The status of Velvet Scoter *Melanitta fusca* breeding in Georgia

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Abstract

The first ever survey of all seven potential breeding lakes for Velvet Scoter *Melanitta fusca fusca* in the Javakheti plateau region of southern Georgia found that nesting was confined to just one traditionally occupied site, at Lake Tabatskuri. Intensive observations revealed that *c.* 25–35 pairs were present at Lake Tabatskuri during mid-May to mid-June in 2017 and 2018, but substantially fewer pairs actually nested at the lake, and all that did so built nests on the only island in the lake. Hatching success (65% of eggs successfully hatched in 2017, 51% in 2018) was lower than in North American White-winged Scoter *M. f. deglandi* studies (67–92%) and fledging success was relatively poor (29% of hatched ducklings survived to fledging compared to 5–10% in North America and 30% in Finland), suggesting challenges to the long-term perpetuation of the population. More research is required to determine the direct causes of the scoters' poor reproductive success. Information from a questionnaire survey of local residents and observations made during the study suggested that interactions with Armenian Gulls *Larus armenicus* nesting on the islands, disturbance and removal of eggs by humans, and drowning of ducklings in active or abandoned fishing nets all contributed to poor overall reproductive success. Conservation actions to ameliorate some of these factors have already been initiated, but further research, monitoring and conservation is needed to safeguard for future generations this tiny disjunct population at its last location in Georgia, potentially in the entire region.

Key words: conservation, habitat use, hatching success, nesting success, Tabatskuri Lake.

The Velvet Scoter *Melanitta fusca* is considered to be decreasing worldwide and is classified as Vulnerable by IUCN (BirdLife International 2018). Two distinct populations are recognised within the Western Palearctic. Of these, the largest in numbers breeds across the boreal and montane regions of northern Europe and western Asia, more or less continuously from Norway to the Yenisey River in western Siberia, extending south to the upper reaches of the Ob and Irtysh River catchments in northeast Kazakhstan, and

winters mainly in north and northwest Europe (Cramp & Simmons 1977). This population is estimated to number 450,000 birds, of which perhaps 1,500 winter in the Black Sea and Caucasus region (BirdLife International 2018). However, a small, isolated population also breeds in eastern Turkey, Georgia and Armenia, wintering most probably in the Caspian and Black Sea areas, the precise numerical abundance and annual distribution of which remains unknown (Dagys 2016). Previous estimates suggested a breeding population of no more than 1,500 individuals in the mid 1990s in Georgia, Turkey and Armenia, but all indications suggest a rapid decline in recent years (Wetlands International 2018). It is the part of this small regional population which nests in Georgia that forms the subject of the current paper.

According to unpublished and published information, the breeding distribution of the Velvet Scoter in Georgia extended to the Saghamo, Paravani, Khanchali, Bughdasheni, Madatapa, Kartsakhi and Tabatskuri Lakes on the Javakheti plateau of southern Georgia in the 1960s and 1970s (Kutubidze 1985; Matcharashvili *et al.* 2004; Gavashelishvili *et al.* 2005, see Fig.1). Even as late as the early 2000s, Velvet Scoters were reported breeding at Khanchali, Bughdasheni and Madatapa Lakes on the Javakheti plateau, with 10–20 breeding pairs on Khanchali Lake and smaller numbers on Bughdasheni and Madatapa Lakes (Matcharashvili *et al.* 2004). BirdLife International (2004) reported 20–50 breeding pairs of Velvet Scoter in Georgia at that time. Velvet Scoter at all of these lakes have suffered direct habitat degradation through water abstraction to

