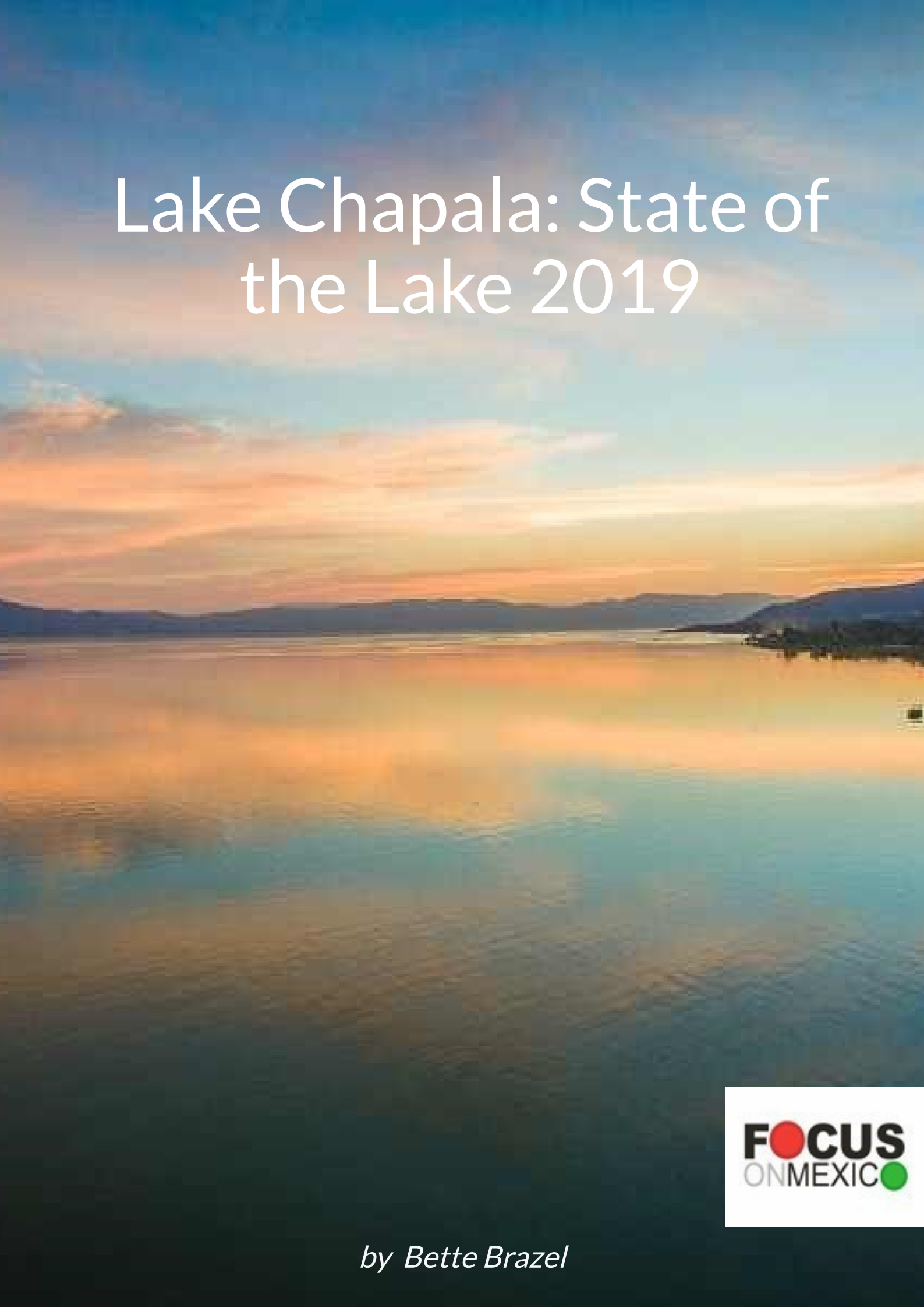

Lake Chapala: State of the Lake 2019

FOCUS ON MEXICO

by Bette Brazel

Lake Chapala: State of the Lake 2019

Lake Chapala is the largest freshwater lake in Mexico formed over 12 million years ago. It is shallow lake with an average depth of 23 feet, deeper in some parts near the east end and shallower in others, and is approximately 50 miles long and 20 miles wide. For centuries the indigenous peoples have revered the life giving water of the lake, fishing in its waters, bathing on its shores and making offerings to the goddess of the lake. Beginning in about 1970, the Santiago-Lerma River, which feeds into the lake, began to be heavily used for industrial and agricultural purposes, dumping heavy amounts of industrial and pesticide waste into the river, which then filters into lake.

