Boca Lake

A Case Study

This publication is supported by Harney Basin Wetlands Initiative, a collaboration working to enhance and conserve Malheur Lake and the surrounding basin. To learn more about the work we are doing please visit:

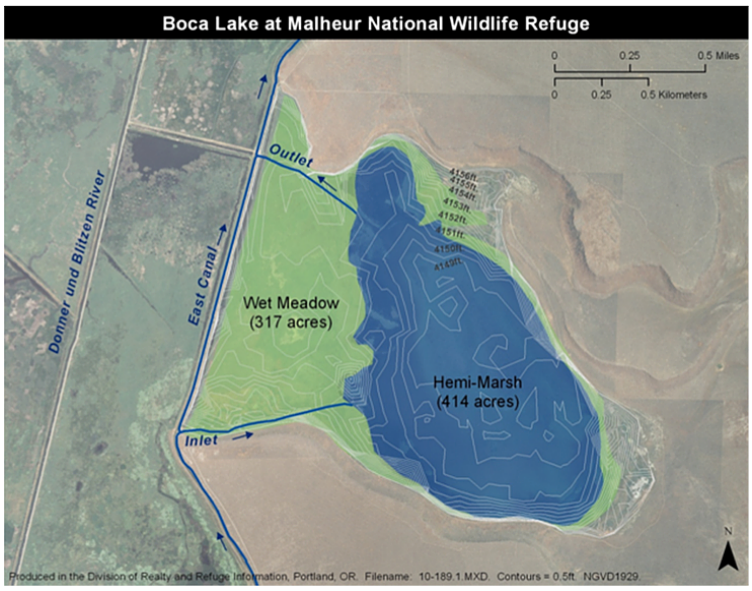
http://highdesertpartnership.org/what-we-do/harney-basin-wetlands-initiative/

Boca Lake carp removal

What would happen if common carp could be eliminated from Malheur Lake? Would it lead to recovery of the vast marshes at the heart of Malheur National Wildlife Refuge, historically some of the most important wetlands in the Pacific Flyway? Would birds return to what is now an empty expanse of turbid open water?

No one knows with any certainty the answers to those questions, and carp will probably never be completely eradicated from Malheur Lake and its tributaries. But a pilot project initiated in 2011 suggests that reductions in carp populations could trigger dramatic improvements in water quality and habitat values for waterbirds.

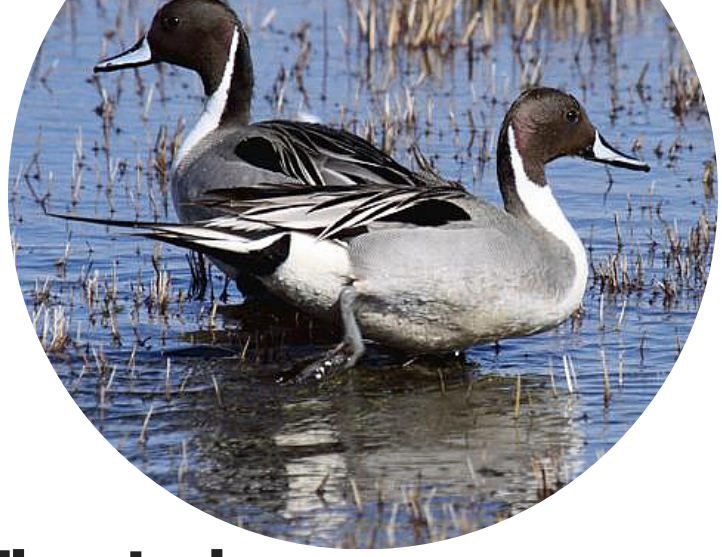
The Harney Basin contains some of the most important wetlands in the Pacific Flyway. Migrating birds' reproductive success depends heavily on these wetlands



Boca Lake: a mini-Malheur

To test the effects of carp removal, and the techniques that would be used to monitor the results of larger-scale control efforts, the U.S. Fish and Wildlife Service and a number of partners conducted a three-year pilot project in Boca Lake, an isolated wetland along the edge of the refuge at the foot of Steens Mountain.

At 731 acres, Boca Lake was in many respects a scaled-down version of Malheur Lake, with fluctuating water levels, abundant carp, and a similar mix of birds. The big difference: flows into and out of Boca Lake could be managed with water control structures. That meant refuge staff could dry the lake completely, eliminate the carp, refill the lake, and see what happened.



> Since the removal of carp in 2011, Boca Lake has seen significant positive changes including dramatically improved water quality, regrowth of submerged aquatic vegetation, and perhaps most importantly a dramatic increase in the number of bird species staying over at Boca Lake.

The Results

Researchers found significant changes in Boca Lake in 2014:

- Carp populations declined from an estimated 20,000+ fish to zero.
- Water quality improved dramatically. In 2011, high turbidity limited visibility to about half of the lake's depth. In 2014, researchers could see the lake bottom at all depths.
- Aquatic vegetation rebounded quickly. In 2011, Boca Lake had no submerged aquatic vegetation. In 2014, vegetation covered almost half of the lake bottom.
- Bird counts in 2014 showed a 20 percent increase in the number of species, and sharp increases in the number and diversity of non-fish eating birds. Adjusted to reflect lower lake levels in 2014, bird use jumped from an average of about 20 waterbirds per acre to more than 50.

Source : Malheur National Wildlife Refuge. 2015. Boca Lake Project Final Report: Harney Basin Aquatic Health Monitoring Phase 1.

The study

Beginning in 2011, Malheur refuge staff and partners conducted pre-treatment monitoring and surveys to establish baseline information on Boca Lake's water quality, vegetation, macroinvertebrates, fish, and bird use. In 2013, carp were removed with nets, and the lake was drawn down and dried out over the summer. In the spring of 2014, the lake was refilled, followed by post-treatment monitoring and surveys.

In the picture above, the tubers of aquatic plants such as catttail must remain buried in the soil of the lake bottom in order to grow healthy plants that are important food sources for many bird species. The feeding behavior of carp is much like a "garden rototiller" that will uproot these tubers and keep them from growing in the shallow lakes, while also suspending sediment that stops light from penetrating, which enables other plants to grow!