

Institute of Tropical Forest Conservation

Final report to the John D. and Catherine T. MacArthur Foundation on grant 19722

Sustaining and Strengthening Conservation Capacity by Anticipating and Preparing for Change in the Greater Virunga Landscape



Submitted 4 July 2012

Abbreviations

AOP	= Annual Operation Plan (for park management, UWA)
AR	= Albertine Rift
ATBC	= Association of Tropical Biology and Conservation
AWF	= African Wildlife Foundation
BBC	= British Broadcasting Corporation
BINP	= Bwindi Impenetrable National Park
BMCA	= Bwindi and Mgahinga Conservation Area
BMCT	= Bwindi and Mgahinga Conservation Trust
CARE-EEEGL	= Enterprise, Environment and Equity in the Great Lakes Landscape, program of CARE-International
CIFOR	= Center for International Forest Research
CTPH	= Conservation Through Public Health
Defra	= Department of Environment Food and Rural Affairs, UK government
ESPA	= Ecosystem Services for Poverty Alleviation
ETFRN	= European Tropical Forest Research Network
FFI	= Fauna and Flora International, UK
IGCP	= International Gorilla Conservation Program
IIED	= International Institute for Environment and Development, UK
ITFC	= Institute of Tropical Forest Conservation
JRS	= JRS Biodiversity Foundation
MGNP	= Mgahinga Gorilla National Park
MPI-EVAN	= Max Planck Institute for Evolutionary Anthropology
MUBFS	= Makerere University Biological Field Station
MUIENR	= Makerere University Institute of Environment and Natural Resources
MUST	= Mbarara University of Science and Technology
MUZ	= Multiple Use Zone
NERC	= Natural Environment Research Council
PA	= Protected Area
REDD	= Reducing Emissions from Deforestation and [forest] Degradation
RNCEAR	= Regional Network of Conservation Educator and Researchers in the Albertine Region
TBA	= Tropical Biology Association
TEAM	= Tropical Ecological Assessment and Monitoring
UNDP	= United Nations Development Program
USAID	= United States Assistance for International Development
UWA	= Uganda Wildlife Authority
WCS	= Wildlife Conservation Society
WILD West	= Wildlife, Landscapes and Development for Conservation, a USAID sponsored program led by WCS-Uganda

List of Appendices

- Appendix A Conferences, workshops, meetings and trainings attended
- Appendix B Collaborations developed or discussed
- Appendix C Foreign students who were associated with ITFC
- Appendix D Participants to the closing workshop of this grant
- Appendix E Assessment of ITFC's long term monitoring and research programs
- Appendix F ITFC's influences and impacts since 2009
- Appendix G Publications by ITFC staff, students and collaborators since 2008
- Appendix H Discussion groups Closing Workshop 2012
- Appendix I Partners' assessment of ITFC's performance

ITFC's final report on grant 19722

Executive summary

The project "Sustaining and Strengthening Conservation Capacity by Anticipating and Preparing for Change in the Greater Virunga Landscape" has been successful in advancing the knowledge, capacity and preparedness required for long-term conservation in the Greater Virunga Landscape.

The rich and unique natural heritage of the Albertine Rift has made it a focus for the MacArthur Foundation. The Greater Virunga Landscape represents the most significant concentration of globally significant biodiversity within this region. This landscape provides a microcosm of the many challenges facing conservation across the globe. Increasing human populations, escalating demand for agricultural land, mounting pressure on water and natural resources, the spectre of climate change, alien invasive species and a number of other threats all pose potential dangers to conservation outcomes.

Successful long-term conservation outcomes in the Greater Virunga Landscape are far from guaranteed. It will require well informed judgement from those in positions of influence to negotiate these challenges and maintain the region's conservation values. The purpose of this project was to bolster local conservation knowledge, capacity and preparedness.

This 3-year project was led by the Institute of Tropical Forest Conservation (ITFC) and began in January 2009. We organised our activities around four linked goals. We used these as headings to structure our report.

1. Build effective partnerships and alliances to enhance flexible science-based conservation and management in the Albertine Rift.
2. Maintain, evaluate and improve long term monitoring and evaluation to enhance flexible conservation and management in the Albertine Rift.
3. Increase preparedness to recognize, mitigate and adapt to climate change and other emerging challenges in the Albertine Rift.
4. Strengthen capacity and communication for science-based conservation in a changing world.

Effective partnerships and alliances

While maintaining a strong relationship with the Uganda Wildlife Authority (UWA) and other local stakeholders through many joint activities and meetings (Appendix A), the grant has allowed the institute to **maintain and expand its research and partnerships** in Uganda, Rwanda and beyond (see Appendix B).

The three **information sharing workshops** during this grant period have been well attended by key regional stakeholders in conservation, development and capacity building (Appendix D). Discussions about **priorities for conservation management**, in particular of the Bwindi and Mgahinga Conservation Area (BMCA), have guided our research planning and proposal writing for additional funding.

Many new research partnerships have been attempted, and several were or are still being developed. ITFC jointly developed **successful grant proposals** with the Tropical Ecosystem Assessment and Monitoring (TEAM, of Conservation International), the Wildlife Conservation Society (WCS), Fauna and Flora International (FFI), the International Institute for Environment and Development (IIED) and the Bwindi and Mgahinga Conservation Trust (BMCT).

We have increased ITFC's **visibility**, locally, nationally, regionally and internationally. Lessons from the project have been shared via meetings, presentations, publications, our website, our blog, through training seminars and via local and international research and conservation networks. The grant allowed us to employ a communications officer, who overhauled our website www.itfc.org. ITFC also

wrote weekly blogs on www.wildlifedirect.org for a wider conservation interested audience. Web-paged requests have risen from the low-hundreds to over one-thousand per day.

ITFC continues to work for **impacts** in terms of conservation and development benefits (Appendix F) and to share its work with a global community through its website www.itfc.org.

ITFC has been well covered in the local and global media with stories on BBC radio and television, in various papers, including *The Observer* and *National Geographic* and in Uganda's *Monitor*.

A questionnaire survey we carried out among participants of the closing workshop of this grant, showed that two thirds of our partners rate ITFC's performance and collaboration as 'good' and the remainder as 'satisfactory'. Appendix I includes more detailed comments and suggestions.

Long term monitoring and evaluation

ITFC's **long term monitoring activities** were reviewed, with various recommendations for improved effectiveness (Appendix E). These are being taken up by UWA in the development of a new General Management Plan for the Bwindi and Mgahinga Conservation Area, expected to be finalised later in 2012.

ITFC kept monitoring the **impacts of resource offtake** on the forest, and continued and improved the **weather data** collection by UWA. We now have 12 and 25 years respectively of continuous data on these important aspects of BMCA, which were defined as crucial by stakeholders at the start in the late 1990-ies. The review led us to discontinue the **water quality** monitoring as well as the **vegetation** monitoring of the Kyabiranyuma swamp, till further notice. **Fire** monitoring is taken over by UWA. New activities include the TEAM project (in collaboration with UWA) and an increased emphasis on phenology. We have revised guidelines and protocols for the climate data collections to better reflect the constant changes in UWA staff that have plagued these activities.

The **sustainability of monitoring programs** has always been a worry to ITFC: few donors have an interest supporting such activities, as results may not be forthcoming within the time span of most grants. We therefore invested effort in convincing Conservation International, through the Wildlife Conservation Society, to add Bwindi-ITFC to its global network of field sites for monitoring climate change. ITFC and UWA partner in this program called Tropical Ecology Assessment and Monitoring (TEAM). We have just completed three full years of data collection, with **vegetation** monitoring in 6 permanent 1-hectare plots, automatic camera trapping of **animals** with 30 cameras, 30 days in 2 sites and an automatic **climate** station.

Funding from the MacArthur Foundation to WCS for Climate Change studies supported ITFC in starting **monthly systematic phenology monitoring**, as well as establishing permanent **vegetation** monitoring plots at two **high altitude** (>4000m.a.s.l.) locations, the first ones in Africa.

In the course of this grant, ITFC organised 3 Information Sharing workshops, well attended by partner organisations in the Albertine Rift.

At the occasion of the final workshop of this grant, we discussed **monitoring priorities** for the years ahead with conservation managers and partner organisations. Issues topping the agenda appear to be Mountain gorilla behaviour (increasingly foraging outside the park, in community land), the prevention and management of human-wildlife conflict, the pressure for and management of resource use by communities and the assessment and monitoring of the impact of conservation and development interventions on changes in community wellbeing and attitudes. Minutes of these group discussions are added as Appendix H.

Climate change and other emerging challenges

During this grant's period, a total of 12 Masters' and 3 PhD students were supported by ITFC. Thanks to the **scholarship program** made possible by this MacArthur grant, 9 Ugandan Masters' students

received funding for their university fees, stipends and fieldwork expenses and contributed to this grant's success by **piloting studies into emerging conservation challenges** in the Albertine Rift. Research questions were identified through consultation with local conservation managers and various academic experts and included assessments of carbon stocks inside and outside the protected forest, people's migration, human-wildlife conflicts, altitudinal zonation (a proxy for climate change), and invasive species. See a complete list in Appendix F. Four students have received their MSc award so far and 5 are still finalising their theses. Several students have submitted articles for peer reviewed science journals and several more plan to do so. We are proud that two of our first batch of Masters' students are now enrolled in PhD programs, one with the University of Cambridge, UK, and one with the University of Eastern Finland. One more, a project staff member with ITFC since completing his MSc degree with MUST, is in an advanced stage of developing a proposal for a PhD.

Additional funding from USAID, through a joint proposal with WCS-Uganda, allowed us to offer 3 more scholarships to Masters' students. Two investigated the risk of rodents and baboons **transferring diseases across the park-community boundary** and one did an inventory of amphibians in Bwindi and checked the presence of the **chytrid fungus**, deadly to frogs and already causing decline in numbers of species across the globe.

ITFC played an important role in various regional efforts to **model the effects of climate change** on conservation: we assisted the MacArthur funded project on the 'Implications of Global Climate Change for Mountain Gorilla Conservation in the Albertine Rift' (coordinated by the African Wildlife Foundation, International Gorilla Conservation Programme and EcoAdapt), set up **high altitude vegetation plots** in Rwenzori Mountains and Mount Elgon for the MacArthur funded Climate Change project (coordinated by WCS) and also through our participation in the TEAM global **monitoring of climate change impacts**.

Capacity and communication for science-based conservation

Several of our staff received field **training** and gained **experience** (systematic plot establishment and recording, phenology, data analysis etc) in the context of grant activities. Some went for formal training in statistics, camera trapping, science communication, research design, payments for environmental services and proposal writing. In particular, staff attended several courses in East Africa offered by the Tropical Biology Association (TBA). (see Appendix A).

Two separate proposals for funding of **education and dissemination activities** were prepared by the Communications Officer of ITFC (in July 2011 we submitted "Education on Bwindi Impenetrable National Park as a World Heritage Site" to Pro Nature Fund, a Japanese conservation funding mechanism; in December 2011 we submitted a similar proposal "Increasing local pride in and support for conservation of Bwindi Impenetrable National Park" to Sea World & Bush Garden). Neither of these was granted.

The Communication Officer assisted staff in improving presentations of their work, as well as internal and external communication skills.

Additional issues

As might be anticipated in a project of this scale and ambition we confronted and had to overcome a number of challenges and setbacks in accomplishing all the project objectives on time. The main challenges were caused by staff changes at ITFC and among our partner organisations. Notably the Uganda Wildlife Authority has appointed four different Conservation Area Managers and three different research and monitoring wardens over the last 3 years, substantially increasing the efforts needed to ensure effective engagement.

Maintaining monitoring programs remains a significant concern. Establishing long-term monitoring activities without clear sustained funding for such activities remains a concern. Similarly short-term project funding cannot always attract the qualified staff that we might like as the positions lack security.

The MacArthur Foundation permitted ITFC a **no-cost extension** of the grant for four months, to allow us to hold a larger scale closing workshop in March 2012 and round off our activities.

We have written many new proposals in the last four years. Successful applications include two Darwin grants in conjunction with IIED another with FFI and a grant to WCS from DEFRA. Other successes have been the inclusion of Bwindi in the CI-WCS led TEAM project, a small grant from a private donor for developing outreach materials.

ITFC feels it is particularly useful if we can find sustainable sources of support for post graduate students to do their field studies with us.

Summary of achievements, following the work plan

	Completed	Comment
1. Building effective alliances		
1.1 Consultation with local and regional partners, including visits and attendance meetings	Yes	Successful. Appendix A
1.2 Workshops to discuss priorities, share review	Yes	Successful. Appendix A, D, H
1.3 Identify, invite and encourage foreign partners	Yes	Numerous new contacts developed. Many visitors from internationally renowned institutions. Appendix A, B and C
1.4 Develop promotional materials, update website regularly	Yes	Successful. See www.itfc.org and www.bwindiresearchers.wildlifedirect.org
1.5 Invite local & international researchers to develop joint research programmes	Yes	Good progress. ITFC is now engaged with two new international programs and has two Ugandan PhDs with overseas supervision. Several further collaborations (IIED, FFI, WCS, MPI) are in the pipeline. Appendix A, B and C
2. Effective long-term monitoring		
2.1 Maintain ongoing long term monitoring	Yes	Activities revised after review. Appendix E.
2.2 Review monitoring program ITFC & partners	Yes	Completed in 2010. Appendix E
2.3 Organise workshop to discuss the review	Yes	A special session during the 2011 Information Sharing workshop
2.4 Training monitoring staff UWA and ITFC	Yes	See Appendix A, Training section
2.5 Organise 'Lesson sharing, evaluation and response' workshops	Yes	3 well attended workshops were held in the course of the grant period
2.6 Convene final workshop at MUST	Yes	2012 Information Sharing workshop, www.itfc.org/workshop_2012.htm

3. Increase preparedness

3.1 Prioritisation, in consultation with partners	Yes	Through annual workshops as well as informal and formal meetings with partners
3.2 Identify key uncertainties, scenarios, system model	Yes	Overlap with other well funded initiatives in the region – so we chose to collaborate with those and integrate our contributions rather than work separately (i.e. IGCP climate change and WCS climate change).
3.3 Conduct pilot studies	Yes	Fieldwork of 9 studies completed. 4 theses accepted, 5 still being finalised or corrected. (Fieldwork of 4 additional MScs funded through other grants also completed).
3.4 Seek relevant training for ITFC staff	Yes	See Appendix A, Training section.

4. Strengthen capacity and communication

4.1 Identify and invite local & international students	Yes	Competitive scholarships advertised, proposals selected and 9 students recruited
4.2 Develop research plans with students & supervisors	Yes	Done successfully
4.3 Organize final workshop	Yes	2012 Information Sharing workshop, www.itfc.org/workshop2012.htm
4.4. Develop program for outreach activities	Yes	2 proposals submitted for education and dissemination work. One small grant received (Kathy Ruttenburg)
4.5. Assess training needs and opportunities	Yes	Continuous process (some significant needs remain unfulfilled)

Introduction

Global demand for agricultural land is on a collision course with environmental objectives. The world is struggling to feed 9 billion people on a diminishing supply of land, water, nutrients and biodiversity. We already live in an epoch of extinctions unsurpassed since the Cretaceous (Burney and Flannery 2005), driven by human activities that affect global ecological processes to an extent that many advocate name the current epoch as “the Anthropocene” (Crutzen and Stoermer 2000). Undoubtedly, tremendous improvements in quality of life have been achieved, and yet still some 2.7 billion people live on less than 2 USD per day (Chomitz and Buys 2007) , and 2 billion people are malnourished (Bruinsma 2003). Despite global efforts, ambitious targets and massive expenditure, indicators suggest that there are as yet no general and effective solutions for meeting both nature conservation goals and human needs (Barrett 2010; Balmford, Green et al. 2012). The Food and Agricultural Organization estimates a 70% increase in food production is needed to feed a projected population of 9.1 billion people (FAO 2009). Yet agricultural expansion and intensification threatens many environmental goods and services (MEA 2005), which could in turn undermine our efforts to meet future food demands. We already devote nearly as much land to IUCN categories I to IV protected areas as to cultivation (WDPA 2010; Foley, Ramankutty et al. 2011), yet the resource base upon which human development depends continues to decline (Vorosmarty, McIntyre et al. 2010). There are many uncertainties: climate change threatens to reduce crop production in some regions, but perhaps to provide agricultural opportunities elsewhere (Lobell, Schlenker et al. 2011); climate mitigation efforts that focus on REDD, biofuels, reforestation and other land-use practices have largely unknown, but certainly complex, implications for future land use and conservation priorities. The Greater Virunga Landscape presents many of these global challenges in one region.

The Greater Virunga Landscape is part of the Albertine Rift (AR) – one of the most important areas for the conservation of Africa’s biodiversity. It contains more vertebrate species, and more endemic vertebrate species, than any comparable region on the continent (Plumptre et al., 2007a). The natural heritage of the AR has made it a focus for the MacArthur Foundation. Four of eight sites identified as highest priorities in the AR are in the Greater Virunga Landscape.

Due to high human population density, this is a region of special concern, where natural resources and environmental services remain of considerable importance for local communities, and conservation interventions, have considerable costs or indeed benefits to local livelihoods. At the same time various species of global significance are restricted to small areas of natural and modified habitats. Effective long term conservation in such a context poses numerous challenges.

Successful conservation in the Greater Virunga Landscape is never going to be simple. There are major pressures on land and resources. There are already many threats to conservation values and many more lurk in the future. It will require skill, flexibility and informed good judgement from those in positions of power and influence to negotiate these challenges and maintain the regions conservation values in the long term. The purpose of this 3-year project, which the Institute of Tropical Forest Conservation (ITFC) began in January 2009 was to sustain and bolster local conservation capacity. Overall the project has been very successful in achieving its goals.

We organised our activities around four linked goals that we also use to structure this report of outcomes and achievements.

1. Build effective partnerships and alliances to enhance flexible science-based conservation and management in the Albertine Rift.
2. Maintain, evaluate and improve long term monitoring and evaluation to enhance flexible conservation and management in the Albertine Rift.
3. Increase preparedness to recognize, mitigate and adapt to climate change and other emerging challenges in the Albertine Rift.
4. Strengthen capacity and communication for science-based conservation in a changing world.

1. Building effective alliances

The complex and inextricable challenges confronting effective conservation in the Greater Virunga Landscape and the Albertine Rift more generally makes the formulation and implementation of technically sound, long term solutions highly demanding. Collaboration with a wide range of partners, stakeholders and other experts is required to work effectively, to build strong alliances around shared visions for science-based problem solving, and to implement improved conservation practices.

