to encourage adoption of project approach to monitoring and natural resource management will continue.
Outputs			
Trained local community members and staff within the partner organisations	10 staff trained in monitoring, data analysis & management and 1 graduate Masters student	10 staff were trained in data and GIS analysis techniques, management plan development and stakeholder analysis techniques	Continued training support offered by project staff and development of final training sessions to review material taught.

North Rupununi Field Manual (NRFM)	Monitoring protocols and data recording sheets produced and peer reviewed, publication and distribution arranged	First draft of the manual published and distributed to all project partners and interested external organizations.	2nd draft of the technical NRFM and a 1st draft of the non-technical NRFM will be produced within the next reporting period
North Rupununi Ecosystems Management Plan (NREMP)	GIS spatial database of ecosystem and species characteristics, stakeholder fora reports, NREMP peer reviewed, publication and distribution arranged	Database set up and in use.	Analysis of collected data will occur within the next reporting period and the production of the 'State of the Rupununi' report will be published in response to wishes of stakeholders
Publications and presentations	6 radio and TV items, 3 newspaper items, posters, 2 papers	4 radio and TV items, 1 presentation and 1 paper occurred within this reporting period	Further radio, TV and newspaper items will occur within the next reporting period

Note: Please do NOT expand rows to include activities since their completion and outcomes should be reported under the column on progress and achievements at output and purpose levels.

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Appendix I – Training and Workshop schedules

Training Schedule

Training planning form		Date: Monday 10th Jan./Friday 14th Jan		Attendees:						
Time	Topic and objective	Method	Format						Responsibility	Logistical needs
				1	2	3	4	5		
8:30	Introduction to day (10 min)		Plenary						Matt	
	Introduction activity (20 min)	Self-portraits	Individuals						Jay	A4 paper, pencils
	The decision-making framework:	Seminar	Plenary						Andrea	Flip charts, pens, A4 paper, pencils
	Introduction									
	Understanding multiple perspectives and surfacing power relations									
	Working with the feasible/desirable tension									
	Personal decision-making	Experiential activity	Individual							
	Nested hierarchy of decision-making	Seminar	Plenary							
10:30	BREAK									
11:00	Introduction to stakeholder analysis (15min)	Seminar	Plenary						Jay	Flip charts, pens
	Introduction to interviewing (15 min)	Brainstorming	Plenary							A4 paper, pencils, pens
	Key components of interviewing:									
	Interview context (30 min)	Photo exercise	Small groups							
	How to ask questions (30 min)	What's wrong with the question?	Small groups							
12:30	LUNCH									
1:30	Judging responses (15 min)	Brainstorming	Plenary						Jay	Flip charts, pens
	How to ask questions (30 min)	But why?	Small groups							A4 paper, pencils, pens
	Problems in group work (15 min)	Saboteur	Small groups							
	Recording interviews (30 min)	Role plays	Small groups							

3:00	BREAK									
3:30	Introduction to diagramming (10 min) Mapping (15 min) Mental maps (20 min) Seasonal calendars (20 min) Multiple cause diagrams (25 min)	Seminar Map your neighbourhood Mental map analysis Seasonal calendars Impact diagrams	Plenary Individuals Small groups Small groups Small groups						Jay	Flip charts, pens A4 paper, pencils, pens
5:00	DEBRIEFING & ASSESSMENT	Exercise	Small groups							A4 paper, pencils
6:00	END. Evaluation throughout evening on graffiti board									

Training planning form		Date: Tuesday 11th Jan./Saturday 15th Jan		Attendees:						
Time	Topic and objective	Method	Format						Responsibility	Logistical needs
				1	2	3	4	5		
8:30	Summary of previous day and introduction (15 min) Transect walks Monitoring and evaluating stakeholder analysis	Transect walks	Plenary Small groups						Andrea Jay	 Flip charts, pens A4 paper, pencils
10:30	BREAK									
11:00	Identifying indicators of sustainable natural resource management: Introduction: what are indicators? Issues around indicators and raw data analysis								Matt	Flip charts, pens
12:30	LUNCH									

1:30	Methods of identifying indicators from data: Spatial and temporal characterisation of indicators Graphical representation and analysis Correlation using PCA								Matt	Flip charts, pens A4 paper, pencils Computers, LCD projector
3:00	BREAK									
3:30	Identifying spatial and temporal relationships among indicators: Correlation Prioritisation of key indicators The role of indicators in decision-making Monitoring and evaluating the use of indicators								Matt	Flip charts, pens A4 paper, pencils Computers, LCD projector
5:00	DEBRIEFING & ASSESSMENT	Exercise	Small groups						Matt	A4 paper, pencils
6:00	END. Evaluation throughout evening on graffiti board									

Training planning form		Date: Wednesday 12th Jan./Sunday 16th Jan		Attendees:						
Time	Topic and objective	Method	Format						Responsibility	Logistical needs
				1	2	3	4	5		
8:30	Summary of previous day and introduction (15 min) Understanding GIS: - Information sources (data input) - Information management - Spatial analysis - Information visualisation	 Seminar Seminar with activities	Plenary Plenary Small groups						Jay Andrea Andrea	 LCD projector, Flip charts, pens A3 paper, pencils, pens, A3 transparencies Computers

10:30	BREAK									
11:00	Is GIS an appropriate technology? - technological issues - ethical issues - human resource issues - institutional capacity issues	Seminar with activities	Small groups						Andrea	A3 paper, pencils, pens, A3 transparencies
12:30	LUNCH									
1:30	Rupununi GIS exercise: - who contributes? what matters? - how do we capture it? - how do we analyse it?	Seminar with activities	Small groups						Andrea	A3 paper, pencils, pens, A3 transparencies
3:00	BREAK									
3:30	Participatory 3-D Modelling - a bridge between communities and GIS - constructing a 3-D model - using a 3-D model with communities	Seminar with activities	Small groups						Andrea	Flip charts, pens A4 paper, pencils
5:00	DEBRIEFING & ASSESSMENT	Exercise	Small groups						Andrea	A4 paper, pencils
6:00	END. Evaluation throughout evening on graffiti board									

Training planning form		Date: Monday 17th Jan		Attendees:						
Time	Topic and objective	Method	Format						Responsibility	Logistical needs
				1	2	3	4	5		

8:30	Summary of previous day and introduction (15 min) Preparation for community visits Identifying indicators for each community	 Seminar Data analysis	Plenary Plenary Small groups						Andrea Jay Matt	 Flip charts, pens A4 paper, pencils, pens, Computers
10:30	BREAK									
11:00	Working with the "scientists", communities and other stakeholders: blending GIS, interviews, GPS and P3DM	GIS activities	Small groups						Andrea	Flip charts, pens A4 paper, pencils, pens, Computers
12:30	LUNCH									
1:30	Interviewing with communities	Brainstorming for interview guide	Small groups						Jay	Flip charts, pens A4 paper, pencils, pens
3:00	BREAK									
3:30	Are we ready for the field? Conclusion	Group profiles Group problem solving	Small groups						Jay	Flip charts, pens A4 paper, pencils
5:00	END. Evaluation throughout evening on graffiti board									

