

# Bird communities at two marshes in Øvre Forra, today and 40 years ago

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*Abstract.* In the protected area Øvre Forra in Central Norway, birds were surveyed at two marshes in two succeeding years at the beginning of the 1970s. By following the same survey procedure 40 years later in these unchanged marsh habitats, I sought changes in the breeding bird community. While the total number of waders seems to have been quite stable, the abundance of some of the involved species might have changed during this period of time. Due to low numbers, and annual variations, the implications for some of the involved species have to be taken cautiously. The most abundant species in Øvre Forra is now the Common Redshank *Tringa totanus*. This species has outnumbered the earlier most abundant species in this bird community, the Meadow Pipit *Anthus pratensis*. The numbers of the Meadow Pipit, Northern Lapwing *Vanellus vanellus*, European Golden Plover *Pluvialis apricaria* and Common Sandpiper *Actitis hypoleucos* all tend to be lower than for 40 years ago. The Common Gull *Larus canus* and two *Tringa* species, the Common Redshank *T. totanus* and Common Greenshank *T. nebularia*, seem to have increased in numbers, while the situation for the Common Snipe *Gallinago gallinago* and the Whimbrel *Numenius phaeopus* appears to be stable. The Ruff *Calidris pugnax* used to be a characteristic species on the Øvre Forra's bogs in the 1970s, but has since vanished. Altogether, the study shows an apparently quite stable avifauna over the time span of 40 years in this environmentally stable reserve.

**Key words:** Marshes; bird densities; long-term population changes

## INTRODUCTION

Many ornithological publications have documented changes in terrestrial bird populations over the last decades. However, very few Fennoscandian surveys have been conducted continuously since the 1960/1970s; exceptions being the work at Ammarnäs in southern Swedish Lapland (cf. Enemar et al. 2004, Svensson & Andersson 2013) and in Budalen in central Norway (Hogstad 2005, Thingstad et al. 2015). An alternative approach is to repeat surveys carried out some decades ago using standardized methods. Changes in the actual bird community can then be sought by following the same procedure in the same survey plots some decades later (e.g. Ławicki et al. 2011, Byrkjedal & Kålås 2012, Hardeng 2014, Grund 2014).

Many European long-distance migrants, among those many waders, have declined significantly since the 1960s (Tucker & Heath 1994, Birdlife International 2004, Zwarts et al. 2010), for some species attributable to the drought period in the African Sahel region that started at the beginning of the 1970s and lasted for more than two decades (e.g. Peach et al. 1991, Foppen & Reijnen 1996, Zwartz et al. 2010). A large-scale annual bird population monitoring project, the Norwegian Extensive monitoring of terrestrial birds initiated in 1996 (Kålås et al. 2014), started too late

to register declines going back to before the 1990s. To get an idea about possible population changes during longer time-spans the alternative, which involves repeating published standardized past ornithological surveys closely today, can be used. By combining the result from a sufficient number of such studies one can look for long-term changes that otherwise can remain unnoticed even for species that are dispersed and in low abundance. The result from such an approach is given here, using ornithological surveys from two marshes in Øvre Forra in Central Norway in 1971 and 1972 (Moksnes 1977) as a reference material.

## STUDY AREA AND METHODS

The survey area was within the Norwegian nature reserve and Ramsar site Øvre Forra in the Levanger, Verdal, Meråker and Stjørdal municipalities, Nord-Trøndelag (Figure 1). The actual plots were laid out and monitored by Moksnes in the early 1970s (Moksnes 1971, 1973, 1977). Identified from details on the original map (small creeks and pools in the bogs were used as references) the exactly same plots could be surveyed 40 years later (Thingstad 2012).