This project provided an opportunity for ITFC to review and renew existing partnerships while seeking out new alliances and collaborations. Such alliances provide multiple benefits: to exchange information and lessons learned, to enhance skills transfer, and to reduce unnecessary redundancy. We also sought closer relationships and exchange of information and ideas with implementers, decision makers and policy makers. These links, and those we developed with local, regional and international centres of expertise and excellence, greatly enhance conservation capacity and sustainability by improving the knowledge that can be drawn upon.

1.1 Consultation with local and regional partners. ITFC has done a concerted effort to expand its network of regional connections. Staff traveled to several research sites and universities in Uganda, Rwanda and Burundi to discuss collaboration (see Appendix A). Many meetings and workshops were attended, and visitors to the station were welcomed and hosted (Appendix A and B). These links have already led to the involvement of ITFC in discussions how to deal with *Sericostachys scandens* in Nyungwe, Rwanda. Also, ITFC is part of the Regional Network of Conservation Educators and Researchers in the Albertine Rift (RNCEAR, also funded by the MacArthur Foundation). Robert Bitariho was selected to chair the collaborative research committee, which is in the process of disbursing small research grants to selected proposals..

Links with Mbarara University of Science and Technology (MUST) and Makerere University have been strengthened, through visits by supervisors of our scholarship students. MUST has committed itself to an **additional financial contribution** of about 15% of our core annual costs, apart from paying the base salaries of 4 of our staff members. Plans are in place to have a **regular stream of interns** from the Medicine School and from the Institute of Computer Sciences, which has started in 2012, and renewed efforts to collaborate with the Faculty of Development Studies have already led to a joint activity and the recruitment of a new project staff from their ranks.

1.2 ITFC has been involved in several **conferences and workshops** that address the goals of this project:

- The Scientific Conference on “Long term changes in the Albertine Rift Region” in Kampala, organized by ARCOS (6-8 January 2009).
- Transboundary Secretariat’s meeting on monitoring and research on “Ongoing monitoring activities, overview of available data and setting priorities for the future” hosted by ITFC (24-26 June 2009).
- Workshop on the “Implications of Global Climate Change for Mountain Gorilla Conservation in the Albertine Rift” in Gisenyi-Rwanda, organised by IGCP/AWF/EcoAdapt (14-18 February 2010).
- The Conference on “Climate Change and Natural Resource use in Eastern Africa: Impacts, adaptations and mitigation” in Nairobi, organised by the Ecological Society for Eastern Africa (ESEA) (19-21 May 2010).

- The European Space Agency meeting on “Proposed satellite mission to assess carbon in the world’s forests (14-17 November 2010).
- The WCS Climate Change project workshop ‘to build consensus on Albertine Rift climate change adaptations’ in Gishoro, Rwanda (22-25 February 2011).

A full list of meetings, workshops and conferences attended by ITFC staff since January 2009 is provided in Appendix A.

1.3 and 1.5 ITFC made considerable efforts to identify, invite and encourage **foreign partners** to work with us. In particular we are happy to mention the following successful joint proposals:

“Integrating *Batwa* cultural values into national parks management in Uganda”, a proposal written with Flora and Fauna International (FFI), the United Organisation for Batwa Development in Uganda (UOBDU) and UWA, submitted to and approved by the **UK’s** Darwin Initiative Grants Call 2012. This project has started in April 2012.

Secondly, together with the International Institute for Environment and Development (IIED), the Advocates Coalition for Development and Environment (ACODE) and the Jane Goodall Institute ITFC developed the project “Research to Policy - Building Capacity for Conservation through Poverty Alleviation” which was granted funding by the Darwin Initiative **UK** and starts in July 2012.

Lastly, for the **UK** government’s ESRC-DFID Poverty Alleviation Call 2011, we joint a project proposal with WCS, University College London and Imperial College London for “Measuring complex outcomes of environment and development interventions”, which was successful and will start in July 2012.

Many others (a concept note on environmental services in the Greater Virunga Landscape to MacArthur Foundation, August 2010; indigenous fire management in Western Uganda to ESPA, January 2011; on conservation education to Pro Natura Funds and Sea World and Bush Gardens, July and December 2011 respectively; and support for long term monitoring to the JRS Biodiversity Foundation) were not successful.

Since 2010, ITFC has been a partner to WCS on a project to investigate impacts of Climate Change in the Albertine Rift, also funded by MacArthur Foundation. ITFC’s role was primarily to supervise the establishment and subsequent sampling of high altitude vegetation plots and to expand its phenology monitoring in Bwindi.

Apart from hosting Ugandan students (see 4.2), ITFC also hosted researchers and visitors from other countries¹, see Appendix B.

ITFC facilitates a long-running research program on the breeding ecology of the Stripe breasted tits (*Paris fasciiventer*, an Albertine Rift endemic bird), led by Dr. Phil Shaw, from the University of St. Andrews, **Scotland**.

Till May 2010, ITFC hosted and facilitated a major bird netting study funded by the Rare Finch Conservation Group, based in **South Africa**. This study focused on the distribution of the Crimson wings, a group of conservation significance (*Cryptospiza spp.*). It also provided unprecedented reference data regarding the status of numerous other bird species within Bwindi. See www.itfc.org/RFCG.htm.

Nature **Uganda** requested ITFC collaborate in a regional bird inventory (Echuya forest, Uganda; Nyungwe forest, Rwanda; and Kibira forest in Burundi). ITFC’s field staff Lawrence Tumugabirwe has participated in this Nature Uganda activity since September 2010.

¹ We emphasise that these projects brought in funds as well as other benefits, and did not bring any costs to the institute.

The questionnaire survey we carried out with participants of a workshop before the start of this grant as well as the closing workshop indicate that our partners value ITFC's work and collaborations: two thirds rate ITFC's performance and collaboration as 'good' and a quarter as 'satisfactory' (see Appendix I).

ITFC has invited Wageningen University, **the Netherlands**, to develop a research project on improved production of climbing beans, a very important crop for local people around our base in Ruhija.

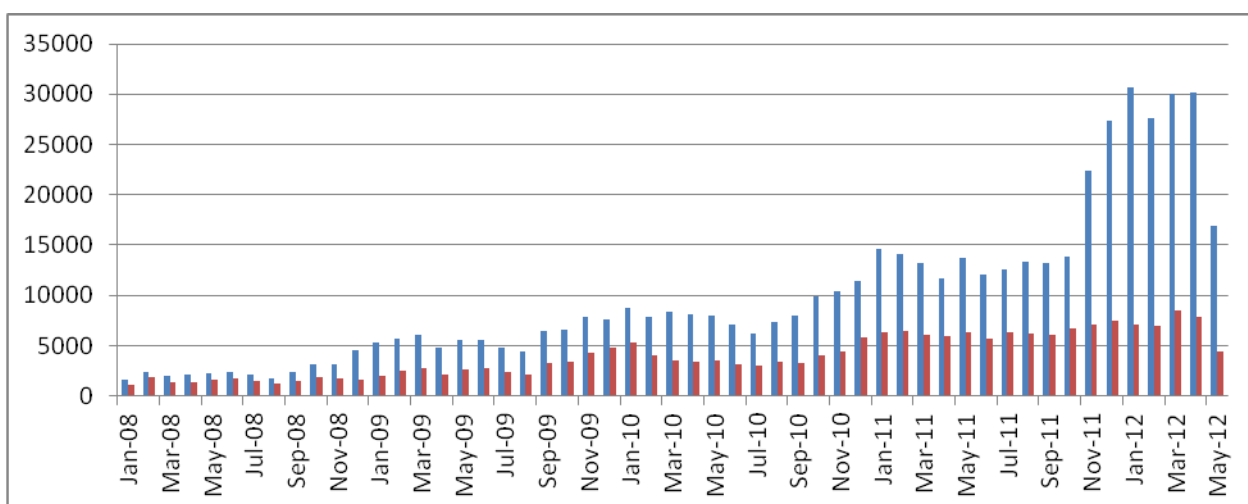
1.4 ITFC's visibility and recognition much improved during the 3 years. Attendance at meetings, presentations, publications, website development, promotional materials and media attention contributed to that. We receive an increasing number of requests for information and interest in further collaborations. Appendix A lists conference, workshops and meetings attended by ITFC staff.

We have increased ITFC's **visibility**, locally, nationally and regionally. The grant allowed us to employ a communications officer, who overhauled our website. On www.itfc.org all information about ITFC's staff, facilities and fees is available as well as about our ongoing and completed programs, including this MacArthur grant. The website's **visitation record increased considerably** (see figure below) and we received many requests for information, collaboration and volunteering. ITFC wrote weekly blogs on www.wildlifedirect.org to give a wider conservation interested audience a flavour of life in a remote research station, challenges and questions.

ITFCs' **website** (www.itfc.org) has played an important role in communicating with a wider audience within and outside of Uganda. We now present 40 summaries of all 60 Master's and PhD theses done from ITFC online and others are still being prepared.

ITFC recruited a **communication officer**. The position derives from the recognition that visibility and reputation of the institute is of crucial importance for creating effective alliances with new partners, for research and impact as well as for fundraising. The communication officer will assist ITFC staff in improving communication about the institute's activities and ensuring that ITFC's impacts and other research results are presented clearly and attractively to the outside world.

The communication officer led a major **make-over of the website**. Over the period of this grant, the trend in visits shows a major increase.



Red = nr of pages visited, Blue = nr of requests

ITFC joined the WildlifeDirect community (see: <http://bwindiresearchers.wildlifedirect.org/>) to promote ITFC and possibly fundraise from the site. Our blogs attract a good number of comments and interest.

Unfortunately a year after we joined, WildlifeDirect withdrew its service as a channel for donations to its blogging organisations.

Media coverage includes:

October 17, 2011 - *ITFC on BBC Science in Action*. Excerpts of interviews with Robert, Miriam, Douglas and a local farmer named Benson have been aired by BBC World Service's Science in Action program.

October 06, 2011 - *New Census for Bwindi Gorillas*. *The Observer*

September 2011 - *Ecological Monitoring at Bwindi Impenetrable National Park to Reveal the Costs of Climatic Change*. ARCOS Newsletter

August 2011 - *Camera-Trap Pictures: Mammals—And a Poacher—Exposed*. National Geographic

August 2011 - *Community structure and diversity of tropical forest mammals: data from a global camera trap network*. Conservation International - Publications

August 2011 - *Camera traps reveal most candid rare moments for mammals*. IB Times

2009 - *Ouganda: les derniers gorilles des montagnes/Berggorillas Ugandas sanfte Riesen*. ARTE television program by Brigitte Maria Berkele.

August-September 2010 - The BBC series "*Mountain Gorilla... a species in intensive care*" was partly filmed in Bwindi, from ITFC. The series was aired in the UK and received much acclaim.

<http://www.bbc.co.uk/programmes/b00tky2t>

2. Effective long-term monitoring

ITFC, in collaboration with partners, has considerable experience in the development and implementation of a broad range of monitoring and assessment activities in the region. These activities need to be reviewed and revised in the light of continuously changing conditions and evidence of effectiveness¹. A number of factors—notably including more novel threats such as climate change—raise new concerns that require additional evaluation and will be considered under component 3 described below. This project provided an opportunity to build on ITFC's experience and ensure readiness for future threats and concerns.

The 3 year grant period started with a conference on 'Long Term Monitoring in the Albertine Rift' (January 2009), organised by ARCOS and funded by MacArthur Foundation. This was a unique chance to meet all partners and be presented with overviews of everyone's data and insights. The conference resulted in a joint publication: Plumptre A.J. (ed), 2012. *The ecological impacts of long term changes in Africa's Rift Valley*. Environmental Science, Engineering and Technology series. Nova Science Publishers, Inc. New York. Former ITFC staff McNeilage and Kasangaki, as well as current staff Bitariho and Sheil contributed to chapters in this publication.

2.1 ITFC has continued its support to UWA to **monitor** resource harvest impact in Bwindi's multiple use zones, gorilla behaviour and ecology (with MPI-EVAN) and climate and has initiated some new activities under TEAM (automated climate including irradiance, vegetation and terrestrial vertebrates). ITFC is also re-starting its road-based monitoring.

¹ For example, a recurring problem has been the high turn-over of UWA staff; a ranger may be trained but is then transferred to a different park. Though such training efforts benefit the capacity of UWA as a whole, it is a problem for maintaining ongoing monitoring activities.

We had three successful years of monitoring for the **global TEAM network** (Tropical Ecological Assessment and Monitoring, run by the American based organisation Conservation International with funding from the Moore Foundation). ITFC monitors forest vegetation (trees and larger lianas) in six 1ha plots and set up a network of camera traps for ground dwelling animals. A fully automatic weather station records climate parameters. UWA works alongside ITFC and co-owns the research. By agreement with TEAM, all data are publically available on the TEAM website www.teamnetwork.org.

ITFC has continued to host the work of the Max Planck Institute for Evolutionary Anthropology (MPI-EVAN), Germany on the behavior and ecology of Bwindi's Mountain gorillas (*Gorilla berengei berengei*). Each year, ITFC hosted a PhD student from MPI as well.

ITFC is an active member of the Research and Monitoring committee of the Greater Virunga Transboundary Secretariat. We hosted the committee meeting at the institute in June 2009. The meeting included protected area managers and researchers from Uganda, DRC and Rwanda and focused on sharing information about ongoing monitoring activities, creating an overview of available data and setting priorities for the future.

2.2 The review of monitoring by ITFC and partners experienced some delays, but was completed late in 2010. That year, a series of meetings were conducted with a wide range of stakeholders. A final summary of conclusions (for wider circulation) is attached as Appendix E. This review has helped to identify a number of additional conservation challenges and research questions that should guide our future work and provide a basis for proposals and projects. Several of these activities are now included in UWA's Annual Operation Plan (AOP), for example fire monitoring, weather data collection, TEAM monitoring protocol. ITFC itself has made attention for socio-economic assessments a priority and fundraised successfully for collaborative projects (see 1.3).

A multi-author chapter of all ongoing monitoring tasks and **observed trends and changes** has been finalized for the WCS led initiative on long term change in the protected areas of the Albertine Rift, also supported by the MacArthur Foundation (see first paragraph of section 2).

ITFC followed up on the findings of the evaluation of UWA's **weather data collection** in the first year of the grant. Faulty or missing equipment was replaced and rangers in all outposts were given a brief training in the use of rain gauges and thermometers. This work needs to be regularly repeated – and the rotation of UWA staff remains a significant obstacle to maintaining good standards.

Robert Bitariho's PhD work focuses on a full technical evaluation of the forest **resource use program** ("Multiple Use Program") carried out for UWA. His PhD will lead towards an improved forest resource management system (monitoring, oversight and decision making) that will be beneficial to park management and the local people involved. Additional funding from WILD West allowed for wider scale investigations, leading to the preparation of guidelines for improved implementation of Resource Use programs.

A full technical evaluation of the **gravity water scheme** in Mgahinga is ongoing. This is in collaboration with IGCP who possess some of the necessary background information. We have decided to reduce the frequency of the site visits due to concern that trampling (during the assessment) is itself having tangible impacts while trends to date have been minor in comparison. Reduced frequency of data collection will lessen costs and thus make the study more sustainable.

A full technical evaluation of **water quality monitoring** was the responsibility of an ITFC staff member who left the institute and started a new job. Despite many reminders, he has still not delivered the promised output. However, we believe he has the intention to complete the assignment and publish a paper out of it. A key question remains whether the intensity of sampling and the costs can be justified in terms of the benefits and safeguards provided. Based on our review this work is likely to be significantly modified. We are keen to explore options for having UWA implement some of the basic procedures themselves (as ITFC has helped implement in the Rwenzori). UWA have already identified some sites of particular concern for monitoring (near Buhoma) and have requested ITFC's help in this.

Recommended changes to the plant **phenology** work (led by MPI-EVAN, but performed by ITFC and focusing on gorilla food plants) have been implemented. ITFC is expanding the scope of the phenology work under the WCS led Climate Change project, funded by the MacArthur Foundation. A full year of data collection was completed in April 2012 and is being analysed. The combined funds of the WCS Climate Change grant and this MacArthur grant will allow ITFC to continue the phenology monitoring till the end of 2013.

ITFC established **permanent vegetation plots at high altitude**, in conjunction with the Global Research Initiative in Alpine Environments (GLORIA). This is a network of researchers around the globe who have developed a standardized methodology to evaluate and monitor the impacts of climate change on biodiversity, focusing on mountain areas as indicators for the wider biodiversity and human community. The initiative (www.gloria.ac.at) started in 2001, and over the 10 years since then had established more than 80 target regions around the globe in all continents except Africa.

Training for monitoring skills has been provided to UWA, for weather data recording, GPS use, plot establishment (TEAM and GLORIA) and for gorilla identification and behavioural observation. Our own staff has benefited from the training and experience with both TEAM and GLORIA activities as well as systematic phenology observations.

In September 2012, ITFC will host a one-week workshop in which East and Central African research sites will gather to analyse and compare results from long term phenology data. This workshop is part of the Climate Change project headed by WCS and financed by the MacArthur Foundation.

2.3 and 2.5 Over the life time of the grant, ITFC held three annual **Information Sharing Workshops** in collaboration with UWA. Participants numbered between 35 and 65 and consisted of conservation area managers, students, supervisors, stakeholders and Conservation & Development partners. The workshops were usually two-day events, and combined presentations of research and ongoing project work, and discussions around themes.

17-18 November 2008, held at the Jopfan hotel Kabale. Information sharing Workshop to finalize the 2005-2008 MacArthur grant. We presented and discussed achievements, checked ITFC's visibility and collaboration through a questionnaire and had discussion groups set priorities for research. http://www.itfc.org/Workshop_Nov08.htm

22-24 February 2010, held at UWA's Lake Mburo Education Centre, Mbarara. 'Measuring Conservation effectiveness' http://www.itfc.org/Workshop_Feb10.htm.

13-14 April 2011, held at ITFC's Conservation Education Centre, Ruhija. 'Emerging issues and challenges of natural resource management in Albertine Rift protected areas'. The focus of this smaller scale workshop was on student projects. Two separate workgroup sessions were devoted to discussing the preliminary guidelines from respective research into the uptake of human-wildlife conflict interventions and the management of resource use access in protected areas. http://www.itfc.org/Workshop2011/Workshop_April11.htm

14-15 March 2012, held at Acacia hotel, Mbarara. 'Key needs, unknowns and research impacts in the Greater Virunga Landscape: are we prepared for change?' This was the final workshop of the MacArthur Foundation grant. We discussed achievements, as well as priorities for monitoring and research in the years ahead. http://www.itfc.org/workshop_2012/Workshop_2012.htm

Priority setting exercises during each of these workshops have guided ITFC in setting its agenda of conservation oriented research. The following fields for research and monitoring have featured highly:

- Assessing the impact of conservation & development interventions on community wellbeing and attitudes. Evaluate success of community support programs by UWA and projects alike
- Monitoring the effects of climate change on biodiversity (also carbon sequestration – REDD)

- Improving the uptake and sustainability of interventions to reduce human-wildlife conflict
- Understanding and responding to the risk of disease transfer from humans/livestock to wildlife
- Understanding and managing the increased out-of-park movements by Mountain gorillas
- Tackling invasive species in protected areas

All these topics have been explored by MSc projects, targeted studies or other activities during the project period. In all cases more attention is (and will be) required. Within the project period several of these concerns have been developed into new proposals.

