

Western Ecological Research Center

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Contact:

Dr. John Y. Takekawa

Phone:

707-562-2000

Email:

john_takekawa@usgs.gov

San Francisco Bay Estuary Field Station, USGS Western Ecological Research Center, P.O. Box 2012, Building 505, Azuar Dr. and I St., Vallejo, CA 94592

Long-term Productivity of Canvasbacks in a Snowpack-Driven Desert Marsh

Ruby Lake, Nevada, is a large Great Basin wetland that hosts the southern-most major breeding population of canvasbacks. This arid marsh, fed by springs derived from mountain snowpack, differs in climate and hydrology from glaciated potholes of the northern prairies where most canvasbacks breed. USGS scientist Dr. John Takekawa, University of Wyoming professor Dr. James Lovvorn and graduate student Kammie Kruse, and refuge biologist Jeffrey Mackay conducted nesting studies and analyzed historic datasets to examine the productivity of the breeding canvasbacks, and report their results in a recent issue of *The Auk*.

The authors analyzed 14 years of nesting data on canvasbacks over a 31-year period (1970–2000) to determine factors affecting breeding performance at Ruby Lake and whether factors differed from those in the prairies. Long-term nest success at Ruby Lake (50 % of all nests) was in the range of that in the northern prairies (21–65 %). Of all canvasback nests, 73 % were parasitized (mostly by redheads) as compared to 83–97 % in a large Manitoba marsh and 57–65 % in Manitoba potholes. However, as in the northern prairies, nest parasitism generally had little or no effect on either nest success or percentage of host eggs that hatched. In Manitoba potholes, nest success was unrelated to habitat variables measured; but successful nests at Ruby Lake were over shallower water, farther from shore, in wider bands of emergent vegetation, and surrounded by lower stem densities than unsuccessful nests.

Water level is the key factor in breeding performance of canvasbacks at both Ruby Lake and the northern prairies; however, the source of water differs (mountain snowpack at Ruby Lake, direct precipitation in the prairies) and effects of water-level variations are reversed.

Management Implications:

- At Ruby Lake, only 17 % of all nests were lost to predators, and only 1 % by mammals. Birds were the main predators, with common ravens and gulls destroying at least 88 % of nests lost to predators and 15 % of all nests.
- Water levels were the most important determinant of canvasback breeding performance in both prairie potholes and Ruby Lake, at least partly because of their influence on predation rates. In small potholes where there were many mammalian predators, high water levels that flooded the emergent fringe increased productivity of canvasbacks. However, at Ruby Lake, high water levels that flooded interior emergent stands decreased canvasback productivity.
- Climatic variations can strongly affect wetland birds in the Ruby Lake region.

In small prairie potholes (mostly < 0.4 ha) with many mammalian predators, productivity of canvasbacks (which build floating nests) is increased by high water that floods the emergent fringe. At Ruby Lake, a very large marsh (2,830 ha) with mostly avian predators, canvasback productivity is decreased by high water that floods interior emergent stands too deeply. Water level at Ruby Lake was highly correlated with mountain snowpack up to three years earlier, emphasizing the strong effect of climatic variations on wetland birds in that arid region.

Kruse, K. L., J. R. Lovvorn, J. Y. Takekawa, and J. Mackay. 2003. Long-term productivity of canvasbacks (*Aythya valisineria*) in a snowpack-driven desert marsh. *Auk* 120:107–119.