Reviving Malheur Lake

By Lauren Brown
Photography by Jeremy Hill

September 2019

When we think of Harney County, Oregon, we imagine a dramatic, high desert landscape supporting abundant wildlife and a culture and economy strongly connected to its rich natural resources. At its center, is a large body of fresh water—Malheur Lake—critical habitat for migrating waterfowl and a multitude of other species. But the health of Malheur Lake is in serious decline. How did this damage occur and why should it be reversed? Many now believe that healing this once majestic lake will significantly enhance the natural and social well-being of this entire region.

Located within Malheur National Wildlife Refuge in Southeast Oregon's Harney Basin and within the Great Basin of the American West, Malheur Lake is a critical stopover for more than 300 species of waterfowl and other birds migrating along the Pacific Flyway—an aerial highway between North and South America. These birds use Malheur Lake and the surrounding fields to rest, feed, or nest before moving on. They provide other benefits as well: they're vital for pollination, dispersing seeds, reducing insects and other pests, and being among the first to let us know how healthy our environment is.

This basin is also home to resident birds—those living here year-round—along with fish, amphibians, reptiles, and many large and small mammals, creating a dynamic, diverse, and balanced ecosystem.

Fed by two rivers, the Silvies and the Donner and Blitzen, Malheur Lake ranges from about 50 to 180 square miles and averages just two-and-a-half feet deep, with a maximum depth of about five feet.

Normally, lakes drain to the ocean, but there are no outlets for Great Basin lakes. The only way for water to exit is through evaporation or through transpiration of water through plants.

An abundance of submergent and emergent vegetation once helped to keep Malheur Lake clear and its ecosystem healthy. These plants calmed disturbances in the water, and their roots held sediments on the lakebed in place.

For thousands of years, Indigenous people, ancestors of the Burns Paiute Tribe, have held a sacred relationship with the wildlife and plants found in and around the lake. Malheur Lake and all that flourishes there provided food, clothing, shelter materials, and medicine for the people, and the Indigenous people helped maintain a healthy environment where plants, animals, and the lake could thrive. Many encampments were located near the lake. The Tribe continues to strengthen its relationship with Malheur Lake and its inhabitants.

When settlers moved into the area around the lake, some rechanneled the once-braided stream system into canals, draining wetlands and creating areas where flood irrigation could be used to grow meadow grasses for livestock. The temporarily flooded fields also provided habitat for migratory birds and other animals. This method of irrigation continues today.

Although people historically altered elements of this ecosystem, Malheur Lake remained relatively healthy until the mid-20th Century. Then, in the 1950s, a major threat entered the lake—non-native Common Carp. Introduced into Silvies River in the 1920s, these fish gradually found their way into Malheur Lake, launching a sequence of events that would be devastating for decades to come.

Lacking predators, carp are remarkable invaders. They can grow to 20 pounds and live for 40 years. In low-water years they can burrow into the lakebed to wait for better conditions. A female carp can lay about one million eggs each year.

It's not just their size, lifespan, or fertility that make carp such a threat to Malheur Lake. As bottom feeders, carp use suction to capture food from the lakebed. This type of foraging uproots plants and stirs sediments through the water, creating a turbid—or muddy—environment, preventing sunlight from reaching plants below the surface. In fact, the extreme turbidity in Malheur Lake now extinguishes all sunlight at a depth of only eight inches. Without sunlight, plants die and their root systems decompose, leaving nothing to hold sediments down. Carp, in the lake for decades now, are considered a "Problem Initiator."

But carp aren't the only challenge in Malheur Lake. Within the water column are microscopic plants called Phytoplankton. Needing sunlight for photosynthesis, phytoplankton—especially tiny, single-celled Picoplankton—rise to the surface, further clouding the water. In a healthy system, Phytoplankton are consumed by tiny animals called Zooplankton, which help keep the water clear. But the turbidity in Malheur Lake has damaged the habitat for Zooplankton. Now, only Phytoplankton thrive, and, along with carp, are the dominant life forms in the lake.

A third problem found at Malheur Lake contributing to turbidity and preventing a healthy ecosystem is wind. "Wind fetch" describes the distance over water wind can travel unobstructed, and "wind speed" is its strength. The combination of these factors determines the amount of energy transferred into the water through "wave action," re-suspending sediments. This effect, or "wind shear stress," along with Phytoplankton, are considered "Problem Intensifiers."

These interrelated problems create a feedback loop in which the water remains murky preventing healthy animal and plant growth. It took nearly seven decades for these disturbances to transform Malheur Lake into a

state considered “Phytoplankton-dominant,” by scientists. What, if anything, can be done to reverse this trend? Can Malheur Lake be restored to benefit plants, animals, and people in this region?

The challenge to return Malheur Lake to a healthy, productive condition is daunting. But there is hope. The solution must be viewed through what’s called a “systems model,” where hydrology, carp, wind, vegetation, and other factors are viewed as parts of a whole, rather than problems to solve separately.

Based on this model, restoration options will be discussed and evaluated for what may be the most effective toward reviving Malheur Lake. As these options are implemented the water will clear, native vegetation will return, providing a rich ecosystem for fish, animals, and birds.

Through innovative scientific research, we now see how a healthier Malheur Lake will become even more important habitat for migratory waterfowl along the Pacific Flyway, remain a world-class destination for visitors, and bring ecological, economic, and social benefits to Harney County for generations to come.

Watch Reviving Malheur Lake here.

This article is provided by High Desert Partnership; a Harney County nonprofit convening and supporting six collaboratives including the Harney Basin Wetlands Initiative.

HIGH DESERT Partnership