3. Increase preparedness

Even if effective landscape conservation could be confidently assured in the short-term, a range of emerging challenges loom on the horizon. Prior to this project, abilities to characterize and address these challenges were limited. ITFC, through this project, has taken concrete steps to confront this challenge. Due to the scale of the numerous challenges, and the many unknowns involved, additional expertise will be needed and capacity building remains a major work in progress. Much also has been gained by building stronger regional and international links and networks to ensure that the best knowledge is available to address problems and to build local capacity (see also section 1).

3.1 Prioritization of threats, concerns and unknowns has already been developed in conjunction with UWA and other partners. These have been used by UWA to develop their Annual Operation Plan: improved weather data collection, removal of exotics, and the subsequent monitoring of regeneration, the implementation of integrated resource use programs and promotion of alternatives, the planting of Mauritius thorn hedges to keep crop raiding animals out of fields (and subsequent monitoring of success/failure), disease surveillance particularly of gorillas, and GPS training for rangers.

3.2 Identify key uncertainties; our 2008 workshop pre-empted this question by producing a draft list of important uncertainties (see for complete list the first annual report of this grant by ITFC).

- Population increase and poverty
- Acceptance of the PAs by the local communities - socio-economic aspects need to be integrated in to monitoring systems
- How to control crop-raiding animals - Buffer zone creation (conflicts)
- Effects of global warming (climate change). Need to assess indicators species that are sensitive to habitat change. Opportunities for carbon marketing, Payment for Environmental Services ?
- Region's instability, political climate

In the longer term:

- Viability of isolated character /fragmentation of PAs
- Development and conservation, governance issues, corruption
- Effect of urbanization
- Sustained democratic support and funding for conservation

A number of other meetings (e.g. the IGCP/AWF/EcoAdapt workshop on Climate Change and Gorillas Conservation, see Appendix A) have highlighted closely related questions. Our subsequent activities and proposals have addressed several of these (e.g. improved understanding of potential disease transmission pathways) others are part of proposals (e.g. the origins of rainfall [a baseline] and the influence or local and regional land-use).

3.3 A number of significant **pilot activities** have been started (various others are planned). Nine Masters' projects have been supported under this grant and are underway. All can be considered relevant pilot projects.

A Swedish lichen researcher, Andreas Frisch, was invited to Bwindi to establish a baseline of the lichen flora: "Distribution and Ecology of epiphytic lichens in Bwindi Impenetrable National Park, Uganda". Fieldwork was carried out in May 2011. Identification of species will need considerable time for completion. So far, 240 species could be identified in the collected material, of which 99 were (tentatively) named. Of these four species are new to science and will be formally described, 33 species, mostly crustose microlichens, are first reported for Uganda and one species (*Coenogonium lepriurii*) appears to be new to Africa. With the exception of *Everniopsis trulla* and *Ramalina hoeneliana*, all species are reported for the first time from Bwindi Impenetrable forest.

Two PhD projects are being hosted by ITFC. Robert Bitariho is assessing sustainable resource use and the value of Bwindi's MUZ schemes while Dennis Babaasa is looking at the nature of gorilla habitat across the protected area. Two more are associated with the institute these are Peter Alele, with a scholarship from Xishuangbanna Tropical Botanical Garden Graduate School of the Chinese Academy of Sciences – he is supervised by Douglas Sheil and will conduct some of his study in Bwindi – the work will help clarify how land-cover change influences the soil biota and the services that these provide. Another PhD student who has regularly visited ITFC is Marieke Sassen from Wageningen University (**the Netherlands**), she works on Mt Elgon National Park and is completing her thesis in 2012 – her work focuses on local communities and their implications for conservation practices, the study has many similarities with that of Robert Bitariho and she is also supervised by Douglas Sheil.

TEAM supported monitoring (see 2.1) provide a basis for a range of future research activities. We are securing another year of funding for this through the Moore Foundation.

A report on opportunities and concerns, and associated research needs, related to REDD+ in SW Uganda was completed in early 2011 and shared via the Uganda REDD list-serve.

An ongoing World-Bank supported "Readiness for REDD" process asked ITFC to help in its regional consultation process.

3.4 see 4.5.

4. Strengthen capacity and communication

Managers of protected areas, researchers and concerned stakeholders, need to be ready to recognize challenges, to assess and prioritize them and to respond with appropriate mitigation and adaptation measures. This requires broad monitoring, flexible management, strong technical capacity, good communication and effective partnerships to guide responses in the region. Building such capacity is ambitious, but is essential to long term protection of the immediate gains already won by the MacArthur Foundation's projects, and by others in the region. Though significant advances have been made, local institutions currently appear to lack trained postgraduates with strong field experience and abilities required to improve conservation in the region, a problem we have begun to address through this project.

Many of the long term threats and their impacts remain unclear, even to international experts. There is thus a major international research effort to characterize and understand processes of global and regional environmental change. Conservation in the AR benefits by being engaged with these efforts and we already see evidence of this. Through this project capacity and understanding have been improved. We are now better equipped to confront the emerging challenges in the region.

4.1 and 4.2 By the closure of this grant, 9 **MSc students** had received MacArthur supported scholarships for their fieldwork year. 5 have completed and 4 are still completing the write-up of their theses. During two rounds of scholarship applications, we received a total of 32 applications. We gave them suggestions for improvements to their proposals, and invited them to ITFC to get input from our staff to make changes.

Student and initial project title	Justification for MacArthur funds
Fredrick Ssali (MUST, Biology): "The impact of elephants on trees in Bwindi Impenetrable National Park, south western Uganda".	Changes in the abundance and feeding behaviour of these animals are considered fundamental to the vegetation conditions within the park. What are these relationships and what is the long-term outlook with or without these animals?
Ronald Twongyirwe (Makerere, MUIENR): "Impact of land use change on carbon stocks, total nitrogen and fluxes in adjacent land use types around Bwindi Impenetrable Forest in South Western Uganda".	Much effort has been expended on studying the proportion of carbon stocks in above ground biomass. Much less is known of soil carbon stocks that are often several times greater than the above ground biomass. This study intends to provide some basic figures on these parameters in relation to land-use history and location.
Lilian Twanza (Makerere, MUIENR): "The conservation value of matrix habitats around Bwindi Impenetrable National Park using bird species as indicators".	This study will examine the conservation value of remaining forest cover that lies outside the National Park. Such sites are increasingly scarce in the landscape but could be promoted by suitable policy and incentives.
Moses Oluka (Makerere, MUIENR): "Understanding the process of emigration and land abandonment in and around Bwindi Impenetrable National park. The longer-term trends and implications".	While most conservation concern has focused on immigration and increasing population densities a range of population changing processes are actually taking place around Bwindi – but these remain poorly understood. This study aim to characterise the nature of these population processes.
Geoffrey Malinga (Makerere, MUIENR): "Causes and implications of altitudinal zonation on bird species, a case of Bwindi Impenetrable National Park".	As the landscape becomes warmer over the next century we might predict that species limited to the highest altitude areas of the forest will be increasingly reduced in habitat extent. But the details of these scenarios must be informed by better knowledge of how species are distributed by altitude and what factors determine the lower-altitude range limit.
David Kissa (Makerere, MUIENR, an NFA staff): "Abundance, distribution and utilisation of <i>Myrianthus holstii</i> , in Bwindi Impenetrable National Park".	<i>Myrianthus holstii</i> , is a species that produces fruit which is in demand by local people – but due to its value for animals (including gorilla and chimpanzees) collection by people is currently prohibited. High levels of illegal harvest occur in some areas – though it is far from clear if this poses a genuine concern. This study will provide a better characterisation of the status and ecology of the species. This will help inform future decisions regarding this species.
Baguma Brian James (Makerere, MUIENR): "The impact of invasive alien plant species in Semuliki NP"	<i>Semuliki National Park</i> is infested with a number of non-native plant species. In discussions with UWA the assessment of the threat posed by these plants and the identification of management responses was identified as a key concern. This project has clarified which species seem able to invade and persist in intact rain forests and those that will decline as disturbed forest areas recover.
Emilly Kamusiime (Makerere, Forestry and Nature Conservation, an NFA	We know very little about the canopy parasitic plants in Bwindi. These plants constitute 1-3% of plant diversity and are involved in a

staff): “An investigation of the distribution and impact of parasitic plants in the forest canopy of Bwindi”	broad range of ecological interactions making them potential indicators for the forests ecological status and functioning. This study has provided the first comprehensive characterisation of these parasitic plants in the region.
Odoi Juventine Boaz (Makerere, Forestry and Nature Conservation, an NFA staff in charge of Masindi District): “Assessment of forest trees resilience in elephant prone areas; a case of Rabongo forest patch- Murchison Falls National Park- Uganda”	This study involves the re-measurement of monitoring plots that will now provide two decades of forest dynamics and change. Such long-term studies remain few. The analyses of these data are essential to understand the processes of forest dynamics and to clarify the role of elephant population change and other factors in habitat change.

Fredrick Ssali was the first student to complete and submit his thesis and had his successful viva exam in December 2010. He is employed at ITFC since early 2011.

Ronald Twongyirwe has invested in publications about his study (one has been accepted by the journal *Geoderma*) and is now preparing for a DPhil degree in Cambridge.

Geoffrey Malinga has embarked on a PhD titled “Enhancing biodiversity recovery in tropical rainforests after anthropogenic disturbances” with the Finnish Academy of sciences, registered at the University of Eastern Finland.

David Kissa published a paper about his MSc study in the journal *Forest Ecology and Management*.

ITFC gained a subgrant under the WCS - WILDWest project, funded by USAID. It started in early 2010 and includes additional support to MSc students, for studies assessing the disease threat to endangered primates from rodents and baboons that move back and forth across the forest boundary, the status of Bwindi’s restricted range amphibians, the threats they face and the prevalence of amphibian pathogens.

- Mawanda Patrick (Zoology - Makerere): The role of rodents as potential carriers of parasites across Bwindi Impenetrable National Park boundary.
- Agaba Hillary Kumanya (Parasitology and Microbiology, Faculty of Veterinary Medicine - Makerere): Assessing the Role of Baboons as Potential Carriers of Pathogens around Bwindi Impenetrable National Park
- Sekisambu Robert Sengooba (MUIENR - Makerere): Diversity and distribution of amphibians in and around Bwindi Impenetrable National Park and potential threats to their conservation.

PhD students

- ITFC’s research officer Robert Bitariho is progressing with his PhD programme which involves a comprehensive review and analysis of impact of Bwindi’s multiple use program. Provisional title is ‘Implications of plant resource utilisation in an Afromontane forest. Bwindi Impenetrable National Park, SW Uganda’
- Meanwhile, former ITFC staff Dennis Babaasa has returned from the US (University of Massachusetts) where he did a first year of taught courses for a PhD. He is currently seeking funding for his proposed study to map habitat types of Bwindi Impenetrable National Park, as an affiliated researcher with ITFC.

- Douglas Sheil supervises one PhD student from Wageningen University (the Netherlands) Marieke Sassen, who works on Mt Elgon National Park and is completing her thesis in 2012.
- Peter Alele, with a scholarship from Xishuangbanna Tropical Botanical Garden Graduate School of the Chinese Academy of Sciences is supervised by Douglas Sheil and will conduct some of his wider study of the Nile Basin in BINP.
- ITFC discussed ideas with Gerald Kairu, now working with the Environmental Conservation Trust of Uganda (ECOTRUST) for a PhD project on environmental services in a landscape context.
- ITFC hosted three PhD students of Max Planck Institute for Evolutionary Anthropology, working on various aspects of Mountain Gorilla ecology and behavior: in 2009, Daniela Hedwig studied “Socioecology of vocal communication”; since August 2010 Edward Wright worked on “Feeding ecology”; and in April 2012 Nicole Seiler embarked on a study of “Socio-ecological influences on spatial and temporal patterns of habitat utilization”. In addition, postdoc Dr. Damien Caillaud, studied the “Influence of habitat characteristics on population dynamics” during several months in 2009.

Additional research plans are being developed with regional partners, through new contacts gained from attending regional meetings: with Dr. Paul Scholte, now heading the Kitabi College of Conservation and Environmental Management in Rwanda, discussions are ongoing about studying regeneration of encroached forest edges in Rwanda’s Virunga Park.

The institute hosted a number of Ugandan graduates as **interns or volunteers**. This is valuable for the volunteers and helpful to ITFC:

- Elias Tushabomwe spent his internship for the Nkumba university- School of Hospitality and Environment Sciences at ITFC, gathering information and developing stories about the plants in our ethnobotanical garden, 2009.
- Emily Turinawe (BA graduate in Environment and Disaster Management from Bishop Barham Christian University Kabale) helped with data entry of several programs and assisted with computer training, 2009-2010. She is now employed at ITFC by MPI-EVAN.
- Leah Wangui Gichohi, a Kenyan botanist trained at Moi University, helped update the taxonomy used in the ITFC herbarium to make it compatible with the recent literature, second half of 2009.
- Christopher Ngabirano (on a BA programme with the Bishop Barham University, Kabale) worked as an intern on environmental education of local schools, 2010.
- Peter Ssekiranda (BSc Forestry graduate from Makerere) joined ITFC in June 2010 as a volunteer, to assist with TEAM fieldwork. He stayed on for a full year.
- Joseph Ngubwagye Mukasa (BSc graduate Makerere Wildlife Health Management) arrived in August 2010 to support the MUZ program. He also helped with a survey of bamboo harvesting in MGNP.
- Moses Akantorana (BA Environmental Management, Geography Department Makerere University) assisted in the community surveys on human-wildlife conflict mitigation (WILD West project) during 2010-2011. He is now employed as a research assistant by Max Planck Institute.
- Saada Namugeiwa (BA graduate in Environment and Disaster Management from Bishop Barham Christian University Kabale) also joined the WILD west project in 2010 and was tasked with interviewing the women in the communities being surveyed regarding the success and failure of human-wildlife conflict interventions.
- Donah Ndinawe (BA graduate Social Sciences Makerere University) worked as a volunteer for six months from September 21, 2011 to March 21, 2012. She actively participated in the study to explore the perceptions of Batwa regarding Bwindi’s conservation values, took part in the

organisation of the 2012 UWA-ITFC information sharing workshop, helped enter research data and recorded data during forest-based fieldwork

- Diane Mukundwa (BSc graduate from National University Rwanda) volunteered at ITFC for nine months, starting July 2011. She assisted Bitariho with the resource use monitoring program.
- Xiana Fab, a volunteer from **Spain**, came to work at ITFC for 10 weeks (October-December 2011). She relabeled the herbarium specimen, needed because of extensive taxonomy changes and created a digital data base for all specimen in the herbarium.

4.4 Final workshop: this activity was moved forward to 14-15 March 2012. The title was *'Key needs, unknowns and research impacts in the Greater Virunga Landscape: are we prepared for change?'* We presented and discussed achievements, gave stakeholders a chance to present their work and organised workgroup sessions to discuss management challenges set by UWA. A focus for our attention was the development of the new General Management Plan (2012-2022) for the Bwindi Mghinga Conservation Area (BMCA). We also asked ourselves what are the capacity needs to address the challenges that conservation is likely to confront over the next decades.

http://www.itfc.org/workshop_2012/Workshop_2012.htm

4.5 We continue to evaluate **training needs** and seek ways to address these. The needs identified in 2010 were refresher training for field equipment used by field assistants. These have been held in between field campaigns; more experienced field staff trained the newer staff. More training is planned for 2011, in conjunction with ranger training.

Robert Bitariho and Miriam van Heist attended a one week practical training course on ArcGIS organized by the WCS-Uganda office (Kampala 15-22 January 2010).

Three ITFC staff were trained in financial accounting software in October 2010.

Badru Mugerwa attended a 5 day training in camera trapping in the Mpala Research station in Nanyuki, Kenya, April 2010. He also attended the TBA course held at MUBFS in Kibale Forest National Park in August 2010, where he obtained training in tropical research design and reporting.

Challenges, advisory activities and funding

Challenges

As might be anticipated in a project of this scale and ambition we confronted and had to overcome a number of challenges and setbacks in accomplishing all our objectives. The main challenges were caused by staff changes at ITFC and among our partner organisations. Notably the Uganda Wildlife Authority has appointed four different Conservation Area Managers and three different research and monitoring wardens over the last 3 years. This turnover of senior UWA staff has also added to the complexity of ITFC's liaison and advisory role with UWA. Familiarization, briefing and communication have been major activities though we believe we have been successful in maintaining good relations and engagement.

We had some difficulty filling staff positions at ITFC, which led to delays in 2010. However, by 2011 two additional staff had been recruited to support the institute's activities.

Some of our scholarship students have not yet submitted their theses for examination. This is not exceptional – we now recognise that our expectations that all these theses studies would be completed and examined in a three year project were unrealistic. Many Ugandan postgraduate students must combine work and studies and face a challenge to complete. ITFC has encouraged all the students and

invited them back to the station for focused and supervised time to work on their analysis and writing – seven have taken seven have taken advantage of these invitations.

The review of the monitoring program was contracted out to a prospective new recruit to ITFC's staff but the draft report was delayed and ultimately found unsatisfactory. The summary table in Appendix E was produced based on critical evaluation through ITFC's annual workshops and consultation with UWA and other partners.

The analysis and evaluation of the water quality monitoring data was the responsibility of an ITFC staff member Aventino Kasangaki who left the institute and started a new job first with MUST and then moved again to ARCOS. Despite delays he promises he will complete the assignment within the next 3 months.

The improved visibility of ITFC via its website and blogs has brought in a higher load of queries and requests. Inevitably not all this attention is well intentioned. In recent weeks our web site has suffered repeated malicious attacks leading to it being blocked for considerable periods.

The institute faces a number of chronic problems. Sustained funding is an obvious one. While we have been successful in gaining increased support from MUST and in bringing in new projects there is still significant insecurity in the longer-term. This insecurity impacts ITFC in various ways, two obvious examples relate to monitoring and staffing. Establishing long-term monitoring activities without clear sustained funding for such activities is a high risk enterprise. Similarly short-term project funding cannot always attract the qualified staff that we might like as the positions lack security and ITFC cannot compete with salary and benefits offered in the NGO sector.

