

Lake Chapala: State of the Lake 2018



by Kristina Morgan with Bette Brazel

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Lake Chapala is Mexico's largest lake, set in the highlands of the Sierra Madre Mountains and undoubtedly a natural resource we want to protect. Thankfully, the lake is in the best shape it has been in many years, according to Dr. Todd Stong, a civil engineer who was nominated for the CNN Hero Award for 2016, and spent over 22 years in humanitarian service in Africa, Asia and Latin America after 30 years as a military engineer.

Dr. Stong has dedicated the past 15 years to developing rural village infrastructure projects about the lake and water related research in all parts of the lake. For 11 years he, along with a few friends, has funded water tests of the lake water to assess its "goodness," as he calls it. Todd is a dedicated and brilliant man with a great affection for the lake and the many villages on its shores.

Dr. Stong notes that no discussion of the health of Lake Chapala is complete without broaching the topic of politics, since water use is largely governed by politics. 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.

Five "best" things to report about the State of the Lake and Mexico in general in 2018:

- Lake volume and quality is very good despite the fact that the lake will never be full in our lifetimes due to Guadalajara water usage.
- 90% of the causes of childhood kidney disease in some of the small towns on the south side of the lake are now identified and lake water is not one of the causes.
- The GDP of Mexico, presently right below that of France, will pass that of the U.K. in 10 years and Germany in 20 years.
- Mexico has free trade agreements with 44 nations, thus 60% of the world market is tax free.
- The sound of needed changes is coming over the horizon via informed young adults who will lead the way in unshackling Mexico from the cost of its cancers of corruption and violence.

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Three “good” things to report about the state of the Lake in 2018:

- High dissolved oxygen (wave actions) eats organics.
- High pH (8.7) 50X more alkaline than the ocean stops chemical action and migration of solids to liquid form.
- Murky – stops algae growth

Five “not so good” things to report about Mexico in 2018:

- Expect no major public works projects before June 2019 as governments change, public funds vanish and too many inept family and campaign staff fill the new offices in January 2019.
- Corruption has increased to the point where Mexico is ranked 135 out of 180 nations in the world for transparency.
- The bottom 10% of the population has 1.3% of the nation's wealth while the top 10% has 36% of the nation's wealth.
- Diabetes, soda consumption and kidney disease in Mexico are among the worst in the world.
- Chapala continues to be the worst performing county around the lake.

Miscellaneous Facts

- 38 million Mexicans or their descendants make up 12% of the U.S. population.
- The value of building sites inside Ajijic is currently \$600,000-\$900,000 per acre. On the south side of the lake, land sells for less than \$8,000 per acre.
- Nearly 80% of the water in Mexico is contained in the southern states.
- The USA border with Mexico is 1952 miles long. Approximately 1/3 has fences/walls and 1/3 is naturally near impassable
- Cultural divisions in Mexico: 60% mestizo, 15% indigenous; 10-40% claim European ancestors
- By 1600 (80 years after the arrival of the Spanish, 80-90% of the native population disappeared
- Mexico is the #1 Spanish speaking nation in the world and the #2 Catholic nation in the world.
- For each Mexican living in Canada, there are over 400 in the USA.
- The current population of Mexico (124 million) is 39% of that of the USA (327 million) and 3.3 times larger than Canada (38 million).
- Most of the lake will eventually become a savannah and then a meadow given that 2mm of sediment per year for 2300 years will fill the lake

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The Fish In Lake Chapala

After testing 250 fish from 25 different locations throughout the lake in recent years, Dr. Stong confirmed that fish from the lake are safe to eat. The fish tested at total 0.4 parts per million for total mercury, a safe level similar to that found in a can of tuna fish in the United States.

His six month testing program was requested and funded by a Jalisco congressman and the various county presidents around the lake. This effort was accomplished to counter a flawed published report by winter break students from the US who had purchased six fish from a local market, had them tested by another university in the US, and then reported their results to have been for methyl mercury which has a very different limit than for total mercury. Dr. Stong's testing program helped to restore the livelihood of 3000 fishing families who had been put out of work after an advisory was issued by the state based on the US report.



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

For much of the past ten years the fisherman have been harvesting fish that aren't mature and so fish propagation levels have been dropping. The edge of the lake is constantly moving in and out, thus altering the protective natural zones where fish seek areas in the grass by the shore but often find only mud on which to lay their eggs that are quickly eaten by other fish and birds.

