

LBA–Ecology Experiment Plan

Ecological Research in the Large Scale Biosphere–Atmosphere Experiment in Amazonia



August 1999

Version 1.0

**The Effects of Tropical Forest Conversion in Amazonia: Ecological Research in the
Large Scale Biosphere–Atmosphere Experiment in Amazonia (LBA–Ecology)**

LBA–Ecology Science Team

This document has been printed as a reference defining the state of the LBA-Ecology Experiment Plan following INPE's concurrence, received in August 1999. An up-to-date Experiment Plan for LBA-Ecology can be obtained from the LBA-Ecology Web site at: <http://lba-ecology.gsfc.nasa.gov/lbaeco/>

LBA–Ecology Experiment Plan

Ecological Research in the Large Scale Biosphere–Atmosphere Experiment in Amazonia

August 1999

Version 1.0

**The Effects of Tropical Forest Conversion in Amazonia: Ecological Research in the
Large Scale Biosphere–Atmosphere Experiment in Amazonia (LBA–Ecology)**

LBA–Ecology Science Team

TABLE OF CONTENTS

0.0 Executive Summary	1
1.0 Introduction	5
1.1 General Background	5
1.2 Investigation Selections and Planning Activities	5
2.0 Summary of LBA–Ecology	7
2.1 LBA–Ecology Science Question	7
2.2 Science Themes, Questions, and Tasks for LBA–Ecology	8
2.2.1 Land Cover and Land Use Change	9
2.2.1.1 Land Cover and Land Use Change Science Questions	10
2.2.1.2 Land Cover and Land Use Change Research Tasks	10
2.2.2 Carbon Dynamics	11
2.2.2.1 Carbon Dynamics Science Questions	13
2.2.2.2 Carbon Dynamics Research Tasks	13
2.2.3 Nutrient Dynamics and Surface Water Chemistry	15
2.2.3.1 Nutrient Dynamics and Surface Water Chemistry Science Questions	17
2.2.3.2 Nutrient Dynamics and Surface Water Chemistry Research Tasks	17
2.2.4 Trace Gas and Aerosol Fluxes	18
2.2.4.1 Trace Gas and Aerosol Flux Science Questions	20
2.2.4.2 Trace Gas and Aerosol Flux Research Tasks	20
2.3 Field Measurement Strategy	21
3.0 The LBA–Ecology Science Team	23
3.1 Membership and Responsibilities	23
3.2 LBA–Ecology Science Team Field Personnel	24
3.3 Science Team Summaries	24
3.4 Science Team Measurement Activities	24
4.0 Education and Training Goals and Objectives	46
4.1 Specific Training & Education Plans for Individual Investigations	46
4.2 Outreach Efforts	54
4.3 Media Relations	54
4.4 Short Courses and Workshops	54
4.4.1 The Ecology of the Carbon Cycle	54
4.4.2 Operation of Experimental Sites	54
4.4.3 Additional Short Courses	55
4.4.4 GSFC Residencies in Database Management for LBA Project Office Personnel	55
4.4.5 Additional Workshops	55
5.0. The LBA–Ecology Project Organization	56
5.1 NASA Headquarters LBA–Ecology Program Office	56
5.2 LBA–Ecology Project Office	56
5.2.1 Project Office at Goddard Space Flight Center	56
5.2.1.1 Project Manager	56
5.2.1.2 Deputy Project Manager	57
5.2.1.3 Project Office Staff	57