Advisory services

Answering conservation questions: the case of bamboo harvesting in Mgahinga

UWA requested help from ITFC regarding conflicting demands on bamboo in the Mgahinga Gorilla National Park. ITFC was able to conduct research and answer the query within 2 months. Here we offer a brief summary:

Bamboo is highly valued resource for local people who were excluded when the Mgahinga Gorilla National Park was gazetted. Requests for access continue and if granted would improve UWA-community relations. At the same time young bamboo shoots provide a key food resource for species of conservation significance including Mountain gorillas (*Gorilla beringei beringei*) and African golden monkeys (*Cercopithecus mitis kandti*). Park authorities are uncertain how to balance these competing demands and recently allowed a controlled trial in which local people were allowed to cut and remove older "dry" stems from one area of the park.

ITFC worked with UWA rangers to examine the bamboo population in the trial area and ask whether harvesting of dry bamboo stems (culms) has had any impacts (positive or negative) on bamboo regeneration. 540 variable area plots were established in and around an area where controlled harvesting of dry stems had been allowed 12 months previously. In each plot stem, cut stems and young spouts were assessed and measured.

Key results: 471 of the 540 plots contained bamboo. 9420 stems (including cut stems) were recorded along with 1981 sprouts. Mean stem densities were 3.96 stems and 0.68 sprouts m⁻². Both stem densities and mean diameters are lower under or near to tree cover when compared to areas of pure bamboo. Densities of young stems and recent sprouts are linearly related to the densities of older stems. Diameters of young stems are positively correlated with size of older stems (even in tree free areas) but younger stems tend to be larger than older stems. Various analyses confirm that cutting of dry stems has had no detectable impact on either the density or stem diameter of younger stems. If cutting has any effect on young stem density it is estimated to contribute only a minor amount in comparison to natural local scale variation.

Conclusions: Densities of young stems are determined by the extent of the underground rhizome. While tree shade detectably reduces stem densities and stem sizes, local stem crowding does not. Cutting of dry bamboo stems has little immediate impact on the density or size of younger stems. Nonetheless as harvesting involves nutrient losses if controlled cutting is allowed, longer term impacts may occur and should be monitored. UWA wants ITFC to help them set up harvesting schemes and monitoring.

In addition, ITFC staff have been involved in a number of other advisory tasks:

- R. Bitariho has continued his advisory work with the CARE-EEEGGL project and UWA to help develop a simple monitoring tool to be used by local people around BINP in support of sustainable plant harvesting
- The Director (who is paid only half time to work at ITFC) also undertook tasks for CIFOR, UNDP and the World Bank. He also published a number of significant scientific publications that have gained interest for ITFC. He currently supervises three PhD students (one from MUST, one [a Ugandan] from Xishuangbanna Tropical Botanical Garden Graduate School of the Chinese Academy of Sciences, and one from Wageningen in the Netherlands) and four MSc students (one from MUST and three from Makerere).
- The Deputy Director is on the board and two committees of the Bwindi and Mgahinga Conservation Trust (BMCT) and advised on the development of a new 10 year development plan, a review of the Trust Deed and an assessment of impact of Trust interventions.
- Robert Bitariho represents ITFC on the Local Community Representative Committee of BMCT.
- Douglas Sheil plays a resource person role in the Ugandan REDD preparedness group and regularly shares useful publications and technical information with the group.
- ITFC regularly shares reports and publications relating to conservation in the region among local managers and stakeholders. These are often appreciated and lead to significant discussions.
- Douglas Sheil and Robert Bitariho have played an advisory role to the transboundary core secretariat. In 2010 this included the review of draft reports (e.g. the transboundary fire plan).
- Since early 2012, Robert Bitariho has represented ITFC on the team that is developing a new 10 year General Management Plan for BMCA.
- Guidelines for the more effective implementation of problem animal interventions (produced in the context of the WILD West project) were finalised and widely shared via IIED PCLG network list-serve.
- Guidelines for the more effective implementation of resource access agreements in National Park (produced in the context of the WILD West project) were discussed with many key stakeholders already, and are being finalized for wider sharing.
- Pilot activities will explore local perceptions of forests and conservation in the region (what matters to who, how much and why -- including heritage and cultural contexts along with environmental services). This can help guide REDD activities and other conservation developments.

Funding

In addition to MacArthur funding and WCS support for the director position, 2010 saw the start of activities under the WILDWest project, a subgrant with WCS Uganda and financed by USAID. Akampulira Emmanuel was employed to coordinate the project.

ITFC also had a subgrant with WCS for its Climate Change project, funded by the MacArthur Foundation.

Despite reassurance that TEAM would provide ITFC with 'sustained funding' for participation in this program, we were told in the middle of 2010 that funding was no longer guaranteed. WCS is making up the difference for 2010-2011, but we are unsure what the next financial year will bring.

Mbarara University offered core funding to ITFC, to the amount of 15,000 USD for the academic year 2010-2011.

The MPI-EVAN pays for ITFC's management of the Mountain Gorilla research. In 2010, a field vehicle was donated as well.

Several bird survey activities were carried out by ITFC staff and paid for (Stripe Breasted Tits project, Rare Finch Conservation Group and Nature Uganda).

Bitariho assisted CARE-EEGL in developing a Terms of Reference for a consulting contract to design and introduce participatory monitoring of resource offtake.

ITFC has kept up its efforts to economize its operations, to be cost covering for services to others. Seeking new funding will be a major focus for 2011.

New funding already secured from **UK**'s Darwin Initiative: "Integrating *Batwa* cultural values into national parks management in Uganda". The proposal was written with Flora and Fauna International (FFI), the United Organisation for Batwa Development in Uganda (UOBDU) and UWA. The project has started in April 2012.

Secondly, together with the International Institute for Environment and Development (IIED), the Advocates Coalition for Development and Environment (ACODE) and the Jane Goodall Institute ITFC developed the project "Research to Policy - Building Capacity for Conservation through Poverty Alleviation" which was granted funding by the Darwin Initiative **UK** and starts in July 2012.

Lastly, for the **UK** government's ESRC-DFID Poverty Alleviation Call 2011, we joint a project proposal with WCS, University College London and Imperial College London for "Measuring complex outcomes of environment and development interventions", which was successful and will start in July 2012.

Financial overview

Item	Received from MacArthur	Spent in Year 1	Spent in Year 2	Spent in Year 3+ext	Total spent
Staff costs	\$163,000	\$54,664	\$45,056	\$64,494	\$164,215
Capital costs	\$40,000	\$26,316	\$13,037	\$749	\$40,102
Recurrent project operating costs	\$48,500	\$13,041	\$15,981	\$20,964	\$49,986
Field work costs	\$33,500	\$10,463	\$12,014	\$11,946	\$34,423
Pilot studies	\$40,000	\$11,670	\$6,924	\$20,984	\$39,579
Workshops/meetings	\$25,000	\$0	\$6,157	\$15,348	\$21,505
TOTAL	\$350,000	\$116,154	\$99,170	\$134,486	\$349,810

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Appendix A

Conferences, workshops, meetings and training attended**Conferences attended**

- Four ITFC staff (Robert Bitariho, Aventino Kasangaki, Douglas Sheil and Miriam van Heist) attended the Scientific Conference on “Long term changes in the Albertine Rift Region” organized by ARCOS with support from the MacArthur Foundation (6-8 January 2009).
- Five staff and volunteers of ITFC attended the Ecological Society of East Africa conference, organised by MUIENR at Makerere University, Kampala (16-18 June 2009). Both Robert Bitariho and Aventino Kasangaki gave presentations on their ongoing work.
- Miriam van Heist attended the large gathering of International experts at the conference on Great Ape Health, organised by Max Planck Institute in Entebbe (21-24 August 2009). She made many new contacts.
- Badru Mugerwa attended the Ecological Society for Eastern Africa (ESEA) Conference (19-21 May 2010). The Theme was: Climate Change and Natural Resource use in Eastern Africa: Impacts, adaptations and mitigation at Multi Media University Conference Center–Nairobi, Kenya.
- Douglas Sheil attended the Association for Tropical Biology & Conservation conference in Sanur, Bali Indonesia (19-24 July 2010). He was an author on three presentations during the conference and chaired one special session.
- Douglas Sheil was invited to present a paper at a conference in Paris organised by the European Space Agency (14-17 November 2010). The meeting discussed a proposed environmentally inspired satellite mission that may one day help assess carbon in the world’s trees and forests. Sheil’s presentation focused on the field assessments and could help make this region one of the focal areas for ground truthing.
- Douglas Sheil, Miriam van Heist, Robert Bitariho and Badru Mugerwa attended the WCS Climate Change project workshop ‘to build consensus on Albertine Rift climate change adaptations’ (22-25 February 2011) in Gishoro, Rwanda.
- Badru Mugerwa attended the five day international conference of the Association of Tropical Biology and the Society for Conservation Biology (ATBC+SCB). The conference was held in Arusha, Tanzania (12-16 June 2011).

Workshops hosted and/or attended

- Robert Bitariho and Miriam van Heist attended a workshop organized by the Batwa organization OUBDU and the Forests & People Program FPP for 3D mapping of Batwa traditional lands, which include the current Bwindi and Mgahinga National Parks as well as Echuya Forest Reserve (27 April 2009). ITFC’s participation in the upcoming exercise was discussed.
- Douglas Sheil and Miriam van Heist attended a workshop in Mbarara, in which IGCP presented a new, MS-Access database for the monitoring data of Bwindi and Mgahinga Conservation Area (15 July 2009). We pointed out a series of design flaws and highlighted that technology was being over-emphasized as the greater need is for a clear data-management system.
- Miriam van Heist participated in the Kabale workshop on “Assessing the prospects for growth of the Bwindi Mountain gorilla population” (26-28 August 2009), jointly organised by Max Planck

Institute, Uganda Wildlife Authority and the International Gorilla Conservation. MPI staff, PhD student and assistants presented findings of the gorilla research and monitoring work and workgroups discussed the major threats to gorilla conservation and possible solutions.

- Robert Bitariho attended a workshop in Kampala on the establishment of a national bio-informatics platform for Uganda (27 August 2009). The workshop heard a presentation about the Tanzania Bioinformatics platform, how it functions and how it links up with the Global Bioinformatics Platform. Discussions followed about data sharing, ownership of data and use rights. A steering committee of academic staff from Makerere University, UWA, NFA, and NBDB was formed to speed up the formation of the Uganda Bioinformatics platform.
- Douglas Sheil, Robert Bitariho and Dennis Babaasa attended an expert workshop in Kigali on *Sericostachys sp.*, a climber which grows exuberantly in Rwanda's Nyungwe forest and other high altitude Albertine Rift forests (including Bwindi) and is believed by some to block regeneration of forest (22 September 2009).
- Robert Bitariho and Douglas Sheil attended a workshop in Rwanda-Gisenyi, organised by IGCP/AWF/EcoAdapt on the Implications of Global Climate Change for Mountain Gorilla Conservation in the Albertine Rift (14-18 February 2010).
- We held our own ITFC-UWA Information Sharing workshop in the UWA Education Centre of Lake Mburo, with the theme "Assessing the effectiveness of conservation" (23-24 February 2010).
- The directors visited WCS in New-York (17–25 May 2010) where they presented ITFC to the WCS staff and hosted a half-day workshop on the institute's future and funding options.
- Douglas Sheil jointly led a workshop in Sanur, Bali, (Indonesia) on "Participatory biodiversity monitoring as a tool for conservation in tropical forests" (18 July 2010).
- Robert Bitariho and Miriam van Heist attended an UWA organized stakeholders' workshop on 'Enhancing community benefits from gorilla tourism' in Kabale (2 September 2010).
- Douglas Sheil, Miriam van Heist, Robert Bitariho and Badru Mugerwa attended the final workshop of the IGCP/AWF/EcoAdapt led project on 'Implications of Global Climate Change for Mountain Gorilla Conservation in the Albertine Rift' (20-21 September 2010).
- Robert Bitariho attended a National University of Burundi workshop on the theme: "The status of Natural resources within the AR and implications for their conservation" (17-23 October 2010).
- Robert Bitariho attended a Population, Health and Environment (PHE) workshop organized by CTPH in Kampala (3 November 2010).
- Robert Bitariho attended an Greater Virunga Transboundary Core secretariat (GVTCS) regional workshop in Gisenyi, Rwanda (23-26 November 2010).
- We held our own ITFC-UWA Information Sharing workshop in Ruhija (12-13 April 2011), with the theme "Emerging issues and challenges for natural resource management".
- Robert Bitariho attended the workshop of the regional Network of Conservation Educators in the Albertine Region (RNCEAR) at the College of African Wildlife-Mweka, Tanzania (9-12 June 2011).
- ITFC participated in the 3D mapping of Bwindi by Batwa. Robert Bitariho held the preparatory interview sessions with elders in early May 2011 and Douglas Sheil, Fredrick Ssali and Moses Akantorana attended the early June workshop in Kisoro in which the communities built the 3D model, developed the legend and inserted their information onto the model. On 20 July 2011, the model was presented to partners and stakeholders.

- ITFC held a seminar for staff and students of Mbarara University of Science and Technology and gave an overview of research activities (8 February 2012). This was followed by a meeting to discuss collaboration with staff of the Biology Department.
- We held our own ITFC-UWA Information Sharing workshop in Mbarara (14-15 March 2012). This well attended event was at the same time the closing workshop for this MacArthur grant.

Meetings attended

- Robert Bitariho and Miriam van Heist attended the IGCP regional meeting in Kabale (12-13 May 2009). This is a quarterly meeting of Protected Area managers and other stakeholders from Uganda, Rwanda and DRC to share experiences about Mountain gorilla conservation.
- During the “Biodiversity Conservation in Albertine Rift” meeting, organised by MUIENR in Kampala (21-25 June 2009), a Regional Network for Conservation Educators of the Albertine Rift (RNCEAR) was created. Aventino Kasangaki attended and is now a member of the Network.
- ITFC hosted the Transboundary Secretariat’s meeting on monitoring and research (24-26 June 2009). The meeting included protected area managers and researchers from Uganda, DRC and Rwanda and focused on sharing information about ongoing monitoring activities, creating an overview of available data and setting priorities for the future.
- Robert Bitariho attended the regional meeting of the Trans Boundary Secretariat, held in Kigali (11 August 2009).
- Several ITFC staff attended the Ruhija Tourism Stakeholder meeting hosted by ITFC (12 August 2009). The meeting was attended by representatives of communities, local government, IGCP and tourism operators.
- The directors attended a meeting on “Climate Change and Gorilla Conservation in Albertine Rift”, held in Kigali on 21 September 2009. This is a project by IGCP/AWF/EcoAdapt, seeking to compile all the existing data on climate change in the region and to integrate it with what is known about gorilla behaviour and the ecology of their habitat. Climate change might result in the introduction of new diseases and parasites, which in the long-term could threaten mountain gorilla populations and thus gorilla tourism in the region, negatively impacting the economy of local communities living around gorilla habitats. The project will address mitigation and adaptation to climate change for more effective gorilla conservation planning in the future.
- Emmanuel Akampulira attended several meetings of the Joint Management Buffer Zone (JMB) committee of Nkuringo, on the south side of Bwindi (2 March, 25 April, 18-19 September 2010).
- Emmanuel Akampulira represented ITFC in the Kanungu District environmental planning meeting (24 June 2010),
- Emmanuel Akampulira represented ITFC in the Employee Health stakeholders’ meeting called by CTPH and UWA (25 Aug 2010).
- Douglas Sheil and Miriam van Heist, Robert Bitariho and Badru Mugerwa toured several projects in Rwanda between 18 Feb and 2 March 2011: DFDGI-Karisoke, Nyungwe project WCS, Kitabi College, University of Rwanda. Gave talks at Nyungwe National Park WCS project, National University of Rwanda and KCCEM.
- Robert Bitariho participated in a cross-visit of projects funded and supported by the CARE-EEEGl project in Rwanda (3-6 April 2011).

- Douglas Sheil and Badru Mugerwa attended the annual meeting of the TEAM Network in Dar es Salaam, Tanzania (4-9 April 2011).
- Robert Bitariho attended the Greater Virunga regional meeting that involved UWA, ORTPN, ICCN, IGCP and TCS members in Goma, DRC (11-12 May 2011).
- Robert Bitariho attended a resource use meeting organized by CARE-EEEGL and UWA-MGNP on negotiations to start a multiple use programme in Mgahinga (5-6 July 2011).
- Mark Mwine, new Administrator of the Bwindi Mgahinga Conservation Trust met with ITFC staff in Ruhija on 24 August 2011, to discuss ideas for the Trust's support of research.
- Robert Bitariho attended the ARCOS workshop on Project Inception and Baselines and Indicators Identification for Echuya Forest in Kabale (25 August 2011).
- Robert Bitariho attended a CARE-EEEGL technical advisory committee meeting on 13 October 2011 in Kisoro.
- Robert Bitariho presented ITFC in a meeting of the Belgium International Research Support (VLIR) officials with MUST staff at MUST Mbarara (24 October 2011).
- Robert Bitariho represents ITFC on the team that is tasked with drafting a new 10 year General Management Plan for Bwindi Mgahinga Conservation Area (ongoing since November 2011). This has involved a fieldtrip, stakeholders' meetings in all districts and a drafting workshop.
- Robert Bitariho attended the project evaluation and debriefing meeting by the CARE-EEEGL project in Kabale (14 December 2011).
- Robert Bitariho and Emmanuel Akampulira visited communities, offices of local government departments in Kabale, Kisoro and Kanungu town, of managers of protected areas (UWA and NFA), as well as conservation and development NGOs to present guidelines for improved implementation of human-wildlife conflict interventions and resource use agreements (December 2011-January 2012). The guidelines were developed after an extensive survey of community views and suggestions.

Training

- Aventino Kasangaki attended a 3 months' Post Graduate course on fish taxonomy at the University of Gent in Belgium (February-April 2009)
- Badru Mugerwa attended a 5 day-training in camera trapping in the Mpala Research station in Nanyuki, Kenya (mid April 2010).
- In the course of 2009-2012 Badru Mugerwa trained 2 UWA rangers as well as ITFC staff in TEAM protocol data collection methods: GPS orientation, plot establishment, tree marking and measurements, camera trap setting and climate station operation and maintenance.
- Badru Mugerwa attended the Tropical Biology Association's field course held at MUBFS in Kibale Forest National Park (August 2010), where he obtained practical training in tropical research design and reporting.
- Scholarship student Robert Ssekisambu attended training in herpetological survey methods by WCS experts in Nyungwe forest, Rwanda (26-30 November 2010).
- In the last quarter of 2010, Badru Mugerwa travelled around Bwindi and Mgahinga parks and gave a training to outpost rangers how to properly set up and record the rain gauges and thermometers for weather data collection.
- Robert Bitariho facilitated a training workshop for wardens and rangers of Rwenzori Mountains National Park on resource use inventory (8-12 February 2011). This training workshop was

organized and facilitated by UGANEB (Uganda Network of Ethno-biologists) from Makerere University, Kampala.