Workshop schedule

Workshop planning form		Date: Sunday 23rd Jan		Attendees:						
Time	Topic and objective	Method	Format						Responsibility	Logistical needs
				1	2	3	4	5		
8:30	Introduction activity (15 min) Overview of community visits: making sense of the data		Small groups						Jay Jay	 Flip charts, pens A4 paper, pencils, pens
10:30	BREAK									

11:00	Adapting the biophysical monitoring		Small groups						Matt	Flip charts, pens A4 paper, pencils, pens, computers
12:30	LUNCH									
1:30	Integrating the social monitoring		Small groups						Jay	Flip charts, pens A4 paper, pencils, pens
3:00	BREAK									
3:30	Informing action? Conclusion		Small groups						Andrea	Flip charts, pens A4 paper, pencils
5:00	END. Evaluation throughout evening on graffiti board									

Workshop planning form		Date: Monday 24th Jan		Attendees:						
Time	Topic and objective	Method	Format						Responsibility	Logistical needs
				1	2	3	4	5		
8:30	Summary of previous day and introduction (15 min) Participatory management planning: Introduction: how do you write a monitoring and management plan? Planning	 Seminar Groups working on indicators, GIS and stakeholder analysis	Plenary Plenary Small groups						Matt Andrea Andrea, Jay, Matt	 Flip charts, pens A4 paper, pencils, pens
10:30	BREAK									
11:00	Drafting	Groups working on indicators, GIS and stakeholder analysis	Small groups						Andrea, Jay, Matt	Flip charts, pens A4 paper, pencils, pens, computers
12:30	LUNCH									

1:30	Evaluation and feedback	Groups swap drafts	Small groups						Andrea, Jay, Matt	Flip charts, pens A4 paper, pencils, pens, computers
3:00	BREAK									
3:30	Writing final draft Conclusion	Groups working on indicators, GIS and stakeholder analysis	Small groups						Andrea, Jay, Matt Andrea	Flip charts, pens A4 paper, pencils, pens, computers
5:00	END. Evaluation throughout evening on graffiti board									

Workshop planning form		Date: Tuesday 25th Jan		Attendees:						
Time	Topic and objective	Method	Format						Responsibility	Logistical needs
				1	2	3	4	5		
8:30	Summary of previous day and introduction (15 min) Exploring future: post Darwin		Plenary						Matt Andrea, Jay, Matt	 Flip charts, pens A4 paper, pencils, pens
10:30	BREAK									
11:00	Exploring future: post Darwin								Andrea, Jay, Matt	Flip charts, pens A4 paper, pencils, pens
12:30	LUNCH									
1:30	Preparation for the Stakeholder Forum								Andrea, Jay, Matt	Flip charts, pens A4 paper, pencils, pens, Computers, LCD projector
3:00	BREAK									

3:30	Preparation for the Stakeholder Forum Conclusion								Andrea, Jay, Matt	Flip charts, pens A4 paper, pencils, pens, Computers, LCD projector
5:00	END. Evaluation throughout evening on graffiti board									

Appendix II – Individual monthly reporting form

Name:
Date:
What have you done this month?
How did it go?
How could it be improved?
What will you do next month and when will you do it?

Appendix III – Training and Workshop Report

Sustainable Management of the North Rupununi Wetlands:

Linking Biodiversity, People and Environment

Phase Two Training and Workshop

Collaborative Resource Management: data analysis and management plan development

January 2005

Complied by: Monitoring and Research Unit

Iwokrama International Centre

January 2005

The second phase training of the Darwin funded project – Sustainable Management of the North Rupununi Wetlands: Linking Biodiversity, People, and Environment was held from the 10th to 26th January, 2005 at the Iwokrama Georgetown Office and Field Station and in three communities (Surama, Annai, and Toka) of the North Rupununi. The training was facilitated by Dr. Andrea Berardi (Open University), Dr. Jay Mistry (Royal Holloway University) and Dr. Matthew Simpson (The Wildfowl and Wetlands Trust) and was focused on techniques for Collaborative Resource Management. This second phase is a follow up from the first phase which was conducted in January 2004 and focused on monitoring techniques and how to conduct monitoring programs. That training course set out the monitoring protocol for conducting biophysical monitoring of the North Rupununi during the 2004 period. These training phases are done a building block fashion which is intended to equip the monitoring team with the knowledge of monitoring techniques to capture the biophysical and social aspects of the environment.

This training session was aimed at introducing techniques that will allow the monitoring team to obtain integral information on how communities used, are using and plan to use the wetland system. This will feed into the future development of a adaptive management plan for the area that captures the needs of the people and of the physical environment. This method is also geared towards getting communities to start thinking of how the monitoring programme can be integrated into community activities that will allow them to effectively manage these activities as well as feed into the overall decision making process in the communities. The main components of the training course were:

1. **Stakeholder Analysis and Social Monitoring** - To better understand how communities use and influence the change in the North Rupununi Wetlands it is necessary to monitor the community use of the area. The data collected coupled with the biophysical monitoring will create a picture that gives a better idea about the system and how best to manage it. Social Monitoring uses a number of techniques in order to obtain the data needed to better understand how different groups in the community use the wetland system. These techniques include:

- semi-structured interviews
- transect walks
- seasonal calendars

2. **Monitoring and Evaluation** – This section of the training dealt with assessing the needs and importance of monitoring the North Rupununi wetlands. There was a revaluation of the parameters used in the monitoring process, and the techniques which are used to collect

data. There were also sessions that focused on the importance and roles of indicators in monitoring to be used in decision making.

3. **Data Management and Analysis** – Over the last eleven months of the project there was much data that was collected, but there was not much done in terms of managing the data that was collected, and analysis of the data. The training sessions allowed for the identification of suitable methods for analyzing the data that is collected and will be collected as project unfolds further, that will then inform decision making. There were discussions and practical sessions using the various statistical tools.
4. **GIS and Participatory 3D Modeling** – The importance of integrating GIS in a simplified form for communities is essential in facilitating participatory approached in managing the Rupununi wetlands and its environs. The purposes of GIS and participatory 3D modeling in the wetland projects include:-

1. Maps of various habitats

- show their distribution
- understand the systems
- map of species presence
- map of resource use

Links to correlation analysis, negative impacts, management advice

2. Show natural relationships

- river water levels and flow
- land and forest/savanna
- rainfall distribution
- soils
- species distribution

3. Influence decision making with maps

4. Identifying boundaries of natural systems and political system e.g. water catchment

5. **Exploring the future of the North Rupununi: Post Darwin –** This section of the training complemented all other aspects of the training. There was a re-identification of key stakeholders, and persons that can impact decision making in the North Rupununi wetlands. The importance of the continued monitoring of the wetland sites after the Darwin Project

comes to an end was emphasized. The training in itself was aimed at developing the social capital of the participants that will in turn positively impact the capacity of the North Rupununi to monitor and manage the wetland and other resources. The need to further strengthen community participation was supported by the development of a community based field manual, which is essentially a simplified version of the more technical field manual. This will allow for communities to implement monitoring systems for various components that are important, in terms of the wetland sites.

