

as research equipment, including microscopes to be used both in the field as well as the laboratory. Provision must also be made for increased space and collection storage facilities at museums which are major repositories for collections resulting from the project.

10. *Budgetary Needs.*—A preliminary estimate of needs over a five-year period was prepared. Estimates of salaries for researchers were based upon approximately eight established scientists plus twelve graduate-degree students per annum. Local student assistants from University of Hawaii were estimated at eight per year at half-time. In addition, there will be need for secretarial, curatorial, and bibliographical personnel. The total salaries per year were estimated at \$230,500. For laboratory equipment and office expenses we estimate \$31,000 for the first year layout; for field equipment and supplies \$33,100. Transportation and subsistence for some members of the task force and for researchers from other states and countries, as well as those on the local scene (including round-trips to Hawaii, inter-island air transport, jeep operation, helicopter hire, and per diem, about \$73,000) will be needed each year. The grand total of our preliminary estimate for the entire five-year period will be \$1,964,850, including an estimate of \$375,500 for required publication expenses.

THE TERRESTRIAL BIOLOGY OF HAWAII

Revised Outline of Proposal to the National Science Foundation

I. ABSTRACT

II. GOALS IN HAWAII

A. Background:

1. Uniqueness, scientific importance, urgency. Terrestrial and fresh-water only.
2. Why relevant to the IBP
3. Body of basic information to build on:
 - a. The Physical Environment (Maps, climatological data, geology, etc.)
 - b. The Biota (Existing checklists, guide books, systematic monographs, ecological studies)

B. Objectives:

1. To determine the most critical studies and establish priorities
 - a. Taxa, sites, communities, ecosystems
 1. Criteria for selection of taxa and communities
 2. Taxa most urgently in need of study
 3. Sites and communities most urgently in need of study
 4. Ecosystems (proposed cooperation with PT-PF in selecting and studying)
 - b. Important invasive species
 1. Exotic
 2. Native species becoming "weeds"
 3. Effects upon native biotas.

C. Activities and Implementation:

1. Taxa
 - a. Biological studies: life cycles, pollination mechanisms, etc.
 - b. Systematic and evolutionary studies
2. Biology of invasive species
 - a. Naturalized
 - b. Native
3. Communities and ecosystems
 - a. Comparative ecological surveys
 - b. In-depth ecological studies of selected sites
 - c. Long-term analysis of a selected Hawaiian ecosystem; desirable if feasible; seek cooperation with PT-PF
4. Development of lists and bibliographies
 - a. Checklists and manuals of Hawaiian taxa, all groups (Need for new flora)
 - b. Annotated bibliography on Hawaiian biology
 - c. Lists of threatened taxa (cf. Red Book)
 - d. Lists of threatened habitats and communities, and areas that should if possible be preserved. (Not an action group; see Shetler, Bishop Museum; Intern. Conservation Association; Conservation Council for Hawaii)