- Badru Mugerwa received training in camera trap data analysis, in Nairobi, Kenya (4-9 April, 2011).
- Miriam van Heist gave two GPS refresher trainings to warden and rangers of Bwindi's Ruhija sector (9-10 March 2011) and Mgahinga Gorilla National Park (25-26 May 2011).
- Douglas Sheil, Miriam van Heist, Badru Mugerwa, Fredrick Ssali and Robert Barigyira attended a one day training by WCS in the GLORIA sampling methods, in Nyakalengiya on the foot of Rwenzori Mountains (1 July 2011). The latter three then spent 2 weeks on Mountains Rwenzori and Elgon each, to set up the first African high altitude plots (July - August 2011).
- Robert Bitariho facilitated a Rapid Vulnerability Assessment training for UWA staff in Mgahinga National Park (13-31 August 2011)
- A 3-day training in census methods was run at ITFC by IGCP-MPI (7-10 and 21-24 September 2011). Participants were from Rwanda, Congo and Uganda, selected to participate in the 4th census of Bwindi's Mountain Gorillas.
- ITFC hosted a 3-day environmental education training for teachers by the Jane Goodall Institute (JGI) on 18-20 July 2011. Participants came from primary schools in Kabale district.
- Badru Mugerwa received training in understanding and valuing ecosystem services. The five day training workshop was organised by TBA, in Amani Nature Reserve, Tanzania (17-22 June 2011).
- Badru Mugerwa attended a four day TBA-DRECA workshop at Makerere University Biological field station, Kibale National Park (21-24 April 2012).

Appendix B Collaborations developed or discussed¹

Uganda

- Kibale Forest field station of Makerere University (MUBFS); Directors met with Dr John Kasenene and his staff and discussed joint proposal writing and other collaboration (2009).
- Research project in Semliki Game Reserve; met with Dr Kevin Hunt and his research assistants (2009). No further follow-up.
- Rwenzori Mountains National Park; met with Warden in Charge as well as with staff of the supporting WWF-Rwenzori project in 2009. In 2011, collaborated with RMNP staff to establish high altitude plots (GLORIA).
- Semliki Valley National Park; met with Wardens in 2009. This led to us drafting an MSc research project on invasive species, recruiting and supervising student Brian Bahuma who did his fieldwork in Semliki in 2011.
- Nature Uganda requested ITFC collaborate in a regional bird inventory (Echuya forest, Uganda; Nyungwe forest, Rwanda; and Kibira forest in Burundi). ITFC's field staff Lawrence Tumugabirwe has participated in this Nature Uganda activity since September 2010.
- During 2010, ITFC discussed with Jonathan Moore, a US volunteer based in Kabale, ideas for a community-led development project. They now work with five isolated and rural villages on the terraced slopes around Lake Bunyonyi. 25,000 Calliandra trees were planted for soil erosion, fodder and soil fertility, 600 vegetable seedlings were handed out for home gardens & nutrition, 400 avocado and guava trees were planted for health and income diversification.
- ITFC has renewed efforts to discuss collaboration with Mbarara University of Science and Technology. As a result, senior staff members of the Faculty of Development Studies visited ITFC in February 2012. We presented our work, showed our facilities and discussed how we can work together on field courses, research projects and proposal writing. This visit has already resulted in a joint research activity to evaluate the impact of community interventions by the Bwindi and Mgahinga Conservation Trust, which will take place in the second half of 2012.
- Also in late February 2012, senior staff of the Mbarara University Institute of Computer Sciences visited ITFC. We presented our facilities, discussed our IT challenges and made plans for collaboration and service provision which are already being followed up.
- The university's new Public Relations and Communications officer took an interest in ITFC, gave advice by email on several matters and came to visit us in April 2012. During that visit he gave a presentation about

Rwanda

- DFDGI-Karisoke Research station in Ruhengiri, Rwanda; during a first visit in July 2009, the directors made a presentation about ITFC and discussed issues of mutual interest with the director and possible collaboration. In February 2011 a second visit took place, with two staff members. DFDGI staff has attended our workshops and there is regular exchange of ideas.

¹ Note: this list is indicative only and does not include many of the more speculative interactions ITFC has had with potential collaborators.

- Biology Department of the National University of Rwanda (NUR); many discussions regarding field courses for a new MSc course-under-development took place by email during 2009, but an actual visit from us to NUR and vice versa only materialized in early 2010. NUR Staff members Professor Gasogo, Appolinaire, Gakunde, Nsabimana, and Bizuru are ITFC's contacts. However, we later learned that the MSc program had eventually become a weekend course, for mostly employed post graduate students. This has probably made it hard to fit in a week's field course. We have kept enquiring and even paid NUR a second visit in February 2011, but so far no concrete plans have been presented.
- We visited the WCS-led Nyungwe Forest project in February 2011. We were informed about the long term program going on, were given a tour of the projects and discussed comparative studies Bwindi and Nyungwe.

Europe/US

Through email and occasional direct meetings, several other contacts were initiated or renewed:

- A consortium of German and East African institutions studying forests in Uganda and Kenya, under the name TREE project. ITFC was an author on a proposal by the consortium in 2009 and hoped to raise funds for post-graduate students in the region with shared supervision. Unfortunately, the proposal did not gain funding.
- Rosie Trevelyan of the Tropical Biology Association (TBA). Several of our graduate staff and students attended various TBA courses in East Africa.
- Robert Ford (University of Rwanda and USA) ongoing discussions about projects.
- Nadine Laporte (Woods Hole, USA) ongoing discussions about projects.
- Wageningen University: various ideas have been in discussion since 2009. The ITFC director supervises one PhD student and a Wageningen MSc student used camera trap data for her thesis.
- Utrecht University, Pieter Zuidema: early 2010, two MSc students will come and work alongside R. Bitariho and develop quantified assessments of plant resource harvesting productions and sustainability in BINP. Successfully completed.
- Center for International Forestry Research (CIFOR): various collaborations are already ongoing between CIFOR and ITFC's current directors. CIFOR have donated many books to the ITFC library and some collaborative research activities are under discussion (one small study of the influence of great apes on forest conservation and related policy is currently underway by the director).
- Trinity College Dublin: David Taylor, head of Geography, has a long standing research interest in the region (on environmental history, with pollen analysis) and already brought an international (mixed European and East African universities) training course for PhD students to ITFC in December 2009. A PhD student Gayle.... Who worked on pollen analysis from Mt Muhavura cores stays in touch with us.
- University of Edinburgh: Patrick Meir and Edward Mitchard, supervisors of Melissa Fedrigo who came to ITFC for fieldwork, are interested to send more MSc students our way.
- International Institute for Aerospace Surveys and Earth Sciences' (ITC) in Enschede, the Netherlands: Deputy Director met former colleagues and checked out ITC's interest in using ITFC as a regular fieldwork base for their MSc students. Costs are a limiting factor.
- ETH Zurich. The Director has been collaborating with Jaboury Ghazoul and some of his graduate students on a range of activities. We have discussed possibilities for research in Uganda but have yet to identify suitable funding opportunities.

- Greg Asner and colleagues discussed with us in 2009 to use ITFC and Bwindi as a base and site for their planned satellite based "Spectranomics project" (funded by MacArthur).
- In 2012, Howard Standen joined DfID Kampala as environmental expert. The Director had an informal discussion with him to inform him about ITFC's existence and mission.
- In 2012, we contacted Dominic Travis, of University of Minnesota, who might be interested in placing students in Bwindi for health-research and pairing them up with Ugandan students.
- Jessica Rothman, former PhD student on the diet of Bwindi's Mountain gorillas, has kept in touch with ITFC and might be interested collaborating on future proposals.
- Simon Jennings former director ITFC brought us in contact with Imperial University staff to discuss potential of running field courses at ITFC.
- In 2011, Eric Prins, of PRINS Engineering, Horsholm in Denmark started discussing with us his plans for 'Bwindi habitat mapping' using high resolution remote sensing.
- Henry Bazira of Water Governance Institute; that organization, in collaboration with CARE Uganda, was selected to conduct Expanded Stakeholder Consultations under Uganda's REDD+ R-PP process in SW Uganda covering the districts of Kisoro, Kabale, Kanungu, Isingiro and Mbarara with a focus on forest dependent communities those living within and on the fringes of forest estates.
- Matthew Edwardsen, Africa Program Coordinator of US Forest Service, met with Director and discussed possible collaboration, Sept 2011.
- E-mail discussions between the Director and Michael Garstang, of the University of Virginia have led to the development of a small consortium developing a funding proposal to use stable isotopes to study the sources and pathways of rainwater in Central Africa, the amounts and origins of water from the ocean, large inland water bodies (lakes) and the role of evaporation and evapotranspiration. The proposals are currently being revised.
- Andreas Frish, lichen expert at the Ecology Department of the Swedish University of Agricultural Sciences (SLU) contacted us in early 2011 with the offer to come and do an inventory of Bwindi's lichens later in the year. We very much welcomed this and Andreas came to Bwindi for 2 months in May-June 2011. The material collected has turned out to be much richer, and indeed much more exciting, than anticipated. Each record has to be carefully checked and confirmed. This process is continuing. To summarise progress so far: Of 240 distinct species 99 have been named so far. Of these, four species are new to science. 33 additional species are reported for the first time in Uganda and one species appears to be new for Africa. With only two exceptions of all species (97) are reported for the first time from Bwindi Impenetrable forest."

Visitors:

- Professor Kayanja, Vice Chancellor Mbarara University of Science and Technology, visited the institute twice in the last 3 years, to open a workshop and to show the institute to a guest.
- Pal Olav Vedeld, of NORAGRIC University Norway, leads post graduate research by Ugandan and Norwegian students into poverty and conservation questions around Mount Elgon and Bwindi National Parks. He visited the institute in August 2008 and followed up with sharing publications. Several students from NORAGRIC have visited ITFC since and attended some of our information sharing workshops.
- Steven Gallo from WCS New York (22-24 July 2009) advised on computer maintenance and internet use at the station

- Steve Sanderson (CEO WCS) and James Deutsch (Africa program manager) visited ITFC on 13-14 Aug 2009, discussed challenges and tracked gorillas.
- BBC film team stayed at ITFC for two months in June and Sept/Oct 2009 and filmed the Kyagurillo gorilla research group with Martha Robbins.
- Anton Seimon of WCS: ITFC developed a joint proposal on Climate Change with WCS, which succeeded to gain funding from the MacArthur Foundation for 2010-2012. In the course of the project, Seimon spent several days at ITFC, setting up weather stations nearby and preparing for the establishment of high altitude plots on Rwenzori and Elgon.
- ITFC's director persuaded Dr Pierre-Michel Forget, ecologist at the Natural History National Museum in Paris, to come and work in Bwindi with his student Aisha Nyiramana (a faculty member from the University of Rwanda). Dr Forget's short visit in July 2011 was a valuable opportunity to show-off Bwindi and ITFC's facilities and encourage future collaborations. Dr Forget wished his student to make a study concerning how elephants interact with the large-seeded tree *Carapa* – this is something that cannot be done in Rwanda (no elephants in Nyungwe) but can be done in Bwindi, where both trees and elephants are locally plentiful.
- Dr Lawrence Mugisha, Director of Animal-Human Health and Ecosystem Services Consultants visited us in August 2011 and showed an interest in developing closer ties with ITFC for his research on primate health.
- Prof Walter Hödl and PhD student Iris Starnberger, herpetologists at University of Vienna Austria visited us for 4 days in August 2011, on a research trip to Uganda. They gave a presentation of their specialised interest (communication between frogs) and discussed possible extension of their fieldwork area to Bwindi. Hödl offered assistance to Ssekisambu, MSc student with ITFC, who made an inventory of frogs and took samples to check the presence of Chytrid fungus.
- Timothy Baker Geography Department at Leeds University UK, visited ITFC on his return from teaching at a TBA course in Kibale in September 2011. He discussed possible links with plot-based work that could be pursued, in addition to biomass and biomass change questions.
- Early January 2012 Prof Frans Bongers of Wageningen University visited ITFC and discussed shared research interests between ITFC and Wageningen University.
- In March 2012 Prof Ken Giller of Wageningen University and co-supervisor of Marieke Sassen visited ITFC and discussed possible collaboration on climbing beans research around Ruhija.
- In February 2012, we welcomed a group of senior staff members from Mbarara University Faculty of Development Studies to ITFC. We presented ITFC's work, showed our facilities and discussed how we can work together on field courses, research projects and proposal writing. This visit has already resulted in a joint research activity to evaluate the impact of community interventions by the Bwindi and Mgahinga Conservation Trust, which will take place in the second half of 2012.
- In late February 2012, senior staff of the Institute of Mbarara University Computer Sciences visited ITFC. We presented our facilities, discussed our IT challenges and made plans for collaboration and service provision which are already being followed up.
- In 1-5 May 2012 a group led by John Bates from the Field Museum of Natural History, Chicago, visited Bwindi. Based on our discussions we hope to host a small study (at our suggestion) to assess the conservation status of the newly described bird *Laniarius willardi*.

Appendix C: Foreign students who were associated with ITFC

Melissa Fedrigo (Department of Geography, School of GeoSciences at the University of Edinburgh, **Scotland**) collaborated with ITFC to investigate how forest carbon stocks can be assessed by satellite borne radar. She trained some of our current students in the field approaches involved. Melissa graduated for her MSc degree in Geographical Information Science, with a thesis called: "Estimating biomass in the mountain region of Bwindi Impenetrable National Park, Uganda, using radar and optical remote sensing".

Ian Lacey, from University College Dublin, **Ireland**, came to ITFC for April-May 2009, to do his fieldwork for "A study of land cover change in Bwindi Impenetrable National Park (BINP), Uganda using satellite imagery analysis". This work was carried out in the context of his MSc in World Heritage Management.

Else Langbroek (University of Utrecht, **the Netherlands**) worked on sustainability of resources under the Multiple Use agreements, focusing on *Rytigynia* (a medicinal plant), for her MSc study. She was supervised by Douglas Sheil and Robert Bitariho from ITFC along with Pieter Zuidema from Utrecht. She carried out fieldwork from ITFC in the period March-May 2010.

Suzanne Stas (University of Utrecht, **the Netherlands**) worked on sustainability of resources under the Multiple Use agreements, focusing on *Ocotea usambarensis* (a medicinal plant) for her MSc study. She was supervised by Douglas Sheil and Robert Bitariho from ITFC along with Pieter Zuidema from Utrecht. She carried out fieldwork from ITFC in the period March-May 2010.

Jade Jacobson (MSc programme University College London, **UK**) evaluated the Amagara vegetable growing cooperative in Buhoma for its impact on conservation and development, between May and July 2010.

Elaine Hsiao J.D., a Fulbright supported student of the **USA** Pace School of Law, International Environmental Law, completed her fieldwork (July 2010-June 2011) for her study on legal issues in transboundary conservation.

Douglas Sheil supervises one PhD student from Wageningen University (**the Netherlands**) Marieke Sassen, who works on Mt Elgon National Park and is completing her thesis in 2012.

Edward Wright, PhD student with Max Planck Institute, was hosted at ITFC for 12 months in 2010-2011 for his research project on Feeding Competition and Female Social Relationships in Bwindi Mountain Gorillas.

Xiana Fab, a volunteer from **Spain**, came to work at ITFC for 10 weeks (October-December 2011). She relabeled the herbarium specimen, needed because of extensive taxonomy changes and created a digital data base for all specimen in the herbarium.

Sietske Altena from Wageningen University, **the Netherlands** developed her MSc thesis based on the data produced by the Bwindi TEAM Network camera trap data and supervised by Douglas Sheil.

Appendix D

Participants of the project closing workshop, 14-15 March 2012

Name	Position	Affiliation	Email/phone contact
Badru Mugerwa	Coordinator TEAM Program	ITFC	mugerwa@itfc.org
Fredrick Ssali	Research Officer	ITFC	ssali@itfc.org
Miriam Van Heist	Deputy Director	ITFC	miriamvanheist@itfc.org
Robert Barigyira	Senior Herbarium Technician	ITFC	(+256)(0)752956537
Robert Bitariho	Research Officer	ITFC	bitariho@itfc.org
Douglas Sheil	Director	ITFC	douglasseil@itfc.org
Dezi Tibamanya	Finance & Administration Officer	ITFC	tibamanyades@itfc.org
Diane Mukundwa	Volunteer	ITFC	dkundwa@gmail.com
Donah Ndinawe	Volunteer	ITFC	donah.ndinawe@yahoo.com
Narsi Oweyesigire	Field Assistant	ITFC	(+256)(0)756807927
Beda Turyananuka	Field Assistant	ITFC	(+256)(0)775605830
Peter Kabano	Research Assistant	MPI-EVA	mparopeter@yahoo.co.uk
Martha Robbins	Director, Bwindi Mountain Gorilla Project	MPI –EVA	robbins@eva.mpg.de ;
Moses Akantorana	Research Assistant	MPI-EVA	mosesakan@yahoo.com
Emilly Kamusiime	M.Sc Student, ITFC/	Makerere University	kamusemily@yahoo.co.uk
Juventine Boaz Odoi	M.Sc Student, ITFC/	Makerere University	juventineboaz@yahoo.com
Geoffrey Malinga	M.Sc Student, ITFC/	Makerere University	malingageoffrey@yahoo.com
Kissa David Ocama	M.Sc Student, ITFC/	Makerere University	kissapet@yahoo.co.uk
Brian Baguma	M.Sc Student, ITFC/	Makerere University	bbaguma@muienr.mak.ac.ug
Patrick Mawanda	M.Sc Student, ITFC/	Makerere University	mawpat44@yahoo.com

