The 60th Report of the Colorado Bird Records Committee: A Report of Emperor Goose in Colorado

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[*Editor's note: Written by Larry Semo before he died, this report follows the precedent established for the Kelp Gull in the 43rd report (Semo 2007), discussing in depth a single exceptional bird record, and thus breaks from the standard format of a records committee report.*]

Introduction

On 4 October 2008, Tom Hall reported to the COBirds listserv that he had observed an Emperor Goose (*Chen canagica*) flying over Foster Reservoir, just east of Union Reservoir, in Weld County. No subsequent mention of the bird was reported to COBirds, but on 30 January 2009, Chris Haas, a coworker biologist at SWCA Environmental Consultants, told me that an acquaintance of his fiancée had shot an Emperor Goose in Prospect Valley near Hudson, Weld County, in late January. I asked Haas to provide some names to follow up on. Ironically, within a few days, I received an email from Mindy Hetrick of the U.S. Fish and Wildlife Service also notifying me about an Emperor Goose being shot near Hudson and wondering whether the Colorado Bird Records Committee (CBRC) would be interested in the record. Obviously, the committee was interested.

Doug Faulkner contacted Hetrick, who informed him that the goose was at a taxidermist's shop east of Barr Lake, Adams County. Faulkner contacted the taxidermist, Tim Wagner, who was more than happy to have us inspect the specimen. Faulkner and I met with Wagner on 5 February 2009 to inspect and take photographs of the bird (Figs. 1-2) in order to document this potential first state record and submit it to the full CBRC for review.

Besides identifying the species correctly, our main concern was establishing the origin of the bird, as a formerly captive bird would not be eligible for the official state list. We took numerous photographs of the specimen, which was already mounted but still drying, and inspected it for signs of captive origin. With the taxidermist's permission, we took the further step of plucking two undercovert feathers for stable isotope analysis, in an attempt to determine the geographic region in which the bird grew those feathers the previous summer.

In evaluating this report, the committee sought answers to four questions:

1. Is the bird an Emperor Goose?
2. Does the bird outwardly express any characteristics of captive origin?
3. How commonly are captive Emperor Geese kept in Colorado and elsewhere?
4. Where was the bird during the summer of 2008, when it molted its new flight feathers?

Status and distribution of Emperor Goose

Emperor Geese breed along the coasts of eastern Siberia and western Alaska and winter in the Aleutian Islands, the Alaska Penninsula, and on Kodiak and Afognak islands (Petersen et al. 1994). The species is a rare winter visitor along the Pacific Coast south of Alaska, and casual a short distance inland. It has been recorded multiple times in Hawaii, is accidental in Greenland, and has been found as a vagrant in Japan and on Midway Island (AOU 1998).

As of 2007, California had 83 accepted records of the species, mostly from coastal areas, but with up to seven records occurring inland within the Klamath Basin in the northeastern part of the state. Of the 83 records, the vast majority are from the winter period. A total of six records have been from October, with the earliest fall record being from 29 September (Hamilton et al. 2007).

Idaho is the only non-Pacific coast state or province that has accepted an Emperor Goose record as pertaining to a wild vagrant. That bird was shot by a hunter on 10 November 2000 (IBRC 2011).

Identification of the specimen

The bird was clearly an Emperor Goose, with no evidence of gene introgression from any other species. Figs. 1-2 show its distinctive features, including the short pinkish bill, immaculate white head and hindneck, silver-gray upperparts plumage barred with black, and white tail contrasting with dark uppertail coverts, all of which combine to eliminate similar species such as dark-morph Snow or Ross's Geese.

Signs of captive origin

To lawfully keep Emperor Geese in captivity, one must possess a Federal Migratory Bird Waterfowl Sale and Disposal Permit. Per the requirements of that permit, all live migratory waterfowl (including progeny) must be physically marked using one of the following methods:

- Removal of the hind toe (hallux) from the right foot;

- Pinioning of a wing by removing the metacarpal bones of one wing;
- Banding of one metatarsus with a seamless metal band; or
- Tattooing a readily discernible number or letter on the web of one foot.

We carefully inspected the mounted specimen for these permanent marks as well as other indicators such as abnormal feather wear or calloused feet as a result of walking often on concrete. Save for a moderate degree of wear on the tertial feathers, we found no obvious signs of those traits, and the bird appeared to have no other characteristics indicative of captive origin, at least in the recent past.

Emperor Geese in captivity

Rachel Hopper conducted research for the committee on the status of captive Emperor Geese in the country and found them to be quite common in captivity. She spoke to various zoological institutions that keep Emperor Geese, including the Denver Zoo, which has five Emperor Geese, all of which are banded, have a hallux removed, and are accounted for.

Hopper also contacted Scott Drieschman of Applied Conservation in Oregon, who manages many private aviaries. Drieschman suggested that Hopper contact Dr. Pepper Trail, the Senior Forensic Scientist at the U.S. Fish and Wildlife Service's Forensic Laboratory in Ashland, Oregon, for an opinion on whether the photographs to him looked to be of a wild bird. Dr. Trail indicated that he saw no indications of captive origin.

