Who Will Use a Global Mineral Resource Assessment? An Environmental Perspective[1]

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The loss of biological diversity is one of the most serious environmental problems facing our planet. Species, genetic diversity within species, and biological communities are disappearing at a rate faster than at any time in history. Environmental degradation, extinction, and the subsequent loss of biological diversity, or biodiversity, has wide-ranging implications for humans. The fact that we will leave our children with a biologically impoverished planet may be the lesser of our concerns. Environmental degradation has been linked to poverty, malnutrition, and disease. While the root of this degradation often lies in the consumptive behavior of developed countries, the consequences are felt most strongly in developing countries, which may not have the technology or capacity to cope with the problems.

Effective conservation depends on identifying potential threats to biodiversity before they have irreversible impacts. An early warning system that helps conservationists identify threats, and react quickly to address them, requires accurate, up-to-date information from many different sources. Scientific data from the fields of biology, taxonomy, behavioral ecology, geology, economics, and sociology are critically important to devising conservation strategies that work. Identifying areas of potential resource development is an important component of this early warning system.

Past mineral exploration and development have resulted in direct and indirect damage to biodiversity, and current exploration and development pose increasing threats in the world's biodiversity hotspots and major tropical wilderness areas (fig. 1). There is some concern that a global mineral resource assess-

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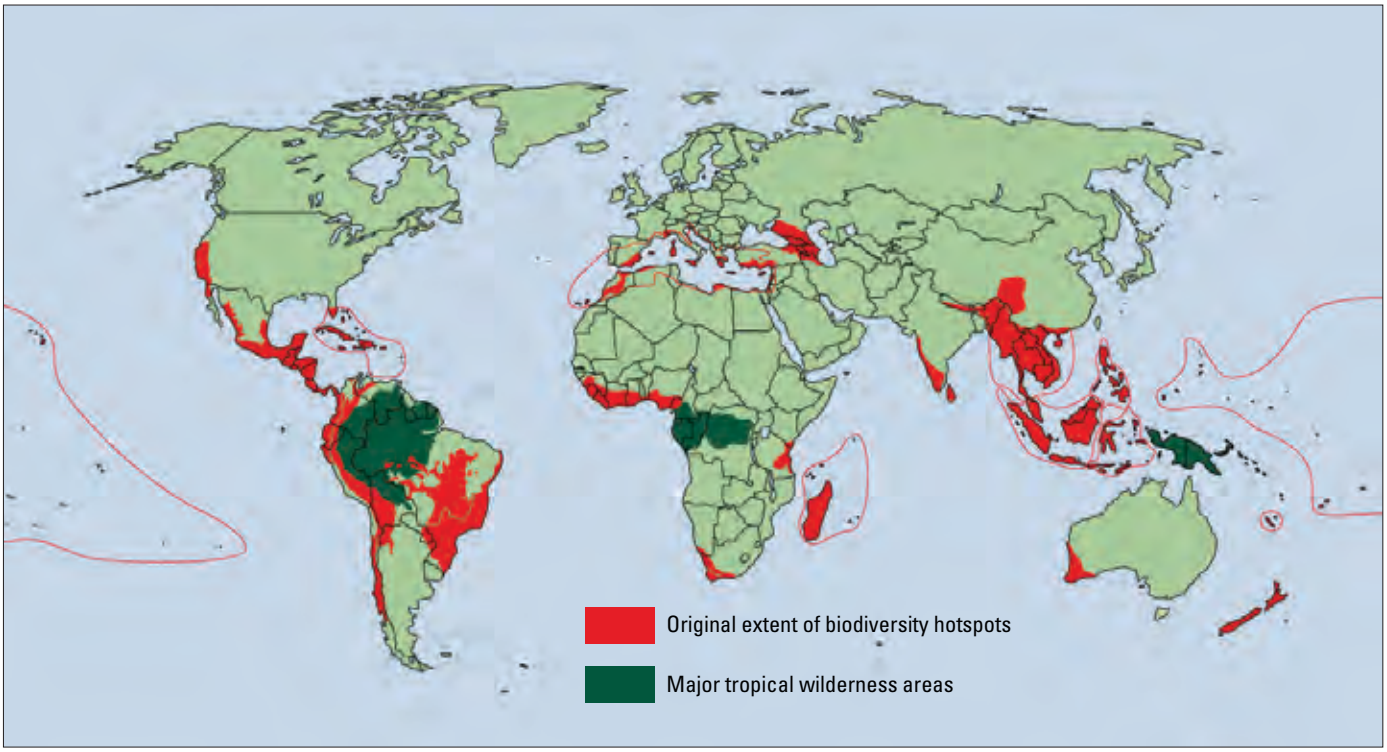

Figure 1. Map of biodiversity hotspots—Earth's biologically richest and most endangered terrestrial ecoregions (modified from Conservation International, 2000).

ment might highlight, and consequently target, biologically sensitive areas for mineral exploration. The reality is that mining companies probably have this information already, whereas most conservation organizations do not. It is important to know which areas are suitable for mineral development so that, when faced with such development, conservation groups can propose areas of lesser biological value or devise strategies to mitigate this development. Information resources from the geosciences, such as the global mineral resource assessment initiated by the U.S. Geological Survey, can level the playing field.

As conservation efforts increasingly aim to protect entire ecosystems, biologists need earth science information to understand the habitat requirements of organisms, including abiotic components such as water, soil, substrate, and nutrient cycles. The distribution of biodiversity is defined largely by the physical structure of Earth—elevation, soils, river meander, even continental drift over time.

Biologists need geological and topographical data to model species distributions when expensive field survey data are not available. Information on the distribution of species, especially those that are threatened and endangered, is important for designing systems of protected areas and for monitoring. In turn, biologists can help geoscientists to define a research agenda that would enhance conservation efforts. They can also work together to understand the effects of mineral exploration and development on biodiversity and human cultures. Science underpins effective conservation, and biologists and physical scientists need to collaborate.

Reference Cited

Conservation International, 2000, Map of biodiversity hotspots—Earth's biologically richest and most endangered terrestrial ecoregions: Washington, D.C., Conservation International, 1 sheet, scale 1:38,485,000.