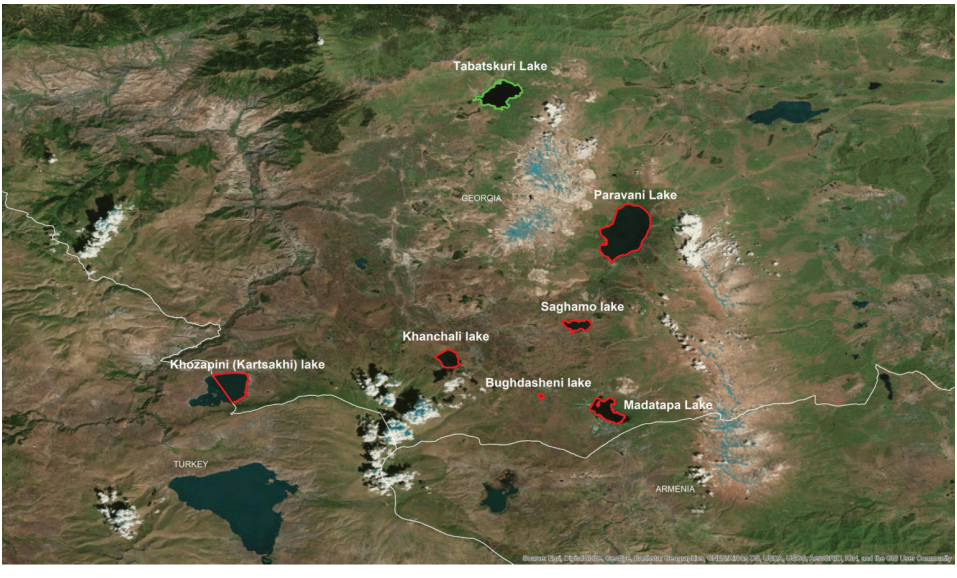

Figure 1. Map showing the extent of the known historical breeding range of the Velvet Scoter in Georgia, with sites surveyed in summer 2017 outlined in red and green (Lake Tabatskuri).

irrigate adjacent agriculture land (lowering water levels), as well as hay cutting on peninsulas and islands in the lakes which cause loss and disturbance to the nesting sites of this species (N. Paposhvili, pers. obs.). In addition, eutrophication (caused by agricultural intensification and waste water), overfishing and illegal hunting all impact on Velvet Scoter on their breeding lakes (N. Paposhvili, pers. obs.). For this reason, it was considered crucial that the current status and abundance of the species in Georgia be determined, and that the nature and levels of current environmental threats to the population be assessed. This paper reports the results of fieldwork carried out in 2017 and 2018 on these topics.

Methods and study area

In summer 2017, all lakes known to be within the historical breeding range of the Velvet Scoter on the volcanic Javakheti plateau in southern part of Georgia were visited and inspected (Fig. 1). The full extent of all of Saghamo, Paravani, Khanchali, Kartsakhi, Bughdasheni, Madatapa and Tabatskuri Lakes were surveyed from suitable vantage points by binoculars and telescope, noting the presence and positions of all waterbirds present. Because no Velvet Scoter were seen at any site away from Tabatskuri Lake, more intensive weekly surveys were conducted at this site in from 31 May to 18 October 2017. The following year, less frequent surveys were made, at 10 day intervals, from 15 April to 15 May 2018 and thereafter at *c.* 3 week intervals until 10 August 2018.

Tabatskuri Lake (41°39'N, 43°38'E) is located at 2,000 m above sea level, has a surface area of 14.2 km^2, a maximum depth of 43 m (average depth = 15 m) and retains a transparent, clean water column. The area experiences cold winters with snow cover extending to 150 days. Mean daily temperatures are –8°C in January and 12°C in July. The small island (1 ha) in the northern part of the lake is now the only natural breeding place for Velvet Scoter in Georgia. The whole lake was survey using telescopes and binoculars from fixed points overlooking the entire lake, with the number of males, females and broods/ducklings present being counted on each date. Three observers walking closely abreast intensively searched the island (especially under bushes and in grass) for nests in both years in late July, after the main hatching period, to count the numbers of hatched and addled eggs in each nest. Although some nests could have been missed, this seems unlikely given the general ease of locating nests without intensive searches.

