



HARNEY BASIN
Wetlands
COLLABORATIVE

Malheur Lake Restoration Studies Spring Forward

Year two of data gathering will help build plan

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*Photos by Jeremy Hill, Malheur National Wildlife Refuge & High Desert Partnership staff
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Located in the Malheur National Wildlife Refuge, Malheur Lake is a large and shallow body of water that serves as a crucial stopover on the Pacific Flyway for migratory birds and also provides a home for the local waterfowl population in eastern Oregon.



The Harney Basin Wetlands Collaborative (HBWC) will once again lead a number of studies at the lake this summer in year two of a two-year study to gather enough data to formulate a plan to restore Malheur Lake to a clear-water state.

HBWC, a collaborative of the nonprofit High Desert Partnership, was formed in 2011 to find ways to improve the aquatic health and sustainability of Malheur Lake and wet meadows across the Harney Basin. This effort draws input from a diverse group of

stakeholders, including local ranchers, conservation organizations, the Sovereign Nation of the Burns Paiute Tribe, government agencies, technical experts, scientists, area residents, and nonprofit partners.

Once a clear water lake, Malheur has suffered setbacks that were accelerated with extensive flooding in the 1980s. Degradation has continued, making the lake less and less appealing to bird populations. For migrating birds on the Pacific Flyway, which runs between Alaska and Patagonia, Malheur Lake serves as an important and necessary stop to rest and refuel. The lake is also a crucial nesting and breeding ground for the local avian population, and attracts birders as tourists to the area.

There are many factors involved that have impacted the turbidity of the lake but the main factors that have been identified are the invasive bottom-feeding carp population, wind wave action, and degradation of the lake's emergent vegetation. The results of the studies will inform on some of these issues and contribute to developing strategies to improve the quality of the lake. The two-year study is funded through the Oregon Watershed Enhancement Board Focused Investment Partnership and led by HBWC partners.

Carp and Redband Trout Telemetry Study

Carp is an invasive species that was first introduced to Malheur Lake almost 100 years ago. Unfortunately, they have thrived in the lake, and elimination of the species is no longer an option. The goal now is to identify any vulnerabilities that could be exploited to reduce their numbers.

Carp are bottom feeders that destroy the vegetation needed for insects and plants to thrive, which in turn are necessary to attract and feed the bird population. This habit also creates additional sediment in the water.



Pictured: One of 36 carp that were tagged the last week of April 2021 in an effort to track their movement around Harney Basin's waterways.

Last year, a carp telemetry study was launched where 36 carp were caught and tagged to monitor their movements within the lake. A number of these fish are still active in the lake and staff plan to tag an additional 40 or so carp this year. The goal is to track their movements to determine any patterns that could make their removal more efficient.

The team will also tag about the same number of redband trout in the lake to determine what overlap in travel there is between the carp and the trout. It's important to have this information so that if measures are taken to eradicate common habitat for the carp, it wouldn't also make the area inhospitable to trout.

Due to extreme drought conditions across the west, it's important to see what information the study yields. "Malheur is experiencing the lowest water year in documented history," said Dominic Bachman, Aquatic Biologist for the Malheur National Wildlife Refuge. As the water gets more and more shallow over summer, the fish will all be pushed out towards the center of the lake.

"But the low water levels could also provide knowledge we may not otherwise uncover," added Bachman. "We'll be able to track if the levels push the carp into the (Donner and) Blitzen River." It's possible that their spawning ground location could be uncovered, but only time will tell.

If any anglers discover a tracker embedded in their catch, they are asked to release the fish back into the lake.



Mesocosm Study

While carp can create turbid water by stirring up sediment from the lake bottom and leaving it suspended, that's not the only issue. Wind wave action also contributes to this problem, which led to the mesocosm study last summer.

Pictured: A mesocosm structure in Malheur Lake that is reached by airboat.

First, what is a mesocosm? It's defined as an enclosed environment that allows a small part of the natural environment to be studied separate from the surrounding environment. Last year, a number of various experimental enclosures were installed in the lake to reduce both wind and wave impact. This provided controlled conditions to

observe potential impacts on surrounding water and vegetation if various factors could be manipulated through actions such as man-made barriers or islands.

However, due to the record-low water levels in the lake, it's not possible to repeat this part of the study in year two. But there's still the opportunity to gain valuable knowledge in a drought year. In 2022, this part of the study will pivot to learning more about the Blitzen River and the amount of turbidity that is introduced via this waterway. The team will use sondes, which are water quality measuring devices, to determine variables such as pH factor and water temperature. This will provide another piece of the puzzle as researchers work on a plan to improve lake conditions.

Emergent Vegetation Study



Malheur Lake was once home to a healthy population of emergent vegetation, which are plants that have foliage above the waterline. Emergent vegetation is important because the growth can provide both a windbreak, reducing wind when it's cold, and a cooler, shady spot as temperatures rise. The vegetation can also serve as a home for insects, which then helps to feed the bird population.

Pictured: An emergent vegetation plot at Malheur Lake.

Examples of emergent plants found in Malheur Lake include cattails and hard-stem bulrush. The remaining population of these plants is patchy at best and is found almost exclusively along the perimeter of the

lake. The study is working to gain information on how best to revive growth within the greater area of the lake itself.

As with most things at Malheur, a number of factors have contributed to the decline of these emergent plant species. The flooding in the 1980s decimated much of the emergent vegetation, and it has not bounced back. The increased wind and waves on the lake resulting from the erosion of formerly existing barriers or small "islands" within the lake lead to more sediment in the water, making it harder for sun to filter down to plants' root systems.

Also, the lake now experiences increased ice action in winter. When there's adequate emergent vegetation throughout the lake, it works as a natural barrier to ice flow. But with so little plant life to disrupt the ice, the lake can now see up to two-mile long ice sheets moving across the lake, causing further damage to what plant life still currently exists.

To restore native vegetation, the study leaders will work to transplant emergent vegetation back into the lake, with data variables including location, clump size, water depth, and others to track what might impact the resulting growth or lack thereof. Using data gathered from 2021 will help guide this year's work.

In the first year of the study, the team set up a number of enclosures in the lake to surround existing plant life and tracked the results. Unfortunately, with the low water this year, some of the plots may not have water on them for very long.

The Harney Basin Wetlands Collaborative has worked to obtain the funding for these studies with the intention of beginning the restoration process for Malheur Lake. "If we can figure out some ways to get the vegetation to grow as well as tie in with these other studies we're doing: reducing turbidity, reducing carp and reducing wind fetch; we might have a real chance at making some pretty vast improvements out here," Bachman said.

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

