



Malheur Lake Study Looks At Ways To Clear Turbid Water

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by Lauren Brown

In its current state, Malheur Lake is not a hospitable environment for plants. In fact, the murkiness of the water allows so little sunlight to penetrate the water column that there are places in the lake nearly devoid of life.

“You pull the mud up and there’s nothing. There’s not a bug, there’s not a worm, there’s nothing. I occasionally see a couple of dragonflies, which are a bug that can live in the lowest water quality,” said Dominic Bachman, Harney Basin Wetlands Initiative Coordinator, during a recent trip to the lake to transplant some vegetation. “It’s so murky and there’s so little vegetation to stop the wind from churning it up and the carp from eating it all that it’s just dark as coffee—coffee with half milk, half coffee. That’s what it looks like.”

The Harney Basin Wetlands Initiative, a collaborative of the High Desert Partnership, seeks to change that. The Harney Basin is a major stopover for migratory birds in the spring, and the water quality of Malheur Lake has had a direct effect on the number of birds that choose to rest and fuel up in the basin. The more quality feed the birds have in the basin, the greater their breeding success when they arrive at their final northern destination.

“Essentially the overarching problem is that submergent vegetation is no longer present in the lake and the emergent vegetation, which is usually around the periphery of the lake, is only present in a few locations,” said Cassandra Smith, an ecologist with the United States Geological Survey, who is working on improving the water quality of Malheur Lake. “The lack of vegetation directly affects water birds in terms of their habitat and food availability.”

Bachman compares the current environment of the lake to that of a kindergarten classroom. “If you imagine a kindergarten that just has white walls and the kids are sitting on a hard cement floor versus a traditional kindergarten that has all the cool stuff in it,” he said. “We’re in this situation where there’s just nothing for the birds out there. Even though, sure there’s water and there’s hardstem bulrush and taller tulle grasses, but it’s almost devoid of any life in those areas.”

Submergent plants are rooted in the bottom of the lake but don’t usually break the surface of the water. According to Smith, sago pondweed is a submergent plant that was abundant in the lake back in the 1980s when the lake was healthier. Emergent vegetation occurs in the wetlands vegetation around the edges of the lake and would include plants such as bulrush and cattails. Smith noted that both kinds of plants are needed for a healthy ecosystem.

The Mesocosm Project

In an attempt to clear the turbid water and encourage aquatic vegetative growth, a new project called the Mesocosm Project is slated to begin in the lake next spring. A mesocosm is an outdoor experiment that examines the natural environment under controlled conditions. The mesocosm project in Malheur lake will involve installing 10 to 12 structures in which the water column will be isolated from different elements such as carp or wind to try make the water within each mesocosm less turbid.

According to Ben Cate, Ecological Coordinator for the High Desert Partnership, when the initiative first started looking at ways to restore Malheur Lake, the focus was on addressing the carp problem. It became apparent

that it was going to be difficult, if not impossible, to remove enough carp to allow for the restoration of the lake.

“After coming to that realization, they started to investigate other ecosystem dynamics that are going on in Malheur Lake,” Cate said. “They started looking into wind and other dynamics in the lake that keep it in that super turbid state with no aquatic vegetation, and the more they started to research, the more they realized that there are other things going on than just carp.”

One study involved examining light penetration in the lake and the effect that wind has on keeping sediment in the water column to prevent sunlight from stimulating aquatic vegetative growth.

While carp can be destructive to the lake bottom with their feeding habits that often uproot vegetation, these new studies indicated that wind could also lift sediment off the lake bottom.

Another finding involved algae and the nutrients in the water that encourage algae growth, which also hampers sunlight from penetrating the water column. Cate noted that last year, biologists started looking at the nutrients entering the lake from tributaries, the Donner und Blitzen River and the Silvies River, and how they affect the algae blooms and other bacteria in the water. “The mesocosm study is just the latest progression of that series of experiments and learning,” Cate said.

Installation and monitoring

Malheur National Wildlife Fish Biologist James Pearson is currently in the process of building and testing prototypes for the Mesocosm Project. Because of the lake’s size, large wind fetches move through the water, which means the mesocosm structures need to be able to withstand considerable force. “In the past, they’ve put things out there that just get destroyed,” Pearson said. Fortunately, he has had luck with a prototype constructed of PVC pipe and plastic sheeting. “The PVC structure holds it together and the plastic sheeting, while isolating the water column, still enables waves to push through the mesocosm,” he said.



Pictured: A mesocosm prototype structure in Malheur Lake made of PVC pipe and plastic sheeting.

The mesocosms will be constructed on land during the fall and winter so that they are ready to install next spring. The structures will be transported out into the lake via airboats to be placed in predetermined locations. The mesocosms will be monitored weekly using sondes, instruments that can provide instantaneous readings of water temperature, pH, chlorophyll and turbidity. They will also remove water samples from each mesocosm and send them off to the USGS laboratory to analyze for nutrients.

It will be a two-year long project. “The first year, we’re focusing mostly on the water quality and seeing what we can do to decrease the turbidity and increase light penetration,” Smith said. “Then in year two we’d like to plant some combination of emergent and submergent plants within the mesocosms to see if the decrease in turbidity is enough for them to survive.”

Upscaling results with collaboration

Once all the data has been collected and analyzed, the results and findings will be brought before the collaborators and stakeholders within the Harney Basin Wetlands Initiative to determine if anything can be upscaled to work on larger portions of the lake. While looking at the ecological impacts on the lake, the social and economic factors will also be taken into consideration to try and find the best solution that works for everyone. “Obviously, people have been working on this for the past 50 years, and it’s a really complex difficult problem to tackle,” Cate said. “Even if we do learn what it’s going to take to restore Malheur Lake, no matter what, it’s going to require a lot of resources and a pretty big investment.”

Having attended several collaborative meetings, Smith said that everybody has the same goal in mind. “They want to see the lake return to a healthy state,” she said. “We understand the complexity of this, and every time we collect more information, that increases our understanding. It’s a really great environment with everybody out there who is interested in that same collaborative end goal.”

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