Following the bird counts, observers attempted to determine how the Velvet Scoter used different sectors of the lake and what the main threats to the species might be. This was undertaken by conducting continuous diurnal monitoring during some study days, to map the movement of Velvet Scoters throughout the lake, including any communication or interactions between them and other species of birds, and the reactions of Velvet Scoters to other species of birds and to fishing boats which came close to them.

Finally, a questionnaire survey was conducted with fishermen and hunters from five local villages to identify the threats affecting Velvet Scoters at Tabatskuri Lake

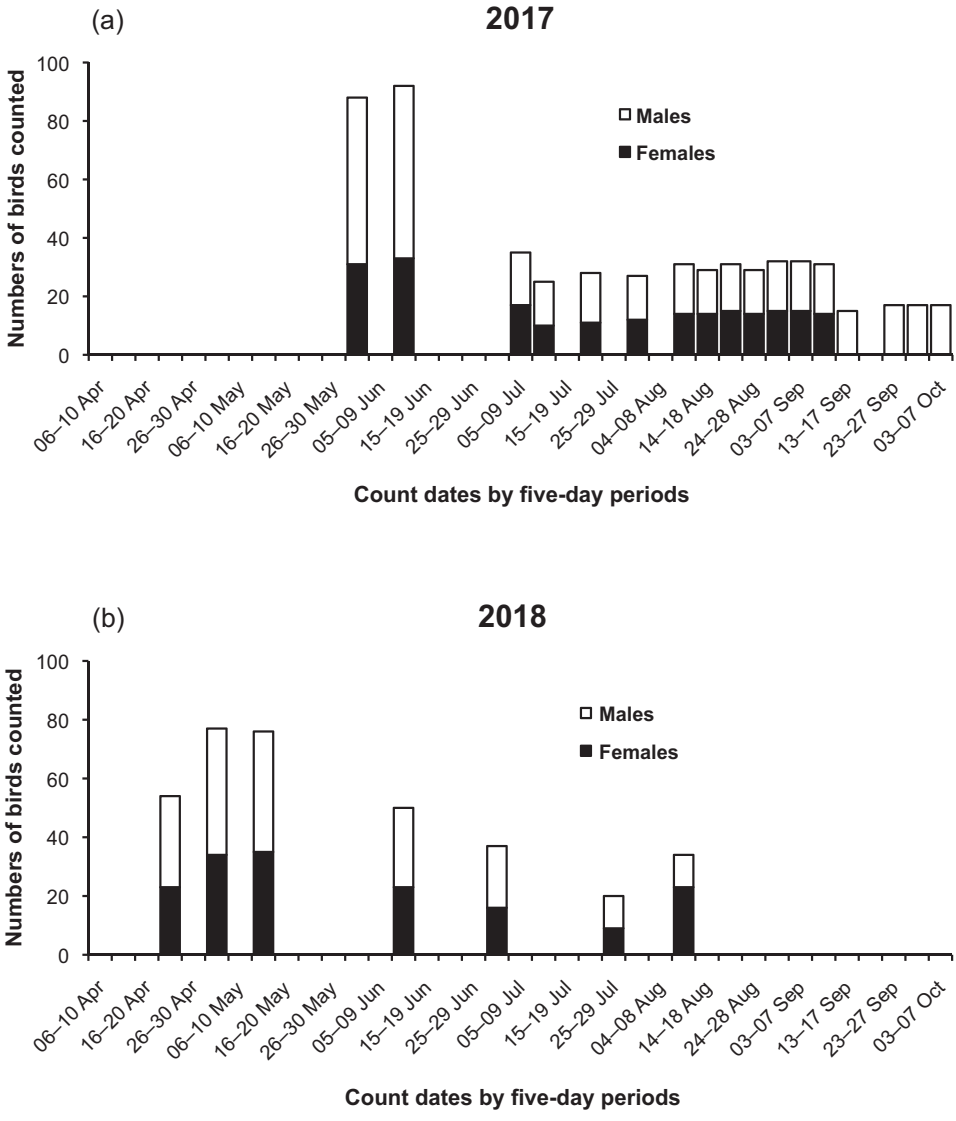

Figure 2. Numbers of male and female Velvet Scoter counted on Tabatskuri Lake, Georgia during regular counts made through the breeding season in (a) 2017, and (b) 2018.