Kumanya Hilary	M.Sc Student, ITFC/	Makerere University	kumanya@ctph.org
Dennis Babaasa	PhD Student, ITFC/	MIT Massachusetts – USA	dbabaasa@yahoo.co.uk
Kenneth Balikoowa	Lecturer College of Agriculture and Environmental Sciences	Makerere University	balikoowa@forest.mak.ac.ug
Derek Pomeroy	Professor College of Agriculture and Environmental Sciences	Makerere University	derek@imul.com
Mark Mwine	Administrator	BMCT	mmd@bwinditrust.org
Lawrence Mugisha	Executive Director	Conservation & Ecosystem Health All.	mugishalaw@gmail.com
Patrick Ndoleriire	Technical manager Conservation	CARE	ndoleriire@careuganda.org
Joseph Byoonanebye	Community Health Coordinator	CTPH	(+256)(0)777912329
Steven Asuma	Uganda Country Representative	IGCP	stevoasumani@yahoo.com
Panta Kasoma	Executive Director	JGI	panta@janegoodallug.org
John Bosco Nizeyi	Research Veterinarian	MGVP	jnizeyi@yahoo.com
Candia Leone	Curator, Natural History, Uganda Museum	Ministry of Tourism, Wildlife & Heritage	(+256)(0)775267608
T. Otushabire	Environmental Journalist	The Daily monitor	(+256)(0)752534204
Zaninka Penninah	Coordinator	UOBDU	zaninkah@yahoo.com ;
Venancio Barugahare	NFA Forest Supervisor	Echuya CFR	princevana@yahoo.co.nz
Maxime Nzita	Deputy Executive Secretary	Greater Virunga Transb. Secretariat	zainmax@yahoo.com
Mediatrice Bana	Programe Officer – IGCP	WCS Rwanda	bmediatrice@gmail.com
Pontious Ezuma	Conservation Area Manager, BMCA	UWA	pontious2010@gmail.com
Raymond Kato	Research and Monitoring Warden, BMCA	UWA	raymondkato04@yahoo.com
Aggrey Rwetsiba	Director, Research and Monitoring	UWA	aggreyrwetsiba@yahoo.com

Olivia Biira	Community Conservation Warden, Bwindi	UWA	biiraolivia@yahoo.com
Christopher Masaba	Warden in Charge, MGNP	UWA	cmasaba@gmail.com
Charles Okuta	Community Conservation Warden, MGNP	UWA	charles.okuta@gmail.com
Patrick Makatu	Ag. Research and Monitoring Warden, MENP	UWA	patrickmakatu@yahoo.com
Abel Musana	Research and Monitoring Warden	Volcanoes National Park	abelmusana@gmail.com
Frederick Kayanja	Vice Chancellor	MUST	kayanjafib@yahoo.com
Grace Kagoro	Senior lecturer, Biology Department	MUST	kgraceug2002@yahoo.co.uk
Jonathan Baranga	Professor, Biology Department	MUST	baranga700@gmail.com
Dennis Lukaaya	Public Relations Officer	MUST	dlukaaya@must.ac.ug
Cleophas Karooma	Lecturer, Faculty of Development Studies	MUST	(+256)(0)772544300
Miguel Leal	Albertine Rift REDD Project Manager	WCS Uganda	mleal@wcs.org
Michelle Wieland	Independent consultant	WCS Uganda	michelle.wieland@gmail.com
Peter. O. Alele	PhD Student	XTBG- China	petok347@yahoo.com
Zeneb Musiimire	Capacity Development Officer	Nature Uganda	zeneb.musiimire@natureuganda.org
Leah Nawegulo Tabo	Head, Research Management	UNCST	leahtabo@gmail.com
Gordon Tabaro	Sub-county Chief	Ruhija	(+256)(0)782496324
Charles Kayijamahe	Field Officer	IGCP	ckayijamahe@igcp.org
Caroline Asimwe	Research Veterinarian	Budongo Forest Project	(+256)(0)774224937
Steven Rubanga	Chief Veterinary Technician	CTPH	(+256)(0)772337653
Florence Mugisha	Forestry department	Kabale district	(+256)(0)789736716
Morgan Andama	Lecturer, Biology Department	MUST	andamamorgan@yahoo.com
Roberts K. Muriisa	Dean Faculty of Development Studies	MUST	muriisak@gmail.com
Rogers Bariyo	Lecturer, Faculty of Development Studies	MUST	rogers_bariyo@yahoo.com

Invited to the workshop, but unable to attend:

Name	Position	Affiliation
Robert Sekisambu	MSc Student ITFC	Makerere University
Edward Mwavu	Senior lecturer	Makerere University
Edith Kabesiime	Program Manager	CARE
Gladys Kalema	Executive Director CTPH	Conservation Through Public Health
Akankwasah Barirega	Principal Wildlife Officer	Min. of Tourism, Wildlife & Heritage
Flavia Lanyero	Environmental Journalist	The Daily Monitor
Fiona Druciru	Collaborative Forest Management Specialist	National Forestry Authority
Teddy Musabe	Deputy Executive Secretary	Greater Virunga Transboundary Secretariat
Felix Mulindahabi	Wildlife Conservation Society, Rwanda	Nyungwe National Park
Pabious Otike Duli	Research and Monitoring Warden, RMNP	Uganda Wildlife Authority
Richard Kapere	Senior Planning and EIA Officer	Uganda Wildlife Authority
Pamela Mbabazi	Dep. Vice Chancellor	Mbarara University of Science and Technology
John Bosco Nkurunungi	Senior lecturer, Biology Department	Mbarara University of Science and Technology
Rennie Bakashaba	Lecturer, Faculty of Development Studies	Mbarara University of Science and Technology
Godber Tushabe	Executive Director ACODE	Advocates Coalition for Development and Environment
George Agaba	District Natural Resources Coordinator	Kanungu district
Vincent Mudanga	District Natural Resources Coordinator	Kisoro district
Ardios Kyomukama	D.F.O/ Ag. District Natural Resources Coordinator	Kabale district

Aventino Kasangaki	Biodiversity & Ecosystem Services Program Manager	Albertine Rift Conservation Society
Geoffrey Muhanguzi	Director	Budongo Field Station
Patrick Mucunguzi	Associate Professor, Department of Botany	Makerere University
Simon Anguma	Dean, Faculty of Science	Mbarara University of Science and Technology
Donat Nsabimana	Biology Department	University of Rwanda
Aisha Nyiramana	PhD student	University of Rwanda

Appendix E

Assessment of ITFC's long term monitoring and research programs: summary of relative benefits and recommendations

Focus	Value	Impacts shown	Comment	ITFC benefit	Final recommendation
MUZ	Needed by UWA and stakeholders	Yes	Need to revise methods and assess overall program. Support from CARE and BMCT	Yes	Continue but focus on how the management systems can be made more effective Train Ugandan students
Daily gorilla	Research oriented	?	Led by MPI. Limited capacity building for Ugandan post-grad	Limited	
Gorilla census	Required by UWA and stakeholders	Yes	Major team effort – good for regional cooperation but costs appear excessive	Some (?)	Continue as long as ITFC does not incur costs
Water quality	Primarily research oriented	No (but has potential)	Analyses of data required (data collection cannot lead to management recommendation if not analysed more regularly!)	For student only?	Analyse data and consider what activities can be managed by UWA
Gravity water scheme MGNP	Was established to address stakeholder concerns	No (but has potential)	Not clear who is interested in these data. Analyses required.	Not yet	Analyse data to examine trends. Identify stakeholder interest. Maintain with less regular data collection.
Fire outbreaks	Requested by UWA	Debatable	Accuracy hard to assess, and omissions possible?	Limited	Explore proactive fire monitoring strategies
Phenology	For gorilla food plants (research only)	No	Would need to be expanded to address many current questions	Not yet	If funds are available expand phenology to include representative vegetation
UWA climate data	Vital context for region (re-climate change etc)	No (but there is demand)	Quality control needs review	Yes (potential)	Continue but give more regular attention to feedback on quality
TEAM climate data	Global research network. Ensures wider interest	Not yet	Jointly with UWA –Still in first year. Funding concern	Started in 2010	Continue but seek funds
TEAM vegetation plots	Global research network. Allows many basic concerns to be addressed	Not yet (but seems guaranteed)	Jointly with UWA –Still in first year. Funding concern	Started in 2010	Continue but seek funds.
TEAM camera trapping	Global research network. Offers exciting new monitoring insights.	Has potential	Jointly with UWA –Still in first year. Funding concern	Started in 2010 (already for PR)	Continue but seek funds
Problem animal interventions	High priority	Yes	Need to include social aspects more clearly	Started in 2010	Continue and seek funds
Community attitudes	High priority	Yes	Has been limited in past. Needs to include broader sets of issues.	Yes. New pilot activities planned for 2011	Develop new program and seek funds.
Amphibian populations	Possible significance	Unknown	Neglected in past	New student project in 2011	
Bird populations	Yes	Yes	Mixed studies (stripe breasted tits and various student projects)	Yes	Support if funds are available
Disease transmission risks	Yes	Yes	Various ongoing activities with CTPH and MGVP also new student projects on rodent and baboon transmission concerns	Yes	New initiatives to assess risks required (insects, birds etc.)
Fuel wood demand and availability	Yes	Not yet	Planned projects have failed to start (lack of applications)	Likely	Need to develop new collaborations and funded initiatives
Inventories of insects	Yes (e.g. pollinator services, rare butterflies)	Has potential	Important for environmental services	Yes	Develop links with experts
Hydrology	Research	Not begun	Especially looking at cloud inputs	Likely	Needs funding
Rainfall recycling	Climate change	Has potential	Link made with US research group	Likely	Links made – funding being sought (proposals already drafted)
Invasive species	Major threat concern	Likely	One MSc begun 2011 – many possibilities for additional work. Contacts with IUCN are promising.	Likely	Seek funds and collaborations

Atmospheric deposition	Unclear	Unclear	No work yet	Useful research	Possible project
Mapping vegetation in BINP	Potentially high	Likely	PhD project ongoing (some quality issues)	Will be of value for many other research questions	Support if funding continues but ensure quality is acceptable
Human demographic and land-use trends	Potentially high	Likely	Some MSc work done but baseline data often poor	Unclear	Support further student work and seek collaborators for larger scale monitoring
Bamboo use (MGNP)	Request from UWA and other stakeholders	Likely	Pilot work performed in 2010	Yes	Needs to expand assessment project to become a monitoring activity
Conservation effectiveness	Potentially high	Likely	Focus of the 2010 workshop led by ITFC in Lake Mburo NP.	Yes	Indicators identified but funding not clear – will continue to use with UWA AOP.
Ecotourism benefits	Yes	Has potential	Studies so far are uncoordinated, short, unfocused	Yes	Important for improving community attitudes

Other aspects raised:

ITFC must improve data storage and management to ensure long term benefit from investments in monitoring activities and building useful baseline data.

There is also much uncertainty around BINP and MGNP about ITFC and its role – it is often confused by respondents with other organisations. Some outreach activities outside of Ruhija might be useful.

Appendix F

ITFC's influences and impacts since 2009

Information, input, services	Means	Impact or influence on conservation	Year
ITFC is in the team developing a new General Management Plan for BMCA	ITFC staff Robert Bitariho is participating in all the discussions and decision processes	The General Management Plan for BMCA is the basis for park management for the next 10 years. The GMP includes plans for resource use access, problem animal management, revenue sharing, and priorities for research and monitoring, all of which have been influenced by ITFC	2012
ITFC seeks sources of regular and sustainable funding for students and research	Working with Mbarara University of Science and Technology on improved mutual support and role vis-à-vis ITFC	A plan to achieve more sustainable funding for ITFC researchers and students, thus capacity building for science based conservation management. The VC and deputy VC are supportive of increased funding from MUST to ITFC and the plan is being implemented.	2011-12
ITFC wrote proposal for regular and sustainable funding for students and research from BMCT	Lobbying the Trust administration	The Trust has been reminded of its role to support research around BMCA must be better guaranteed, to ensure for science based conservation management	2011-12
ITFC developing attitude study to understand motivation for illegal activities	Project proposal with IIED.	Project accepted for funding (Darwin Award). Results will inform conservation managers	2011, study to start in mid 2012
ITFC to implement study of Batwa Cultural Values	Project proposal with FFI.	Project accepted for funding (Darwin Award). Results will inform conservation managers. Targets include increased role for Batwa in PA management.	2011, study to start in mid 2012
ITFC has been piloting studies of Batwa concerns and issues	Pilot activities funded under MacArthur	A trial of approaches and possibilities. Has proved a useful to build a more nuanced statement of the aspirations of the Batwa that can now guide goals and the identification of opportunities for better integration.	Started 2011, ongoing
ITFC supported UOBDU, Batwa organization, in 3D mapping of Bwindi	Participation in mapping process, observing and recording stories. Report on the process	Engagement of various organizations. A positive step in building a more constructive dialogue between the Batwa and others.	2011
ITFC provided GPS and map reading (refresher) training for rangers of BMCA	2-day training sessions of rangers in Ruhija and Ntebeko respectively. Hands-on exercises	UWA rangers better able to collect quality GPS data Trails and boundaries were checked and corrected where necessary, coordinates for new features were included in the GIS of Bwindi and Mgahinga and (draft) maps given to UWA	2011
REDD "white paper" produced and shared	2 ITFC consultants talked to diverse stakeholders about the potential for REDD projects in SW Uganda and published results	The paper was widely shared and discussed on the Uganda REDD e-mail group. A number of key concerns and needs highlighted to ensure that conservation and development outcomes can benefit from REDD+ in SW Uganda.	2011
ITFC set up the first African high altitude plots for monitoring changes in mountain vegetation and temperature	Two fieldwork campaigns to establish plots	6 Permanent plots for monitoring high altitude vegetation—the first in Africa- established on Mt Rwenzori and Mt Elgon. UWA staff trained in assessment methods. Visibility of Uganda increased due to global monitoring network	2011
ITFC supported Jonathan Moore with a new community development initiative around Lake Bunyonyi (built on a study to examine REDD+)	Discussions, images, GPS use	Increased tree cover in cultivated community land	2010-11
ITFC developed guidelines for improved implementation of Resource Use agreements	Wide survey of community attitudes, consultations with all stakeholders	ITFC influenced perceptions of local government and UWA with regard to resource use management. The meetings were planned to coincide with UWA's stakeholder consultations on the BMCA general management planning	Started in 2010. Guidelines 2012

ITFC developed guidelines for improved uptake of HWC measures	Wide survey of community attitudes. Guidelines written and consulted with all stakeholders.	ITFC influenced perceptions of local government and UWA with regard to human wildlife-conflict interventions. The meetings were planned to coincide with UWA's stakeholder consultations on the BMCA general management planning	Started in 2010. Guidelines 2012
ITFC advised UWA on mature bamboo stem harvesting by communities in Mgahinga Gorilla NP. New agreements in process for 2012	ITFC designed a survey of the pilot plots set up by UWA, trained UWA staff in measuring impact, analysed the data and published the study.	UWA was advised that the harvesting of mature dead stems does not negatively influence the availability of shoots. However, UWA was advised to vary the locations for harvesting and supervise the quantities harvested, as the removal of bamboo might in the long term result in decreasing availability of nutrients to the rhizome. Now the new resource use programme for MGNP has included dry bamboo harvest for local people basing on the results from ITFC study	Started in 2009, published in 2012
ITFC developed a proposal to join TEAM global network, in collaboration with UWA; weather data collection	New TEAM funding project in partnership with UWA (addresses an agreed UWA responsibility)	Automatic weather station established near Ruhija. This is in addition to and supports the manual weather data collection by rangers around the park. These baseline data help ensure that Bwindi is included in ongoing assessments of how environmental changes are influencing biodiversity in the wet tropics.	Ongoing; started in 2010
ITFC developed a proposal to join TEAM global network, in collaboration with UWA; vegetation monitoring	New TEAM funding project in partnership with UWA (addresses an agreed UWA responsibility)	Established 6 permanent vegetation plots spread throughout Bwindi. These will be assessed on a yearly basis. These plots help ensure that Bwindi is included in ongoing assessments of how environmental changes are influencing biodiversity in the wet tropics.	Ongoing; established and first recorded in 2010
ITFC developed a proposal to join TEAM global network, in collaboration with UWA; camera trapping	New TEAM funding project in partnership with UWA (addresses an agreed UWA responsibility)	A systematic camera trapping system was developed and set up in the lower and higher altitude section of BINP. The survey will be repeated on a yearly basis. These baseline data help ensure that Bwindi is included in ongoing assessments of how environmental changes are influencing biodiversity in the wet tropics. TEAM has increased visibility of UWA-Bwindi and ITFC	Ongoing; started in 2010
ITFC hosted the Transboundary Secretariat's meeting on monitoring and research.	Focused meeting with core group from Rwanda, DRC and Uganda	The meeting included protected area managers and researchers from Uganda, DRC and Rwanda and focused on sharing information about ongoing monitoring activities, creating an overview of available data and setting priorities for the future. The meeting agreed that attempts to harmonize methods and share data would be explored. Areas with poor data coverage were highlighted as needed attention.	24 to 26 June 2009
Expert workshop in Kigali on <i>Sericostachys</i>	Three ITFC staff attended the meeting and contributed to the discussions. A publication in <i>Oryx</i> shares the conclusions. Scholte, P. et al. (2010). Reaching consensus: impact of the liana <i>Sericostachys scandens</i> on forest dynamics in Nyungwe National Park, Rwanda. <i>Oryx</i> , 44(3), 325–326	The meeting addressed the threat posed by <i>Sericostachys</i> a climber which grows exuberantly in Rwanda's Nyungwe forest and other high altitude Albertine Rift forests (including Bwindi) and is believed by some to block regeneration of forest. The meeting. The meeting was successful in refuting some significant misconceptions regarding the climber and the Bwindi experiences were central to this. A publication in <i>Oryx</i> was developed by selected participants including two ITFC staff. It was agreed that a series of management trials would be established, rather than planning large scale control.	2009
9 Ugandan Masters' students were supported for their fieldwork year, through our scholarship program made possible by MacArthur grant. Research questions identified through consultation with local conservation managers and various academic experts			
		*Fredrick Ssali (MUST, Biology): "The impact of elephants on trees in Bwindi Impenetrable National Park, south western Uganda". Changes in the abundance and feeding behavior of these animals are considered fundamental to the vegetation conditions within the park. The study focused on what these relationships are and what is the long-term outlook with or without these animals?	<i>Graduated, now staff at ITFC</i>
		*Geoffrey Malinga (Makerere, MUIENR): "Causes and implications of altitudinal zonation on bird species , a case of Bwindi Impenetrable National Park". As the landscape becomes warmer over the next century we might predict that species limited to the highest altitude areas of the forest will be increasingly reduced in habitat extent. But the details of these scenarios must be informed by better knowledge of how species are distributed by altitude and what factors determine the lower-altitude range limit.	<i>Completed and now enrolled for PhD.</i>

