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BARROW'S GOLDEN-EYE IN THE YELLOWSTONE NATIONAL PARK

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Records of the Barrow's Golden-eye (*Glaucionetta islandica*) in the Yellowstone, are very similar to what they have been elsewhere—largely neglected. Since this bird was both resident at all times, and abundant at least in summer, I can explain the neglect only by saying a Golden-eye, as usually seen in summer when the majority of scientists visited the Park, had few distinctive marks. It then passed as a small, unimportant black, or very dark brown, duck.

Knight (1902) mentions it as occurring in Wyoming but does not record it in the Yellowstone National Park. A year later, President Theodore Roosevelt just missed being the first to record Barrow's Golden-eye there. In his "Wilderness Reserves" he says that he noted ducks on the Gardiner River on April 8, 1903. On that date, only these Golden-eyes and Mallards were likely to have been there in numbers. As he does not particularly say "Mallards", it can be assumed that he saw other kinds, probably these Golden-eyes, or perhaps both Golden-eyes and Mallards.

My own reaction to the presence of Barrow's Golden-eyes has been similar—one of neglect and silence. I first actually saw them during an extensive trip on Yellowstone Lake in 1898; yet it was not until seventeen years later that I even mentioned their name in an article. And still five more years passed before I wrote out a description, and a few additional words, in 1920.

At the end of this article there is a bibliography of twenty-one titles, of every article that I can find mentioning the bird in Yellowstone Park at all. Most of them give but a few words each; and, aside from historical and bibliographical completeness, many can be neglected. Bent (1925), Sawyer (1928), and the present paper contain all the essential material published to date about Barrow's Golden-eyes in the Yellowstone.*

*An important article by Allan Brooks, in the Auk, 1920, pages 356-365, should also be consulted.

In the spring and early summer, it was easy to identify the drakes by the purple color of their heads and their white cheek crescents. But during most of the summer and the fall, and including all of what was known as the "Park season", the drakes then in eclipse plumage had few distinguishing marks, to say nothing of the decidedly unmarked females and young (even the young drakes did not assume breeding plumage until approximately sixteen months old). It was not until October (October 14 in 1922) that the adult males resumed distinctive plumage, although it developed rather rapidly after that.

Because descriptions of the topographical and climatic features that affect Yellowstone bird life have already been given in the WILSON BULLETIN for December, 1927, and September, 1928, they are not repeated here. But it will prove advantageous to bear in mind that the Transition, Canadian, and Hudsonian Zones cover large areas in Yellowstone Park, and that the first two are generously supplied with water—ponds, lakes, and rivers. Mr. Sawyer's paper (1928) deals with the Barrow's Golden-eyes at Ice Lake. While the present author has made many studies at Ice Lake, both earlier and later than he did, Mr. Sawyer has covered so well that locality, and the whole subject of courtship there, that repetition here is carefully avoided. Mr. Sawyer's valuable article should be read with this one in order to have a complete picture of the whole.

While I really thought that these Golden-eyes preferred the larger lakes and streams, I often found them on smaller bodies of water in all parts of the Park. But I saw so many far out from shore on Yellowstone Lake, and on the Yellowstone River just below the Lake, that I learned to look upon those two locations as more representative. Still, in spring, they frequented small ponds and the open water that first gathered at the edge of the ice of larger lakes; and in summer, I found them on virtually all the well known Park waters, even on beaver ponds. They usually preferred to remain on the water; but sometimes they climbed out on a boulder to preen or sun themselves, or lined up on a sand beach or gravel bar, almost in the breaking waves, for the same purpose. In winter, they stayed on the partially frozen reservoir near Mammoth Hot Springs, on the rapid water of the Yellowstone River, along the open Gardiner River, and on other waters kept open by hot spring and geyser water.

Usually these ducks were seen one or two at a time; or, in the proper season, a family party. But on one occasion, I noted a compact flock of a hundred individuals well out on Yellowstone Lake. When in pairs, it was the female that took alarm and flushed first. A

seeming exception to this rule was a pair on the Gardiner River on April 8, 1923, when the male flew away first. But this was no doubt due to the female being still under water, and not seeing me, when I suddenly revealed myself to the male.

Although Barrow's Golden-eyes were normally ducks of the lakes and other still waters, they were well able to negotiate the swift waters of rivers. In fact, they seemed to take delight in coasting down the rapids. While doing so, they frequently allowed themselves to be washed over "falls", dropping as much as three feet, and at the bottom even going temporarily out of sight in the foam and spray without showing the slightest concern. Sometimes, I thought they intentionally flew up the Gardiner for the purpose of coasting down. Still, as they came down, they fed; and food might have been the real reason of the floating trip. At times, during the descent, these birds took advantage of an eddy, or of quiet water behind a rock, to rest and preen. Even on the much larger Yellowstone River, I noted that these Golden-eyes actually seemed to favor the roughest water. Neither were they afraid of ice. On November 14, 1922, when the anchor ice was freely running in the Yellowstone River below Alum Creek, these ducks were the only ones among a dozen species to be dodging in and out, and diving under, the floating cakes.

