

HARNEY BASIN WETLANDS INITIATIVE LAKE TURBIDITY

LESS CARP, SAME TURBIDITY

When Harney Basin Wetlands Initiative partners received Oregon Watershed Enhancement Board's Focused Investment Partnership grant in 2016, they believed that carp were causing turbidity - unclear water conditions created by stirred up sediment - in Malheur Lake. Carp root up submerged and emergent vegetation and cause sediment suspension in the water. The turbid water conditions prevent light from reaching the lake bottom and allowing vegetation that provide bird habitat to regrow. This past year, fishermen removing carp from Malheur Lake caught smaller numbers of fish, indicating a possible reduction in the number of carp in the lake, and yet the turbid conditions in the lake persisted.



|| **LIGHT IN THE WATER COLUMN THAT REACHES THE BOTTOM IS A FUNDAMENTAL DRIVER OF MANY OF THE DESIRED MANAGEMENT OUTCOMES SPECIFIED IN THE MALHEUR NATIONAL WILDLIFE REFUGE'S COMPREHENSIVE CONSERVATION PLAN BECAUSE OF ITS DIRECT EFFECT ON AQUATIC VEGETATION.**

In the 2011 Boca Lake study, water quality improved dramatically with the removal of carp. In 2011, high turbidity limited visibility to about half of Boca Lake's depth, but by 2014, the lake bottom could be seen at all depths. Although carp have not been completely removed from Malheur Lake, it was expected that a potential reduction in their numbers would lead to a decrease in water turbidity as seen at Boca Lake. Was there another reason we were seeing no improvement in Malheur Lake despite the possible decline in the carp population?

A NEW CULPRIT: WIND

One theory behind the continued turbidity is wind. Wind blowing across the lake creates waves, which move columns of water back and forth across bottom sediments left bare by the lack of vegetation, and in the process lifts sediments up into the water column. So despite less carp in the system, the waters remain turbid. Why didn't wind have the same effect on Boca Lake? Malheur Lake is on average seven miles across compared to Boca Lake which is one mile and wind does not have the same impact over a smaller surface area.

MALHEUR NATIONAL
WILDLIFE REFUGE
BIOLOGIST JOE
BARNETT TAKING WATER
QUALITY READINGS AND
COLLECTING WATER
SAMPLES UNDER THE
ICE TO COMPARE
AGAINST SUMMER
WATER QUALITY .



USGS hydrologist Tamara Wood will be collecting data in 2018 to test this theory. The data will help us understand how light varies with turbidity, what types of suspended material contribute to turbidity, and what factors control the concentration of suspended material. Collected data will inform a systems model being developed for Malheur Lake, which will guide partners in making restoration management decisions.



ADAPTIVE MANAGEMENT

With this new information in hand, the Malheur Lake Working Group held a summit in January 2018 to develop management alternatives with the recognition that carp control alone will not be sufficient to clear the lake's waters and it will most likely be a combination of actions that achieve our aquatic health goals. Some alternatives under consideration include different kinds of wind breaks (floating, permanent structures, vegetation, etc.), a system for managing water levels in Malheur Lake, and various carp control methods. The alternatives developed will be analyzed using the Malheur Lake systems model. The working group will be meeting regularly over the next year to decide what alternatives to move forward with.