and determine their level of knowledge about the local duck population (9 women and 26 men). We asked whether: 1) there was hunting/fishing on the lake, 2) people collect bird eggs on the island, 3) they had seen or heard of ducks being trapped in fishing nets, 4) they had seen Velvet Scoter on the lake (when shown a photograph),

and 5) they knew that Velvet Scoter breeds only on the lake and nowhere else in Georgia.

Results

After extensive searches of the seven plateau lakes (Saghamo, Paravani, Khanchali, Kartsakhi, Bughdasheni, Madatapa and Tabatskuri), Velvet Scoter were detected only at Tabatskuri Lake. No scoters were seen at any other lakes.

Counts made at Tabatskuri Lake in 2017 on 31 May and 10 June located 88 and 92 Velvet Scoters, with sex ratios of 1 female to 1.84 and 1.79 males, respectively (Fig. 2a). Subsequent weekly counts located a total of 25–32 birds from 5 July to 10 September 2017 and during this period, the sex ratio ranged from 1.06 (5 July) to 1.55 (22 July), but with a mean of 1.21 males per female, *i.e.* a little over parity for most of the breeding season. In 2018, the earliest count on 15 April preceded the first arrivals, but 54 were present on 25 April peaking at 77 on 5 May (Fig. 2b). There was no obvious peak with a surfeit of males in late May/early June as had occurred in 2017, but the sex ratio remained at an average of 1.25 (range = 1.17–1.35) males: females.

Table 1 shows clutch size and hatching success in both years. In 2017, a total of 48 eggs were found in six nests, of which 17 failed to hatch, a hatching rate of 64.6%. Unfortunately, it was not possible to determine duckling survival rates from individual broods, but the 31 hatched eggs gave rise to nine fully fledged young, which assuming all nests to have been found amounts to a 29.0% fledging rate, or 18.8% success rate from 48 eggs originally laid. In 2018, 191 eggs were found in 20 active nests, of which 94 failed to hatch, a hatching rate of 50.7%. There were 34 ducklings in six broods on 10 August 2018, but there was not time to assess how many of these birds survived to fledge in this year.

Crude mapping of the use of the lake by the Velvet Scoters, based on the birds' location and movements recorded during 2017, is illustrated in Fig. 3. More than 75% of the lake was never used by the ducks, with the northern sector around the island used most intensively by nesting pairs and brood-rearing females. The extreme northeast corner was used by birds during moult.

The questionnaire revealed that all 35 respondents reported that hunting and fishing occurred on the lake, with 20 (57%) reporting that people collected bird eggs on the island and 25 (71%) knew of ducks/ducklings being drowned in fishing nets. Most surprisingly, only 12 (34%) respondents recognised Velvet Scoters when shown a photograph and none was aware that the species only occurred on "their" lake in Georgia.

Discussion

The regular observation made in 2017 found that no more than 6–15 pairs of Velvet Scoter settled to breed on Tabatskuri Lake in that year, despite 25–35 pairs being at the site in mid-June (Fig. 2a). It seems likely that the high numbers present at the beginning of the season could be indicative of high nesting failure rate, potentially caused by a combination of competition with the gulls, their destruction of nests and locals collecting eggs on the island.

Table 1. Brood size and hatching success for all Velvet Scoter nests found at Tabatskuri Lake, Georgia in summer 2017 and 2018. Note that it was not possible to determine fledging success of individual nests, but nine ducklings ultimately fledged at the site from a minimum of 31 hatched eggs in 2017. In 2018, three active nests with sitting females on 10 August were not visited for fear of disturbing incubation (nest codes: 4/2018, 8/2018 and 17/2018).