As a rule the Barrow's Golden-eyes in Yellowstone Park became extraordinarily tame on waters close to main highways; they even appeared entirely unconcerned when the biggest autos along the Gardiner River went thundering past within a hundred feet. But even there they regarded with suspicion an auto *that stopped*. When I approached them too closely, either on foot or on horseback, they swam away, or disappeared down the rapids, instead of flushing as soon as the nearby Mallards did. But if they were forced to flush, they only flew a short distance, and soon came back again without apparent hesitation or fear.

I do not know that these Golden-eyes had any more curiosity than other ducks, but I have seen them come swimming across Swan Lake when they caught sight of me in the bushes on shore. And I once had a similar experience at Twin Ponds, near Junction Butte, and again on the Yellowstone River at the mouth of Alum Creek. In the first instance, there were a dozen Barrow's Golden-eyes scattered over the Lake; but there was only one pair at Twin Ponds. On the other hand, the mouth of Alum Creek was alive with many individuals of several species of water-birds.

I doubt if the Barrow's Golden-eyes ever sought the society of other waterfowl, but common interests and tastes brought other species near them. For instance, I have seen individual Coots, Mallards, Green-winged Teals, Mergansers, Buffleheads, Ruddy Ducks, Redheads, Canvasbacks, Bluebills, and White Pelicans in the neighborhood of Barrow's. Occasionally in winter, American Golden-eyes and Barrow's were accidentally near each other, but more often the two species kept entirely apart. I have seen both beavers and muskrats on the same pond with Barrow's Golden-eyes, but so far as I could see, each of the different species swam along about its own business, merely careful to avoid collision with any other individual.

Nesting in hollow trees as they did, the Barrow's Golden-eyes' eggs were comparatively safe from enemies. I did not observe that any of the hawks, owls, or eagles preyed on these Golden-eyes. But all the fur-bearing mammals, smaller than the wolf, hunted them more or less, with rather indifferent success, because these ducks usually kept well out of reach. However, on one occasion (December 3, 1922), I found the remains of a drake on the shore of Gardiner River. Some animal, probably a mink, had fed on the body, but I could not determine whether it had killed the bird, itself, or had found it already dead. Or, this might have been a wounded bird, as the place was only a mile or so from permissible shooting territory outside the Park.

As a rule, the flight of these ducks was low, not more than three to four feet high. When rising from the water, their progress seemed labored at first. If the air was calm, or the wind was light, they were often compelled to kick the water for the first twenty or thirty wing strokes. Sometimes, along the Gardiner River, where the average descent of the water surface, due to the rapids, was five degrees, or less, from the horizontal, I have seen them start up the river, finding the rising too difficult, and later strike the water a resounding splash when they fell back. But if they had a strong wind blowing down the river, they rose easily against it, and might then fly at a greater height, even as much as thirty or forty feet above the water. Once, when I was going up a narrow stream, with the wind blowing *up stream*, I suddenly found a half dozen Barrow's Golden-eyes before me. They dared not fly up into my face, they could not rise at all with the wind, and the canyon we were in was too narrow and high to fly out of sideways. So they were obliged to swim down past me, no doubt closer than they liked, and then flush behind me. On broad, open waters these ducks always flew up against the wind, if at all possible, and later swung around in the direction they wished to go. In such places,

they had much less difficulty in rising, probably because there was generally some wind. Apparently, even against a breeze, these Golden-eyes could not jump up as the Mallards so frequently did. But once under way, the flight of Barrow's Golden-eyes was swift, steady, and powerful, giving rise to a peculiar whistling sound that earned them the name of "Rocky Mountain Whistlers".

While the majority of these ducks that were in the Park during the summer migrated south when their home waters began to freeze, a few remained along the Yellowstone River, the Gardiner, and some other waters. The Yellowstone was large enough, and rapid enough, so that it always remained open in places. On the other hand, the Firehole, Gibbon, Madison, Snake, and Gardiner Rivers, being much smaller, would undoubtedly have frozen if it had not been for the large quantities of thermal water discharged into them.* It seemed very wonderful that there should be enough natural hot water to keep these streams open, for the rivers named remained clear of ice, even when the temperature was far below zero. When the temperature of the air fell to near the freezing point, vapor appeared above these waters. As the degree of cold increased, this vapor became denser and denser until it was really a heavy fog for a few feet above the water, at extremely low temperatures. So far as I know, this visible vapor did not affect the Barrow's Golden-eyes in any way, but the warmer water did undoubtedly increase the food—both vegetable and animal—over what would have been available otherwise. Minute vegetation flourished as luxuriantly all winter in the warmed water as it did in summer; and in places, insects actually persisted at all times close to the warm water!

