

INSTITUTE OF TROPICAL FOREST CONSERVATION-ECOLOGICAL MONITORING PROGRAMME

MBARARA UNIVERSITY OF SCIENCE AND
TECHNOLOGY



THE TEAM!

- Douglas Sheil (Director)
- Miriam vanHeist (Deputy Director)
- Robert Bitariho (Research Officer)
- Aventino Kasangaki (Research Officer)
- Barigyira Robert (Herbarium Technician)
- 19 Field assistants
- Finance and Administrative staff
- Others
- Alastair McNeilage (Former Director)

Background

- ITFC - field station of Mbarara University of Science and Technology based at Ruhija in Bwindi, S.W Uganda and was established in 1991
- Mission - *to lead in the implementation of biological and socio-economic research and training that furthers conservation and management of Albertine Rift forests and biodiversity*
- We have been implementing an Ecological Monitoring Programme for Bwindi and Mgahinga since 1998

ITFC Research and Monitoring Activities

1 Status of forest ecosystems and health

- Monitoring water quality of major rivers due to Anthropogenic activities
- Establishing the status of key mammal populations (Mt Gorilla and other large mammal census every 5 years, MPI research on Gorillas)

ITFC Research and Monitoring Activities (Contd)

2 Impacts of human populations on forest ecosystems

- Monitoring impacts of plant resource harvesting in Bwindi
- Monitoring impacts of water harvesting from the Kabiranyuma swamp in Mgahinga (Gravity water scheme)
- Monitoring fire incidences in Bwindi and Mgahinga

ITFC Research and Monitoring Activities

(Cont'd)

3 Biophysical status of the parks

- Climate monitoring in Bwindi and Mgahinga Parks (Daily recording of rainfall and temperature data)

Forest ecosystems and health

2 Water quality monitoring of Bwindi major rivers

Relates past and present human disturbance (past logging, agricultural activities & tourism) to benthic macro-invertebrates and physical-chemical parameters

12 sampling sites at four major rivers in Bwindi were established

The 4 major river are, Ishasha, Munyaga, Kajembajembe and Ihihizo

Two variables were selected as indicators for changes in water quality; Water transparency & Conductivity



Annual variation in water quality indicators of Bwindi major rivers (s.E in brackets)

Indicator/Year	2002	2003	2004	2005	2006
Conductivity ($\mu\text{s}/\text{cm}$)	56.1 (3.0)	57.6 (3.4)	58.2 (2.8)	66.3 (3.3)	70.3 (3.5)
Transparency (cm)	89.1 (4.8)	90.1 (6.0)	86.6 (4.9)	96.9 (4.9)	97.2 (4.9)

Annual variation in water quality indicators (continued)

- Transparency and conductivity measures were stable over the years suggesting stability within the BINP landscape
- There was also a significant difference in water transparency between 2003 and 2006 ($P = 0.038$) as water transparency has increased over years
- **Generally there are no major changes that have occurred within the Bwindi watershed to trigger dramatic changes in water quality**

Publications/Reports on water quality monitoring by ITFC

- Kasangaki Aventino, Babaasa Dennis, Efitre Jackson, McNeilage Alastair, Bitariho Robert (2006). Links between anthropogenic perturbations and Benthic macroinvertebrate assemblages in Afromontane forest streams in Uganda. ***Hydrobiologia 563:231-245***
- Kasangaki A, Efitre J, Babaasa D, McNeilage A, and Bitariho R. 2002. Benthic macro invertebrates in biomonitoring in Bwindi Impenetrable National Park, Uganda. (Abstract). ***Annual Conference of the Society for Conservation Biology***. Canterbury, Kent, UK
- Two unpublished reports in the ITFC library-Ruhija

Impacts of human activities

1 Multiple use (plant harvest impacts monitoring)

- Two medicinal plants; *Rytigynia kigeziensis* (*Nyakibazi*) and *Ocotea usambarensis* (*Omwiha*) harvested for bark harvest
- One basketry plant; *Loeseneriella apocynoides* (*Omujega*) harvested for whole stems
- Permanent Sample Plots were set up in Bwindi multiple use zones in 2001

Ocotea and *Rytigynia* Bark harvests



- Bark harvest from *Ocotea* tree



- Bark harvest from *Rytigynia* shrub

Loeseneriella Apocynoides



- A mature *Loeseneriella* stem ready for harvest



- *Loeseneriella* seedlings (take over 15 years to reach maturity)

Plant harvest impacts monitoring key results

- There are no clear negative harvest impacts depicted by the harvest of *Rytigynia kigeziensis* and *Ocotea usambarensis* bark
- *Rytigynia* and *Ocotea* annual bark yield in multiple use zones and non multiple use zones was not significantly different
- Harvest of *Loeseneriella apocynoides* (Omujege) depicts very high negative harvest impacts with over 80% of stems seedlings and resprouts
- There are very few “useful” harvestable stems of *Loeseneriella apocynoides* (Omujege) (>24mm) available in Bwindi
- *Loeseneriella apocynoides* (omujege) stems are highly demanded by local communities for making tea baskets and stretchers

