

Tracking Canvasbacks Across the Seasons

by Kammie Kruse and John Takekawa

It is a cold Nevada morning in early April. The sun is beginning to crest the snow-dusted peaks to the east of the Ruby Valley, and steam is rising off the blue pools within the bulrush-covered marsh. Through the quiet dawn in the rosy light, an eerie croak is reverberating from the distance. Increasing in volume as we wait, the strange call sounds like a soft growl from a cat, but it arose from the water's surface. Emerging slowly from the morning mists, a red-headed duck with a long bill and white back swam slowly toward us, courting its mate. A pair of canvasbacks has come home to nest.



Canvasback /Photo by Leslie Day

The canvasback (*Aythya valisineria*) is one of the largest and fastest flying ducks in North America. In flight, the male exhibits the most white of any duck and is very distinct with its "canvas" colored back, chestnut-red head, elongated black bill, and blood-red eyes. The female has the same elongated bill, but its head is buffy with brown eyes, and its body is brown. For the past 25 years, the continental population of canvasbacks has fluctuated around 580,000 individuals, with 25% of that population in the Pacific Flyway. San Francisco Bay estuary has historically supported the largest wintering numbers in the flyway.

Why are we concerned about this species? More than 60,000 canvasbacks were found in the estuary 30 years ago, but in the past decade, numbers have decreased to an average of less than 25,000 birds. Canvasbacks are diving ducks, which mean that they forage for their food underwater in bottom sediments. In the past, canvasbacks fed primarily on the starchy tubers of aquatic plants such as wild celery, eelgrass and sago found in estuaries, but with declining water quality, these plants were lost and clams are now their main food during the winter. In addition, canvasbacks are commonly found in open water habitats including artificial salt ponds. Recent conservation efforts in the estuary to restore artificial salt ponds and other open water habitats to tidal marsh for other species may severely decrease the acreage of habitats used by canvasbacks.

The greatest number of canvasbacks in the San Francisco Bay estuary is found in San Pablo Bay, including San Pablo Bay National Wildlife Refuge and Suisun Bay. However, since 1990, the clams in this northern area have been displaced by the invasion of a

non-native species known as the Asian clam (*Potamocorbula amurensis*). This clam has a large undigestible shell which canvasbacks consume with the mollusk but the shell is passed through their system whole and they obtain no energy from it. The Asian clam has also been found to have triple the concentration of contaminants, such as selenium, compared with other species. We are concerned with the status and health of canvasback populations so we initiated a research study in March of 1998 to examine the effects these changes have on diving ducks in the estuary. Our primary goal was not only to document contaminants accumulated by these ducks during the winter, but also to examine the effect of contaminants on survival and productivity of these migratory birds where they breed.

Most western canvasbacks migrate in March and April to breeding grounds widely dispersed throughout Alaska and western Canada, although the exact breeding distribution for western canvasbacks is not well known. We were faced with the daunting challenge of tracking this long distance migrant with a low nesting density from San Francisco Bay to its breeding area several thousand miles away. However, a natural wetland in the arid Great Basin ecosystem of Nevada provided us with a unique solution. Ruby Lake National Wildlife Refuge, located about 500 miles east of San Francisco Bay and 75 miles south of Elko, Nevada is recognized as one of the densest, southernmost breeding areas for canvasbacks west of the Mississippi River. Fortunately for us, previous marking studies by the refuge indicated that the majority of the canvasbacks from this wetland migrated to the San Francisco Bay estuary during the winter.



This spring at Ruby Lake, we are conducting nesting surveys to examine canvasback breeding success. Female canvasbacks typically occupy floating nests in water 6-24 inches deep, vegetated by bulrush and cattail. Their 1-2 inch deep nest platforms are constructed in bulrush, camouflaged by strands pulled over the bowl. Females lay one egg per day up to an average 8 egg clutch, and spend the rest of day foraging for food. The males leave the females after they start their 26-day incubation and congregate in larger ponds where they molt their feathers. During incubation, redhead ducks (*Aythya americanus*) lay their eggs in canvasback nests to be incubated and raised by the canvasbacks. This type of behavior is called parasitism and studies in the Minnedosa area of Canada, a major breeding area in the north, have shown that it occurs in as many as 85% of the canvasback nests. Our study this summer at Ruby Lake found that 90% of the canvasback nests have been parasitized by redheads and the largest number of redheads eggs found in one canvasback nest was eleven.

Canvasbacks must also avoid egg predators such as raccoons, skunks, foxes, and crows. The rough estimate for nest success for this summer is 62%, which is comparable to previous studies conducted at Ruby Lake. Once the ducklings hatch, the

females bring their broods to large ponds where they eat aquatic invertebrates. Females usually stay with the ducklings until they are almost ready to fly, but as many as 25% of the ducklings die before fledging in early August. The ducklings are dying as a result of predation by avian and mammalian predators and possibly largemouth bass, exposure when separated from hens, and severe weather.

This year, we plan to capture 60 female canvasbacks and implant them with radio transmitters with a 1-year life, so we may track the birds from Ruby Lake to their wintering areas on San Francisco Bay and back again. We hope to examine the distribution and movements of these radio-marked canvasbacks, determine their foraging areas and diet, and the bioaccumulation of contaminants on their wintering areas and its subsequent effect on their nesting success. With a little luck, we may find new information which improves our understanding of this species and provides a way to improve their populations across the seasons.

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