Scholarship students ctd.		*Ronald Twongyirwe (Makerere, MUIENR): " Impact of land use change on carbon stocks , total nitrogen and fluxes in adjacent land use types around Bwindi Impenetrable Forest in South Western Uganda". Much effort has been expended on studying the proportion of carbon stocks in above ground biomass. Much less is known of soil carbon stocks that are often several times greater than the above ground biomass. This study provided some basic figures on these parameters in relation to land-use history and location.	<i>Graduated, now enrolled for DPhil at Cambridge University.</i>
		*David Kissa (Makerere, MUIENR): "Abundance, distribution and utilization of <i>Myrianthus holstii</i> , in Bwindi Impenetrable National Park". <i>Myrianthus holstii</i> is a species that produces fruit which is in demand by local people – but due to its value for animals (including gorillas and chimpanzees) collection by people is currently prohibited. High levels of illegal harvest occur in some areas – though it is far from clear if this poses a genuine concern. This study provides a characterization of the status and ecology of the species. This will help inform future decisions regarding this species.	<i>Completed and awaiting graduation</i>
		*Lilian Twanza (Makerere, MUIENR): "The conservation value of matrix habitats around Bwindi Impenetrable National Park using bird species as indicators ". This study examined the conservation value of remaining forest cover that lies outside the National Park. Such sites are increasingly scarce in the landscape but could be promoted by suitable policy and incentives.	<i>Completion delayed</i>
		*Moses Oluka (Makerere, MUIENR): "Understanding the process of emigration and land abandonment in and around Bwindi Impenetrable National park. The longer-term trends and implications". While most conservation concern has focused on immigration and increasing population densities, a range of population changing processes are actually taking place around Bwindi – but these remain poorly understood. This study tried to characterize the nature of these population processes.	<i>Completion delayed</i>
		* Emily Kamusiime (Makerere, FNC): Diversity, distribution and effects of hemi-parasitic plants in the canopy of Bwindi Impenetrable Forest	Writing thesis
		* Brian Baguma (Makerere, MUIENR): Invasive alien plant species in Semuliki Valley National Park	Writing thesis
		* Juventine Boaz Odoi (Makerere, FNC): Assessment of forest trees' resilience in elephant prone areas- A case of Rabongo forest patch-Murchison Falls National Park- Uganda	Writing thesis
3 additional scholarships became available from USAID, through the WCS' WILDWest project.			
		Robert Sekisambu : Assessing amphibian populations of conservation significance around BINP and an assessment of the prevalence of Chytridiomycetes fungi among amphibians in BINP.	Writing thesis
		Hilary Agaba Kumanya : The role of baboons as potential carriers of Parasites across BINP boundary.	Writing thesis
		Patrick Mawanda : The role of rodents as potential carriers of parasites across BINP boundary. Patrick is currently collecting his data.	Writing thesis
Two PhD students are working with ITFC addressing issues of conservation relevance. Consultations with local partners and with academic supervisors			
		Robert Bitariho , senior research officer with ITFC, is well advanced on his PhD work addressing the evaluation of BINP's MUZ program	Ongoing, expected to complete in 2012
		Dennis Babaasa , former ITFC staff, remains affiliated to the institute and has developed a PhD proposal focusing on habitat mapping in BINP; he has completed a year of course work at the University of Massachusetts.	Field work still ongoing

ITFC welcomed 6 foreign students to Bwindi and supported their research projects in several ways. This involved discussions and collaboration with experts at foreign universities. These were produced and recommendations made			
	Dr. Patrick Meir of Edinburgh University	* Melissa Fedrigo, MSc in GIS at the University of Edinburgh. "Estimating Biomass in the Mountain Regions of BINP, Uganda, using Radar and Optical Remote Sensing". She tested an algorithm for biomass/carbon calculation from remote sensing, developed in level landscapes and found they do not apply for a rugged area as BINP.	
	Dr. Claire Cave of University College Dublin	* Ian Lacey, MSc World Heritage management at University College Dublin. "A study of land cover change in Bwindi Impenetrable National Park (BINP), Uganda using satellite imagery analysis". He assessed loss of tree cover outside the park and interviewed people about that.	
	Dr David Taylor of Trinity College Dublin	* Gayle McGlyn, PhD student Geography Trinity College Dublin. Studying historical environmental change based on pollen analysis of cores taken from Muhavura.	
	Dr Pieter Zuidema of Utrecht University	*Two students from Utrecht University, Suzanne Stas and Else Langbroek, helped analyze and evaluate the productivity of harvested NTFPs (three species) in Bwindi. They proposed a number of improvements in the data collection.	Graduated
	Dr Katherine Homewood of University College London	*Jade Jacobson from UCL evaluated the Amagara community project in Buhoma, assessing the conservation and development impacts.	Graduated
Also, 12 volunteers and interns joined ITFC for periods varying from 2 to 12 months, assisting the institute with regular and special tasks	Experience and opportunities for further employment	*Badru Mugerwa, Emmanuel Akampulira and Peter Kabano were initially (2008) taken on as volunteers helping with the MUZ program. Badru and Emanuel are now ITFC project staff, and Peter was employed by MPI, to work on the Mountain gorilla research program.	2008-2009
		* Leah Wangui Gichohi, a Kenyan botanist, helped update the taxonomy used in the ITFC herbarium to make it compatible with the recent literature.	2009
		* Elias Tushabomwe spent his internship for the Nkumba University at ITFC, developing stories for the ethnobotanical garden plants	2009
		*Emilly Turinawe helped with data entry of several programs and assisted with computer training. She is now employed by MPI	2010
		* Christopher Ngabirano worked as an intern on environmental education of local schools	2010
		*Peter Ssekiranda joint ITFC as a volunteer, to assist Badru with all TEAM fieldwork	2010
		*Joseph Ngubwagye volunteered on the MUZ program	2010-11
		*Diane Mukundwa (BSc, University of Rwanda) is volunteering on the MUZ program	2011
The monitoring of resource offtake under the MUZ program was maintained. The MU agreements with six communities are being revised and renewed. New approaches are also being discussed with UWA and CARE.	Extensive field work in Bwindi. Consultations with other field work. Robert Bitariho is examining the effectiveness of current management strategies in the MUZ and seeking alternative models elsewhere in the region	*Donah Ndinawe (BSc Social sciences Makerere University) assists with phenology work and Batwa value surveys	2011
		*Xiana Fab from Spain relabeled all specimen in the herbarium and created a database of it.	2011
		The MUZ program is maintained and strengthened. Stakeholders (UWA and CARE) have come to ITFC to seek input and guidance on these processes. There is an in principle agreement that some new approaches will be piloted in at least one Parish in the next year	Ongoing

ITFC's visibility was greatly improved by renewing and expanding the website and joining the blogging network of Wildlifedirect.	Regular updates on ITFC's website, including announcements of vacancies and scholarship program. Blogging on Wildlifedirect: various ITFC staff raises day-to-day issues and stories.	ITFC is becoming better known and recognized by various interested blog readers. Many of the comments on the blog come from professionals and students interested in conservation topics. Some blogs raise difficult challenges for discussion and some prove controversial. Blogs are currently gaining a readership of 200-300 each.	Ongoing, since 2009
The smaller scale 2011 Information sharing workshop was held at ITFC and focused on students and their supervisors.	Scholarship students presented their preliminary findings to supervisors and park managers. Consultations with stakeholders	Discussions during this workshop focused on Recommendations from the review of Multiple Use and Human Wildlife Conflict	April 2011
A well attended information sharing workshop was held in February 2010, in Lake Mburo National Park. The workshop theme: 'how to judge and measure conservation success and effectiveness'	Wide engagement with local, national and regional stakeholders. Rich and multifaceted discussion.	Sharing of research results and discussion of management implications. (See proceedings at ITFC.org.) UWA's Research and Monitoring plan includes outputs from the workshop (prioritized research questions)	Feb 2010
Max Planck Institute's research assistant, together with ITFC assistants has guided UWA in the habituation process of new mountain gorilla groups for tourism.	Partnership with UWA and MPI	More gorilla groups are available for tourism. This brings in more revenue for UWA (thus supporting national conservation) and increases the value of Bwindi to the country. At the same time these advances are being done with minimal disruption to the animals involved. Research efforts are being made to assess the nature of the behavioral changes associated with habituation. MPI assists UWA in individual recognition of gorillas, for improved monitoring.	Ongoing, since 2009
ITFC is on the Research and Monitoring working group of the Trans Boundary Secretariat and hosted a regional meeting in 2009.	Guidance for an international process. The governments of DRC, Rwanda and Uganda are signatories to this process.	A series of assessments and guidelines are being developed for management and monitoring across the region. Already efforts are being made to harmonize and share data and to identify where the key knowledge gaps occur.	Ongoing, since 2009
ITFC reviewed a report on 'global assessment of conservation and poverty link'; the ITFC led study of Conservation and Development success around Bwindi (2004) was one of the cases presented.	International processes. Brings attention to the region. Well received publication by IIED	Raises the problems and possible solutions at Bwindi to a global audience. Bwindi is seen as a case-study and site where improved conservation and livelihood outcomes are being sought. Publication of: Blomley T. et al. 2010. Development AND Gorillas? Assessing fifteen years of integrated conservation and development in south-western Uganda. Natural Resource Issues (23). IIED London	2010
ITFC facilitated a project funded by the Rare Finch Conservation Group	Day-to-day support and management of the project which used ITFC staff and logistics	This was an assessment of the distribution and status of the Crimson Wings (<i>Cryptospiza</i> spp.) in BINP, Echuya and Mgahinga. The aim is to develop a conservation plan for these taxa (especially the threatened Shelley's Crimson Wing).	2009-2010 (possible to continue)
ITFC worked with Makerere staff to develop a monitoring plan for the Rwenzori Mountains NP	This task was communicated to us. ITFC suggested to share the task with Makerere. A joint proposal made to UWA/WWF was accepted.	The consultancy document has been accepted by WWF/UWA. This plan will now form a basis for UWA/WWF activities in the Rwenzoris (though WWF funds are yet to be clarified).	2010
ITFC has hosted and facilitated a number of television crews to work in BINP	Television coverage will raise the international status of the region and bring attention to problems while perhaps increasing tourism revenues.	At least four crews have visited and worked closely with and consulted with staff and partners. The most valuable output is likely to be the three part BBC series which will gain international distribution.	Especially 2009, the International Year of the Gorilla

ITFC is introducing a range of new measures to improve forest-village hygiene and reduce likelihood of disease transmission between ITFC field staff and wild primates	This is collaboration with the Max Planck Institute. There was considerable consultation with experts on this topic asking for guidance.	ITFC field staff working with the mountain gorillas are now required to wash their boots between the park and the village, to change their clothes between home and forest and to be extra vigilant with respect to disease and related transmission risks.	From 2010 onwards
ITFC contributed to IGCP's Physical Planning for Ecotourism in Ruhija project and advised the various consultants that visited the station.	Input to ToR, briefing of the consultants, and comment on various topics. Dissemination materials (posters and videos) will be shared locally.	Evaluation on the impacts of current (unplanned) physical developments in the region and their consequences. There is the potential that new infrastructure will be developed, or that some others may need to be adapted or destroyed. ITFC's contributions have largely related to waste and water. UWA has already asked helped in developing waste management practices (funding not yet secured).	Completed. Unclear what follow-up is planned
An evaluation of ITFC's long term ecological monitoring program (water, MUZ, weather, fire) is ongoing	Wide consultation and technical review. An advisory report is expected shortly, which will be guiding future monitoring activities	The long term data that we believe is going to be of greatest value and significance in the future is being judged and responded to. These methods and data will be available to other stakeholders in the wider region who look to ITFC for guidance.	Completed
Fire monitoring and planning	Consultation (and corrections!)	The US Forest Service International Program consulted ITFC reports and advice while preparing a transboundary fire management plan for the Greater Virunga Landscape. The Fire management plan should be out before October 2010. It is intended that this will be a basis of future planning and transboundary fire management. ITFC guided some major corrections.	Planned October 2010
ITFC regularly advises the Ugandan Forest Carbon Working group	DS was invited by the World Bank to join the e-discussion group. This includes all the key Ugandan actors in this process.	ITFC has taken the approach of sharing technical information and correcting errors when these arise. Feedback by group members suggests that this technical guidance is valued. These efforts ensure realism and better informed discussions. The group remains in a consultation phase so no specific decisions have yet been made (though some editorial comments and corrections have been adopted).	Since 2010
Publications in peer reviewed literature See separate list	Publications in the academic literature give a quality assurance of the research work itself and provide a means to share knowledge with the wider research community	ITFC and its collaborators have continued to publish in the peer reviewed literature and to share these publications widely. Forty four (44) such publications were achieved between 2008 and the end of 2009. These include some high impact articles. A number of significant publications are in press. These include: chapters in Andy Plumtre's edited book on trends in key protected areas in the AR (chapter on BINP is led by ITFC). A key publication on ICDPs. A review of plant resource assessment and control is in press in AJE.	2008-present

Appendix G

Publications, reports and theses by ITFC staff, students and collaborators since 2008

The following list includes publications and reports by scholars who have worked in Bwindi and received ITFC support over the last 3 years.

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Appendix H Discussion groups

INSTRUCTIONS FOR WORKGROUP SESSIONS

Information Sharing Workshop Mbarara 14-15 March 2012

Day 1 afternoon

TOPIC: “Research and monitoring in support of management questions/challenges” (UWA to lead. Group division suggested in separate spreadsheet)

Introductions (total 30 minutes):

1. Pontious Ezuma to present context, GMP formulation and priority challenges for BMCA (see below)
2. Raymond to present ‘research overview of last 10 years and what goals were met’.

Group discussions: by 4 priority themes defined by UWA (parallel sessions, one hour 20 minutes, including reporting back). Chaired by UWA participants. See attached table for suggested division of participants.

- 1) Gorillas roaming outside the park
- 2) Resource use management and monitoring
- 3) Monitoring community attitudes
- 4) Monitoring animals and other biodiversity

For each topic, the group should first take 10 minutes to clarify what is UWA’s problem or challenge. Have causes and/or solutions been suggested yet? What has been tried already?

After this clarification, we ask chairpersons to give everyone a few minutes to write their thoughts onto cards (this way we do not lose valuable input from all participants). Then go around the group gathering views, and start the group discussion around the following questions:

- Is research on this topic needed? If so, what kind of research?
- Are there any trials that might help?
- What skills are needed?
- Who should lead on these tasks?
- Who has an interest to assist in this (what role?)

*** Please summarise your main deliberations on a flipchart sheet, to be shared with other groups**

Day 2 Discussion groups

TOPIC: "Capacity building for conservation". Groups are the same as on Day 1 and can build on the previous discussions. Each group addresses the following general questions:

- a. What are the main requirements in terms of trained people? What are the gaps? (Consider UWA, NFA, Government and other sectors.)
- b. Role of Universities? How can we encourage students into practical conservation and development? How to identify projects? How to facilitate? What collaborations are possible? Opportunities/funding?
- c. How can communication between researchers and managers/policymakers be improved? What information is required, in what form and way of communication? Opportunities/funding?

Again, we ask chairpersons to give everyone 5 minutes first to write their thoughts onto cards (for a, b, and c), before starting the group discussion, and to summarise discussion points on a flipchart.

ITFC-UWA WORKSHOP (14th to 15th March 2012) GROUP DISCUSSIONS

We present the discussions by the respective thematic groups by way of their notes on flipcharts. The discussion was guided by the 'workgroup sessions instructions', added as an Appendix.

GROUP A: Gorillas roaming outside the park.**Suggestions for solutions and/or research AND *who should lead on them?***

- a) Encourage cultivation of income generating non-palatable crops e.g. tea. - *Local government, private sector, IGCP, communities (land owners)*
- b) Strengthen HUGO (in the interim) – *IGCP, CBO (NCDF, BCRC), RCDA (tourism), UWA*
- c) Undertake research on habitat use – Ranging and diet- both in and outside the park and combine with RBM data - *MPIEVAN and ITFC : PhD project by MPI student underway*
- d) Study impact of gorilla habituation on gorillas ranging outside the park - *IGCP*
- e) Stop tracking on private land, but allow for monitoring - *UWA*
- f) More buffer zones where possible – *as (a) and should be combined*
- g) Sensitise local communities about interventions like buffer zones and Mauritius Thorn hedges - *UWA*(cc), CD Officers, agricultural extension services*
 - a. Engage communities in management and problem solving - *All stake holders*
- h) Buffer zones and gorilla repellents (pepper??) - *ITFC*
- i) Assess the effectiveness of current interventions and feasibility of others (run trials) - *ITFC*
- j) Assess the effectiveness of long term strategies and multiple interventions – *ITFC, UWA*
- k) Conduct a study to assess the views of tourists tracking gorillas outside the park vs in the park - *UWA*
- l) UWA should invest in the long term management of problem animals - *UWA*

Skills and knowledge requiredCommunities

- Knowledge about gorilla ecology and behaviour
- Skills on implementing interventions

UWA

- Public relations
- Continuous update and orientation involving other stake holders (e.g. IGCP, CTPH...)

HUGO (community groups trained to respond to gorillas coming out of park into crop fields)

- Skills of chasing away gorillas
- Engage them in health monitoring (e.g. collecting samples)
- First aid skills

Other stakeholders

- Knowledge about gorilla tourism based practices, rules and regulation
- Information sharing meetings
- Encourage corporate social responsibility of tour operators and camp/lodge owners (tax to UWA??)

GROUP B: Resource Use Management and Monitoring

Day 1 Discussions

Is research on this Topic needed?

YES, high priority for UWA

Are there any trials that might help? (any attempts to clarify these issues)

Yes: Previous research and monitoring on resource in BINP..e.g Cunningham 1996, Wild & Mutebi 1996, Bitariho et al 2006, Byarugaba et al 2007, Muhwezi 1998, Muhwezi et al 2010 etc Stas et al in press, Ndangalasi et al 2007.

How is resource access managed in other PAs, e.g Echuya, Rwenzori, Elgon, in Rwanda and Congo's Volcanoes/Virunga. In Rwanda & Congo -where there is no resource access- how are local people's demands for resources handled?

What kind of research?

- How much is harvested? (both legal and illegal)
- How much of the resource is available? (stock levels of the harvested plants)
- Is resource access contributing to illegal activities within the park..e.g. snares, pitsawing etc.
- What are the drivers of illegal resource access? (Commercialization, livelihoods etc)
- What are the incentives, disincentives of resource access?
- 18 years after resource access, has it contributed towards livelihoods of the local people involved/conservation of park resources (how do park management view the program?)
- How can local communities be involved in resource harvest impacts monitoring, what are the motivations/Incentives etc

What Skills are needed?

Social scientists, biologists, Ecologists, capacity of park staff, and local communities in data collections and analysis

Who should lead on these tasks?

UWA assisted by ITFC

Who has interest to assist in this

Donors, local governments, academic institutions, local communities

What role

- Local communities- harvest and data collections (participating in harvest impact monitoring)
- Donors-Source funds for research and monitoring
- Local Government- Policy, community mobilization,
- Academic Institutions-Research skills & proposal writing

Day 2 Discussions

CAPACITY BUILDING FOR CONSERVATION BMCA

1) What are the main requirements in terms of trained people?

