

Center for Applied Biodiversity Science



CONSERVATION
INTERNATIONAL

Investing in Conservation Solutions

Earth's biodiversity is being destroyed at an unprecedented rate, with far-reaching and irreversible consequences for life on our planet. If current trends continue unchecked, we can expect the end of nature as we know it. The threat to humanity is enormous, since we rely on healthy ecosystems for clean air and water, soil conservation, watershed protection, and pollination of major food crops, to name a few of nature's vital benefits.

Fortunately, the world is waking up to the escalating crisis. The 1992 Convention on Biological Diversity, signed by 175 countries, reflects a global consensus of the importance of biodiversity in maintaining the planet's life-sustaining systems. Yet, traditional reactive approaches will not suffice if we are to successfully confront the complex conservation challenges of this dawning millennium. All too often, conservationists, scientists, and decision-makers face major threats to biodiversity only after potentially manageable situations have solidified into intractable losses. The Center for Applied Biodiversity Science (CABS), a division of Conservation International, is working to change this equation by anticipating harmful scenarios before such situations become unsolvable crises. By providing early warning systems for threats to and opportunities for biodiversity and its many components, CABS is striving to make conservation a more proactive endeavour.

In order to fulfill its objectives, CABS is currently working with numerous universities, research centers, multilateral and

government agencies, non-governmental organizations, corporations, foundations, and other institutions. Each year, over 20 senior-level scientists from a range of backgrounds become CABS Fellows who put their expertise to work helping us identify threats to, and opportunities for, the conservation of biodiversity.

Research at the Center ranges from modeling tropical landscape dynamics to the economics of biodiversity protection. Working with its partners, CABS field-tests promising solutions in priority ecosystems that are distributed across the 25 countries where Conservation International has on-the-ground presence. The Center also explores trends and opportunities by holding high-level conferences and seminars. These meetings bring together scientists, decision-makers, business leaders, and the media. Hosted by Gordon Moore and Edward O. Wilson, the next major biodiversity conference will take place at the California Institute of Technology later this year.

Finally, an integral part of the Center's mission is to stimulate and promote the dissemination of high quality information and analyses pertaining to global conservation. We are proud, therefore, to be associated with this very timely supplement of *Nature*, which will prove an invaluable state-of-the-art reference in the applied biodiversity sciences.

Peter Seligmann

Chairman and CEO
Conservation International

Gustavo A. B. da Fonseca

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BELOW RAP scientists, Dr. Marcos Callisto (Brazil) and Dr. LeeAnne Alonso (US) sample zooplankton in the Brazilian Pantanal, the world's largest wetland. (SEPTEMBER 1998)

Integrating Science and Conservation

The Center for Applied Biodiversity Science (CABS) is an institute designed to acquire knowledge most relevant to the assessment of endangered ecosystems and the unique species they contain, and to advise the conservation community on priorities this knowledge implies. Its mission also includes developing methods by which the goals of conservation can be more effectively met. CABS has an in-house function: to provide day-to-day scientific guidance for the programs of its parental organization, Conservation International, which is unusually practical and field-based in its orientation. It also aims to serve the broader global conservation community as an easily accessible research center and clearing house of information.

CABS researchers monitor and collate the now enormous and growing mass of information on biodiversity built by other scientists around the world. In addition, it draws on the original information provided by Conservation International's network of field stations, and still further on the databases from its Rapid Assessment Programs (RAPs). RAPs are surveys of vertebrates, plants, and other taxonomically well-known groups in habitats suspected of harboring significant numbers of unique species. When this initial sweep of sampling suggests that the locality in addition constitutes such a "hotspot" of biotic

endangerment, further studies and conservation activity can be quickly initiated. One of the key roles of CABS is thus to keep an eye on the natural world in order to provide an early warning system. In this it is true to the principle that conservation practice, like medicine, is most effective when correct diagnoses are made early.

The capacity of CABS and other organizations to master such a planet-wide set of problems is substantially enhanced by the ongoing revolution in information technology. It will soon be possible for researchers in the field, while conducting rapid assessment programs in even the most remote locations to verify taxonomic identifications by downloading illustrated monographs of plants, birds, and other organisms. When monographs are not available, the field biologist can acquire digitized images of type specimens kept in museums scattered around the world. Experts elsewhere can be consulted instantly by the same means, information can be exchanged, and advice can be sought. With the global positioning system the location of samples can be pinpointed to within a few tens of meters. And with key electronic journals online, other information on the ecology, geography, and economics of the region can be sifted and included, without delay. Much of the basic research for conservation practice will thus be speeded up, very likely by one or two orders of magnitude, as a great deal of the primary research, analysis, and reporting are accomplished right at camp sites.

By necessity, the role of CABS also extends beyond the natural sciences into the social sciences. Conservation is not achieved by the creation of reserves alone. It requires the support of local people whose lives are improved by the security of the natural environment around them, and of political leaders who come to view conservation as a benefit to their constituencies and themselves. In short, conservation science must include research in the relevant aspects of economics and the other social sciences, fitted hand in glove to traditional biodiversity research.

