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## Lake Nicaragua In Decline, Besieged By Corruption, Privatization, And Politics

by Mike Leffert

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Lake Nicaragua is the largest and most important source of fresh water in Central America, the second-largest lake in all of Latin America. It has the potential to bring potable water to many of the isthmus's 32 million people, half of whom have no access to clean fresh water. But before that potential can be realized, the lake must be saved from the state corruption, the international politics, and the unfettered commercialization that, taken together, are killing it. In Nicaragua, the lake is known as Cocibolca, the sweet sea. Second in size in Latin America only to Lake Titicaca, it covers approximately 8,624 sq km and, like a sea, features high winds, crashing waves, and even sharks. In all, a formidable body, impervious to natural forces but not to human avarice and neglect (see NotiCen, 2006-02-09). One of the major sources of the lake's contamination is the proliferation of fish farms, specifically of tilapia. Taking advantage of the government's failure to exercise its regulatory powers regarding private exploitation of the lake, the firm Nicanor SA operates breeding pens for these fish. Of combined Norwegian and Nicaraguan capitalization, the enterprise also has another advantage the general manager of the operation, Patrick Bolanos, is the nephew of President Enrique Bolanos. The farm incorporates a processing plant on the shores of San Ramon, Ometepe. Ometepe is an enormous island in Cocibolca. Caged rats In October 2003, an interim environmental review prepared in connection with negotiations for the Central America Free Trade Agreement (CAFTA) included documentation written in 2001 by Salvador Montenegro Guillen, director and founder of the Centro para la Investigacion en Recursos Aquaticos de Nicaragua of the Universidad Autonoma de Nicaragua (CIRA/UNAN). After writing on the rising value of tilapia on world markets and the ease with which they can be grown in captivity, Montenegro took on the unsuitability of the methods used in the lake, where they are bred in huge cages, because "breeding aggressive species such as tilapia is not allowed in cages in natural waters in civilized countries because the risk of harm is big and unpredictable." The CIRA/UNAN report emphasized that the cages were designed to be used in artificial ponds or lakes, not in natural water. It dismissed as myth the idea that the fish are herbivorous and therefore harmless. "Tilapias are similar to rats in their ability to adapt, resist, and take advantage of whatever they find to feed on," said the report. "That is why they are so dangerous to the balance of natural ecosystems. The tragedy caused by rats in the country is equivalent to what tilapias do to natural water." The report went on to say that, even if the fish could be kept in the cages (unlikely), "there is a serious and harmful effect resulting from three thousand to five thousand metric tons of live fish crowded in a space of 21,000 sq meters, the size of a cage. This amount of fish constantly produces waste equivalent to the raw sewage of a growing population." Authorizing the project, Montenegro wrote, would be the same as installing a chicken pen with 3.7 million chickens suspended over the water. "In other words, the waste-elimination system of this gigantic project is the water of Lake Cocibolca, the same water the government of Nicaragua has declared to be used for drinking and for ecotourism." The portion of the report cited in the interim environmental review concludes, "There is nowhere in the world, and there could never be, a waste-water treatment system for this kind of intensive culture." The interim environmental review also makes much of the connection between the project and the position in it