6. **Stakeholder forum in Georgetown –** A stakeholder forum was scheduled for the 27th January, upon the completion of the training. However, it was cancelled as a result of the severely flooded conditions in Georgetown. The forum was set to involve all the agencies and persons that are important in the North Rupununi wetlands, and in the current, and future uses of the resources. The forum will be rescheduled for a time subsequent additional community visits by the team in April.

7. Training Participants & Facilitators

1. Vanda Allicock – Wetland Assistant (Surama)
2. Malizya Hamilton –Wetland Field Assistant (Arapanputa)
3. Delano Davis - Wetland Field Assistant (Toka)
4. Orville Davis – Wetland Field Assistant (Toka)
5. Dexter Torres – Ranger/Wetland Field Assistant (Iwokrama/Wowetta)
6. Lakeram Haynes – Ranger/Wetland Field Assistant (Iwokrama/Rewa)
7. Nigel John – Ranger (Conservation International)
8. Elvis Joseph – Ranger (Conservation International)
9. Hendrick Simon – Ranger (Conservation International)
10. Deirdre Jafferally – Wetlands Field Researcher (Iwokrama)
11. Hemchandranauth Sambhu – Wetlands Field Researcher (EPA/Iwokrama)
12. Aiesha Williams – Wetlands Field Researcher (Iwokrama)
13. Indranee Roopsind – Wetlands Field Researcher (Iwokrama)
14. Calvin Bernard – Open University Master's Candidate

Facilitators

Dr. Andrea Berardi, Dr. Jay Mistry & Dr. Matthew Simpson

Appendix IV – North Rupununi Methods Manual – Draft Edition

North Rupununi Field Manual

Darwin Initiative Guyana Partnership

The Wildfowl & Wetlands Trust
Royal Holloway University of London
The Open University
Iwokrama International Centre for Rain Forest Conservation and Development
Environmental Protection Agency
North Rupununi District Development Board
University of Guyana

Wildfowl & Wetlands Trust
Slimbridge
Glos.
GL2 7BT
UK

Royal Holloway University of London
Department of Geography
Egham
Surrey TW20 0EX
UK

August 2004

Appendix V – Supporting information for annual review comments

Sustainable management of the Rupununi: linking biodiversity, environment and people

Project Bulletin 1

Welcome to the project! We hope our collaborations will be fruitful and the project a success for all. I hope in each Project Bulletin to update all those involved with what all the project partners have been doing, particularly with regard to the project outputs as outlined in the original application.

The following table outlines what tasks we need to carry out in the months up to and including the first training workshops in Guyana:

Date	***Tasks***
September 03	*Establish E-mail discussion group amongst partners. Training manuals and presentations developed, National TV and radio items in Guyana & UK, local radio in North Rupununi District*
October 03	*Commence selection of nine staff to become trainees and work on project as field researchers + MSc Student*
November 03	
December 03	*Appoint nine staff to become trainees and work on project as field researchers + MSc Student*
January 04	*Field researchers + MSc Student to start work on project + UK partners to visit Guyana. Start-up workshop to plan work and identify tasks + stakeholder forum*
February 04	*Training of field researchers for three weeks + selection of field survey sites + commencement of field surveys*

Myself and Matt are in charge overall and any questions relating to administration, funding, and field research should be directed to us. Andrea is in charge of the GIS/remote sensing part of the project and also the running of the Masters. Up to the time of the training workshops, we expect that Graham will coordinate the appointment of the field research staff (including the Masters student) in consultation with Indarjit at the EPA and Philip at UG. Unfortunately I don't as yet have an e-mail for Rodney Davies or Eugene Issac of the NRDDB. I hope Graham can organise with them to begin publicising the project on the local radio station and at NRDDB meetings.

We hope to have a project website up and running soon. For the moment, Andrea is hosting a project page through his site at http://systems.open.ac.uk/page.cfm?pageid=AndreaBGuyana. We

plan to have a discussion section on the site where we can all post messages regarding the project.

Well, that's all for now. Please get back to me if there is anyone else you think needs to be part of this e-mail group, and if there are any other items you think should be included in the bulletin.

I look forward to working with you all!

Jay

Sustainable management of the Rupununi: linking biodiversity, environment and people

Project Bulletin 2

Hello again, and welcome to those of you new to the Darwin/Rupununi project! The first training session and field visit from the UK staff has been completed, and overall, we think it was very successful. We'd like to thank attendees and everyone involved in the organisation of the training and field visit for making it such a great success. Here are the activities carried out and some of the outputs:

Date	***Tasks***
Staff selection	*Ten staff were appointed to become trainees and work on project as field researchers. These are Dierdre Jafferally, Lakeram Haynes, Hemchandranauth Sambhu (EPA liaison), Malizya (Pinky) Hamilton, Dexter Torres, Delano Davies, Urvile (Rocky) Davies, Vanda Allicock, Aiesha Williams/Indranee Roopsind (shared position). Calvin Bernard has been selected to undertake the MSc in Global Development Management based at the University of Guyana.*
Stakeholder engagement	*Meetings were held with staff at Iwokrama, NRDDB, EPA, WWF, FFI, CI, Karanambu Trust, Wildlife Division, Fisheries Department, and the Amerindian Peoples Association. Some of the outputs include possibilities for CI and the Karanambu Trust to expand the monitoring to their areas, and the EPA helping out with monitoring equipment for the project.*
Training and selection of field survey sites	*Three weeks of field training was carried out. The team consisted of the UK staff, the ten Darwin staff, plus Michael Patterson, Waldyke Prince and Jake Bicknell. Four days of training took place in and around the Iwokrama Field Station, followed by two boat trips; Iwokrama Field Station to Annai, and Annai to Karanambu and an overland trip to the flooded savanna areas and savanna ponds inland from the Rupununi river. Over 45 sites were surveyed during the training period of which 30 will be selected for the two year monitoring work.*
Media outputs	*Graham appeared on Guyanese national TV for World Wetlands Day on the 3rd February and talked about the Darwin project. Articles about the project also appeared in Kaieteur News and Starbroek News. Andrea did a broadcast to all the North Rupununi communities on Radio Paiwomak.*

The following table outlines what tasks we need to carry out in the next couple of months:

Date	***Tasks***
April/May 04	*Development of the North Rupununi Field Manual*

April 04	*Monitoring work to begin. This will involve surveying the 30 selected sites every month. The data collected will then be inputted into an online database, managed by Deirdre Jafferally. Chanchal Prashad will be working on linking the database to a web-based Geographical Information System showing the location of the study sites and the characteristics of the Rupununi region as a whole.*
May 04	*Calvin Bernard will commence Open University courses in 'Capacities for Managing Development' and 'Environmental Decision Making - a systems approach' as part of the Masters in Global Development Management.*

We are in the process of setting up the project website, which will also hold the database for data entry, and will send out details as soon as it's up and running

Bye!

