Over 360 chemical compounds have been identified in the Great Lakes - a system that provides one fifth of all of the planet’s fresh water. Many of these identified chemicals in our water are potentially dangerous to humans. They are also proving detrimental to aquatic ecosystems and are having an impact on the survival of various species of fish, as well as the birds and mammals that consume them.

Pollution is not the only stressor affecting the health of the Great Lakes. Climate change, caused by human activity, is having an impact as well, and may be leading to the high evaporation rates that are contributing to low water levels in the Great Lakes. In fact, the Great Lakes are now at lows that have not been seen since the mid-1920s. Over the last century, the difference in water levels has ranged from nearly 4 feet for Lake Superior and between 6 and 7 feet for the other Great Lakes.

One of the most disturbing developments in the Great Lakes story is the introduction of nearly 150 invasive species to date. They’ve entered in the ballast water of freighters; they’ve swum up the river systems, and some have even been purposely introduced. The results have been catastrophic for the indigenous wildlife of the Lakes, as many of the aliens have overcome the native species and are now part of the ecological makeup of the region. Notable invaders include the lamprey eel, the alewife, the round gobi and the zebra mussel.

Human consumption is also taking a hefty toll on the Great Lakes system. We may live on a blue planet where 75% of the Earth’s surface is covered in water, but the real issue is the amount of fresh water available. Fresh water resources in North America, and around the world, are unequally distributed. Only about 1% of the water found on
Earth is available for direct human use, with the rest locked up in our oceans, glaciers and polar ice caps. In addition, the demands of the 40 million people who live on the Great Lakes, along with the water needs of industry, power plants, farms and urban sprawl continue to grow.

Global water needs are increasingly attracting attention, and some experts are predicting that a catastrophic water crisis is looming. The steps we take over the next few decades with regard to water conservation, preservation and sustainability will impact generations to come.

The Story of the Lake Sturgeon

The life thread through the Mysteries of the Great Lakes story is about a remarkable fish and the efforts to bring it back from the edge of extinction. The lake sturgeon is the largest fresh water fish in the world. This living fossil has survived for over 100 million years, virtually unchanged. It can grow to weigh an astonishing 300 pounds, and can live to be nearly 200 years old.

At one point, lake sturgeon was so plentiful that it represented 90% of the Great Lakes’ biomass. In the late 1800s, due to over-fishing and the destruction and pollution of their spawning beds, the sturgeon populations crashed.

Bringing back the sturgeon population is a momentous task. This fish species is particular about the streams and rivers they spawn in. They need fast-moving water, with a minimum flow-level for the larval fish to survive. Lake sturgeon will travel huge distances over their lifetime, but will always return to the stream in which they hatched to spawn.

Mysteries of the Great Lakes portrays the work that is being done to solve the mysteries surrounding this fish species, and the efforts that are being undertaken to bring it back from the brink. The sturgeon is a threatened species in the US. Biologists are working to study the sturgeon, and fertilize its eggs, which will be protected in mobile hatcheries until the new fish can be released.

Work is also underway to clean up rivers to make them suitable once again. Studies about the spawning beds these fish use has led to new experiments to create spawning beds with a variety of artificial materials such as gravel and boulders.

In many ways, the story of this fish is the story of the Great Lakes. If we can save the sturgeon, we can save the Great Lakes.
The amazing recovery of the Bald Eagle is another story featured in *Mysteries of the Great Lakes*. The Bald Eagle was once a common sight in the skies throughout North America, including the Great Lakes shoreline. However, due to the effects of the pesticide DDT (dichlorodiphenyltrichloroethane) in the 1950s they all but disappeared and the Bald Eagle faced the possibility of extinction.

DDT was a pesticide that was sprayed regularly along wetlands, shorelines and in agricultural areas, from the late 1940s to the 1970s. Exposure to this toxic chemical interfered with the eagles’ ability to reproduce. Canada and the United States restricted the use of DDT in the early 1970s, and over time, due to a significant reduction in the use of toxic chemicals around the Great Lakes, the eagles’ reproduction rates began to climb. Today, Great Lakes Bald Eagles are recovering slowly. The highest concentration of Bald Eagles is in the Apostle Islands of Lake Superior.

The story of the Bald Eagle is an important one. In fact, some scientists and conservation groups consider the birds as a bio-sentinel species, due to their sensitivity to toxic chemicals. They feel the birds should be viewed as a reliable indicator of the health of aquatic ecosystems in the Great Lakes region.

The caribou arrived on the Slate Islands in the early 1900s when Lake Superior froze over. They have since been thriving and over the course of their 100 plus years on the islands, they have also evolved some unusual biological adaptations – the female caribou on the Slate Islands have stopped growing antlers since there are no natural predators on the Islands.

Another advantage of island life for the Slate Islands’ caribou, is that moose and deer are absent, therefore, there is less competition for food. Also, moose and deer carry a parasite that can be fatal to caribou, so their absence has direct health benefits to the caribou.

In 1985, the Slate Islands were protected as an Ontario Provincial Park. There are no facilities and the islands can only be accessed via boat or airplane. The Slate Islands are located in northern Lake Superior, south of Terrace Bay. They are also part of the new Lake Superior Marine Conservation Area that stretches from Isle Royale to the Slate Islands, and includes territory on both sides of the border. It is one of the largest fresh water sanctuaries in the world.

The Slate Islands were formed by a meteorite impact and are home to spectacular rock formations.