Habitat Fragmentation Can Amplify Ecological Stress

By Robin Meadows

Habitat fragmentation is even more devastating than we thought. Fragments are well-known to be inferior to intact habitat because they are more likely to lose species. New research shows that fragments are also more vulnerable to hunting, fire, drought and other kinds of ecological stress.

“Such negative synergisms could potentially be one of the most important—and least understood—aspects of the modern environmental crisis,” say William Laurance of the Smithsonian Tropical Research Institute (STRI) in Balboa, Panama, and Mark Cochrane of Michigan State University in East Lansing, who co-edited a five-paper special section called “Synergistic Effects in Fragmented Landscapes” in the December issue of Conservation Biology.

The findings in the special section include:

- Hunting may accelerate extinction in fragments. A study of hunting in Amazon forest fragments found that the smaller the fragment, the greater the overharvesting of animals from peccaries to monkeys to curassows (turkey-, tree-dwelling birds). The disproportionate impact of hunting on fragments is presumably due partly to the fact that fragments are more accessible to hunters. This work is by Carlos Peres of the University of East Anglia in Norwich, the United Kingdom.

- Fragments may also be more vulnerable to airborne pollutants. A study of atmospheric deposition in deciduous forest fragments in New York State found that during the growing season, sulfate is about 20% higher at the edge than in the interior. Moreover, nitrogen in the forest understory is about 45% higher at the edge than in the interior of fragments. Considered to limit the growth of many temperate trees, excess nitrogen could increase the growth of nitrogen-loving species along forest edges. This work is by Kathleen Weathers, Mary Cadenasso and Steward Pickett of the Institute of Ecosystem Studies in Millbrook, New York.

- Forest fragments can also be more susceptible to fire. A study of fire in the Brazilian Amazon found that more than 90% of burned forest was within a third of an edge. Once burned, many fragments are likely to burn again within a decade or two. The estimated historical fire interval is at least 100 years, and tropical trees cannot withstand more frequent fires because their bark is too thin. This work is by Mark Cochrane.

- Amazon forest fragments are also more susceptible to damage from El Niño-Southern Oscillation droughts. During the 1997 drought, trees near fragment edges were 50% more likely to die than trees in the interior. These fragments are already particularly vulnerable to fire because they have dry edges and often adjoin cattle pastures, which are burned regularly. Moreover, global warming could make Amazon forest fragments even more vulnerable to fire by exacerbating the periodic droughts. This work is by William Laurance of STRI, and Bruce Williamson of Louisiana State University in Baton Rouge, Louisiana.

This small but compelling body of research shows that other environmental stresses can amplify the effects of fragmentation. However, most habitat fragmentation studies fail to take other environmental changes into account, simply focusing on the fact that fragments are small and isolated. “The current fragmentation paradigm...is dangerously inadequate for conservation purposes,” say Laurance and Cochrane.
Global Trees Campaign is Launched

Trees are essential for life on earth, but over 8,000 species, 10% of the world’s total, are threatened with extinction. Woodland and forest destruction and unsustainable felling of valuable timbers are depleting birch, cedar, magnolia, mahogany, maple, meranti, oak and pine species around the world.

A Global Trees Campaign has been organized by Fauna and Flora International (FFI), which aims to save the world’s most threatened tree species and the habitats where they grow through information, conservation and wise use. The campaign focuses on trees as flagship species for conservation of ecosystems and landscapes and enables local people to carry out rescue and sustainable use operations. FFI is a UK non-government organization that acts to conserve threatened species and ecosystems worldwide.

PlantNet, the Plant Collections Network of Britain and Ireland, has produced an attractive leaflet, *Trees in Danger*, in collaboration with FFI to encourage people to support the Campaign. Nine species are illustrated in the brochure, including *Fitzroya cupressoides*, *Sorbus wilmottiae* and *Metasequoia glyptostroboides* with a map to show a selection of the many places in Britain and Ireland with diverse tree collections. The leaflet suggests that people should visit botanic gardens and arboreta and learn about their conservation activities.

For further information contact the Global Trees Campaign, Fauna and Flora International, Great Eastern House, Tenison Road, Cambridge CB1 2TT, U.K.; Tel: +44 01223 461481; or visit <http://www.fauna-flora.org>.