Jay

February 2004

Sustainable management of the Rupununi: linking biodiversity, environment and people

Project Bulletin 3

Hello everyone!! I thought it was about time there was another project bulletin. Here are some updates.

Website

The website is finally up and running (http://www.gg.rhul.ac.uk/Rupununi), and I hope you will all have a good look and let me know if there is anything you think needs changing, adding or deleting. I'm also hoping to build up the Photo Gallery page, so please do send me any photos you'd like to put on the page.

Manual

We're very pleased to release the first version of the North Rupununi Field Manual. It is also available on the website in the 'Bulletins and Reports' page (http://www.gg.rhul.ac.uk/Rupununi/Bulletins.html). We envisage the manual to be an evolving document, which will go through much iteration during the lifetime of the project, and beyond. Please remember that the protocols will change as the monitoring work continues. Here is a summary of the development of the monitoring process, which led to this first draft of the manual.

The aim of the project has always been to have a participatory approach to the monitoring process. While in Guyana in 2001 for the pre-project expedition (see http://www.gg.rhul.ac.uk/Rupununi/Expedition.html), we had discussions with various stakeholders which identified a number of key issues the communities were worried about. These included the range of impacts on fish populations, such as fire and mining, which could possibly affect fish numbers as well as spawning areas in the wetlands and rivers of the region. Following from this, we put together this Darwin project to begin the monitoring. The first stage of development of the monitoring protocols involved discussions with stakeholders to identify a wide range of components, both social and ecological, that influence the functioning of the Rupununi and ultimately determine the status of key resources such as fish species. Due to limitations in funding and time, this dialogue was carried out in 2003 with the project team that was to carry out the monitoring, and representatives of a range of stakeholders (up to 30 people were involved in the consultation). This exercise resulted in the identification of a wide range of components that influence the Rupununi system, but more importantly, a shift from looking at individual components in isolation to focusing on the relationship between these components. We

also established that over time the components will change as will the relationships. The implication of this is that different aspects of the Rupununi system will have to be monitored and/or monitored at different temporal and spatial scales. That's why we are emphasising the dynamic nature of the monitoring protocols and hence the manual.

Although we identified some of the socio-economic components of the Rupununi system, such as land/site use, we did not have sufficient time to explore the socio-economic components in depth. The final outcome of this initial exercise was therefore the establishment of the monitoring protocols, based on the biophysical components of the system. Nevertheless, this was a good starting point from which to build a more holistic monitoring scheme. Key sites were identified, parameters to measure established, and the monitoring began. As part of the 2005 field training, we will be engaging more deeply with the socio-economic components so that a monitoring protocol for the socio-economic status of the Rupununi can be established.

This first version of the manual provides a clear process for the development of protocols for monitoring habitats, key species and land use impacts to date. We hope it will engage and empower the local community, but at the same time generate data, models and plans acceptable at national and international level. Some of the wording in the manual needs to be reviewed. During the 2005 field training, we will be discussing the user-friendliness of the manual in the view to modify it in accordance with stakeholder terminology.

I hope that gives some context before you delve into the manual! Any comments on the document are welcome.

Monitoring

The monitoring work which began in April is continuing. The monitoring team is currently monitoring 33 sites, and this includes taking water chemistry readings, bird surveys, caiman surveys, fish surveys (food and aquarium), and recording changes in land morphology and land use activities. Water chemistry, fish and bird surveys are done both morning and afternoon. Matt has now set up an Access database which will now be used for data input. We hope this will make the process somewhat easier.

We are also happy to report that Manuel Mandook from Karanambu and Nigel John from Conservation International were trained in the monitoring protocols by our Darwin trainees in April. Their training included the use of the water chemistry kit and survey techniques, as well as data sheet completion procedures. The group had general discussions on the importance of the project and its aims, and what is hoped will be achieved with the data collected. Manuel and Nigel have accompanied the Darwin trainees on a number of trips since their initial training.

Training for January 2005

Finally, the second phase of training is scheduled for the 10th to the 28th of January 2005. We'll be having sessions on Data analysis and GIS analysis, Socio-economic monitoring and stakeholder participatory methods, and Environmental decision-making and management plan development.

We hope these dates will be convenient for everyone. More details of the training will be given in October.

OK, I think that's all for now. Bye from a cold, insect-free London!

Jay

September 2004

Sustainable management of the Rupununi: linking biodiversity, the environment and people

List of stakeholders

Stakeholder	*Location*	*Contact name*	*Who do we need to talk to?*	*Specific issues to be discussed*
Iwokrama	*Georgetown*	*Graham Watkins (Director)*	*Graham Watkins, Dane Gobin, David Singh*	*Institutional arrangements, financial arrangements*
Environmental Protection Agency	*Georgetown*	*Indarjit Ramdass (Director of Natural Resources)*	*Indarjit Ramdass, Ramish Lilwah, and Doorga Persaud (Executive Director of the EPA)*	*Institutional arrangements for managing the project, ensuring clear lines of reporting* *Ramsar status, GIS management*
NRDDB	*Annai, Rupununi*	*Rodney Davis (Vice Chair)*	*Rodney Davies, Emily Allicock, Sydney Allicock, Eugene Isaacs, Terry Ellis*	*Institutional and financial arrangements for managing the project*
University of Guyana – Centre for the Study of Biological Diversity	*Georgetown*	*Philip da Silva (Dean Faculty of Natural Resources)*	*Philip da Silva* Masters student	*The Masters programme*
Fisheries Department	*Georgetown*	*Tejnarine Geer*	*Tejnarine Geer, Pamela Ramotar*	*Arapaima management planning, fisheries management planning*
Wildlife Division – Office of the President	*Georgetown*	*Mr Kellawan*	*Mr Kellawan*	*Aquarium fish trade licensing, wildlife export licensing*
Ministry of Amerindian Affairs	*Georgetown*	*Juliet Solomon*	*Minister Rodrigues, Juliet Solomon*	*Management arrangements, permits for village visits*
Ministry of Foreign Affairs	*Georgetown*			*Courtesy*
Bina Hill	*Annai, Rupununi*	*Sydney Allicock*	*Sydney Allicock*	*Relationship with Bina Hill*
Conservation	*Georgetown*	*Eustace Alexander*	*Eustace Alexander, Major*	*Broader management systems,*

