



CRES

CENTER FOR REPRODUCTION OF ENDANGERED SPECIES

REPORT

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Under Threat of Pollution: Nepal's Royal Chitwan National Park

The Naryani, one of the major rivers of Nepal, rises in the Himalayas, flows south through Royal Chitwan Park and then into India, where it eventually enters the Ganges. Listed as a World Heritage Site, Chitwan Park receives an average of 65,000 visitors a year. The remarkable and unique mixture of wildlife in Chitwan Park—which includes the one-horned Indian rhinoceros, Asian elephant, tiger, leopard, sloth bear, wild dog, hyena, gaur, langur, gharial, mugger crocodile, and many species of birds—is largely dependent on the Naryani as a source of food and water. But the river is no longer pristine: a brown stain in the water can be seen for many miles.

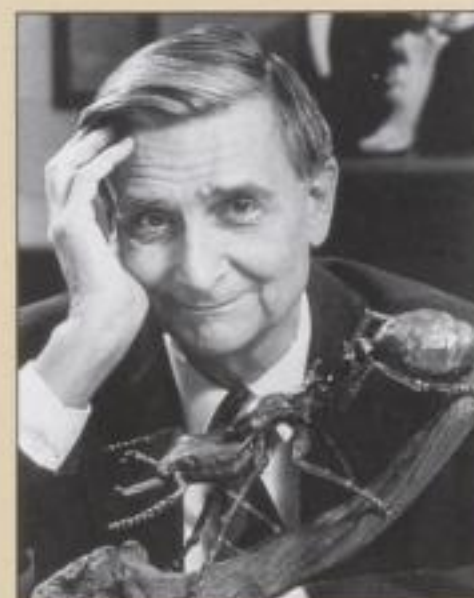
In the past ten years, the human population along the banks of the Naryani and just upstream from Chitwan has increased dramatically. The inevitable deforestation has followed, along with an increase in agriculture and industry—and, of course, a huge increase in pollution. This situation prompted the Nepalese to initiate a research project to assess the level of pollution in the Naryani River. It has brought together CRES endocrinology division staff and a team of students from Tribhuvan University in Kathmandu, Nepal, and from Florida International University.

Of particular concern is the effluent from a recently constructed paper mill—and the road through the once-pristine

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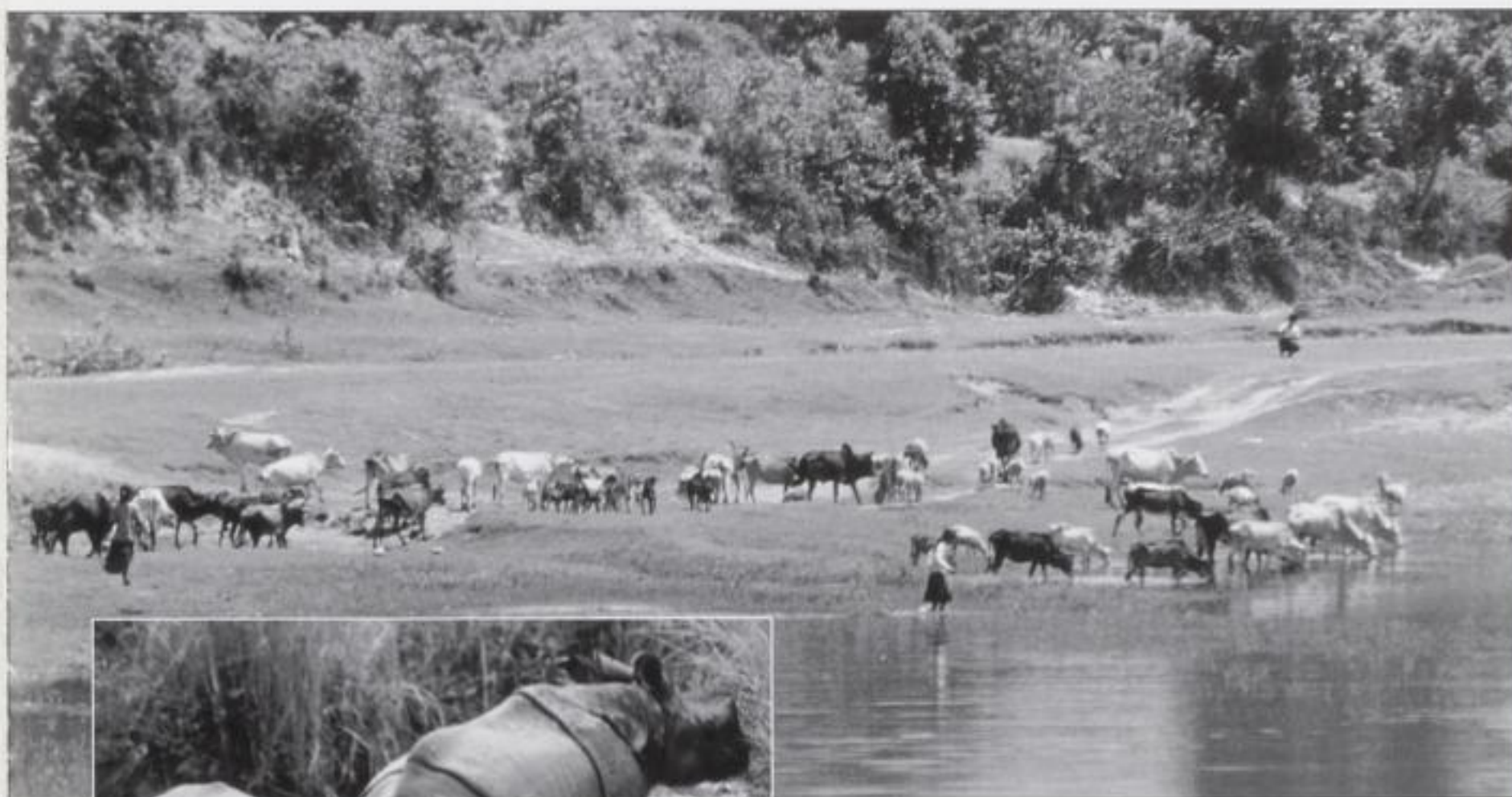
The Tyler Trust Donation
*Supporting giant panda conservation at CRES.
See page 3.*