of President Bolanos' nephew. It calls the approval of the project "backroom manipulation," running contrary to Bolanos' publicly stated policy, "a policy that supports good administrative practices and transparency in the study and management of natural resources, as well as the binational integrated management and sustainable-development initiative for Lake Nicaragua and the San Juan River Basin." Trapped sharks In the succeeding years, much of what the review warned against has come true. Other signs of deterioration include a decline in the number of the lake's famed fresh-water sharks. In this case, it is not the quality of the water that is at fault as much as a failure to maintain an open channel to the Caribbean for the animals to breed. At one time, myth had it that these animals lived and bred exclusively in the lake, but research has shown this not to be the case. They breed in saltier waters and require access to the Caribbean along a route that has not been looked after because of Nicaragua's border squabbles with Costa Rica (see NotiCen, 2004-10-28). Research by ichthyologist Thomas Thorson and others has revealed a great deal about the bull sharks' ability to osmoregulate in fresh-water habitats. Osmoregulation is the control of the levels of water and mineral salts in fluids of the body; it is a homeostatic mechanism. For the shark, a failure of this mechanism would result either in dehydration or fatal dilution of physiological fluids. It was Thorson who discovered that the sharks are not a distinct species and that they readily traverse the rapids of the Rio San Juan. The animals were found to have body fluids more than twice as salty as fresh-water fishes, and so they experience a massive influx of water, which must be excreted at huge energetic expenditure. Newborns are not capable of this expenditure and must therefore be born in the saltier environment of the Caribbean, so that is where the sharks court, mate, and bear young. Once mature enough to osmoregulate, the sharks can remain in the fresh water of the lake for four to six years. Now the sharks of Cocibolca are being thwarted in their efforts to keep their behavior tuned to their physiology because Nicaragua and Costa Rica cannot come to terms on maintaining the route of their peregrinations. "We have tried to reach this accord in meetings of the Sistema de Integracion Centroamericano (SICA), but Costa Rica has been reluctant despite it meaning the extinction of these species in our lake," said Miguel Marengo, director of Nicaragua's Administracion de Pesca y Acuicultura. Marengo was also concerned for the survival of sierra, another species dependent on access to the sea. He said the issue is nets cast by Costa Rican fishers that block the passage through the San Juan. He said the entire river used to flow into the Caribbean on Nicaraguan territory, in the Bahia de San Juan del Norte, but now, because of sedimentation and the sinking of a Costa Rican vessel at Barra del Colorado, the course changes toward Costa Rica, where the fishers deploy their nets. "We have a permanent prohibition on fishing sierra and sharks in the Great Lake because they have been almost extinguished since the decade of the 1980s when they were overexploited," said Marengo. Marengo's agency has proposed to the Nicaraguan government dragging the river to return it to its original channel. He charged that failure to reach an accord with Costa Rica owes to the ongoing battle regarding the permissibility of navigation on the San Juan by armed Costa Rican security forces. The case is in the International Court of Justice (ICJ) in The Hague. Meanwhile, back at the lake, other factors have added to the choked outflow and tilapia to produce a rapidly thickening soup. Ecologist Dr. Jaime Incer Barquero explained, "There are several factors that progressively have been deteriorating the quality of Lake Nicaragua, among them urban waste from the populations situated on the banks, especially Granada, rural waste carried by the rivers that empty into the lake, both from the Nicaragua side and the Costa Rica side, like toxic herbicides, fertilizers, and sedimentation from the lake's watershed, which have been mismanaged by deforestation, hillside cultivation, the expansion and burning of pasturelands, etc." Recent studies have shown the increasing presence of ammonia and E coli bacteria. Incer said the data lags behind the reality because CIRA has not had the funding to monitor the situation more

than sporadically, and neither the government nor the university have provided sustained support. On the legislative side, said Clemente Martinez of the environmental organization Humbolt Center, "It can be said that there is a legal framework abundantly filled with good intentions referring to the use and protection of the waters." Article 97 of the Ley General de Aguas Nacionales (1996), for instance, says, "The state has the responsibility, with the participation of municipal governments, regional councils, municipal associations, the private sector, nongovernmental organizations (NGOs), and the population in general, for the protection, conservation, and use of the waters of the Great Lake of Nicaragua or Cocibolca." There are other laws and several bills before the Asamblea Legislativa (AL) supporting strong protective measures. But, with it all, "the lake has suffered, not for lack of laws, but for lack of a cultural attitude of protection," said activist and former mayor of Juigalpa Edwin De Castilla. The laws are simply not obeyed. Incer summed up the causes of the lake's decline as a "combination of administrative inefficiency, intervention of private interests, and corruption and bribery." He gave as an example an initiative of a group of lakeside mayors for protection of the lake, "but the AL didn't consider it because of objections or pressures from MARENA [Environmental Ministry]. The link to corruption is that private businesses pay taxes as bribes to be able to continue to dump waste." President Bolanos is in the process of soliciting UNESCO, the UN Educational, Scientific, and Cultural Organization, to designate the lake as a Patrimony of Humanity site, but at the same time MARENA and MIFIC (Industrial and Trade Ministry) are accepting projects that will dump more contaminants into the water. And while these apparently contradictory activities compete, local governments are planning for their populations to drink the water. The government of Juigalpa has drawn up a plan and appears to have won US \$21.5 million in financing from the South Korean government for this purpose. De Castilla predicted, "In the near future, cities like Managua, Masaya, Leon, Granada, Rivas, etc, will all look to the Great Lake Cocibolca as a source of potable water." Studies show the lake produces 41.3 million cubic meters of water a day, giving it the potential to supply not only Nicaragua but all of Central America. The Korean money will finance a holding tank with a capacity of 492 cubic meters, or 130,000 gallons, a treatment plant, and a pipeline along the Juigalpa-Puerto Diaz highway. It is to be built by Empresas Nicaraguense de Acueductos (ENACAL). Said Martinez, "It is calculated that we have enough water to satisfy the national need, but the country lacks distribution facilities and supervision of the quality." About 30% of the population of 5.4 million has no access to potable water, and a high percentage in rural areas have only contaminated water. To reach these people, 48% of the rural population, with good water service would cost about US\$300 million, according to estimates. Managua also faces water scarcity, but, in the case of the capital, the problem is a system in such a condition of obsolescence and disrepair that it leaks 50% of the 110 million liters consumed by its one million inhabitants. In all of Central America, it is estimated that half the 32 million people either have no access to potable water or have water that is not quality controlled. [Sources: [www.elasmoresearch.org](http://www.elasmoresearch.org), no date; [www.lasuerte.org](http://www.lasuerte.org), 10/07/03; Associated Press, 01/17/06; Notimex, 03/14/06; Inforpress Centroamericana, 05/05/06]

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