New Publications

One of the major impediments to the advancement of medicinal plant conservation is the difficulty of accessing and analyzing the relevant literature. Books and papers on medicinal plants count by the tens of thousands worldwide. The bulk of them relate to pharmacology and medicinal properties or to classical ethnomedical research. Regrettably, information on distribution, life history, biology, population status, levels of extraction and trade, or resource management of the taxa is scarce. Therefore, information urgently needed for setting plant conservation priorities is rare and scattered. The *Medicinal Plant Conservation Bibliography: Volume 2*, by Uwe Schippmann, is designed to collect this information from the scattered sources.

The *Medicinal Plant Conservation Bibliography* systematically reviews about 70 journals and newsletter for papers with relation to medicinal plant conservation issues. Also, other serial and monographic publications are included. The first volume included references of the years 1990 to 1996. The present, second volume covers the period 1997 to 2000. Volume 2 also contains sporadic references from earlier years. In total, 801 references and 170 reviews, indexed by general, geographic, and taxonomic keywords, are incorporated.

This volume of *Medicinal Plant Conservation Bibliography* (*MPCB*) can be obtained at the price of US$15.00 / GBP 10.00. It is available through: IUCN Publications Service Unit, 219c Huntingdon Road, Cambridge, CB3 0DL, United Kingdom; Tel: +44/1223/277-894; Fax: +44/1223/277-175; E-mail: info@books.iucn.org.

Future Meetings

**National Invasive Weeds Awareness Week 2002** (NIWAW III) will be held 25 February to 1 March 2002 in Washington, D.C. The event will focus on invasive weeds and non-native species issues and the critical role of federal programs in dealing with these problems. The schedule has been designed to provide ample time for participants to visit congressional offices and to inform them about invasive plant issues in particular U.S. regions. Additional activities are still being planned, but the week’s activities will include a breakfast briefing on key national invasive weed issues, meetings with federal agencies active in invasive weed management and control, a poster session for federal policy makers showcasing invasive weed problems and innovative management strategies from the country’s top practitioners and researchers, and a Congressional reception. NIWAW III is being sponsored by the Invasive Weeds Awareness Coalition, a Washington D.C. based coalition dedicated to increasing awareness of the problems and needs associated with invasive weeds. To participate and gain more information, contact NAWMA, PO Box 1910, 461 E. Agate, Granby, CO 80446-1910; Tel: 970-887-1228; Fax: 970-887-9560; or visit <http://www.nawma.org/niwaw.htm>.

An international conference on research to promote plant conservation will be held 8-10 July 2002 at Trinity College, Dublin, Ireland. Entitled “Science for Plant Conservation - An International Conference for Botanic Gardens,” this exciting international conference includes three days of contributed and invited presentations, and both pre- and post-conference trips to explore the plant diversity of Ireland. Although oriented towards the glo-
The Association for Tropical Biology will be holding their 2002 annual meeting “Tropical Forests: Past, Present and Future” in Panama City, Republic of Panama, from 29 July to 2 August 2002. The meeting will emphasize ecology and evolution, and the perspective to be gained through an understanding of past and future changes in climate and human populations. Tropical forests are undergoing unprecedented change as 1.2% of the remaining forests is removed each year, as hunters reduce vertebrate populations, as atmospheric carbon dioxide increases by 0.4% each year, and as global climate change begins in earnest. Symposia on paleoclimate and prehistoric human population density will provide perspectives on the modern human onslaught. Symposia on deforestation rates, consequences of forest fragmentation, and forest carbon balance will evaluate ongoing responses. Additional symposia are already planned for a wide range of topics of current interest. The deadline for contributed abstracts is 30 April 2002. The Smithsonian Tropical Research Institute, the Organization for Tropical Studies, and the Center for Tropical Forest Science will co-host the meeting. For further information, contact Smithsonian Tropical Research Institute, ATTN: ATB 2002, APO AA 34002-0948 USA; E-mail: ATB2002@tivoli.si.edu; or visit <http://www.stri.org/ATB2002>.

Current Literature


Heywood, V. 2001. Floristics and monography - an uncertain


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