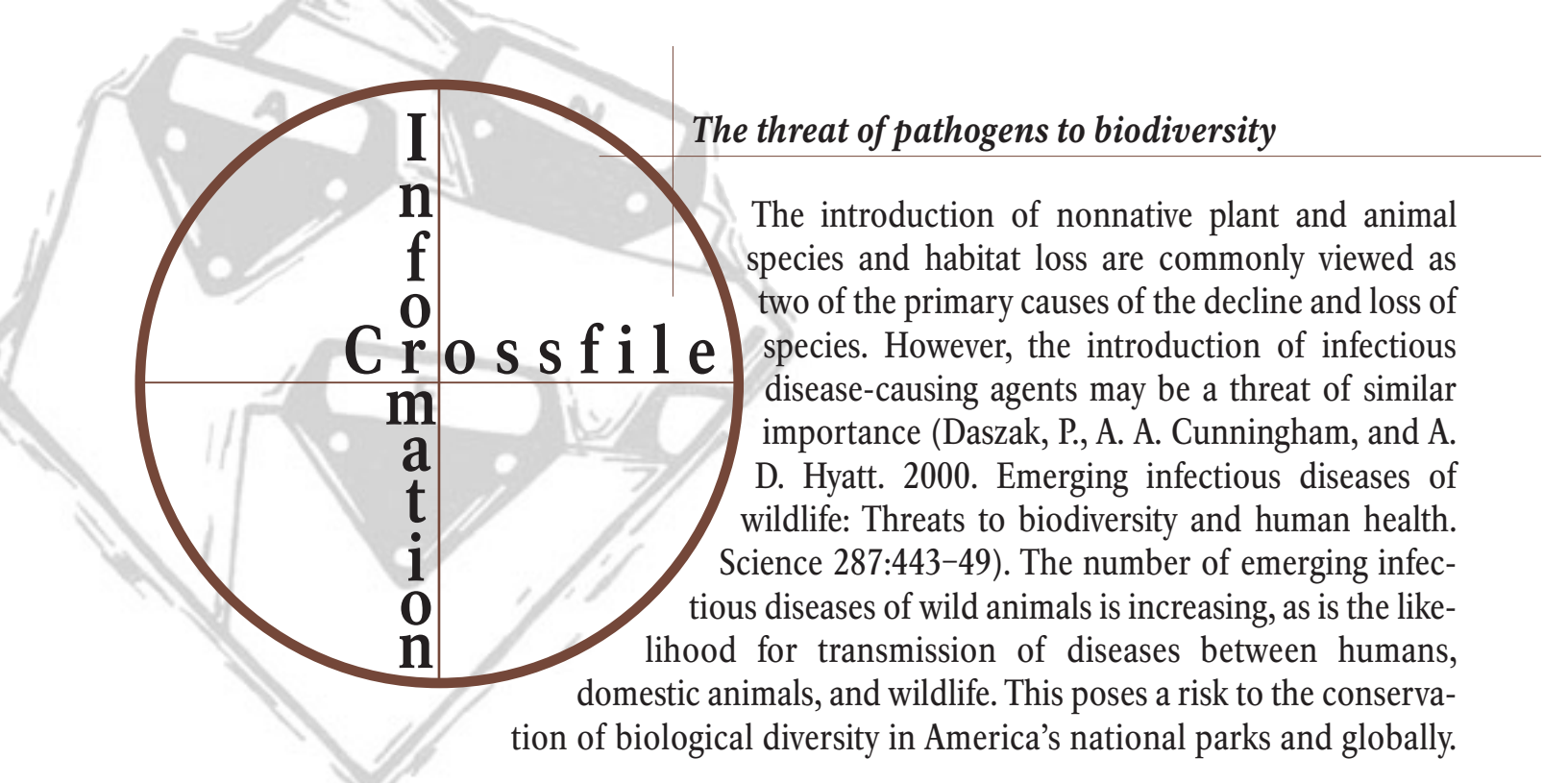




Information Crossfile

The threat of pathogens to biodiversity

The introduction of nonnative plant and animal species and habitat loss are commonly viewed as two of the primary causes of the decline and loss of species. However, the introduction of infectious disease-causing agents may be a threat of similar importance (Daszak, P., A. A. Cunningham, and A. D. Hyatt. 2000. Emerging infectious diseases of wildlife: Threats to biodiversity and human health. *Science* 287:443–49). The number of emerging infectious diseases of wild animals is increasing, as is the likelihood for transmission of diseases between humans, domestic animals, and wildlife. This poses a risk to the conservation of biological diversity in America's national parks and globally.

In addition to the well-known Lyme disease, rabies, and brucellosis, other infectious diseases can be transmitted among animal species and from animals to humans. In the United States these diseases include cryptosporidiosis, hantavirus pulmonary syndrome, and plague. Other diseases that can be transmitted between domestic and wild animals include canine distemper and canine parvovirus disease (that primarily affect members of the dog family), and strains of Newcastle disease (that affect poultry and waterfowl). An emerging fungal disease, chytridiomycosis even affects amphibians.

Human encroachment into wildlife habitat increases the likelihood for transmission of disease between humans, domestic animals, and wildlife species. Pathogens are also spread by people in several ways. The widespread introductions of animals into new areas poses a risk of transmitting infectious diseases to native animals that have never been exposed to the diseases. Infections may cause disease outbreaks, resulting in widespread mortality and possibly the extinction of local populations. This risk is particularly grave to endangered species.

Pathogens also may be introduced by international traffic in agricultural materials, domesticated animals, food crops, timber, and biologically contaminated wastes and ballast water. Evidence of this pathogen pollution (i.e., pathogens introduced by people) seems to be everywhere, even in Antarctic wildlife: antibodies to the infectious bursal disease virus, a domestic chicken pathogen, have been found in Antarctic penguins.

The authors noted the means to detect and control wild animal infectious diseases are inadequate. Although the conservation community has guidelines for preventing the spread of pathogens through the release of animals into areas where they have not lived, the guidelines have not always been followed. Between 1973 and 1986, conservation programs in the United States, Australia, Canada, and New Zealand translocated 700 terrestrial

vertebrate animals, but 24% were not screened for diseases.

The authors called for extending the integrative, multidisciplinary approach taken to detect and control infectious diseases in humans to diseases in wild animals. Detecting and controlling diseases in wild animals must include investigations of the ecology, pathology, and population biology of host-parasite systems, and the identification of underlying causes of diseases and spread of diseases. Rapid dissemination of information by modern media and far-reaching legal support are also needed to control these diseases.