Dr. Stong conceived a project a few years ago that built and anchored floating cages that are twenty feet in diameter by 6 feet deep off the coast of Mezcala Island to house and harvest Bagre, or catfish.

That effort has demonstrated the potential for producing up to five tons of fish per cage per year. Thus the income from each cage may support several families. He began with raising Tilapia but found the lake water to be too cold in December and January for this type Of fish. The Tilapia also sold for less than half the price of catfish. Stong has illustrated quite handily the idea that if you give a man a fish you feed him for a day, whereas if you teach him to fish you feed him for a lifetime. Mexicans in the area who struggle generationally with poverty now have the chance to establish a stable income for their families.

The Water Level of Lake Chapala

All of the villages at Lake Chapala draw their water from wells, while Guadalajara draws its water (losing much of it in of it in the city's distribution along the way) from Lake Chapala.

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The vast majority of the water required by the lake is via government control of agreements among the five states along the Lerma River where over 500 dams can now collect every drop of water in the river. The current water level is 9 feet below full, 60% volume or 6-25 feet deep currently. The lowest level of lake occurs around June 15.

The Lake has been a closed river basin for the past 40 years, but the water quality meets all standards for recreation/swimming and fully qualifies as a raw water source treated for 3 million users in Guadalajara each day. This applies as long as the lake is at least 35% full. Five inches evaporates per year and the minerals stay behind, making the lake more and more alkaline. 0-10% of the Lerma River now comes to the lake each year as contact with 100% before 1930.

The lake depth averages approximately fourteen feet deep or four meters, which means that the waves help keep it oxygenated and mostly free of algae. Closer to Mezcala island the water is deeper at a few locations at about 33 feet or 10 meters. The lake is about 49 miles long by 12 miles across.

Currently, the lake is at 60% capacity, or 9-10 feet below full. The lake was at an all-time low in 2001-2002, reaching dangerously low levels (15% full) due to the 4 states up the river from the lake extracting huge amounts of irrigation water from the Rio Lerma, the main river that feeds Lake Chapala. By the 1990s only 10% of the Rio Lerma reached Lake Chapala. A few years ago Dr. Stong presented to the Governor of Jalisco a 24 page briefing that showed that whenever the lake volume, which is 95% under the control of the government, not rainfall, is permitted to fall below 30% it is not possible for Guadalajara to adequately treat the water because the heavy metals cannot be removed economically. Since that time and with an increased focus on environmental issues in Mexico, the Government of Jalisco is paying more attention to the water level in Lake Chapala.

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2018 is an election year in Mexico and each of the Jalisco gubernatorial candidates have made the state of the lake part of their campaign platform. The PAN candidate declared at an April 24 luncheon that no more water will be taken from the lake, without mentioning an alternate solution. Increased environmental awareness worldwide will hopefully continue to place pressure on governments and candidates to safeguard water resources.

Is Lake Chapala Contaminated?

Testing of the water at Lake Chapala, for recreational safety, found a coliform count of 50. To help put this in perspective, at a US public beach, the water is declared safe to swim in if the coliform count is under 126.



Swimming in Lake Chapala

Stong answers, " I can say with over 14 years experience as an engineer working in the lake with real test data from the past 35 years that Lake Chapala is not a polluted mass of water. Based upon government test data and many years of my own directed laboratory study I know of no mineral element in the lake that exceeds international limits." A report from the XVI World Water Congress in 2017 indicates an average coliform level of 55 points, implying a water of medium quality that should be purified prior to distribution and consumption.

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As Stong explained that all water has minerals and one of the minerals our lake has is arsenic but not in any dangerous level unless the lake were to fall to extremely low levels, below the 30% volume level. If that were to happen, it would concentrate various heavy metals. Currently, Lake Chapala is very alkaline with a pH reading of 8.7.

“Lake Chapala about 35 years ago was rightfully believed to be experiencing a buildup of some heavy metals due to them being carried to the lake by the 700 km long Lerma River. While some of those heavy metals were indeed approaching international limits. Published reports of that time by a US university researcher several years at the lake stated that NONE exceeded the limits. The construction of over 150 dams and wastewater purification plants along the Lerma River and about the lake in the past 25 years has significantly reduced undesirable substances reaching the lake.”

The bottom line is that the lake is in an acceptable condition and it's a satisfactory raw water source for Guadalajara once it is treated. Dr. Stong has attested to the lake water's quality by drinking it at public lecture sessions after he has filtered and disinfected it before the audiences.

Dr. Stong says, “The people in the villages know my sincere concern for them. This has been the happiest chapter in my life.”

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