The two surveyed plots (I and II in Figure 1) included ombrotrophic bogs with string fens and open

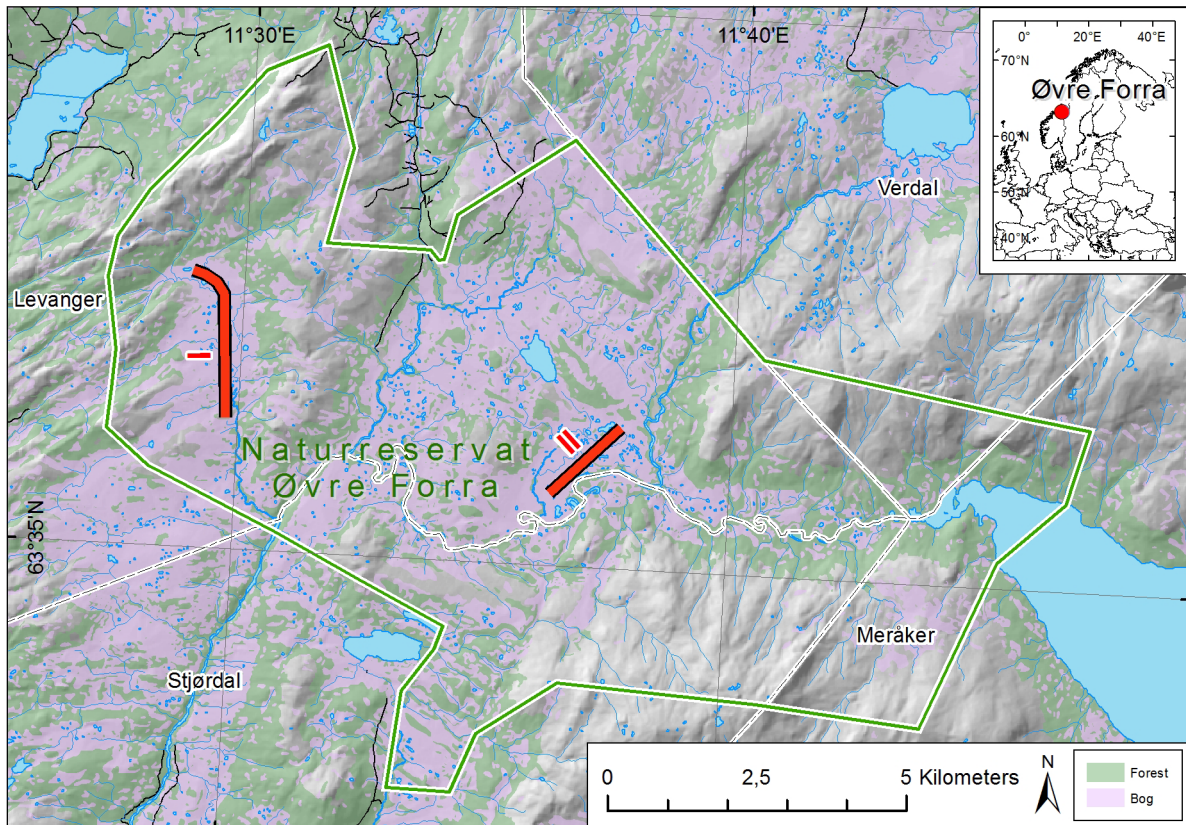


Figure 1. Map showing the reserve Øvre Forra with the two surveyed bog plots: I = Leinsslettene, II = Skillingsmyrin. Drawn after Moksnes (1977).

waters and flat fens with smaller, richer parts, and were 400–450 m a.s.l. Plot I at Leinsslettene was 3000 x 200 m and plot II at Skillingsmyrin 1700 x 200 m, thus totally covering 0.94 km<sup>2</sup>. There were no apparent changes in the physical habitat features of these boggy areas over the intervening four decades (Figure 2). While all of the Skillingsmyrin plot was on an open bog (alternating between small ponds, ombrotrophic bog and poor fen), some birch trees (*Betula* sp.) and willow scrub (*Salix* sp.) grew along the border of the Leinsslettene plot, which consists of small ponds, open pool and intermediate fen with small plots of damp *Calluna* heath (Moen et al. 1976) (Figure 3).

