1.0 Introduction

1.1 General Background

The Amazon region (Amazonia), a vast area of 5.8 million square kilometers, contains almost one half of the world's undisturbed tropical evergreen forest and a large area of tropical savanna. Amazonia is important in the metabolism of the Earth, accounting for approximately 10 percent of the terrestrial net primary production. Equally important, it is a region of high biodiversity. Since the massive road–building efforts of the 1960's and 1970's, the Brazilian portion of Amazonia has experienced considerable development. Large areas of forest and savanna have been cleared and converted to cattle pastures or row–crop fields in several states including Mato Grosso, Pará and Rondônia. Selective logging has changed the structure and composition of forested areas, particularly in eastern Pará, southern Mato Grosso and along river courses. Based on research to date, we have a general sense that these activities have caused changes in carbon and nutrient budgets on land, the fluxes of gases between the land and the atmosphere, and the exchange of materials between the land and river systems. We need additional research to refine our understanding of the magnitudes of the changes and the controls on key biogeochemical processes in Amazonia's ecosystems. An understanding of the controls on these processes is essential for us to develop predictions of the consequences of changes in land cover and land use.

In this document, we outline a plan to study the ecological and biogeochemical consequences of land–use and land–cover changes in Amazonia. The planning of ecological research for LBA is an international exercise led by scientists from South America, the U.S., and Europe within the context of the Brazil–led LBA project. This draft plan focuses on the investigations being developed in response to the NASA LBA–Ecology solicitation. As we further develop this plan, we will continue to integrate the LBA–Ecology project within the overall framework of the Brazilian led Large Scale Biosphere–Atmosphere Experiment in Amazonia (LBA). Research on ecological questions will include investigations that are sponsored by Brazilian, other South American, and European partners. We refer to these programs in this document. We endeavor to develop an integrated study for ecological research wherein all investigators will work as equal partners.

1.2 Investigation Selections and Planning Activities

The NASA Terrestrial Ecology (TE) Program and the NASA LCLUC Program provide funding for LBA–Ecology. Forty teams of researchers were selected to conduct investigations. These 40 research teams in addition to the Project Scientist, the Project Manager, the Deputy Project Manager, and the NASA Headquarters Program Managers comprise the Science Team.

The LBA–Ecology project held its first Science Team Meeting in Miami from December 15–18, 1997. The Science Team began planning the research for LBA-Ecology within the context of the overall LBA project by defining the nature and approximate location of component research projects. The assembled investigators defined the LBA–Ecology science questions in four science theme areas. Discussions related to experiment implementation were held on the following subjects: data and information systems (DIS), site

selection, satellite data requirements, use of light aircraft for remote sensing, and training and education.

The Second Science Team Meeting for NASA's LBA–Ecology Project was held April 27–29, 1998, in Hunt Valley, MD. The meeting helped to develop collaborations necessary to accomplish the Project's objectives as an integrated effort. More than 100 Science Team members and international representatives from the U.S., South America and Europe continued the refinement of the Project's Science Plan. This second meeting further developed themes from the first meeting and provided information for development of this Experiment Plan including identification of the scientists' needs for infrastructure implementation, laboratory analysis, and other project support.