Talk for Panamanian group (board directors of PANAJURU) at STRI

27 June 1991

The Forest Dynamics Project at STRI

I. Thank you, and I am pleased to be able to describe to you my work here at STRI

II. FDP has two main components

A. A long-term study of forest trees on BCI in Panama

B. Coordination with similar studies being operated by a variety of different forest departments and universities in Malaysia and India, as well as new sites being planned in Panama, Ecuador, Thailand, Sri Lanka, and Indonesia

C. Our purpose is to gather data on abundance, growth, and survival of thousands of poorly known species of tropical trees, and to compare tropical forests throughout the world in a precise way

III. Tropical forests posed a great mystery to ecologists for many years

A. Early European scientists who explored jungles of the world repeatedly wrote about the great number of species they encountered and the difficulty they had identifying any of them; how finding two plants of the same species was often nigh impossible

B. This element of mystery persisted well into the modern era of ecology, indeed into the period when I was trained in ecology; when I first came to Panama as a student in 1977, my teacher, who is a world's authority on tropical birds, taught me that it was still nearly impossible for most biologists to identify tropical trees, let alone know how many there are of any one species or how they are distributed (this was a former STRI scientist who shall remain nameless)

C. I can easily personally testify to the extent of difficulty one can encounter trying to learn a tropical forest, compared to the temperate forests where I'm from; there is a sea of leaves (first slide), each slightly different from the others, but most without remarkable characteristics; I often am sure I will remember the one species, only to walk for several days through the forest without seeing it again (showing slides here); perhaps the monkeys and the ants know the leaves well, but for me it is an enormous chore

D. All of this makes it nearly impossible to make even vague guesses about what species are abundant, which are rare, how far apart are plants of the same species, in general, what characterizes the forest; even after spending years in the same area; and to both scientists and foresters, there are many important reasons for knowing how many trees there are of a particular kind that produces one sort of fruit, or has fine hardwood

E. The 1980's have been a decade in which scientists have

begun to pull back the shroud of mystery surrounding tropical forests, and our study of forests on Barro Colorado Island in Panama has been one of the most important contributions toward this end

IV. Starting in 1980, Robin Foster and Steve Hubbell undertook a census of all the stems above 1 cm dbh in 50 ha of forest on Barro Colorado; there seemed no other way to accurately characterize the forest -- to estimate abundances of different species, or to learn about growth and death of tropical trees

A. 50 ha is an area the size of 100 football fields, and ended up including 240,000 plants

B. There are 300 different species in the 50 ha, compared to 20-50 one would find in a similar forest in North America or Europe

C. This continues to be the largest and most complete map of any forest in the world

V. I have been fortunate to be involved with work that has uncovered many features of a forest that would have forever remained unknown without such a detailed census

A. We have precise maps of 300 different species (slides); we found a species that occurs entirely in 1 hectare of the forest on Barro Colorado

B. We found species that grow especially well on slopes

C. I have been carefully studying several species which show a peculiar distribution of juveniles (try slide of Trichilia and then Eugenia) -- repelled from adults; we are studying what causes this effect, as this is a very important phenomenon in tropical agroforestry; a variety of valuable tropical trees cannot be grown in plantations, where all neighbors are the same species

D. We have drawn similar maps and made similar studies of a forest in Malaysia which has more than double the number of species as the site on Barro Colorado

VI. In sum, there are two main purposes of our work with Forest Dynamics

A. One is an understanding of the structure of the forest -- number of different species and how abundant each is -- and especially, how this changes over time; since forests change slowly, we need to do long-term studies, and this is why we plan to return every 5 years to recensus the forest at Barro Colorado Island; we have already found important changes in the forest over a 10 year period, changes which we must understand if we expect to manage and conserve tropical forests

B. Second, we want to gather data on individual species of tropical trees from all over the world; most of the species we have studied in Panama and in Malaysia are virtual unknowns -- that they exist is the extent of human knowledge about them; there are 100s of 1000s of these poorly known trees in the world's tropics, many of which may be valuable as sources of food, or wood, or medecines; we intend to develop a library of basic data that will allow agronomists and foresters to test new species for human use