International - Guyana			*General Joe Singh (Director)*	*possible collaboration, conservation concession in the Rupununi*
Karanambu Trust	*Georgetown, and Karanambu Ranch*	*Diane McTurk, Dawn McTurk*	*Melanie McTurk and Eddie McTurk*	*Collaborative management and monitoring arrangements,* *Ramsar status*
WWF – Guiana Shield	*Georgetown*	*Patrick Williams*		*Possible co-funding arrangements for specific wetlands projects*
Iwokrama Field Station Staff	*Field Station*	*Vibert Welch, David Singh*	*Rangers and research staff – Indranee Roopsind, Hemchandranauth Sambhu, Aiesha Williams*	*Information and discussion of arrangements, patrol modifications*
Guyana Marine Turtle Conservation Society	*Georgetown*	*Shyam Nokta*	*Shyam Nokta,*	*Parallel FFI Darwin Initiative project with Shell Beach, Ramsar status*
Roraima Indigenous Council	*Boa Vista*	*Contact through Vincenzo Lauriola - INPA/RR [enzo@inpa.gov.br]*		*Project discussion, for parallel projects in Roraima State with Makushi people*
NRDDB Trustee	*Georgetown*	*Vanda Radzik*		*To discuss Bina Hill*
Guyana Geology and Mines Commission	*Georgetown*			*Water quality discussions*
Wildlife clubs in the Rupununi	*Rupununi*		*Through NRDBB*	*Wildlife clubs taking part in project*
Hydromet	*Georgetown*			*Water quality and levels and rainfall type monitoring*
Fisheries committee members of the NRDDB	*Annai*		*Through NRDBB*	
Zacharias Norman,	*Annai*		*Through NRDBB*	

Touchau of Annai District					
Amerindian Association	*Peoples*	*Georgetown*	*Jean La Rose*	*Jean La Rose*	*Amerindian rights*

Sustainable Management of the Rupununi – Darwin Initiative Project Training and Monitoring Programme – January/February 2004

Programme

17th January 2004 7:00pm

Introduction to the project

Aim

Objectives

People

Timetable

18th January 2004

Morning session: Start 11:00am

Principles of monitoring

Systems

Change

Indicators

Lunch 12:00

Afternoon session: Start 2:00pm

System identification exercise

Identifying the Rupununi System

Scale - time and space

Biophysical component of the Rupununi System

Land cover

Remote sensing/GIS data

Ground truthing

19th January 2004

Morning session: Start

Biophysical component of the Rupununi System continued

Monitoring the physical characteristics

Geomorphology

Hydrology

Water Quality

Water body dimensions and features

Habitat characterization

Species surveys

Lunch

Afternoon session: Start

Site selection

Logistics

Representation

20th and 21st January

Field exercises

GIS and GPS Mapping

Indicator and feature identification

Species Surveys

Recording sheets

22nd January to 6th February

Site visits to practice survey techniques, assess site suitability for monitoring and to determine monitoring logistics

Sustainable Management of the Rupununi – Darwin Initiative Project

Training Day 1 – January 18th 2004

Why do we need to do monitoring?

Systems

"A system can be defined as any two or more parts or units that are related, such that change in any one unit changes all units"

Units and networks

The simplest way of investigating systems is in identifying units. We create units when we divide up the world in order to study it. E.g. a nation, a city, a family, an individual, a brain, a cell……

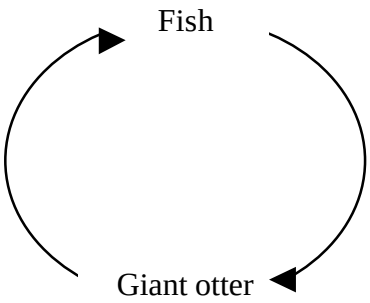
These units are connected and interact within networks, thus creating systems. Examples of systems include an ecosystem, a city's transport system and a person's circulation system.

Feedback

What distinguishes systems is feedback.

"Feedback refers to the ability of a system to reintroduce output as input"

The best way to understand the operation of feedback within systems is through the drawing of diagrams. Below is an example of a multiple cause diagram for a predator/prey system:



One can represent extremely complex systems with multiple-cause diagrams.

Change

The relative amounts of components within systems are constantly changing but the network connections nearly always remain the same. So our fundamental objective is to be able to measure change within the system. We do this using monitoring.

Indicators

For practical purposes one cannot monitor every single component within a system. So one has to identify indicators that are good at picking up change within a system.

Systems, indicators, monitoring and management plans

In order to develop a management plan for the Rupununi wetlands, one must:

1. *Identify the units and networks that create the Rupununi wetland system.*
2. *Identify which components are the most important for a variety of purposes (e.g. biodiversity conservation, people's livelihoods)*
3. *Identify indicators of change to be monitored*
4. *Establish thresholds of change that will trigger certain actions.*

Scale within systems

Scale is a fundamental factor in considering change. Scale has two aspects: time and space.

Time

Some changes occur rapidly while others occur slowly

Some changes occur regularly while others occur randomly

Space

Some changes occur locally while others occur extensively.

Exercise: Why did George W. Bush order the invasion of Iraq?

In groups of four, draw a multiple cause diagram for the above question. Each group will then present their diagram.

Identifying the Rupununi wetland system

The main aspects of the Rupununi wetland system are the hydrological, geomorphological, ecological, human (cultural, social, economic and political).

Mapping the extensive aspects of Rupununi wetland system

For the project, we acquired a LANDSAT remotely sensed image. The satellite sensor collects information for different light wavebands (colours) and each different landcover unit reflects back into space different amounts of wavebands.

A classification of the different landcover types within the Rupununi was carried out. One of our tasks is to check (ground-truth) whether the classification is appropriate.

We do this by mapping areas of the same landcover using a GPS.

Sustainable Management of the Rupununi – Darwin Initiative Project

Training Day 2 – January 19th 2004

The following monitoring sheets provide a first attempt at the identification of the physical characteristics of the Rupununi System. This form and the methods used to identify the characteristics will be refined during the field exercises and site visits.

Sustainable Management of the Rupununi			*Page 1 of 10*
Site Monitoring Form			
A. Site details			
A1	*Site Name*		
A2	*Site Code*		
A3	*Date of survey*		
A4	*Weather conditions*		
A5	*Name of surveyors*		
A6	*GPS location*		
A7	*Time survey started*		
B. Geomorphic attributes			
B1	*River type*	*Main River Channel*	?
B2		*Creek*	?
B3	*Pond or lake that floods directly from river*	*Cut-off channel (inlet with connection to river)*	?
B4		*Former channel (separate from river)*	?
B5		*Ox-bow lake (separate from river)*	?
B6	*Pond or lake that floods back up small creek from river*	*Former channel (separate from river)*	?
B7		*Ox-bow lake (separate from river)*	?
B8	*Basin Ponds (these ponds*	*Permanent pond*	?

B9		*Pond that dries out*	?
C. Hydrological attributes and water quality			
C 1	*Hydrological inputs*	*Groundwater discharge*	?
C 2		*Surface runoff*	?
C 3		*Surface overbank inundation from a river*	?
C 4		*Surface overbank inundation from a rise in water level of a waterbody*	?
C 5		*Precipitation*	?
C 6		*Other……*	?
C 7	*Flooding regime*	*Water present*	?
C 8		*Water not present*	?