Nest code	Clutch size	Hatched
1/2017	10	8
2/2017	8	5
3/2017	8	4
4/2017	7	4
5/2017	7	5
6/2017	8	5
Total in 2017	**48**	**31 (65%)**
1/2018	7	5
2/2018	3	0
3/2018	8	6
5/2018	9	7
6/2018	11	8
7/2018	15	8
9/2018	8	7
10/2018	7	0
11/2018	9	9
12/2018	10	9
13/2018	12	0
14/2018	13	0
15/2018	16	0
16/2018	9	7
18/2018	9	8
19/2018	11	9
20/2018	8	7
21/2018	9	0
22/2018	10	7
23/2018	7	0
Total in 2018	**191**	**97 (51%)**

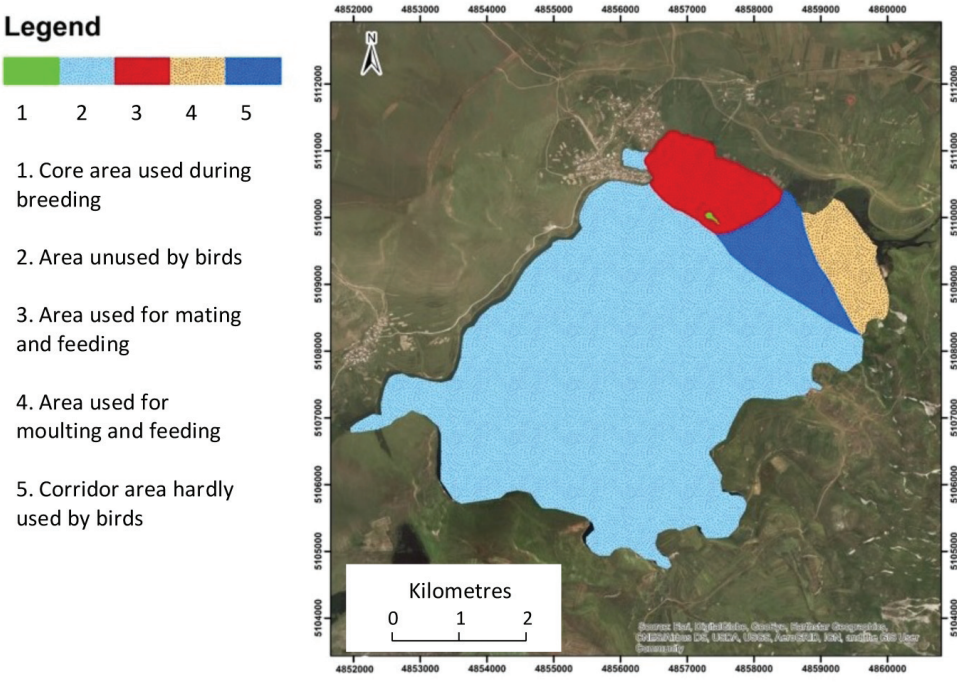

Figure 3. Map of Tabatskuri Lake showing for the five main areas of the lake their differential use by Velvet Scoters during different periods of the summer. The scoters were not seen in the light blue areas during the surveys.

However, it is also possible that these birds were staging on Tabatskuri Lake before continuing onwards to nearby breeding areas in Turkey. Some 30–35 pairs returned in late April/early May 2018, after the lake started to melt in early April. Early season numbers did not peak so markedly in 2018, but birds seemed to disperse away from the site more rapidly towards the end of June (Fig. 2b). Nesting only occurred on the one island in Tabatskuri Lake. The six nests inspected post-hatching in August 2017 had reasonably high success (64.6% of eggs having hatched), but this was lower than the 67–92% reported by Brown & Brown (1981) and 72–89% by Traylor *et al.* (2004) from North American studies of White-winged Scoter *M. f. deglandi*. Fledging success was low (29.0%; perhaps as a result of predation, ducklings drowning in fishing nets or local lack of food), resulting in low reproductive success overall (18.8% of eggs leading to fledged birds). This was similar to the 30% fledging success estimated in Finland where birds were subjected to considerable human disturbance (Mikola *et al.* 1994), but higher than in North America (5–10%, Traylor & Alisauskas 2006), where gull predation played a major part in duckling loss in both studies. It remains a mystery why the females should depart in early September, as they did in

2017, with males remaining until early October at Tabatskuri Lake.