Publications on Plant harvest impacts monitoring by ITFC

- Bitariho, R and Mcneilage A, 2007. Population structure of montane bamboo and causes of its decline in Echuya Central Forest Reserve, South West Uganda, ***African Journal of Ecology, Early online 2007***
- H.J. Ndangalasi, R. Bitariho, and Delali B.K. Dovie, 2007. Harvesting of non-timber forest products and implications for conservation in two montane forests of East Africa, ***Biological Conservation, Vol 134 (2,) 242-250, Elsevier.***
- Bitariho R, McNeilage A, Babaasa D and Barigyira R (2006). Plant harvest impacts and sustainability in Bwindi Impenetrable National Park, S.W Uganda. ***African Journal of Ecology, 44 (1), 14-21***
- Bitariho R and Mosango M (2005). Abundance, distribution, utilization and conservation of *Sinarundinaria alpina* in Bwindi and Mgahinga forest National Parks, South West Uganda. ***Journal of Ethnobotany research and applications, 3 (3): 191-200.***
- *Six unpublished reports available at ITFC-Ruhija*

Impacts of human activities

2 Kabiranyuma swamp monitoring

Kabiranyuma swamp is located in the saddle between Mt Muhabura and Mt Gahinga in Mgahinga N.P

The swamp is a high altitude swamp and one of the rare habitats in the region (including Mubwindi swamp in BINP)

It is a major source of water for over 35,000 people living adjacent Mgahinga through the Gravity water scheme

Kabiranyuma swamp monitoring



- Kabiranyuma swamp from top of Mt Gahinga



- Scramble for water from the Kabiranyuma gravity water scheme

Kabiranyuma swamp monitoring Key Results

- Observable decline in the number of endemic swamp plant species of *Alchemilla johnstonii* and *Lobelia wollastonii* (statistically significant)
- Observable increase in the “dry land” plant *Hypericum revolutum* seedlings/saplings (not statistically significant)
- Major swamp vegetation is *Carex spp* (60% cover)
- Fixed point photos have shown no decrease in swamp

Kabiranyuma swamp monitoring



- Channels draining water from the swamp



- Hypericum seedlings/saplings invading the swamp

Publications/Reports on the Kabiranyuma swamp monitoring

- Bitariho, R, Maryke G, Babaasa D, Kasangaki A (2001). The impact of water harvesting in Kabiranyuma swamp, Mgahinga Gorilla National Park, southwest, Uganda, ***Unpublished report, ITFC, Ruhija, Kabale***

Impacts of human activities

3 Fire incidences and damage monitoring

- Fires in BMCA caused by humans (Honey collection and from Agricultural fields during bush burning)
- We monitor fire locations, fire area damage and local community response to putting off the fires

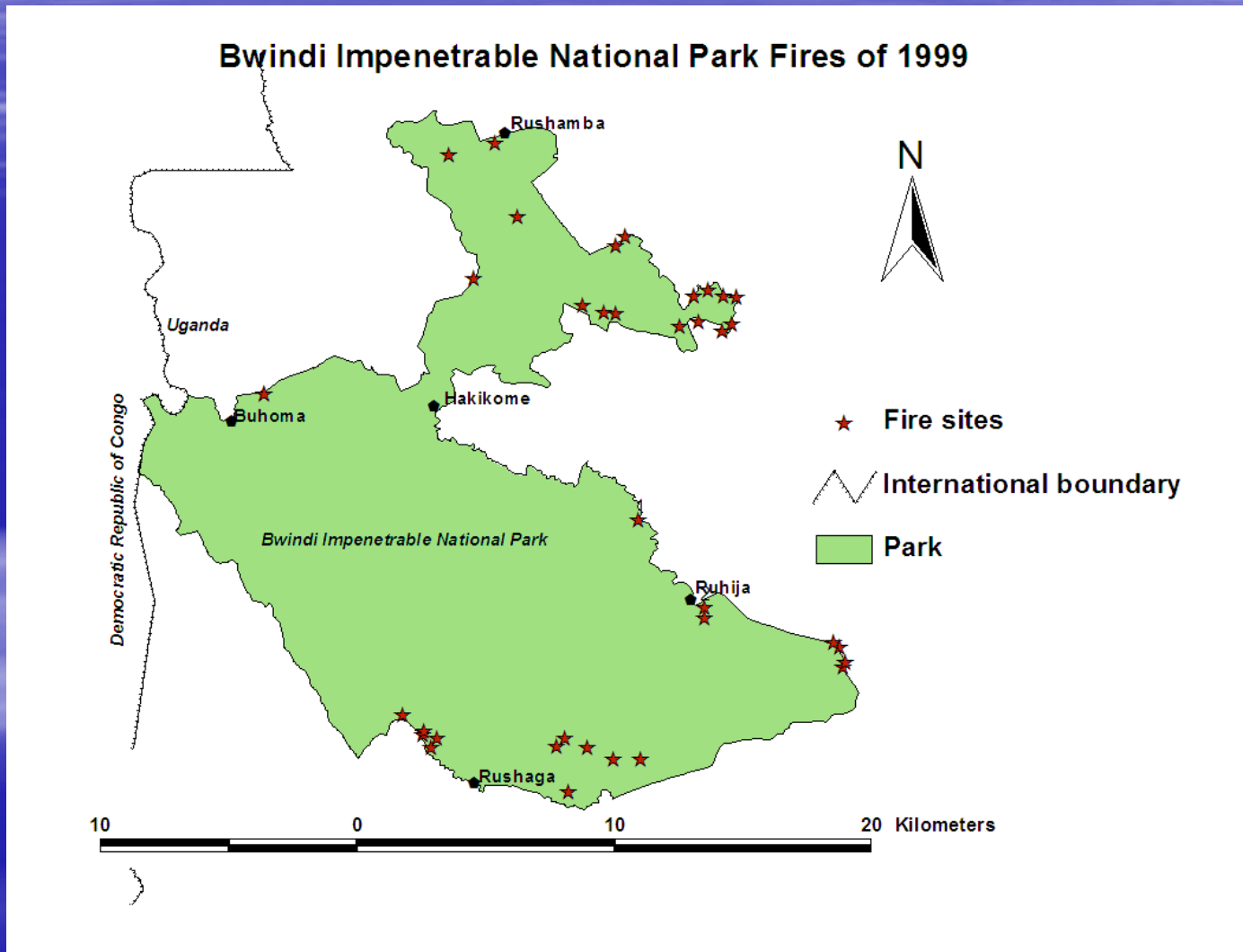
Fire damage in the southern part of Bwindi caused by honey collectors