Ordinarily, these Golden-eyes did not summer along the Gardiner; but they appeared there each autumn at the time the larger ponds and lakes closed over. In 1922, the first of the season came to the water supply reservoir at Mammoth Hot Springs on October 15, and on the Gardiner River a month later on November 11. Those that wintered along the Gardiner, 1920-1921, began leaving about February 25, or about the time that the first open water appeared along the edges of ponds and lakes—the waters supplied with spring water that was somewhat warmer than the snow then beginning to melt a little during the warmest part of the day, being the earliest to open. First to leave the Gardiner that year were the males, followed one by one by the

*The Gardiner River, for instance, was usually frozen in winter above the mouth of Boiling River, where the accumulated hot waters from Mammoth Hot Springs discharged themselves into it; but it was always open below.

females and immature, until the last one left on March 2. But a cold, freezing spell brought a female back on March 7; and others returned later until there were six drakes and five females on the approximately three miles of open river water, on March 12. Then they decreased in number again, gradually. By March 24, they were abundant at the outlet of Yellowstone Lake, forty miles away and a thousand feet higher in altitude, about 7700 feet above sea level. No doubt, some of the Golden-eyes gathering at the Lake outlet came from other wintering grounds, although they had all probably spent the winter within the Park, for all were very tame. A month later, during the last week in April, some much wilder birds arrived, indicating that the flight from more southern, unprotected waters, had begun.

Usually, Barrow's Golden-eyes fed by diving, even going far under the ice of partly closed ponds and streams, and later returning unerringly to the open portions when they wished to regain the air. While feeding on the bottom, these ducks kept their bodies comparatively motionless while their heads and necks swung from side to side below them in their search. At least once, I found a swimming female feeding along the Gardiner in shallow water by thrusting her head under; but on getting into deeper water, she stopped feeding, and did not attempt to "tip" as Mallards do.

These Golden-eyes bathed by rising in the water until almost standing on the surface, scooping the water up with bowed wings and throwing it forward and over them. After from five to fifteen of these "showers", they plunged head and neck under, shooting forward and shaking themselves at the same time so that a thin film of water ran over the shoulders and down the back. Generally, they preened while on the water, if not too rough, turning far over on one side or the other to get at those parts of their plumage that were ordinarily under water. In windy weather, or when the surface was rough, they gathered in protected bays and coves, or on smaller ponds and streams, to do their bathing and preening.

During the first part of the winter, the females along the Gardiner River outnumbered the drakes—three to one. While I did not learn where they came from, more and more drakes arrived as spring approached, and the two sexes gradually became more nearly equal. By the first of February there was a marked tendency to pair off, courtship beginning at this time and lasting until June in some cases. Almost all flocks were broken up by April, even on the ponds and small lakes where the birds now were. On waters other than Ice Lake, I found the courting differing in small particulars from the procedure

as given by Mr. Sawyer (1928). While the drakes always did most of the "chasing" and the "dancing", the females usually responded, often bobbing rapidly up and down so as to send a widening series of circular waves chasing each other across the water. Sometimes, I saw a male swim jerkily along, not necessarily toward the female, with an occasional extra effort raising his breast high above the water, and at the same time the bill pointing upward, and opening and shutting twice. Then the head was drawn far back until it rested on the lower back. After remaining there a moment, the head was returned to normal; and the drake that had been swimming forward all the time kicked backward and upward, a little spurt of water. Often a male pursued a female with *his* head and neck extended out in front just above the surface and parallel with it. Of course some of these variations may have been due to individualism as Mr. Sawyer also pointed out.

The breeding range of this species is usually given as the far north, without recognition of the extensive breeding range extending south along the Rocky Mountain backbone as far as Colorado. Although the fourth edition of the A. O. U. Check-List does not mention Wyoming at all, the Barrow's Golden-eye was actually the most abundant breeding duck, with the possible exception of the Mallard, in the Park.

Here the Barrow's Golden-eyes made their nests and laid from eight to twelve eggs in May, at the lowest elevations in the Transition Zone, as at Ice Lake at about 5700 feet altitude. But most of the resident Golden-eyes nested in the Canadian Zone, where the first eggs were laid in early June; and there were even a few sites in the Hudsonian Zone above 8500 feet elevation where eggs were still a little later. All nests that I found were in hollow trees, either standing on the shore, or within a hundred feet, of lakes, small natural ponds, beaver ponds, or streams. So far as I know, the females did all the brooding. After hatching, the mothers took entire care of the young while the males spent their time elsewhere, recovering from the molt. Some of the broods were large enough to fly by the end of July, as was the case at Twin Lakes, near Norris Geyser Basin. On the other hand, I once found a backward brood of partly grown ducklings following their mother across a backwater near Yellowstone Lake on August 8.

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While I have not named any article from it in the above list, there is an important mimeographed serial, issued by the National Park Service in Yellowstone Park, from six to twelve times a year, called the "Yellowstone Nature Notes". These Nature Notes contain many valuable references to all birds of the Park, but it is rather hard to refer to them, because it is quite difficult to locate a complete file.

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