Velvet Scoters only used the northern 25% of the lake, being mostly confined to the northwest corner during the breeding period and the northeast corner during moult. More research is needed to understand whether these patterns relate to lack of disturbance in these areas, food supply or a combination of factors and how these could be managed to improve conditions for the birds.

Although the number of questionnaires was rather limited and the sample of respondents may be biased, the results reflected observations made unsystematically during the study. It seems likely that disturbance and nest destruction from local people collecting gull and duck eggs on the island for food contributes to Velvet Scoter nest failure, especially because nesting appears completely confined to the one island in the lake. Additionally, Armenian Gulls *Larus armenicus*, which breed in a large colony on the island, were seen attacking and displacing Velvet Scoters from the island. There were surprisingly many respondents who knew of ducks being drowned in fishing nets and it is evident that fishermen abandon old, damaged fishing nets in the water, representing a major threat to diving species. This would be in addition to the accidental by-catch of scoters associated with active fishing nets, although in interviews fishermen considered this to be a rare occurrence.

Information brochures and posters have been circulated to local communities around Tabatskuri Lake giving information about the status of Velvet Scoter, the factors that threaten their future survival and how local people can contribute to reducing these threats. All classes in local schools have had lectures and received information, notebooks and pens with Velvet Scoter logos. Children also took part in field trips to see and identify the species and participate in bird counts.

Tabatskuri Lake is part of the Ktsia-Tabatskuri Managed Reserve, an IUCN Category 4 Protected Area, designated for protection by the Georgian Government in 1995. Although the lake is located within a protected area, before this study the rangers responsible for protecting the site did not control the lake strictly, because they were unaware of the existence of Velvet Scoters. During the project, representatives of the protected areas were informed them about the tiny disjunct population of Velvet Scoter and, as a result, local rangers have been encouraged to enhance their current monitoring activities, restrict illegal hunting and try to reduce the magnitude of current threats to Velvet Scoter. Since then, the impact of human disturbance on birds has decreased (N. Paposhvili, pers. obs.), but this has seemingly promoted the growth of the Armenian Gull colony (N. Paposhvili, pers. obs.), which has potentially had adverse effects on breeding Velvet Scoter. Fishermen continue to fish in close proximity to the island which increases the risks of Velvet Scoter drowning in nets. Hence, the long-term survival of this tiny population of Velvet Scoter remains at risk and needs greater investment in long-term surveys and active conservation to safeguard its future. This is especially important, because I visited four lakes in Turkey

(Aktaş (Khozapini) 41°13'N, 43°13'E; Çildir 41°03'N, 43°14'E; Aygir 40°46'N, 43°00'E and Kuyucuk 40°44'N, 43°27'E) during mid-August 2018 where BirdLife International have recorded breeding Velvet Scoter in historical times, without finding a single bird. A contact who has annually visited one of these, Aktaş (Khozapini) Lake, during late June/early July since 2012 confirmed that he has never seen Velvet Scoter in all this time at this site (Ortac Onmus, pers. comm.). This suggests that the Caucasian population of Velvet Scoter is in far more trouble than was previously thought. Indeed, it is possible that Tabatskuri Lake is the last breeding place for the species in the entire region.

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(a)

(b)

(c)

(d)

Photographs: Velvet Scoter breeding season, showing (a) female on the nest, (b) hatchlings, (c) clutch successfully hatched, and (d) female with brood on Tabatskuri Lake, by Nika Paposhvili.