C. Hydrological attributes and water quality continued				
C9	*Water colour*	*Black*		?
C10		*White*		?
C11		*Clear*		?
C12		*Brown*		?
	Water chemistry	*Time of survey*	*06:00 to 07:00*	*16:00 to 17:00*
C13		*Electrical conductivity (µS)*		
C14		*pH (pH)*		
C15		*Temperature from pH meter (°C)*		
C16		*Dissolved Oxygen (%)*		
C17		*Turbidity (Length of tape before disc disappears in metres)*		

D. Waterbody dimensions and features				
D1	*Waterbody WATER width (metres)*			
D2	*Waterbody WATER depth (metres)*			
D3	*Waterbody WATER length (metres)*			
			RIVER TYPE	*BASIN TYPE*

		Bank Orientation on river (i.e north)					*All of the basin*	
			Present	*>33%*	*Present*	*>33%*	*Present*	*>33%*
D4	*Bank profiles*	*Not visible*	?	?	?	?	?	?
D5		*Vertical/undercut*	?	?	?	?	?	?
D6		*Vertical + toe*	?	?	?	?	?	?
D7		*Steep (>45°)*	?	?	?	?	?	?
D8		*Gentle (<45°)*	?	?	?	?	?	?
D9		*Composite*	?	?	?	?	?	?
D10	*Bank features*	*None*	?	?	?	?	?	?
D11		*Not visible*	?	?	?	?	?	?
D12		*Eroding earth bank*	?	?	?	?	?	?
D13		*Stable earth bank*	?	?	?	?	?	?
D14	*Bank vegetation features*	*Unvegetated bank base*	?	?	?	?	?	?
D15		*Vegetated bank base*	?	?	?	?	?	?
EXTRA NOTES								

D. Waterbody dimensions and features continued

PLEASE RECORD THE FOLLOWING AS A PERCENTAGE (%)			*RIVER*				*BASIN*	
		Bank Orientation on river (i.e north)					*All of the basin*	
			Present	*>33%*	*Present*	*>33%*	*Present*	*>33%*
D15	*Bank material*	*Not visible*	?	?	?	?	?	?
D16		*Bedrock*	?	?	?	?	?	?
D17		*Boulder*	?	?	?	?	?	?
D18		*Cobble*	?	?	?	?	?	?
D19		*Gravel/sand*	?	?	?	?	?	?
D20		*Earth*	?	?	?	?	?	?
D21		*Sticky clay*	?	?	?	?	?	?

			Present	*>33%*
D22	*Bottom substrate*	*Not visible*	?	?
D23		*Bedrock*	?	?
D24		*Boulder*	?	?
D25		*Cobble*	?	?
D26		*Gravel/pebble*	?	?
D27		*Sand*	?	?
D28		*Silt/mud*	?	?

D29		*Clay*	?	?
D30		*Peat*	?	?
D31	*Bottom features*	*Not visible*	?	?
D32		*None*	?	?
D33		*Exposed bedrock/boulders*	?	?
D34		*Unvegetated mid-channel sand bar*	?	?
D35		*Vegetated mid-channel bar*	?	?
D36		*Mature island*	?	?
D37		*Areas completely covered in vegetation*	?	?
D38		*Areas completely covered in debris (leaf litter)*	?	?
E. Habitat characterisation				
E1	*Habitat types*	*Forest - Flooded*	?	
E2		*Forest – Non-flooded*	?	
E3		*Savanna – Flooded*	?	
E4		*Savanna – Non-flooded*	?	
E5		*Forest 5 – Mixed forest*	?	
E6		*Forest 6 – Scrub forest*	?	
E7		*Savannah 1 – Lowland (flooded)*	?	
E8		*Savannah 2 – Highland (not flooded)*	?	
E9		*Savannah 3 - Scrub*	?	
E10		*Savannah 4 - Palm*	?	
E11		*Bamboo*	?	
E12		*Wetland 1 - Lana*	?	
E13		*Wetland 2 – Low grassland*	?	

E. Habitat characterisation

E14	*Vegetation structure of the habitat types above*	*No vegetation*	?
E15		*1 layer composed of herbaceous plants & grasses*	?
E16		*1 layer composed of shrubs*	?
E17		*1 layer composed of trees and saplings*	?
E18		*2 layers: one composed of shrubs, the other of trees*	?
E19		*4 layers: one composed of herbaceous plants, one of shrubs, and two layers of trees, with some trees much taller than the others*	?
E20		*2: layers one composed of herbaceous plants, one of trees; no shrubs present*	?

PLEASE RECORD THE FOLLOWING AS A PERCENTAGE (%)			*RIVER*		*BASIN*
		Bank Orientation on river (i.e north)			*All of the basin*
E21	*Extent of trees and associated features*	*Bank*			
E22		*Isolated/scattered*			
E23		*Regularly spaced, single*			
E24		*Occasional clumps*			
E25		*Semi-continuous*			
E26		*Continuous*			
E27		*Shading of waterbody*			
E28		*Overhanging trees*			

E29		*Exposed bankside roots*			
E30		*Underwater tree roots*			
E31		*Fallen trees*			
E32		*Coarse woody debris*			
E33	*Bank vegetation types*	*Bryophytes*			
E34		*Short herbs/creeping grasses*			
E35		*Tall herbs/grasses*			
E36		*Scrub*			
E37		*Climbers*			
E38		*Trees and saplings*			
E39	*Waterbody vegetation types*	*Algae*			
E40		*Floating*			
E41		*Emergent*			
E42		*Submerged*			
E43	*Habitat niches (note that there are more niches on the following page)*	*Otter dens and campsites*	?		
E44		*Sheet rock*	?		
E45		*Floating vegetation – Victoria amazonica*	?		
E46		*Floating vegetation - grass*	?		
E47		*Floating vegetation - nymphaea*	?		
E48		*Floating vegetation - Guavaballi*	?		

E4 9		*Floating vegetation - Maaho*	?

E. Habitat characterisation continued			
E50	*Habitat niches continued*	*Moco moco tree*	?
E51		*Tapir entrances*	?
E52		*Arapipi Palm*	?

F. Land use					
	Land use		*Waterbody*	*50m of banktop*	*Hinterland*
F1		*Fishing - Commercial*	?	?	?
F2		*Fishing - Subsistence*	?	?	?
F3		*Farming – Slash/burn without pesticide*	?	?	?
F4		*Farming – Slash/burn with pesticide*	?	?	?
F5		*Farming - Ranching*	?	?	?
F6		*Farming – Agro-forestry*	?	?	?
F7		*Hunting*	?	?	?
F8		*Trapping*	?	?	?
F9		*Mining - Riverbed*	?	?	?
F10		*Mining - Land*	?	?	?
F11		*Tourism – Sport fishing*	?	?	?
F12		*Tourism - Trekking*	?	?	?
F13		*Tourism - Riding*	?	?	?
F14		*Tourism – Boat trips*	?	?	?
F15		*Tourism - accommodation*	?	?	?
F16		*Settlement*	?	?	?
F17		*Burning*	?	?	?
F18		*Logging - commercial*	?	?	?
F19		*Logging – local construction*	?	?	?