Stable isotope analysis

The use of intrinsic markers such as the stable isotope signature of feathers can provide useful information about the geographic origins of individual birds. Stable isotope analysis of feathers can reveal where those feathers were grown, and is especially useful for individuals dispersing or migrating long distances.

Stable isotope analyis makes use of the fact that chemical elements can exist in multiple forms of different atomic weights, called isotopes. These isotopes can be stable or unstable (radioactive). Naturally occurring stable isotope signatures—that is, the relative proportions of the different isotopes—vary geographically due to regional patterns in geology, the water cycle, the nitrogen cycle, and human activities. As individual birds grow new tissues using food from the environment around them, they incorporate the local isotopic signatures into those tissues. In the case of feathers, which are a form of inert tissue, no new isotopic assimilation occurs after the feather is grown. Thus, a feather forever

Fig. 1. Emperor Goose mounted at Tim Wagner Taxidermy, Brighton, Adams County, 5 February 2009.

Fig. 2. Head detail of the Emperor Goose mounted at Tim Wagner Taxidermy, Brighton, Adams County, 5 February 2009.

retains the isotopic signature of the geographic region in which it was produced.

To be able to tell whether the Emperor Goose had spent the summer in its native breeding range along the coast of the Bering Sea, we needed a set of isotopic signatures of Emperor Geese from that region to compare with the signature of the Colorado specimen. Hopper contacted Joel Schmutz, a Research Wildlife Biologist for the United States Geological Survey (USGS) in Anchorage, Alaska, an avian flu researcher who had taken feather samples from Emperor Geese across their range and analyzed the carbon, nitrogen, oxygen, and hydrogen isotopes within the feathers. Indicating that he saw nothing in the photographs that would suggest captive origin, Schmutz offered the results of his isotope analysis of birds from their native range as a standard against which to compare the isotopes of the Colorado bird.

Schmutz suggested that Hopper contact Craig Stricker of USGS in Lakewood, Colorado, to perform the analysis. Stricker agreed, and indicated that he would use Schmutz's results for comparison. Stricker said that he talked to Schmutz regarding the testing specifics so he could duplicate the procedure as closely as possible.

On 2 March 2009, Hopper and I met with Stricker at the Federal Center in Lakewood to pass the feathers off to him. Stricker noted that he would not be able to run the tests for three weeks as all hydrogen isotope test specimens must calibrate with ambient hydrogen levels within the lab.

Stricker analyzed only the hydrogen isotopes, as hydrogen is tied to the global water cycle. Water isotopes are a good biological tracer for the origin, condensation, and evaporation history of an air parcel, since lighter isotopes preferentially evaporate and heavier isotopes preferentially condense. In general, if the isotopic hydrogen signature of the Colorado bird compared well with the isotopic hydrogen signatures of the Alaska birds, it would quite easily indicate that the Colorado bird had spent the summer in the Northern Pacific region, and thus was of wild origin. If the isotopic signatures differed, it would only tell us that the goose was not in the Northern Pacific, where it should have been, during the molt period.

Between March and May 2009, Stricker analyzed three sections from the two different feathers. The hydrogen isotope values, measured as deuterium ratios, were -121, -125, and -120 per milliliter, with an average of -122 per milliliter. Schumutz's data from Yukon-Kuskokwim Emperors ranged from about -185 to -200 per milliliter. This indicates that the Colorado Emperor Goose stable isotopes fell well outside the range of birds from Alaska. According to Stricker, the average value of -122 suggests that the feathers were grown at a lower latitude, probably a latitude similar to that of Colorado, indicating that the bird had not

migrated from Alaska during at least the year prior to its collection in Colorado.

Why was the bird not on its breeding grounds during the summer when it molted its flight feathers in? If it was a natural vagrant to Colorado, it must have wandered here at some point prior to the summer of 2008 and then decided to stay for the entire year, which, as it was an uninjured free-flying bird, seems unlikely.

Results of CBRC deliberations

The CBRC voted conservatively to not accept this report as the first record of Emperor Goose for Colorado (2009-115; 1-6), largely due to the results of the isotope analysis. The specific identity of the bird was not questioned. Dissenting members were most concerned that the bird's flight feathers were grown at a lower latitude than Alaska, suggesting at least the possibility that the bird was not of wild origin.

The CBRC member in favor of the report noted that the isotope analysis was the only problematic evidence, and that everything else favored a wild, free-flying bird. Summer stays in Colorado have occurred for individuals of other Arctic-breeding species, such as Snow Goose (*Chen caerulescens*), and the Emperor Goose showed no evidence of captivity.

Even when an unusual species record is well documented, as is the case with this goose, legitimate questions often remain about its wild origin. Appropriately, conservative attitudes usually demand that wild status be demonstrated before a record is accepted. A conservative approach, however, while it serves to reduce error, may nevertheless misrepresent the actual status of this rarity.

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