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The Moorea Biocode Project

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The Moorea Biocode Project (MBP) intends to genetically barcode the first complete tropical ecosystem, from the top of the highest peak to the limits of diving depths in the sea. The ultimate goal of the project is to characterize an entire tropical biota: marine, terrestrial and freshwater, in order to create a model system for biodiversity science. By building capacity to genetically identify all taxonomic components of the ecosystem, the outputs will create the most data-rich backdrop currently available for ecological studies. As model organisms, such as *C. elegans* and *D. melanogaster*, have shown for molecular biology and medicine, detailed knowledge of a system can greatly accelerate scientific discovery yielding significant benefits for society. The Moorea Biocode Project goes “beyond the barcode” to create digital keys (morphological barcodes) dynamically linked to images and genetic sequences, as well as non-sequence higher resolution genetic data to identify individuals for focal taxa. The comprehensive biocode approach will thus provide a major impetus to understanding complex ecological processes. Importantly, the work proposed is scaleable—for example, the biocode approach can be extended from its initial model system (Moorea) to develop tools for ecological monitoring and management planning across the biodiversity gradient of the tropical Pacific.

In addition to an integrated species identification system for field biology and conservation, the Moorea Biocode Project aims to provide an informatics infrastructure to unite ecology, systematics, and genomics. MBP is an international and multi-institutional collaboration coordinated in partnership between France (EPHE-CNRS), the University of California Berkeley, and French Polynesia (Délégation à la Recherche) via their field stations in Moorea: CRIOBE (EPHE-CNRS) and the Richard B. Gump South Pacific Research Station (UCB). Computer scientists associated with the Berkeley Natural History Museums, in cooperation with teams from other institutions, lead the biodiversity informatics development of the biocode.

The first year of the project, currently underway, is a pilot study to develop necessary partnerships and determine efficiencies for data capture and protocol workflows. Phase I focuses on the fishes, a subset of marine invertebrates, insects and spiders from selected terrestrial habitats, and the geckos of Moorea. We will review the current status of knowledge on all these fronts and present a progress report on our work to date.