As of February 2019, the lake level is at ~96%, something not seen in the past 20 years or so when the lake level has averaged approximately 60-65%.

Much has been written about the state of Lake Chapala in the run up to and aftermath of the 2018 elections. So let's look more in-depth at the pollution problem and the importance of and challenges facing Lake Chapala.

Water Pollution Around the World

Like almost every body of water on the planet today, Lake Chapala is under pressure. To put this in context, I've recently returned from a visit to the Ganges, one of the most polluted rivers in the world today affecting over one billion people, and it's been widely reported that water pollution is being seen as far north as the arctic circle and in tropical waters in remote ocean regions around the world. Fortunately, the Indian government is beginning to implement similar solutions to the Mexican government, including rehabilitation and construction of new wastewater treatment plants. It remains to be seen what will be done worldwide to deal with the pesticide problem which is contributing heavily to the pollution of the planet. As inhabitants of our environment, we should all be concerned about the state of our rivers, lakes and oceans

Lake Chapala Pollution

The particular pressures facing Lake Chapala are related to the aforementioned industrial and agricultural waste, dumping heavy metal and pesticide residue into the lake, and the lack of modern waste treatment plants. Currently, many towns and villages around the lake release waste water and sewage directly into the lake. The approximately 40 waste water treatment plants that are functioning are outdated and inefficient.

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A study prepared by the Mexican Water Technology Institute indicates that the water quality of the lake varies in different parts of the lake, with the most contaminated areas located near the mouth of the Lerma river and the area of the lake directly in front of Chapala, Ajijic, San Juan Cósala and Jocotepec. The contamination near the mouth of the Lerma river is primarily chemical, while the contamination found in the tourist areas is primarily organic. The fields of corn, sorghum, alfalfa and chickpea, located in La Barca, Jamay and Poncitlán use pesticides and fertilizers that end up in the lake.

The lake is also invaded with water hyacinths that were bought from Africa 100 years ago as a decorative plant. Although the lake water tested for levels of heavy metals is within international norms, the water hyacinths and the tuberous plants show higher concentrations of heavy metals, and they are breeding grounds for mosquitos and other noxious insects. The phosphorus from detergents and agrochemicals along with nitrogen used in fertilizer also contributes to the proliferation of water hyacinths and other noxious plants.

Lake Water Usage

Laws in place since the early 1980s govern how much water from Lake Chapala is destined for use in Guadalajara, but the population of Guadalajara, estimated to grow from the current 4.5 million inhabitants to 12 million inhabitants in the next 50 years, will require new water solutions to provide water for agriculture, public consumption, and to preserve the lake. Currently, 62% of the drinking water consumed in Guadalajara comes from Lake Chapala after treatment.

Can you swim in Lake Chapala?

While there are many wonderful anecdotes of foreigners swimming in the lake daily back in the 1950s/60s, it is no longer advisable for all of the reasons described above, and in 2019 the high lake level has made swimming even more unadvisable. The beaches shown in the picture here do not currently exist and there are many obstacles, walls and other obstructions currently under the water line that are hazardous to swimmers. The government has recently posted warnings along the Ajijic malecon advising people to stay out of the water due to the underwater hazards.

Can you eat the fish from Lake Chapala?

White Pelicans on Lake Chapala; photo: John Mitchell, E.I.F.

All of the fish we consume today contains some level of mercury and some studies suggest that eating fish should be avoided all together. U.S. EPA standards for safe levels of mercury in fish guidelines state that fish with a mercury level of >0.46ppm should be avoided, fish with a mercury content of <0.46 ppm can be consumed no more than once a week, fish with a mercury content of <0.23 ppm can be consumed twice a week, and fish with a mercury content of <0.15 ppm can be consumed frequently.