Fire damage in Mgahinga caused by wild honey collectors



Fire damage sites in Bwindi Park



Fire monitoring results

	1999	2000	2001	2002	2003	2004	Average
# of fires	37	7	0	0	2	3	8.1
Area damaged (ha)	264	17	0	0	9.4	4.1	49
% fires put out with help of community	68	100	-	-	0	100	89

Fire monitoring results

- Fire incidences have greatly reduced over the last 10 years
- The greatest damage caused by the fires was in the year 1999 (La nina)
- High local community participation in setting off the forest fires (positive park mgt-community relation)

Publications/Reports on fire monitoring by ITFC

- Babaasa, D., Kasangaki, A. and Bitariho, R. (2000). Forest Fire Prevention and Control in Bwindi Impenetrable National Park, Southwest Uganda. ***Unpublished discussion Paper, Institute of Tropical Forest Conservation-Ecological Monitoring Programme***
- Kasangaki, A., Babaasa, D., Bitariho, R. and Mugiri, G. (2001). A survey of burnt areas in Bwindi and Mgahinga National Parks, Southwest Uganda: The fires of 2000. ***Unpublished report, Institute of Tropical Forest Conservation-Ecological Monitoring Programme***

The biophysical status BMCA

Ecosystem

Climate

- We are collecting climate data of daily rainfall and temperatures from five stations in Bwindi and two in Mgahinga at different elevations
- The weather stations are based on ranger outposts (Ruhija, Buhoma, Rushamba, Rushaga and Nkuringo in Bwindi and Ntebeko and Muhabura in Mgahinga)

Climate monitoring results

- The two main wet and dry seasons at Ruhija have been constant over the 20 year study period (1987-2007)
- There has been a temperature increase in BINP over the 20 year study period by 1°C (1987-2007)
- Ruhija has a mean daily maximum of 19°C and a mean daily minimum of 14°C
- Mean annual temperature at Ruhija is 16.3°C

Publications/Reports on fire monitoring by ITFC

- Bitariho, R, Babaasa, D and Kasangaki, A (2000). Weather Patterns at Ruhija, Bwindi Impenetrable National Park, South West Uganda. ***Unpublished report, ITFC, Ruhija, Kabale***
- Bitariho, R (1998). Notes on Climate Data Recording for the Ecological Monitoring Programme Of Bwindi Impenetrable and Mgahinga Gorilla National Parks. ***Unpublished Report, ITFC, Ruhija, Kabale.***

Other activities of EMP

- Incidences of fires in Bwindi and Mgahinga (**Reports available in ITFC library**)
- Potential supply of plant resources for local community use (medicinal and basketry) (**Reports available in ITFC library**)
- Review of the BINP multiple use program (**Reports available in ITFC library**)
- Potential supply of Batwa forest resources in **BINP**(**Reports available in ITFC library**)
- AND OTHER CONSULTANCY PROJECTS RELATED TO FOREST USE, SOCIO-ECONOMIC STATUS, FOREST SURVEYS, MANAGEMENT PLANS ETC**

THANK YOU