5.2.1.4 Brazilian LBA–Ecology Liaison	57
5.2.2 LBA–Ecology Project Science Office at University of New Hampshire	58
5.2.2.1 Project Scientist	58
5.2.3 Oak Ridge National Laboratory / Distributed Active Archive Center	58
6.0 Study Site Descriptions	59
6.1 Proposed Intensive Study Sites in Brazil	59
6.1.1 Brasília, DF	59
6.1.2 Manaus, AM	61
6.1.3 Rondônia	66
6.1.3.1 Ariquemes	68
6.1.3.2 Ji–Paraná	68
6.1.3.3 Machadinho D’Oeste	68
6.1.3.4 River Drainage Basins	68
6.1.4 Santarém, PA	72
6.2 Proposed Distributed Study Sites in Brazil	79
6.2.1 ACRE	79
6.2.1.1 Rio Branco	79
6.2.2 Amazonas	81
6.2.2.1 São Gabriel da Cachoeira	81
6.2.3 Mato Grosso	81
6.2.4 Pará	81
6.2.4.1 Northeastern Pará	81
6.2.4.1.1 Belém	81
6.2.4.1.2 Igarapé–Açu	83
6.2.4.1.3 Paragominas	83
6.2.4.1.4 Peixe Boi	84
6.2.4.1.5 Ponta de Pedras	84
6.2.4.1.6 Tailândia	84
6.2.4.1.7 Tomé–Açu	84
6.2.4.2 Altamira	85
6.2.4.3 FLONA de Caxiuanã	86
6.2.4.4 Jari	88
6.2.4.5 Marabá	88
6.2.4.6 Santana do Araguaia	90
6.2.4.7 Uruará	90
6.2.5 RIO GRANDE DO NORTE	90
6.2.5.1 Natal	90
6.2.6 Amazon Regional Studies	91
6.2.7 Ecuadorian Amazon Study Site	92
6.2.7.1 Sucumbios and Napo	92
6.2.8 Colombian Amazon Study Site	92
6.2.8.1 Yapu, VAUPES	92
7.0 Project Office Field Support: Infrastructure and Logistics	94
7.1 General Support for all Sites	94
7.1.1 Shipping	94
7.1.2 GPS	95
7.1.3 Communications	95
7.1.4 Permits and Related Issues	95
7.2 Ground–Based Support in Brazil	96
7.2.1 Proposed Intensive Study Sites	96
7.2.1.1 Brasília, DF	96
7.2.1.2 Manaus, AM	96
7.2.1.3 Rondônia	97

7.2.1.4 Santarém, PA	98
7.2.1.4.1 General Santarém Support	98
7.2.1.4.2 Primary Forest Site	99
7.2.1.4.3 Logged Forest Site	100
7.2.1.4.4 Pasture Site	100
7.2.2 Other Proposed Study Areas	101
7.2.2.1 Belém, PA	101
7.2.2.2 Rio Branco, AC	101
7.3 Airborne Sampling Support	101
8.0 The LBA–Ecology Data and Information System	102
8.1 Preface	102
8.2 LBA–Ecology DIS	103
8.3 The User’s Overview of the LBA–Ecology DIS	104
8.3.1 Minimizing the Time for Data to Become Available to All Investigators	104
8.3.1.1 Web–Based Data Search and Retrieval Requirements	105
8.3.2 Maximizing the Ease of Searching for and Retrieving Data	105
8.3.2.1 Web–Based Data Search and Retrieval Requirements	106
8.3.3 Facilitating the Preparation of Value–Added and Integrated Data	106
8.3.3.1 Web–Based Data Search and Retrieval Requirements	106
8.3.4 Developing and Operating the LBA–Ecology DIS at a Minimal Cost	107
8.3.4.1 Web–Based Data Search and Retrieval Requirements	107
8.3.5 Summary of Features and Functionality	107
8.4 A Technical Overview of the LBA–Ecology DIS	109
8.4.1 Data Registration	109
8.4.1.1 Investigator and Project Support Roles	110
8.4.2 Metadata Quality Assessment	110
8.4.2.1 Investigator and Project Support Roles	111
8.4.3 Data Search and Retrieval	111
8.4.3.1 Investigator and Project Support Roles	112
8.4.4 Data Quality Assurance	113
8.4.4.1 Investigator and Project Support Roles	113
8.4.5 Value–Added Product Generation	114
8.4.5.1 Investigator and Project Support Roles	115
8.4.6 Data Archival	115
8.4.6.1 Investigator and Project Support Roles	116
8.4.7 DIS Component Activities Relative to Data Maturation	117
9.0 Remote Sensing	118
9.1 Satellite	118
9.1.1 Needs of Investigators	118
9.1.2 Strategies for Data Acquisition	120
9.1.3 Summary of Existing Data Sets	120
9.2 Airborne Remote Sensing	121
10.0 References	123
10.1 Additional Contact Information	123
10.2 Bibliography	123
Appendix A. LBA-Ecology Proposal Abstracts	127
Appendix B. LBA-Ecology Contact Information	186

Appendix C. LBA-Ecology Project Office Contact Information _____	213
Appendix D. LBA-Ecology Participant List _____	214
Appendix E. LBA-Ecology Time Line _____	221
Appendix F. Acronyms _____	222