Dr. Edward Wilson
*An evening with the Conservation Medalist.
See page 4.*



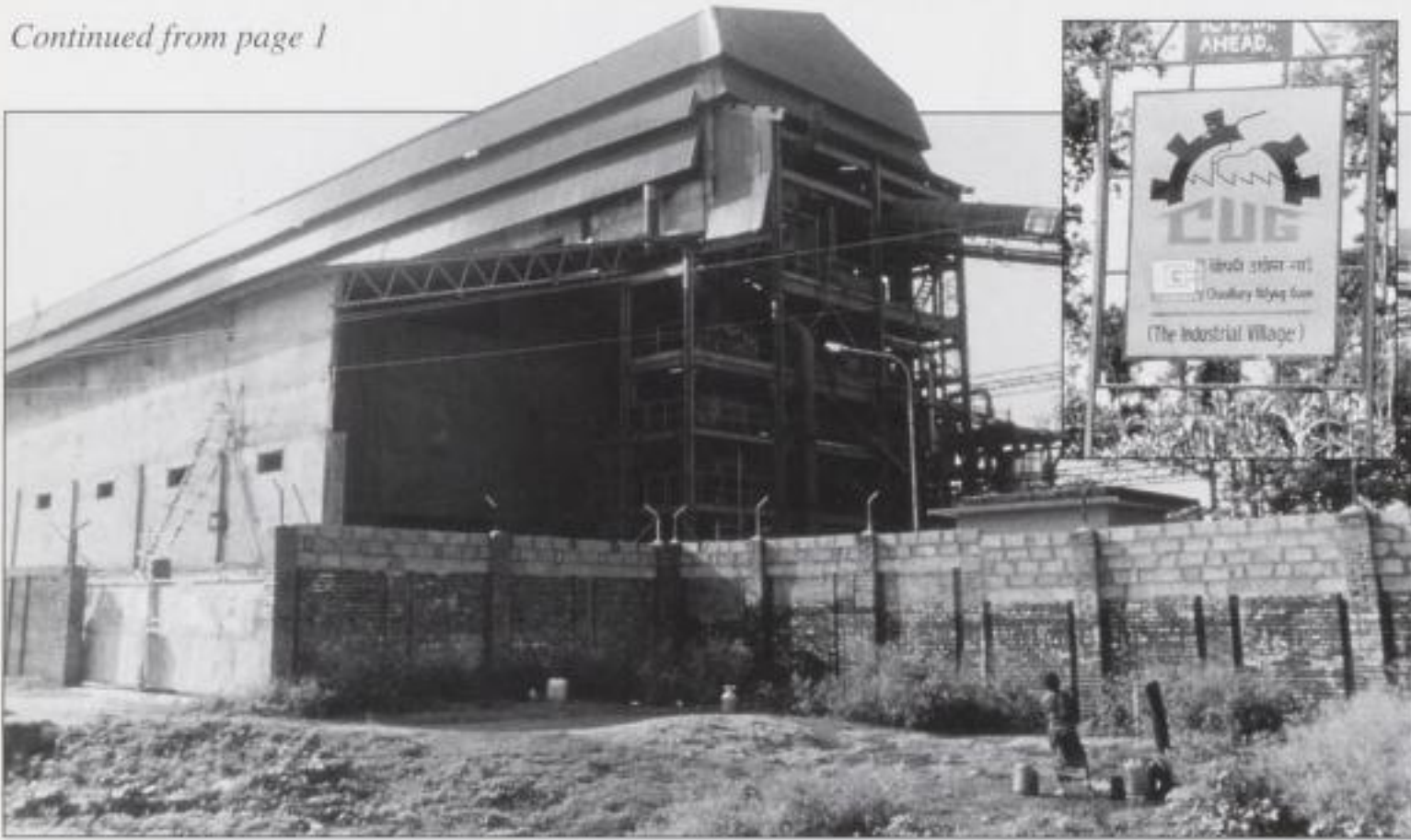
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Cattle along the banks of the Naryani, just upriver of Chitwan. Farmers and their livestock now share the river with native species such as the Indian rhino (inset).