Although Svensson (1978) claimed that three censuses per year should be sufficient to monitor the territories of the “easy inventory species” on bogs, and five for the “middle easy inventory species”, we used, as Moksnes (1977) did, the standard 10-census procedure of the “mapping method”. This was essential to achieve comparable datasets. Furthermore, it reduced the risk of overseeing the more cryptic wader species, as well as allowing us to estimate numbers of passerine territories using the standard procedure for the mapping method. The surveys were conducted from the last days of May to late June, after snowmelt, in accordance with international recommendations for the standardized territory mapping method (10 censuses, mainly in early morning dispersed over some time

to cover the different phases of the breeding season, cf. Bibby et al. 1992). As the individual territories (a cluster consisting of at least three records) for the involved waders may be large in relation to the surface cover of the surveyed area, some territories were not completely within the plots. In addition, the shape of the plots causes some substantial edge effects due to their restricted width. Accordingly, “border territories” were recorded as the fraction ( $\frac{1}{4}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$ ) of the cluster that fell within the surveyed area. Only individuals with territorial behaviour were recorded. However, also nests or nesting birds discovered within the plots were registered as territories (e.g. the criteria used for the Common Gull *Larus canus*). In some cases, as for the polygynous and lek-performing Great Snipe *Gallinago media* and Ruff *Calidris pugnax*, the mapping method is not very suitable, and the former birds within “fixed” day resting places, might have been incorrectly judged as territorial in 2011. With regard to the Ruff, only distracting females or a nest discovery were used as criteria (Arne Moksnes pers. medd.).

Due to few registered territories of the involved species (Table 1), few statistically significant differences between the two survey periods can be expected. Number of mapped territories was compared between the dyads (1971 + 1972 vs. 2011 + 2012) for the most numerous species, using chi-square tests (Fowler & Cohen 1990).



Figure 2. Skillingsmyrin as this area appeared at the beginning of the 1970s (upper picture) and in 2012 (lower picture), seen above from Færsvola in the south. The survey plot Skillingsmyrin (cf. Figure 1) goes right across the central parts of this bog. Photo: Per Gustav Thingstad.

## RESULTS

A comparison of the total registered territories in the beginning of the 1970s with those from the beginning of the 2010s, shows evidence of few changes (Table 1). Altogether 16 species were recorded with breeding territories and, while five of these were passerines and one a gull, no less than 10 were waders. The most common species were Meadow Pipit *Anthus pratensis*, Common Redshank *Tringa totanus*, European Golden Plover *Pluvialis apricaria* and Whimbrel *Numenius*

*phaeopus*, but only the two first mentioned were represented with more than 10 territories in any one year. Variation between years was tested for these two species, but the tests gave no statistically significant results (Meadow Pipit:  $\chi^2 = 3.467$ ,  $df = 3$ ,  $0.5 > p > 0.25$ ; Common Redshank:  $\chi^2 = 1.270$ ,  $df = 3$ ;  $0.75 > p > 0.50$ ).

In 11 of the species the differences between years within dyads surmounted (or equalled) the difference between the dyads. Two species recorded in 1971 and 1972, Ruff and Northern Lapwing *Vanellus vanellus*,



Figure 3. The upper part of the surveyed plot at Leinsslettene (cf. Figure 1). Photo: Per Gustav Thingstad.

did not occur in 2011 or 2012, while two species not recorded in 1971 or 1972, Great Snipe and Wood Sandpiper *Tringa glareola*, occurred in 2011 or 2012.

The category 'other species' (Table 1) includes two territories (nests) of Fieldfare *Turdus pilaris* found in 1971; in 2011 and 2012 also some other passerines

associated with the surrounding forest habitats (Bluethroat *Luscinia svecica*, Common Redstart *Phoenicurus phoenicurus*, Redwing *Turdus iliacus*, Song Thrush *Turdus philomelos* and Hooded Crow *Corvus cornix*), and further a nesting Willow Grouse *Lagopus lagopus*, a Mallard *Anas platyrhynchos*

Table 1. Number of territories of the 16 most abundant bird species in the surveyed plots in 1971, 1972 (Moksnes 1977) and 2011, 2012. The waders and then the passerines are listed according to their total abundance over the four years.

