EARTHWATCH INSTITUTE FIELD REPORT

Earthwatch Institute Mission: Earthwatch engages people worldwide in scientific field research and education to promote the understanding and action necessary for a sustainable environment.

Earthwatch Institute uses the UNESCO Definition of a Sustainable Environment:
A sustainable environment is one in which the natural environment, economic development and social life are seen as mutually dependent - and the interaction between them contributes to the sustainability and enhancement of the quality of people's lives and the natural environment.

This field report will be publicised on our weblink with the United Nations Environment Program (UNEP) World Conservation Monitoring Centre (WCMC) at www.unep-wcmc.org. This website is available to the general public.

Project Title: Biodiversity of the Grenadines

Principal Investigator (s): Dr. Gregg E. Moore

Position/Affiliations: Research Scientist, University of New Hampshire

Research Site(s): Southern Grenadines Islands (Carriacou, Frigate, Large, Mabouya, Saline, and White Islands)

Local Management Status of the Research Site(s): Proposed National Park

Scientific names of primary species being studied (if appropriate): n/a

Key Research Objectives:

- Conduct a botanical survey and characterize dominant habitat types within each island ecosystem;
- Conduct surveys of the dominant avian species (resident and passerine) within each island ecosystem;
- Conduct a survey of the butterfly species within each island ecosystem;
- Photo-document rare, threatened, endangered or otherwise conspicuous flora and fauna;
- Establish permanent transects and survey plot stations on each island and map plot locations, major habitat types, critical areas, or points of ecological interest using Geographic Information Systems (GIS) base maps.

Data Collection and Results

a) Give a concise account of the data you have collected during the past field season.

We surveyed the plant, avian and lepidopteran diversity of five islands within the southern Grenadines including Frigate, Large, Mabouya, Saline, and White Islands. Additional survey work was completed on Carriacou. Surveys of each island were conducted over a period of one to three days in both winter (January) and summer (June) sampling periods.

b) What progress have you made towards achieving your original objectives?

The primary objective was to survey the plant, bird and butterfly biodiversity of the above-referenced islands and to identify all species of the observed. This task was completed, although we now intend to continue these observations on additional islands within the region. The secondary objective was to document all rare, endangered, or otherwise conspicuous species observed. This task was completed, but will be extended to nearby islands as above. The final objective was to establish permanent transects and survey plot stations on each island and map plot locations, major habitat types, critical areas, or points of ecological interest using Geographic Information Systems (GIS) base maps. Towards these goals, we have not established permanent transects due to the fact that we altered our transect methodology. This will be a goal for 2005 now that a relatively complete flora for each island has been established. We have determined dominant habitat types and have sketched their boundaries on individual island maps. These zones have not yet been translated into a GIS format, as no GIS basemap is presently available at the scale our project requires. We are working with The Nature Conservancy's (TNC) Eastern Caribbean Program to obtain preliminary base maps to ground truth both our own observations, and the data layers provided by TNC. This important facet of the project remains as a critical goal for 2005.

c) Please provide a summary of your results (even if they are preliminary).

Our surveys to date have identified over 130 species of plants, 63 observed and positively identified bird species, and 21 species of butterflies. Our work determined that these islands contain up to 8 distinct micro-habitat types and that habitat types and diversity differed significantly between some, but not all islands. The plant diversity findings are presently the most compelling of the data, as there are many more data points and much more variability from island to island as compared with bird or butterfly observations. Neither plant diversity nor habitat diversity was correlated to total island size or maximum island elevation. In fact, the smallest islands demonstrated some of the highest plant and habitat diversity observed. However the ratio of plant diversity and total island size is negatively correlated to the estimated number of feral goats occurring on 3 of the 5 islands surveyed. We hypothesise that the presence of feral goats significantly impacts plant and habitat biodiversity and negatively affects total biodiversity within the region. Sustainable management of these important ecosystems will require effective management of feral goats and other indiscriminate, non-native herbivores.

Significance/Benefits of Research

a) What is/are the significance/benefits of your research at the following levels?

- Local – Within the research sites themselves, this research is providing a snapshot in time to be used as a baseline for biodiversity indices and temporal studies about habitat stability and changes. Locally, it is our intention that this work will lead to informed management decisions by local government and private land-owners, and in this way benefit and preserve the existing biodiversity. In extreme cases, such as overgrazed islands like Large or Saline, changes in management of feral goat populations could result in increases in biodiversity for a host of potential species.

- National - This work is directly applicable to and benefiting the national initiative to declare these islands as part of the proposed National Park and Protected Seascapes of Grenada, Carriacou and Petite Martinique. Documentation of plant, bird and butterfly diversity and the habitat types contained within these islands will aid in the evaluation of the ecological importance of the islands within local and regional contexts. This work should also lead to additional studies of other taxa, including reptile, mammal and other insects. Additionally, even without the National Park concept, knowing the existing ecological resources of these islands helps drive land management and conservation efforts as well as lead to informed development of sustainable ecotourism initiatives.

- International – This type of inventory and basic research is conducted widely throughout the world. Despite being common, the trends observed and management issues explored can help support other research, management, and conservation initiatives serving as a model, a case study, or lesson learned. Furthermore, the many topics covered under this study (plant conservation, biodiversity, island biogeography, habitat mapping, and invasive species/herbivore management) have significance to countless other environments and regions both within and beyond the Caribbean.

b) How do your findings contribute to issues of sustainability?

Originally, we predicted our research would be of direct importance to local and regional initiatives to develop sustainable tourism by identifying, protecting and showcasing natural resources of interest to eco-tourists and ecologists. The clear relationship between unmanaged foraging and loss of biodiversity was an unexpected finding, but of no less significance to any examination of sustainability. Clearly the issue of sustainable grazing of domesticated, wild or feral goats is a direct issue where our research could have very timely and significant benefits to the region.

Dissemination of Results

a) Have you provided details of results from your research to or within:

- Scientific papers
  A manuscript entitled Floral diversity and the impact of feral goats (Capra hircus) in the southern Grendaines was submitted to Biological Conservation and is presently in review.

- Management plans and reports
  A summary of our findings is presently in preparation to be presented to the Government of Grenada and will be used by several environmental NGO's within the region to assist their conservation work, data bases, etc.

- Presentations
  A presentation is planned to be made at the upcoming Nature Conservancy regional conference and the Eastern Caribbena Coalition for Environmental Awareness.