Gordon Moore

Co-Founder & Chairman Emeritus
Intel Corporation

Edward O. Wilson

University Research Professor
Harvard University



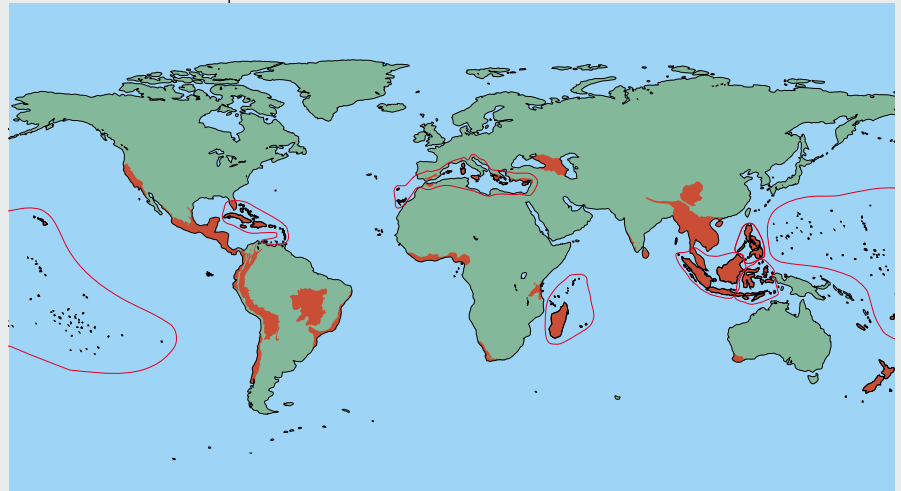
Conservation International and Biodiversity Conservation

Since its creation in 1987, the mission of Conservation International (CI) has been to conserve our planet's biodiversity and to demonstrate that human societies can live harmoniously with nature. This mission is both science-based and people-centered, recognizing that conservation must rely upon the soundest scientific underpinnings, while at the same time addressing the needs and aspirations of human communities.

The core element of CI's strategic approach is the hotspots concept. First developed by British ecologist Norman Myers, it focuses heavily on areas that are rich in biodiversity, and especially in endemic species, while being under severe threat. CI has just completed a reanalysis of the hotspots, a three and a half year study involving some 100 experts from around the world (see results in *Nature* 403:853-858, 2000). Twenty-five terrestrial hotspots were identified, including several not previously recognized (see map). These areas once covered about 12% of the land surface of the planet, but cumulatively have lost 88% of their original natural vegetation; they are now down to just 1.4% of the Earth's land area. Although this area is only about three times the size of Texas, the hotspots harbor, as endemics, fully 44% of all vascular plants and 35% of all tetrapods (i.e., mammals, birds, reptiles, and amphibians).

Paralleling the hotspots strategy is the major tropical wilderness areas approach. As with hotspots, these areas are also exceptionally rich in biodiversity; unlike the hotspots, they are still largely (>75%) intact, with low human population. Few and far between, these wilderness areas are found mainly in western and central Amazonia, the Guayana Shield region of northeastern Amazonia, the Congo Basin, and the island of New Guinea. About 60% of CI's programs focus on 13 of the 25 hotspots, while the remaining 40% are concentrated in the four wilderness areas.

CI has long been a leader in biodiversity conservation, having introduced innovative approaches and tools to the business of saving the full range of life on Earth. Included among its many firsts are the first-ever "Debt for Nature Swap," the user-friendly conservation software CI/SIG tailored to the needs of developing countries, and the Rapid Assessment Program (RAP) designed to



THE 25 GLOBAL BIODIVERSITY HOTSPOTS

quickly and effectively survey poorly known tropical ecosystems. CI has also been a pioneer in engaging the private sector in conservation, including partnerships with Ford Motor Company to promote conservation in Brazil, with Intel Corporation to bring leading edge information technology to the field, and with Starbucks to market environmentally-friendly coffee from hotspot ecosystems.

Major new efforts include the Healthy Communities Initiative (1997), which investigates linkages between biodiversity and human health, and the Tropical Wilderness Protection Fund (1999), which focuses on setting aside large blocks of intact tropical forest. Finally, CI's Center for Applied Biodiversity Science (CABS), established in 1999 and sponsor of this landmark supplement, is providing scientific leadership to the conservation community at large. In general, CI places great emphasis on partnerships with all sectors of society, since we believe that they are vital to making biodiversity conservation a reality.

CI is headquartered in Washington, D.C. and has offices in London, Tokyo, Amsterdam, Cape Town, and most of the 25 tropical countries in which it works in the field. More than 75% of the organiza-

tion's 600 staff are based in the field and represent more than 30 different nationalities. Its budget in fiscal year 2000 is \$33.6 million.

The organization is now positioning itself to set new standards for biodiversity conservation, among them a "moral high ground" of "zero deforestation – zero further species loss" for the hotspots. The first project under this banner is focusing on the Brazilian Atlantic Forest, through a major partnership with the Fundacao SOS Mata Atlantica, the largest Brazilian NGO. To further these and other major objectives, CI is now in the middle of a five-year, \$200 million capital campaign to raise the resources necessary for its ambitious conservation program in the new millennium.

Most important of all, CI has a positive, optimistic, can-do philosophy to achieving its goals. We believe that flexibility, agility, and the ability to adapt and create new and innovative solutions can take the conservation movement a long way towards successfully meeting the enormous challenges of the first two decades of the new millennium.

Russell A. Mittermeier

President
Conservation International



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