Species	1971	1972	2011	2012
Common Redshank <i>Tringa totanus</i>	7.50	8.50	12.00	13.25
European Golden Plover <i>Pluvialis apricaria</i>	9.00	7.00	6.50	4.75
Whimbrel <i>Numenius phaeopus</i>	3.50	4.50	2.50	5.50
Common Snipe <i>Gallinago gallinago</i>	4.50	3.50	1.75	6.00
Common Greenshank <i>Tringa nebularia</i>	0.00	1.00	3.00	1.00
Ruff <i>Calidris pugnax</i>	3.00	2.00	0.00	0.00
Common Sandpiper <i>Actitis hypoleucos</i>	2.00	1.00	1.00	0.50
Northern Lapwing <i>Vanellus vanellus</i>	2.00	1.50	0.00	0.00
Great Snipe <i>Gallinago media</i>	0.00	0.00	2.00	0.00
Wood Sandpiper <i>Tringa glareola</i>	0.00	0.00	0.00	0.50
Common Gull <i>Larus canus</i>	0.00	1.00	4.00	4.50
Meadow Pipit <i>Anthus pratensis</i>	17.50	10.50	6.50	6.75
Common Reed Bunting <i>Emberiza schoeniclus</i>	3.50	4.00	2.00	0.50
Willow Warbler <i>Phylloscopus trochilus</i>	4.00	0.50	1.25	0.50
Yellow Wagtail <i>Motacilla flava</i>	1.50	0.00	1.00	3.00
Brambling <i>Fringilla montifringilla</i>	0.00	1.50	1.00	1.00
Other species	2.00	0.00	2.75	5.25
Total number of territories	60.00	46.50	47.25	53.00
Territories of waders	31.50	29.00	28.75	31.50

territory and some fractions of a Red-throated Diver *Gavia stellata* and a Common Crane *Grus grus* territory.

## DISCUSSION

The composition of the avifauna in the study plots shows striking similarity between the two dyads, both in species composition and in the numerical representation of a predominance of the species. The study does not reveal any significant population changes over the forty years between the dyads. This might primarily be attributable to the overall low sample size for most of the species involved. Partly because of this, variation within the dyads can also easily exceed the difference between the dyads. Such turned out to be the case even in the more numerous Meadow Pipit, indicating a substantial annual fluctuation of this species in the studied area. However, the mean number of registered territories of this pipit is today only half of what it was 40 years ago.

Surveys of breeding wader fauna on bogs rarely result in huge amounts of data, as their territories are very dispersed and large. As such, even large changes in population sizes might be recorded as insignificant within small monitoring areas. Accordingly, our barely one km<sup>2</sup> surveyed bog areas included too few territories of less dominant species that one could expect to detect significant population changes. The only approach to detect population changes for such dispersed and low-numbered species is to compare their trends over a longer period from a sufficient number of locations.

In Øvre Forra the total numbers of territorial waders have varied remarkably little since the 1970s, however, some of the involved species might indicate changes. The Common Redshank and the Common Greenshank *Tringa nebularia* both tended towards an increase since the 1970s. From the nearby mountain wetlands at Ånnsjön in Sweden, the Common Redshank is reported to be the most numerous wader (Holmberg 2012), and from the large-scale monitoring of breeding waders in the boreal and arctic regions of Fennoscandia since 2002 the species has shown significant positive trends (Lindström et al. 2015). Overall, population trends seem to be stable in the Common Greenshank yet slightly declining in the Common Redshank (Birdlife International 2015, Wetlands International 2015). Where population decreases are reported, habitat changes are often assumed to be the main cause, as for the lowland populations of the Common Redshank. There is no apparent change in the breeding habitat in the Øvre Forra reserve during the 40-year period of my study.

In contrast to the southern populations of the European Golden Plover that has declined, Fennoscandian populations are considered stable (Wetlands International 2006, Ottwall et al. 2009,

Väisänen et al. 2011, Grund 2014, Green & Lindström 2015, Lindström et al. 2015), or even locally increasing (Svensson & Andersson 2013), although the quality of data is poor (Wetlands International 2015). The long-term status for the Norwegian populations is unknown, and the negative tendencies seen in Øvre Forra and at Hardangervidda (Byrkjedal & Kålås 2012) are too small for conclusion.