F20	*Transportation - river*	?	?	?
F21	*Transportation - land*	?	?	?
F22	*Cultural significance / practice*	?	?	?
F23	*Scientific research*	?	?	?
F24	*Biodiversity conservation*	?	?	?
F25	*Brick making*	?	?	?
F26	*Gathering - Honey*	?	?	?
F27	*Gathering - Seeds*	?	?	?

F. Land use continued					
	Land use continued		*Waterbody*	*50m of banktop*	*Hinterland*
F28		*Gathering - Plants*	?	?	?
F29		*Gathering - Firewood*	?	?	?
F30		*Gathering – other non-timber forest products*	?	?	?
F31		*Recreation*	?	?	?

G. Species					
	Bird survey	*Time bird survey started*	*06:00*	*12:00*	*16:00*
		Time bird survey finished	*07:00*	*13:00*	*17:00*
		No disturbance at water body			
		Disturbance from people, animals or weather			
	BIRD SPECIES (note that the bird species continue onto the next page)	*Herons*			
		Egrets			
		Ospreys			
		Kingfishers			
		Cormorants			
		Ducks			
		Storks			
		Jacanas			
		Hawks			
		Terns			
		Ibis			
		HERONS			
		Capped Heron Pilherodius pileatus			
		Cocoi Heron Ardea cocoi			
		Tricolored Heron Egretta tricolor			

	Little Blue Heron Egretta caerulea *Striated Heron Butorides striatus* *Green Heron Butorides virescens* *Agami Heron* Agamia agami *Black-crowned Night-Heron* Nycticorax nycticorax *Yellow-crowned Night-Heron* Nyctanassa violacea *Boat-billed Heron Cochlearius cochlearius* *Rufescent Tiger-Heron* Tigrisoma lineatum *Zigzag Heron Zebrilus undulates* *Egrets* *Great Egret* Ardea alba *Snowy Egret Egretta thula*				

G. Species				
BIRD SPECIES continued	*Cattle Egret* Bubulcus ibis			
	OSPREY			
	Osprey Pandion haliaetus			
	KINGFISHERS			
	Belted Kingfisher Ceryle alcyon			
	Ringed Kingfisher Ceryle torquata			
	Amazon Kingfisher Chloroceryle amazona			
	Green Kingfisher Chloroceryle americana			
	Green-and-rufous Kingfisher Chloroceryle inda			
	American Pygmy Kingfisher Chloroceryle aenea			
	CORMORANTS			
	Anhinga Anhinga anhinga			
	Neotropical Cormorant			
	DUCKS			
	Muscovy Duck			
	Black-bellied Whistling Duck			
	White-faced Whistling Duck			
	STORKS			
	Maguri Stork			
	Jabiru Stork			
	HAWKS			
	Black-collared Hawk			
	Common Black Hawk			
	TERNS			
	Least Tern			
	Yellow-bill Tern			
	Black Skimmers			

		Pied Plover *IBIS* *Green Ibis*			
	Caiman	*Time survey started*			
		Species Type	*Length*		

G. Species

	Caiman continued	*Species Type*	*Length*

G. Species continued

	Fish Species	*Species Type*	*Length*

G. Species continued

Giant River Otter	*Dens & Campsites*	*Direct Observations*

Incidental Faunal Observations

Site Selection Activity Output

Using the categories identified in the System Identification Exercise the team identified the following potential monitoring sites.

Basin Dry

Forest – Used

None

Forest – non- used

Ovid's hideout

Savannah – used

Johnson pond.

Near itch pond

Jordon pond (Kwataman)

Pashuwa

Savannah – non-used

Marvin Pond

Riverine wetland

Forest – Used

Inkapati

Garnet

L.C.

Tiger jump

Makarapan

Forest – non- used

Blackwater

Inkapati 2

Waimu

Savannah – used

Devil pond

Yakarinta

Pygmy

Crashwater creek

Savannah – non-used

Oma pond near Yakarinta

Quataman

Crane pond (Karnambo)

Basin - Wet

Forest – Used

Corkwood swamp

Post arinda swamp

Forest – non- used

Bird pond (surama)

Dixie pond

Bird pond (Murai)

Savannah – used

Itch pond (Wowetta)

Seven pond

Two pond near brazil (cajuiro and long pond)

Savannah – non-used

Karanambo area

River

Forest – Used

Taraqua

Simoni

Awormi

Stanley lake

Government camp

Forest – non- used

Burro-burro

Tiger creek

Sand landing

Savannah – used

Pamboro

Wagan

Yakarinta landing

Hunt oil landing

Savannah – non-used

Before pariyshara

Just past Kwaimatta landing

Appendix VI – Project evaluation and graffiti board comments

Project Evaluation and Graffiti Board Comments

First Training Group in Georgetown

Introduction, Information, Values and Resources, Stakeholder Analysis	*Learning the transect walks can also be a very valuable tool for collecting social data and was also very insightful. After all, what is science and conservation and sustainable development, its all about PEOPLE.*
	Definitely interesting, training sessions can sometimes be too much, but the day's activities were all very interesting, with regards to applications to the Darwin Project. Even though we should've asked the questions before designing the project, we're now doing it. Better late than never!
	I think the session was very good. All information were clearly understood, I can now be able to share much more information with the people in my community and most of all I am happy to be learning how to monitor and manage our project better.
Data management and statistical techniques	*Statistical analysis can be a bit too much, and taxing, but it helps to put the pieces of data together that so much time has been spent collecting. Today's exercise was very helpful in that regard. Also trying to think of possible relationships that have been noticed so far, and discussing them allows for persons to add to the way the project should go, and would be the best indicators for the proposed adaptive management plan.*
	Everyone should be involved in data analysis so that we can have a better knowledge about using computer and providing accurate information.
	The days session was very interesting but I think there is too much scientific terms and lots of information to grasp in one day. Definitely I need some one to go over the statistical analysis. May you try to break it down a little. I hope by the end of the training I can be able to understand and explain stats clearly.
	Sorry my eyes wanted to close. I believe there should be some exercises at intervals to have everyone active. Maybe because of the room temperature in the afternoon.
	The day went well until statistical technique came on board. Perhaps doing it on the computer would have been better. Practising would save me. Looking forward to the rest of the days.
	Statistical techniques was very complicated to understand, need more to get through with it. Good teaching.

Introduction to GIS	*Every single thing which is being taught are so much interesting but one thing though. TIME is too limited to think about and grasp. However, it would be best to practice and learn slowly…..I'd wish to be an expert on GIS.*
	Great, its all coming together. There is lots more to be done, decided and changed, but we have the right approach. GIS was also very good, cause I've been doing it, but never fully understood the terms.
General comments	*Working with you all for the past three days has taught me a lot, even though some of the things spoke was very strange to me. I personally feel they are very valuable information for me and for the people of the North Rupununi in order for them to develop and management plan so as to keep our wetlands preserved.*
	It was great to be learning some more. Teachers you have all done a great job. Personally I feel it was a step forward for me in terms of knowledge. Looking forward to learning some more interesting stuff.
	I love being taught but my brain is 11 days young in the year. I am having a fantastic time, I wish I could be a student of you guys.
	The training was fun and very interesting but one thing, there was too much information to learn in three days.
	It was fantastic!!! Thanks for your time Jay, Andrea and Matt.
	I must say the three days of training taught be a lot. I can now go back and explain better to my community what exactly we are doing and what would be doing in the future. Good information and I'm definitely looking forward to seeing you back with more information next year. All the best to you.
	This is great but needs more time to figure out the problems that we encountered over the monitoring period. At least we are going somewhere. Lets go for it!!!!!
	What we are doing now definitely would be very useful to more effectively do the monitoring. Especially when it comes to community level. I'm enjoying the course besides sleepiness.

