



Lake Nicaragua, Central America's largest source of freshwater, is a flashpoint in plans for an interoceanic canal.

of biologists, some take a sunnier view. Deforestation and pollution are already ravaging Nicaragua's environment, they note, and they applaud HKND's plans to replant forests near the canal to halt erosion and control runoff. They also view the project as a possible boon to science: a chance to collect a windfall of environmental data through HKND-funded studies in a country too impoverished to support much fieldwork. "We should provide help and support, so that the [impact] study is as complete as possible and the canal's impact on the environment is as minor as possible," says Ricardo Rueda, a botanist at the National Autonomous University of Nicaragua (UNAN), León.

The scientific debate is unlikely to dissuade President Daniel Ortega's Sandinista government from pursuing a megaproject that it claims is vital to the nation's future. Nicaragua is the second poorest country in the Americas, after Haiti, and "we don't have many development opportunities," says Manuel Coronel Kautz, president of the Nicaraguan canal authority.

Nicaragua stands to gain a 1% stake in the canal each year, which means that after a half-century of operation it will have accumulated a controlling stake. In the meantime, the canal law states that HKND will pay the Nicaraguan government up to \$10 million a year

for 10 years. "We want to transform the economic lives of Nicaraguans—that's what makes us revolutionaries," says Coronel, a long-time Sandinista. "And there is no other option that makes as big of an impact."

Far from posing a further threat to Nicaragua's dwindling forests and wetlands, asserts engineer Bill Wild, HKND's chief project adviser, the canal will benefit conservation by bringing economic development. "I personally believe that the only thing that will save Nicaragua's environment is the canal," Wild says. "There is nothing else."

FOUR CENTURIES AGO, Spain dreamt of what Nicaragua is bent on doing today. Tired of schlepping gold and silver across Panama on foot and by mule from mines in western South America to ships in the Atlantic, the empire began eyeing Nicaragua as an alternative route. Although wider than both Costa Rica and Panama, Nicaragua offered a hydrological advantage. The navigable San Juan River allowed large ships to sail

from the Atlantic 200 kilometers inland to Lake Nicaragua. Crossing the lake's roughly 100-kilometer span left a mere 20 kilometers to the Pacific coast. But when an engineer surveyed the potential canal route, he found that ships would need to be raised and lowered more than 30 meters as they traversed the Nicaraguan terrain: too great an elevation to overcome with 17th century technology. Other countries thought to pick up where Spain left off, but time and again their plans fell through.

Hoping to succeed where empires stumbled is HKND's founder, a Chinese magnate named Wang Jing. His plans, too, face skepticism because of the project's costs and scale. "Practically every week there's a reason to believe the canal is going to happen and another reason to believe it won't," says Edmundo Jarquín, an opposition politician here. HKND says it plans to finance the project by attracting investors on the open market. But he says that "if the canal is built, it won't be for financial reasons." Instead, Jarquín says, it would be part of a larger "geopolitical vision" backed by the Chinese government. If Beijing doesn't step up to fund the canal's construction, the project could

collapse, says R. Evan Ellis, an expert on Chinese-Latin American relations at the U.S. Army War College Strategic Studies Institute in Carlisle, Pennsylvania. An economic feasibility study HKND commissioned has not been made public.

Since securing the preliminary concession, HKND has been investigating possible canal routes, including the one Spain considered. After determining that commandeering the San Juan River would be too destructive—and would surely anger Costa Rica, which shares the river as a border—HKND settled on a route running from Brito through Lake Nicaragua to the mouth of the Punta Gorda River (see map, p. 222).

Although Lake Nicaragua was once considered a boon to a canal, it now presents a daunting engineering challenge. The lake's average depth—13 meters—is far too shallow for supertankers and cargo ships. To create the necessary 30-meter-deep channel, HKND must carve 17 meters into the lakebed. ERM estimates that would require removing 715 million cubic meters of sediment: "the largest wet excavation ever," Vammen says.

She worries about what it might stir up. In the single sediment core from Lake Nicaragua analyzed for the impact study,

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Jorge Huete-Pérez, Central American University

says, "is going to be an environmental disaster of enormous dimensions."

Huete-Pérez had already published editorials in *Nature* and *Science* (23 January 2015, p. 355) decrying the project's downsides, including the possible salinization of Lake Nicaragua—Central America's largest source of freshwater—and the forced relocation of indigenous communities in the eastern part of the country. He views the 11,000-page impact assessment, conducted by Environmental Resources Management (ERM), a consulting firm headquartered in London, as inadequate. Many others expressed similar qualms at a meeting of Nicaraguan and international scientists that Huete-Pérez organized in November 2015 to review the assessment. "It's irresponsible" to commit to building the canal with so little data, says Katherine Vammen, a water expert at UCA. "There are just too many left-open doubts."

But among Nicaragua's small community