In spite of considerable recent decline in the Common Snipe *Gallinago gallinago* at the boreal and arctic breeding grounds in northern Fennoscandia (Lindström et al. 2015) and an apparent overall decline in Whimbrel (Henriksen & Hilmo 2015), no decline was indicated at Øvre Forra for these species. Recently a significant decline is reported for the Common Snipe at the boreal and arctic breeding grounds in northern Fennoscandia (Lindström et al. 2015).

During the whole survey period, Great Snipe, still listed as near threatened NT by the most recent Norwegian Red List (Henriksen & Hilmo 2015), displayed on a medium-sized lek near the Leinsslettene survey plot, yet only in one year (2011) were the criteria for territorial birds within this plot fulfilled (see method). According to Østnes & Kroglund (2010), two Great Snipe leks in these parts of Øvre Forra have been known for more than 40 years, and numbers attending have been stable.

Very few pairs of the Common Sandpiper *Actitis hypoleucos* occurred within the survey plots and thus the observed lower numbers might only be coincidental. According to Wetlands International (2015), the West and Central European populations have declined between 1998 and 2008, although the quality of the information is poor. In Norway the species had a stable population for the period 1996–2013 (Kålås et al. 2014), while Husby & Stueflotten (2009) found a decline in the period 1995–2008. In Sweden a significant decline is reported for the period 1975–2014, and a modest, insignificant decline for the period 1998–2014 (Green & Lindström 2015).

The disappearance of the Ruff and the Northern Lapwing from the Øvre Forra area is in accordance with the global decrease in these species (Birdlife International 2015), a decrease found for both species also in Fennoscandia (Väisänen et al. 2011, Svensson & Andersson 2013, Grund 2014, Heggøy & Øyen 2014, Østnes & Kroglund 2014). Both are listed in the new Norwegian Red List (Henriksen & Hilmo 2015) as endangered (EN). In Nord-Trøndelag, the Ruff was a quite common breeder in the 1970s and 1980s, but has since disappeared from most of its traditional lekking areas, even where the habitat quality has remained unchanged (Østnes & Kroglund 2014). At Holmtjønna in Øvre Forra, a maximum of 23 lekking males was registered by 1968 (Moksnes 1971), whereas the last single male was seen in 2000 (Thingstad 2012). In the important wetland area nearby in Sweden, Annsjön, the

Ruff has shown the same negative trend since the middle of the 1990s, although there have been indication lately of some increase (Holmberg 2012).

The present low number of Meadow Pipit on the Øvre Forra's bogs may indicate a decrease, yet the numbers are inconclusive. A decrease in Meadow Pipit numbers was registered on Hardangervidda between 1980 and 2010/11 (Byrkjedal & Kålås 2012), and it has shown a negative trend during the last 40 years at two bogs in Aurskog-Høland (Hardeng 2014). At Ammarnäs in Swedish Lapland, Svensson & Andersson (2013) registered a decrease since the early 2000s up to 2010 and the species is now at a low at the marshes of Dalarna (Grund 2014).

The observed possible decline in the Common Reed Bunting *Emberiza schoeniclus* is consistent with the 30-year trend for the Swedish populations (Ottvall et al. 2009), but Svensson & Andersson (2013) suggested that habitat deterioration in southern Sweden might be the main cause of the Swedish decline. From some surveyed marshes in Dalarna the Common Reed Bunting population seemed to be at the same level in 2012 as it was in 1977–79 (Grund 2014). In Norway the Common Reed Bunting is now listed as near threatened (NT) in the new Red List (Henriksen & Hilmo 2015).

The study area was environmentally stable during the 40-year study period with no apparent changes to the habitat conditions on the breeding grounds. All things considered, the avifauna has also remained noteworthy unaltered over this period. This prevailing stability makes the reserve the more valuable as a breeding bird resort, especially for waders, which make up a prominent part of the species composition.

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