Second training group in Field Station

Introduction, Information, Values and Resources, Stakeholder	*First session was good, but for one thing. I was or does not have much knowledge of the object of the project.*
	More explanation is needed for 'technical' words. However, everything is going smooth.
	The session was not boring even though we are tired.
	Could someone turn the air-conditioning on? Please. P.S. Just kidding.

Analysis	*The day was a bit hard especially the project evaluation. Other than that everything else went well. I think sessions should be more in detail.*
	It was very interesting and was bit difficult in some areas. Need to explain more in detail for student. Had an idea about evaluation of the sustainable management of Rupununi.
	I'm sure as it goes by I will gather enough info….about it….
	Management plan of evaluation chart was good. It will help me in better planning.
	1. *Evaluating the course time is a bit short.* 2. *Instructor kind and clear.* 3. *The project is now to be on the trainees. The important resource.*
	The few hours of today's session is interesting and new to me. Its learning and exciting to know about the Darwin Initiative project in the North Rupununi. The Questions are challenging. Did not answer all the question but at least I answered a few. It is just a start for I. Enjoyable. Good.
	Looking forward to the bit on dealing with stakeholders.
	Very interesting sessions. Hope the Project evaluations would be discussed in a group setting.
	From first glance of the handouts they seem complicated. Too much 'big' words.
	Andrea – like the passion with which you explain things *Jay – it was a nice ice breaker, getting to know each others names.* *Matt – good overview of session* *Don't worry it can't be good all the time. It's the first day and people always try to make a good impression. It was nice today guys.*
	Jay you were great. Very enjoyable in all the practical presentation. Thank you.
	Good show! Enjoyed it.
	Today was nice. Very interesting. It cause lots of question for a young mind which will be settled with practice but with proper preparation
	It was a good day but still unsure about some of the topics dealt with today.

	Today's session was quite informative and nice. *Good that we have practice.* *There was a lot of work, it would have been good to have more days.* *Need more practice and critical analysis of us doing interviews.*
	A wonderful day! Jay you are a wonderful 'teacher'! A lot have been learnt today.
	Very, very interesting sessions. Well planned and presented.
	The day's result was good and the exercises did help me in various areas of interviewing. Session was not boring!
	OK! Today's session was very good. Let me tell you of some of the things I learn during today's session. 1. *Stakeholders of the project* 2. *Questions e.g. closed, leading etc.* 3. *Interview practice etc.* 4. *Transect walk interview* 5. *Developing a seasonal calendar through interview.* *Also the session was not boring. Doing practical or having doing little games make the course of the day successful.*
	Today was great. I learnt a lot about what was taught. Especially with the seasonal calendar, using two units of measurement. The interview part was also a great part in the training.
Data management and statistical techniques	*Session was great. I was getting sleepy but wash the face and it was back to business. Information was good but just need more time to process and analysis.*
	Stats…..well never did that until yesterday, it was good…..
	Today was very interesting. Sparked interest in stats once again. I liked how you tried to make it very simple for me and the others. With none interesting topics use physical activities so people don't fall asleep or lose interest.
	It was better than I thought it would have been.
	The day was quite good especially when Matt and Andrea was around trying to have everyone's attention.

	On the part of statistical analysis was quite interesting, still a bit confused about this unit of the training. Learnt most and understood what was taught today especially with the measurement scale. Need more time to practice the analysis.
	Today's session was simpler than expected for me. You made an effort to make the mathematics simple. Hopefully everyone else understood since all may not have been exposed to stats.
	Comments on data stats session. *1. Not fully under stand the frequency of observation of a value in system around the means.* *2. Learnt most about graphing in different ways, e.g. column charts, line charts.* *3. Few are not full understand.*
	Today' session is brilliant instructor very helpful – good. I did not learn every single thing that was taught – bad. Need to spend more time studying the whole concept of the project (trying!)
	A very good and enjoyable day! A lot of fun! Learnt a lot and more is expected.
Introduction to GIS	*The GIS session was a bit difficult for me to understand. I have a little understanding of GIS but the details Andrea explained was a bit complicated and may need more time and visual practice session*
	The 3D modelling was good. While the actual constructing would need more time than we have.
	Happy Day. Teaching materials very helpful/useful. 3-D modelling – very interesting. Instructors willing to assist when call upon. Thank you so much.
	GIS session. *Maps: understanding map is not difficult because I have done it before. Source of data. Analysing data through maps – understanding the GIS exercise is very complicated for me to understand. This particular exercise need more time.*
	The sessions on GIS was so complex, a lot to learn about the concept. *Due to time space not much was grasped but have an idea about the lesson.* *The lesion could have been more effective if we had some breathing space. E.g. info were quick and no time to think about, lesson goes on for hrs, class got tired and start to lose concentration. (but great day).*
	I learn a lot from the GIS course and wish to share that knowledge with someone else in the future. It also help me to better understand data collection, storage and error.

	At first I was lost, I had no idea that GIS could be so difficult but as the day goes by it got a little clearer as to what we were doing. But it was great.
	Never really considered the politics in maps so that was pretty useful. Needed more time for some activities. Might be useful to give everyone a chance to see GIS work more on computers. And to do a bit for themselves.
	Mr GIS. Really interesting to know the GIS information in a good tool to do outreach programmes in community (e.g. map of resources).
	The morning section is nice but was not 'interest' to many so it was tedious. It was nice that the physical activity. The afternoon session was much more active and fun for people because of the hands on activity. The attribute table section/session could use a bit more explaining as hands on activity.
	My training was good. I wish you gal and guys all the best.
General comments	*Hi! The few days of training was really, really interesting and the instructors are kind enough and very patient. I gain a lot from the training. I will certainly practice the things I learnt.*
	Really nice week.
	Really interesting week. I ate a lot of chicken and cows and a garden of fresh vegetables.
	In order to understand scope of the exercises it would have been nice to do hands on, on the computer.
	Great week, hope I can remember some things what was taught during the week. And looking forward to practice some of what was taught. Practice can make perfect with determination.
	We are in a sense doing the same thing you pointed out about the training done during the resource mapping activities by give the locals the capacity to do GIS without the facilities to do it in the communities.
	Hey! Guys. Jay, Andrea and Matthew. Very good work. I am really proud of myself to know more interesting stuff like these wetland monitoring. It has a lot to do with conservation of species, GIS and other stuff. P.S. Keep up the hard work. Hoping to sit in more on your class in the future. Good luck. Thank you.