Needs: Lobbying and coordination, Law-enforcement, Data collection and analysis, dissemination, community mobilization skills, advocacy skills, partnerships

Trained people: Community mobilization, communication and advocacy skills, conflict resolution skills, fundraising skills, project management skills, EIA skills, Risk and disaster management (e.g. fires), customer care (tourism), research skills, human resource management, partnerships and coordination of conservation activities, Problem animal management/vermin control management skills

2) What are the gaps?

Adequate finances, vermin guards in the districts, policy implementation gaps, trained personnel, inadequate manpower

3) What is the role of universities in capacity building for conservation?

Research, training in the skills outlined above, Develop a curricular that is based on hands on outputs that are relevant to conservation issues/problems

4) How can we encourage students into practical conservation and development

Attach students to conservation areas as interns/volunteers, Develop a curricular that is based on hands on outputs that are relevant to conservation issues/problems, encourage students to do research related to conservation issues that also tackle park management problems

5) How to identify projects

Do a needs assessment

6) How to facilitate?

Build partnerships for funding, etc.

7) What collaborations are possible for opportunities for funding

Institutional collaborations (government, NGOs)

8) How can communications between researchers and managers and policy makers be improved?

Information sharing workshops, joint trainings

9) What info is required?

Research findings

GROUP C: MONITORING COMMUNITY ATTITUDES

Day 1

Brainstorming notes

There are many interventions already tried out around BMCA. It is important to bear in mind that managing the park involves managing community attitudes. Thus, issues of illegal access, problem animals and poaching need to be better managed.

Do park neighbours appreciate the interventions?

Communities have been participating in volunteer groups (e.g. HuGo), which is a sign of community appreciation.

Which studies have been done on community attitudes?

Report by CARE-EEEGl has shown that attitudes are improving. According to survey, 76% of respondents were positive.

How has UWA used the CARE-EEEGl report?

Awareness-raising through community meetings, radio shows, school visitations, etc...

Revenue sharing, resource access, engaging communities in development e.g. supporting on farm forestry, basketry, road management, controlling problem animals

Encouraging MT hedge planting, unpalatable crops like tea, buffalo wall in Mgahinga, etc...

Overall aim: to increase community support for conservation

Challenge/problem to discuss: low participation of communities in conservation.

What approach used? Bottom up and participatory

Guidance by the chair

Problem statement: park management tries many interventions but wants to judge effectiveness of these interventions. So, there is need to devise ways and means to monitor attitudes and see if there is an improvement in attitudes.

Baseline: Trend on attitudes fluctuating, dire problem of community participation. For instance, why are people poaching?

Reactions

Nyungwe experience: people may have positive attitudes but still poach. So the problem is not just about attitudes but could also be about community participation

Question: is the problem also about culture? About poverty?

Observed: need to look at what underlies people's attitudes and practices.

Agreed: we need more than a study on attitudes. The question of attitudes is subjective. Does just knowing people's attitudes help UWA?

Underlying issue: is it lack of alternatives?

Need to investigate why family/household x or y goes into the park illegally. Use reformed poachers to help the current poachers to give up the habit.

Is it a problem of deterrents not being severe enough?

Since snaring is the main problem in BMCA probably the illegal activities occur for food

The problem could also be that communities poach for reasons other than food.

So, what other parameters do we need to monitor? Knowledge, attitudes and practices. Need to find a way to target especially practices.

More on the problem: park resources are cheaper compared to market products. Thus, need for wider development approaches e.g. improved varieties for cultivation and animal keeping

Counter argument: at times poverty is not the whole truth. Even well-to-do individuals poach. Why?

Do communities distinguish between hunting and poaching? Some think when they are hunting in the park they are not poaching!

The lake Mburo experience: Local communities comparatively better off than those in BMCA. They are allowed to hunt controllably but those in BMCA have no such opportunity. Why? It could be about animal populations, but do local people understand this? Has this been made clear to them?

Challenge: communities around BMCA have been sensitized but they seem to be hiding behind tradition. So, hunting is more of a ritual.

Agreed: need for research to understand how tradition/rituals influence illegal activities.

Use former poachers to convince others to give up the habit

Challenge: reformed poachers were involved in discouraging poaching. This effort declined but has been revamped.

Question of incentives or disincentives? The QENP experience where reformed poachers were helped to start income generating activities like poultry and goat rearing appears to be working. UWA also helped reformed poachers by employing them as casuals. However, some had very high expectations e.g. they wanted to be recruited as rangers and so did not feel rewarded enough for giving up poaching.

Q. Is research on this topic needed?

Yes, but in addition to attitudes the research should include

- Knowledge and behaviour/ practices (including illegal activities)
- Drives for illegal activities
- Socio-economic condition (CARE is still doing surveys on socio-economic status)/poverty, with attention to income, family size, education level, health care access
- Relationship between people and park
- Impact of gazettement BMCA on Batwa
- Establish through research other factors apart from attitudes leading to negative community conservation practices.

Q. Are there any trials that might help?

- Need to first collate the available data on community attitudes into a central data base. Then update existing baseline
- UWA in collaboration with local government should set up a forum for coordinated activities
- To assess the socio-economic costs generated by gorillas roaming outside of the park
- To think out of the box, for innovative management of Human Wildlife Conflict.
- To review the current criteria used in the benefit sharing concept between park and community.

- Population control as a means to reduce encroaching on the limited land around the park. As one produces more children the dependence burden and need for resources will drive such people to the park.
- UWA should lobby for key services to be availed to the community from line ministries for infrastructure development (water, power, better roads). The local community may attach such gesture to the presence of the park.
- Installing a wire mesh at the boundaries – though expensive may help to reduce elephant raids.
- Introduce large scale production projects/enterprises like IGA's projects (Agriculture project-fruit growing)
- Resettling the Batwa in areas of their choice
- Introduction of hunting licenses
- Promote alternative sources to forest-based resources for increasing household incomes (outside the park interventions trials).
- Intensive sensitisation of the communities/Education
- Using incentives e.g. improved varieties to boost agriculture and for poachers to stop illegal activities

Q. What skills are needed?

- Coordination
- Project management
- Research skills: analysis of socio-economic and illegal activities data, data management
- Lobbying
- Training community members in hand craft making.
- Planning and facilitation
- Communication
- Group formation, enterprise selection and development.
- Marketing
- Formation of village savings and loans association.
- Enterprise selection and development with community -Use USLAS formation
- Strategic promotion of the unique culture to benefit from tourism

Q. Who should lead?

UWA, supported by stakeholders such as local government and development partners

UWA should identify the needs and agree with different stakeholders (e.g. academic institutions, CSOs etc) on a common protocol for conducting the research.

Q. Who has an interest to assist with this?

Who?	Role
- Development partners*	Funding, execution
- Academic institutions	Research and monitoring
- Civil society organisations	Funding, execution
- UWA	Funding, coordination
- Local government	

*NGOs (IGCP-BMCT, UOBDU-CARE, NATURE UGANDA etc...)

DAY 2: CAPACITY REQUIRED FOR MONITORING COMMUNITY ATTITUDES

Challenges/issues raised

- Inadequate funding
- Logistical limitations

- Understaffing
- Inadequate training and retraining of UWA staff
- Poor communication skills
- Inadequate tools for research
- Poor quality tools for research e.g. poor quality data sheets
- Poor data management skills
- Few specialists in social sciences

Possible solutions

- Empower research and monitoring department of UWA with research skills, tools and feedback from other researchers
- Involve community leaders
- Empower community volunteers like HuGo
- Recruit more specialists in social sciences
- Increase UWA staff involved in research

Role of universities

- Training and retraining UWA staff
- Identifying and encouraging students for internships and volunteering with UWA
- Taking students for field courses in PAs

Improving communication

- Regular meetings
- Joint planning
- Google groups
- Social networks like Facebook
- Improving internet connectivity for UWA offices
- Provide incentives for researchers to share their findings with UWA

Funding opportunities

- Revenue sharing should facilitate research
- NGOs should contribute towards improving UWA's research capacity
- Local government should support UWA's research

GROUP D: Monitoring animals and other biodiversity

Day 1 Discussions

Current monitoring activities in BMCA

- Mountain gorilla: This is externally funded.....concerns about funding sustainability.
- Terrestrial vertebrates using camera traps: externally funded.... concerns about funding sustainability. Being part of a global network stands a better chance for long term funding
- Stripe breasted tits: funded by the researcher himself. Sustained enthusiasm!
- Vegetation (lianas, tree ferns and trees) monitoring: TEAM (2009.....), Gerald Eilu, David Hafashimana, Dennis Babaasa, MUZ plant resources (Robert Bitariho), Julius Lejju
- General biodiversity surveys (Andy Plumptre et al.)
- MIST: internally funded....high possibility for long term funding

Useful baseline inventories in BMCA (ITFC collection)

- Bird surveys with elevation (G. Malinga + A. Plumptre et al.)
- Small mammals + rodents (P. Mawanda, A. Kasangaki + A. Plumptre et al.)
- Amphibians (R. Ssekisambu + A. Plumptre et al.)
- Pteridophytes (Rose Badaza).
- Mammal inventories (Andama, + A. Plumptre et al.)
- Trees (Kakuru,)

N.B: Well designed inventories can in the long run become long term monitoring activities.

Is research on this topic needed? YES, If so what kind of research?

- Let us focus on indicator species. Possible examples; Albertine rift endemics (amphibians, birds, reptiles etc) since we don't have enough funds to monitor all taxa (everything).

What skills are needed?

- Adequate experience in forest ecology.
- UWA should have specialist teams/ individuals on different taxa to do the monitoring.

Who takes the lead on these tasks?

- UWA in collaboration with other stake holders.

Key recommendations to UWA to improve biodiversity monitoring programs

- Should set up a biodiversity monitoring data base in collaboration with other institutions e.g. NBDB, ITFC, WCS, MAK
- UWA be responsible in organizing regular research symposiums to share biodiversity monitoring information.
- UWA should develop a simple guideline for researchers to summarize management implications of their research findings.
- Collaborative funding (between UWA and stake holders) for biodiversity monitoring.
- The challenge is the annual staff transfers.....we lose lots of time training new rangers.

Who has an interest to assist in the roles?

- UWA should identify and attract interested stake holders through advertizing research priorities.
- Link with conservation agencies e.g. IUCN, WCS, CI, WWF etc.

How to improve communication/ dissemination in research?

- UWA needs summaries of the crucial findings

- Scientists should use language that managers understand, avoid jargon.
- Researchers are encouraged to present their findings at the head quarters e.g. Andy will be presenting soon at the head quarters. UWA invites you to give a talk.....should consider inviting other stake holders to these meetings to allow peer review. UWA is to start an advisory committee to help to review the reports.
- Researchers should check the website and make suggestions on how the website can help them make communication better.
- UWA should be able to get UNCST (and the reverse is true). UNCST advises researchers to contact UWA (for national parks) and NFA (for forest reserves). The challenge is that most foreigners run away before submitting their reports.
- Are past studies available on UNCST and /or UWA websites. UNCST is in process of doing this. UWA can give a list of the past studies.....the challenge is data sharing...people don't want to share their results.
- There is need for information management to keep track of already submitted work....also allows the council to advice researchers...also discourage plagiarism.
- An interface for data/ research sharing

Day 2 Discussions

Needs for capacity building

- Students should be attached to field stations... institutions to make requests for interns
- MOU's between UWA and stations are already expired...and ventured into business e.g. accommodation.
- Interface for data display e.g. animal, plant collections...e.g a map showing where different researches have been done.
- The MAK herbarium is currently upgrading its collections data base.
- The UNCST has such a facility....showing researches from different stations. This will help to identify gaps on the national level e.g. where monitoring plots are.
- Researchers need a one stop center where all researchers collect their products and works....tailored to fit particular audiences....hence works and products should be say divided in two categories....for the technical and non technical groups. The challenge is that getting biodiversity data in formats that can be absorbed by the system.

Appendix I. Partners' assessment of ITFC's performance

The 2012 information sharing workshop included a questionnaire with fixed choice and open questions. Forty complete responses were received of which 32 considered themselves well placed to judge ITFC's work (see table below).

ITFC 2012 workshop questionnaire analysis (40 responses)

• Do you feel qualified to judge ITFC's activities?	Yes 32(80%), No 8(20%)
• Rate ITFC's overall performance	Good 27(67%), Satisfactory 11(28%), Don't know 2(5%)
• Rate ITFC as a collaborator with your organization	Good 26(65%), Satisfactory 12(30%), Don't know 2(5%)
• Is there a need for greater integration of research and monitoring with PA managers?	Yes 36(90%), Don't know 4(10%)
• Is there a need for more research coordination in the region?	Yes 36(90%), No 1(3%), Don't know 3(7%)

We asked for negative or positive comments on what ITFC had achieved – several positive comments highlighted the value of the capacity building and well grounded practical research, several also indicated that they would like to see ITFC's work expanded more generally and that more work should be done on communities and their livelihood needs. On comments about collaboration several respondents were positive but wanted to see more joint activities and coordination – the information sharing workshops were highlighted as a valuable approach and opportunity.

Two thirds of respondents rated ITFC's performance and collaborations as "good". We asked respondents to identify ITFC's strengths. These were mainly in experience, presence, capacity building, dissemination, research skills and expertise. We asked where ITFC could improve: several responses were about specific research questions that people would like to see addressed, in addition several respondents wanted to see ITFC raise more funds and support more students, and work more widely. There were also requests for more information sharing meetings and more opportunities to collaborate.

We asked respondents "**Which ITFC related activities or results are /have been particularly useful or important? Why?**" and were given a diverse set of response. These included: "Research data on gorillas, bamboo regeneration and forest ecology", "information on wildlife conflict", "for academic and practical management purposes", "All related information of systematic investigation for new knowledge in conservation of UWA", "Bamboo research in Mgahinga NP, human wildlife conflicts and guiding in resource access", "Capacity building and providing information on key conservation challenges in PA management", "Capacity building through student research support", "Community research", "Community research", "Dissemination of research findings. It has helped in awareness creating and management initiative on timely basis", "Emails on publications", "Field staff empowerment because they are teaching their different skills e.g. using GPS, data collection etc", "Gorilla ecology, help in making decisions (management)", "Identifying research topics and areas", "Research progress sharing meetings", "Interest mainly with Dr Sheil for advise on my research project, but the information sharing workshops here brought together a team of professionals that are a gold mine of information", "ITFC carried out school sensitization activities for teachers and pupils of some schools in Ruhija. This is important because we need to target the young ones and impart on them the goodness of conservation so as to grow into responsible citizens", "ITFC research in Echuya forest and bamboo trends made recommendation on sustainable bamboo off-takes which became a basis for development of collaboration forest management plans", "Long term climate change monitoring stations (GLORIA site) at Mt. Rwenzori",

“Management oriented research work that has helped in decision making like multiple use program”, “Offering scholarship opportunity to students, researchers (post graduates)”, “Programmes like Multiple Use”, “Research has provided insight into management issues scholarships – capacity development”, “Research programmes, training and collaborations”, “Research symposiums”, “Resource assessment for sustainable use, problem oriented studies for management action”, “The ITFC Library”, “The study about Batwa and their livelihoods”, “Training and guiding the Ugandans and this particular workshop for information sharing”, “Useful in building the capacity of young researchers”, “Useful in monitoring trends in change of climate in tropical regions (Albertine Rift)”, “Various research findings and studies e.g. on the impact of bamboo harvesting. Continuous discoveries of other species e.g. lichens”, “Vegetation research and community research”, “Vegetation study, gorilla habitat use, monitoring bamboo harvest in MGNP etc”, “Wildlife health monitoring”, “Workshops like this to share information”.

90% of respondents wanted to see better integration of research and monitoring activities with management and more coordination in the region more generally. Reasons were that expertise and information were “scattered”, that efforts were being duplicated and that many lessons could be learned by more regular sharing. Several respondents were especially concerned how the communities were confused by the different actors and activities in the region. Opportunities for joint funding were also highlighted.

We asked respondents to list concerns and **“What do you consider the most pressing research questions?”**. The replies were diverse and included: “Agriculture and conservation”, “Alternative tourism attraction, increasing real benefits from gorilla tourism”, “Behavior changes in habituated gorillas”, “Causes of and mitigation measures for climate change”, “Climate change impact, food security, income generation and community livelihood, socio-economic impact of tourism”, “Climate change mitigation and adaptation strategies”, “Climate change monitoring studies (activities, indicators, actors, etc)”, “Current stability of the ecosystems, impact of the changes to ecosystems and species”, “How do you integrate government departments and donors to make effective change?”, “How relevant is Bwindi to climate change?”, “How to improve livelihoods without impacting ecosystems”, “How to improve the effectiveness and engaging local communities in development projects around Pas”, “Immuno-responses in gorillas”, “Impact of tourism on gorilla behavior”, “Impacts of climate change”, “Is government ready to face the impact of the degradation going on due to failure or poor policy enforcement and implementation?”, “Research covering livelihood improvement effect limiting its measures to be used to colonize the effect of oil exploitation biodiversity”, “Research into interventions, necessary to address the challenges of increasing human population on natural resources including conservation areas and reducing wild-human conflicts”, “Research of human-gorilla interface for zoonotic diseases”, “Research on resources (Natural resources use) around PAS and effects on climate change on protected areas”, “Resource access and off take”, “Set long term and consistent monitoring activities for biodiversity”, “Socio-economic surveys”, “SPP dynamics, socio-economic responses to the C.C”, “The extent to which poverty and high population growth have impacted on conservation and the environment”, “The impact of exploitation to biodiversity”, “Underlying causes of drivers of the long term threats and how they can be addressed”, “What are factors leading to continued negative practices towards the conservation area”, “What are the best practice and strategies for family planning”, “What are the causes of the increased wildlife in the park” and “What is government prospect of continuing to use command and control approach to conservation”.

We also asked **“What are the most pressing capacity building needs (skills, academia, professionals)?”**. Here there was less variation in replies with most highlighting either the need to develop skilled local researchers or the need to ensure all stakeholders are well informed about environmental issues. A couple of respondents highlighted the need for help with fund raising and with data management.

We also asked **“Any comments on the workshop?”**. Most of the comments were positive and appreciative, for example “Interesting, useful, necessary”, “Informative, keep it up”, “It was worthwhile; a lot was shared and learnt”, “Well organized and executed”, “Workshop was well organized”, “Very useful for making contacts gathering information about conservation issues”, “Great work shop”, “Interesting”, “Well organized”, “Very

impressive and interactive, bringing issues that are relevant to conservation of biodiversity and respect for human existence”, and even “Perfect”. But several noted that time had been limited and wanted more people to be invited next time for example. One was more negative “Too many participants, too many papers in very short time”. One respondent noted that “Being held in Mbarara town improved attendance” but another requested that the next meeting would be held in ITFC so that people could see the situation for themselves.