Under Threat of Pollution: Nepal's Royal Chitwan National Park

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This paper mill factory and the road leading to it were a gift of the Chinese government to the Nepalese. The advertisement for an industrial village (inset) indicates more factories are being built near the Naryani, which will lead to increased pollution that affects local wildlife.

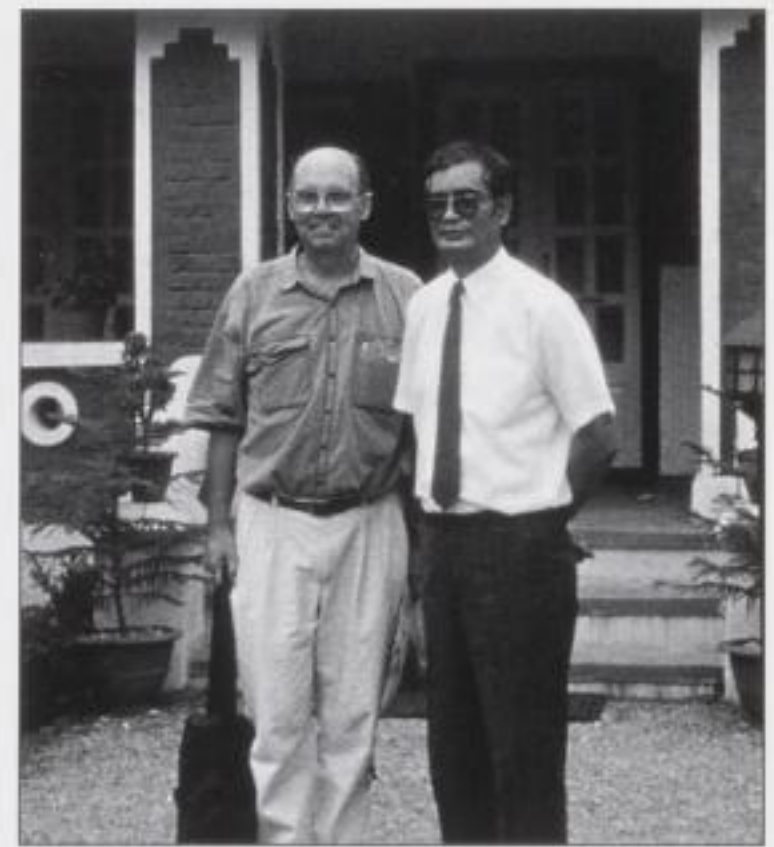
forest—that was built along the banks of the Naryani. When first built, the factory had the production capacity of 13 metric tons per day. Today, the mill has the capacity of 70 metric tons per day and employs 500 full-time workers.

An enormous amount of water—250 cubic meters per minute, or approximately 66,000 gallons per minute—is drawn from the river. Five percent is consumed and the rest is poured back into the river in the form of a dark brown, foul-smelling effluent. This effluent is produced 24 hours per day, 7 days a week.

The impact of this one mill alone is not known, but it is probably significant. The

director of Chitwan Park is concerned about this potential threat to the health of the park's ecosystem, as are a number of other Nepalese conservationists. However, in order to persuade the government to exert some measure of control over this pollution, we must first document the extent of pollution in the river.

There have been a large number of studies on the effects of pulp mill effluents on aquatic wildlife in Canada, the United States, and northern Europe, and all showed negative impact. Even in the most modern mills, where attempts have been made to reduce the levels of toxins in the effluent, there are still significant effects on wildlife. In addition to this mill, there are a number of small factories under construction in the



Author and CRES endocrinologist Dr. Valentine Lance (left) at the Central Zoo, meeting with R.K. Shrestha, director of the King Mahendra Trust for Nature Conservation in Nepal.

area and a major brewery and distillery—all of which will be adding their effluent to the Naryani River.

The impact of road building on forested areas is now well known. The road along the Naryani's banks is a classic example of how such well-intentioned efforts can lead to ecological disaster. The spectacular forests that supported one of the richest faunas in the world are almost gone. The population along this stretch of river is increasing rapidly. With a modern road, a large pool of cheap labor, and an unlimited supply of water from the Naryani, this region will attract even more industry.

We are documenting levels of pollutants in the river at various points, starting upstream from the mill and at intervals downstream, where the river enters Chitwan Park. A report on the levels of pollution and their potential threat to the wildlife of Chitwan will be presented to the Nepalese government, with a goal for conservation and antipollution measures to be implemented before irreparable damage is done.

—Valentine Lance, Ph.D.

Head of Endocrinology Division/CRES

Unique and endangered species like this one-horned Indian rhinoceros are dependent on the Naryani River. This CRES project will document levels of pollution in the water, which is a potential threat to the health of the park's ecosystem.