Dr. Todd Stong has tested 250 fish from 25 different locations around the lake in recent years with an average result of 0.40 ppm for total mercury. Other scientists who have tested fish from various parts of the lake have found mercury levels ranging from .17 ppm to .7 ppm, depending on how close to the Lerma River the fish were caught and the species of fish, with carp having the highest mercury content. A U.S. government sponsored study noted that the mercury levels found in fish caught in Lake Chapala are similar to those found in other locations throughout the world.

While it is difficult to obtain results of government water testing, there is a body of evidence that suggests that Lake Chapala could be made safe for swimming again with sufficient efforts on the part of the government, industry and agriculture. In Mexico, according to the standards NMX-AA-42-1987 and NOM-003-ECOL-1997, water that has contact with the public must have a fecal coliform count of less than 240 per 100 milliliters (ml) and, for indirect contact as in rowing, the standard is a fecal coliform count of 1000/ml. In the US, the standard for recreational use of water is less than 235 E. coli bacteria in 100ml. It is currently believed that 80% of the lake is within those levels, although hard data is difficult to obtain and coliform counts vary widely from month to month according to season, water temperature and effluents.

Kidney Disease

A full report on the high instance of kidney disease at the eastern end of Lake Chapala is beyond the scope of this publication. A number of scientific studies have and are being conducted with no firm conclusion regarding the cause, but evidence definitely points to the high level of pollution of the Santiago River that feeds into Lake Chapala. A study by Jalisco nephrologist Karina Renoirte López, found that 40% of the inhabitants of Poncitlán, a municipality located near the mouth of the Santiago River, presented some level of kidney failure and traces of lead and other heavy metals. The symptoms were more prevalent among young, male farm workers. Complicating the issue, the incidence of renal failure is high in Mexico overall. Approximately 9% of the population presents renal disease with approximately 40,000 patients on dialysis, suggesting that this is a complex problem with multiple causes.

As reported by Reuters in 2017, in Agua Caliente, one of the villages in the Poncitlán municipality, a University of Guadalajara study concluded that half of the children presented below average kidney function and only one in six has normal cognitive development. All of the 451 inhabitants who participated in a urine study tested positive for pesticides including the insecticide dimethoate and the popular weed killer glyphosate. Studies seems to suggest that the problem is related to a complicated mix of toxic spring water, heavy mineral content in some of the local well water, pesticide use on the surrounding farms, the heavy pollution in the Santiago River, and some genetic causes as evidenced by one family where almost all of the members suffer from renal failure. Activists are demanding answers and government action and it seems that they are finally being heard..

Reasons for Optimism

In December 2018, the newly elected Governor of Jalisco, Enrique Alfaro Ramirez, announced that state and federal governments will cooperate to contribute 3.4 billion pesos (US $167.4 million) to clean up the Santiago River. As part of this effort, the government will rehabilitate 40 water treatment plants and build 14 new ones at a total cost of just over 2.5 billion pesos (US $123 million). According to a 2012 study by Conagua in conjunction with several other agencies, Mexico overall has some of the best wastewater management treatment systems in Latin America and hopefully will be an example for the rest of Latin America with the slated improvements.

Lake Chapala is an official RAMSAR site (a wetland of international importance.) In February 2019, a three day festival was held to commemorate this designation and to continue to educate residents about the importance of Lake Chapala and the surrounding wetlands. The event included clean-up of noxious plants, and speaker panels emphasizing the importance of the lake to the culture of the towns surrounding the lake. The local director of environmental projects stated that the vision of the festival is to promote understanding of the role of society in caring for the ecosystem. He noted that many inhabitants see the lake as merely a tourist attraction, and the hope is to promote greater public understanding of the ecosystem, its dynamics, and the importance of caring for the environment.

In conclusion, we all have a part to play in maintaining our sources of water and there is reason to hope that with increasing awareness on the part of government and the public along with personal responsibility for waste management, we can once again fully enjoy all that Lake Chapala has to offer.

Join us at one of our 6-Day programs and explore the beauty of the Lake Chapala area for yourself.